RESEARCH DAY SPONSORS

The Surgery Research Day 2019 Planning Committee gratefully recognizes the contributions of the sponsors for the Annual Surgery Research Day.

Research Program:
Department of Surgery GFT Surgeons
The Wayne Beecroft Western Surgical Lectureship Fund

Awards Dinner:
Thorlakson Chair in Surgical Research
American College of Surgeons—Manitoba Chapter
Department of Surgery GFT Surgeons

ACKNOWLEDGEMENTS

The Surgery Research Day 2019 Planning Committee greatly appreciates the support from the Pan Am Clinic Foundation and Department of Surgery Research Advisory Committee members in the planning of our Annual Surgery Research Day 2019.
WELCOME MESSAGE

Dear Colleagues,

On behalf of the Planning Committee, it is with great pleasure that we welcome you to the Department of Surgery’s Annual Research Day, 2019.

Over the past 18 years, surgeons, residents, medical students and fellows have made major contributions to research, teaching and clinical practice in all of our surgical specialties, resulting in a positive impact on patient care and education. Today, we wish to recognize the extensive accomplishments in research and innovation achieved within our Department, and we seek to share and exchange these ideas in a collaborative, interdisciplinary research environment.

On behalf of the members of the Surgery Research Day 2019 Planning Committee, we would like to extend our thanks to all those who have submitted an abstract, to our sponsors and to those attending this exciting department-wide event.

We hope you find this day enriching, with new concepts to implement in your practice, teachings and future research aspirations.

Sincerely,

Dr Biniam Kidane

Dr Ryan Mitchell

Co-Chairs, Surgery Research Day 2019 Planning Committee

RESEARCH DAY 2019 PLANNING COMMITTEE

Biniam Kidane, Co-Chair

Ryan Mitchell, Co-Chair

Richard Keijzer, Thorlakson Chair in Surgical Research

Megan Delisle, Resident Representative

Charity Pascual, Research Coordinator
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## Abstracts

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Alex B. Haynes, MD, MPH is a member of the Division of Surgical Oncology at the Massachusetts General Hospital and Associate Professor of Surgery at Harvard Medical School. His primary clinical focus is on the surgical management of melanoma and sarcoma, including gastrointestinal stromal tumors (GIST) and retroperitoneal tumors. He received his undergraduate, medical, and public health degrees from Tulane University, Wayne State University, and Columbia University. He completed surgical residency training at the Massachusetts General Hospital and a research fellowship at the Harvard School of Public Health. Following this, he completed a fellowship in complex general surgical oncology at the University of Texas M.D. Anderson Cancer Center. He is dual board certified by the American Board of Surgery in Surgery and Complex General Surgical Oncology.

In addition to his clinical practice, Dr. Haynes is a researcher in health care systems and delivery. He has published in numerous journals, including the New England Journal of Medicine, JAMA, Cancer, The Lancet, and Health Affairs. He is on the editorial board of the Annals of Surgical Oncology. He serves as director of the safe surgery program at the Ariadne Labs of the Harvard School of Public Health (www.ariadnelabs.org) and serves as faculty in the Codman Center for Clinical Effectiveness in Surgery.
Dr. Teodor Grantcharov completed his surgical training at the University of Copenhagen, and a doctoral degree in Medical Sciences at the University of Aarhus in Denmark. He is a Professor of Surgery at the University of Toronto, holds the Keenan Chair in Surgery at St. Michael’s Hospital in Toronto and Canada Research Chair in Simulation and Surgical Safety.

Dr. Grantcharov is the Director of the International Centre for Surgical Safety – a multidisciplinary group of visionary scientists with expertise in design, human factors, computer- and data science, and healthcare. His clinical interest is the area of minimally invasive surgery, while his academic focus is in the field of surgical innovation and patient safety. He has become internationally recognized as a leader in this area with his work on curriculum design, assessment of competence and impact of surgical performance on clinical outcomes. Dr. Grantcharov developed the surgical black box concept, which aims to transform the safety culture in medicine and introduce modern safety management systems in the high-risk operating room environment.

Dr. Grantcharov has more than 170 peer-reviewed publications and more than 180 invited presentations in Europe, South- and North America. He sits on the Board of Governors of the American College of Surgeons (ACS) and on numerous committees with Surgical Professional Societies in North America and Europe. He also sits on the Editorial Boards of the British Journal of Surgery and Surgical Endoscopy.
RESEARCH DAY 2019 OBJECTIVES

At the end of the Department of Surgery Annual Research Day, participants will be able to:

- Present and evaluate current clinical, educational and basic science research being conducted in the Department of Surgery; and learn and discuss innovative advanced techniques and technology in a collaborative surgery research environment.

