

7th Annual

McMaster Medical Student Research Day

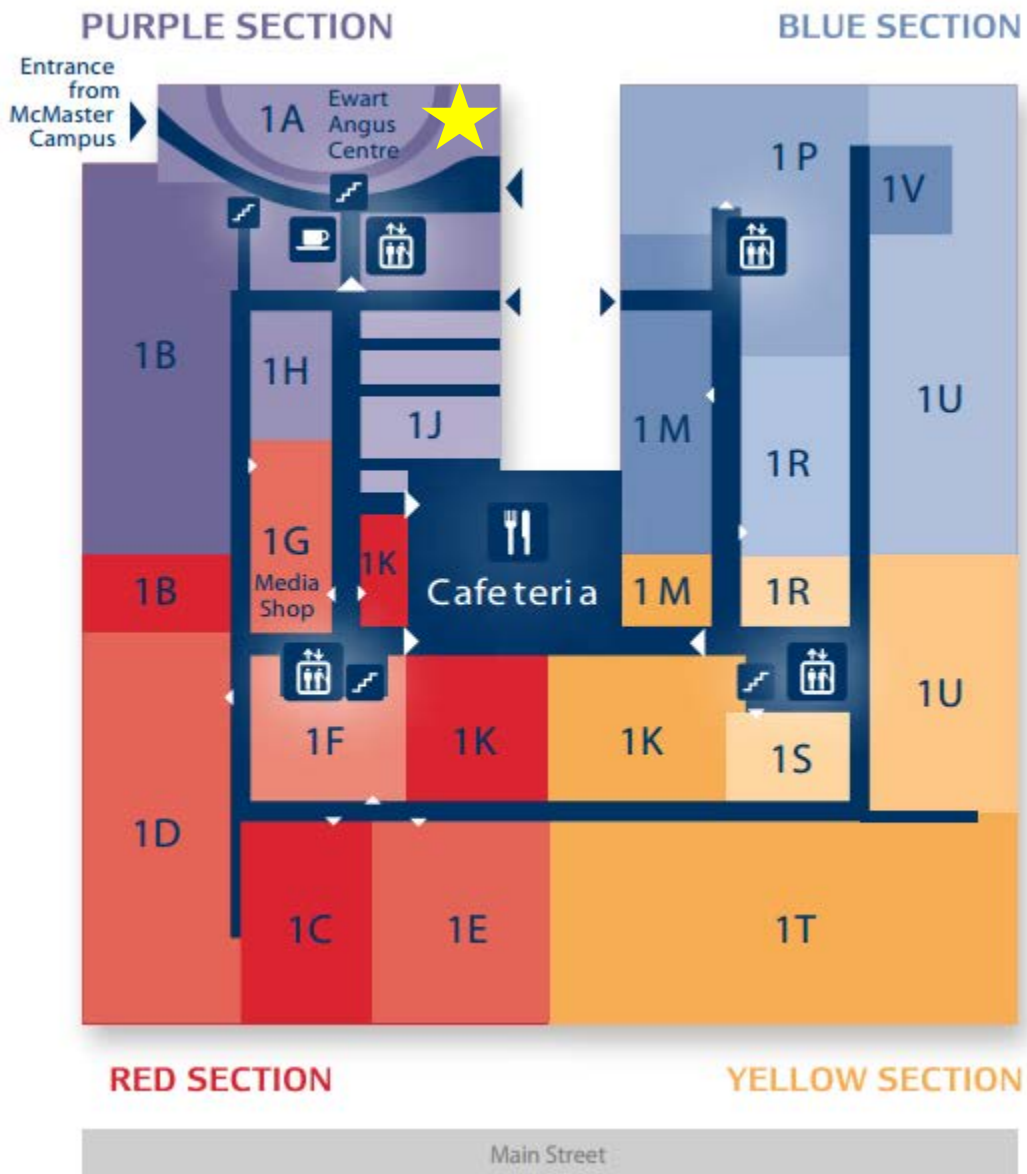
Wednesday, April 13th, 2016



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Level 1



MMSRD History



McMaster Medical Student Research Day (MMSRD) was first founded in 2010 by Alex Kaplan (MD Class of 2012) to highlight 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 (2013/2014) and Rebecca Rodin and Emerson Marinas (2014/2015).

The MMSRD committee is proud to showcase student's accomplishments in all avenues of research including the basic sciences, clinical research, medical education, population health, and health policy. This year, Roman Reznikov and Isabel Kim (2015/16) have recognized McMaster students' penchant for quality improvement research and introduced a separate award category for these projects given the distinct nature of this work and accessibility to medical students. Moving forward, MMSRD will hopefully continue to grow and provide important cross-talk opportunities for medical students and the broader community.



Dear Medical Students, Faculty, and McMaster University community members,

Thank you for being here! We are pleased to welcome you to the 7th annual McMaster Medical Student Research Day (MMSRD). The purpose of MMSRD is to give the future generation of physicians an opportunity to showcase their scholarly work and to promote the virtues of clinical research including collaboration, intellectual curiosity and a desire to improve the health of individuals in our local communities and around the world.

From Germ Theory, to the discovery insulin, to the implementation of vaccines, scientific research and the pursuit of new knowledge has played an enormous role in saving and improving the lives of countless individuals. Today, healthcare research continues to be a tremendously valuable and necessary endeavor for our society, with many important discoveries made right here at McMaster.

This year, in addition to a series of oral and poster presentations delivered by McMaster University medical students, we are fortunate enough to welcome **pediatric neurosurgeon and Tier 2 Canada Research Chair in Human Cancer Stem Cell Biology, Dr. Sheila Singh (MD, PhD, FRCSC)** to deliver the keynote address. Dr. Singh is currently studying the regulation of brain tumour-initiating cell signaling pathways in glioblastoma, brain metastases and childhood medulloblastoma, with an ultimate goal of selectively targeting these cells with appropriately tailored drug and molecular therapies.

We hope this event will help continue to drive the passion for discovery in the next generation of physician-scientists. We look forward to seeing all of the hard work that our undergraduate medical community has been involved in during their time at the Michael G. DeGroot School of Medicine in what will certainly be an exciting and intellectually stimulating day.

Thank you once again for your support of this year's MMSRD!

Keynote Speaker



Dr. Sheila Singh
BSc, MD, PhD, FRCSC

Dr. Sheila Singh is an associate professor of surgery and biochemistry, a pediatric neurosurgeon at McMaster Children's Hospital, and scientist appointed to the Stem Cell and Cancer Research Institute at McMaster University. She holds a Tier 2 Canada Research Chair in Human Cancer Stem Cell Biology, and is Director of the McMaster Surgeon Scientist Program. Her PhD thesis described the novel identification of a population of cancer stem cells that exclusively drive the formation of brain tumours. Since 2007, Dr. Singh's lab applies a developmental neurobiology framework to the study of brain tumorigenesis. Building upon previous cell culture techniques developed for the isolation of normal neural stem cells (NSC) and applying them to brain tumours, and through development of a xenograft model to efficiently study brain tumour initiating cell (BTIC) activity, Dr. Singh's lab aims to understand the molecular mechanisms that govern BTIC self-renewal.

Schedule

8:30 – 9:15 am	Check-in, Poster setup, & Breakfast
9:15 – 9:30 am	Welcome, Introduction, & Schedule overview
9:30 – 11:00 am	Oral presentations – Morning session
11:00 – 12:00 pm	Poster presentations – Morning session
12:00 – 1:00 pm	Keynote speaker & Lunch
1:00 – 2:30 pm	Oral presentations – Afternoon session
2:30 – 3:30 pm	Poster presentations – Afternoon session
3:30 – 4:00 pm	Closing ceremony & Presentation of awards

Acknowledgements

Co-Chairs

Roman Reznikov & Isabel Kim (Junior)

Emerson Marinas & Rebecca Rodin (Senior)

Judging Subcommittee

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Jenn Qian

Logistics Subcommittee

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Keynote Speaker

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Matthew Kwan

Cheryl Levitt

Event Sponsorship and Special Thanks

Undergraduate MD Education Office

Oral Presentations

Morning Session

Improving patient safety and streamlining care at a community hospital with a trauma care bundle
Tom de Kok

Horizontal Elective for Interprofessional Growth & Healthcare Team Enhancement (HEIGHTEN): A quality improvement project
Laura E. Walmsley

Telemedicine: Bridging the gap between refugee health and health services accessibility in Hamilton, Ontario
Anthony R. Sandre

Ara h 1 peptide treatment protects against severe peanut-induced anaphylaxis
Elizabeth Simms

Limitations reported in current interventional radiology literature: a systematic review
Michelle Kuang

Afternoon Session

Making patient preferences visible in healthcare: a systematic review of existing tools to elicit and record patient treatment priorities and preferences in the context of multimorbidity
Dee Mangin

A prospective study to investigate predictors of relapse among patients with opioid use disorder treated with methadone
Leen Naji

Examining the role of perioperative nerve blocks in hip arthroscopy - a systematic review
Jeffrey Kay

Identifying Perceived and Unperceived Needs in Continuing Professional Development Through Needs Assessment Survey
Ada Gu

Evaluation of access of antenatal care in Matangwe, Kenya and surrounding communities
Joseph Joanne E. Kearon

Oral Presentations – Abstracts

Improving patient safety and streamlining care at a community hospital with a trauma care bundle

Tom de Kok (1), Elan Hahn (1), Ryan Andres (2), Allison Brown (1), Jeff Doyle (3,4)

(1) Michael G. DeGroot School of Medicine, McMaster University, Hamilton, Ontario, Canada

(2) Brock University - Faculty of Applied Health Sciences

(3) Niagara Health System

(4) McMaster University - Department of Surgery

Background: Non-trauma centers (NTC) and community hospitals commonly deliver medical care during the “golden hour” which has significant implications on patient health outcomes. The Niagara Health System (NHS) and its 3 community NTC hospitals provide trauma care to over 100 patients annually. NTCs lack standardized resources commonly found in trauma centers. Checklists and bundles have been effective in streamlining processes to ensure that health care providers provide timely and effective care.

Methods: A quality improvement (QI) approach to design, implement and evaluate a trauma care bundle at a NHS community hospital. The pilot used rapid cycle improvements, known as Plan-Do-Study-Act (PDSA) cycles. We assessed outcome and process through a chart audit of all trauma patients in the NHS from July-December 2015. A safety attitudes questionnaire (SAQ) was administered to participating staff to assess balancing measures.

Results: 4 PDSA cycles resulted in sequential improvements to the bundle. These improvements were used to institute the bundle across all 3 sites of the NHS. 33% of patients received the trauma care bundle between July 1– October 31. Looking at emergency department average length of stay times, those patients who received care with the trauma care bundle had an average time of 1.6 hours while those who did not receive care with the bundle had an average time of 3.4 hours.

Conclusions: Trauma care bundles may foster safer and more efficient care in community hospitals where the golden hour often occurs. This community trauma care bundle shows promising results at ensuring patients receive the right care at the right time during this critical period.

Horizontal Elective for Interprofessional Growth & Healthcare Team Enhancement (HEIGHTEN): A quality improvement project

Laura E. Walmsley* (1), Melanie K. Fortune* (1)

(1) Michael G. DeGroot School of Medicine, McMaster University, Niagara Regional Campus, St. Catharines, Ontario, Canada

Background: Despite emphasis on interprofessional collaboration (IPC) within McMaster's Faculty of Health Sciences, experiential interprofessional education (IPE) for pre-clerkship medical students is lacking. Students are unknowledgeable about other health professionals' scopes of practice and lack confidence with IPC. This QI initiative seeks to assess and address this gap by piloting a horizontal elective for interprofessional growth and healthcare team enhancement (HEIGHTEN), whereby Niagara Regional Campus (NRC) pre-clerkship medical students learn from non-physician healthcare professionals at the Niagara Health System (NHS).

Methods: A literature review of IPE methodology and a needs assessment survey of medical students were conducted. A small-scale pilot was administered in June 2015 with two pre-clerkship students learning from general medicine nurses. An expanded pilot of 20 students from the class of 2018 randomly allocated into three Plan-Do-Study-Act (PDSA) cycles is ongoing. Participants' knowledge, confidence, and attitudes are assessed before and after participation using surveys adapted from evidence-based measurement instruments. Post-elective program evaluation surveys are also completed. Descriptive data analysis alongside key informant interviews with staff are used to make continuous improvements to spread and scale. Future PDSA cycles will include other disciplines and campuses.

Results: Eighty percent of students surveyed rate the existing IPE curriculum as 'poor' or 'okay' and ninety percent would prefer pre-clerkship IPE in clinical settings. Staff and students in the small-scale pilot provided positive feedback. Participation by over 70% of eligible students in the expanded pilot demonstrates strong engagement. Substantial improvement in student confidence with IPC, improved knowledge of the nursing role, and change in attitudes towards IPC have been observed during the first PDSA cycle of the expanded pilot.

Conclusions: A novel initiative for Canadian medical schools, HEIGHTEN is anticipated to make an important contribution to IPE regionally and nationally. Contributing to positive interprofessional relationships in early training will improve future IPC, patient care, and safety.

Telemedicine: Bridging the gap between refugee health and health services accessibility in Hamilton, Ontario

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(2) Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Ontario, Canada

Background: Refugees face considerable challenges upon seeking asylum in Canada; and, accessing health care services remains a prominent issue. Recurrent themes in the literature outlining barriers to health care services accessibility include: geographic, economic and cultural barriers (1–4).

Methods: Drawing on the experiences of service providers in Hamilton, Ontario, we explored the efficacy of telemedicine services in bridging the gap between refugee health and health services accessibility. Research methodology included structured interviews with clinicians whom are involved in the provision of health care services to refugees, complemented by a scoping literature review.

Results: The sampled population includes five physicians, one of whom was a former refugee, and a nurse practitioner. The results of this exploratory study demonstrate the potential efficacy of telemedicine in the health care setting.

Conclusions: See Results.

Ara h 1 peptide treatment protects against severe peanut-induced anaphylaxis

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Background: Peanut allergy has doubled in prevalence in the past 10 years and accounts for the majority of fatal reactions to foods, yet there is a marked absence of disease-modifying therapies available for peanut-allergic patients. Peptide immunotherapy, a disease modifying treatment that uses short peptides representing major allergen T cell epitopes, has been shown to reduce symptoms of allergic rhinoconjunctivitis. This study evaluated the ability of peptide immunotherapy to protect against anaphylaxis in a murine model of peanut allergy.

Methods: We identified a novel peptide from the major peanut allergen Ara h 1 that is recognized by C57Bl/6 mice. Mice were sensitized to peanut epicutaneously and treated 1 week later with 2 intraperitoneal injections of peptide, 1 week apart. We included 6 doses, ranging from 0.01 ug to 300 ug of peptide. Mice were subsequently challenged with whole peanut extract and evaluated for signs of anaphylaxis. They were monitored over a period of 40 minutes for clinical signs of allergic reaction, changes in rectal temperature, and vascular leakage.

