11TH ANNUAL

MCMASTER MEDICAL STUDENT RESEARCH DAY

October 14, 2020

VIRTUAL CONFERENCE

OMSA Ontario Medical Students Association

AÉMO Association des étudiant·e·s de médecine de l'Ontario

MMSC McMaster Medical Student Council

MUMJ A PEER-REVIEWED, STUDENT-RUN PUBLICATION

Table of Contents

Click for Zoom Session Links

Schedule of Events

10:00am - 10:15am	Welcome Remarks and Overview of Event
10:15am - 11:15am	**Seven Minute Thesis Oral Presentations**
11:15am - 11:25am	*Exercise Break*
11:25am- 12:05pm	**GROUP A: Poster Presentations** **GROUP B: Lunch/Networking** **PREP@Mac (Session A)**
12:05pm -12:10pm	Transition Time
12:10pm - 12:40pm	**Keynote Speaker: Dr. Anand**
12:40pm -12:45pm	*Transition Time*
12:45pm - 1:25pm	**GROUP A: Lunch/Networking** **GROUP B: Poster Presentations** **PREP@Mac (Session B)**
1:25pm - 2:05 pm	**Three Minute Thesis Oral Presentations**
2:05pm - 2:15pm	*Yoga Break*
2:15pm - 2:30pm	Awards Presentation & Closing Remarks
2:30pm - 2:55pm	Networking

Acknowledgements

Keynote Speaker

Dr. Sonia Anand

Judges

Dr. Kevin Woodward
Dr. Elizabeth McCready
Dr. Michael Rheaume
Dr. Conor Bell
Dr. Anna Mathew
Dr. Dorothy Bakker
Dr. Alim Pardhan
Dr. Marianne Talman
Dr. Bruno Losier
Dr. Sebastien Prat
Dr. Jeffrey Pernica
Dr. Heather Waters
Dr. Zubin Punthakee
Dr. Natalia McInnes
Dr. Ally PH Prebtani
Dr. Katherine Zukotynski
Dr. Savitoj Khehra
Dr. Jason Profetto
Dr. Fiona Kouyoumdjian
Dr. Irene Turpie
Dr. Andrea Hunter
Dr. Diana R Ahmed
Dr. Elizabeth Shaw
Dr. Agnes Chmiel
Dr. Victor Lo
Dr. Keyna Bracken
Dr. Zahira Khalid
Dr. Brian Haynes
Dr. Rae Brager
Dr. Sharon Marr
Dr. Fiona Smaill
Dr. Peter Rosenbaum
Dr. Olaf Kraus De Camargo
Dr. Mary Zachos
Dr. Adam Fleming
Dr. Mihir Bhatt
Dr. Melissa Parker
Dr. Daniel Cordovani
Dr. Manoela Braga
Dr. David Price
Dr. Sebastien Prat

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Mary Boulos & Parnian Pardis (MMSRD Co-Charis)
Daniel Borins (Sponsorship Chair), Pranali Raval (Judging Chair), Gurinder Sandhu (Logistics Chair), Naman Arora (Outreach Chair), Yujin Suk (Scientific Chair)

Faculty Support

Dr. M. Constantine Samaan (Director, Research & Scholarships, Michael G. DeGroote School of Medicine)
Mike Weir (Program Coordinator), Naznin Alam (Administrative Assistant)

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Cynthia Chan
Reid Rubinsky
Ali Eshaghpour
Avinash Pandey
Jeremy Biro
Yu Fei Ma
Ravinder Sandhu
Jamie Zhen

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Claire Fine
Noam Raiter
Eugene Wang

Sponsorship

Iva Okaj

Judging

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Grace Martin
Xinxin Tang
Shannon Gui

Outreach

Claire Lee
Christopher Povolo
Michelle Schneeweiss
Angelica Rivas

Event Sponsorship & Thanks

Undergraduate MD Office, McMaster Medical Student Council, McMaster Undergraduate Medical Journal, Ontario Medical Student Association

MMSRD History

Welcome to the 11th Annual McMaster Medical Student Research Day (MMSRD)! MMSRD was first founded in 2010 by Alex Kaplan (MD Class of 2012) with the goal of highlighting the importance of research in bridging the **bench-to-bedside gap**. By providing a platform for interdisciplinary dialogue, critical appraisal and networking, MMSRD became an avenue to promote educational values that extended beyond the classroom, encouraging participants and attendees to harness both the **scientific method** and **creative thinking** to solve medical issues in all domains of health care.

MMSRD has now grown in scope and capacity, building upon previous years of experience led by the following medical student co-chairs: Alex Kaplan and Fareeha Qayyum (2010/11), Calvin Yeh and Stephanie Kletke (2011/12), Branavan Manoranjan and Zamin Ladha (2012/13), Ilana Hanes and Derek Chan (2013/14), Rebecca Rodin and Emerson Marinas (2014/15), Roman Reznikov and Isabel Kim (2015/16), Karishma Manji and Marina Wang (2016/17), Aadil Bharwani and Jennifer Asselstine (2017/18), Ali Zhang and Charlotte McEwen (2018/19) and Mary Boulos and Parnian Pardis (2019/2020).

The MMSRD committee is proud to showcase student accomplishments in all areas of research, including the **basic sciences**, **clinical research**, **medical education**, **population health**, and **health policy**. Moving into the next decade of MMSRD, we hope this conference will continue to grow and provide important opportunities for medical education about research, dialogue about new methods of research, and opportunities for interaction between medical students and the research community.

Welcome from the Co-Chairs

Dear students, Faculty and community members,

We welcome you to the 11th annual McMaster Medical Student Research Day (MMSRD), which provides an opportunity for McMaster University's MD and MD/PhD students to showcase their accomplishments within, and contributions to, research and academia. The 2020 MMSRD committee is proud to have created an exciting program filled with inspiring presentations, including one from our keynote speaker, Dr. Sonia Anand.

While our scientific program features both poster and oral presentations, we have replaced the traditional oral presentations with three- and seven-minute theses (3MT, 7MT) this year. In particular, this year's conference will showcase eleven 3MT and six 7MT presentations in total. An overwhelming amount of excellent abstract submissions were made this year, and our scientific committee had the difficult task of selecting these fourteen speakers from this pool of excellent candidates. Poster and oral presentations are divided into the following categories: Basic and Experimental Sciences, Clinical and Epidemiological Studies, Health Services and Quality Improvement, and Health Design and Innovation. **These categories reflect the diversity and strength of research undertaken by students at McMaster. The program committee is also pleased to note that it has continued to achieve gender parity for oral presentations this year.**

This year, we faced logistical challenges given the global covid-19 pandemic, and have transitioned to an online platform as a result. In an attempt to create an engaging day for students and faculty alike, we modified the schedule accordingly to enhance the experience of all attendees. Both poster and oral presenters will receive an overall score from judges, and presenters with the highest scores will receive an award from the MMSRD committee. All presenters will continue to have the opportunity to present their work, as well as answer questions and receive feedback from judges and conference attendees. Our continued commitment to our PrEP program will also provide undergraduate students within the McMaster community to learn further from the experiences of undergraduate medical students at McMaster University.

We would like to express our appreciation towards several individuals without whom this event could not be successful. First, we thank our sponsors, McMaster Medical Student Council, McMaster University Medical Journal, and the Ontario Medical Association for their invaluable funding and support. We would also like to thank Dr. Constantine Samaan, Mike Weir and Naznin Alam for their continued assistance with planning the MMSRD. Finally, we thank our entire MMSRD 2020 committee chairs and members for the hours they have contributed to planning this event. We thank you all for taking the time to be involved with the 2020 MMSRD.
We are extremely impressed by the quality of research and are thrilled to provide this platform to showcase it. We hope that you discover unique insights from a breadth of perspectives, and form ties that strengthen our ever-growing community.

Sincerely,

Parnian Pardis
MD Student
Class of 2022

Mary Boulos
MD Student
Class of 2022

Premedical Research Engagement Program (PREP)

Panels & Panelists

Panel A: The Journey to Medicine - How We Got Here

Panelists:
Laura Fallico, Andrew McLean, Naman Arora

Moderators:
Angelica Rivas
Claire Lee

Panel B: It Will All Be Alright - How to Get Past Set-Backs

Panelists:
Ian Burns, Devyani Bakshi, Natalie Chartrand

Moderators:
Michelle Schneewiess
Chris Povolo

Mentors

Samuel Tsai
Vivian Au
Megan Lam
Muralie Vignarajah
Vithushan Surendran
Jacqueline Slomovic
Tri Dinh
Claire Lee
Sherry Cui
Daniel Lazzam
Michelle Biehl

Namita Sharma
Preksha Rathod
Claire Fine
Maaz Shanjer
Cynthia Chan
Victoria Forcina
Rachel Heo
April (YiChen) Liu
Sebastian Dowhanik
George Hu
Paul Spill
Rahul Jayachandiran

Yuan Qiu
Devika Singh
Leah Nairn
Jamie Zhen
Shayne Friedman
Iva Okaj
Maya Amar
Grace Martin
Amrik Randhawa
Randi Mao
Morgan Glass
Ravinder Sandhu

Keynote Speaker

Dr. Sonia Anand is a Professor of Medicine and Epidemiology at McMaster University, and a Senior Scientist at the Population Health Research Institute. She is also a vascular medicine specialist at Hamilton Health Sciences and McMaster University. Dr. Anand holds the Canada Research Chair in Ethnic Diversity and Cardiovascular Disease and theHeart and Stroke Foundation of Ontario/Michael G. DeGroote Chair in Population HealthResearch. Her present research focuses upon the environmental and genetic determinants of vascular disease in populations of varying ancestral origin, women and cardiovascular disease.

Dr. Anand received a Doctor of Medicine from McMaster in 1992, Internal Medicine Training at McMaster and a Fellowship of the Royal College of Physicians and Surgeons ofCanada in 1996. She further received her Master's in Clinical Epidemiology at McMaster in 1996 and Ph.D. in Health Research Methodology at McMaster in 2002. Her current research includes leading cohort studies including two birth cohorts - one among SouthAsian women of the greater Toronto area and the second among Indigenous women from the Six Nations Reserve. Further she is a co-PI of the Canadian Alliance of Health Hearts and Minds cohort study funded by the Canadian Partnership Against Cancer and Heart andStroke Foundation of Canada. Her work is widely published amongst academic journals, and in 2019 she was inducted as a Fellow to the Canadian Academy of Health Sciences.

Oral Presentations Schedule

7 Minute Thesis Oral Presentations

10:15am - 11:15am

Mary Thompson
Kyle Gouveia
Megan Lam
Uamseh Sivanesan
Daniel Rosenberg

3 Minute Thesis Oral Presentations

1:25pm - 2:05pm

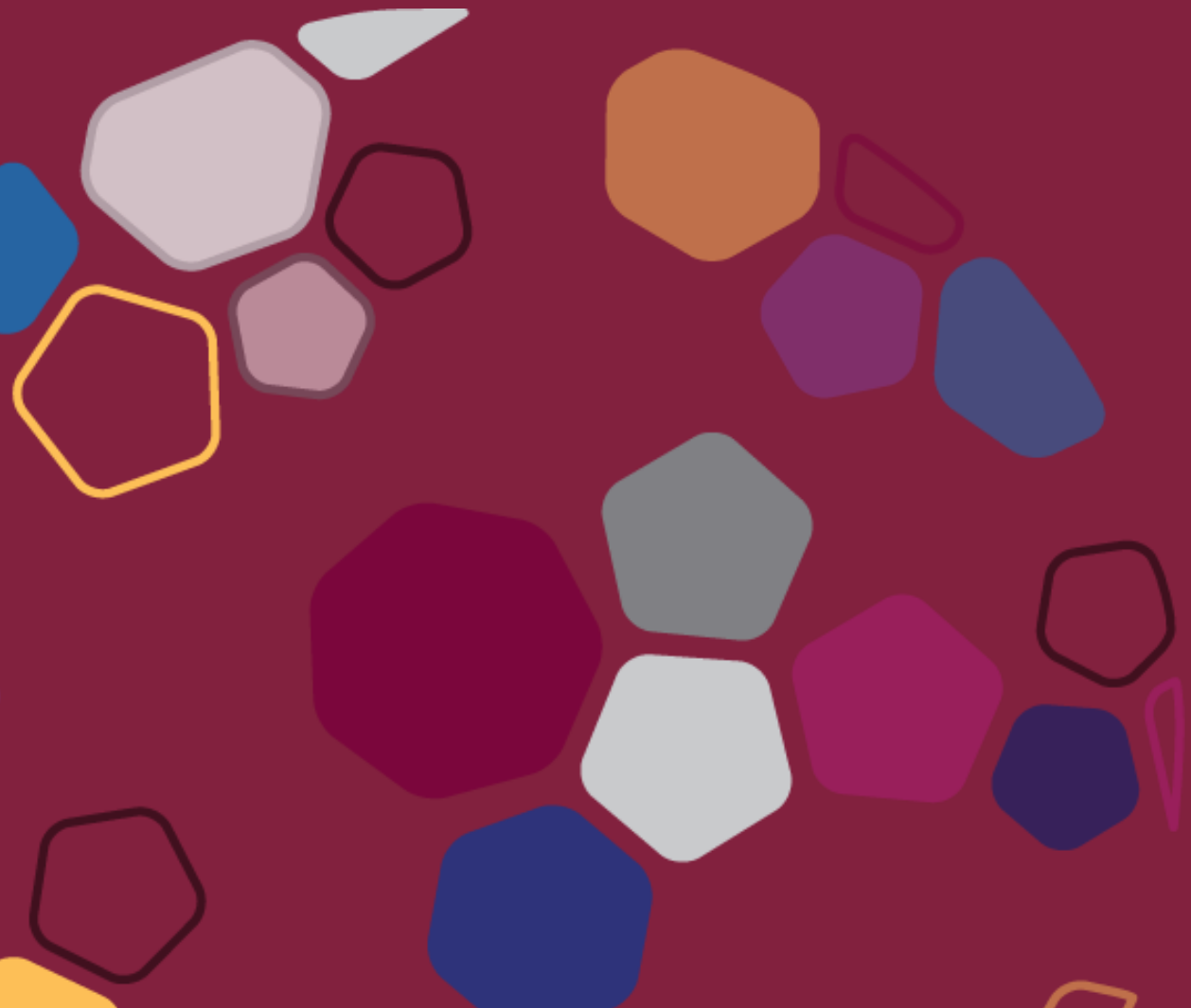
Group A

Bianca MacLean
Chloe Wong
Shayne Friedman
Justin Lu
April Liu
Grace Martin

Group B

Puru Panchal
Alysha Laviolette
Jasmyn Cunningham
Katherine Fuller
Maaz Shanjer

Full Abstracts
Oral Presentations



7 Minute Oral Presentations

Authors: Mary Thompson(1), Shirley HJ Mei(2), Dianna Wolfe(1), Josée Champagne(1), Dean Fergusson(1), Duncan J Stewart(2), Katrina J Sullivan(1), Emily Doxtator(1), Manoj Lalu(3), Shane W English(1), John Granton(4), Brian Hutton(1), John Marshall(5), Alies Maybee(6), Keith R Walley(7), Brent Winston(8), Lauralyn McIntyre(1)

Cell Therapy with Mesenchymal Stromal Cells Continues to Appear Safe: An Updated Systematic Review and Meta-Analysis

Introduction: Characterization of the mesenchymal stromal cell (MSC) safety profile is important as this novel therapy continues to be evaluated in clinical trials for various inflammatory conditions. Due to an increase in published randomized controlled trials (RCTs) from 2012-2019, we performed an updated systematic review to further characterize the MSC safety profile.
Methods: MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials and Web of Science (to May 2018) were searched. Prospective RCTs that compared intravascular delivery of MSCs to controls in adult populations were included. Our primary safety outcomes were pre-specified adverse events which were grouped according to: (1) immediate, (2) infection, (3) thrombotic/embolic, and (4) longer-term events (mortality, malignancy). Adverse events were pooled and meta-analyzed by fitting inverse-variance binary random effects models. Primary and secondary clinical efficacy endpoints were summarized descriptively.
Results: 7473 citations were reviewed and 55 RCTs met inclusion criteria. A total of 2696 patients from several clinical populations were included. MSCs as compared to controls were associated with an increased risk of fever (Relative Risk (RR) = 2·48, 95% Confidence Interval (CI) = 1·27-4·86; I2 = 0%), but not non-fever acute infusional toxicity, infection, thrombotic/embolic events, or malignancy (RR = 1·16, 0·99, 1·14, 0·93; 95% CI = 0·70-1·91, 0·81-1·21, 0·67-1·95, 0·60-1·45; I2 = 0%, 0%, 0%, 0%). The risk of death was significantly reduced in the MSC as compared to control group (RR = 0.78; 95% CI = 0.65-0.94; I2 = 0%). Safety reporting has improved since 2012 as many more authors reported an a priori plan to monitor for safety (78.2% versus 37.5%, post- versus pre-2012, respectively) and none of the trials were ended pre-maturely due to safety concerns.
Conclusion: MSC therapy continues to exhibit a favourable safety profile. However, future trials should continue to strengthen study rigor, reporting of MSC characterization and functionality, and adverse events.

7 Minute Oral Presentations

Authors: *Kyle Gouveia (1), Syed K. Abidi (2), Saif Shamshoon (3), Chetan Gohal (4), Kim Madden (4), Ryan Degen (5), Timothy Leroux (6), Bashar Alolabi (4), and Moin Khan (4)

Arthroscopic Bankart Repair with Remplissage in Comparison to Bone Block Augmentation for Anterior Shoulder Instability with Bipolar Bone Loss:A Systematic Review and Meta-Analysis

Background: Recurrent anterior shoulder instability with bipolar bone loss often requires surgical intervention, which is controversial in the setting of subcritical bone loss. Two common options include procedures that involve bone block augmentation of the glenoid as well as the arthroscopic Bankart repair with remplissage (BR).
Objective: The objectives of this study were to compare the post-operative rates of recurrent instability, as well as functional outcomes and complication rates between these two interventions as well as determine the effects of pre-operative glenoid bone loss on treatment success.
Methods: EMBASE, PubMed, and MEDLINE were searched from database inception until June 2019 for articles examining either bone block augmentation to the glenoid or Bankart repair with remplissage in the setting of subcritical glenoid bone loss. Search and data extraction were performed by two reviewers independently and in duplicate. A separate analysis was done for comparative studies.
Results: Overall, 145 studies were identified, including four directly comparing the Latarjet to BR. Across all studies, post-operative rates of recurrent instability were 4.9% (345/7010) for bone block augmentation and 6.7% (65/974) for BR. Subgroup analysis identified an increased failure rate in patients undergoing BR (10.9%) when compared to the Latarjet (5.0%) for studies reporting pre-operative mean glenoid bone loss of 10-15%.The overall complication rates for the bone block and BR groups were 6.6% and 0.3% respectively. Lastly, pooled analysis of the four comparative studies found no significant difference in risk for post-operative recurrence (RD, 0.02; 95% CI = -0.04 to 0.08; P = 0.31; I2 = 17%).
Conclusion: Both BR and bone block augmentation are effective treatment options for recurrent anterior shoulder instability in appropriately selected patients. Both have comparable functional outcomes, albeit bone block procedures carry an increased risk of complications. However, when glenoid bone loss ranges from 10-15%, BR may be associated with a higher failure rate. As such, soft tissue repair may be best suited for glenoid bone loss <10% however large adequately powered trials are required to inform clinical practice.

7 Minute Oral Presentations

Authors: Sama Anvari (1,2,3), Yung Lee (1,2,3), *Megan Lam (1), Jorge A. Wong (4,5), Dennis Hong (2), Aristithes G. Doumouras (2,3)

Effect of bariatric surgery on natriuretic peptide levels: a systematic review and meta-analysis

Background: The effect of bariatric surgery on natriuretic peptide levels in patients with obesity is unclear. The purpose of this study was to conduct a systematic review and meta-analysis to determine the effect of bariatric surgery on BNP and NT-proBNP levels.

Methods: MEDLINE, EMBASE, and Cochrane Central Register of Controlled Trials (CENTRAL) were searched to February 2020. Primary outcomes included change in NT-proBNP or BNP levels following bariatric surgery and change in weight and body mass index (BMI). Secondary outcomes included change in blood pressure, echocardiographic findings, and heart failure symptoms. MINORS tool was used to assess quality of evidence.

Results: Twelve studies with 622 patients were included. Most patients underwent Roux-en-Y gastric bypass (RYGB) (70.5%). Mean absolute reduction in BMI was 23%. NT-proBNP levels increased significantly from baseline at 6 months (mean difference (MD) 53.67 pg/mL; 95% CI, 28.72-78.61; P = <0.001, I2 = 99%; 8 studies) and 12 months (MD 51.16 pg/mL; 95% CI, 20.46-81.86; P = 0.001, I2 = 99%; 8 studies) post-bariatric surgery. BNP levels also increased significantly at 6 months (MD 17.57 pg/mL; 95% CI, 7.62-27.51; P <0.001, I2 = 95%; 4 studies). Systolic and diastolic blood pressure decreased significantly 12 months after surgery. Studies measuring echocardiographic findings saw improvement in LV mass and E/A ratio, but no significant change in ejection fraction.

Conclusion: Bariatric surgery is associated with increased natriuretic peptide levels in the absence of deteriorating cardiac function, and may be associated with improved cardiac and metabolic function after the procedure.

7 Minute Oral Presentations

Authors: *Umaseh Sivanesan(1), Luis H. Braga(1), Ranil R. Sonnadara(1,2), Kiret Dhindsa(1,2)

Image synthesis for unsupervised medical image segmentation: from edge diagrams to segmentation maps

Abstract: Medical imaging segmentation (localization of organs/lesions) is challenging but necessary for clinical decision-making. Deep learning segmentation networks are ideal for automatic segmentation, but these networks are supervised (require many labelled image-segmentation pairs). Some researchers use generative adversarial networks (GANs) to produce new pairs, but GANs are also supervised. Alternatively, unsupervised networks are effective for non-medical images, but without human guidance, they focus on unimportant features in noisy medical images. We propose a novel unsupervised method of using GANs to produce synthetic image-segmentation pairs to feed into segmentation networks, evaluated using a clinical dataset of prenatal renal ultrasounds and an online skin lesion segmentation competition.First, we used basic edge detection to turn medical images into edge diagrams comprising simple shapes, and we trained a GAN to convert these back into medical images. Then we generated anatomically feasible but otherwise random edge diagrams with known segmentations and used the GAN to produce synthetic medical images. The synthetic image-segmentation pairs were used to train segmentation networks, and these networks were compared to other unsupervised approaches and to supervised segmentation networks using metrics like mean Jaccard index and Dice coefficient (for both metrics, higher is better).On skin lesions, our Jaccard was 0.753, compared to 0.440 for an unsupervised competitor and 0.852 for the best supervised approach. On renal ultrasounds, our unsupervised approach had a mean Dice of 0.81 (SD 0.09), compared to 0.46 (0.10) for the next best unsupervised approach (erroneously segmented ultrasound cone, not kidney), and 0.91 (0.09) for a supervised approach. Furthermore, by adding in just 20% of the labelled data, our approach reached 0.90 (0.09).Our approach, without any human-labelled data, outperformed other unsupervised approaches and performed reasonably compared to supervised approaches. We plan to extend our approach to 3D imaging and more complex biological structures.

7 Minute Oral Presentations

Authors: *Daniel Rosenberg (1), Jacqueline Slomovic(1), Deven Deonarain(2), Forough Farrokhyar(2, 3), Varun Chaudhary(2, 4)

Association between Health Literacy and Adherence to anti-VEGF Treatment for Patients with Neovascular AMD at the Hamilton Regional Eye Institute – Interim Analysis

Introduction: Macular degeneration (AMD) is a leading cause of blindness and often requires frequent clinic visits for ocular injection of anti-vascular endothelial growth factor (anti-VEGF) medication. Poor adherence to regular anti-VEGF treatment is common. Prior research demonstrates an association between poor clinical attendance and suboptimal health literacy, defined by the Public Health Agency of Canada as a person's ability to "access, comprehend, evaluate, and communicate information as a way to promote, maintain, and improve health." Our study aims to compare anti-VEGF treatment adherence in patients with adequate and suboptimal health literacy.