- To describe the role of structured implementation in effective uptake of surgical safety checklists; understand the relationship between safety culture and surgical outcomes; and evaluate implementation science approaches to surgical research.

- To review the cultural barriers in surgery that prevent effective quality improvement initiatives; outline successful performance enhancing concepts from other high-risk, high performance industries; review existing evidence about data-driven approach to surgical education; and highlight the importance of implementation of modern risk reduction strategies in surgery and review the opportunities for improving patient safety using modern educational concepts.

JUDGES

Dr Alex Haynes
Massachusetts General Hospital
Associate Professor of Surgery
Surgery, Harvard Medical School

Dr Teodor Grandcharov
Canada Research Chair in Simulation and Surgical Safety
St Michael’s Hospital
Professor of Surgery
Department of Surgery, University of Toronto

Dr Megan Delisle
MSc Graduate Student, General Surgery Resident
Department of Surgery, University of Manitoba
CONFLICT OF INTEREST DISCLOSURE

Before each presentation, speakers will disclose on their first slide any significant relationships that may be a perceived or apparent conflict of interest to the subject of the proposed CME/CPD activity.

Each member of the Research Day 2019 Planning Committee were asked to disclose any significant relationships with the manufacturer of any commercial product that may have a direct or indirect conflict of interest in the program content. All members reported no conflicts.

CONTINUING PROFESSIONAL DEVELOPMENT

This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification Program of The Royal College of Physicians and Surgeons of Canada and approved by the CPD Medicine Program, University of Manitoba for a maximum of 6.5 credits.

*Participants should only claim credit for the actual number of hours attended.*

The University of Manitoba CPD Medicine Program is fully accredited by the Committee on Accreditation of Continuing Medical Education (CACME).
## PROGRAM — MORNING

### 7:45  
**LIGHT BREAKFAST**  
Joe Doupe Atrium—Basic Medical Sciences

### 8:00  
**DR ALEX HAYNES, MEDICAL HARVARD SCHOOL**  
Scaling Safety: The Science of Surgical Safety Checklist Implementation  
Introduction—Dr Megan Delisle (Research Day 2019 Planning Committee)

### 9:00  
**OPENING REMARKS - Dr Ryan Mitchell**  
(Co-Chair, Research Day 2019 Planning Committee)

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<thead>
<tr>
<th>Time</th>
<th>Abstract Title</th>
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<tbody>
<tr>
<td>9:10</td>
<td>The relationship between macrophages, MMP-12, IL-6, and intraluminal thrombus in human abdominal aortic aneurysms.</td>
<td>Lauren Bath* Vascular Surgery</td>
</tr>
<tr>
<td>9:20</td>
<td>The effect of multimorbidity on changes in health-related quality of life following hip and knee arthroplasty</td>
<td>Eric Bohm Orthopedic Surgery</td>
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<tr>
<td>9:30</td>
<td>The Life Course of Children with Pediatric Traumatic Injury Compared to Matched Controls: A Longitudinal Population-Based Study</td>
<td>Dominic Chung* Plastic Surgery</td>
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### BRIEF SESSION  
**Moderator: Dr Rahul Bansal (Urology Surgery)**

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<tr>
<td>9:40</td>
<td>Perioperative Outcomes of Standard Versus Mini-laparoscopic Pyeloplasty in the Pediatric Population</td>
<td>Abdullah Alenazi* Pediatric Surgery</td>
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<tr>
<td>9:45</td>
<td>Identifying Appropriate Biomarkers of Ventilator Induced Lung Injury During One Lung Ventilation Surgery</td>
<td>Allan Bruinooge* Thoracic Surgery</td>
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<tr>
<td>9:50</td>
<td>Laparotomy or peritoneal drainage for the management of surgical necrotizing enterocolitis and spontaneous intestinal perforation – a 25-year retrospective chart review</td>
<td>Danielle Stepnuk* Pediatric Surgery</td>
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<tr>
<td>10:00</td>
<td>Activation of the Aryl Hydrocarbon Receptor is involved in the pathogenesis of CDH</td>
<td>Landon Falk* Pediatric Surgery</td>
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<tr>
<td>10:05</td>
<td>Mid-term progressive loosening of hydroxyapatite-coated femoral stems paired with a metal on metal bearing</td>
<td>Trevor Gascoyne Orthopedic Surgery</td>
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<tr>
<td>10:10</td>
<td>Regulating transparental transport of nanoparticle as a novel therapy during pregnancy</td>
<td>Andrew Tse* Pediatric Surgery</td>
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| 10:15 | **COFFEE BREAK**  
Joe Doupe Atrium | Basic Medical Sciences |
# PROGRAM — MORNING