Results: Peptide immunotherapy provided significant protection against anaphylaxis in a dose dependent manner. Mice that received 100 ug of Ara h 1 peptide exhibited the highest level of protection. Control mice treated with saline experienced a mean maximum temperature drop of 7.4°C, while mice receiving 100 ug of peptide experienced a drop of 2.0°C ($p=0.01$ vs control). Maximum mean clinical score was 4.0 in control mice, and 1.8 in treated mice ($p=0.002$). Mean hematocrit for control mice was 56.4%, and 48.9% for treated mice ($p=0.16$).

Conclusions: One T cell epitope-containing peptide from a single major peanut allergen can protect against anaphylaxis elicited by whole peanut extract challenge.

Limitations reported in current interventional radiology literature: a systematic review

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(3) McMaster University Medical Centre, Radiology, Hamilton, Ontario, Hamilton

Background: Interventional radiology (IR) is a growing field with numerous new studies. This project aims to describe and summarize limitations reported in current interventional radiology (IR) literature.

Methods: A MEDLINE database search was performed to extract articles from Journal of Vascular and Interventional Radiology and Cardiovascular and Interventional Radiology from January 2013 to September 2015. We included peer-reviewed original research studies and excluded abstracts, basic science studies, case reports, commentaries, conference proceedings, guidelines, and reviews. In total, 626 articles were included and assessed by 4 independent researchers.

Results: In total, 953 limitations were identified and grouped into 18 categories including retrospective nature of study (45.5%), small sample size (42.0%), limited/lack of follow up (20.4%), lack of comparison/control group (18.2%), inconsistency and/or lack of standardization in protocol (18.1%), selection bias (14.9%), missing data/records (13.9%), single institution (11.7%), nonrandomized trial (11.5%), confounding factors not addressed (11.3%), technological limitation (11.0%), lack of generalizability to the population at large (8.9%), and assumptions/oversimplification (7.2%) among others. On average, retrospective studies reported more limitations (3.15) than prospective studies (2.50).

Conclusions: The top three limitations reported in current IR literature include the retrospective nature of the study, small sample size, and limited/lack of follow up. Given this, effort should be made to conduct prospective trials and over-recruit participants to avoid small sample size and anticipated participant drop-out. When feasible, the institution of selective prospective data repositories, collaboration across the IR community, and establishment of standardized practice patterns could potentially improve the quality of IR literature.

A prospective study to investigate predictors of relapse among patients with opioid use disorder treated with methadone

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- 7) Population Genomics Program, Chanchlani Research Center, McMaster University, Hamilton, Canada
- 8) Centre for Evaluation of Medicine, Hamilton, Canada
- 9) System Linked Research Unit, Hamilton, Canada
- 10) Department of Psychiatry and Behavioural Neurosciences, McMaster University, Hamilton, Canada
- 11) Peter Boris Centre for Addictions Research, St. Joseph's Healthcare Hamilton, Canada

Background: Opioid use disorder (OUD) is a serious health condition affecting approximately 26-36 million people worldwide. The most commonly employed treatment is methadone maintenance therapy (MMT). Unfortunately, relapse during MMT is a prevalent problem and the majority of patients on MMT continue to abuse opioids illicitly. Illicit opioid use concurrent to MMT is associated with high treatment drop-out rates and poses the largest risk factor for increasing the incidence of overdose and death. Most studies have quantified treatment success based on retention rates. However, treatment retention alone in the presence of continued opioid abuse is a limited treatment response and does not constitute a complete positive treatment outcome. This is the first study to conduct a survival analysis evaluating key clinical and socio-demographic characteristics that serve as predictors for the length of time a patient with OUD remains abstinent (relapse-free) on MMT.

Methods: Data were collected from 250 MMT patients enrolled in addiction treatment clinics across Southern Ontario. We determined the impact of certain clinical and socio-demographic factors on the outcome (time until opioid relapse) using a Cox proportional hazard model.

Results: History of injecting drug use behavior (HR: 2.26, $p=0.042$), illicit benzodiazepine consumption (HR: 1.07, $p=0.002$), and the age of onset of opioid abuse (HR: 1.10, $p<0.0001$) are important indicators for accelerated relapse among MMT patients. Conversely, current age is positively associated with duration of abstinence from illicit opioid use, serving as a protective factor against relapse (HR: 0.93, $p=0.003$).

Conclusions: The identification of MMT patients at high risk for opioid relapse allows for improved treatment tailoring, whereby health practitioners can target more aggressive adjunct therapies within these populations. Improvement in duration of abstinence from illicit opioid use will ultimately serve to increase treatment retention rates, in addition to lowering the risk of comorbidities associated with concomitant use of illicit opioids during MMT.

Examining the role of perioperative nerve blocks in hip arthroscopy - a systematic review

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2 Division of Orthopaedic Surgery, Department of Surgery, McMaster University, Hamilton, Ontario, Canada.

3 Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Ontario, Canada.

4 Department of Anesthesia, McMaster University, Hamilton, Ontario, Canada.

Background: This systematic review examines the efficacy of perioperative nerve blocks for pain control following hip arthroscopy.

Methods: The databases EMBASE, PubMed and Medline were searched on June 2, 2015, for English-language studies that reported on the use of perioperative nerve blocks for hip arthroscopy. The studies were systematically screened and data abstracted in duplicate.

Results: Nine eligible studies were included in this review (two case reports, two case series, three non-randomized comparative studies, and two randomized controlled trials). In total, 534 patients (534 hips) with a mean age of 37.2 years who underwent hip arthroscopy procedures were administered nerve blocks for pain management. Specifically, femoral (two studies), fascia iliaca (two studies), lumbar plexus (three studies) and L1 and L2 paravertebral (two studies) nerve blocks were used. All studies reported acceptable pain scores following the use of nerve blocks and four studies showed significantly lower postoperative pain scores acutely with the use of nerve blocks over general anesthesia alone. The use of nerve blocks also resulted in a decrease in opioid consumption in four studies and provided a higher level of patient satisfaction in two studies. No serious acute complications were reported in any study and long-term complications from lumbar plexus blocks, such as local anesthetic system toxicity (0.9%) and long-term neuropathy (2.8%) were low in incidence.

Conclusions: The use of perioperative nerve blocks provides effective pain management following hip arthroscopy and may be more effective in decreasing acute postoperative pain and supplemental opioid consumption than other analgesic techniques. Future research is needed to compare techniques and develop a standardized approach.

Identifying Perceived and Unperceived Needs in Continuing Professional Development Through Needs Assessment Survey

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(3) Department of Clinical Epidemiology & Biostatistics, McMaster University, Hamilton, Ontario, Canada

(4) Undergraduate Department of Life Science, McMaster University, Hamilton, Ontario, Canada

Background: Continuing Professional Development (CPD) must tailor educational activities to meet both perceived and unperceived learning needs. The present study examined whether challenging cases, as reported by practicing clinicians, can provide insight into both perceived and unperceived learning needs. To identify learning needs, we conducted a comprehensive needs assessment during December 2013.

Methods: A 38-question survey was emailed to practicing clinicians. The survey examined reasons for choosing specific CPD activities, barriers preventing participation, and factors that changed learning needs. To assess perceived needs, we asked participants to identify topics that they would like to learn about. To examine unperceived needs, we asked them to describe challenging cases encountered in practice; responses to these questions were coded onto CanMEDs Roles.

Results: 1141 physicians responded to the survey. Reasons for choosing CPD events included problems encountered in practice (24% of respondents), assessment of own learning needs (19%) and overall enjoyment of content (16%). Barriers to participation included time away from work, cost and timing. Participants identified factors that have changed their learning needs as technological changes (65%), changes in patients' knowledge (48%), and changes in scope of practice (50%). With regards to specific learning needs identified by participants, most were within the medical expert domain (75%), followed by scholar, manager, health advocate, professional, communicator and collaborator. When asked to describe their most challenging cases, the majority of responses fell within the medical expert domain (85%), other responses were as follows: advocate, communicator and collaborator; other CanMEDs roles constituted <1% of responses.

Conclusions: Physicians tend to choose CPD events based on their own perceived learning needs; yet CPD providers must develop activities that also address unperceived needs, as demonstrated by personal examples. We discuss how information on challenging cases may enable providers to address unperceived learning needs.

Evaluation of access of antenatal care in Matangwe, Kenya and surrounding communities

Joanne E. Kearon* (1,2), Olivia Kwan (1,2), Alison Mikelsons (1,2), Andrew Costa (1)

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(2) Caring Partners Global, Kitchener, Ontario, Canada

Background: Access to antenatal care (ANC) is a key component of achieving the World Health Organization's Millennium Development Goal of improving maternal health. Yet, research has shown that access to quality ANC is still lacking in many areas of the world. Moreover, the barriers to access are highly heterogeneous, varying even within countries. Therefore, a qualitative study was undertaken to identify barriers to access of ANC in Western Kenya in order to provide recommendations to improve access.

Methods: 25 women from Matangwe, Kenya and surrounding villages who had an infant within the last 2 years were interviewed via a translator. Their responses to a standard set of questions were coded and qualitatively analyzed for themes.

Results: All of the women interviewed attended ANC for each of her pregnancies. However, in 42% of pregnancies, ANC was begun late, after the recommended 12 weeks. Reasons for late initiation and choice of facility were mainly practical, including distance and cost. Experiences of ANC were highly variable, depending on facility and social standing.

Conclusions: Our findings indicate that ANC is readily available in this region, but women purposely delay initiating ANC due to cost. These barriers could be lessened by switching to the WHO's model of ANC that recommends only 4 visits, rather than the current monthly visits. As well, efforts should be made to standardize the quality of care being administered throughout the region.

Poster Presentations

Morning Sessions

“My baby is growing small— help!” An exploration on Mumsnet of pregnant women’s experiences of carrying a small for gestational age fetus

Sheiry Dhillon

Osteochondral grafts and chondrocyte transplantation for the treatment of cartilage defects of the hip: a systematic review

Nolan S. Horner

Outcomes in the offspring of mothers with pre-diabetes during pregnancy: a systematic review and meta-analysis

Ling Zeng

Ara h 1 peptide treatment protects against severe peanut-induced anaphylaxis

Elizabeth Simms

Short Term Medical Service Trips: disease patterns and ethical implications

Olivia Geen

The h-index of editorial board members correlates positively with their PhD status and faculty position as well as the impact factor of sports medicine journals

Jeffrey Kay

Emotional Flexibility in Combat Veterans with PTSD and Depression

Rebecca Rodin

Hip Arthroscopy in Patients Over Age 40: A Systematic Review

Nolan S. Horner

Anatomical patterns suggest the involvement of biomechanical stress in the pathogenesis of erosions in rheumatoid arthritis.

Matthew A. Jessome

Return to Work and Sport Following High Tibial Osteotomy: A Systematic Review

Seper Ekhtiari

Physicians' Attitudes Towards Fibromyalgia: A Systematic Review Of Cross-Sectional Studies

Lucas Gallo

Improving Patient Comprehension of Discharge Instructions in the Emergency Department: A Quality Improvement Project

Carley Campbell

Increasing the use of screening tool at admission to improve access to palliative care services in the Niagara Health System: a quality improvement initiative

Jennifer Bisson

Specialty Overview Series (SOS): a quality improvement project for guiding medical student specialty choices

Daegan Sit

Developing a primary care approach to treating poverty in the Niagara Region: A quality improvement project

Sarah Hanik

Integrating medical decision making, professional competencies, anatomy, clinical skills, and tutorials (IMPACT): a quality improvement in medical education pilot project

Franziska Miller

Quality improvement initiative to standardize the pre-operative process across the Niagara Health System

Saravannan Shaan

Use of a pediatric trigger tool to identify the frequency of preventable adverse events and the development of quality improvement measures

Ellery Cunan

Improving Transitions Through Peer-to-Peer Mentoring: Redesigning the MacMasters Program

Emma Dudley

Practicing medical image interpretation within the anatomy curriculum: a QI approach

Daniel Tsoy

PICC Line Practice Review and Incidence of Adverse Events (PRICE) Study

Tasha Stoltz

Developing a new model through quality improvement to reduce wait times for oncology patients presenting to the ED of the Niagara Health System

Pauline K. Kosalka

**Physicians' Attitudes Towards Fibromyalgia: A Systematic Review Of Cross-Sectional Studies
Assessing patient perspectives on receiving bad news: a survey of over 1400 patients with life-
changing diagnoses in partnership with PatientsLikeMe**

Melody Ren

**Community-based service learning to enhance confidence and competency in working with
vulnerable populations among medical trainees at McMaster University: a QI approach.**

Gayathri Naganathan

Reducing MRI No Show Rates Through Patient Education at a Primary Care Level

Erdit Cello

**Cumulative standardized clinical skills evaluations as a method of quality improvement in the
clinical skills curriculum**

Emily E. Quick

**Impact of CT ordering policies on patient length of stay in the St. Catharine's Site Emergency
Department**

Ravi Shergill

**Improving reporting of both professional and unprofessional behaviour in the medical curriculum
at McMaster University**

Sarah Aziz

Lessons learned from local implementation of diabetic basal bolus order set in surgical inpatients

Benjamin van der Woerd

**A longitudinal student-patient program to introduce MD students to vulnerable populations: a QI
study**

James A. De Santis

**Using a quality improvement approach to enhance student knowledge and confidence in medical
education through multiple choice self-evaluation tools**

Waseem F. Hijazi

**Using quality improvement to optimize access to mandatory and optional course scheduling to
facilitate supplementary medical education: a quality improvement in medical education pilot
project.**

Ryan C. Chadwick

**Integration of diagnostic imaging into McMaster's self-directed curriculum: a quality improvement
study in medical education**

Michael Nguyen

**Understanding the Role for Allied Health Professionals in Medical Education at a Satellite Medical
Campus**

Zamin Ladha

Afternoon Session

Making patient preferences visible in healthcare: a systematic review of existing tools to elicit and record patient treatment priorities and preferences in the context of multimorbidity

Dee Mangin

Implementing MacAnatomy as a tool to enhance student learning of pathology: a qualitative analysis

Belle YX. Cao

Level of clinical evidence presented at the arthroscopy association of north america annual meeting over 10 years (2006-2015)

Jeffrey Kay

A prospective study to investigate predictors of relapse among patients with opioid use disorder treated with methadone

Leen Naji

Clinical experience using an automated MRI-guided robotic platform for breast biopsy

Kathryn G. Chain

HEART - Health and equity through advocacy, research, and theatre

Rahat Hossain

Chemical residue on machine-washed plastic plates

Adam Mutsaers

Protocol for Surgical Atrial Fibrillation Ablation: A systematic review of randomized trials

Graham McClure

Chronic pain variables in long-term care: a retrospective cohort study

Simone Banh

Impact of initial lactate level on ED management of patients with sepsis: a multicenter retrospective cohort study

Helen (Haitong) Su

Accessibility and use of primary healthcare amongst immigrants in the Niagara Region

Rebecca Swartz

Sir William Osler's enduring values in medical education

Dominik A. Nowak

Developing a navigation process for post-MF4 electives using a quality improvement approach.
Kelly Lien

QI in medical education: resource critical appraisal and optimization
Megan R.V.