Methods: This cross-sectional study used the validated Newest Vital Sign (NVS) questionnaire to determine health literacy of 63 patients who attended the Hamilton Regional Eye Institute for anti-VEGF treatment between February 6th to March 12th 2020. Patients >50 years receiving anti-VEGF treatment for AMD for greater than 24 months were included. Patients receiving anti-VEGF injections for other diseases were excluded. Retrospective chart review was conducted to assess adherence to scheduled treatment visits for 24-months prior to recruitment.

Results: Of 63 patients (48% female, median age 82), 51(81%) demonstrated suboptimal health literacy level. Of 12 patients with adequate health literacy, 1(8%) experienced ≥1 episode of therapy break-off, defined as a missed treatment followed by absence of at least 30 days. Of 51 patients with suboptimal health literacy, 8(16%) experienced ≥1 therapy break-off. There was no difference in therapy break-off frequency between patients with adequate and suboptimal health literacy (OR=2.05, 95%CI[0.23,18.1], p=0.52). Ongoing analyses are underway to determine demographic predictors of health literacy and their associations with poor anti-VEGF compliance.

Conclusions: Compliance to anti-VEGF therapy for neovascular AMD did not differ significantly between patients with adequate and suboptimal health literacy. However, the proportion of participants with limited health literacy was high. Further investigations are needed to determine whether patient-appropriate educational interventions might enhance the health literacy of this patient population.

3 Minute Oral Presentations

Authors: Bianca McLean*(1), Shabbir Alibhai (2), Fay Strohschein(3), Naser AlQurini (4), Anson Li (5), Caroline Mariano(6), Rajin Mehta(7), Johanne Monette (3), Doreen Wan-Chow-Wah(3), Aria Wills (8) Martine Put (8)

Clinical and Cost Effectiveness of a Comprehensive Geriatric Assessment and Management for Canadian Elders with Cancer: The 5C Study - Final Recruitment and Implementation

Background/Purpose:
Geriatric assessment and management is recommended for older adults with cancer considering chemotherapy, but no definitive randomized controlled trial (RCT) has been completed in Canada. Our objective is to report on the successes and challenges faced in implementation of the multicentre 5C trial.

Methods:
Patients aged 70+ with cancer and referred for chemotherapy are recruited and randomized (single blind, outcome assessor). Patients randomized to intervention receive a comprehensive geriatric assessment and management for 6 months. Outcomes such as quality of life and cost effectiveness are measured via monthly validated questionnaires and health care cost diaries.

Results:
Recruitment started April 2018 in 2/8 centres. All sites have completed recruiting. Three hundred fifty one participants have been recruited and 111 (32% of target) have completed the study. Approximately 10% of follow-ups are missed each month due to participant illness, difficulty contacting the participant, or other reasons.
Recruitment success ranges from 20% to 76%. Larger, more research-intensive hospitals are recruiting more patients in total (70% of total participants are from one centre). However, recruitment success does not seem to correlate with hospital size. Participant dropout for reasons other than death has been very low (n=16, 5%)

Discussion:
The implementation of this multicentre RCT across 3 provinces in 2 languages has taken at least 50% longer than projected. Recruitment was delayed due to the differing timelines in opening recruitment at the different hospitals and the lower than anticipated recruitment success at several centres.

Conclusions:
Site-specific adaptations, regular communication among teams, minor protocol modifications and a person-centered approach in participant interactions have promoted recruitment and retention of participants. Recruitment is expected to be completed within the next few months and data collection will finish one year later

3 Minute Oral Presentations

Authors: Aneesh Karir (1), Chloe R. Wong (2), Minh NQ Huynh (3)

Primary repair of pediatric flexor tendons: a systematic review of the literature

Background: Literature on pediatric flexor tendon repairs remains sparse. Given different repair techniques and rehabilitation protocols available, the goal of this systematic review is to investigate the outcomes of primary pediatric flexor tendon repairs.

Methods: Searches of MEDLINE, Embase, PubMed, and Cochrane Central Register of Controlled Trials databases was performed from inception to June 2018 in concordance with PRISMA guidelines. Studies were included if patients were under the age of 18, sustained a flexor tendon injury repaired primarily, and had documented functional outcomes. Titles, abstracts, and full texts were screened. Demographics, injury characteristics, repair technique, rehabilitation protocol, functional assessment, and complications were recorded.Quality assessment was completed using the Newcastle-Ottawa Scale. The study was registered with PROSPERO (CRD42018089089).

Results: Of the 596 articles identified, 180 underwent full text review, and 16 met inclusion criteria. There were 387 patients with 445 injured digits, most frequently injured by a laceration from glass. The number of tendon injuries in zones I, II, III, IV, and V were 54, 294, 19, 2, and 19, respectively. In total, 390 FDP, 226 FDS, and 47 FPL tendons were lacerated. Concurrent digital nerve injuries occurred in 169 digits. Time of repair ranged from 15 hours to 23 days post-injury, most commonly via the modified Kessler (n= 197 digits). Post-operatively, 88 patients were immobilized and 219 patients underwent early active (n=96) or passive (n=123) protocols. Functional outcomes were reported in 225 digits (excellent= 173, good= 36, fair=10, and poor= 6, per the respective assessment tool used). There were eight tendon ruptures reported.

Conclusions: Despite heterogeneity in operative and rehabilitation protocols, there is low level evidence that low complication rates and good outcomes are expected following primary repair of pediatric flexor tendons.

3 Minute Oral Presentations

Authors: Ian Jones (1), *Shayne Friedman (1), Saif Awladthani (2), Cathy Watts (2), Andrea Simpson (2), Ahmed Al-Farsi (2), Ronish Gupta (2), Ashley Todt (2), Karen Choong (2)

LIBER8 GLASS GOALS PROJECT: A NOVEL METHOD FOR ENSURING DAILY, INDIVIDUALIZED PATIENT-GOAL SETTING AND TEAM COMMUNICATION.

Background: Patient care in adult and pediatric intensive care units (PICUs) is complex, multifaceted, and requires team collaboration and communication. The "Glass Goals" (GG) project was created to encourage team collaboration in daily patient goal setting, enhance family engagement, and optimize the application of Liber8, a quality improvement bundle to reduce PICU-acquired complications.Objectives: To implement GG in McMaster Children's Hospital PICU. The outcomes of interest were the uptake of the GG and the impact of GG on goal setting and rounding duration compared to previously used paper Daily Goals Checklist (DGC).

Methods: Quality-improvement, implementation study. We used Pronovost's 4E's model to engage key stakeholders and ensure effective rollout. Completion rates of existing DGCs were recorded (n=70). An implementation team consisting of PICU HCPs, family members, and medical students used feedback from PICU inter-professional focus groups to design the GG as a template on patient doors used for goal setting in significant patient care domains. Prior to roll out, a rounding audit assessed goal setting frequency and measured rounding duration (49 patients – 392 goal setting events). Feedback from key stakeholders was used to refine design of GG. Following implementation, GG uptake was evaluated (n=74) and a second rounding audit was performed (50 patients – 400 goal setting events).

Results: DGC completion was 27.1%. Prior to implementation, goal setting during rounding was 40.1% across all domains with median rounding time of 706 seconds. Post-implementation, GG completion was 90.7%, frequency of goal setting during rounding improved to 58.5%, and median rounding time improved to 450 seconds.

Conclusions: Glass Goals improved the frequency of goal setting, while reducing rounding duration. This suggests that the Glass Goals is a useful tool that can improve team communication without increasing time burden of rounds. We plan to assess perceptions of HCPs and parents regarding the Glass Goals.

3 Minute Oral Presentations

Authors: *Justin D. Lu (1), Sabeen Tiwana (2), Priya Das (3), Javed Siddiqi (4), Faisal Khosa (5)

Gender and Racial Underrepresentation in Academic Dermatology Positions in the United States: A Retrospective, Cross-Sectional Study

Background: There has been an increase in faculty appointments in dermatology across the USA over the past decade; however, little is known about the gender and racial distributions within dermatology faculty positions. Hence, we determined gender and racial distributions with respect to academic ranks, tenure tracks, and degree types in academic dermatology faculty positions over a 12-year period.
Methods: Using the annual reports from the American Association of Medical Colleges (AAMC), a retrospective cross-sectional study was conducted on the faculty positions of academic dermatologists. Analysis was conducted on gender, race, academic ranks, tenure tracks, and degree types from 2007-18.Results: From 2007-18, the total number of academic dermatology appointments increased by 53%, but White dermatologists remain the majority with a 12-year average of 67.9% as well as occupying higher academic ranks. As the ranks decreased in hierarchy, the other races increased in representation, particularly Asians. The majority of Asians had additional doctoral degrees and 15.6% had only an MD only. Blacks or Hispanics comprise only 2.7% of dermatologists.Female faculty appointments improved significantly with more female than male dermatologists in 2018. However, higher academic ranks were dominated by males as they overrepresented chair positions (79.6%), full professors (71.5%), and associate professors (53.6%), while females represented lower ranks such as assistant professors (56.9%) and instructors (57.7%). More male dermatologists were tenured (69.5%) and had a PhD or other doctoral degree (63.0%) compared to female counterparts.
Conclusions and Relevance: Despite the increase in faculty appointments in dermatology over the past 12 years, gender and racial disparities still persist. Dermatology is significantly overrepresented by White dermatologists. Leadership positions such as chairperson, full professor, and associate professors are also male- and White-dominated. Further research regarding barriers to dermatology and faculty promotion is warranted.

3 Minute Oral Presentations

Authors: April (YiChen) Liu*(1), Andrea Dower(2), Saeda Nair(2)

Case Report: Using Dexmedetomidine Infusion for Sedation in Spontaneously Breathing Patient with Myotonic Dystrophy

Abstract - REDACTED

3 Minute Oral Presentations

Authors: *Grace Martin(1), Molly Gingrich(2), Rimsha Chattha(2), Cynthia Monaco(2), Thomas J. Hawke(2)

Xin as a novel regulator of mitochondrial morphology and bioenergetics in skeletal muscle

Background: Disruptions to mitochondrial integrity have been implicated in metabolic diseases, including diabetes and obesity. One potential mediator of mitochondrial integrity is Xin, a cytoskeletal adaptor protein, which we have localized to the mitochondria in skeletal muscle.
Hypothesis: The loss of Xin combined with the metabolic stress of a high fat diet (HFD) will result in mitochondrial alterations in structure and bioenergetics leading to whole body metabolic dysfunction.
Methods: Wild-type (WT) and Xin knockout (Xin-/-) mice were fed a HFD for 8 weeks. Glucose tolerance tests were administered at 0, 4, and 8 weeks to assess glucose handling. Mitochondrial respiration was conducted to assess mitochondrial bioenergetics. Electron microscopy quantified mitochondrial area, density and content, and analyzed mitochondrial ultrastructure in the tibialis anterior muscle. Mitochondrial dynamics were assessed using western blot analysis of fusion, fission, and autophagy proteins.
Results: Xin-/- mice did not gain greater body mass or display significant differences in fasted blood glucose levels or glucose tolerance compared to WT mice. Electron microscopy revealed a ~2.1-fold increase in mitochondrial density ($p < 0.05$) in Xin -/- mice with evident structural impairments, including swelling, streaming and loss of cristae. Mitochondrial complex I and II supported-respiration was significantly decreased in Xin-/- mice when corrected to mitochondrial density (complex I: JO2 Xin-/- 8.68±0.57; WT: 22.10±2.31; $p<0.05$; complex II: JO2 Xin-/-: 8.86±0.51, WT: 21.10±1.87; $p<0.05$). Western blot analysis of fusion, fission and autophagy protein content revealed no differences between Xin-/- and WT mice.
Conclusion: Xin-/- mice demonstrate impairments in mitochondrial structure and function with no change to body mass or glucose handling ability. Xin-/- mice appear to compensate for dysfunctional mitochondria by increasing in mitochondrial area and density. Future studies are needed to identify binding partners of Xin to further elucidate its function.

3 Minute Oral Presentations

Authors: Puru Panchal (1), Saurabh Gupta (2,3), Kevin Gilotra (4), Ann Mary Wilfred (4), Winston Hou (4), Deborah Siegal (5,6), Richard P Whitlock (2,3,6), Emilie P Belley-Cote (5,6)

Intravenous iron therapy for patients with preoperative iron deficiency or anemia undergoing cardiac surgery: a promising solution for a common problem

Background: Preoperative anemia has perioperative and anesthetic considerations. However, the benefits of preoperative intravenous (IV) iron therapy among anemic or iron-deficient cardiac surgery patients has not been well-established. We performed a systematic review and meta-analysis to determine the effects of treating preoperative anemia or iron-deficiency with IV iron versus oral iron or no iron in this population.
Question: What are the effects of treating preoperative anaemia and iron deficiency with IV iron among adult cardiac surgery patients?
Methods: We searched CENTRAL, MEDLINE and EMBASE for randomized controlled trials (RCTs) and observational studies comparing IV to oral or no iron. We performed title and abstract, full-text screening, data extraction and risk of bias assessment independently and in duplicate. We pooled data using a random effects model and evaluated the quality of evidence using the GRADE framework.
Results: We identified four RCTs and seven observational studies. Pooled observational data suggested a benefit of IV iron versus no iron on mortality (relative risk (RR)0.39, 95%CI [0.23 to 0.65], p=0.0003, very low quality), units transfused per patient (mean difference (MD)-1.22, 95% CI [-1.85 to -0.60], p=0.0001, very low quality), renal injury (RR0.50, 95%CI [0.36 to 0.69], p<0.0001, very low quality), and hospital length of stay (MD-4.24 days, 95% CI[-6.86 to -1.63], p=0.001, very low quality). RCT data demonstrated fewer patients requiring transfusion among those treated with IV iron compared to oral or no iron (RR0.81, 95% CI[0.70 to 0.94], p=0.005, moderate quality). Pooled RCT estimates for mortality, hospital length of stay, units transfused per patient, and renal injury were consistent in direction with observational studies.
Conclusion: Our meta-analysis suggests that IV iron may improve postoperative mortality and morbidity among anemic or iron-deficient cardiac surgery patients. Large placebo-controlled, double-blinded, multi-center trials are needed to clarify the role of IV iron in this patient population.

3 Minute Oral Presentations

Authors: Ryan Chadwick (1), Sarah Chadwick (1), Keil Elliott (1), Rebecca Haworth (2), Hannah Kearney (3), *Alysha Laviolette (3)

Improving access to automated external defibrillators in the Niagara community: A QI initiative

Abstract: Over 35 000 Canadians lose their lives to cardiac arrest each year. CPR and automated external defibrillators (AEDs) are important modifiable factors that can improve outcomes. Survival rates decrease by 7-10% each minute that defibrillation is delayed, and survival rates are <5% after 12 minutes of ventricular fibrillation. This time frame emphasizes the importance of timely bystander AED use, however, finding an AED is often a difficult and time-consuming task.AED access is a major focus in King County (Seattle, Washington), which has resulted in the registration of all AEDs with EMS and higher out-of-hospital cardiac event survival rates. In Niagara, a publicly accessible AED registry doesn't exist. Our project aimed to log 100+ AEDs in an open-access registry and to disseminate the registry information to Niagara Health System (NHS) medical trainees and employees.Through the utilization of PulsePoint, a free smartphone application that allows users to geotag AEDs, we have logged 109 AEDs over 5 PDSA cycles. Our PDSA cycles tested the effectiveness of logging methods for AEDs into PulsePoint, which included: opportunistic logging, daily email reminders, contacting organizations with a high likelihood of having AEDs (e.g. gyms), and collaborating with Heart Niagara (a charitable not-for-profit corporation that works to improve access to heart health services).Information about this initiative has already been disseminated to current Niagara medical trainees, as well as community members via a televised InfoHealth seminar. However, as this is an ongoing project, we are currently working to complete targeted knowledge dissemination to NHS employees and to raise awareness of the registry to local emergency services and local CPR training providers. We hope that by increasing public awareness of the importance of AEDs and increasing AED accessibility via the PulsePoint registry, we will be able to improve out-of-hospital cardiac arrest survival rates in the Niagara region.

3 Minute Oral Presentations

Authors: *Jasmyn E. A. Cunningham(1), Hugh McCague(2), Ashley J. Malin(3), Julia Riddell(4), David Flora(5), Christine Till(5)

Fluoride exposure and duration and quality of sleep in a Canadian cohort

Background: Research suggests that fluoride from dietary and environmental sources may concentrate in calcium-containing regions of the body such as the pineal gland. The pineal gland synthesizes melatonin, a hormone that regulates the sleep-wake cycle. We used population-based data from Cycle 3 (2012-2013) of the Canadian Health Measures Survey (CMHS) to examine associations between fluoride exposure and sleep outcomes.

Methods: The sample included participants aged 16 to 79 years. Fluoride concentrations were measured in urinary spot samples (n=1303) and household tap water among those who reported drinking tap water (n=1016); urinary fluoride was adjusted for specific gravity (UFSG). We used multinomial and ordered logistic regression analyses to examine associations of fluoride exposure with self-reported sleep outcomes, including sleep duration and frequency of sleep problems. Sleep duration was classified as normal, low, or high according to age-based recommendations by the National Sleep Foundation, and frequency of sleep problems were measured on a 5-point scale, ranging from “never” to “all of the time”. Covariates were based on theoretical relevance and included age, sex, ethnicity, body mass index, and household income.

Results: Median (IQR) UFSG and water fluoride concentrations were 0.67 (0.63) and 0.12 (0.38) mg/L, respectively; 32% of participants lived in communities supplied with fluoridated municipal water. A 0.5 mg/L increase in water fluoride level was associated with 34% higher relative risk of reporting sleeping less than the recommended duration [RRR = 1.34, 95% CI: 1.03, 1.73; p = .026]. UFSG was not significantly associated with sleep duration. Water fluoride and UFSG concentration were not significantly associated with frequency of sleep problems. Including chronic health conditions as a covariate did not substantially change the association between water fluoride and sleep duration.

Conclusions: Fluoride exposure may contribute to sleeping less than the recommended duration among older adolescents and adults in Canada.

3 Minute Oral Presentations

Authors: Katherine Fuller (1, 2), Humberto Omaña (1), Courtney Frengopoulos (1), Michael W. Payne (3, 4), Ricardo Viana (3, 4), Susan W. Hunter (4, 5)

Reliability, validity, and agreement of the full and short-form Activities-specific Balance Confidence Scale in people with lower extremity amputations

Background: Falls in people with lower extremity amputation(s) (PLEA) can lead to injury and a fear of falling that impacts activity engagement and quality of life. The Activities-specific Balance Confidence (ABC) scale is used to understand how confident PLEAs are at completing a range of tasks. A short-form of the ABC scale, the ABC-6, was developed in order to decrease administration time, using the six most difficult tasks from the ABC scale. The psychometrics of the ABC-6 and agreement with the full-scale ABC have yet to be explored in PLEAs.
Objective: To determine the relative and absolute reliability, construct validity, and agreement of the ABC and ABC-6 scales in PLEAs.
Methods: Participants (n=60; age 58.2±12.6 years; 80% male) had a lower extremity amputation and minimum 6 months prosthetic walking experience. The test-retest interval was 2 weeks. Analysis for relative reliability and internal consistency was intraclass correlation coefficient (ICC) and Cronbach's α, respectively. Absolute reliability was measured using standard error of measurement (SEM) and minimal detectable change (MDC95). Bland-Altman plots measured agreement between scales. Construct validity was evaluated against the L Test using a Pearson-product moment correlation.
Results: The ABC-6 (intraclass correlation coefficient = 0.92) and ABC (intraclass correlation coefficient = 0.91) scales had excellent relative reliability. Both scales demonstrated good internal consistency. Worse absolute reliability was observed in the ABC-6 than the ABC scale. Construct validity against the L Test was confirmed. Bland–Altman plots indicated poor agreement between scales.
Conclusion: Both scales exhibit excellent relative reliability and good internal consistency and construct validity. Poor agreement between the ABC-6 and ABC scales indicates the scales should not be used interchangeably in this population. Inadequate absolute reliability of the ABC-6 scale suggests the full-length ABC scale should be the balance confidence scale of choice for PLEAs.

3 Minute Oral Presentations

Authors: *Kay Wu(1), *Maaz Shanjer(1), Akshit Bagga(2), Avani Mehta(2), Robert Fleisig(2)(3)

'It's Okay': a mobile mental health therapy solution for patients suffering from chronic illness

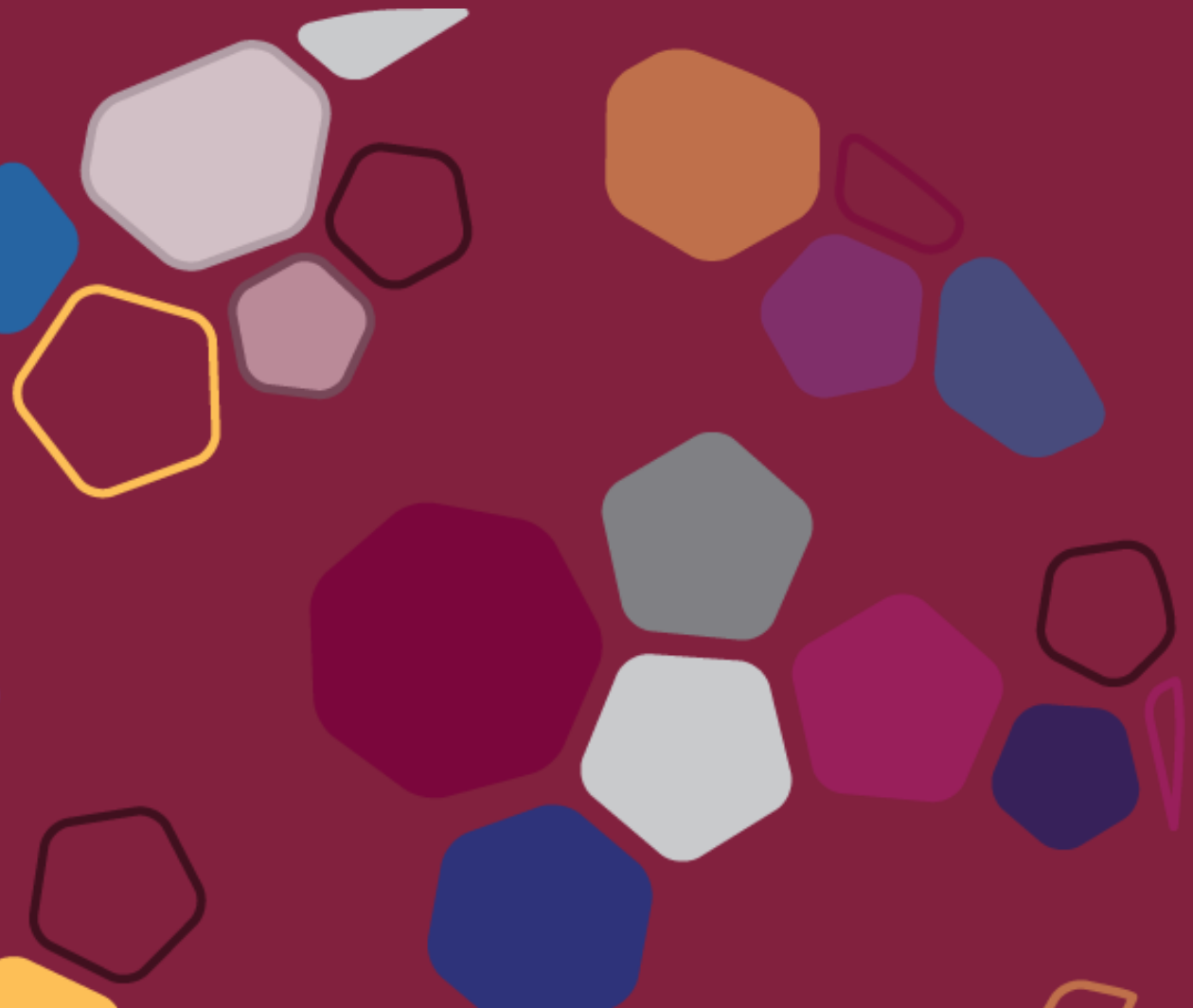
Background: The problem-centred engineering approach was applied by an interdisciplinary team of engineering and medical students to identify problems in healthcare that could be feasibly solved. One such prevalent issue is that of mental health, with approximately half of Canadians having had a mental illness by age 40. Mental illnesses and chronic illnesses are strongly linked, with individuals afflicted with chronic health issues twice as likely to experience depression and anxiety compared to the general population. These individuals also experience diminished quality of life and worse health outcomes. Access to specialized therapy programs is often limited, with long wait times and inaccessible locations.