## PLENARY SESSION

**Moderator:** Dr Kanwal Kumar (Cardiac Surgery)

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<tr>
<td>10:40</td>
<td>Does Personal Learning Style Predict the Ability to Learn Laparoscopic Surgery? A Pilot Study.</td>
<td>Giuseppe Retrosi Pediatric Surgery</td>
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<tr>
<td>10:50</td>
<td>What does Merkel cell carcinoma look like in Manitoba?</td>
<td>Olivia Hershorn* General Surgery</td>
</tr>
<tr>
<td>11:00</td>
<td>In vivo analysis of vascular changes associated with pulmonary hypertension in miR-200b -/-mice</td>
<td>Samira Seif* Pediatric Surgery</td>
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## BRIEF SESSION

**Moderator:** Dr Kanwal Kumar (Cardiac Surgery)

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<tr>
<td>11:15</td>
<td>Periprosthetic fracture rate after short and long hip nails: analysis of a health region database</td>
<td>Gabriel Larose* Orthopedic Surgery</td>
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<tr>
<td>11:20</td>
<td>Musculoskeletal Ultrasound Curriculum for Orthopaedic Surgery Residents</td>
<td>Samuel Larrivee* Orthopedic Surgery</td>
</tr>
<tr>
<td>11:25</td>
<td>The Incidence and Prevalence of Thoracic Aortic Disease in Manitoba, Canada: a Population Based Study</td>
<td>Carly Lodewyks* Cardiac Surgery</td>
</tr>
<tr>
<td>11:30</td>
<td>Does a delay in ACL reconstruction increase the incidence of secondary pathology in the Knee? A systematic review and Meta-analysis</td>
<td>Graeme Matthewson* Orthopedic Surgery</td>
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<td>11:35</td>
<td>Aerobic fitness in recreational athletes following anterior cruciate ligament rupture and reconstruction</td>
<td>Sheila McRae Orthopedic Surgery</td>
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<tr>
<td>11:40</td>
<td>Incidence of Total Knee Replacement in Patients with Previous Anterior Cruciate Ligament Reconstruction</td>
<td>James McCammon Orthopedic Surgery</td>
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<td>11:45</td>
<td>Transitory Stiffness After Bicruciate-Retaining TKA: A Prospective RCT</td>
<td>Sophie Zhu* Orthopedic Surgery</td>
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<td>11:50</td>
<td>Pedicle Screw Design in Osteoporotic Bone</td>
<td>Jonathan Tan* Orthopedic Surgery</td>
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## PROGRAM — AFTERNOON

### 12:00 LUNCH BUFFET
Joe Doupe Atrium—Basic Medical Sciences

### 1:00
**DR TEODOR GRANTCHAROV, UNIVERSITY OF TORONTO**
Using data to enhance performance of surgical teams and improve patient safety
Introduction—Dr Biniam Kidane (Research Day 2019 Planning Committee)

### PLENARY SESSION  
**Moderator: Dr Julie Kickbush (General Surgery)**

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<tr>
<td>2:05</td>
<td>Interventions to address burnout among surgical trainees: a systematic review and meta-analysis</td>
<td>Jessica Bednarz* General Surgery</td>
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<tr>
<td>2:15</td>
<td>Impact of pre-surgical self-reported exercise on post-surgical outcomes in patients with cervical pathology</td>
<td>Mark Xu* Orthopedic Surgery</td>
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<tr>
<td>2:25</td>
<td>Does Aortic Stenosis Have an Autoimmune Component?</td>
<td>Rizwan Manji Cardiac Surgery</td>
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### BRIEF SESSION  
**Moderator: Dr Julie Kickbush (General Surgery)**

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<tr>
<td>2:35</td>
<td>Outcomes and prognosticators of pathological T4 Renal Cell Carcinoma using a large Canadian multi-institutional database</td>
<td>Justin Oake* Urology Surgery</td>
</tr>
<tr>
<td>2:40</td>
<td>Social Complexity and Risk for Paediatric Burn Injury: A Systematic Review</td>
<td>Adam Padalko* Plastic Surgery</td>
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<tr>
<td>2:50</td>
<td>Proposal of a Standard Classification Scheme for Traumatic Sinus Thrombosis</td>
<td>Mohamed Somji* Neurosurgery</td>
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<tr>
<td>2:55</td>
<td>Post-operative outcomes of patients with esophageal atresia +/- tracheoesophageal fistula in Manitoba; a retrospective review</td>
<td>David Chung* Pediatric Surgery</td>
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<tr>
<td>3:05</td>
<td><strong>COFFEE BREAK</strong></td>
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Joe Doupe Atrium | Basic Medical Sciences
## PROGRAM — AFTERNOON