Redistribution of the MF5 Anatomy Curriculum - A Quality Improvement Medical Education Initiative
Lucas Gallo

Identifying Perceived and Unperceived Needs in Continuing Professional Development Through Needs Assessment Survey
Ada Gu

engageMED - Enhancing community engagement among medical students at McMaster University: a quality improvement in medical education pilot project
Shagfuta Banchbhaya

A review of global health competencies in undergraduate medical training at McMaster University
Molly Whalen-Browne

Horizontal Elective for Interprofessional Growth & Healthcare Team Enhancement (HEIGHTEN): A quality improvement project
Laura E. Walmsley

Improving Equality Between McMaster's Clerkship Streams
Cinnamon Barone, David Pirello

Mutual Needs, Mutual Aid: Connecting Undergrad MDs and Residency Research Projects
Om Bhatt

Process improvement for low cardiac risk patients with high troponin levels
Victor C.K. Lo

MORE at Mac: Using a Quality Improvement Model to Develop a McMaster Online Radiology Education (MORE) Program
Gerald Gotesman

Implementation of a community-integrated advocacy and research elective (CARE) in medical school using quality improvement methodology
Rahat F. Hossain

Use of the model for improvement to implement the Integrated Nutrition Pathway for Acute Care (INPAC) algorithm and improve patient nutrition outcomes

Nicole Jedrzejko

Incorporation of practical personal protective equipment (PPE) training in pre-clerkship medical education at the Michael G. DeGroot School of Medicine

Matthew Narine

Building the Pipeline: engaging first year medical students as teachers in undergraduate training

Siavash Taheri-Shalmani

Putting the Canadian CT Head Rule into Practice in a Community Emergency Department: a Quality Improvement Project

Shane Freeman

Using a Delphi process to define priorities for prison health research in Canada

Lucie E Pivnick

Improving patient safety and streamlining care at a community hospital with a trauma care bundle

Tom de Kok

Poster Presentations – Abstracts

“My baby is growing small— help!” An exploration on Mumsnet of pregnant women’s experiences of carrying a small for gestational age fetus

Sheiry Dhillon (1), Louise Cassidy (2), Celeste Collins (2), Olga Kciuk (2).

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Background: Despite how frequently small for gestational age (SGA) is diagnosed, patient experience of SGA is poorly understood. As a result, patient-centred resources are limited and women often engage with social media for information and support. Discussion forums are thus uniquely positioned to provide rich information regarding patient perceptions and impact of SGA on parental well-being.

This study aimed to: 1) quantify what pregnant women are discussing on Mumsnet with regards to SGA and 2) thematically analyse the content of these posts in order to identify potential unmet information and support needs of women carrying an SGA fetus.

Methods: Consent to conduct this study was obtained from the Mumsnet research team. Archived discussion posts from 2000-2015 were retrieved from the website. A coding framework was developed using deductive and inductive methods. Four researchers conducted the analyses and each post was coded independently by two people; discrepancies were resolved through discussion. Two types of analyses were conducted: 1) content analysis to understand what was being discussed and how often; 2) thematic analysis for a richer exploration of the information and support needs of pregnant women. NVivo Version 10 was used for all analyses.

Results: A total of 1,599 posts comprised of 204 questioners and 1,395 respondents were analyzed. Supportive statements were provided in 703 posts, while 526 posts provided SGA-related information. Posts of first-person accounts of SGA were most prevalent (1,065 posts). There were 335 posts concerning emotions and reflected mostly negative experiences. Thematic analysis revealed unmet information and support needs in several areas. These included questions and discussion around causality e.g placental blood flow, eating patterns. Other concerns included implications for the baby and birthing plan. Women also sought validation from others through the medium of stories, advice on what to do next and how to make sense of their emotions.

Conclusions: Carrying an SGA fetus can be distressing for pregnant women and there is a need for appropriate, patient-centred resources. In an era where online health information is ubiquitous, we under-utilize the Internet to understand and improve the patient experience. This is the first study to our knowledge that investigates this gap for an obstetric condition using social media. Clear opportunities exist to improve the care pathway for SGA patients using first-person accounts online, as an information source.

Osteochondral grafts and chondrocyte transplantation for the treatment of cartilage defects of the hip: a systematic review

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Background: Cartilage defects of the hip joint represent a diagnostic and therapeutic challenge for the orthopaedic surgeon. Articular cartilage is friable, difficult to replace, and has limited intrinsic capacity for healing. Of the treatment options available, there is little consensus on how effective each option is and which modality should be used in a given situation. Thus, the purpose of this study was to evaluate the indications, imaging investigations, rehabilitation strategies and clinical outcomes associated with treatment of hip cartilage defects using autologous chondrocyte transplantation, osteochondral allografts, osteochondral autografts, or synthetic osteochondral grafts.

Methods: The electronic databases MEDLINE, EMBASE, and PubMed were searched and screened in duplicate for relevant studies. Data regarding indications, imaging investigations, clinical outcomes, rehabilitation strategies and complications were abstracted from eligible studies.

Results: After screening, 32 studies were included, involving 268 hips and 262 patients. Osteochondral grafts and chondrocyte transplantation were most commonly used for treatment of osteochondral defects and avascular necrosis of the femoral head. The chondral lesions treated varied in size from 1 cm² to 15.7 cm² and included femoral and acetabular lesions. Positive outcomes were reported across numerous standardized outcome scores. Overall complication rate was 3.4%. The rate of patients requiring further surgery was 9.5% at a mean follow-up of 28.6 months. Radiographs, MRI and CT scans were used pre- and post-operatively. Studies recommended 6-12 weeks of restricted weight-bearing post-operatively.

Conclusions: Treatment of articular cartilage defects with osteochondral grafts, chondrocyte transplantation and synthetic osteochondral plugs results in generally positive outcomes with low rates of complications and further surgeries. These treatment options appear most appropriate in young patients to treat full thickness osteochondral defects of the hip that are larger than 2cm². Radiographs, MRI and CT scans are useful in pre-operative planning and post-operative follow-up. These new methods show great promise in treating intra-articular hip pathology.

Outcomes in the offspring of mothers with pre-diabetes during pregnancy: a systematic review and meta-analysis

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Background: The influence of maternal pre-diabetes on offspring outcomes is uncertain. The objective of this systematic review was to evaluate the risk of adverse outcomes in the offspring of women with gestational pre-diabetes compared to healthy women and women with gestational diabetes mellitus (GDM).

Methods: We reviewed the literature for all primary studies reporting birthweight, macrosomia, prematurity, caesarean section rate, mean Apgar scores, offspring body size and/or glycemia outcomes in the offspring of mothers with gestational pre-diabetes. We searched EMBASE, Medline, PsycINFO, and PubMed from 1979 to December 2014. Screening and data extraction were conducted in duplicate and independently. Random-effects meta-analysis was conducted comparing outcomes.

Results: 654 citations were identified, from which 39 articles met inclusion criteria. 89580 participants were included (12141 had pre-diabetes, 69641 had normal glucose tolerance and 2949 had GDM). When compared to the group with normoglycemia, women with gestational pre-diabetes were at higher risk of delivering by C-section (RR 1.35; 95% CI 1.25-1.46; $P < 0.001$) and their offspring were more likely to have macrosomia (RR 1.62; 95% CI 1.21 to 2.16; $p = 0.001$), lower Apgar scores at 1 minute (MD -0.10; 95% CI -0.18 to -0.20; $P = 0.010$) and higher BMI in childhood. There were no differences in prematurity risk, 5-minute Apgar scores, birth weight, or offspring glycemia. Outcomes of offspring of mothers with pre-diabetes were similar to offspring of mothers with GDM.

Conclusions: The risk of adverse outcomes is higher in the offspring of women with pre-diabetes during pregnancy compared to healthy women.

Ara h 1 peptide treatment protects against severe peanut-induced anaphylaxis

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Background: Peanut allergy has doubled in prevalence in the past 10 years and accounts for the majority of fatal reactions to foods, yet there is a marked absence of disease-modifying therapies available for peanut-allergic patients. Peptide immunotherapy, a disease modifying treatment that uses short peptides representing major allergen T cell epitopes, has been shown to reduce symptoms of allergic rhinoconjunctivitis. This study evaluated the ability of peptide immunotherapy to protect against anaphylaxis in a murine model of peanut allergy.

Methods: We identified a novel peptide from the major peanut allergen Ara h 1 that is recognized by C57Bl/6 mice. Mice were sensitized to peanut epicutaneously and treated 1 week later with 2 intraperitoneal injections of peptide, 1 week apart. We included 6 doses, ranging from 0.01 ug to 300 ug of peptide. Mice were subsequently challenged with whole peanut extract and evaluated for signs of anaphylaxis. They were monitored over a period of 40 minutes for clinical signs of allergic reaction, changes in rectal temperature, and vascular leakage.

Results: Peptide immunotherapy provided significant protection against anaphylaxis in a dose dependent manner. Mice that received 100 ug of Ara h 1 peptide exhibited the highest level of protection. Control mice treated with saline experienced a mean maximum temperature drop of 7.4°C, while mice receiving 100 ug of peptide experienced a drop of 2.0°C ($p=0.01$ vs control). Maximum mean clinical score was 4.0 in control mice, and 1.8 in treated mice ($p=0.002$). Mean hematocrit for control mice was 56.4%, and 48.9% for treated mice ($p=0.16$).

Conclusions: One T cell epitope-containing peptide from a single major peanut allergen can protect against anaphylaxis elicited by whole peanut extract challenge.

Short Term Medical Service Trips: disease patterns and ethical implications

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Background: Although interest in short-term medical service trips (STMST) to underserved populations has grown rapidly in the last few decades, ethical questions regarding their safety, efficacy, and long-term impact have been raised. Such questions have gone unanswered largely due to the limited literature on STMST experiences, with only thirteen papers using empirical evidence published in the last twenty years. This study expands the scope of current literature through analysis of common diagnoses made during STMSTs, while also using a novel approach to look at indicators of ethical concerns.

Methods: Analysis was conducted on clinic data collected from patients living in shanty-towns surrounding Lima, Peru, as part of a two-week medical student elective organized by McMaster University in July 2015.

Results: The most common diagnosis clusters in the adult population included acute or chronic MSK pain (30.2%) and chronic noncommunicable diseases (18.1%). Within the pediatric population, upper respiratory tract infections (25.4%), parasites (22%), and dermatologic issues (13%) were most prevalent. Analysis of disease chronicity found 44.7% of conditions were acute, with 24% classified as chronic. The majority of patients (58%) would require follow-up for better care. Diagnosis stratified by preceptor shows significant variability in the pediatric population, most notably in the diagnosis of anemia ($P > 0.001$).

Conclusions: The common diseases seen during STMSTs to Peru are similar to those reported in other developing countries. However, our study shows for the first time the high prevalence of chronic diseases in patients accessing STMST care, which limits the efficacy of programs structured to address acute care needs. Additionally, data shows the need for safety improvement both in terms of patient follow-up and interprovider reliability. Communication of these findings to other STMSTs will be the first step towards creating a higher standard of care across STMST services.

The h-index of editorial board members correlates positively with their PhD status and faculty position as well as the impact factor of sports medicine journals

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Background: The h-index is a new metric widely used to present both the productivity and impact of an author's previous publications. The purpose of this study was to evaluate and observe any correlations in the h-indices of editorial board members from four top sports medicine journals: American Journal of Sports Medicine (AJSM), British Journal of Sports Medicine (BJSM), Arthroscopy: The Journal of Arthroscopic and Related Surgery, and Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA).

Methods: The gender, country of residence, most advanced degrees, and faculty position of the editorial board members were identified using their respective scientific publication profiles. The h-index and other bibliometric indicators of these editorial board members were obtained using both the Web of Science (WoS) and Google Scholar (GS) databases. Non-parametric statistics were used to analyze differences in h-index values.

Results: Two hundred and ninety-three editorial board members were evaluated. The median h-index of all editors was 18 (Inter-quartile range [IQR]=18) using GS and 14 (IQR=15) using WoS. GS h-index values were 1.19 times higher than WoS, with significant correlation between these values ($r=0.882$, $p=0.0001$). Editorial board members of journals with the highest Impact Factors (IFs); BJSM (IF=5.025), and AJSM (IF=4.362) had significantly higher h-indices (GS: $p<0.0001$, WoS: $p<0.0001$) than the journals with the lower impact factors; Arthroscopy (IF=3.206), and KSSTA (IF=3.053). Editorial board members with a PhD had significantly higher h-indices than those without (GS $p=0.0007$, WoS $p=0.0002$), and full professors had higher h-indices than associate and assistant professors (GS $p=0.0001$, WoS $p=0.0001$). There were no significant differences between MDs and non-MDs (GS: $p=0.3724$, WoS: $p=0.4130$) or between males and females (GS: $p=0.8220$ and WoS: $p=0.1890$).

Conclusions: The h-index of editorial board members for sports medicine journals shows a positive correlation with the journal's IF in addition to an investigator's PhD status and faculty position. Improved standardization in the identification of authors might help to ensure h-index calculations are based on proper data and provide enhanced information for those examining the research impact of investigators.

Emotional Flexibility in Combat Veterans with PTSD and Depression

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Background: A growing body of evidence suggests that flexibility in the expression and suppression of emotions following exposure to traumatic events supports successful adaptation. However, the protective effect of emotional flexibility has yet to be examined among individuals exposed to combat trauma, and in the context of posttraumatic stress disorder (PTSD) and depression. The present study aims to test whether lower levels of emotional flexibility are associated with PTSD and depression in combat-exposed veterans.

Methods: Fifty-nine Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF) combat veterans with and without PTSD completed self-report measures assessing symptoms of depression, PTSD, and combat exposure. In addition, participants completed an emotional flexibility task in which they were asked to either enhance or suppress their expressions of emotion while viewing affective images on a computer screen. Emotional flexibility was assessed by both expressive enhancement ability and expressive suppression ability. Blind observers rated the expressiveness of the participants in response to the affective stimuli.

Results: Repeated measures ANOVA's showed that both PTSD and depression were associated with lower levels of emotional enhancement ability. In addition, a series of linear regressions demonstrated that lower levels of emotional enhancement ability were associated with greater symptom severity of PTSD and depression. The ability to suppress emotional responses did not differ among individuals with and without PTSD or depression.