Methods: Over four months, collaborative design-thinking methodology was used to define a problem, ideate, and iteratively prototype solutions. Four patient advisors from St. Joseph's Healthcare, with extensive lived experience, were interviewed to identify potential healthcare problems. Poor mental health of patients suffering from chronic illnesses was a key problem identified. Feedback from engineering faculty and patient advisors was then integrated to create and refine a solution.

Results: The team developed 'It's Okay', a mobile app that aims to improve the mental outlook of patients dealing with chronic health issues. The app targets individuals unable to pursue in-person mental therapy programs such as those who have limited mobility or resources or are hesitant. The app provides patients with multiple therapy options. They can enroll in virtual group therapy sessions with trained professionals, with the sessions focusing on issues such as addiction, depression, and coping with stress. Patients can also go through self-based modules with exercises on mindfulness and anger management.

Conclusions: Initial response to 'It's Okay' from the engineering faculty and the patient advisors has been positive. Future steps include refining the prototype through iterative testing and piloting the app with patients under the supervision of medical professionals.

Full Abstracts
Poster Presentations



Basic & Experimental Sciences

Investigating the mechanistic role of GJB4 missense mutations in causing erythrokeratodermia variabilis

Authors: *Samina Nazarali (1,2), Qing Cindy Shao (1), Dale W. Laird (1)
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(2) Michael G.Degroote School Of Medicine, McMaster University, Hamilton, ON, Canada

Abstract:
Background: Ubiquitously expressed connexins are a large family of transmembrane proteins that form cell surface hemichannels or gap junctions which mediate cellular communication. Mutations in connexin encoding genes are responsible for a range of disorders, including erythrokeratodermia variabilis (EKV). EKV, a rare autosomal dominant skin disease, has been linked to several missense mutations in the connexin 30.3 (Cx30.3) encoding GJB4 gene; however, mechanisms underlying the phenotype remain poorly understood. Objective: In the current study, we investigate four EKV-linked Cx30.3 mutants (G12D, T85P, F137L, and F189Y) to uncover the molecular mechanisms underpinning these disease links. Methods: Cultured rat epidermal keratinocytes and HeLa cells were transfected with GFP-tagged or untagged Cx30.3 and mutant cDNA constructs. Transfected cells were subsequently immunolabeled for various cellular components and markers, such as the Golgi apparatus and endoplasmic reticulum. Stained cells were visualized with a confocal microscope. Results: We demonstrate that the G12D, T85P, and F189Y mutants expressed in both rat epidermal keratinocytes and gap junction-deficient HeLa cells undergo trafficking defects, leading to protein retention within the endoplasmic reticulum and Golgi apparatus. Conversely, the F137L mutant experiences wildtype localization but, induces a general cell stress response, perhaps due to aberrant channel kinetics. Conclusions: Collectively, we demonstrate the underlying localization effect of four GJB4 missense mutations and begin to elucidate their link to the EKV phenotype. Our results emphasize the overall complexity of connexin-linked diseases and the importance of gap junction intercellular communication in disease prevention.

Investigating the role of the LAG-3 receptor on NK cells

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Abstract:
Background: A function of our immune system is to protect us from cancer. Specifically, we have NK and T cells which are able to target and destroy tumours. However, a hallmark of cancer is the ability of tumors to avoid immune destruction by expressing the ligands of immune checkpoint receptors expressed by NK and T cells. The binding of these ligands to checkpoint receptors suppresses the anti-tumor responses of NK and T cells, thereby permitting tumor survival. LAG-3 is expressed by NK and T cells and has been identified as an immune checkpoint receptor for T cells. However, the function of LAG-3 on NK cell activity is currently unclear. Hypothesis: We hypothesize that LAG-3 is an immune checkpoint receptor which suppresses the anti-tumor activity of NK cells. Consequently, we believe LAG-3 blockade has the potential to enhance NK-mediated tumor clearance.Methods: We identified two mouse models of cancer with elevated LAG-3 expression on NK cells, RMA-S and CT26. Using the RMA-S model, RMA-S cells were transfected with either an empty vector (RMA-S/empty) or a vector to overexpress a known ligand of LAG-3 (RMA-S/MHCII). Survival was compared in C57BL6/j mice injected with each of these cell lines. Using the CT26 model, BALB/c mice were injected with CT26 cells and either anti-LAG-3 or a control isotype antibody and survival was compared. Mice were euthanized at a pre-determined endpoint. Results: The RMA-S model is not a strong model because RMA-S/empty results in poorer prognosis, which is inconsistent with our hypothesis. The CT26 model is a potential model because mice injected with anti-LAG-3 had a better prognosis, which is consistent with our hypothesis. Conclusion: While these studies are still ongoing, we hope that this work will help provide insight for the development of future cancer therapeutics capable of harnessing patients' immune systems.

Basic & Experimental Sciences

Clonal lineage tracing and single cell transcriptomics of diverse progenitor cells downstream of primitive neural stem cells from the embryonic mouse brain

Authors: Ian Burns* (1, 2), Samantha Z. Yammine (2), Daniel Merritt (3), Brendan Innes (2), Jessica Gosio (2), Gary Bader (2), Derek van der Kooy (2)
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Abstract: Primitive neural stem cells (pNSCs) arise in the mouse embryo at E5.5. These cells self-renew and differentiate, giving rise to all major cell types of the brain. They generate cellular diversity via neural progenitor cells (NPCs), though NPC heterogeneity and the lineages downstream of pNSCs have not been fully elucidated. To enrich for NPCs in vitro, we grow pNSCs in media supplemented with Leukemia Inhibitory Factor, which gives rise to clonogenic neurospheres. Over 99% of the cells in these neurospheres are NPCs, which cannot self-renew or give rise to secondary spheres. To investigate heterogeneity in fate specification among these NPCs, we performed clonal retroviral lineage tracing on individual NPCs in pNSC-derived neurospheres from the E17.5 mouse ventral germinal zone. Cell fate analysis of clonally related cells using immunocytochemistry revealed several types of bipotent NPCs and many unique unipotent NPCs. Using these data, we constructed a hierarchy of progenitor subtypes downstream of pNSCs. To validate this hierarchy, identify markers for distinctly-specified NPCs and assess gene expression differences between NPC subtypes, we performed single-cell RNA sequencing on pNSC-derived NPCs using Drop-seq. Gene expression profiles for candidate cell fate markers were analyzed using Seurat 3.0 and scClustViz, and corroborated experimental findings of bipotent and unipotent pNSC-derived NPCs. Single cell analyses also identified novel candidate genes that may be implicated in the fate specification and survival of these early NPCs. For example, the gene Nexn, previously shown to be enriched in neuroblastoma cells but otherwise poorly characterized, is highly expressed in putative neuronal fate-specified NPCs. Knockdown of Nexn transcripts in pNSC-derived NPCs reduces the number of Beta-3 tubulin positive neurons they produce, suggestive of a role for Nexn in the survival or fate specification of neuron-specified NPCs.

Basic & Experimental Sciences

Evaluating the impact of IL-27 and CpG ODN on the activation of antigen presenting cell populations and implications for drug-delivery

Authors: *Devyani Bakshi(1), Kyle Seaver(2), Sam Basta (2)
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Abstract
Background: Professional antigen presenting cells (pAPCs), play an important role in bridging the innate and adaptive immune system. Antigens have an impact on the biochemical, cytokine response, and phenotypical changes that pAPCs undergo. CpG oligodeoxynucleotides (ODN), a Toll-like receptor-9 (TLR9) agonist, signals to promote pAPC maturation, antigen presentation, and pro-inflammatory cytokine production. In contrast, interleukin (IL)-27, is both a pro- and anti-inflammatory cytokine. Studies have reported contradictory roles for IL-27 on pAPC maturation and little work has been done to directly evaluate the relationship of IL-27 and TLR agonists on pAPC populations. In this study, we seek to determine the impact of IL-27 and CpG on pAPC activation. Methods: The dendritic cell (DC) 2.4 murine cell line and murine bone-marrow derived DCs were cultured. Cells were stimulated with IL-27 (50 ng/ml) and/or CpG ODN Class B 1826 (1.5 mg/ml) at different time points to evaluate gene, surface marker, and protein expression. As a positive control, cells were stimulated with LPS (10 ng/ml). Reverse-transcriptase polymerase chain reaction (RT-PCR), flow cytometry, and enzyme-linked immunosorbent assays (ELISA) were performed. Results: We found that CpG stimulates pAPC activation through the upregulation of pro-inflammatory cytokines and co-stimulatory molecules (IL-6, 11-fold; TNF-α, 12-fold; and IL-12p40; 10-fold) when compared to untreated cells. In contrast, IL-27 suppress pAPC activation, both alone and in combination with CpG, through the upregulation of anti-inflammatory cytokine expression (ie. TGF- and IL-10). Conclusion: This study helps clarify pAPC responses to IL-27 and CpG stimulation, having wider implications on understanding the mechanisms induced by combining cytokines and TLR agonists. Studying these interactions will help in the discovery of molecular signalling pathways that regulate pAPC activation and how they can be modulated for specific immune outcomes. The data obtained from this study has substantial impact on the development of drug delivery systems, such as vaccines.

Basic & Experimental Sciences

Effect of cigarette smoke on human monocyte and macrophage proliferation in atherosclerosis pathogenesis

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Abstract
Background: Coronary artery disease, largely caused by atherosclerosis, remains in the top ten leading causes of global disease measured by mortality and disability-adjusted life years. While 1 in 3 deaths caused by coronary artery disease is associated with smoking, the influence of cigarette smoke on atherosclerosis pathogenesis remains poorly understood. Composition of atherosclerotic plaques has been observed to contain various immune cells, including macrophages, and in vivo mice experiments demonstrate that aortic arches of mice exposed to cigarette smoke have increased atherosclerotic plaque size. This project focuses on extending the in vivo animal studies to in vitro human cell lines by observing the response of human monocytes and macrophages to in vitro cigarette smoke extract stimulation. Methods: Monocytes derived from the THP-1 human monocytic cell line were incubated in media with 1%, 2.5%, 4% cigarette smoke extract for 36 hours, with cell counts being conducted at the following time points: 3h, 12h, 24h, 36h. Macrophages were differentiated from THP-1 cells via PMA differentiation over 36 hours and then exposed to 36 hours of cigarette smoke exposure. Following the exposure period, cytospins of the differentiated macrophages were prepared following PBS resuspension, stained with Hema3, and imaged for qualitative analysis.Results: After 36 hours, mean monocyte concentrations were significantly increased in cell lines exposed to 2.5% and 4% cigarette smoke extract compared to control ($p<0.0001$) as well as compared to cells exposed to 1% smoke extract ($p<0.0005$, $p<0.005$ respectively). An increase in THP-1 differentiated macrophage concentrations stimulated with cigarette smoke extract was also observed in a dose-response manner. Conclusion: These results suggest that cigarette smoke exposure elicits a proliferative response in human monocytes and macrophages in vitro, indicating that the observed increase in severity of atherosclerosis in response to cigarette smoke exposure may be owed in part to monocyte and macrophage proliferation.

Basic & Experimental Sciences

Secretion of Adipocyte-Derived Thymic Stromal Lymphopoiretin In Response To TNF-α and IL-1ß Stimulation

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Abstract
Introduction: Patients with obesity exhibit excess amounts of adipose tissue involved in cytokine secretion and chronic low-grade inflammation. Thymic stromal lymphopoietin (TSLP) is one of the cytokines involved in various inflammatory pathways. A recent study has demonstrated adipocyte-derived TSLP expression resulting from thyroid stimulating hormone (TSH) stimulation. However, the other agonists and the transduction mechanisms involved remains unknown. Question: The pro-inflammatory cytokines, TNF-α and IL-1ß, have been shown to induce TSLP secretion in epithelial cells and keratinocytes, thus, the objective of this study is to determine if they may also regulate TSLP expression in adipocytes. Methods: Pre-adipocytes are isolated from surgical patient donors, differentiated into mature adipocytes, stimulated with TNF-α and IL-1ß, and the TSLP released into the media was measured. Results: Results demonstrate an increase in TSLP expression in adipocytes, pre- adipocytes, and fractionated non-adipocyte stromal cells following stimulation. Furthermore, dexamethasone potently inhibited TNF-α and IL-1ß stimulated TSLP expression, while SC514, an inhibitor of IKK2, decreased IL-1ß-stimulated TSLP expression. Conclusion: Overall, the results suggest that human adipocyte-derived TSLP release is regulated by both TNF-α and IL-1ß. Future studies are required to delineate the exact cellular origin of TSLP secretion in adipose tissue and could ultimately lead to a better molecular understanding of how excess adipose tissue increases risk of cardiovascular disease.

Clinical Epidemiological Studies

Trends in COVID-19 research in early-to-mid 2020: beginnings of a pandemic

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Affiliations: (1) Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Ontario, Canada;(2) Schulich School of Medicine & Dentistry, Western University, London, Ontario, Canada;(3) Trent University, Peterborough, Ontario, Canada;(4) Department of Medicine, McMaster University, Hamilton, Ontario, Canada

Abstract
Background: Production and dissemination of basic and clinical COVID-19 research has been rapid, in part due to the foundations established by two other recent coronavirus outbreaks (MERS-CoV and SARS-CoV-1). In this study, we aim to characterize the complete landscape of COVID-19 literature, and to infer trends in publication types and rates over time.Methods: We searched PubMed for all references related to SARS-CoV-2/COVID-19 from January 17, 2020 to the present date (August 17, 2020). All references captured were reviewed on title/abstract with full text for conflicts in an ascending chronological order by a minimum of two independent reviewers. They were categorized by type of research, relevant medical specialties, and type of publication. Inclusion into our evidence database was based on a minimum subjective quality threshold based on English language, relevance, methodological quality, and uniqueness of findings.Results: Between January 17, 2020 and August 17, 2020, 40102 references were captured. All references up to May 10, 2020 inclusive (N=10685) were reviewed, of which 2742 (25.66%) met minimum inclusion criteria. In the time since, a further 21786 references have been reviewed, of which 3279 (15.05%) were included. Overall, the most common types of research reviewed were narrative reviews/expert opinions (67.48%), case series/reports (12.12%), and non-English (4.26%). Publication rates reached a plateau mean of 325 daily publications (IQR=234-375) from May 2020 onwards.Discussion: In concordance with other bibliometric analyses, our analysis finds that early research into SARS-CoV-2 consists largely of editorials, case reports, and basic science. The relative lack in quality of early publications is reflected in a low inclusion rate based on minimum standards of relevance and methodological quality. Presently, there remains a pressing need for more rigorous applicable evidence, such as randomized trials, systematic reviews and meta-analyses, and treatment guidelines.

Clinical Epidemiological Studies

Successful renal transplantation in a patient with clinically severe Protein C deficiency: A case report and review of the literature

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Abstract
Background: Severe protein C (PC) deficiency can be inherited in an autosomal dominant fashion or through compound heterozygous mutations. Patients with severe PC deficiency present early in life with severe thrombotic events and require lifelong anticoagulation. There are no clear guidelines on peri-operative management for this patient population. Methods: Case report and literature review. We searched MEDLINE for original research from 1946 to present for the following terms: “protein C deficiency” and “surgery” or “transplantation” or “perioperative period/care”.Case Report: A 35 year old female patient with clinically severe protein C deficiency with a baseline protein C level of 0.09 units/mL was scheduled to undergo renal transplantation. Her thrombotic history was significant for recurrent episodes of venous thromboembolism, mesenteric arterial thrombosis leading to bowel ischemia and recurrent spontaneous abortions. In 2015, she developed HELLP syndrome which led to end-stage renal disease. She was maintained on life-long tinzaparin at a dose of 10,000 IU subcutaneously once daily which was held pre-operatively. To mitigate her risk of thrombosis, she received protein C concentrate to target a protein C level of 1.0 units/mL in the perioperative period. She received an IV bolus of 4000 U of protein C concentrate on the day before her surgery. This was followed by an infusion of 300-400 units/hr until post-operative day 11. Anticoagulation was resumed post-operatively. Her renal transplantation was successful with no peri-operative thrombotic events. She continues to be medically stable with no complications at the 2 year follow-up appointment. Conclusions: Our literature review revealed a variety of approaches to manage PC deficiency in the peri-operative period. We show that the infusion of PC concentrate to target a protein C levels of 1.0 units/mL can enable successful renal transplantation in a patient with severe PC deficiency.

Clinical Epidemiological Studies

Electronic cigarettes and rhinology: A systematic review

Authors: Marc Levin(1), *Nicole Crimi(1), Doron D. Sommer(2)
Affiliations: (1) Michael G. DeGroote School of Medicine, McMaster University, Hamilton, ON; (2) Department of Surgery, Division of Otolaryngology - Head and Neck Surgery, McMaster University, Hamilton, ON

Abstract

Introduction:With the global rise of electronic cigarette usage, there is a need to understand electronic cigarette-related symptomatology and pathology. As electronic cigarette vapor is typically inhaled orally, all anatomical areas of the unified airway may be affected. As such, this study describes the peer-reviewed literature on how electronic cigarette usage impacts the nasal cavity, nasopharynx and paranasal sinuses. With such a review, a unified understanding of rhinological symptoms and pathology that have been identified in individuals who use electronic cigarettes may be possible.Methods:OVID Medline, EMBASE and Web of Science databases were searched for articles related to electronic cigarettes and the nasal cavity, nasopharynx, and paranasal sinuses. Articles reporting electronic cigarette use and associated symptomatology of nasal congestion, obstruction, rhinorrhea, epistaxis, anosmia/hyposmia and trauma were included. Relevant data from included studies were extracted regarding specifics of electronic cigarette usage, patient symptoms, medical and/or surgical management and treatment outcomes. Descriptive analysis was performed with the extracted data. Results:The database search initially identified 1047 articles. Title, abstract and full-text screening resulted in the inclusion of 12 studies. These studies included a total of 21,110 patients. The most commonly reported vaping product was the electronic cigarette with nicotine-containing flavoured e-liquid. Symptomatology/pathology associated with electronic cigarette use included nasal congestion (n=130), nasal irritation (n=23), rhinorrhea (n=1), epistaxis (n=603), and nasal trauma (n=5). Patient-specific surgical interventions were described for patients with epistaxis/nasal trauma.Conclusion:Electronic cigarette use has greatly increased in recent years. This systematic review demonstrates that electronic cigarettes can cause rhinological symptoms and pathology such as nasal congestion, irritation, rhinorrhea, epistaxis, and trauma. Further research is needed to understand the pathophysiological mechanisms and strengthen associations of electronic cigarette usage to the reported rhinological symptoms.

Clinical Epidemiological Studies

How does physician migration affect practice-level opioid prescribing patterns?

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Abstract
Objectives. This study examines how physicians working in the same clinics influence each other's opioid prescribing habits to quantify peer effects associated with physician migration. Methods. Using National Health Service (NHS) data in England, we linked data for current GP practitioners with GP practice prescribing presentation-level data. After normalizing this data, we were able to compare practices that received a GP from high opioid prescribing practice with practices that received a GP from a low opioid prescribing practice, defined respectively as the top 10% and bottom 10% of morphine prescribing. Using a standard event analysis approach, we compared morphine prescribing in all other practices in the NHS during the time period around the prescriber movement to high and low prescribing treatment practices. Results. Over the period of 2010 to 2018 we observe 78,122 physicians associated with 12,194 GP practices and 14,019 movers. Treated practices are not statistically different from control practices in the time leading up to a prescriber moving. Practices that receive a prescriber from a high prescribing practice see immediate and statistically significant increases in the prescribing rate of morphine across all outcomes. In contrast, significant decreases in the prescribing of morphine occur in the month that receive a prescriber that moves from a low prescribing practice. These differences between treatment and control practices persist for at least six months after a move occurs. Conclusions. The study results suggest that movement of prescribers to a new practice are associated with more prescribing of morphine on a per provider basis. Plausible mechanisms may be pent up demand by patients or supply sided change involving changing practice prescribing. Given the significant focus to reduce overprescribing of opioids in recent years, this data has consequential public health implications, suggesting the importance of physician migration and peer effects on practice-level opioid prescribing.

Clinical Epidemiological Studies

SuScoping review of the use of emicizumab in acquired hemophilia A (AHA) with or without inhibitors

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Abstract
Background: Acquired hemophilia A (AHA) is a rare disease similar to congenital hemophilia A (CHA) where one develops autoantibodies (inhibitors) against its own factor VIII instead of carrying a X-linked mutation for factor VIII. Emicizumab is a revolutionary biologic approved by the FDA in 2018 for the treatment of congenital hemophilia A (CHA) with or without inhibitors. It contains binding sites simultaneously for factor IX and factor X and replaces the function of VIII by directly coupling factor IX and factor X, allowing for the formation of factor X. Four published clinical trials (HAVEN1-4) demonstrated superior efficacy in the CHA population with or without inhibitors. We believe that it is reasonable to consider its use in AHA given its similarity to CHA.Methods: The rationale for this project to thoroughly examine the literature using a systematic search to find any studies on the use of emicizumab in AHA. We will be following the PRISMA protocol to conduct a systematic literature search for all published studies involving the use of emicizumab in AHA. This will be followed by title/abstract screening and full-text review by two independent reviewers. The data will then be extracted for analysis.Results: Our search identified 407 results. After screening and full-text review by two independent reviewers, a total of 5 studies was selected for data extraction and analysis. Four case reports and one case series included data on a total of 8 patients. Due to the nature of the studies, a narrative and qualitative synthesis of the data was done instead of a statistical analysis. Conclusions: Our analysis suggests that emicizumab should be considered as a possible treatment option in AHA especially in patients refractory to current treatment guidelines.

Clinical Epidemiological Studies

Successful renal transplantation in a patient with clinically severe Protein C deficiency: A case report and review of the literature

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Abstract
Background: Peripheral artery disease (PAD) is an under-represented cardiovascular disease that affects over 200 million people worldwide. An acute limb ischemic (ALI) event is among the most severe prognostic factors for PAD outcomes, requiring urgent revascularization or amputation. Post-ALI, 1-year absolute risks of complications are high, including rehospitalization (61.5%), major acute limb event (MALE) (20%), major acute cardiac event (MACE) (3.7%), and death (8.3%). Optimal anti-thrombotic prophylaxis in PAD is unclear. CANALISE-2 is an ongoing prospective pilot study exploring current anti-thrombotic practice post-ALI.Methods: 30 patients were recruited (1.6/month) post-ALI intervention and stratified into two arms at discharge: 1) Full dose anticoagulant+/-aspirin (ASA), 2) Dual antiplatelet therapy, low-dose anticoagulant+ASA, or ASA alone. Patients were followed for 12 months and data on patient outcomes such as hospitalizations, interventions, major hemorrhages, MALE, MACE, and death were captured. Results: Preliminary feasibility data show that data on outcomes was adequately captured via follow-up with a 10% loss to follow up. 50% of patients had no history of PAD and 80% were smokers. Post-intervention discharge anti-thrombotic practice was varied with anticoagulant+ASA (41%), anticoagulant alone (17%), and ASA alone (38%). At 12 months many patients were weaned off anticoagulants and were still varied with anticoagulant + ASA (14%), anticoagulant alone (0%), low-dose anticoagulant+ASA (43%), dual-antiplatelet (14%), and ASA alone (29%). At 6 months (n=18) there were 8 (44%) hospitalizations, 7 (39%) MALEs, 0 MACEs, 0 major bleeds, and 1 (6%) death. Conclusions: Anti-thrombotic prescribing post-ALI varies greatly as the evidence is not clear, and evolves differently over the 12 month course with a high rate of complications. We report good feasibility in recruitment, data capture, and attrition at a single center. A large randomized multi-center trial is required to elucidate the optimal therapy, and we hope to use this data to build towards a multi-center registry.