### PLENARY SESSION  
**Moderator: Dr Giuseppe Retrosi (Pediatric Surgery)**

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<tr>
<td>3:15</td>
<td>Impact of time-to-surgery and surgical delay on oncologic outcomes for renal cell carcinoma</td>
<td>Benjamin Shiff* Urology Surgery</td>
</tr>
<tr>
<td>3:25</td>
<td>A theranostic nanofibrous wound dressing for wound infection detection and treatment</td>
<td>Hardev Singh Plastic Surgery</td>
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<tr>
<td>3:35</td>
<td>The impact of distance on post-operative follow-up in pediatric general surgery patients: a retrospective review</td>
<td>Meagan Wiebe* General Surgery</td>
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### BRIEF SESSION  
**Moderator: Dr Giuseppe Retrosi (Pediatric Surgery)**

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<tr>
<td>3:45</td>
<td>Circular RNAs as potential biomarkers for Congenital Diaphragmatic Hernia</td>
<td>Richard Wagner* Pediatric Surgery</td>
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<tr>
<td>3:50</td>
<td>Frailty in acute care surgery: Clinical Frailty Scale as a predictor of morbidity and mortality</td>
<td>Melissa Ward * General Surgery</td>
</tr>
<tr>
<td>3:55</td>
<td>The Advantage of Adventitia; A 3D-Microsurgical Simulation Model</td>
<td>Jessica Winter* Plastic Surgery</td>
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* Speaker eligible for a presentation award

### CLOSING REMARKS - Dr Ryan Mitchell (Co-Chair, Research Day 2019 Planning Committee)

### SURGERY RESEARCH DAY AWARDS DINNER
Gateway to Arctic | 2595 Roblin Boulevard | Assiniboine Park Conservancy

Cocktails—6:30PM (cash bar)
Introduction
Ruptured abdominal aortic aneurysms (AAA) are associated with significant morbidity and mortality. We have previously shown that AAA rupture occurs in regions of low wall shear stress, where flow recirculation and intraluminal thrombus (ILT) deposition predominate. Higher levels of metalloproteinase-9 also correlate with ILT deposition; suggesting that ILT may promote AAA wall degeneration due to increased proteolytic activity.

Macrophage metalloelastase-12 (MMP-12) is involved in extracellular elastolysis. In human AAA, MMP-12 is histologically associated with macrophage infiltration and elastin degradation. Many macrophage-associated cytokines are elevated in AAA, with interleukin-6 (IL-6) being most abundantly expressed. We analyzed differential MMP-12, and IL-6 levels in human AAA tissue. We hypothesized that AAA with higher ILT will have greater macrophage-mediated elastolytic activity.

Methods
Tissue was obtained from patients undergoing open infrarenal AAA repair (n=21) or aortobifemoral bypass (control) (n=8). Informed consent was obtained. Full thickness AAA tissue was harvested from stereotyped locations. Control tissue was sampled from normal aorta. Tissue was processed for histological analysis of inflammatory cells and CD68+macrophages; or snap frozen in liquid N2 and then stored at -80 for MMP-12 and IL-6 immunoassay.

Results
There were no significant differences between AAA and controls at baseline; aside from higher rates peripheral vascular disease and younger age in the control group (p<0.01). There was significantly greater inflammation found in AAA tissue compared to control (p<0.00001). There was also significantly higher CD68+ macrophages counts in ILT-rich regions compared with control (p<0.0001); however, there was no difference in MMP-12 or IL-6 levels between ILT and non-ILT regions, and no correlation between ILT thickness and MMP-12 levels.

Conclusion
Although we demonstrated inflammation and increased CD68+ macrophage levels adjacent to IL T in AAA compared with control; contrary to our hypothesis, there was no difference in macrophage-related elastases and cytokines suggesting that macrophages may have a limited role in AAA degeneration.
The effect of multimorbidity on changes in health-related quality of life following hip and knee arthroplasty

Introduction
Multimorbidity is defined as the occurrence of two or more chronic conditions simultaneously. More than 95% of primary care patients aged > 65 years have multiple morbidity. Arthritis is a common chronic condition that can adversely affect health-related quality of life (HRQoL). Total hip (THA) and total knee arthroplasty (TKA) usually result in improved HRQoL. While multimorbidity is common in patients undergoing THA or TKA, little has been published about its effect on improvements in either condition-specific or general HRQoL following surgery. The aim of this study was to assess the effect of multimorbidity on improvements in HRQoL following THA and TKA.