Conclusions: Deficits in emotional flexibility, particularly related to the ability to enhance emotional expression are associated with PTSD and depression among combat veterans. These findings shed light on previously unrecognized affective mechanisms associated with PTSD and depression and may help to inform future interventions.

Hip Arthroscopy in Patients Over Age 40: A Systematic Review

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Background: Hip arthroscopy is a rapidly evolving method for treating intra-articular hip pathology. Though it has shown great promise in young, active patients, there is scarce and inconclusive evidence for its utility in older patients. The purpose of this study was to evaluate the indications, outcomes, failure rate and rate of conversion to total hip arthroplasty (THA) for hip arthroscopy in patients over the age of 40.

Methods: The electronic databases MEDLINE, EMBASE, and PubMed were searched and screened in duplicate for relevant studies. Data regarding indications, imaging investigations, clinical outcomes, rehabilitation strategies and complications were abstracted from eligible studies.

Results: After screening, 17 studies were included, involving 9954 patients, 39.6% of whom were male with a mean age of 56.3 years old. Mean follow-up was 43.9 months, and 1.1% of patients were lost to follow-up. Patients over 40 demonstrated significant improvement across a number of standardized hip outcome scores, and had very low complication rates with only six total complications reported across all studies. Rates of conversion to THA ranged from 18.1% to 25.2% depending on age, with older patients having higher conversion rates. Preexisting osteoarthritic changes were an important predictor of poor outcomes.

Conclusions: Overall, hip arthroscopy in patients over age 40 produces a significant improvement across a number of standardized hip scores and has a low complication rate. However, in this patient population, there is a high rate of conversion to THA within a decade, and these patients have worse outcomes compared to younger patients. Therefore, although hip arthroscopy may be suitable in some individuals over 40 years of age, careful consideration is important and patients should be made aware of the high risk of failure.

Anatomical patterns suggest the involvement of biomechanical stress in the pathogenesis of erosions in rheumatoid arthritis.

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Background: There is limited data outlining the anatomic characteristics of bone erosions of the metacarpophalangeal (MCP) joints in rheumatoid arthritis (RA). Our objective was to describe the anatomical features of erosions to explore the importance of biomechanical stress in erosion pathogenesis.

Methods: MR images of the 2nd through 5th MCP joints were acquired bilaterally from 22 RA patients. Maximum depth and width of erosions were determined using semi-automated segmentation software. Identified anatomical features included: affected hand and MCP joint, metacarpal head vs. phalangeal base involvement, radial- vs. ulnar-sided cortical breakage, and palmar vs. dorsal cortical breakage. One-way ANOVA was used to compare means across groups.

Results: Patients were 91% female with mean (SD) age of 55.9 (9.3) years, and symptom duration of 4.8 (5.3) years. Thirty right-handed and 19 left-handed erosions were identified; all involved the metacarpal head. Erosion frequencies across MCP joints 2 through 5 were: 15, 22, 7 and 5 erosions, respectively. Radial-sided cortical breakage was observed in 42 (86%) erosions, and ulnar-sided breakage was observed in 4 (8%) erosions, 3 of which were on the 5th metacarpal. Palmar cortical breakage was observed in 3 (6%) erosions, and dorsal breakage was observed in 1 (2%) erosion. Mean (SD) maximum erosion depth and width were 4.3 (1.5) mm and 4.6 (2.1) mm, respectively. Maximum depth and width correlated moderately, Pearson's $r = 0.51$ ($p < 0.05$). Neither erosion depth nor width were significantly associated with MCP joint number, or location of cortical break ($p > 0.05$).

Conclusions: Predominance of erosions on the right (mostly dominant) hand, 2nd and 3rd MCP joints, and the radial side of metacarpal heads except on the 5th metacarpal, all support the hypothesis that anatomical areas subjected to greater biomechanical stress are more susceptible to erosive damage. The moderate correlation between maximum depth and width reflects the geometric irregularities of erosions.

Return to Work and Sport Following High Tibial Osteotomy: A Systematic Review

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Background: For young active populations, an important outcome following surgical intervention with high tibial osteotomy (HTO) is return to sport and/or preoperative work (1). However, current data on return to work and sport guidelines for post-HTO is evolving. The purpose of this systematic review was to examine reported timelines for return to sport and examine whether or not those who return to work and/or sport are doing so at levels similar to their pre-operative level.

Methods: The electronic databases MEDLINE, EMBASE, and PubMed were searched and screened in duplicate for relevant studies. Data regarding indications, surgical technique, rehabilitation strategies, return to work, return to sport, and complication and failure rates were abstracted from eligible studies.

Results: Eighteen studies were included, involving 1081 patients and 1125 knees, with a mean age of 45.8 years (range = 16-80 years). Opening wedge HTO was the most commonly used surgical technique, followed by closing wedge and hemicallotasis. Post-operative rehabilitation involved partial or non-weightbearing for one to twelve weeks. Mean follow-up time was 69.9 months (range = 12-253). 87.2% of patients returned to sport post-operatively, and 68.8% returned at a level equal to or greater than their pre-operative level. 82.9% of patients returned to work post-operatively, and 65.5% returned at a level equal to or greater than their pre-operative level. About 90% of patients return to work and sport within one year. The complication rate was 9.7%, while 7.7% of patients progressed to a total knee arthroplasty (TKA) at an average of 6.65 years (range = 0.8-15 years).

Conclusions: The majority of patients undergoing HTO return to sport and work, and most do so at a level equal to or greater than their pre-operative level. Furthermore, most patients are able to return to work or sport within one year of their operation.

Physicians' Attitudes Towards Fibromyalgia: A Systematic Review Of Cross-Sectional Studies

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Background: Fibromyalgia is a syndrome characterized by chronic widespread pain and excessive tenderness at 11 of 18 specific muscle tendon sites, for which no clear cause can be found. The lack of defined pathology, or consensus regarding definitive treatment, presents challenges for clinicians. In this systematic review, we aim to synthesize attitudes of physicians and physicians-in-training towards fibromyalgia.

Methods: We searched EMBASE and MEDLINE for studies published through to July 20, 2015. We included all cross-sectional surveys or systematic reviews of such studies targeting physician and/or physician-in-training perspectives on fibromyalgia – specifically, the aetiology of the diagnosis, primary management focus, and health care professional roles and confidence in competencies. Assessment for study inclusion, data abstraction and risk of bias assessment were performed in duplicate by trained reviewers using standardized forms.

Results: Twenty-nine eligible cross-sectional studies were identified for our review. The results of our systematic review are pending upon completion of data abstraction and analysis, which will be completed by May 2016.

Conclusions: Our findings will identify physician attitudes towards fibromyalgia, including management approaches, perceived roles, and areas in which beliefs or practices are highly divergent, or inconsistent with current best evidence. These results will prove invaluable for guiding educational efforts to promote optimal management of patients with fibromyalgia.

Improving Patient Comprehension of Discharge Instructions in the Emergency Department: A Quality Improvement Project

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Background: The emergency department discharge process is a critical time to communicate medical instructions to patients prior to leaving the hospital. Failure to communicate instructions regarding medications, worrisome symptoms, and follow-up appointments can result in avoidable adverse events and an increased burden on our healthcare system. Often, non-standardized instructions are given verbally to patients facing high stress or fatigue, resulting in failure to recall the instructions (1). Once out of hospital care, those individuals that do not have proper understanding of their discharge plan have a higher chance of re-visiting the emergency department (2).

Methods: This project is focused on creating a standardized discharge process that will provide patients with clear, written discharge instructions. We distributed a needs assessment survey to patients in the ED to assess the quality of current discharge instructions by measuring patient comprehension. Working off of a similar project(3), we used the results of the survey to create a standardized discharge instruction form. This form is to be completed by the physician and distributed to patients prior to their discharge from the ED. After implementation, we will reassess patient comprehension of discharge instructions in order to analyze its effectiveness and to identify areas of improvement.

Results: We expect implementation of our standardized ED discharge instruction form to increase patient comprehension of discharge instructions to 100%. We also expect a decline in the number of unnecessary return visits from patients recently discharged from the ED, as well as a minor reduction in ED wait times.

Conclusions: Providing patients with written discharge instructions will improve their recall of medical instructions, resulting in better adherence and health outcomes.

Increasing the use of screening tool at admission to improve access to palliative care services in the Niagara Health System: a quality improvement initiative

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Background: Patients with life-limiting illness have identified the importance of support and coordination of care throughout their journey. Unfortunately, palliative care coordinators are often not included in the care of these patients until they near end of life. Receipt of palliative care can improve the quality of life of patients and their family, providing relief from symptoms, pain, and stress. Consequently, it is essential that patients are identified by palliative care teams in a timely manner. This can be accomplished through the administration of a palliative care screening tool. By June of 2016, our goal is to ensure that 100% of patients admitted to unit 4A at the St. Catharines Site of the NHS have been assessed using the palliative care screening tool within 24 hours of admission on weekdays and 72 hours on weekends.

Methods: A quality improvement methodology will be applied to implement the palliative care screening tool. Multiple Plan-Do- Study-Act (PDSA) cycles will be completed to identify barriers to administering the tool. Following education of the nurses and implementation of the tool on unit 4A, a feedback survey will be completed by the nurses. Their feedback will be used to make adjustments before widespread implementation across the NHS.

Results: The number of new patients admitted to unit 4A will be compared to the number of screening tools received by the palliative care team to determine the percentage of patients being assessed by the screening tool. As we educate the nurses and make changes based on feedback, we expect this number to approach 100%.

Conclusions: Palliative care is an important component of caring for patients with life-limiting illness that is often not accessed by patients. We expect that implementation of the palliative care screening tool will increase access to palliative care services across the Niagara region.

Specialty Overview Series (SOS): a quality improvement project for guiding medical student specialty choices

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Background: Specialty choice is a major decision and a source of reported stress for over 70% of Canadian medical students. Specialty choice is a multifactorial decision and there arise important concerns regarding whether students have adequate information and exposure to make an optimal and timely specialty choice. Current decision-making tools such as clinical exposure, information sessions, and web resources are deemed useful by students, but have a variety of limitations. In particular, there is a lack of an accessible early decision-making tool that covers a broad range of specialties and effectively addresses the factors most important to medical students in prioritizing specialties.

Methods: We propose the creation of a web series covering different specialties which addresses the factors deemed important in decision-making by medical students, as determined by our needs assessment survey. Self-rated confidence of specialty knowledge as well as use of and satisfaction with current decision-making tools will also be assessed.

Results: Findings on a literature review on the current resources available for facilitating medical student specialty decision will be presented as well as current gaps in resources, specific to both McMaster and other Canadian medical schools. We will also be presenting an outline of our proposed Web Series intervention and how it addresses the current gap in resources identified in the literature review.

Conclusions: There is significant value in ensuring that medical students have timely access to a broad and comprehensive specialty decision-making tool. The creation of this web series will address the six dimensions of quality improvement and aims to: provide an equitable decision making tool, improve knowledge of specialties, facilitate student speciality decision-making.

Developing a primary care approach to treating poverty in the Niagara Region: A quality improvement project

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Background: In Niagara, 12% of families live below the low-income cut-off line (1). Individuals with low income face many issues related to poverty including unemployment, food insecurity, and poor health (2). An individual's health status improves as income and social status increase, demonstrating the important interaction between social determinants of health and health status (3). Poverty is identified as a risk factor for multiple health conditions and is associated with an increased disease burden and higher mortality. Therefore, primary care is an opportune time to screen patients and intervene, as health and poverty are inextricably linked.

The purpose of this quality improvement (QI) project is to engage Niagara Region primary care providers in the development and implementation of a poverty treatment strategy by April 2017. The overall objective is to screen all patients in primary care settings for poverty and subsequently connect these individuals with the required resources.

Methods: First, a literature review of poverty's impact on health, poverty in Niagara, and existing poverty strategies was conducted. Currently, a needs assessment with Niagara primary care physicians is ongoing. Three primary care offices have been selected for interviews and initial project piloting. Using this data and the model for improvement framework, an intervention to screen for and treat poverty in the primary care setting will be developed and piloted.

Results: The findings from the first two phases of this quality improvement project, the literature review and needs assessment, will be shared. Preliminary reflections from the pilot project phase will be highlighted.

Conclusions: By developing a tool that will allow primary health care providers to screen and treat poverty, this QI intervention aims to engage primary care providers in addressing poverty as a significant determinant of health, with the ultimate goal of decreasing the burden of poverty and thus improving patient health outcomes in the Niagara region.

Integrating medical decision making, professional competencies, anatomy, clinical skills, and tutorials (IMPACT): a quality improvement in medical education pilot project

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Background: The use of concept application exercises (CAEs) and professional competencies integrative exercises (PIEs) are helpful in identifying learning gaps but are limited to their respective domains of the curriculum. As a result, pre-clerkship medical students lack the opportunity to foster interdisciplinary knowledge integration between medical decision making, professional competencies, anatomy, clinical skills, and tutorials. This could potentially impede the development of clinical confidence prior to clerkship. The aim of this project is to develop pre-clerkship benchmarking sessions concurrent with the curriculum's medical foundations whereby students rotate through multiple stations with prompts specifically designed to facilitate integration.

Methods: As a quality improvement approach will be used for this project, a needs assessment survey will be administered to McMaster medical students of the class of 2018 to assess the students' perceived level of knowledge integration and confidence, as well as the utility of our proposed pilot IMPACT session. A second needs assessment survey will be administered to McMaster faculty involved in the different curriculum domains to evaluate their perceptions of our proposed intervention. A sample of first-year medical students at McMaster's Niagara Regional Campus will participate in a pilot IMPACT session. Students will be asked to assess their confidence before and after the session using entry and exit surveys. In addition, feedback from student participants will be incorporated into multiple Plan-Do-Study-Act (PDSA) cycles to modify the proposed integration activity before widespread implementation across campuses.

Results: Findings obtained from our needs assessment surveys will guide the development of prompts and scenarios for the pilot IMPACT session. Anticipated outcomes from this QI project include increased confidence with integrating knowledge and skills acquired in the different curriculum domains.

Conclusions: Promoting integration between medical decision making, professional competencies, anatomy, clinical skills, and tutorials in the pre-clerkship curriculum has the potential to improve the quality of McMaster's undergraduate medical program.

Quality improvement initiative to standardize the pre-operative process across the Niagara Health System

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Background: Pre-operative assessments are a key part of ensuring that patients are healthy enough to undergo various invasive procedures. They also allow the patient to understand the surgical process, and help reduce anxiety for what can be a very stressful event. The Niagara Health System has functional operating rooms in 3 hospitals, and the pre-operative process varies between each hospital. To optimize the booking process, along with the amount of administrative work for each patient, we plan to implement a standardized pre-operative process across the 3 hospitals.

Methods: We followed patients scheduled for surgery at each of the 3 sites, in order to map the pre-operative process. Using this information, we created a process map and took elements from each site to create an optimized pre-operative path for patients to take. This new pre-operative process would result in the least amount of redundant work being done, while ensuring that both patients and health care providers find the system easy and intuitive to use.