Clinical Epidemiological Studies

Systematic review of the safety of e-scooters in the general population; Risk factors, demographics and common injury presentations.

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Abstract

Electric kick scooters (e-scooters) are a form of micro-mobility devices that have been introduced into city streets worldwide as a viable travel solution. On January 1st 2020, Ontario launched its pilot program to permit e-scooters onto provincial roads. While data is limited, it is important to evaluate what is already known about e-scooter use, including its safety and applicability, to inform users about the risks and benefits of this new technology being used in the community. This ongoing systematic review aims to evaluate the general safety of e-scooters, in the population at-large. We performed a literature search of randomized control trials, case reports, case series, cohort and control series on PubMed, Web of Science, CINAHL, MEDLINE, and Embase. The PRISMA and GRADE guidelines were used to evaluate the quality of articles selected. Two independent researchers assessed abstracts based on predefined inclusion and exclusion criteria. Inter-rater reliability on data abstraction will be measured and tested using Cohen's Kappa Statistic. Six hundred and sixty abstracts were screened with 102 full texts screened meeting the inclusion criteria Based on previous literature reviews, it is predicted that limited helmet use and alcohol use contribute to injuries among e-scooter riders. Common injuries are predicted to include: extremity fractures, facial fractures, lacerations, and head injuries including concussions and intracranial hemorrhages. It is predicted that the most common injured riders are men between 20 - 40 years old. This study hopes to characterize the safety of e-scooters in terms of common injuries, demographics of injured patients, and factors associated with severity of injury. This will help guide future primary care physicians, emergency physicians and paediatricians to be better informed and prepared for the potential surge in e-scooter use and misuse.

Clinical Epidemiological Studies

Comparing PrEP Accessibility and Users in Mid- and Large-Sized Urban Centres

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Abstract
BackgroundIncreasing access to pre-exposure HIV prophylaxis (PrEP) has increasingly been heralded as a means of dramatically reducing new HIV infections and playing a significant role in eliminating the epidemic. As such, access and usage of PrEP has been studied in some depth. However, these studies have all focussed on extremely large urban centres, excluding the experiences of people living in small to mid sized cities; a large population that requires targeting to optimize PrEP availability and utilization. MethodsWe reviewed all current patients in two PrEP clinics (Hamilton and Toronto), comparing the distances travelled to reach each clinic to assess ease of PrEP access, as well as comparing baseline HIRI-MSM scores and age. ResultsPatients receiving care at the Hamilton clinic travelled on average almost twice as far (22.13km) as those in the Toronto clinic (11.19km), a significant difference in accessibility. Patients in Hamilton tended to be older with an average age of 36, compared to an average age of 33 in Toronto. Finally, patients seen in Toronto had slightly higher baseline HIRI-MSM scores than those in Hamilton (17.8 vs 15.3); however, this difference is unlikely to be clinically significant.ConclusionsThese results clearly illustrate that accessing PrEP in small and mid sized Canadian cities is more challenging than in large urban centres. While efforts targeting extremely large cities has resulted in increased PrEP availability, similar efforts in mid and smaller sized cities would significantly increase overall access to PrEP in Ontario, and have thus far been lacking. The baseline differences in age between larger and smaller city populations could also potentially inform advertising campaigns in both locations, increasing their efficacy and thus PrEP usage.

Clinical Epidemiological Studies

Very distal femoral periprosthetic fractures: replacement versus fixation, a systematic review

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Abstract
Background: Very distal femur periprosthetic fractures (vDFPFs) around total knee arthroplasties (TKAs) are a growing and potentially devastating problem. These fractures can be fixed using a lateral distal femoral locking plate (DFLP) however, this often comes with a period of restricted mobility, which may be associated with increased morbidity and mortality in geriatric populations. Alternatively, surgeons can revise the TKA to a distal femoral replacement (DFR), allowing for earlier mobility – however this prosthesis comes with added upfront costs, and its own unique complications.Methods: We conducted a systematic review and summary analysis of complication rates, as well as clinical and functional outcomes, following the treatment of displaced vDFPFs with either a DFLP or DFR.Results: A literature search identified 25 studies with 645 patients (649 vDFPFs) included for analysis. There were 440 knees in the DFLP group (mean age 74.3 years) and 209 knees in the DFR group (mean age 77.7 years). All-cause reoperation rates were 22.6% in the DFLP group and 12.0% in the DFR group. Revision surgeries per complication were 1.19 for DFLP knees and 1.00 for DFR knees. Time to full weight bearing in DFLP patients averaged 132.3 days, versus an average of 1.9 days in DFR patientsConclusion: vDFPFs pose a challenging problem for patients and orthopaedic surgeons due to a high rate of all-cause reoperations. DFR may offer benefit over ORIF with DFLPs by reducing reoperation rates and time to weight bearing. Future research should include cost-effectiveness evaluations to better understand the utility of DFR for these complex fractures.

Clinical Epidemiological Studies

Exploring the association between cannabis and serum testosterone in men receiving methadone maintenance treatment

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Abstract
Introduction: Cannabis and opioids are two widely used substances with negative effects on reproductive health. Recent studies have shown that cannabis use may increase serum testosterone. Although opioids are known to suppress serum testosterone, there is a lack of research describing the endocrine effects of concurrent cannabis and opioid use. Objective: To test the hypothesis that cannabis use improves the suppressive effects of opioids on testosterone level in men on methadone maintenance treatment (MMT) for opioid use disorder (OUD). Methods: We used data from a prospective cohort study including 122 men enrolled in MMT for OUD. Serum testosterone level was assessed using an enzyme-linked immunosorbent assay at study enrolment and urine drug screens were collected for 12 months post-enrolment.Results: Altogether, 52.5% of participants (n = 64) were identified as cannabis users by urine drug screens. To examine the association between cannabis use and serum testosterone level we constructed unadjusted and adjusted regression models with serum testosterone as the dependent variable. In our unadjusted analysis, serum testosterone was inversely correlated with methadone dose (B = -0.002, 95% CI -0.005, -0.001, p = 0.004) and positively correlated with the percentage of cannabis-positive urine drug screens (B = 0.003, 95% CI <0.001, 0.006, p = 0.035). In our adjusted multivariable regression model, higher methadone dose was associated with lower serum testosterone (B = -0.003, 95% CI -0.005, -0.001, p = 0.003). However, neither cannabis use nor the percentage of cannabis-positive urine drug screens was significantly associated with serum testosterone (B = 0.143, 95% CI -0.110, 0.396 p = 0.266, and B = 0.002, 95% CI >-0.001, 0.005 p = 0.116, respectively). Conclusion: It does not appear that cannabis is able to normalize serum testosterone levels in men on MMT for OUD.

Clinical Epidemiological Studies

A Rare Case of Type 1 Neurofibromatosis Associated Unilateral Gigantomastia: A Case Report and Literature Review

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Abstract
Neurofibromatosis type 1 (NF1) is an autosomal dominant disorder characterized by the formation of benign nerve sheath tumours known as neurofibromas. A 28-year-old female presented with a large neurofibroma extending from the elbow of the right arm into the axilla and across the right breast. A mastectomy was performed to excise 4 kg of tissue with an immediate flap reconstruction. Postoperatively, the patient's hemoglobin levels dropped significantly due to excessive blood loss, but the patient was discharged by post-op day 5 with no additional complications. This study raises awareness for NF1, describes possible complications that may arise following excision of highly vascularized neurofibromas, and outlines possible techniques for breast reconstruction.

Clinical Epidemiological Studies

STATIN-INDUCED RHABDOMYOLYSIS: A CAUTIONARY TALE FOR HIGH-DOSE ROSUVASTATIN (Case Report)

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Abstract
Statins are a widely prescribed lipid-lowering agent for preventing adverse cardiovascular events. However, a major side effect is rhabdomyolysis, a breakdown of muscle tissue, which can cause acute kidney injury and death. We present a case of a 77-year-old Chinese woman who was started on 40 mg rosuvastatin following percutaneous coronary intervention and ultimately developed rhabdomyolysis and acute kidney injury one month later. This case highlights the need to consider patient risk factors for developing statin-induced rhabdomyolysis when choosing the right dose of statin to prescribe.

Clinical Epidemiological Studies

The role of fecal calprotectin in the diagnosis of acute pouchitis following IPAA for ulcerative colitis: A systematic review and meta-analysis

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Abstract
Purpose: Total proctocolectomy (TPC) with ileal pouch anal anastomosis (IPAA) is commonly performed for patients with refractory ulcerative colitis (UC). Pouchitis occurs in 20-50% of these patients. Fecal calprotectin is a biomarker that correlates well with the pouchitis disease activity index. However, previously established cut-off values have been variable. The aim of this review is to establish a clinically valuable cut-off value.Methods: Search of Medline, EMBASE, CENTRAL, and PubMed was performed. Articles were eligible if they measured fecal calprotectin in the setting of pouchitis in patients who underwent TPC with IPAA for UC. The pooled prevalence of sensitivity and specificity was calculated using meta-analysis of proportions. Results: From 117 relevant citations, seven studies with 256 patients (44.8% female, 39.88 years) met inclusion criteria. The pooled prevalence of pouchitis was 42%. The derived fecal calprotectin cut-off value was 171.89 μg/g (SD 50.6). The pooled sensitivity and specificity for the derived cut-off were 89% (95% CI 74-98%) and 76% (95% CI 61-88%), respectively. Conclusion: Fecal calprotectin may be a reliable and rapid diagnostic tool for acute pouchitis in patients following TPC with IPAA for UC. The high sensitivity of fecal calprotectin for detection of pouchitis makes it a valuable test for ruling out pouchitis. When used in conjunction with other biomarkers, the high specificity offers value in ruling in pouchitis. However, given the complexity of this disease process, relying solely on biomarkers for diagnosis is currently unreasonable. Larger, prospective studies are required to confirm these findings.

Clinical Epidemiological Studies

Is intrathecal analgesia associated with reduced post-operative pain in laparoscopic liver resections?

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Abstract
Introduction: Intrathecal analgesia have been recommended by the Enhanced Recovery After Surgery (ERAS) Society in laparoscopic colon resections and are also used in open liver resections; however, they have not been extensively studied in laparoscopic hepatobiliary surgeries.Objective: Primary objective was to explore postoperative pain at 48 hours among patients who underwent laparoscopic liver resections (LLR), receiving either intrathecal analgesia with or without patient controlled analgesia (PCA) versus PCA alone. Secondary objectives were to determine association of treatment type with post-operative pain outcomes at 48 hours and surgical complications.Methods: Ethics approval was obtained from the research ethics board. Patients who underwent LLRs between January 2016 and April 2019, and had intrathecal analgesia administration and/or PCA were included. To describe the postoperative pain levels at 48 hours, descriptive statistics were presented by treatment group for each pain outcome. Unadjusted regression analyses were then performed to explore the association of treatment type with each pain and surgical complication outcome. Multivariable linear regression analysis was then conducted to determine other factors associated with increased cumulative postoperative opioid consumption at 48 hours.Results: Out of 111 patients identified, 79 patients met criteria for inclusion; 22 had intrathecal analgesia with or without PCA and 57 had PCA only. There were no statistically significant differences in baseline characteristics, use of non-opioid pain-control, and post-operative complications between the groups. Intrathecal analgesia use was associated with reduced post-operative opioid consumption, measured in oral morphine equivalents, compared to PCA alone (Mean Difference (95%CI)=-45.92 (-83.10, -8.75); p=0.016).Conclusions: Intrathecal analgesia administration has the potential to decrease post-operative opioid use for patients undergoing LLRs. The findings from this study are consistent with the ERAS Society recommendations for laparoscopic colorectal surgery and offers support for the safety and efficacy of using intrathecal analgesia in the setting of LLRs for ERAS.

Clinical Epidemiological Studies

Systematic review of asthma and Chronic Obstructive Pulmonary Disease (COPD) burden, risk factors, and interventions in Malawi

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Abstract
Objective:Recent studies have identified an increasing burden of non-communicable diseases (NCDs) in sub-Saharan Africa, including cardiovascular disease, diabetes, and chronic lung diseases. This systematic review was undertaken to collate the current literature on the burden, risk factors, and management of chronic lung diseases in Malawi. The findings from this paper will inform the development of implementation research strategies to tackle NCDs in the country.Methodology:An extensive search of PubMed, Medline, EMBASE, and the WHO Global Health Library databases was undertaken in January 2020. All English-language studies conducted in Malawi after 2000 that reported on the prevalence of asthma, COPD, or their associated risk factors and management were included. Two authors independently reviewed each title and abstract for inclusion, followed by a comprehensive full-text screening. Any disagreement was resolved by joint review of the article with a third author. Results:Findings from the 19 included studies revealed a population with a large proportion of undiagnosed asthma and chronic obstructive lung disease (COPD). Point prevalence estimates reflected high heterogeneity in the literature, ranging from 0.83%-12% for asthma and 0.16%-13.6% for COPD. Risk factors associated with chronic respiratory disease symptoms included ever-smoking, old age, female sex, lower BMI, employment in farming or dusty conditions, being HIV-positive, carbon monoxide exposure, lack of access to private water supply, taller stature, and poverty. The quality of clinical care was generally limited and demonstrated a need for context-informed, innovative, and targeted interventions to manage chronic lung diseases in Malawi.Discussion:To our knowledge, this is the first systematic review of asthma and COPD burden, risk factors, and management in Malawi, putting the currently available literature into context and elucidating critical research gaps. As treatment of priority conditions such as HIV continues to improve in this setting, NCDs are increasingly being recognized as the next frontier in health.

Clinical Epidemiological Studies

Six-year publication outcomes for research presented at Annual Meetings of two Canadian surgical societies: Canadian Association of General Surgeons and Canadian Ophthalmological Society

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Abstract
Background: The Canadian Association of General Surgeons (CAGS) and Canadian Ophthalmology Society (COS) respectively sponsor and program two of largest biomedical conferences in Canada. Significant heterogeneity in methodology of previous studies precludes direct comparison of publication rate between specialties. Our objective was to evaluate publication rate and predictors of subsequent publication for abstracts presented by CAGS and COS at their respective Annual Meetings from 2010-2015.Methods: A PubMed search was conducted for abstracts by keywords, first and last authors to identify related publications. Study design, number of authors, and impact factor were compared between specialties.Results: 874 abstracts presented at COS and 365 abstracts presented by CAGS were reviewed. 376(43.0%) COS abstracts, and 167(45.3%) CAGS abstracts were published. There was no statistically significant difference in publication rate between the two specialties (p=0.491). Impact factor of published abstracts from COS was 2.39±2.30, significantly lower than those by CAGS of 3.03±2.09 (p<0.001). Predictors of subsequent publication for both conferences included abstracts with ≥5 authors (OR 2.18, 95% CI [1.59-3.00], p < 0.001), 3-4 authors (OR 1.43, 95% CI [1.03-1.97] , p = 0.031), RCTs (OR 1.95, 95% CI [1.12-3.37] p = 0.017), and basic science (OR 1.65, 95% CI [1.03-2.66], p = 0.037).Discussion and Conclusion: In this 6-year analysis, abstracts presented at CAGS Annual Meetings were published at a similar rate to COS Annual Meetings. Future research clarifying barriers to full-text publication of conference abstracts are required to investigate possible interventions to increase the ratio of published to unpublished conference abstracts.

Clinical Epidemiological Studies

The long-term functional recovery trajectory of patients with intracerebral hemorrhage: a systematic review

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Abstract

Introduction: Although many studies have been published relating to the recovery trajectory (including timeline and degree of recovery) of ischemic strokes, the literature on hemorrhagic stokes is much sparser. Consequently, our study aims to better understand when patients with intracerebral hemorrhage (ICH) show long-term functional improvements post-stroke and when their recovery plateaus. This information can help to plan appropriate time points for ICH treatment trials which have functional outcome as their main outcome measure.Methods: A systematic search was conducted in MEDLINE, Embase, CINAHL, OTSeeker, and PEDro English language primary studies from January 1, 1970 through November 20, 2019. We included studies that had a population of at least 50 spontaneous (non-traumatic) adult ICH subjects (>18 years old) with some measure of functional outcome or clinical stroke severity for ≥2 defined time points beyond the acute phase of recovery (defined as after the first month). We excluded studies where the ICH was a result of a hemorrhagic transformation of ischemic stroke, hemorrhagic tumor, vascular malformation, pure intraventricular hemorrhage without intraparenchymal hemorrhage, and subarachnoid hemorrhage. Results: Of the 6,892 articles initially identified in the database searches, 5,198 titles and abstracts were screened following duplicate removal. After full-text review of 79 articles, 17 citations were considered eligible for qualitative synthesis.Future Steps: We will abstract the following information from the included texts: study-level characteristics (e.g. study country, study period, study objectives, and sample size), functional outcome scale used, time of outcome measurement, the stated break-down of functional outcomes in the groups studied and/or percentage of patients achieving good outcome where a dichotomized outcome is given. The methodological qualities of the studies will be assessed by the Quality in Prognostic Studies tool for prognostic studies and the Newcastle-Ottawa Scale for observational studies.

Clinical Epidemiological Studies

Radiation safety in interventional radiology: comparative analysis of radiation exposure in venous access procedures

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Abstract
PURPOSETo evaluate radiation exposure in a large patient cohort, with implantation of port catheters and tunneled central venous catheters as a function of operator experience, access site and evolution of technique and fluoroscopy systems. This study examines radiation dose in an adult population at a single institution to examine improvement in radiation safety by taking into consideration parameters that influence stochastic and deterministic effects, ALARA principle, ICRP and NRC guidelines. METHOD AND MATERIALSIRB approval was obtained for this HIPAA compliant retrospective study. Radiation dose data was obtained from PACS for all implantable venous access procedures performed between 2015-2019. Statistical analysis included median, minimum, maximum and mean radiation dosage exposure per procedure. A $p < 0.05$ was statistically significant. Analysis parameters include involvement of trainee and radiation dosage {fluoroscopy time (FT), Dose Area Product (DAP) and peak skin dose (PSD) at the interventional reference point}. Procedures were sub-categorized into port insertion (6 Fr) and tunneled central venous (TCVC) insertion of Hickman catheter (10Fr) and apheresis catheter (14.5 Fr). RESULTSA total of 2111 procedures (545 apheresis catheters (AC), 358 Hickman catheters (HC), 1208 ports) were performed with a gender split of 60.4% female and 39.6% male. Age was not statistically significant as an independent variable. Significant differences in dose were observed for TCVC versus ports. TCVC had higher median FT (AC: 36sec, HC 34sec) as compared to ports (31sec). Higher PSD was observed in TCVC (4.1 mGy) as compared to ports (3.0 mGy). Higher DAP was observed in TCVC (105 cGy/cm2) as compared to ports (84 cGy/cm2). Trainee involvement accounted for 25% of procedures, with a higher FT and PSD as compared to non-trainee (FT: 31s vs 42 s; PSD: 3.3 vs 4.0 mGy). No major periprocedural complications were identified. CONCLUSIONRadiation doses from venous access procedures have decreased over the last 15 years, given the well-calibrated equipment and advances in fluoroscopic parameters such as FOV, focal spot size, temporal and motion factors, dynamic range, pixel binning, frame averaging and pulsed fluoroscopy. CLINICAL RELEVANCE/APPLICATIONVenous access procedures are unlikely to deliver a radiation dose high enough result in skin injury given advances in interventional techniques and fluoroscopy systems.

Clinical Epidemiological Studies

Embolization of ectopic stomal varices utilizing a transhepatic antegrade approach: a case series

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Abstract
Background: Ectopic stomal varices (ESVs) are dilated mesenteric varices at the mucocutaneous border of the stoma. Variceal bleeding/hemorrhage is the main presentation of ESVs, with mortality rates of ectopic varices reported as high as 40%. The ideal management approach to treating ESVs is yet to be established.Purpose: Evaluation of outcomes following percutaneous antegrade transhepatic venous obliteration (PATVO) in patients presenting with active bleeding from ESVs.Methods: A retrospective review of nine patients who underwent ten PATVO interventions for ESVs at our tertiary care institution was performed. Inclusion criteria was age >=18 years and acute or chronic bleeding from ESVs. Technical success was defined as resolution of varices on angiography immediately after embolization. Early clinical success was defined as resolution of bleed for at least 30 days after procedure.Results: Technical success rate was 100% (n=9), and early clinical success rate was 88.9% (n=8). Intra- and post-operative complication rate was 0%. Re-bleed rate of 22.2% (n=2) at a mean of 274.5 days was established after initial PATVO procedure due to unresolved underlying portal hypertension. These patients were successfully treated with TIPS. Within our study population, 22.2% (n=2) of patients underwent prior surgical interventions that resulted in clinical failure and subsequent re-bleeding prior to being referred to interventional radiology. These patients were successively treated with PATVO, resulting in complete technical and early clinical success.Conclusion: PATVO is an effective option for embolization of bleeding from ESVs. Given the high technical success rate and satisfactory early clinical success, PATVO should be considered as the primary treatment option prior to attempting TIPS, especially considering these patients have multiple comorbidities often precluding surgical options. Additionally, PATVO is less invasive than TIPS, and demonstrates a lower incidence of complications and faster recovery period.

Clinical Epidemiological Studies

An overview of the evidence on the relationship between dietary fat intake and health outcomesDietary fat intake and cancer incidence. Dose-response meta-analysis of cohort studies.

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Abstract
Background:Systematic reviews addressing the association between dietary fats and health outcomes commonly lack appropriate analyses and a systematic approach to evaluate the certainty of evidence. We conducted an overview of systematic reviews that improves upon these limitations. This abstract presents our findings on cancer incidence. Methods: We searched MEDLINE, EMBASE, CINAHL and the Cochrane Database of Systematic Reviews from 2015 to June 2, 2019 for systematic reviews of cohort studies and randomized control trials that addressed the effect of dietary fats, measured by either self-report or biomarkers, on health outcomes. Reviewers worked independently and in duplicate to screen search results for eligibility and to extract data. We selected the most recent systematic reviews of RCTs and cohort studies addressing each exposure and outcome of interest for inclusion in the overview and extracted study characteristics, results, and assessed risk of bias. We conducted de novo meta-analyses for reviews that did not include dose-response meta-analysis or had analytic errors and applied the GRADE system to evaluate the certainty of evidence (1,2). Results: Our search yielded a total of 6,184 unique records of which 76 reviews were eligible for inclusion. Results showed that the magnitude of effect of dietary fats on cancer incidence was very small and the certainty of evidence was low to very low. Dietary fats may have little or no effect on endometrial, pancreatic, gastric, esophageal and liver cancer. For ovarian cancer incidence, vegetable, monounsaturated and polyunsaturated fats may result in a small decrease while animal, saturated and trans fats may result in a small increase and total fat may have little or no effect. Total, saturated, monounsaturated, and trans fats may result in a small increase in breast cancer, while animal fat may have little or no effect. Polyunsaturated fats may have little or no effect on colorectal cancer, while the effect of total, saturated and monounsaturated fats is unclear. Conclusions: The effects of dietary fat on cancer incidence are likely very small and certainty of evidence is low to very low. These findings may have implications for future recommendations and research on dietary fats.

Clinical Epidemiological Studies

VALUE OF LIVER BIOPSY IN ANOREXIA NERVOSA-RELATED TRANSAMINITIS: A CASE STUDY AND LITERATURE REVIEW

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Abstract
Background/Question: Anorexia nervosa (AN) is a complex eating disorder that affects multiple organs. Liver injury with transaminitis occurs in 63-76% of patients. Although the mechanism of liver injury in AN remains unclear, clinicians often rely on presumptive clinical diagnosis and do not consistently order a liver biopsy. We present a patient with severe AN-related transaminitis who underwent liver biopsy and a literature review of similar cases to delineate the clinicopathologic spectrum of liver injury in AN patients. A 19-year-old female with AN was admitted for right-upper-quadrant pain, severe malnutrition (BMI 12.7 kg/m2) and marked transaminitis (ALT/AST >40x the upper limit of normal ULN), yet the liver biopsy was near normal.Methods: A Google Scholar search for keywords “anorexia nervosa” and “liver [needle] biopsy” or “autopsy” yielded 35 cases in 22 reports, including one autopsy.Results: Of these 36 cases including ours, 31 were female and median age was 26-year-old (range 18-66). The median BMI was 12.4 kg/m2 (range 7.6-17.5). Clinical presentations included severe malnutrition(58%) and hypoglycemic coma(19%). On admission, 34(94%) had elevated transaminases (ALT>63 U/L, AST>40); 22(61%) had enzyme levels >10xULN. Other lab findings were hypoalbuminemia(41%); and elevated INR(74%), ALP(63%) or bilirubin(33%). Radiographically, 20 cases had normal liver, 7 ascites, and 2 fatty liver. Microscopically, 12 cases displayed fibrosis (6/12 AST>10xULN), 8 necroinflammation (5/8 AST>10xULN), 8 hepatocellular atrophy, 7 iron overload, and 4 macrovesicular steatosis. 15 cases had glycogen depletion while 2 had increased deposition. All but one case had normal liver architecture. Concurrent etiologies included drug-induced injury, Wilson’s disease, and hemochromatosis (with C282Y mutation).Conclusion: AN patients display a wide spectrum of liver histopathology and transaminitis often does not correlate with the degree of liver injury microscopically. In severe persistent AN-related transaminitis, liver biopsy is useful to assess the degree of liver injury and to exclude other potential etiologies.

Clinical Epidemiological Studies

Artery of Percheron infarction with persistent amnesia: a case report and review of bilateral paramedian thamalic syndrome

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Clinical Epidemiological Studies

Noise in endoscopic sinus and skull base surgery operating rooms

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Abstract
Introduction: Noise in the operating room contributes to miscommunication among team members and may negatively impact patient outcomes. This study aimed to quantify noise levels during endoscopic sinus and skull base surgery. The secondary aim was to understand how OR team members perceive noise during endoscopic sinus and skull base surgery. Methods: Noise levels were measured using the validated phone application SoundMeter X 10.0.4 (r1865) (Faber Acoustical, Utah, USA) at the ear-level of the surgeon, scrub nurse, circulating nurse, and anesthesiologist. At the end of each surgery, OR team members were asked to complete a six-question questionnaire about noise during that surgery. Results: 1412 noise measurements were recorded across 353 trials. The loudest mean noise measurement was 84.51 dB at the ear-level of the surgeon. Noise was significantly higher at the ear-level of the surgeon and scrub nurse in comparison to the circulating nurse ($p = .000$) and anesthesiologist ($p = .000$). 40% of questionnaire respondents believed noise was a problem and 38% stated that noise caused communication issues during surgery. Conclusions: Surgeons and scrub nurses have significantly higher noise exposure in comparison to circulating nurses and anesthesiologists during endoscopic sinus and skull base surgery. For these members of the OR team, noise is also perceived as problematic and causing issues with communication. Mechanisms to reduce potential noise may be implemented to improve communication and patient outcomes in endoscopic sinus and skull base surgery.

Clinical Epidemiological Studies

Hydromorphone versus Morphine: A Retrospective Cohort Study to Evaluate the Quality of Postoperative Analgesia

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Abstract
Background: Opioids are the most widely used therapy for pain during the postoperative period. It has been suggested by some that hydromorphone is clinically better. Our primary objective was to determine if there is a difference in postoperative pain score ratings between adult patients receiving intravenous hydromorphone versus intravenous morphine on discharge from the post-anesthesia care unit (PACU).Methods: For this historical cohort study, convenience sampling was used to identify the first 605 patients ≥18 years undergoing elective, non-cardiac surgery. Patients were categorized based on treatment in the PACU with hydromorphone (n=326) or morphine (n=279). Pain scores (scale of 0–10), nausea/vomiting (scale of 0–3), pruritis (scale of 0–3), and sedation (scale of 0–4), as well as total opioid dose administered from arrival in PACU until readiness to discharge were evaluated.Results: Regarding the primary outcome of pain reported at discharge from the PACU, there was no significant difference between hydromorphone and morphine (mean difference, 0.10; 95% confidence interval, –0.21 to 0.42; P = 0.53). Similarly, there were no significant differences in between-group length of stay in PACU, satisfactory analgesia, nausea/vomiting, and sedation.Conclusion: This study serves to help guide the decision process for selecting either morphine or hydromorphone for acute postoperative analgesia. Overall, we found no statistically significant difference for analgesia or for common opioid-related adverse effects between these two opioids in the postoperative period at the time of discharge from the PACU.

Clinical Epidemiological Studies

Application of Routinely Collected Administrative Data to Track Demographic, Health-Care Use, and Mental Health Characteristics of People Experiencing Homelessness in Ontario, Canada

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Abstract
Introduction: People experiencing homelessness have complex health needs and poor access to care. Emergency departments (EDs) are often their main point of health-care contact. Using administrative data from EDs, we examined demographic, health service use, and mental health characteristics of people experiencing homelessness over time in Ontario.Question: What are the demographic, health, and healthcare use patterns among individuals experiencing homelessness in Ontario, Canada from 2010-2017?Methods: All routinely collected administrative data from EDs within Ontario (2010–2017) were analyzed. Individuals experiencing homelessness were identified via postal code designation, and compared with a matched homed sample. Outcomes included number of visits, unique patients, International Classification of Diseases (ICD)-10 category of diagnoses, and re-presentation time.Results: A total of 604,170 visits to EDs over 10 years were made by 39,408 unique individuals experiencing homelessness. The number of visits steadily increased over 10 years, despite declining shelter use. The most prevalent ICD-10 category was mental disorders (34.9% of visits). An ED visit that results in a mental disorder diagnosis is 13x more likely in a person currently experiencing homelessness than a homed person. Under mental disorders, substance-related disorders accounted for 54% of presentations, with alcohol being the most common substance. Psychotic disorders and neurotic, stress-related, and somatoform disorders were the second and third most common presentations. 18% of patients experiencing homelessness returned to EDs on the same day. The median representation time was 14 days for patients experiencing homelessness, compared to homed sample median of 117 days.Conclusion: Applications of administrative data present a novel method of measuring health for marginalized populations. We found people experiencing homelessness are presenting to EDs more frequently in Ontario, with significant psychiatric problems. Furthermore, representation to EDs is common, which suggests inadequate treatment. Our study identifies several important health vulnerabilities within this population, which may guide future interventions.

Clinical Epidemiological Studies

Diagnosis and Acute Management of E-cigarette or Vaping Product Use-Associated Lung Injury (EVALI) in the Pediatric Population: A Systematic Review

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Abstract
Objectives: To synthesize quantitative data on the presentation, investigative findings, patterns of lung injury, and interventions of pediatric cases of e-cigarette or vaping associated lung injury (EVALI) in the acute care setting.Study design: A literature search using keywords was performed on April 17, 2020 in accordance with PRISMA guidelines. 3558 articles published were extracted from MEDLINE via PubMed, Embase via OVID, CINAHL via EBSCO, Web of Science and the Cochrane Library. Studies were evaluated for inclusion based on predetermined inclusion and exclusion criteria by two independent reviewers.Results: The search yielded a total of 3558 individual results, 145 of which were evaluated by full text review, resulting in 22 articles included in this systematic review. Two of these articles were identified by manual search of article references. A total of 61 cases of EVALI were described and 10 major patterns of lung injury were identified for which presenting symptoms, diagnostic and laboratory investigations, interventions and outcomes were synthesized.Conclusions: Cases of EVALI in the pediatric population have been reported in patients as young as 13 years of age and often present with respiratory, constitutional, abdominal and cardiovascular signs and symptoms. Diagnostic findings vary based on underlying lung injury pattern, however typical patterns of common findings were identified including the presence of ground-glass opacities on computed-tomography (CT) and leukocytosis. Mainstays of treatmentinclude the use of corticosteroids, antibiotics, and ventilatory support including extracorporeal membrane oxygenation (ECMO). Outcomes range from complete or near complete recovery of lung function to death.

Clinical Epidemiological Studies

Ab-interno Implantation of XEN 45 Microstent in Eyes with Previous Tube Shunt Surgery for Glaucoma

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Abstract

BackgroundTube shunt surgery is often done on glaucomatous eyes deemed to have high risk of surgical failure with trabeculectomy. Over time, however, subconjunctival fibrosis may result in suboptimal filtration, requiring further intervention. The XEN gel stent (Allergan Inc., an Abbvie company) is a promising intervention with minimal trauma. This study explores whether XEN implantation with the ab-interno approach could be a viable approach in patients with suboptimal intraocular pressure (IOP) after tube shunt surgery.MethodsThis is a retrospective, single-surgeon study conducted on patients who had XEN implanted post-tube shunt. Main outcome measures were IOP and number of glaucoma medications preoperatively, and at postoperative week (POW) 1, postoperative month (POM) 1, 3, 6, and 12. Adverse events and further interventions such as bleb needling were noted. Surgery outcomes were categorized as absolute success (IOP </= 18mmHg or >/= 20% IOP reduction without glaucoma medications), qualified success (IOP </= 18mmHg or >/= 20% IOP reduction with glaucoma medications), or failure (additional glaucoma surgery, or IOP > 18mmHg and < 20% IOP reduction with maximum tolerated glaucoma medications).ResultsThe study population consisted of 7 eyes from 6 patients, with 1 eye having data only up until POM3. Preoperative IOP was 23.9 + 5.3mmHg (mean +/- standard deviation) with 4.3 +/- 1.3 glaucoma medications and by POM12, mean IOP was 14.0 + 5.8mmHg with 1.5 +/- 1.6 glaucoma medications. By POM12, bleb needling was performed on 3 eyes (50%) and complications also occurred in 3 eyes (50%). 2 eyes (33.3%) were considered as absolute successes, 3 eyes (50%) as qualified successes, and 1 eye (16.7%) as a failure.ConclusionThere is a trend for ab interno XEN implants after failed tube shunt surgery to reduce mean IOP and mean number of glaucoma medications, though mild complications occurred in some eyes. Interventions after XEN implant such as bleb needling can help further optimize IOP control.

Clinical Epidemiological Studies

Diagnosis and Acute Management of Adolescent Cannabinoid Hyperemesis Syndrome: A Systematic Review

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Abstract
Objective: To synthesize qualitative and quantitative data on the diagnosis and effective management of Cannabinoid Hyperemesis Syndrome (CHS) in the adolescent population.Study Design: Using keywords, 1334 studies published between December 1954 and December 2019 were extracted from MEDLINE via PubMed, Embase via OVID, CINAHL via EBSCO, Web of Science and the Cochrane Library. Studies were evaluated by two independent reviewers using predetermined inclusion and exclusion criteria. Results: The search yielded 148 studies for full-text review, of which 21 were included in the systematic review. A total of 10 articles related to the diagnosis of CHS while 11 articles discussed the treatment and management of adolescent cases of CHS, all of which 11 articles were case reports or case series. Conclusion: CHS in the adolescent population fits the major and minor diagnostic criteria of CHS in an adult population; however, in adolescent patients, CHS may present more frequently in females, with the earliest reported case presenting at age 15. CHS may also occur in a substantial proportion (21%) of adolescent patients with a history of anxiety and depression; however, higher quality studies to assess the prevalence are warranted. Although haloperidol and topical capsaicin cream show symptom relief in isolated cases, complete cessation of cannabis use is the only known effective treatment.

Clinical Epidemiological Studies

Reliability and validity of impulsivity measures in borderline personality disorder patients: a systematic review and meta-analysis.

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Abstract

Impulsivity is a multifaceted construct and an important trait of many mental health disorders. Borderline personality disorder is a disorder characterized by impulsivity, in addition to unstable interpersonal relationships, self-image and affect. Measures of impulsivity are widely used clinically and in research pertaining to treatment outcomes and risk factors of borderline personality disorder. However, the reliability and validity of these impulsivity measures has not been well established in this population. The purpose of this review is to ascertain the reliability and validity of impulsivity measures in borderline personality disorder.PubMED and PsycInfo were searched from database inception to August 12,2020 for studies reporting on measures of impulsivity in a population of patients with borderline personality disorder. Studies were included if they reported on reliability and/or validity measures of impulsivity indices including self-report scales, laboratory measures and clinician-rated scales.The search yielded 984 studies. Following duplicate removal, 783 records were screened and 356 full-text articles are currently being assessed for eligibility. At this time, 37 studies are eligible for inclusion and 99 studies have been excluded. Included studies will have their quality assessed and the GRADE approach will be used for assessment of bias and quality of evidence. This systematic review and meta-analysis will address a gap in the literature by evaluating the reliability and validity of measures used to assess impulsivity specifically in borderline personality disorder patients, although they have been well studied in other clinical and nonclinical population. This has important implications due to current widespread use of these measurements for assessment of symptoms and treatment outcomes of borderline personality disorder patients in clinical trials.

Clinical Epidemiological Studies

Healthcare outcomes for people who inject drugs (PWID) with infections: a retrospective chart review

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Abstract
Background: Injection drug use poses a significant public health challenge. Clinical experience indicates that people who inject drugs (PWID) are hospitalized frequently, especially with regards to infectious diseases (ID). However, little is known about their healthcare trajectories. Objective: To evaluate the feasibility of building a cohort of PWID who access health care facilities in Hamilton, Ontario, in order to evaluate their ID-related comorbidities, mortality, and other health-related outcomes.Methods: Patient charts were identified from two local hospitals between 2013 and 2018, based on ID consultations and hospital searches using International Statistical Classification of Diseases and Related Health Problems codes. Individuals were included if they had injected drugs in the past 6 months and had an infection on admission. Charts were accessed using MediTech and underwent primary and secondary reviews. Research Electronic Data Capture was used to record and analyze data.Results: Of 244 PWID included, 33.6% were admitted to the intensive care unit, 36.1% underwent surgery, and 9.0% of patients died during the index admission. Primary ID diagnoses included sepsis/bacteremia (20.5%), endocarditis (28.3%), abscess (16.4%), cellulitis (12.7%), osteomyelitis (5.3%), septic arthritis (3.7%), pneumonia (3.7%), and other (9.0%). Within 30 days of discharge, 29.8% were seen in the ED again and 14.2% were readmitted. 27.0% were discharged with a PICC line, 12.8% left AMA, and 2.0% left AMA with a PICC line. Of the 50 patients diagnosed with sepsis/bacteremia and 69 patients with endocarditis, 10 (20.0%) and 8 (11.6%) died, respectively.Conclusions: Understanding the trajectory of PWID represents the first step in focusing interventions to improve care for this population. Limitations include completeness of information found in hospital charts. Findings may not be generalizable to all PWID, since this study captures PWID with higher acuity of IDs admitted to hospital.

Clinical Epidemiological Studies

Risk of non-catheter-related venous thromboembolism events in cystic fibrosis patients during hospitalization

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Abstract
Background: Cystic Fibrosis (CF) is a rare autosomal recessive genetic disorder affecting multiple organs with pathology most prominent in the lungs. Increased incidence of venous thromboembolism (VTE) has been found in pediatric CF patients and CF patients with central venous catheter (CVC). However, the risk of VTE, especially non-catheter related VTE, remains poorly defined in hospitalized adult CF patients.Objectives: The primary objective was to determine the rate of non-catheter related VTE in adult CF patients hospitalized with CF bronchiectasis exacerbation. The secondary objectives were to determine risk factors for VTE and rate of prophylaxis in hospitalized CF patients. Methods: Retrospective chart review of all adult (17+) CF patients admitted at the University of Alberta Hospital for acute exacerbations of CF bronchiectasis between 2006-2016 and a control group of gender-matched patients admitted to the same unit with non-CF, respiratory exacerbation of underlying chronic lung diseases.Results: 109 CF patients with 399 successive hospital admissions and 315 non-CF patients with 353 admissions were identified. There were 6 (1.5%, 1 non-catheter related) confirmed VTE in the CF group, and 12 (3.4%, 8 non-catheter related) confirmed VTE in the non-CF group, which was older and had higher prevalence of VTE risk factors. Prophylactic anticoagulation rates during hospital stay were 67.8% in CF vs. 75.7% in non-CF. Analyses of potential thrombotic risk factors among CF patients and VTE development are presented, with no clear correlation to number of exacerbations or duration of hospitalization.Conclusions: The incidence of VTE in patients with CF was clinically similar to those reported in other studies (1.4%) and the general population. The risk of non-catheter-related VTE is significantly lower than identified for general medical inpatients. Rate of anticoagulation prophylaxis was lower in patients with CF compared to without. The small event number limits identification of significant thrombotic risk factors related to CF. Larger prospective studies are needed to better determine the risk of VTE during hospitalization for CF patients.

Clinical Epidemiological Studies

“In case of emergency, go to your nearest emergency room”- Good advice for thoracic surgery patients?

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Abstract
PurposeHospital readmissions post lung cancer surgery are associated with worsened overall prognosis. This single-center retrospective cohort study aimed at evaluating if readmissions to the centre where the surgery was performed (index hospital) were associated with improved long-term outcomes when compared to different (non-index) hospital.MethodsPatients undergoing malignant lung resection between 1/2012 and 12/2019 were identified from a prospectively maintained institutional database. The primary outcome was incidence of multiple readmissions comparing index to non-index patients. Secondary outcomes included overall survival, length of readmission, and characteristics associated with non-index status. Overall survival differences were tested using log-rank test. Cox regression was used to study association between non-index readmission and all-causes mortality. Logistic regression was used to analyse clinical factors associated with non-index status and multiple 90-day readmissions.ResultsOverall, 3615 patients were included in the analysis. Of those, 311 patients (8.6%) were readmitted, with 173 (56%) to index hospital and 138 (44%) to non-index hospitals. Outside of age, there were no statistically significant differences in patients or clinical characteristics, comorbidities, type and extent of surgery and perioperative complications. Patients in the non-index group were older than those readmitted to the index hospital (70 □10.7 vs 66□12.2, p=0.018). Prevalence of multiple readmissions was 26% (95% CI=0.19,0.34) amongst non-index patients at 90-days, compared to 16% (95% CI=11%,22%) of index patients. There was a strong association between non-index status and experiencing multiple readmissions (OR=1.83, 95% CI=1.01 to 3.32). This association remained consistent after adjustment for relevant confounding variables (OR=2.0, p=0.024,95% CI=1.1,3.6). Patients readmitted to non-index hospitals demonstrates a worsened overall survival in both crude (hazard ratio [HR]=1.85, CI=1.2,2.8, p=0.04) and adjusted (HR=1.9, 95% CI=1.2,2.9, p=0.006) models.ConclusionLung resection readmissions to a non-index hospital were associated with higher likelihood for multiple readmissions and worse overall short and long-term survival.

Clinical Epidemiological Studies

Cryoanalgesia for postoperative pain relief: a systematic review and meta-analysis of randomized controlled trials

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Abstract

Background: Pain after surgery is common and causes patient suffering and interferes with function and quality of life. Current treatments such as opioids have significant side effects. Regional anesthetic blocks can be effective but do not last long. Cryoanalgesia can be an effective modality to treat acute pain and to manage pain that persists after surgery. However, there is no clear consensus regarding its clinical effects. This systematic review and meta-analysis assesses its efficacy and safety for postoperative pain. Methods: MEDLINE and EMBASE databases were searched from inception to July 2020 to identify RCTs that evaluated the efficacy of cryoanalgesia for postoperative pain in adults. Studies were screened by two reviewers for inclusion and data extraction. Outcomes included pain relief (0-10 pain rating scores), opioid use, and incidence of adverse effects. A random effects meta-analysis was carried out for pooled outcomes. Results: From 193 citations, twenty-four trials were eligible; twenty examined thoracic surgeries and four assessed other surgeries. Within thoracic surgery, acute pain intensity was reduced by mean differences (95% confidence interval) of 1.51 (0.84-2.19) with cryoanalgesia compared to no cryoanalgesia. There was no difference when added to epidural analgesia. For persistent pain cryoanalgesia reduced pain intensity by 0.96 (0.51-1.42) compared to no cryoanalgesia. There were no effects on opioid consumption. Adverse events were inconsistently reported and could not be pooled. Heterogeneity in comparators and outcomes were important limitations. Conclusion: Cryoanalgesia is a potential tool to help manage postoperative pain. Limited evidence consisting of small studies indicates it can effectively decrease pain intensity in thoracic surgeries. However, most existing studies are old and suffer from methodological limitations. There is a need to perform larger studies and also assess safety outcomes in appropriate populations.

Clinical Epidemiological Studies

Evaluating direct oral anticoagulants versus vitamin K antagonists for patients with a left ventricular thrombus: a systematic review and meta-analysis

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Abstract
BACKGROUND: Left ventricular (LV) thrombi are associated with high rates of stroke and systemic embolism (SSE), morbidity, and mortality. While vitamin K antagonists (VKAs) such as warfarin have historically been the anticoagulant of choice, they have a narrow therapeutic window and require frequent monitoring. Direct oral anticoagulants (DOACs) offer more predictable anticoagulation but have not been well studied for use in this condition. One recent cohort study found a significantly increased risk of SSE with DOACs in this population. This systematic review compares the risk of SSE when using either a DOAC or VKA as treatment for LV thrombus.METHODS: CENTRAL, MEDLINE, EMBASE, CINAHL, ACPJC, Web of Science, grey literature, and conference proceedings were searched for studies comparing DOACs and VKAs in treating LV thrombus. Two reviewers independently performed title and abstract screening, full-text screening, data extraction, and risk of bias assessment.RESULTS: Twelve observational studies (n=2,225) were included. Estimates of the effect of DOACs versus VKAs on occurrence of stroke (RR 1.15, 95% CI [0.76, 1.75], p=0.51) and systemic embolism (RR 1.72, 95% CI [0.78, 3.81], p=0.18) did not reach statistical significance. There were no significant differences in mortality (RR 0.99, 95% CI [0.67, 1.45], p=0.95), thrombus resolution (RR 1.02, 95% CI [0.91, 1.15], p=0.69), any bleeding (RR 1.47, 95% CI [0.65, 3.33], p=0.36) and major bleeding (RR 0.22, 95% CI [0.01, 4.21], p=0.32). CONCLUSIONS: The results suggest that the effect of DOACs vs. VKAs on risk of SSE cannot be determined. This review highlights the need for well-designed randomized controlled trials examining the outcomes of DOAC vs. VKA as treatment for LV thrombus.

Clinical Epidemiological Studies

Qualitative Analysis of Opinions of Homeless and Street-Involved Youth on Marijuana Use and Mental Health

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Abstract

Background: A substantial body of research demonstrates adolescent cannabis use as a significant risk factor for future onset of psychosis. Related studies have identified increased rates of substance use amongst homeless at-risk youth compared to their counterparts living in homes and schools. Despite homeless and street-involved youth having greater experience with substance use than their middle and upper class peers, the opinions of these groups on cannabis use and associated mental health sequelae are not well documented.Objective: To identify and qualitatively analyze the opinions of socially disadvantaged youth on cannabis use and its association with psychosis and mental health.Methods: A mixed methods study was conducted whereby interview transcripts from conversations with participants recruited from the Good Shepherd homeless shelter in Hamilton, Ontario were qualitatively analyzed by 2 reviewers. Participants played two video games designed for the study, one of which was a generic game and another that focused on core concepts of cannabis use, substance addiction, and psychosis. Following gameplay, participants engaged in the interview. Themes regarding opinions about cannabis use, mental health, and help seeking behaviours were developed, coded, and collated from the transcript data.Results: The three central emerging themes were the interpersonal effects of cannabis use (including: psychiatric symptoms, social isolation, academic and occupational ramifications, emotional trauma, and socialization), the need for stigma reduction in the areas of substance use and mental health, and the importance of psychoeducation in promoting appropriate help seeking and safer drug-related behaviours. Conclusions: Participants associated cannabis use with deleterious effects on interpersonal relations and occupational productivity, and identified the potential of use to give rise to psychiatric disturbance. Moving forward, systematic psychoeducation and efforts to reduce stigma are likely to lead to safer behaviours related to cannabis use and promote healthier help seeking habits among at-risk youth.