Results: Implementation of the standardized map has not yet begun but there are plans to phase it in over numerous PDSA cycles. This will allow for fine-tuning with a smaller sample size before implementation across the entire Niagara region.

Conclusions: There are vast differences between the three hospitals in the NHS, which leads to large variability in efficiency and patient experiences in the three separate hospitals. Implementation of PDSA cycles will allow us to standardize and optimize the process across the hospitals.

Use of a pediatric trigger tool to identify the frequency of preventable adverse events and the development of quality improvement measures

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Background: The identification of adverse events (AEs) that occur in hospitalized children is essential if we are to prevent or minimize their potential risks. In Canadian community hospitals, 3.3% of children experience at least one AE, 61.5% of which are deemed preventable (1). Within the Niagara Health System (NHS), AE reporting relies on voluntary incident reports by members of the healthcare team. Over a 21-month period, 109 incident reports were filed within the Pediatrics service, 14% of which caused some degree of harm to the patient. However, voluntary reporting has been shown to be less effective than chart reviews, with the use of a trigger tool resulting in a 25-fold increase in AE detection compared to voluntary reporting (2). Without having a structured chart review process in place, the actual rate of harm may not be truly understood, which could lead to a minimization of the pediatric patient safety problem.

Methods: The Canadian Pediatric Trigger Tool (CPTT), a validated structured chart review process (1), will be used to identify preventable AEs in pediatric medical and surgical patients admitted to the St Catharines Site of the NHS. The CPTT will also be adapted for prospective use within the Pediatrics service across the NHS to ensure identification and reporting of preventable AEs in a timely and efficient manner.

Results: Using a quality improvement approach, we will then identify best practices and develop patient-centered interventions to reduce the incidence of the most frequently identified AEs. We aim to reduce the incidence by 50%. We also expect the prospective use of the CPTT will result in better identification and a higher incidence of detection of AEs in the NHS than is currently reported.

Conclusions: Our study will directly reduce the incidence of an identified adverse event, as well as allowing for ongoing quality improvement initiatives directed towards improving patient safety in the pediatric population.

Improving Transitions Through Peer-to-Peer Mentoring: Redesigning the MacMasters Program

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Background: The transition to medical school can be a difficult and stressful experience for many students and could be improved by a peer-to-peer mentorship program. The MacMasters program attempts to fill this need, but it does not address concerns specific to each student, does not provide ongoing one-on-one support, and is not sufficiently advertised to the student body. Furthermore, it puts the onus on the student to contact the MacMaster peer, which may be intimidating to first year students. Without sufficient support and mentorship, a student may face both academic and non-academic issues that may impact their learning and academic performance. Through this initiative, we aim to improve self-reported student experience in transitioning to medical school by increasing student self-confidence and sense of belonging by the end of MF1 and ongoing through the first year of school.

Methods: As a buddy system for incoming students does not currently exist, we propose changing the structure of the MacMasters program to a system where incoming students self-identify as wanting an upper-year mentor. They will then be paired with volunteer second year students. This program will be piloted with a small group of first year students and second year mentors, and PDSA cycles will be used to evaluate and redesign the program according to student needs.

Results: Results from a primary needs assessment will be used to design the buddy program. Preliminary results from post-MF1 assessment of the buddy program will be available in early December 2016, with final results from post-MF4 assessment available in late June 2017. Anticipated results include increased self-reported confidence, sense of belonging and decreased anxiety for first year students.

Conclusions: Improving first year student experiences is essential for ensuring that these students will feel welcomed and will excel in the McMaster Medical program, resulting in better doctors of the future.

Practicing medical image interpretation within the anatomy curriculum: a QI approach

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Background: The McMaster medical program continuously emphasizes the importance of medical imaging in most fields of medicine but provides limited opportunities for students to practice their skills in image interpretation. We aim to intergrate practice of medical image interpretation into the anatomy curriculum in order to enhance students' proficiency in image diagnostics.

Methods: We propose the extension of one scheduled anatomy session every two weeks by twenty minutes past the time at which it would normally end. During this time, the students participating in the project would work on their interpretation of pre-selected medical images and radiographs. The diagnostic findings within these images will focus on pathologies appropriate to the medical foundation. A staff or experienced student facilitator will be present, and will instruct students on the proper approach to the interpretation of those medical images.

Results: Students' satisfaction with all of the image interpretation practice sessions throughout a medical foundation will be evaluated using surveys conducted at the beginning and end of each medical foundation. Multiple Plan-Do-Study-Act (PDSA) cycles will be implemented at a local level in order to both pilot this project and to iterate on feedback gathered from sessions run throughout each medical foundation.

Conclusions: A robust capability to interpret medical images is extremely important in almost all surgical or clinical specialties. The implementation of these practice sessions will enhance students' capability to interpret medical images before beginning clinical rotations, allowing for students to better learn from the images they will be exposed to during clerkship.

PICC Line Practice Review and Incidence of Adverse Events (PRICE) Study

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11

Background: 1

Methods: 1

Results: 1

Conclusions: 1.

Developing a new model through quality improvement to reduce wait times for oncology patients presenting to the ED of the Niagara Health System

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Background: Fever in the patient undergoing chemotherapy is a common and potentially severe complication increasingly being evaluated in the emergency departments (ED) of community hospitals. As infection is a leading cause of death in patients with fever and neutropenia, febrile neutropenia is an oncologic emergency requiring prompt management to minimize morbidity and mortality. At the Niagara Health System, dissatisfaction of febrile chemotherapy patients (FCPs) screened through the ED for neutropenia has been documented, with patients citing wait-times and process slowdowns among current barriers. Given the severe complications and mortality associated with infection and delayed treatment and the current dissatisfaction of FCPs, an evaluation of current processes for neutropenia screening is essential.

Methods: We will take several steps to investigate current processes and barriers for FCPs in the ED. A retrospective chart review of chemotherapy patients presenting with fever to the ED will be undertaken to identify process slowdowns. An analysis of distance from patients' area of residence to the oncology centre will also be completed. Next, focus groups with chemotherapy patients will be conducted to further define areas of dissatisfaction. Following these investigations, areas for improvement will be targeted and a quality improvement (QI) approach will be implemented to address barriers.

Results: Reviewing Emergency Department records between April 12 and October 29, 2015, we identified 77 chemotherapy patients that presented to St. Catharines Hospital with fever. Data analysis is ongoing and final results will be available at MMSRD.

Conclusions: At the conclusion of this project, by eliciting improvements in the targeted areas identified through a QI approach, we expect to remove barriers for FCPs screened in the ED for neutropenia. We expect to make care more available and efficient with outcomes including reduced wait times and improved patient satisfaction.

Physicians' Attitudes Towards Fibromyalgia: A Systematic Review Of Cross-Sectional Studies Assessing patient perspectives on receiving bad news: a survey of over 1400 patients with life-changing diagnoses in partnership with PatientsLikeMe

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Background: Even though the need to break bad news is frequent and the ability to do so effectively has a positive therapeutic effect, many physicians feel poorly equipped to break bad news. Only 4-6% of physicians from a meeting of the American Society of Clinical Oncology reported any training in breaking bad news; today, institutions still report no training for residents. Basic approaches to breaking bad news have been developed, however, further insights are hampered by limitations in the evidence. Existing research has predominately been conducted in oncology and is traditionally based on clinician intuition, rather than patient preferences. We partnered with PatientsLikeMe (PLM) to investigate preferences among patients with different diagnoses and patient support of current guidelines.

Methods: Participants from PLM were invited to answer open-ended questions about their diagnosis – cancer, lupus, amyotrophic lateral sclerosis, multiple sclerosis, human immunodeficiency virus infection, or Parkinson's. We developed a survey assessing the most important aspects of a receiving bad news based on the existing guidelines and recurring themes in the qualitative phase.

Results: Respondents agreed with existing guidelines; this finding was robust across disease states. Of 1485 participants surveyed, 32% were unhappy with how they received life-changing news.

Conclusions: Patients across disease states consistently agreed with current guidelines suggesting that models from oncology can be applied to other interactions. Conversely, the high rate of dissatisfaction suggest that adherence to guidelines may be poor. This is in keeping with current statistics demonstrating a lack of training on how to break bad news. We propose dedicated formal instruction on giving life-changing news to improve patient experiences.

Community-based service learning to enhance confidence and competency in working with vulnerable populations among medical trainees at McMaster University: a QI approach.

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Background: Providing treatment for diverse populations is a critical part of the physician's role (1). In particular, physicians must be able to empathize with and advocate for patients who belong to marginalized populations including ethnic minorities, LGBTQ, refugees etc. Though treating these populations has unique challenges, medical students receive limited training in this area (2). Less than half of McMaster medical students surveyed felt that they had received adequate training in working with vulnerable populations (3). Recognizing this gap, this study aims to increase medical students' confidence and competency in working with marginalized populations through "Service Learning" (4).

Methods: A needs assessment survey will be sent out to current medical students to establish baseline levels of confidence for working with vulnerable populations. The proposed intervention will be implemented for the Class of 2019 in two parts. First, students will receive introductory training in cultural safety and anti-oppression via online modules adapted from the University of Victoria and other sources (5,6). Second, students will connect with community-based health organizations to facilitate 1-2 day "Service Learning" opportunities, which include hands-on experiential learning and direct feedback from community organizations (4). Using self-reported data collected from students and community organizations, plan-do-study-act (PDSA) cycles will be continuously used to implement and improve the intervention with real-time feedback.

Results: Improvement from baseline is expected for student self-reported confidence levels regarding working with marginalized populations in clinical practice after the intervention. Focus groups and semi-structured interviews with students and community organizations will identify strengths and weaknesses of the intervention for improvement.

Conclusions: The intervention is expected to improve student confidence and competence with treating vulnerable populations in future clinical practice. Further, the intervention is expected to enhance community partnership and engagement.

Cumulative standardized clinical skills evaluations as a method of quality improvement in the clinical skills curriculum

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Background: Clinical skills is intended to teach a standardized level of clinical competency to medical students. There is currently a noted discrepancy in the level of knowledge, comfort and/or exposure of students to various clinical skills. The first opportunity to formally practice and receive evaluation on clinical skills performance is in June, at the end of the fourth medical foundation. This leaves a long gap between when exams were learned and the next opportunity to practice and receive feedback on them. Furthermore, these formal evaluations occur only three times throughout the duration of the program, which leaves little opportunity for standardized examination practice and revision. Clinical skills is currently the only aspect of the curriculum without an ongoing opportunity for assessment.

Methods: A cumulative standardized clinical skills evaluation during the last clinical skills session of each medical foundation is proposed. This format will reiterate the spiral curriculum, and allow for frequent review of previously covered clinical skills. With implementation of these structured evaluations, students will have adequate time to practice clinical skills, make adjustments according to identified areas of weakness, and gain confidence in physical examinations. Students will be able to reflect on their performance and determine what interventions are required to improve learning strategies and achieve mastery of physical exam skills. Lastly, this will provide an equitable opportunity to ensure each student is receiving comparable clinical skills education.

Results: We expect students to gain confidence and competence in clinical skills after this intervention due to an increased frequency of standardized evaluation.

Conclusions: Student feedback and results will allow for potential quality improvement in the clinical skills curriculum across all three campuses.

Impact of CT ordering policies on patient length of stay in the St. Catharine's Site Emergency Department

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Background: The time taken to order and complete imaging constitutes a large component of the overall length of stay (LOS) for patients in the emergency department. At SCGH, an intervention was introduced in 2015 to help reduce the overall LOS for patients in the ER. This policy change allowed ER physicians to order computed tomography (CT) scans without radiologist consultation. The purpose of this study is to assess the impact and effectiveness of the CT policy change on patient experience and outcomes. This will clarify if such policy changes are effective in improving patient care, and identify approaches to improve the current state of CT utilization.

Methods: Data for two time periods pre- and post-intervention was collected: before the change in policy (January 12- April 12, 2014) and after the policy change (January 12- April 12, 2015). Data indicators relating to LOS in the ED, including the times from when the CT scan was ordered to when it was taken, when it was taken to when it was signed, when it was signed to patient disposition, and from when the scan was ordered to patient disposition. This data was analyzed both according to shift and according to scan type.

Results: Comparing 2014 to 2015, we found that the length of time from order-taken decreased by an average of 20 minutes. However, the overall LOS from order-disposition only dropped by an average of 4.0 minutes. Though, in the midnight-8 AM shift specifically, there was an average drop of 27.1 minutes in the overall LOS from order-disposition. Furthermore, the number of CT scans ordered increased by approximately 4.1% after indexing for the 7.8% increase in total ER visits.

Conclusions: In sum, the elimination of radiology consultation in the ordering process made a slight improvement in ED flow efficiency but increased the overall volume of scans ordered.

Improving reporting of both professional and unprofessional behaviour in the medical curriculum at McMaster University

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Background: Nearly three out of five medical learners report experiencing harassment, bullying, and discrimination during their medical training; experiences that are potentially detrimental to their learning and mental health (1). McMaster University currently provides learners with information on professionalism expectations and processes for complaint resolution. However, medical learners rotating off-campus may not have immediate access to existing reporting structures should they encounter harassment, bullying, or discrimination. Furthermore, health care professionals, including medical learners, often struggle to speak up about their concerns, even in situations that compromise patient safety (2). Frequently cited reasons for this hesitancy include concerns about reprisal from superiors or hospital administration, fear of disruption within the medical team, and the expectation that nothing will be done to remedy the situation (2). The aim of this project is to ensure that 100% of McMaster medical learners, regardless of their campus or placement location, have timely access to a confidential reporting and advising system for instances of either unprofessional or exemplary professional behaviour.

Methods: Initially, we will perform a needs assessment via an anonymous email survey distributed to McMaster medical students and residents. This survey would investigate the impact of harassment, bullying, and discrimination from peers or superiors and assess learners' confidence in the existing systems for reporting unprofessional behaviour, as well as inquiring whether a confidential and accessible reporting system would facilitate the reporting of unprofessional behaviour.

Results: Findings from the needs assessment will be presented and will inform the design of a web-based reporting tool for reporting instances of unprofessional or exemplary professional behaviour and for receiving advice from McMaster University on addressing unprofessional behaviour observed by medical learners.

Conclusions: A confidential online reporting system for professional and unprofessional behaviour would improve students' access to appropriate supports if they experience harassment, provide a means of recognizing exemplary professional behaviour, and potentially curb unprofessional behaviour toward medical learners at McMaster University.

Lessons learned from local implementation of diabetic basal bolus order set in surgical inpatients

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Background: Surgery can complicate glycemic control in diabetics by triggering episodes of hyperglycemia while disrupting a patients' diabetic medication regimen. To best maintain glycemic control postoperatively, the preferred treatment choice is a proactive, scheduled, subcutaneous insulin administration regimen consisting of a basal, bolus, and correctional component. However, the predominant method of glycemic control in many hospitals is sliding-scale insulin therapy.

Methods: We modified an existing basal-bolus order set for surgical inpatients with a diagnosis of Type I or II diabetes at the St. Catharines Site hospital. The order set was further modified, following feedback from several staff surgeons, to include safe insulin dosing calculations and to enhance the ease of use. Additionally, with the help of the pre-operative staff, the order sets were placed in the charts to pre-emptively optimize accessibility, since which there has been a shift to electronic order sets, further increasing availability.

Results: After implementing the order set in May 2015, uptake of the insulin order sets was poor. A small volume of patients with diabetes received insulin order sets, even fewer received the basal bolus regimen. Between April 30– November 30th 2015, 22 patients had met criteria for use of the order set. On 6 occasions (27%), the order set was used for insulin dosing, 3 times (14%) the order set was filled out correctly. Interest in changing ordering and habits, as well as level of comfort with the new regimen, contributed to low order set uptake.

Conclusions: At this point in time we cannot infer that insulin safety has improved at the St. Catharines Site hospital but still encourage the use of this intervention. Next steps include education to both physicians to promote the uptake of the order set, and unit nursing staff to enhance comfort levels with this model. Larger discussions with administration may encourage additional strategies for the promotion of the basal bolus order set, spread and scale, and overall enhancement of surgical safety.

A longitudinal student-patient program to introduce MD students to vulnerable populations: a QI study

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Background: One of the objectives of the Professional Competencies component of the McMaster MD Program is to cultivate awareness and knowledge of the social determinants of health. Currently, learning is largely limited to classroom discussion, and there is a lack of exposure to real patients belonging to vulnerable groups. Such exposure would be invaluable in deconstructing stereotypes and building empathy in the medical learner. Current literature demonstrates a need and benefit for such exposure programs. For example, in the elderly longitudinal shadowing program at the University of Saskatchewan, medical learners meet with an elderly person to learn about their life, living situation, medical needs, and hospital experiences. It was found that after the program, attitudes towards the elderly significantly improved and ageism was reduced (Basran et al., 2012). However, to our knowledge, a program that exposes medical learners to patients from a variety of vulnerable backgrounds both in the community and clinical settings has not been reported or evaluated.

Methods: Medical students will visit patients from one or more vulnerable groups, including the elderly, disabled, LGBTQ+ community, mental health patients, and indigenous peoples at multiple timepoints throughout their first year. Visits will take place at the patient's home and healthcare facilities. Students will observe, inquire about, and reflect on the experiences and challenges their patients face in managing their health. Assessments will be completed by patients; they will assess the student's willingness to learn from the patient, overall enthusiasm, and the extent that the student manifests understanding and empathy toward people from vulnerable populations. Students will also self-assess their own changes in attitude and understanding.

Results: Results are pending.

Conclusions: The addition of a longitudinal program to expose medical students to patients from vulnerable populations is expected to improve medical students' awareness and empathy to the unique needs of vulnerable populations, and ultimately reduce racism, ageism, trans/homophobia, classism, and able-ism among medical students. Such empathy will translate into future improved doctor-patient communication and care delivery, resulting in better patient outcome and satisfaction.

Using a quality improvement approach to enhance student knowledge and confidence in medical education through multiple choice self-evaluation tools

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Background: Many medical students feel unsure as to whether their understanding is adequate regarding the expectations of the curriculum. Although Concept Application Exercises (CAEs) provide feedback intermittently over the course of the pre-clerkship period, their evaluation often feels subjective and does not comprehensively cover the content of the curriculum. Given that the physician licensing exam (i.e. LMCC) is partly multiple-choice format, it would be beneficial for students to be given the opportunity to evaluate their own learning using optional multiple-choice resources. If implemented alongside the CAEs, this would allow students to identify disparities in their own knowledge without forcing students to conform to a non-preferred learning style. Ultimately, by providing students with additional opportunities for multiple choice evaluation, we anticipate improved confidence (to be assessed by survey) with this examination writing format.

Methods: We plan on providing McMaster pre-clerkship students with optional multiple choice questions to use alongside their tutorials in order to evaluate their knowledge across multiple domains: anatomy, physiology, pharmacology, pathology and clinical reasoning. This intervention will address a perceived gap in student abilities, exposure, and confidence in multiple-choice evaluation. We plan to slowly introduce these questions to tutorial groups alongside control groups in order to evaluate the effectiveness of this intervention using a quality improvement methodology, and PDSA cycles for ongoing evaluation of this intervention.

Results: A disparity in confidence regarding multiple-choice evaluations has been identified through a needs talk with McMaster pre-clerkship students. Using a QI framework, we hope to improve subjective student confidence in multiple-choice testing by 15% over the course of pre-clerkship.

Conclusions: We hope to improve self-assessment strategies at McMaster University and better familiarize pre-clerkship students with the multiple-choice evaluation format. This will improve student confidence ratings and better prepare students for the licensing exams.

Using quality improvement to optimize access to mandatory and optional course scheduling to facilitate supplementary medical education: a quality improvement in medical education pilot project.

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Background: The organization of events by students, interest groups, and other providers of extracurricular learning, is a frustrating and time-consuming process. Due to McMaster's small group learning format, every student has a different schedule, none of which are readily available to event/meeting organizers. Moreover, the event schedule is distributed in a very non-uniform fashion (G+, Facebook, E-mails, etc.), which makes keeping track of events very difficult. These problems result in under-attended or inconsistently-attended events, scheduling conflicts and scheduling angst for event organizers. We intend to reduce information duplication across multiple platforms by providing a method of unifying event information distribution. Ideally, we would like to get all Niagara Regional Campus students using the same, efficient information source by the end of 2016.

Methods: We will apply a Quality Improvement (QI) methodology to implement more efficient scheduling for extracurricular events at the Michael DeGroot School of Medicine. We have utilized several QI tools in planning our intervention, including a web survey-based needs assessment as well as fishbone, matrix and flow diagrams. We intend to pilot this project at the Niagara Regional Campus.

Results: We will present the results of our initial needs assessment and our QI framework for improving scheduling by consolidating the information on an easily accessible and intuitive website and integrated messaging platform. We will also discuss our process, outcome, and balance measures for this project.

Conclusions: We anticipate that this change will optimize student access to valuable extra-curricular medical education events that are planned and executed by members of our medical community.

Integration of diagnostic imaging into McMaster's self-directed curriculum: a quality improvement study in medical education

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Background: Diagnostic imaging is becoming more readily used and widely available, making it an essential part of a comprehensive health care assessment. Currently at McMaster, diagnostic imaging is taught sparingly and at a fairly advanced level. The aim of this project is to increase pre-clerkship exposure to diagnostic imaging modalities in order to improve confidence in such techniques and prepare students for the expanding role of diagnostic imaging in clinical practice.

Methods: Quality improvement methodology was employed to identify a quality gap in medical curriculum regarding teaching of diagnostic imaging. The proposed change is to first create a shared document (Google Doc) with input from the subunit planners for objectives that should be explored and understood by the end of each MF. Tutorial groups can refer to this document and create diagnostic imaging objectives for relevant tutorial cases. Surveys will be administered to participating tutorial groups during and at the end of the MF to assess confidence and self-reported understanding of the relevant diagnostic imaging techniques covered.

Results: Due to a limited number of spots in an ultrasound conference, the majority of medical students were unable to attend, but expressed that the conference was a valuable educational opportunity for diagnostic imaging. We will be conducting a needs assessment survey to formally determine which aspects of diagnostic imaging students believe would be the most helpful to learn about. Based on this data, we will carry out our intervention as described in the methods section, while tailoring it to the expressed needs of the class.

Conclusions: Our proposed change will increase pre-clerkship exposure to different diagnostic imaging modalities and facilitate learning in relevant tutorial cases. Ultimately, this will instill confidence and competency in diagnostic imaging techniques, and will prepare students for application during clerkship and future medical practice.

Understanding the Role for Allied Health Professionals in Medical Education at a Satellite Medical Campus

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Background: As medical schools expand to have satellite campuses, Allied Health Professionals (AHPs) in regional hospitals are being introduced to medical learners. The lack of clarity of the role of medical students in hospital, and the role for AHPs in teaching, may hinder interprofessional care and medical education. The purpose of this project was to assess the relationship between medical students and AHPs in community hospitals.

Methods: Surveys were distributed to AHPs at two community hospitals in the Waterloo Region. A second survey was distributed to medical students attending a satellite campus of McMaster University's Michael G. DeGroot School of Medicine.¹

Results: Of 141 healthcare professionals, 90% had encountered medical students in their work; however, none had received orientation to the role of medical students. The majority of AHPs indicated that it would be beneficial to have these roles clarified. Participants also indicated a desire to teach medical students, despite potential barriers. Of 56 students, 88% indicated AHPs should have a direct role in medical education, and 94% would be open to receiving teaching at the bedside. Comparing their experiences to those at academic centres, the majority of students felt AHPs in regional sites were less familiar with their role and less involved in teaching. Both AHPs and medical students believed that interprofessional medical education at the bedside would lead to improvements in patient care, interprofessional communication, and higher quality education.

Conclusions: Clarification of Interprofessional Education curriculum, enhanced understanding of the roles of medical students and AHPs, and designated opportunities for teaching may foster better interprofessional education and collaboration between medical students and AHPs.

Implementing MacAnatomy as a tool to enhance student learning of pathology: a qualitative analysis

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Background: MacAnatomy has been successfully used as an online portal for the Education Program in Anatomy at McMaster University. The utility of this resource is now being explored as a method to enhance students' learning of pathology through the use of an online specimen database. The focus of this analysis was to evaluate the perceived usefulness of MacAnatomy as a platform for this area of learning, and to obtain feedback that will be used to develop a new pathology learning tool.

Methods: Data was collected from interviewees (n=24) spanning various programs at McMaster including Bachelor of Health Sciences, Undergraduate Medicine, Midwifery, and Biomedical Engineering who had participated in the anatomy curriculum. Transcripts were analyzed by five independent assessors based on a predetermined protocol.

Results: Six main themes emerged related to design and layout, user interface, learning approach, assessment, multimedia, and maintenance. These themes explored concepts such as the visual appeal and organization of the online content, the user-friendliness of the tool, the relevance of specimens to various case studies, and clinical backgrounds and diagnostic imaging. Students placed an emphasis on learning pathogenesis and pathophysiology and better integration of learning objectives and different resources within their courses.

Conclusions: Students appreciate the accessibility and utility of an online learning tool for pathology, with more emphasis being placed on a good user interface and the relatability of the content to each student's curriculum. This thematic analysis has allowed for the development of two learning tools, one that presents information in the form of a self-testing game, and another that focuses on comparing normal and pathological specimens and providing more contextual information on their pathogenesis and clinical presentation. Next steps for this research project include the complete development of these learning tool prototypes and the evaluation of their efficacy.

Level of clinical evidence presented at the arthroscopy association of north america annual meeting over 10 years (2006-2015)

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Background: The Arthroscopy Association of North America (AANA) annual scientific meeting is a leading forum for informing today's orthopaedic surgeons of the latest research advances in arthroscopic surgery. The purpose of this study was to evaluate any trends in the level of clinical evidence in the papers presented at the AANA annual scientific meetings from 2006-2015.

Methods: The online abstracts of the paper presentations presented at the AANA were independently evaluated by two reviewers (664 total presentations). The reviewers independently screened these results for clinical studies and graded their level of evidence from Level I (i.e. randomized trials) to IV (i.e. case series) based on the American Academy of Orthopaedic Surgeons (AAOS) classification system.

Results: 513 presentations met the inclusion criteria and were evaluated. Overall, 16% of the presentations were level I, 15% were level II, 26% were level III and 43% were level IV evidence. We observed a significant non-random improvement in the level of evidence of presentations at the AANA meetings ($p \leq 0.001$) between 2006 and 2015. In particular, the percentage of level IV evidence presented significantly decreased ($p \leq 0.001$) and the percentage of level III evidence increased ($p=0.004$) over the study period.

Conclusions: Statistical trends demonstrate that the influence of Evidence-Based Medicine in orthopedics has had a positive impact on the quality of research presented at the AANA meetings.

A prospective study to investigate predictors of relapse among patients with opioid use disorder treated with methadone

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Background: Opioid use disorder (OUD) is a serious health condition affecting approximately 26-36 million people worldwide. The most commonly employed treatment is methadone maintenance therapy (MMT). Unfortunately, relapse during MMT is a prevalent problem and the majority of patients on MMT continue to abuse opioids illicitly. Illicit opioid use concurrent to MMT is associated with high treatment drop-out rates and poses the largest risk factor for increasing the incidence of overdose and death. Most studies have quantified treatment success based on retention rates. However, treatment retention alone in the presence of continued opioid abuse is a limited treatment response and does not constitute a complete positive treatment outcome. This is the first study to conduct a survival analysis evaluating key clinical and socio-demographic characteristics that serve as predictors for the length of time a patient with OUD remains abstinent (relapse-free) on MMT.

Methods: Data were collected from 250 MMT patients enrolled in addiction treatment clinics across Southern Ontario. We determined the impact of certain clinical and socio-demographic factors on the outcome (time until opioid relapse) using a Cox proportional hazard model.

Results: History of injecting drug use behavior (HR: 2.26, $p=0.042$), illicit benzodiazepine consumption (HR: 1.07, $p=0.002$), and the age of onset of opioid abuse (HR: 1.10, $p<0.0001$) are important indicators for accelerated relapse among MMT patients. Conversely, current age is positively associated with duration of abstinence from illicit opioid use, serving as a protective factor against relapse (HR: 0.93, $p=0.003$).

Conclusions: The identification of MMT patients at high risk for opioid relapse allows for improved treatment tailoring, whereby health practitioners can target more aggressive adjunct therapies within these populations. Improvement in duration of abstinence from illicit opioid use will ultimately serve to increase treatment retention rates, in addition to lowering the risk of comorbidities associated with concomitant use of illicit opioids during MMT.

Clinical experience using an automated MRI-guided robotic platform for breast biopsy

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Background: The IGAR (Image Guided Automated Robot) is a robotic platform capable of performing highly accurate and automated minimally invasive image guided interventions. The ultimate goal of the IGAR platform is teleoperation, whereby a remote offsite expert clinician can control the robot over a network, eliminating discrepancies in healthcare for patients living in underserved remote locations. A Phase I clinical trial was conducted to demonstrate safety of this novel technology, and a prospective, multi-center cohort study was initiated for Phase 2 to demonstrate efficacy.

Methods: During Phase I, patients scheduled for MRI-guided biopsy were offered an IGAR procedure. Outcomes including diagnostic quality of the biopsy sample, procedure time, re-biopsy rates, target accuracy, subject pain, and ease of use were studied. Phase II involves a larger cohort and a second arm to compare efficacy against the standard manual procedure.