Clinical Epidemiological Studies

Assessing sex-based differences in ST-elevation myocardial infarction reperfusion therapy.

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Abstract
Background: Percutaneous coronary intervention (PCI) is a standard of care reperfusion therapy for people who experience an ST-elevation myocardial infarction (STEMI). Reperfusion therapy is time-sensitive with the benchmark Door to Balloon (DTB) time of 90 minutes. The key subinterval in achieving the benchmark is the initial recognition of STEMI, identified as the time from First Medical Contact (FMC) to electrocardiogram test (ECG). Some studies show that females experience delayed reperfusion compared to male STEMI patients whereas other studies show no effect of sex on reperfusion time. Whether or not female sex influences timely reperfusion within the Hamilton-Niagara-Haldimand-Brant Region (HNHB) local health integrated network (LHIN) remains unknown.Questions: In patients diagnosed with STEMI, does female sex predict delayed DTB times when compared to male sex? If a difference in DTB exists, is the delay attributable to the STEMI diagnosis time?Methods: This will be a retrospective observational study assessing the DTB time in patients presenting with STEMI and who received reperfusion therapy from 2016-2019. CorHealth Ontario database will be used to obtain relevant time intervals (FMC to ECG, and overall DTB), and patient characteristics like chief complaint, Killip class, and co-morbidities. Appropriate quantitative (t-tests, logistical regressions) and qualitative (Chi-square tests) statistical analyses will be performed using SPSS.Results: A previous study in HNHB LHIN identified that females on average receive less STEMI treatment, suggesting that females will likely experience delayed DTB in our study. Furthermore, this study will identify several patient and system-related factors that might lead to a delay in STEMI recognition and reperfusion.Discussion/Conclusions: Currently, there is a lack of sex-based guidelines for STEMI therapy. The study information could guide the initiation of system or patient level interventions to optimize timely primary PCI within the HNHB region. The study information may apply to other large-volume, urban PCI-capable centers.

Clinical Epidemiological Studies

Diagnosis and management of odontogenic mediastinitis: Case report and a systematic review

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Abstract

Objective: Odontogenic descending necrotizing mediastinitis (DNM) is a rare but sometimes fatal complication of tooth infections. The mortality rate remains high, up to 40%, and there is no consensus on optimal workup and management currently. This review aims to summarize cases of odontogenic DNM in the literature to optimize management strategies and aid physicians in its early recognition. Methods: A systematic review of the Ovid Medline, EMBASE Classic and Pubmed databases was conducted using PRISMA guidelines. Original research studies reporting an odontogenic etiology of DNM were included. Results: Our search identified 226 articles. Final inclusion consisted of 60 studies describing 204 cases. Most patients were male (80.4%) with a mean age of 47.64 ± 15.96 years old. Patients primarily presented with edema (57.7%), fever (42.3%), trismus (37.2%), dyspnea, (26.9%), dysphagia (26.9%). Common radiologic findings were abscesses or fluid collection in the mediastinum (53.1%), air in the soft tissues (50.0%), pleural effusion or empyema (37.5%), mediastinal widening (32.8%), and pericardial effusion (7.8%). Patients were treated with intravenous antibiotics and a variety of surgical techniques such as cervicotomy only (51.2%), thoracotomy only (15.9%), cervicotomy and chest tube (3.5%). The mortality rate was 14.2% with a mean length of hospital stay of 30.1 ± 20.2 days. Conclusion: This systematic review reports and analyzes epidemiological, clinical and treatment-related data regarding patients with odontogenic DNM. Further research is needed to promote implementation of such data into clinical practice, with potential to reduce the associated mortality rate.

Clinical Epidemiological Studies

Safety and early results of Subchondroplasty® for the treatment of bone marrow lesions in osteoarthritis: a systematic review

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Abstract
Purpose: Subchondroplasty® is a novel minimally invasive procedure for painful subchondral bone marrow lesions (BMLs). The aim of this systematic review was to characterize the clinical outcomes of the Subchondroplasty® procedure, a novel minimally invasive procedure for the treatment of BMLs. Methods: MEDLINE, Embase, Web of Science and Clinicaltrials.gov were searched from database inception to search date (June 10, 2020) for all clinical studies which discussed Subchondroplasty®. Data was collected regarding patient demographics, indications, outcomes and complications of the procedure.Results: Seventeen studies met the inclusion criteria. There were 756 patients included, 45.1% were female, the mean age was 54 years old (range: 20-85). Mean pain score on visual analogue scale (VAS) prior to Subchondroplasty® was 7.8 ± 0.6, but decreased to 3.4 ± 0.7 postoperatively. All studies investigating functional scores reported improvement following Subchondroplasty® (IKDC 31.7 ± 1.9 to 54.0 ± 4.2, KOOS 38.1 ± 0.6 to 70.0 ± 4.1). There were consistently high levels of patient satisfaction, 87 ± 8% of patients would be willing to undergo the procedure again. Seven cases of complications were reported, most seriously osteomyelitis and avascular necrosis. Conversion to knee arthroplasty ranged from 12.5% to 30% with length of follow-up ranging from 10 months to 7 years. Conclusions: Existing low-quality studies show Subchondroplasty® to benefit patients with BMLs through reduction in pain and improvement in function, along with a high degree of satisfaction following the procedure. The low short-term conversion rate to arthroplasty suggests that Subchondroplasty® may play a role in delaying more invasive and expensive procedures in patients with BMLs. Subchondroplasty® is a novel procedure that has promising initial findings, but requires further high-quality, comparative studies with long-term follow-up to better understand the outcomes of the procedure and impact clinical practice recommendations.

Clinical Epidemiological Studies

Randomized controlled trial of scrotal versus inguinal orchidopexy on postoperative pain: The EXPRESSO trial

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Abstract
INTRODUCTION AND OBJECTIVE: To compare the impact of orchidopexy approach (scrotal [SO] vs. inguinal [IO]) on analgesic requirements, postoperative pain scores and complication rates.METHODS: A superiority RCT including boys 10-95 months of age at surgery, diagnosed with palpable undescended testicles (UDT) was conducted. Patients with non-palpable or bilateral UDTs, previous inguinal surgery on the ipsilateral side and concurrent procedures were excluded. Block randomization with 1:1 allocation ratio and a standardized anesthesia protocol were employed. The primary outcome was postoperative pain and analgesic use in hospital and at home using validated pain scales (FLACC, CHEOPS, PPPM, TPPPS). Secondary outcomes included operative time (OpT), conversion and success rates, and complications at 6-8-weeks. An intention to treat protocol (ITT) was followed. RESULTS: We enrolled 173 patients, 12 withdrew. Of the 161 patients who completed follow-up, 80 had SO and 81 IO. In-hospital use of ibuprofen($p=0.02$) and acetaminophen($p<0.01$), as well as FLACC($p<0.01$) and CHEOPS($p=0.04$) pain scores were slightly higher in IO patients. No difference in mean OpT and median at-home administration of analgesic was noted. The conversion rate was 24% (19/80). Of these, 13(68%) had canalicular testes. The overall complication rate was 4% (6/161):1 testicular atrophy, 3 re-ascents, 2 wound infections. Of these, 5 underwent SO and 1 had IO (wound infection).CONCLUSIONS: Even though in-hospital mean postoperative pain scores and analgesic consumption were slightly lower for SO patients, the pain levels were mild across all scales. Median at-home analgesic use and pain scores were similar for both groups, as well as OpT and complication rates. SO is an effective alternative to IO for low-lying UDT, as 68% of those that needed conversion were canalicular testes.

Clinical Epidemiological Studies

Relative Bleeding Risk of Direct Oral Anticoagulants for the Treatment of Atrial Fibrillation, Acute Venous Thromboembolism, and Venous Thromboembolism Prophylaxis for Total Knee and Total Hip Arthroplasty: a Network Meta-Analysis.

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Abstract

Direct oral anticoagulants (DOACs) have proven themselves to effective for the management of atrial fibrillation (AF)(Acanfora et al., 2019), venous thromboembolism (VTE)(Burnett et al., 2016), and VTE prophylaxis secondary to total hip (THA) and knee arthroplasty (TKA)(Broadbent et al., 2019; Rachidi et al., 2013). However, there is little guidance regarding safety between DOACs. We performed a network meta-analysis to compare safety as defined by ISTH major bleeding criteria of several DOACs for the management of AF, VTE, TKA, and THA. Warfarin or heparin were the common comparators. We searched for phase III randomized controlled trials comparing DOACs to warfarin and/or enoxaparin. 20 studies were included in our analysis. For the treatment of VTE, apixaban 5 mg BID (OR 0.3, 95% CI 0.17-0.56) had significantly less ISTH major bleeding events as compared to warfarin, and performed the best (P-score = 0.9922). For the treatment of AF, apixaban 5 mg BID (OR 0.60, 95% CI 0.60-0.80) and edoxaban 30 mg OD (OR 0.47, 95% CI 0.40-0.54) and 60 mg OD (OR 0.78, 95% CI 0.69-0.90) had significantly lower rates of major bleeding, with edoxaban 30 mg OD performing the best (P-score = 1.0). For THA, no DOACs were significantly safer although edoxaban 30mg OD performed the best (P-score = 0.9248). For TKA, apixaban 2.5mg BID (OR 0.55, 95% CI 0.32-0.96) had significantly lower rates of major bleeding and performed the best (P-score 0.8561). Overall, apixiban 5 mg BID (OR 0.54, 95% CI of 0.36 to 0.47) and edoxaban 30 mg OD (OR 0.47, 95% CI 0.36-0.82) had significantly lower rates of major bleeding as compared to warfarin, with edoxaban 30mg OD performing the best (P-score = 0.7530). Overall our analysis shows that DOACs were safer with respect to bleeding across several indications for DOACs. Our analysis provides valuable guidance and direction for clinicians deciding between different DOACs.

Clinical Epidemiological Studies

The addition of Deaminated Gliadin Peptide to Anti -Tissue Transglutaminase Antibodies does not increase the likelihood of detecting Celiac Disease.

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Abstract

Introduction: Current literature proposes that a combination of specific autoantibodies, anti-tissue transglutaminase IgA (tTG) and deaminated gliadin peptide antibody IgG (DGP), increases the possibility of detecting CeD. Recent pediatric studies indicate DGP may be falsely elevated in the absence of CeD but this was not confirmed in adults. The primary aim is to evaluate whether the addition of DGP antibodies to tTG increases the performance of tTG for the diagnosis of CeD compared to duodenal biopsy. Methods: Adults attending the McMaster clinic with suspected CeD had tTG and DGP serologies plus upper endoscopy to ascertain diagnosis. Genetic testing of HLA DQ2/8 was done when serology and biopsy were discrepant. Sensitivity and specificity was calculated for each test and ROC curves were generated with corresponding AUC. Logistic regression assessed the likelihood of diagnosing CeD with both serologic strategies. Results: Of the 116 patients that met inclusion criteria, 49 and 95 patients had available dataat diagnosis and follow up time-points. There was low agreement between tTG and DGP at both time-points (kappa 0.22 and 0.25). At diagnosis, both tTG and DGP antibodies had similar sensitivity compared to duodenal biopsies (86.57% vs 79% p=0.70). DGP was less specific than tTG for the diagnosis of CeD (17%vs 46%; p=0.02). The performance of tTG was superior to DGP for the diagnosis of CeD (AUC=0.84 vs 0.49 p= 0.008). The likelihood of detecting CeD did not improve with the addition of DGP to tTG (tTG+DGP LR =26.09 vs tTG LR=24.51;p= 0.7). The performance of tTG alone was better than the combination of tTG+DGP for the diagnosis of CeD (AUC=0.84 vs 0.64; p=0.046). Conclusions: tTG outperformed DGP for the diagnosis of CeD. The addition of DGP to tTG antibodies decreased the diagnostic accuracy in IgA sufficient patients, possibly related to decreased specificity of DGP.

Clinical Epidemiological Studies

The role of toxicities in patient compliance to cabozantinib treatment for metastatic renal cell carcinoma

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Abstract

Background: The diagnosis of kidney cancer is often incidental, with 17% of renal cell carcinomas (RCCs) presenting with distant metastases. Metastatic RCCs are conventionally treated with tyrosine kinase inhibitors that block important oncogenic pathways, such as cabozantinib. Currently, cabozantinib is approved in Canada to treat metastatic RCCs with poor prognosis or as second-line therapy. Although the efficacy of cabozantinib has been established through clinical trials, it is difficult to ignore its associated toxicities that limit patient adherence to result in suboptimal antitumour activity. This study aimed to evaluate patient compliance to cabozantinib and outline the associated toxicities in daily clinical practice at a single cancer centre.Method: A retrospective chart review of metastatic RCC patients at McMaster University between 2018 and 2020 that received cabozantinib at any-line therapy with at least 3 month follow-up. Outcomes included time to discontinuation, time to dose reduction, progression-free survival, and overall toxicity profile of cabozantinib.Results: A total of 28 patients were evaluated (mean ± SD; age = 59.4 ± 8.3 years) and the median time of exposure to cabozantinib was 8.1 months (IQR: 3.3 – 12.9). Cabozantinib was usually started at 60 mg (82%) and half of the (54%) patients required dose reductions with the median time to first dose reduction at 6.1 months (IQR: 3.5 - unknown). Seven (25%) patients required treatment discontinuations due to toxicity (n=4) and the reasons for toxicity-induced discontinuation were hypertension (n=2), PPES and thromboembolic event. Median progression-free survival was 12.8 months (IQR: 9.1 – unknown). The incidences of previously seen toxicities of fatigue, mucositis, PPES, hypertension, nausea, diarrhea, GERD and myelotoxicites were lower than clinical trials. Meanwhile, the incidences of laboratory findings of hypothyroidism and liver enzymes were higher.Conclusion: This study aimed to evaluate the role of cabozantinib-induced toxicities that predispose unwanted dose reductions. These findings provide a benchmark for clinicians to anticipate toxicities and manage them by responding to reversible adverse events and incorporating alternate dosing schedules.

Clinical Epidemiological Studies

Impact of perioperative benzodiazepines on post-operative cognitive decline in adult surgery patients.

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Abstract
Introduction: Perioperative benzodiazepines are routinely used because of their anxiolytic and amnestic benefits, even in light of limited evidence suggesting an association between benzodiazepines and adverse neuropsychiatric effects. The aim of this study was to evaluate the relationship between perioperative benzodiazepine administration and post-operative cognitive decline (POCD) as measured with any validated scale. Methods: We conducted a systematic review in the context of a larger protocol examining benzodiazepines' impact on postoperative outcomes. We searched Cochrane CENTRAL, MEDLINE, EMBASE, PsychINFO, CINAHL, and Web of Science from inception to March 2019 and included randomized controlled trials (RCTs) evaluating the administration of benzodiazepine medications as compared with all other medications (or nothing) in adult patients undergoing inpatient cardiac and non-cardiac inpatient surgery. Independent reviewers extracted data, including patient characteristics, type and total dose of benzodiazepine and comparator intervention, and outcomes of interest, using pre-piloted forms. We assessed the risk of bias of each study using the Cochrane tool. Because of variability in POCD assessment and reporting, meta-analysis was inappropriate; we described results narratively. Results: 26161 titles and abstracts were screened, 688 full texts were reviewed, and 241 studies were retained. Of these, 18 trials reported POCD outcomes: 17 were at high risk of bias and 1 was at low risk of bias. 10 of these trials suggested that the groups that patients who received perioperative benzodiazepines performed worse on psychomotor and neurocognitive assessments post-operatively (up to post-op day 3), while 8 studies found no significant difference (see narrative table). No studies reported on the impact of perioperative benzodiazepine administration on long-term cognitive function. Conclusion: Based on the current body of evidence, it remains unclear if perioperative benzodiazepine administration is associated with short-term cognitive decline. No data exist on the long-term side effects of perioperative benzodiazepines on cognitive function.

Clinical Epidemiological Studies

The Incidence and Prevalence of Uveitis in Psoriasis: A Systematic Review and Meta-Analysis

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Abstract

Background: The systemic effects and comorbidities of psoriasis include ocular disorders, such as uveitis. Patients with psoriatic arthritis in particular have been demonstrated to have an elevated risk for developing uveitis. Presently, the risk of uveitis in psoriasis has yet to be fully elucidated and this systematic review seeks to address this gap.Objective: To examine the prevalence and incidence of uveitis in psoriasis patients compared to non-psoriasis patients.Methods: We conducted a systematic review search on MEDLINE, Embase, and CENTRAL electronic databases with no lower limit on year of publication.Results: Fourteen articles met our inclusion criteria, with a total of 234 143 psoriasis subjects. Two studies found that participants with severe psoriasis were at a greater risk of uveitis than those with mild psoriasis. A random-effectsmeta-analysis of the 3 studies, which reported risk of incidence of uveitis in psoriasis patients compared to non-psoriasis controls, found a pooled risk ratio of 1.29 (95% CI, 1.10-1.51), indicating an increased risk of uveitis in psoriasis. Three studies compared risk of uveitis in psoriatic arthritis with psoriasis-only participants, all finding that psoriatic arthritis was associated with a greater risk of uveitis.Conclusions: In summary, our findings suggest that psoriasis is associated with an increased risk of uveitis, with or without psoriatic arthritis.

Clinical Epidemiological Studies

Pre-allogenic stem cell transplant clinical factors and their association with chronic graft versus host disease - a risk factor analysis for cGVHD prediction.

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Abstract

PurposeAllogeneic stem cell transplants are the only curative treatment to several hematological malignancies but are associated with chronic graft versus host disease (cGVHD) which can be debilitating and sometimes fatal. We sought to ascertain which prognostic factors could predict gastrointestinal (GI)/liver specific cGVHD. MethodsWe conducted a retrospective case-control study including a consecutive sample of patients from a single specialty clinic from 2012–2017. Patients with biopsy proven GI/liver cGVHD based on pathology or determined by expert opinion reports were classified as cases and patients who underwent allogenic stem cell transplant without GI symptoms or liver enzyme elevations were controls. Data extracted included: age, gender, chemotherapeutics, donor status (related or unrelated), recipient and donor blood type, stem cell dose, complete blood count and differential, and electrolytes. Logistic regression was used to analyze clinical factors associated with GI/liver specific cGVHD. ResultsOur chart review retrieved 66 patients without GI/liver specific cGVHD and 55 patients that experienced GI/ liver cGVHD. The mean [SD] age of the sample was 50 [14] years and most of the participants in the study were men (59%). The most common cancer was acute myeloid leukemia. Univariate analysis revealed that male gender and stem cell dose were associated with GI/liver cGVHD. After adjusting for potential confounders, history of any acute GVHD demonstrated a statistically significant association with GI/liver cGVHD (adjusted OR [aOR]=2.7; 95% confidence interval=1.0–1.3; p=0.049), while male gender (aOR=2.7; 95% confidence interval=1.2–6.2; p=0.02) and stem cell dose (aOR=1.2; 95% confidence interval=1.0–1.3; p=0.037) remained statistically significant. The combination of these three clinical factors demonstrated fair discrimination (area under the curve=0.69). Other clinical factors were not significantly associated with GI/liver cGVHD. ConclusionMale gender, previous episode of acute GVHD, and stem cell dose were strongly associated with gastrointestinal (GI)/ liver cGVHD among patients who receive allogeneic stem cell transplants.

STEMI ALERT substudy: interobserver agreement in the diagnosis of STEMI in the emergency department (AIDED)

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Abstract
Background: ST-elevation myocardial infarction (STEMI) is a life-threatening condition caused by obstruction of a coronary artery. Individuals with STEMI should receive reperfusion therapy, by percutaneous coronary intervention (PCI) or fibrinolysis, in a timely manner as delays in reperfusion are associated with increased mortality. The Niagara region faces a unique challenge as there are no PCI-capable hospitals in the area. STEMI patients must be assessed in Niagara, before being transported to a PCI-capable hospital. Retrospective chart reviews identified the door-in-door-out (DIDO) time as being the most variable factor contributing to delays in reperfusion in the Niagara region. A DIDO time of 30 minutes or less significantly improves in-hospital mortality, yet the average DIDO time in the Niagara region was one hour. Our aim was to identify factors contributing to increased DIDO time.Methods: We reviewed patient charts from January-December 2019 who presented as walk-in patients to St. Catharines Site, Welland Site or Greater Niagara General emergency departments with STEMI as their primary diagnosis. Results: 88.2% of patients received an ECG within 10 minutes of triage, while only 13.2% of patients achieved a DIDO time of less than 30 minutes. Age ($p>0.05$), gender ($p>0.05$), chief complaint ($p>0.05$), diabetes ($p>0.05$), time of presentation ($p>0.05$), and other anginal symptoms ($p>0.05$) were not associated with longer ECG. Shorter time to ECG was positively correlated with CTAS score ($p=0.02$).Conclusion: A DIDO time of 30 minutes or less was rarely achieved across the Niagara region. With these results, we will be implementing a STEMI ALERT Tool in EDs to improve the sensitivity of STEMI screening. This tool aims to decrease the time to ECG, initiation of code STEMI, and arrival of EMS to improve DIDO time.

Health Design & Innovation

The use of in situ simulation to improve emergency department staff comfort with the management of high acuity low occurrence cases

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Abstract
Background: In the emergency department (ED), high-acuity presentations encountered at low frequencies are associated with reduced staff comfort. Previous studies have shown that simulation can improve confidence with management of various presentations. Research Question: The present study examined the effect of in situ simulation on interprofessional provider comfort with the identification and management of high-acuity low-frequency events in the ED. It further assessed the feasibility of implementing weekly simulation as an interprofessional education initiative in a high-volume ED.Methods: This was a retrospective pre-test post-test quasi-experimental design. Weekly in situ simulation events were facilitated by an interdisciplinary team in a high-volume ED in Hamilton. 34 simulation events were held between January and November 2019, and included neonatal, pediatric and obstetric emergencies. Events included a debrief, and typically lasted 60 minutes total. Participants included individuals from various disciplines on shift at the time of the event. Questionnaires administered via email following the event asked participants to rank their comfort with emergency codes before and after the simulation using 5-point Likert scales. Data from 39 questionnaires was analyzed. T-tests were used to analyze differences in self-reported comfort scores.Results: Questionnaire responders included nurses (41%), respiratory therapists (26%), residents (10%), paramedics (3%), attending physicians (3%), students of various disciplines (10%) and other (7%). 38% of participants reported increases in comfort following simulation when compared to prior. Using the 5-point scale, the average reported score for comfort was 3.59 pre-simulation (95% CI 3.30–3.88), and 3.97 post-simulation (95% CI 3.76–4.19, p=0.03).Discussion: Our results demonstrate that weekly interprofessional in situ simulation is feasible in a high-volume ED and significantly improves self-reported comfort with the identification and management of high-acuity, low-frequency events. This warrants the implementation of this simulation design and has implications for its potential role in improving team dynamics and patient safety.