Results: All IGAR-Breast biopsies were successful and no repeat biopsies were required. 7 patients were enrolled in the Phase I trial. Average tool tip accuracy was within 3.11 ± 1.14 mm of target lesion. IGAR-Breast procedures took an average of 27 ± 7 minutes of scanning time and 16 ± 2 min of procedure time. Mean patient pain scores (McGill) were $1.8 \pm 3.0/45$. A successful Phase II trial has been completed and has demonstrated IGAR efficacy.

Conclusions: Preliminary results are encouraging and show that the IGAR can be used for safe and accurate automated MRI-guided robotic breast biopsies. In the future, the IGAR platform may be extended to other imaging modalities such as ultrasound, and other interventional procedures including multiple soft tissue biopsy sites as well as ablation therapy.

HEART - Health and equity through advocacy, research, and theatre

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Background: Ontario is failing to meet the increasing demands and complexity of providing equitable healthcare for marginalized populations. Currently, there is no comprehensive understanding of the quality of healthcare experienced by homeless individuals in Niagara. However, research and policy reform can mitigate a quality gap to ensure such vulnerable populations have access to equitable and patient-centered healthcare. Using a unique approach, HEART seeks to understand issues of health quality faced by homeless individuals during their transitions in the healthcare system to identify areas for improvement and policy reform.

Methods: We will interview homeless individuals to elicit unique barriers encountered when seeking healthcare in Niagara. These interviews will assist in developing a legislative theatre production - a play which allows audiences to say 'Stop!', replace an actor on-stage and solve the problem being presented. There will be performances for our participants, healthcare professionals, and another for medical students. Solutions from audiences will be presented to the board of the Niagara Health System, health professionals, decision-makers, and administrators.

Results: We expect to gain insight into unique challenges confronted by homeless individuals when accessing or receiving healthcare in Niagara.

Conclusions: We anticipate our production, which will draw on the challenges elucidated through our research, will allow the homeless population and healthcare professionals involved in their care to generate solutions which can be written into a report to inform health policy. This unique engagement of patients as change agents and partners in the design of healthcare services and policy may create a framework for adaptation across other populations and services.

Chemical residue on machine-washed plastic plates

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Background: Crohn's disease, asthma and allergy have markedly increased in children over the past 35 years. Environmental factors which may cause dysbiosis have been postulated to explain an increase in inflammatory bowel disease in children. Dishwasher detergent ingredient Sodium Dodecyl Sulfate (SDS) induces dysbiosis and colitis in mice. Studies in Sweden have shown increased atopy in children from families using automatic dishwashers. Rising exposure to automatic dishwasher detergent may provide a link to Crohn's disease incidence.

Methods: Grade 4-plastic plates (G4PP) were uniformly abraded to represent usage. Samples were batch tested in 2 different dishwashers under the same protocol. G4PP were washed with standard, non-acid rinse detergents. X-ray Photoelectron Spectroscopy (XPS) Surface Analysis was conducted on samples to determine elemental surface percentages. Controls were tested pre-wash, plasma-cleaned, and SDS-spotted.

Results: 36 samples were analyzed. Dishwashed G4PP showed elemental changes suggestive of SDS deposition not seen on grade-5 plastics, ceramic, glass, hand-washed G4PP, or dishes acid rinse representing detergent "rinse-agents". Some machine-washed G4PP showed evidence of increased concentrations of Sodium and Sulfur vs baseline. While nonspecific for SDS, there was directional elemental increase. Further testing was performed on G4PP (n=20). 75% of tested G4PP showed increases in Sodium, 40% showed increased Sulfur, and 35% showed both increased simultaneously.

Conclusions: 1) Biologically active substances are present on some plastic dishware; 2) The presence of these substances may be influenced by: the nature of surfaces; how surfaces are washed and; use of acid based "rinse-agents". Further research is warranted into the deposition of synthetic detergent on different grades of plastic dishware, the role of hand-washed versus machine-washed dishware, and the use of "rinse" products in automatic dishwashing machines.

Protocol for Surgical Atrial Fibrillation Ablation: A systematic review of randomized trials

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Background: Atrial fibrillation (AF) affects 10% of patients undergoing cardiac surgery. (1) AF is an independent risk factor for all-cause mortality, ischemic stroke, and heart failure. (2,3) Surgical AF ablation has been shown to significantly improve maintenance of sinus rhythm, however, small to medium size trials conducted to date lack the power required to assess patient-important outcomes such as mortality, stroke, heart failure, and health-related quality of life.(4,5) Moreover, a recent randomized trial (RCT) suggested harm by surgical AF ablation with an almost threefold increase in the requirement for permanent pacemaker post-ablation. We aim to perform a systematic review and meta-analysis to evaluate efficacy and safety of surgical AF ablation. (6)

Methods: We will search Cochrane CENTRAL, MEDLINE and EMBASE from inception to July 2015 for RCTs evaluating the use of surgical AF ablation, including any lesion set, versus no surgical AF ablation in adults with AF undergoing any type of cardiac surgery. Outcomes of interest include mortality, embolic events, quality of life, re-hospitalization, freedom of AF, and adverse events including need for pacemaker and worsening heart failure. Independently and in duplicate, reviewers will screen references and assess eligibility of potentially relevant studies using predefined eligibility criteria. Data collection will also be performed independently and in duplicate using pre-piloted forms. We will pooled data using a random effects model and present results as relative risk with 95% confidence intervals (CI) for dichotomous outcomes and as mean difference with 95% CI for continuous outcomes. We will assess risk of bias for individual studies using the Cochrane Collaboration's tool, and quality of evidence for each outcome with the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach.

Results:

Conclusions: Pooling RCTs evaluating AF ablation will allow greater power to assess its impact on patient-important outcomes and may lead to the generation of updated recommendations for its use.

Chronic pain variables in long-term care: a retrospective cohort study

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Background: With the increase of the aging population, care for seniors has been prevalent in recent news topics, especially with the call for a National Seniors Strategy.

Methods: This retrospective cohort study investigated various clinical and quality of life variables and the association with chronic pain. 1,033 cognitively intact to mildly cognitively impaired long-term care (LTC) residents from eleven facilities in Ontario, Canada were included. Variables were assessed using the Minimum Data Set 2.0 (MDS 2.0) and the interRAI Self-Report Nursing Home Quality of Life (RAI QoL) Survey instruments between 2010 to 2014. A multivariate logical regression was used.

Results: Statistically significant results for the presence of minor and major depressive symptoms (OR 1.55; 95% CI 1.29,2.45), health instability (OR 1.62; 95% CI 1.18, 2.23), ulcers (OR 1.57, 95% CI 1.06, 2.33), arthritis (OR 1.54, 95% CI 1.13, 2.11), depression (OR 1.44, 95% CI 1.03, 1.99), and active infection (OR 1.75, 95% CI 1.22, 2.52) with chronic pain. Quality of life, on the other hand, did not have any significant role.

Conclusions: Minor and major depressive symptoms, health instability, ulcers, arthritis, depression, and active infection were found to be significantly associated with chronic pain. Next steps should be to better address these concerns in the LTC setting.

Impact of initial lactate level on ED management of patients with sepsis: a multicenter retrospective cohort study

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Background: Sepsis represents a systemic inflammatory syndrome associated with infection. It often leads to organ hypoperfusion and thus multiple organ failure and death (1). Lactate is a marker of organ hypoperfusion and has been shown to be predictive of mortality (2, 3). In this multicentre retrospective cohort study, we examined the role of initial lactate level in the management of sepsis in the emergency department (ED).

Methods: We conducted a multicentre retrospective cohort study of patients with sepsis, severe sepsis, or septic shock with initial lactate level drawn in the ED of three community acute care centers from July 2011 to July 2015. Data was extracted from existing comprehensive database compiled by a dedicated Regional Sepsis Coordinator. Institutional research ethics board approval was obtained.

Results: A total of 2082 patients were included in the study. The median age was 72 years (interquartile range, 60-81), and the mean initial lactate level was 3.48 +/- 2.63 mmol/L. 960 (46.1%), 508 (24.4%), 322 (15.1%) and 292 (14.0%) patients had normal (0-2.49 mmol/L), low (2.5-3.99 mmol/L), intermediate (4-5.99 mmol/L) and high (≥ 6 mmol/L) initial lactate level, respectively. Door-to-antibiotics time decreased from 194 +/- 156 min in the normal lactate group to 138 +/- 135 min in the high lactate group ($p < 0.05$). Total fluid administration in first 6 hours increased from 2.1 +/- 5.4L in the normal lactate group to 3.2 +/- 1.9L in the high lactate group ($p < 0.05$). Central line insertion rates increased from 8.8% in normal lactate group to 47.8% in the high lactate group ($p < 0.05$). Intensive Care Unit (ICU) admission rate increased from 25.4% in normal lactate group to 54.5% in high lactate group ($p < 0.05$). Unadjusted in-hospital mortality for normal, low, intermediate and high lactate group was 13.9%, 21.7%, 32.9% and 57.2%, respectively.

Conclusions: Higher initial lactate level correlates with more intensive ED management of sepsis including earlier antibiotics administration, more fluid resuscitation, increase chance of central line insertion and ICU admission. It also correlates with higher unadjusted in-hospital mortality rate.

Sir William Osler's enduring values in medical education

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Background: Having achieved nearly universal adoration within the modern medical community, Canadian-born Sir William Osler (1849-1919) is often described as a medical humanist, educational visionary, and radiant role model.

Methods: Nearly a century after his passing, Osler's relevance endures. We drew from biographical reviews, primary medical literature, Osler's personal communications, as well as testimony from Osler scholars to explore Osler's lasting values within medical education.

Results: Osler was among the greatest advocates for bedside teaching, and his push for a clinical clerkship and postgraduate residency while at Johns Hopkins fundamentally changed medical education worldwide. A fierce proponent of scientific medicine, Osler was a natural historian of disease and worked extensively to correlate its clinical and pathological manifestations. To his patients and students, he was a warm clinician, exquisite diagnostician, and inspiring pedagog. Osler was loyal, persevering, everinquiring, and an exemplary medical leader.

Conclusions: Osler continues to be as relevant as ever in that he represents "an almost impossible idea of what a physician could be" (M. Bliss, personal communications).

engageMED - Enhancing community engagement among medical students at McMaster University: a quality improvement in medical education pilot project

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Background: There is a lack of facilitated community engagement opportunities for McMaster University medical students. Community engagement complements McMaster's patient-centered and holistic approach to medical education and helps students understand the social determinants of health. However, it is difficult for students to make these connections, particularly with the accelerated curriculum and everchanging schedules. The aim of this quality improvement (QI) project is to establish a program (engageMED) that will involve an ongoing volunteer relationship and with a community organization. A pilot project will be launched in October 2016 with ten students (class of 2019) who will continue participation until graduation. With each subsequent

Methods: A QI methodology will be applied to design and implement engageMED. A fishbone diagram was created to understand the current level of community engagement among students along with barriers and motivators. Going forward, we will administer a needs assessment survey in order to investigate the current attitudes towards engagement, the availability and accessibility to such activities, and interest. The data collected will inform multiple Plan-Do-Study-Act cycles, which will be used in conjunction with ongoing feedback to modify the intervention.

Results: Preliminary findings, collected from a baseline needs assessment, will inform the design of engageMED. Students will be surveyed at multiple time points to gather information about their interaction with engageMED including their perceived community engagement and satisfaction.

Conclusions: engageMED will provide students with the opportunity for community engagement while enhancing their personal development and understanding of social determinants of health. Ultimately, engageMED will empower students to become active community members and to continue this involvement beyond medical school and into their careers, which will positively impact the communities in which they practice.

A review of global health competencies in undergraduate medical training at McMaster University

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Background: Global health has become a popular area of curriculum development in medical education in recent years. However, there is considerable variety in the content and format of global health teaching at the undergraduate medical level. An assessment of the current state of global health teaching within the McMaster MD program will serve as a basis for developing future curricula.

Methods: A review of global health competencies was performed. The global health core competencies (GHCC), recently created by adapting the GHEC competencies to the Canadian context, were mapped to the existing McMaster curriculum. An analysis of the mapping exercise was performed to identify areas of achievement as well as areas within the curriculum with room for development and inclusion of additional competencies.

Results: The global health competency mapping exercise revealed that the McMaster curriculum addressed 28/38 competencies as identified by the GHCC. However, a number of these competencies were not explicitly identified in the curriculum and they were unevenly distributed throughout the program. In particular, the McMaster curriculum lacked inclusion of competencies related to the Scholar and Professional CanMEDS roles.

Conclusions: Examining the inclusion of global health competencies within the McMaster undergraduate medical program reveals that the majority of competencies are covered within the existing curriculum but that there is room to improve the diversity of inclusions as well as increase the number of competencies covered within certain CanMEDS roles.

Horizontal Elective for Interprofessional Growth & Healthcare Team Enhancement (HEIGHTEN): A quality improvement project

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Background: Despite emphasis on interprofessional collaboration (IPC) within McMaster's Faculty of Health Sciences, experiential interprofessional education (IPE) for pre-clerkship medical students is lacking. Students are unknowledgeable about other health professionals' scopes of practice and lack confidence with IPC. This QI initiative seeks to assess and address this gap by piloting a horizontal elective for interprofessional growth and healthcare team enhancement (HEIGHTEN), whereby Niagara Regional Campus (NRC) pre-clerkship medical students learn from non-physician healthcare professionals at the Niagara Health System (NHS).

Methods: A literature review of IPE methodology and a needs assessment survey of medical students were conducted. A small-scale pilot was administered in June 2015 with two pre-clerkship students learning from general medicine nurses. An expanded pilot of 20 students from the class of 2018 randomly allocated into three Plan-Do-Study-Act (PDSA) cycles is ongoing. Participants' knowledge, confidence, and attitudes are assessed before and after participation using surveys adapted from evidence-based measurement instruments. Post-elective program evaluation surveys are also completed. Descriptive data analysis alongside key informant interviews with staff are used to make continuous improvements to spread and scale. Future PDSA cycles will include other disciplines and campuses.

Results: Eighty percent of students surveyed rate the existing IPE curriculum as 'poor' or 'okay' and ninety percent would prefer pre-clerkship IPE in clinical settings. Staff and students in the small-scale pilot provided positive feedback. Participation by over 70% of eligible students in the expanded pilot demonstrates strong engagement. Substantial improvement in student confidence with IPC, improved knowledge of the nursing role, and change in attitudes towards IPC have been observed during the first PDSA cycle of the expanded pilot.

Conclusions: A novel initiative for Canadian medical schools, HEIGHTEN is anticipated to make an important contribution to IPE regionally and nationally. Contributing to positive interprofessional relationships in early training will improve future IPC, patient care, and safety.

Improving Equality Between McMaster's Clerkship Streams

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Background: Clerkship is a stressful time for medical students, as it determines the fate of their future training. The choice of one's electives can influence whether or not they are accepted into their desired residency program. For example, some residency programs demand a specific number of reference letters from physicians in their discipline in order to be invited for an interview

(1). McMaster's clerkship streams are assigned via lottery and upon evaluating the streams and speaking with colleagues assigned to each of them, there appears to be inequality between the streams. Some clerkship streams have the majority of elective time prior to core rotations, while others have the majority of electives after multiple core rotations. The former is problematic for three reasons:

- 1) It makes planning electives difficult, as students have not yet had the chance to explore different career options during core rotations.
- 2) It prevents students from being able to complete certain electives because some schools require completion of core rotations as prerequisites for electives (2).
- 3) It prevents students from applying the significant knowledge and experience gained from core rotations to their electives so that they can excel in this competitive environment.

Methods: We created a needs assessment survey to determine the satisfaction of students with their assigned clerkship stream and to ask students to compare McMaster's current streams to our proposed streams that address some of these concerns. This project is focused on identifying potential inequalities between the current clerkship streams and to gather insight from medical students to improve the proposed streams.

Results: A one-way ANOVA showed there were significant differences between medical students' satisfaction with their assigned stream ($p < 0.0001$). Upon analyzing medical students' first choice of current clerkship stream, a chi-square test was used to reject the null hypothesis that all current clerkship streams are equally desirable ($\chi^2 = 52.872$, $p < 0.001$). We found that only 1% of medical students ranked the Red Stream as their first choice and 2% the Pink Stream, while 31.3% ranked the Yellow Stream ($n=99$). In addition, 71.4% of students ranked the Red Stream as their last choice, while 0% ranked the Yellow Stream ($n=98$). This compares to our proposed streams, which showed each stream was ranked first a minimum of 5.9% and a maximum of 20.6% of the time ($n=102$) and ranked last a minimum of 5.0% and a maximum of 25.7% of the time ($n=101$).

Conclusions: The proposed clerkship streams appear to reduce inequality between clerkship streams. We hope that the results of this project will allow us to further improve the clerkship streams for implementation into future McMaster MD curriculums.

Mutual Needs, Mutual Aid: Connecting Undergrad MDs and Residency Research Projects

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Background: Many students at Michael G. DeGroot School of Medicine hope to conduct research during their undergraduate training. However, at the Hamilton campus, the onus for discovering research opportunities falls upon individual students due to a lack of an established, easily accessible, and up to date listing of ongoing research projects that would benefit from student contribution. At the same time, numerous medical residents have active research agendas, are pressed for time, and would welcome contributions to their research projects that capable MD students could offer. Thus a mutual needs exist among undergraduate MD students and medical residents for improved collaboration on research projects. We intend to establish an easily accessible and periodically updated database of ongoing research projects seeking MD student contributors in the specializations of internal medicine, pediatrics, surgery, and psychiatry, at the Hamilton campus.

Methods: We will administer a needs assessment survey to all years and select residents in order to assess attitudes toward the development of a research collaborative interface. A quality improvement methodology will then be applied to establish a system for coordinating research projects between residents and medical students at the Hamilton campus. Initial steps will be directed to create a system to catalogue research projects in e internal and pediatric medicine departments. Multiple Plan-Do-Study-Act (PDSA) cycles will be used to assess both resident and medical student attitudes toward the intervention and guide implementation into other medical specialties.

Results: Preliminary findings from the needs assessment will be presented to discuss the current state of research collaboration; with regards to attitudes and proposed goals from the undergraduate and postgraduate learners.

Conclusions: Improving research collaborative tools for medical students has to the potential to promote greater interest in medical research and foster research collaboration. We anticipate that this tool will enable medical students at McMaster to more easily access research opportunities and subsequently develop competency in research early in their medical education. Hence, medical students might be better prepared to meet the requirements of residency training.

Process improvement for low cardiac risk patients with high troponin levels

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Background: Cardiac troponin levels are routinely used in the evaluation of chest pain in the emergency department as a specific biomarker for myocardial infarction (MI). Since the mortality risk for MI is high, patients presenting with chest pain undergo prolonged observation or admission to perform further investigation such as angiography or catheterization. However a retrospective review of outcomes at the Niagara Health System (NHS) in St. Catharines has shown that many patients who had elevated levels of cardiac troponin did not actually have MI, resulting in unnecessary prolonged visits and increased iatrogenic risk. This also represents unnecessary burden on healthcare resources. The Siemens Vista 500 is the current troponin assay used at NHS. Re-testing select samples with a different assay, the Abbott iSTAT, resulted in negative (normal) troponin levels. Thus, this pilot study was designed to determine whether selective use of the iSTAT troponin assay in patients who tested positive with the Vista assay, will result in fewer clinically unnecessary investigations, a shorter length of stay in hospital, and improved patient care.

Methods: Sixty consecutive patients who presented to the NHS emergency department with chest pain and had positive troponin tests as measured by the Vista assay will be included. Demographic data, medical history, physical examination, laboratory results, investigations, and outcome data will be collected from NHS medical records. The same sample of blood will be re-tested for troponin levels using the iSTAT assay. McNemar's test will be used to determine the extent of agreement between the two assays, and results will be compared to the outcome data to determine if the additional data provided by the iSTAT would have changed clinical management.

Results: Results are pending.

Conclusions: Ultimately, the results of this study may improve the process in evaluating troponin levels and consequent cardiac risk categorization in patients presenting to the NHS emergency department with chest pain, reducing the number of unnecessary interventions and hospitalization time, and improving patient care.

MORE at Mac: Using a Quality Improvement Model to Develop a McMaster Online Radiology Education (MORE) Program

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Background: The ability to understand and interpret radiological images is an essential skill in medicine. Despite this, there is limited exposure to radiology in pre-clerkship at several Canadian medical schools (1, 2), including the McMaster School of Medicine. To address this, some Canadian medical schools have implemented online radiology education programs. Evaluations of these programs have demonstrated improved learning outcomes regarding radiological knowledge and image interpretation skills (3, 4). Using a quality improvement approach, this project aims to implement an online radiology education program that will improve both the competence and confidence of students in understanding and interpreting radiological images over the course of one medical foundation.

Methods: A quality improvement approach will be used to assess the perceived need for expanded radiology education at McMaster and to develop a pilot online education program. An environmental scan of current pre-clerkship online radiology programs at Canadian medical schools will be conducted. Next, a needs assessment will be performed by surveying first-year McMaster medical students to identify satisfaction with current radiology education and perceived areas of improvement. "Plan-Do-Study-Act" (PDSA) cycles will then be used to guide the implementation of a series of modules designed to improve students' radiological knowledge and interpretation ability. The program will be implemented as a short-term pilot project at the Waterloo Regional Campus, with the Niagara Regional Campus as a control. Participants will be assessed before and after program completion to quantify improvements in confidence and competence in radiological image interpretation. Participant feedback will be used to identify areas of improvement in the program.

Results: Results from the needs assessment will be presented, along with detailed analysis of the pilot program's effectiveness, efficacy, and student-satisfaction. The results will be used to support the expansion of the online radiology education program to all McMaster students throughout the entire pre-clerkship period.

Conclusions: The proposed implementation of an online radiology education curriculum aligned with McMaster's educational philosophy of innovative, evidence-based, and self-directed learning. It will improve students' knowledge and confidence in radiology, better preparing them for clerkship, residency, and beyond.

Incorporation of practical personal protective equipment (PPE) training in pre-clerkship medical education at the Michael G. DeGroote School of Medicine

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Background: Personal protective equipment (PPE) and safety training prepare students to protect themselves and patients during clinical interactions. Proper PPE use and hand hygiene can reduce transmission of infectious diseases to health care providers, and patients (1). Studies have shown that entry level personnel and student learners are most vulnerable to preventable workplace injuries (2). Medical students at the Michael G. DeGroote School of Medicine are exposed to PPE training early in their curriculum via educational modules completed prior to registration into the program; however, the program has not evaluated the adequacy of this training in preparing students to use PPE appropriately in clinic.

Methods: To improve PPE education, we will use a Quality Improvement approach to implement and assess the effectiveness of additional PPE training in the clinical skills curriculum. Needs assessment surveys will be distributed to McMaster medical students to evaluate need for further PPE training. A 1:1:1 pilot will be implemented with one tutorial group to assess the effectiveness of our intervention. Pre- and post-intervention surveys and quizzes will be administered to evaluate the effect of our intervention on student confidence with PPE, PPE knowledge, balancing measures (i.e. time, cost), and process measures. Feedback from the pilot will be incorporated into subsequent Plan-Do-Study-Act cycles to refine our intervention before widespread implementation. Long-term effectiveness will be assessed by measuring rates of preventable workplace injuries experienced by medical students.

Results: A comprehensive plan detailing the implementation and assessment of additional PPE training in clinical skills will be presented. We anticipate improved in confidence in PPE use by junior medical students and fewer a workplace injuries. Our intervention will undergo continuous changes as feedback is received.

Conclusions: Implementing formal PPE training as part of clinical skills will improve students' confidence in PPE use and improve student safety.

Building the Pipeline: engaging first year medical students as teachers in undergraduate training

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Background: First year medical students from the Niagara Regional Campus at McMaster University act as teachers and role models for local elementary and secondary students through the Pipeline Project.

Methods: First year medical students from the Niagara Regional Campus at McMaster University act as teachers and role models for local elementary and secondary students through the Pipeline Project.

Results: First year medical students were highly engaged with the Pipeline Project with a class participation rate of greater than 50%. Pipeline was initially designed to promote community engagement and to expose early learners to health care career options. It was well received in its first year. In the second year of the program, feedback from medical students was positive with increased confidence in public speaking and explaining medical concepts at levels tailored to the audience. Medical student participants showed an increased likelihood of incorporating teaching into their future practice.

Conclusions: Teaching more junior students is a significant task in residency yet current undergraduate medical programs often lack a formal curriculum that prepares medical students for these skills. There has been a growing recognition of the need to prepare medical students for their role as teacher. Early undergraduate medical education is an excellent opportunity to target educational skills improvement and stimulate teaching interests amongst medical students. Programs such as the Pipeline Project support the development of medical students as teachers and mentors by giving them an opportunity to interact and share their knowledge with younger learners. The early introduction to teaching could be key to better prepare medical students to become more effective educators, starting in medical school and continuing through residency and into practice, and that these repeated exposures and experiences might produce high quality teachers in medical education.

Putting the Canadian CT Head Rule into Practice in a Community Emergency Department: a Quality Improvement Project

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Background: While CT scans are an invaluable diagnostic tool, they are associated with significant cost and radiation exposure. Evidence suggests that CT utilization is increasing, with CT head rates in all-comers complaining of head injury regardless of mechanism approaching 75% (1). Canadian literature suggests that over 90% of these studies are reported as negative and only 1% require any neurological intervention (1). The Canadian CT Head Rule (CCHR) is a well-validated decision tool that predicts clinically significant head injuries and can confidently defer imaging when unnecessary, ensuring the right patients receive the right care at the right time.

Methods: We aimed to investigate whether providing emergency department (ED) physicians with point-of-care access to the CCHR in the form of a newly implemented requisition would result in fewer head CTs ordered compared to a visit-matched period prior to implementation. In consultation with ED physicians and diagnostic imaging, a new requisition was created and implemented using a quality improvement (QI) approach. This consisted of drafting the requisition followed by gathering feedback from stakeholders, one-person trials, and a 24-hour ED-wide rollout. The final revised requisition contains the CCHR as a flow diagram concluding in “excluded”, “CT recommended”, or “not recommended.” This was then implemented as the new mechanism for ordering a head CT across the ED.

Results: While full study results will be presented at MMSRD, the majority of data is available. Through increased accessibility of the CCHR our primary outcome (visits receiving a head CT) has demonstrated a 10.9% relative reduction to date (chi square: $P = 0.0147$). No significant differences were observed in patient volume or demographics.

Conclusions: Our results show that by using a QI approach, we were able to design an evidence-based tool that has been adopted throughout our ED. More importantly, this tool appears to provide patient benefit with presumably fewer unnecessary CTs being conducted.

Using a Delphi process to define priorities for prison health research in Canada

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Background: A large number of Canadians spend time in correctional facilities each year, and they are likely to have poor health compared to the general population. Relatively little health research has been conducted in Canada with a focus on people who experience detention or incarceration. We aimed to conduct a Delphi process with key stakeholders to define priorities for research in prison health in Canada for the next 10 years.

Methods: We conducted a Delphi process using an online survey with two rounds in 2014 and 2015. We invited key stakeholders in prison health research in Canada to participate, which we defined as persons who had published research on prison health in Canada since 1994 and persons in the investigators' professional networks. We invited 143 persons to participate in the first round and 59 participated. We invited 137 persons to participate in the second round and 67 participated. Participants suggested topics in the first round, and these topics were collated by investigators. We measured the level of agreement among participants that each collated topic was a priority for prison health research in Canada for the next 10 years, and defined priorities based on the level of agreement.

Results: In the first round, participants suggested 71 topics. In the second round, consensus was achieved that a large number of suggested topics were research priorities. Top priorities were diversion and alternatives to incarceration, social and community re-integration, creating healthy environments in prisons, healthcare in custody, continuity of healthcare, substance use disorders and the health of Aboriginal persons in custody.

Conclusions: Generated in an inclusive and systematic process, these findings should inform future research efforts to improve the health and healthcare of people who experience detention and incarceration in Canada.

Improving patient safety and streamlining care at a community hospital with a trauma care bundle

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Background: Non-trauma centers (NTC) and community hospitals commonly deliver medical care during the “golden hour” which has significant implications on patient health outcomes. The Niagara Health System (NHS) and its 3 community NTC hospitals provide trauma care to over 100 patients annually. NTCs lack standardized resources commonly found in trauma centers. Checklists and bundles have been effective in streamlining processes to ensure that health care providers provide timely and effective care.

Methods: A quality improvement (QI) approach to design, implement and evaluate a trauma care bundle at a NHS community hospital. The pilot used rapid cycle improvements, known as Plan-Do-Study-Act (PDSA) cycles. We assessed outcome and process through a chart audit of all trauma patients in the NHS from July-December 2015. A safety attitudes questionnaire (SAQ) was administered to participating staff to assess balancing measures.

Results: 4 PDSA cycles resulted in sequential improvements to the bundle. These improvements were used to institute the bundle across all 3 sites of the NHS. 33% of patients received the trauma care bundle between July 1– October 31. Looking at emergency department average length of stay times, those patients who received care with the trauma care bundle had an average time of 1.6 hours while those who did not receive care with the bundle had an average time of 3.4 hours.

Conclusions: Trauma care bundles may foster safer and more efficient care in community hospitals where the golden hour often occurs. This community trauma care bundle shows promising results at ensuring patients receive the right care at the right time during this critical period.