Health Design & Innovation

Trends in the Use of Family Physician Billing Codes in Ontario

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Abstract

Background: There has been a greater focus on the billing fees of physicians and the Ontario government's aim to decrease spending. While some services are reported as overcompensated (ie. Removal of a polyp greater than 1cm on gastroscopy is $142.40 under code E674) other services are reported as undercompensated (ie. A pap smear is $6.75 under code G365). Many of these differences are reported to stem from an antiquated billing fee schedule. By understanding billing trends, fee schedules can be updated appropriately.Hypothesis: Billing practices have changed over time, and that those changes may be influenced by broader policy and technological changes. Methods: Data was obtained from the Institute for Clinical Evaluative Sciences (ICES), a secure database with anonymous billing records from all Ontario physicians. The top 25 most billed codes of each year from 2008-2018 were analyzed for growth trends both for total frequency and average frequency per physician. Additionally, a semi-structured survey was distributed across a convenience sample of family physicians in the Waterloo-Wellington Region to assess for personal opinions on billing and was subject to thematic analysis.Results: While some codes, such as the A007 Intermediate Assessment, have remained consistently billed each year at approximately 30,000,000 times by primary care providers across Ontario, other billing codes have seen drastic changes. For example, the K131 Periodic Health Visit code was initiated in 2013 and was submitted 920,156 times that year. From 2008 to 2018, the frequency at which family physicians on average billed for K030 Diabetic Management Assessment increased by 48.82%.Discussion: Changes in billing frequencies coincide with the advent of new policies ie new codes, updated technology ie. urine screening, and changing health concerns ie. increased need for diabetic management. Billing codes and fees should continually evolve to meet the changing requirements of our healthcare system.

Health Design & Innovation

The application of human centred design methodology to help patients cope with prolonged hospital stay

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Abstract

Background: There is a well-studied link between loneliness, chronic illness and overall morbidity and mortality. A qualitative study from The University College London found that seriously ill patients felt that time passed slowly in hospital, which often led to feelings of loneliness and depression. They found that interactions with other patients helped to pass time, were appreciated, and increased patients' quality of life. Despite the high prevalence and impact of loneliness, there have been few efforts by public health officials to help patients cope with the alienation that comes with longer hospital stays. Our aim is to use a human-centred design process to design a functional prototype with the goal of helping patients with chronic conditions share resources and connect.Methods: Human centered design methodology and tools were used to create a functional prototype application. Our client was a chronic care patient at St. Joseph's hospital and 4 interviews were held with the client for the context of user experience. The specific design tools used were an empathy map, point of view statements, "how might we" statements, low-fidelity prototyping, user feedback, mind mapping tools and narrative storyboards. Results:Our final prototype was a cell phone application called HOME2 that will connect chronically ill hospitalized patients with one another. The platform has specific "teams", or social networks, that users can join, each with a different focus (i.e. specific chronic diseases, upcoming events, get to know me, peer support, general). Conclusions: By using human-centered design, we put the constraints, contexts and perspectives of our client at the focus. We propose a cell phone application that connects patients with chronic conditions in the hospital as a method to combat loneliness during hospital stays. The app was very well received with our client.

Health Design & Innovation

A needs assessment of the role of 3D printed simulation learning in rural settings

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Abstract

There is an increasing emphasis on incorporating high fidelity simulations in medical education. Moreover, studies have shown that practicing health care providers (HCPs) also benefit from simulation-based learning, particularly in the context of extremely rare but often lifesaving procedures, or high acuity low occurrence (HALO) procedures. However, access to high fidelity simulation labs are often limited to urban academic centers. Access to these resources is limited by both affiliation and commute time-cost, while creating and maintaining simulation labs in rural settings is costly and impractical. Given the rising accessibility of 3D printing and the open access nature of model designs, 3D printed models may be an effective and cost-friendly method to integrate hands-on simulation in maintaining procedural competencies for rural practitioners.A needs assessment will be conducted with regional rural HCPs in the Waterloo region, evaluating current methods of continuing medical education (CME), prevalence and comfort of various procedures, recent access and/or use of simulation learning, and interest in future opportunities with 3D printed simulation models and simulation sessions.Future directions for the study include trialling 3D models with HCPs and hosting simulation sessions in controlled settings, assessing effectiveness and feasibility.

Aspiration pneumonia in the pediatric population: an understudied, yet highly prevalent clinical condition affecting the most vulnerable

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Abstract
Background and Questions: Aspiration pneumonia is associated with significant disease burden and prolonged ICU stay. Children with medical complexities are at increased risk for aspiration pneumonia due to their prolonged supine position, low viscosity liquid diet, nasogastric feeding tubes, and underdeveloped cough reflex. Despite its widespread prevalence and associated morbidity, the incidence of aspiration pneumonia is further complicated by a lack of a gold standard diagnostic tool, or widely accepted definition. Standardized diagnostic and treatment approaches to pediatric aspiration pneumonia are critically needed to optimize treatment outcomes. Methods: We conducted a broad literature review using PubMed/Medline from January 1970 to July 2020. The key terms 'aspiration pneumonia' and 'pediatric' or 'children with medical complexities' were used to focus the search. We also approached pediatric centers across the country using SPECTRUM and direct contact to gather information about antibiotic treatment and duration of pediatric aspiration pneumonia cases. Results: Despite overt clinical symptoms and imaging, it is often difficult to recover organisms in patients with aspiration pneumonia. The microbiology of pneumonia after microaspiration has changed over the last 60 years from anaerobic organisms to Gram-negative bacilli and Gram-positive cocci. Current management guidelines are centered on community-acquired pneumonia in adult populations resulting in discrepant care in pediatric populations. Despite the gap in available literature, our paper demonstrates that current protocols in Hamilton Health Sciences and other pediatric centers recommend a third-generation cephalosporin (ie. ceftriaxone) or intravenous (IV) cluavulin for appropriate management and reduction of morbidity. Conclusions: This research provides important information about our current knowledge on aspiration pneumonia and demonstrates the gap in knowledge when it comes to pediatric populations. Our work also produces important and ground-breaking information for clinicians about treatment protocols for pediatric aspiration pneumonia. Based off of this work, we hope to design standardized management guidelines for pediatric aspiration pneumonia.

Health Design & Innovation

The cost-effectiveness of mammography-based breast cancer screening in Canada: a systematic review

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Abstract

Introduction: The current literature on female breast cancer screening is largely focused on the health outcomes that result from screening. There is comparatively little data on the cost-effectiveness of the screening. Objective: To evaluate the cost-effectiveness of current mammography-based breast cancer screening recommendations within female Canadian populations. Methods: Systematic review. Searches were performed within the PubMed, MEDLINE, Embase, Canadian Agency for Drugs and Technologies in Health (CADTH) and EconLit databases according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to identify all studies published within the last 10 years that addressed mammography-based Canadian breast cancer screening.Results: Of the 879 papers identified, seven studies met the inclusion criteria, four of which were applicable to average-risk Canadian women. The benefits of mortality reduction rose approximately linearly with costs, while costs were linearly dependent on the number of lifetime screens per woman. Moreover, triennial screening for average-risk women aged 50-69 years was found to be the most cost-effective in terms of cost per quality adjusted life year. The use of MRI in conjunction with mammography for women with the BRCA 1/2 mutation was found to be cost-effective, while annual mammography-based screening for women with dense breasts was found to be cost-ineffective. Lastly, in survivors of thoracic radiation-treated adolescent Hodgkin Lymphoma patients, annual mammography was found to be the most cost-effective method of breast cancer surveillance with little difference in life expectancy to annual MRI. Conclusion: In spite of the growing interest to enhance breast cancer screening programs, analyses of the cost-effectiveness of mammography-based screening within Canadian populations are scarcely reported and have heterogeneous methodologies. The existing data suggests that Canada's current policy to screen average-risk women aged 50-74 biennially or triennially is cost-effective.

Determining the Rate of Hand Hygiene Opportunities in the Emergency Department

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Abstract
Background:Proper hand hygiene amongst healthcare workers is a crucial element in preventing the spread of healthcare associated infections. Adherence to hand hygiene standards can be monitored using electronic systems that survey the number of dispenses of soap or alcohol hand-rub and compare it to a denominator value of the expected number of hand hygiene opportunities (HHOs). The high patient flow and diversity of care provided in the emergency department makes determining accurate rates of HHOs a challenge in this area of the hospital. This project aims to assess the type and frequency of HHOs in the emergency department to obtain a denominator value for electronic monitoring of hand hygiene compliance. Methods:Direct observations were conducted at Mount Sinai Hospital (Toronto, Ontario) from May-August 2012, June-July 2016, and May-August 2017. Patients in the emergency department were seen in one of four main areas: major rooms, resuscitations rooms, rapid assessment zone (RAZ), or ambulatory care (AC). Major and resuscitation patients were observed for 1-hour intervals, whereas RAZ and AC patients were followed by an observer throughout their stay. HHOs were assessed according to Ontario's 4 Moments for Hand Hygiene.Results: A total of 726 HHOs were captured from 124 1-hour observations of major and resuscitation patients. The average rate of HHOs per patient-hour was 4.7 [95% CI, 3.8-5.6] for major patients and 8.4 [95% CI, 6.5-10.4] for resuscitation patients. For RAZ and AC patients, 282 HHOs were identified from following 10 RAZ and 34 AC patients for a total of 81 hours of observation. Per patient-hour, the average rate of HHOs was 4.8 [95% CI, 3.3-6.2] for RAZ patients and 3.5 [95% CI, 2.7-4.2] for AC patients. Nurses and physicians contributed 60% and 15% of HHOs, respectively. HHOs before patient contact comprised 42% of moments observed, whereas HHOs after patient contact comprised 38%. HHOs before an aseptic procedure and after a body fluid exposure risk each composed 10% of all HHOs.Conclusion:The rate of HHOs per patient-hour varied across different areas in the emergency department. These estimates for expected rates of HHOs will be used in combination with patient census and location data to determine a denominator for electronic monitoring of hand hygiene compliance at Mount Sinai Hospital's emergency department

Health Design & Innovation

Addressing Burnout in Emergency Medicine: A Literature Review

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Abstract

TContext: The well-being of healthcare providers has become a growing concern across Canada in recent years. One dimension of well-being—burnout—has been identified as an issue that necessitates intervention. The implications of burnout extend to patient-care, as high levels of burnout have been associated with increases in medical errors and malpractice. Burnout is consistently reported the most in emergency medicine (EM) physicians compared to physicians in other specialties. Many institutions have implemented interventions in an attempt to decrease burnout, but to our knowledge, a comprehensive analysis of these interventions has not been conducted. Objective: To identify effective interventions that successfully reduced burnout among EM staff (physicians, residents, nurses). Design: Systematic review. A literature search was conducted using multiple electronic databases. English studies that investigated interventions on burnout in ED Staff (>50% of the sample being EM staff) using validated assessment tools (e.g. the Maslach Burnout Inventory or MBI) were included. Intervention studies with comparator groups were included. Two independent reviewers completed title and abstract screening, full-text screening, data abstraction, and risk of bias assessment. Preliminary Results: Seven out of 2357 studies were eligible for final inclusion. The search yielded four pre- post-intervention trials, and three randomized controlled trials. The sample sizes of these studies ranged from 21–127. Interventions were heterogeneous and ranged from mindfulness training, group seminars, didactic sessions, multimedia resources, and attention-based training. Five of the seven studies used the MBI to quantify burnout, while others used the Copenhagen Burnout Inventory or the Professional Quality of Life measure. Conclusion: Although still a work in progress, we believe that this is the first systematic review that evaluates the utility of burnout intervention programs in EM staff. Through this research, we hope to identify what makes a burnout intervention effective so that we can establish guidelines for future intervention programs.

Health Design & Innovation

Environmental scan to inform the co-design and implementation of the EMBOLDEN program.

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Abstract

Introduction: The EMBOLDEN program seeks to promote both physical and community mobility in adults 55 years and older who face barriers accessing community programs and reside in areas of high inequity in Hamilton. Hypothesis: The environmental scan will provide contextual information about the current state of programs in Hamilton, determine priority neighbourhoods, and identify assets and gaps in health and social programs for older adults in the priority neighbourhoods. Methods: Publicly available data were used to identify current programs and services in the greater Hamilton area. Sociodemographic indicators of neighbourhood-level needs and inequities (i.e., % of older adults, level of material deprivation, % of immigrants, and % of low income older adults) were used to determine priority neighbourhoods (Statistics Canada, 2016). Features of each neighbourhood were assessed by windshield surveys and mapped using GIS software. Assets, gaps, and barriers to health and social services in the neighbourhoods were determined. Results: Across Hamilton, 98 programs from 50 organizations that addressed mobility were identified, with 26% of these programs targeted toward older adults. From the census tract data, 8 priority neighbourhoods in Hamilton were identified to serve as the target sites for the EMBOLDEN program. Common differences between neighbourhoods included the location and number of services, as well as the number of recreational services specific to older adults. Barriers included financial and physical accessibility, lack of ethnically diverse community centres, and food deserts.Discussion: Findings from the environmental scan have been compiled into infographics, and presented to the study's Strategic Guiding Council. The Strategic Guiding Council is composed of researchers, community service providers, and older adults from each neighbourhood. Findings from the environmental scan together with knowledge and experiences of the Strategic Guiding Council will be used to guide the co-design and implementation of the EMBOLDEN program.

Total hip arthroplasty versus hemiarthroplasty for displaced femoral neck fracture: a systematic review and meta-analysis of randomized controlled trials

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Abstract

Background: Hip fractures are a leading cause of disability worldwide, with displaced femoral neck fractures being of particular concern. A recent meta-analysis looked at the difference reported between total hip arthroplasty (THA) and hemiarthroplasty (HA) but, publication of 4 additional randomized controlled trials that enrolled nearly 1,780 additional patients merits an updated meta-analysis. Methods: We conducted a literature search of 4 databases to identify randomized controlled trials comparing THA and HA in patients with displaced femoral neck fractures. For patient-reported outcomes, the minimally important difference informed calculation of risk differences. We performed a subgroup analysis to address the possible impact of risk of bias and performed meta-regression to assess the possible impact of duration of follow-up. Results: Sixteen studies that enrolled 3,084 patients randomized to undergo THA (n = 1,521) or HA (n = 1,563) proved eligible. There were no significant differences between the 2 groups in terms of the revision rate at up to 5 years of follow-up or functional outcome at up to 3 years. Health-related quality of life was superior in the THA group (mean difference [MD] = 0.05, 95% CI = 0.02 to 0.07, minimally important difference, 0.145). There was no significant difference between the groups in terms of dislocation or periprosthetic fracture incidence. Operative time was significantly shorter in the HA group (MD = 22 minutes, 95% CI = 9 to 35 minutes). Conclusions: The best evidence showed that HA and THA likely result in similar revision rate, function, mortality, periprosthetic fracture, and dislocation at up to 5 years, with a small, possibly unimportant benefit in health-related quality of life with THA. More specifically, the improvements are well below established cutoffs for clinical importance. Almost half of all patients were from a single large randomized controlled trial, although the results were consistent across the studies.

Health Design & Innovation

What Does It Take to Be an Academic Plastic Surgeon in Canada: Hiring Trends over the Last 50 Years

Authors: Andrea E. Copeland (1), Daniel E. Axelrod (2), Chloe R. Wong (3), Janna L. Malone* (3), Lucas Gallo (1), Chris J. Coroneos (1)
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Abstract
PURPOSE: Canadian academic plastic surgery positions have become highly competitive secondary to delayed retirement, stagnant hospital funding, and an increasing number of plastic surgery graduates. Little information is available to help graduates navigate this challenging landscape. Our objectives were to evaluate the training backgrounds of all academic plastic surgeons in Canada, and to develop training recommendations for residents pursuing an academic career.METHODS: Training backgrounds were obtained from institutions' websites. Surgeons were subsequently emailed to confirm this information and fill in missing details. Multivariable regression models were designed to analyze the effects of gender and FRCSC year on number of fellowships and graduate degrees and time to first academic position. RESULTS: Training information was obtained for 196 surgeons (22% female), with a 52% email response rate. 91% of surgeons completed residency in Canada. 94% completed fellowship training, while 43% held a graduate degree. 67% were hired in the same city as their residency and 18% in the same city as their fellowship. Regression analysis revealed that women took significantly longer from graduation to first academic job ($p<0.01$), with no gender differences in graduate or fellowship training. Additionally, younger surgeons were more likely to have graduate degrees ($p<0.01$). CONCLUSIONS: Nearly all plastic surgeons completed additional training, and most were employed where they previously trained. Women are disadvantaged, taking significantly longer to acquire academic positions, with no gender difference in fellowship or graduate training. Trainees should consider these patterns when planning their careers. Future research should focus on exploring gender-based discrepancies in hiring practices.

Health Design & Innovation

Primary Care Physicians' knowledge, perception, and practices in eye care

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Abstract

Purpose: Primary care physicians (PCPs) play an important role in preventing and managing eye disorders. Many studies reported inconsistencies in PCPs' eye care practices, recognizing potential negative impacts on patient care. This study examined PCPs' knowledge, awareness, and perceptions of eye care guidelines and their relations to practice patterns. Methods: A questionnaire collected: (i)demographics; (ii)guideline awareness, perspectives, and use; and (iii) practice patterns.Results: 51 PCPs participated, including family physicians (94.1%), internists (2.0%) and geriatricians (3.9%).40.8% of PCPs were aware of practice guidelines, including the American Academy of Ophthalmology (AAO) (2.0%), American Academy of Family Physicians (AAFP) (4.8%), College of Family Physicians of Canada (CFPC) (25.5%), Canadian Ophthalmology Society (COS) (7.8%). Fewer physicians used guidelines, specifically the AAFP (2.0%), CFPC (19.6%), COS (5.9%). 20.4% of PCPs claimed existing guidelines altered their practice, while 79.6% claimed recommendations did not alter their practice or did not use guidelines. 58.3% of PCPs believed Canadian guidelines could alter their practice Barriers to implementation included lack of training, administrative support, time, finances, equipment, and forgetting.PCP practices included preventing (72.0%), screening (48.0%), diagnosing (42.0%), treating (76%; 6.0%), and managing (65%; 16%) acute and chronic eye diseases, referrals to optometry (92.0%) or ophthalmology (98.0%), and/or education (48%). PCPs screened for disorders such as red-eye (80.0%), glaucoma (2.0%), diabetic retinopathy (38.0%), and/or cataracts (28.0%), based on self-reported symptoms (94.1%), history (88.2%), risk factors (54.9%), examination (41.2%), visual acuity (68.6%), visual fields (37.3%), and/or ophthalmoscopy (41.2%). Conclusions: PCPs have a wide scope of practice related to eye disorders. Although guidelines exist to support practices, many PCPs were not aware and/or did not use these recommendations. Despite barriers, Canadian primary care guidelines

What Does It Take to Be an Academic Plastic Surgeon in Canada: Hiring Trends over the Last 50 Years

Authors: Andrea E. Copeland (1), Daniel E. Axelrod (2), Chloe R. Wong (3), Janna L. Malone* (3), Lucas Gallo (1), Chris J. Coroneos (1)
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Abstract
PURPOSE: Canadian academic plastic surgery positions have become highly competitive secondary to delayed retirement, stagnant hospital funding, and an increasing number of plastic surgery graduates. Little information is available to help graduates navigate this challenging landscape. Our objectives were to evaluate the training backgrounds of all academic plastic surgeons in Canada, and to develop training recommendations for residents pursuing an academic career.METHODS: Training backgrounds were obtained from institutions' websites. Surgeons were subsequently emailed to confirm this information and fill in missing details. Multivariable regression models were designed to analyze the effects of gender and FRCSC year on number of fellowships and graduate degrees and time to first academic position. RESULTS: Training information was obtained for 196 surgeons (22% female), with a 52% email response rate. 91% of surgeons completed residency in Canada. 94% completed fellowship training, while 43% held a graduate degree. 67% were hired in the same city as their residency and 18% in the same city as their fellowship. Regression analysis revealed that women took significantly longer from graduation to first academic job ($p<0.01$), with no gender differences in graduate or fellowship training. Additionally, younger surgeons were more likely to have graduate degrees ($p<0.01$). CONCLUSIONS: Nearly all plastic surgeons completed additional training, and most were employed where they previously trained. Women are disadvantaged, taking significantly longer to acquire academic positions, with no gender difference in fellowship or graduate training. Trainees should consider these patterns when planning their careers. Future research should focus on exploring gender-based discrepancies in hiring practices.

Bridging the gap in clinical skills: do we teach what doctors actually do - a pilot study investigating the use of respiratory clinical examination skills in practice

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Abstract

Background: The transition to clinical settings represents a source of anxiety for medical students. Many students feel underprepared for clinical rotations, citing the theory-practice gap and a perceived lack of clinical skills knowledge as stressors. Having an understanding of clinically relevant examination skills may better focus studying, increase preparedness, and ease student anxiety. Due to a paucity of existing literature, we aim to address this gap and highlight to students which skills are clinically relevant.Methods: We disseminated a 10-minute online anonymized survey to residents and physicians using an open recruitment strategy with convenience and snowball sampling. This survey focused on determining the practical use of respiratory exam skills in the McMaster Clinical Skills guide (4th edition). We conducted basic quantitative analysis to determine the percentage of respondents that found a skill useful and a descriptive content analysis for short-answer questions. Results: From a total of 161 physician and resident respondents, 148 individuals completed the entire survey. The majority of respondents found all 12 inspection skills to be useful in practice. Tracheal deviation was the only palpation skill found useful (68.63%). No percussion or auscultation skills were seen as useful by a majority of respondents, except for auscultating for breath sounds (100% useful). In qualitative analysis, the major theme was that skills should continue to be taught despite minimal use as they help teach disease pathophysiology, help in limited resource settings, and have use in particular situations, such as in traumas or different specialties.Conclusions: There is a discordance between the clinical skills taught to students and the ones actually used in practice. Despite this fact, there is still utility in teaching these skills to medical students. Highlighting what skills are commonly used while retaining all aspects of the curriculum could help students better prepare for clinical settings.

Natural language processing of radiology reports to automate the collection of quality metrics: towards greater standardization in the reporting of percutaneous interventions for permanent hemodialysis access

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Abstract

Background: Well-functioning vascular access is critical in caring for hemodialysis-dependent patients. International guidelines have been created to support the reporting of quality metrics. However, manually generating these metrics retrospectively is time-consuming and impeded by heterogeneous reporting practices.Purpose: To assess the completeness of reports describing vascular access interventions and demonstrate the efficacy of natural language processing (NLP) algorithms in generating quality metrics.Methods: Radiology reports from May 28, 2019 to May 27, 2020 were retrieved from PACS. A validated NLP classifier tool, iSCOUT, was used to identify reports containing ≥ 1 arteriovenous fistula-related term(s) and ≥ 1 intervention-related term(s). Two pipelines were developed: (1) negation of terms considered, and (2) negation disregarded. Statistical analyses were conducted to evaluate performance. The reports were manually annotated for inclusion of data required to calculate two quality metrics: (1) post-intervention primary patency (PIPP), defined as the interval of uninterrupted patency between interventions, and (2) post-intervention lesion patency (PILP), defined as the interval of uninterrupted patency at/adjacent to lesion site. A Python script was designed to calculate PIPP using the metadata from each radiology report. Ground truth was manually annotated.Results: The pipeline that disregarded negation performed best with an F1 score of 0.9385. Applying the script to ground truth resulted in the same PIPP rates as manual annotation. Only 20.3% and 17.9% of reports were self-sufficient in providing information required to calculate PIPP and PILP, respectively. Therefore, standardized reporting elements adapted from international guidelines were proposed to support the automated generation of quality metrics.Conclusion: NLP was successful in identifying relevant reports from an unfiltered dataset and achieved similar PIPP rates as ground truth. A small percentage of reports contained information required to generate vascular access quality metrics. NLP and standardized reporting have the potential to automate the generation of medically relevant quality metrics.

Health Design & Innovation

Examining the demographics of inpatient deaths in a tertiary children's hospital without a palliative care program

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Abstract

The death of an infant, child, or teenager is always a uniquely tragic event. The medical and psychosocial complexities of pediatric end-of-life care cannot be understated and require careful clinical precision to manage the suffering of both child and family. As a result, much of children's end-of-life care occurs in tertiary pediatric hospitals. The goal of this study is to understand the demographics of death and end-of-life care for inpatients of a tertiary pediatric hospital prior to the initiation of a Pediatric Palliative Care specialist program. We undertook a descriptive retrospective chart review of inpatient deaths in a tertiary pediatric institution between 2010 and 2015. Infants who died prior to admission were not included. Data fields included: age, primary diagnostic category, presence of a LTLL (life-threatening/life limiting) illness prior to final admission, location of death, proximate cause of death, total days of hospital admission in the last year of life, total days spent in the last admission.The most common location of death was NICU (50.4%), followed by PICU (37.5%), Oncology (8.1%), general pediatrics (3.2%), and other (1.29%). The 5 most common primary diagnostic categories include perinatal including prematurity (32%) followed by chromosomal (15%), cancer (14%), external/trauma (11%), and central nervous system (8%). Of non-NICU patients, 99 patients (64%) had a LTLL condition prior to admission. These children with a LTLL condition prior to admission spent an average of 52.9 days of their last year of life in hospital (95% CI 41.6 - 64.2). Children's inpatient end-of-life care occurs predominantly in intensive care settings. Two-thirds of children dying outside of the NICU carry a LTLL prior to admission and these children, on average, spend nearly 2 of their last 12 months of life admitted to hospital. Pediatric Palliative Care may serve to support this population and potentially reduce inpatient deaths (by shifting these to the community), to reduce intensive treatments at end-of-life, and decrease total days of admission in the last year of life.

Health Design & Innovation

McMaster medical student professional identity development in the COVID-19 era

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Abstract

Background: McMaster Medicine's response to the COVID-19 pandemic and associated public health risks involved pulling medical students from all clinical environments. For the class of 2022, all components of the curriculum were moved online, except Clinical Skills which was temporarily cancelled. In addition, any in-person clinical experiences such as horizontal electives (shadowing opportunities) and post-MF4 electives (pre-clerkship electives) were cancelled. One of the pillars of the McMaster Medicine Professional Competencies curriculum is supporting professional identity development. The purpose of this study is to explore how the lack of in-person clinical experiences due to physical distancing measures in response to COVID-19 have impacted pre-clerk medical students' professional identity development and capacity for career exploration.Methods: An online survey was distributed to McMaster medical students in the class of 2022 (n = 203). It examined student perspectives on the role of medical students during the COVID-19 response as well as student's perceived competency during the online curriculum. In addition, it examines how their social identity and perception of social responsibility have changed due to the COVID-19 response, as well as whether students have felt that their career exploration has been impacted. Expected Results: A survey was sent to the class of 2022 in September. The collected data will then be analyzed. We expect that as a result of the COVID-19 response, preventing in-person clinical experiences and physical community, medical students' professional identity development will have been adversely impacted. These results will hopefully be able to inform McMaster Medicine Professional Competencies curriculum in order to continue supporting professional identity development in medical students, whether the curriculum is delivered online or in-person.

Health Design & Innovation

Evaluating a bedside sign to promote non-pharmacological delirium prevention strategies

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Abstract

Background: Delirium is a clinical syndrome characterized by an acute, fluctuating, and typically reversible decline in cognition. Postoperative delirium occurs in up to 50% of adults aged 60 years or greater. Given the importance of delirium prevention, we created a bedside sign containing elements of the evidence-based Hospital Elder Life Program. The sign prompts clinical staff to use non-pharmacological delirium prevention strategies. This quality improvement (QI) study aimed to measure utilization of and staff feedback regarding the sign. Methods: The sign was piloted in two semi-private rooms on the orthopedic ward at Juravinski Hospital in Hamilton, Ontario from September 2019 to January 2020. We measured sign completion via twice-weekly audits over eight weeks, using an online data collection form with multiple choice and open-ended questions. Clinical staff voluntarily completed surveys concerning ease of sign use and its value. Surveys consisted of both Likert scale and open-ended questions, which were coded for themes by two independent investigators. Results: The sign was used on 91% of patient admissions, although subsection completion rates ranged from 4% to 84%. The free-text “Mobility” and “About Me” sections often contained unanticipated information such as vital signs, communication from family members, or re-orienting messages to patients. Of the 37 clinical staff surveyed, 92% agreed or strongly agreed that the sign was easy to use, and 76% stated that the sign improved their knowledge of delirium prevention strategies. Limitations to sign usage included time constraints, not being part of daily routine, and implement availability. Suggestions for improvement included reducing the crowded appearance of the sign, and encouraging family involvement in its completion.Conclusion: Based on staff feedback and utilization patterns, we plan to revise the sign to improve clarity and optimize its use. We will also seek patient and family feedback to make the sign more patient friendly.

Quality of life instruments for patients with chronic rhinosinusitis with nasal polyposis: a systematic review

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Abstract

Introduction: Chronic rhinosinusitis with nasal polyposis (CRSwNP) is an inflammatory disease of the upper respiratory tract. Many QoL measurement instruments for CRSwNP patients exist; however, it is unclear whether the most responsive and disease-specific instrument is currently in use. Objective: To identify all original psychometric validation studies of QoL measurement tools for NP subjects and assess each instrument's performance characteristics, in order to evaluate the need for a more disease specific QoL tool.Methods: A literature search was performed in the PubMed, MEDLINE, EMBASE, PsycINFO and Cochrane CENTRAL databases up to April 2020. The updated Consensus-based Standards for the selection of health status Measurement Instruments (COSMIN) checklist was used to assess the methodological quality of the measurement properties of each CRSwNP QoL tool's original validation studies.Results: Ten validated QoL instruments for CRS patients were identified and appraised. On quality assessment, four instruments scored positive for at least five of the six measurement properties. Three questionnaires specified the percentage of CRSwNP patients included in the item generation trials, which ranged from 29% to 71%; however, none focused exclusively on these patients. The most commonly used instrument, the SNOT-22, had changes in scores that paralleled that of other outcome measures, suggesting that this instrument demonstrates adequate responsiveness to clinical change.Conclusions: While all measures underwent some form of item generation and validation process, most lacked a thorough CRS subtype analysis within the sample included in the development study, raising questions of their ability to appropriately assess QoL in CRSwNP. Instruments previously developed to assess QOL in nasal polyp patients have not exclusively used these patients in their development. A short, validated, more disease specific QoL instrument may be more helpful in assessing new therapies for NP and making decisions regarding clinical management.

Health Design & Innovation

Antibiotic prescriptions for viral upper respiratory infections: a qualitative analysis on the thought process of family medicine residents

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Abstract

Background: Antimicrobial resistance is a significant threat worldwide due to its economic, healthcare and societal costs. Despite antibiotic stewardship efforts, the literature suggests that there continues to be inappropriate antibiotic prescriptions in Ontario. Upper respiratory tract infections (URTIs) are a common presentation to family physicians; the majority of these infections are viral, yet antibiotics are not uncommonly prescribed. The factors that influence physician decision-making about prescribing antibiotics for such viral presentations may stem from their training as resident physicians.Objective: The primary objective was to evaluate factors that influence the decision-making process of family medicine residents when prescribing antibiotics to treat URTIs. The secondary goal was to identify opportunities for educational intervention to reduce such unnecessary antibiotic prescription. Study design: Semi-structured interviews with six current family medicine residents (PGY-1 and PGY-2) at McMaster University were completed. Qualitative analysis was performed using a grounded theory methodology. Interviewees were asked to describe a time that they prescribed antibiotics for a URTI and comment on factors that affected their likelihood to prescribe an antibiotic. A Certificate of Approval has been received from Hamilton Integrated Research Ethics Board (HiREB) [#5848].Findings: The analysis has yielded multiple contributing factors which can be organized into the broader categories of: accountability amongst supervisors and peers, patient and caregiver cues and resident experience. Most provoking factors stem from patient and caregiver cues, including maintaining relationships and meeting patient expectations. Most protective factors stem from educational or cultural influences from staff and colleagues including formal and informal education, personal experience and the culture of guideline adherence at their training site. Conclusion: These results suggest a significant role of patient-physician interaction influencing inappropriate antibiotic prescribing, even during family medicine residency training. These results have identified opportunities for educational intervention to reduce inappropriate antibiotic prescribing in McMaster Family Medicine trainees.

Health Design & Innovation

Resident Physician Training in Identifying and Managing Sex-Trafficked Patients: A Needs Assessment

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Abstract

While victims of sex trafficking endure abuse ranging from gang rape to physical torture, they often do not come forward to police due to fear, threats, isolation or other concerns. However, an estimated 80% of trafficked individuals come into contact with a health care professional at some point during captivity. This provides physicians with a unique opportunity to intervene if they are trained on the subject. This needs assessment aimed to i) identify gaps in training of McMaster Waterloo family residents regarding identifying and managing sex-trafficked patients and i) determine an effective training approach to build their confidence and clinical skills in this area.All sixteen McMaster Waterloo campus family residents were surveyed to determine their exposure to sex-trafficked patients, confidence in identifying clinical signs of trafficking and perception of residency program training on the topic. A one-hour training session was given by a YWCA Anti-Human Trafficking program coordinator with 14 years of experience. A follow-up survey, approved by HiREB, was completed by all residents.Prior to the training, most (86%) students rated their program's training around sex-trafficking victims as ineffective or very ineffective. Students reported being significantly more confident after the training session, averaging an increase of 30% in reported confidence levels. When asked if it would be helpful to have a similar session incorporated into the residency program, all sixteen students answered 'yes.'The assessment shows evidence that residents do not feel comfortable identifying and managing trafficked patients and are eager for more training. In addition to a training session, residents expressed a desire to be provided with information on community resources for referral of sex-trafficked patients and a list of screening questions and risk factors to use to assess patients.

Improving the Patient Decision Making Experience for Cataract Surgery During the Covid-19 Era

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Abstract

BackgroundAs technologies advance, cataract patients are faced with an increasing variety of options that they have to choose from prior to surgery, with no one being particularly superior to another. Worse still, patients now have to make these decisions in an era where prolonged consults increases the risk of exposure to COVID-19. However, these unique circumstances also provide an opportunity for healthcare providers to integrate video-based decision aids into practice, an intervention that has the potential to enhance patient experience while upholding patient safety as a priority during the pandemic. This study explores whether the implementation of video-based decision aids in the cataract surgery consent process during COVID-19 can help patients become satisfied and confident with their decisions. MethodsParticipants are given time at the beginning of their appointment to watch a series of videos that outlines the process of cataract surgery and discusses choices they can expect to make before their surgery. The videos go over 3 choices: the type of biometry to be used for axial measurements (ultrasound A scan/optical biometry), the type of IOL to be implanted (standard/wavefront/toric/multifocal), and the type of focus they would like (distance/intermediate/near/monovision). After watching these videos, patients will consult with an ophthalmologist specialized in cataract surgery (Dr. Brian J. Chan). During the consult, another video is played that outlines the choices once more and elaborates on some risks and benefits of each. As the ophthalmologist is in the room, patients are then able to ask questions and engage in shared decision making. After the consult, patients will fill out a decision conflict scale questionnaire.

Quality of Maternal Care in Low- and Middle-Income Countries: A narrative synthesis

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Abstract

BackgroundCountries vary in the quality of maternal care that is provided to patients. In most developing countries, the primary issues that lead to increased maternal mortality and morbidity have been access to care and to skilled birth attendants. In order to improve maternal health, two main strategies by the World Health Organization include increasing the number of deliveries by skilled birth attendants and increasing access to emergency obstetric care. Even with access to skilled birth attendance though, there continues to be issues with regards to quality of maternal care. ObjectiveThis study aims to identify and summarize the frameworks available to understand how quality of maternal care can be measured at a facility-level in urban settings within low- and middle-income countries. MethodsA narrative synthesis is being conducted. The following databases were used: PubMed Medline, OVID, Health Systems Evidence, and Web of Science. The search string included terms for quality of care (e.g., quality OR care OR service*), maternal (matern* OR mother*), the type of literature being included (framework OR tool OR theor*), health-care delivery (facility* OR hospital* OR clinic*), and terms for location (urban OR city). We will identify frameworks, tools or theories relevant to maternal quality of care in facility-level settings. Title/abstract and full-text screening will be done by two independent reviewers and conflicts will be resolved by a third reviewer. To synthesize the information gathered through this narrative synthesis, we plan to do a content analysis of the literature found.ResultsAn initial search resulted in 3182 documents identified through database searches. This was narrowed down to 90 full-text articles that will be screened for inclusion. Results will be presented. LimitationsArticles will be included if they are in English, Spanish or French only. Frameworks may exist that are not captured through the search string.

Medical Education

Mental health night: a peer-led initiative

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Abstract

Introduction/Background: Medical students have been identified as having high levels of burnout. Discussing mental health may be a possible avenue to combat/address burnout in this high-risk group. Hypothesis/Question: To determine the effectiveness of peer-led seminars on improving medical students' comfort in discussing mental health (MH). We hypothesized the intervention would improve students comfort level discussing MH. Methods: A 2-hour non-mandatory evening seminar about managing personal mental health (MH) while in medical school was held for first year medical students attending the Niagara Regional Campus (NRC) of McMaster University. During the seminar, upper year NRC students presented 3 sessions: 1) An intro into MH in medical school, 2) Sharing personal MH narratives 3) Small group session discussing personal struggles, coping strategies, and recognizing peers in need. Attendance to the seminar was open to all members of McMaster University's NRC class of 2022. In total, 28 students were invited, 20 attended, and 15 complete surveys were analyzed. 5 surveys were discarded for incompleteness. General stress levels were evaluated using the Medical Student Stressor Questionnaire (MSSQ), and comfort levels discussing personal and peer MH were evaluated using a novel 14-question survey. The novel 14-item Wellness Questionnaire was administered before and after the MH seminar. Results: The intervention changed students' comfort level in talking to classmates about personal MH , asking friends for help with MH, expressing concern to friends about their MH, and recognizing MH crisis. The intervention did not change comfort level in talking to classmates, patients and the public about their MH, helping friends with MH, knowledge of MH, seeking professional MH care of recognizing bad MH day in oneself.Discussion/ConclusionThe peer-led MH seminar provided an outlet for first-year medical students to recognize MH challenges and connect with their peers about their personal MH. After the intervention, students still reported discomfort helping one another with MH and seeking professional MH care. Given the high rates of stress and burnout in medical trainees, future seminars should focus more on methods to increase comfort in these areas.

Medical Education

A Scoping Review of MD/PhD Programs, Trainees, and Graduates

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Abstract

Background: MD/PhD programs aim to train clinician-scientists to help bridge clinical practice and biomedical research. There are over 130 MD/PhD programs worldwide, yet there remains a paucity of synthesized data to understand and examine characteristics of MD/PhD programs and their graduates. We aimed to conduct a comprehensive scoping review to describe the major outcomes being examined about these dual-degree programs in an effort to guide potential changes to educational frameworks, program structure, and trainee mentorship. Question: What is the research landscape on MD/PhD programs and their current trainees/graduates? Methods: A literature search of MEDLINE, EMBASE, CINAHL, PsycINFO, and Web of Science was conducted with no date restriction until October 20, 2019. A health sciences research librarian was consulted to ensure terms were inclusive and specific. Studies were included if any outcome regarding MD/PhD programs, their trainees, or their graduates was measured. Results: An electronic search of databases identified 11,056 potentially relevant articles. After removal of duplicates (n=5,207), title and abstract screening, we identified 237 articles for full-text review. Emerging themes in MD/PhD literature include predictors of admission to dual-degree programs, career outcomes of MD/PhD graduates (e.g., faculty appointments to research-intensive universities, publication record, continuing research during residency etc.), mentorship of trainees, and improving equity and diversity in MD/PhD programs. Conclusion: While the scoping review is ongoing, emerging themes suggest that emphasis is being paid to the training of MD/PhD students and its implications for future career outcomes including residency choices and faculty appointments. Future work should aim to understand predictors of successful clinician-scientists which may help guide admission policies and MD/PhD educational curricula.

Medical Education

Medical students' experiences and perceptions of a competency-based written communication skills rubric pilot in clerkship

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Abstract

Background: Despite the value placed on clinical documentation and volume of written work required from medical students, there is limited research on methods to assess medical students' written communication skills. This study aims to establish validity evidence for the use of a pilot written communication assignment rubric to support assessment of written communication skills in clerkship.Methods: A phenomenological qualitative study was performed using Stobart's validity model as a theoretical framework. This rubric was evaluated in three components: purpose, construct validity, and impact. Fourth-year Queen's medical students who completed the written communication assignment and present in Kingston were recruited through an electronic survey. A semi-structured focus group was conducted, audiorecorded and transcribed verbatim. The focus group transcript was coded line-by-line to identify significant statements and quotes, which were grouped into themes that reflected the student experience.Results: Eighty-six students were approached, 8 responded to the recruitment survey, and 6 were included in the focus group. One participant participated in a longitudinal clerkship experience in Oshawa. Emerging themes include students have an accurate understanding of the assignment's purpose, the assignment prompted preceptors to give valuable feedback on students' written communication skills, and the utility of feedback is influenced by the documentation method and preceptor.Conclusions: Results will inform semi-structured interviews of faculty in the next step of this study and improvements to the rubric. As the first tool designed to measure when a student achieves targeted competency in documentation skills, validity evidence can contribute to the development of future competency-based written communication assessment tools.

Medical Education

Immersive virtual reality (iVR) improves procedural duration, task completion, and accuracy in surgical trainees: a systematic review

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Abstract

Background: With limitations on operating time for surgical trainees and concerns for patient safety, immersive virtual reality (iVR) has emerged as a portable, low-cost, high-fidelity addition to competency-based surgical education. This review explores current literature, applications, and effectiveness of iVR in surgical skills training.Methods: A systematic search was performed on MEDLINE, EMBASE, CENTRAL, Web of Science and PsycInfo for primary studies published between January 1, 2000 and May 13, 2020. Two reviewers independently screened citations, extracted data, and assessed methodological quality using the Medical Education Research Study Quality Instrument (MERSQI).Results: The literature search yielded 8,939 citations, with 13 articles included for qualitative synthesis. Ten studies (three pre-post, seven controlled trials) measured time to completion. Of the controlled trials, four reported that iVR groups completed the following procedures faster than control groups: pedicle screw placement (43% faster, $p<0.05$), glenoid exposure (33%, $p=0.04$), tibial intramedullary nailing (19%, $p=0.002$), and total hip arthroplasty (THA; 18%, $p=0.03$). Of four controlled trials that used procedural checklists, two found that iVR groups completed significantly more steps than control. In one study, the iVR group scored 14 points higher on a 30-point task specific checklist ($p<0.001$). Four studies reported on implant placement accuracy. In two randomized controlled trials (RCTs) by Xin et al., iVR groups placed significantly more successful grade I pedicle screws compared to controls (89.6% vs. 60.4%, and 69.6% vs. 55.4%). In an RCT by Logishetty et al., the iVR group placed the THA acetabular component implant with 12° greater accuracy in both acetabular cup inclination and anteversion ($p<0.001$). The mean MERSQI score was 11.88±1.60.Conclusions: Given these promising results and robust user satisfaction, iVR shows high potential for incorporation into surgical training curricula.

Medical Education

Explaining mental illness stigma in Canadian medical students: a nationwide study

Authors: *Morgan L. Glass(†), Rebecca Voth(†), Angelo Canty(1)
Affiliations: (1) Department of Mathematics and Statistics, McMaster University, Hamilton, Ontario, Canada

Abstract

Background:Mental illness is ubiquitous and accounts for a substantial portion of the global disease burden. Unfortunately, the stigma toward mental illness is pervasive. Worse yet, this stigma is common in health care providers, which can decrease the quality of care that patients receive. The degree of stigma has been shown to differ between various subgroups of medical students, and at various points in their training. However, it is not known which specific beliefs, experiences, and attitudes precipitate and perpetuate this stigma before training has begun. The aim of the present study was to describe mental illness stigma in Canadian medical students at the beginning of their education and identify the factors that underlie it.Method:A survey was created, including novel questions, as well as the validated Mental Illness: Clinicians' Attitudes (MICA-2 Medical student version) scale. Responses were collected from first-year students from all 14 of the English-language medical education programs in Canada. Data collection occurred in the first few months of schooling. A regression analysis was conducted to determine which factors predicted greater MICA-2 stigma score. Results:In total, 262 participant response sets were retained for analysis. Greater mental illness stigma was predicted by male gender, less mental illness exposure, less knowledge about mental health, greater distrust/skepticism toward people with mental illness, and stronger belief that people with mental illness cannot meaningfully contribute to society. Exposure, knowledge, distrust/skepticism, and perceived inability to contribute, cumulatively explained 31.7% of the variability in MICA-2 stigma score. Specialty of interest (family medicine vs. surgery vs. other) did not predict stigma score. Discussion/Conclusions:This study identified modifiable predictors of greater stigma in Canadian medical students at the beginning of their education. These should serve as targets for future educational interventions.

Medical Education

Medical students are more likely to enter family medicine after early primary care placements: a systematic review and meta-analysis

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Abstract

Introduction: 15.3% of Canadians aged 12 and older do not have a family physician. One of the greatest challenges preventing Canadians from finding a family physician is the low physician-to-population ratio resulting in a country-wide shortage. A solution to this shortage is to increase the proportion of medical students matriculating to a family medicine (FM) residency. The purpose of this systematic review is to explore examples of interventions that provide exposure to FM during the pre-clinical years of medical school and investigate if this approach is successful in increasing students' subjective interest in, and selection of FM.Methods: Three databases (PubMed, Ovid MEDLINE, Embase) were used for the literature search and independently screened by two reviewers. Methodological quality of included papers was assessed using the Methodological Index for Non-Randomised Studies instrument. Pooled statistical analysis and meta-analysis were performed.Results: Eleven studies were identified including a total of 5430 patients, with 2428 receiving an "FM intervention" (IG) and 3002 controls (CG). A pooled statistical analysis of the percentage of students with FM as their first choice before and after placements showed a pre-/post- difference (29.0% to 41.8%, mean difference: +12.8%, n=586). Pooled data regarding residency specialty match rates showed that the IG was more likely to match to FM (RR: 1.63 [1.04-2.54], I2=72.5%, p=.03) and PC (RR: 2.06 [1.48-2.86], I2=36.5%, p<.001) vs. comparison subgroups. Participation in a primary care placement was associated with a 25% greater likelihood in matching to FM residency compared to the CG, particularly in those who partook in longer (4-11 weeks) interventions.Conclusions: Medical students who participated in early PC placements were more likely to match to a FM residency. Longer pre-clinical FM placements were more effective in influencing specialty choice.

Medical Education

Explaining mental illness stigma in Canadian medical students: a nationwide study

Authors: *Morgan L. Glass (1), Rebecca Voth(2), Angelo J. Canty(3)
Affiliations: (1) Michael G. DeGroote School of Medicine, McMaster University; (2) Department of Family Medicine, McMaster University; (3) Department of Mathematics and Statistics, McMaster University

Abstract

Background:Mental illness is ubiquitous and accounts for a substantial portion of the global disease burden. Unfortunately, the stigma toward mental illness is pervasive. Worse yet, this stigma is common in health care providers, which can decrease the quality of care that patients receive. The degree of stigma has been shown to differ between various subgroups of medical students, and at various points in their training. However, it is not known which specific beliefs, experiences, and attitudes precipitate and perpetuate this stigma before training has begun. The aim of the present study was to describe mental illness stigma in Canadian medical students at the beginning of their education and identify the factors that underlie it.Method:A survey was created, including novel questions, as well as the validated Mental Illness: Clinicians' Attitudes (MICA-2 Medical student version) scale. Responses were collected from first-year students from all 14 of the English-language medical education programs in Canada. Data collection occurred in the first few months of schooling. A regression analysis was conducted to determine which factors predicted greater MICA-2 stigma score. Results:In total, 262 participant response sets were retained for analysis. Greater mental illness stigma was predicted by male gender, less mental illness exposure, less knowledge about mental health, greater distrust/skepticism toward people with mental illness, and stronger belief that people with mental illness cannot meaningfully contribute to society. Exposure, knowledge, distrust/skepticism, and perceived inability to contribute, cumulatively explained 31.7% of the variability in MICA-2 stigma score. Specialty of interest (family medicine vs. surgery vs. other) did not predict stigma score. Discussion/Conclusions:This study identified modifiable predictors of greater stigma in Canadian medical students at the beginning of their education. These should serve as targets for future educational interventions.