Methods
Using data from a regional joint registry for 14,573 patients, HRQoL was measured prior and one year following surgery using the Oxford Hip Score (OHS) and Oxford Knee Score (OKS), and the 12-Item Short-Form Health Survey Physical and Mental Component Summary scores (PCS and MCS, respectively). Multimorbidity was defined as the concurrence of two or more self-reported chronic conditions. A linear mixed-effects model was used to test the effects of multimorbidity and the number of chronic conditions on improvements in HRQoL.

Results
Almost two-thirds of patients had multimorbidity, which adversely affected improvements in HRQoL. For THA, mean improvements in HRQoL scores were reduced by 2.21 points in OHS, 1.62 in PCS, and 4.14 in MCS; for TKA, the mean improvements were reduced by 1.71 points in OKS, 1.92 in PCS, and 3.55 in MCS (all p < 0.0001). An increase in the number of chronic conditions was associated with increasing reductions in HRQoL improvements.

Conclusion
Multimorbidity adversely affects improvements in HRQoL following THA and TKA. Our findings are relevant to healthcare providers focused on the management of patients with chronic conditions and for administrators reporting and monitoring the outcomes of THA and TKA.
Introduction
Pediatric traumatic injury (PTI) is a leading cause of hospitalization among children. Little is known about subsequent mental health outcomes (MHOs). This longitudinal cohort study compared the MHOs in survivors of PTI with matched controls from the general population. This study hypothesized that survivors of PTIs will have increased rates of MHO relative to matched controls.

Methods
Children under 18 years old that survived an injury that required hospitalization between January 1, 2004 to December 31, 2016 (n = 9551) were matched to five controls from the general population (n = 47755). Individuals were matched based on age, sex and geographic region. Pre-and post-injury adjusted relative rates (ARRs) of anxiety, depression and substance use disorders (SUDs) were determined with generalized estimating equations (GEE). Adjusting for sex, income group, location and age group, a group-period interaction term was used to compare changes in ARR over time between groups.

Results
Survivors of PTIs had increased ARR of anxiety (1.66, 95% CI 1.51-1.82); depression (2.87, CI 2.57-3.21); substance use RR=3.23, [CI: 2.64-3.99] and any MHO (1.90, CI 1.76-2.04)). They also had high pre-injury rates: (anxiety 1.30, CI: 1.16-1.47) depression (2.00, CI 1.73-2.32); substance use (4.99, CI 3.08-5.20) and any MHO (1.50, CI 1.37-1.66]). Comparing the pre- and post-injury ARRs showed a significant difference over time (p< 0.001) for anxiety, depression and any MHO. There was no significant difference in substance use over time.

Conclusion
Child survivors of traumatic injury had increased ARR of anxiety, depression and any MHO compared to matched control after adjustments for sex, income and age group and geographic location. These findings support targeted intervention strategies for this population.
Perioperative Outcomes of Standard Versus Mini-laparoscopic Pyeloplasty in the Pediatric Population

Introduction
Conventional laparoscopic surgery (CLS) (ports=5mm) has largely replaced open surgery for treating many urological diseases. Mini-laparoscopic surgery (MLS) (Ports=3mm in size) is now being used in many urologic procedures. Advantages include superior cosmetic results, decreased analgesic requirement and shorter hospital stay. Our aim is to present our single centre experience in intra- and postoperative outcomes of MLS and CLS pyeloplasty, performed on pediatric patients.

Methods
A retrospective chart review of pediatric patients who underwent CLS and MLS pyeloplasty between 2012 - 2018 at the Children’s Hospital of the Health Science centre was performed. Our outcome was to compare the operative time, postoperative analgesic consumption, pain intensity score, duration of Foley catheter, length of hospital stay (LOS) and the postoperative complications such as anastomotic leak, incidence of postoperative stricture and urinary tract infection between the two groups. The two groups were compared using unpaired t-test.

Results
A total of 21 patients were identified with a mean age of 8.5 years. There were 6/21 patients who underwent a MLS and 15/21 who received a CLS pyeloplasty. The male to female ratios were 1.1:1 in the CLS group and all male in the MLS group. We did not detect any significant differences in the duration of catheter, LOS, postoperative complications and blood loss. The two tailed t test did not reveal a significant difference in post-operative pain with a p=0.485 (CI of -3.44-1.71).

Conclusions
Laparoscopic pyeloplasty in children is effective and safe in both MLS and CLS procedures. We did not find a significant difference between the two group with regards to all outcomes suggesting that both methods are acceptable for practice. This would warrant, however, further investigation with a possible randomized control trial to elucidate if there are any advantage to MLS in the pediatric population.
Introduction
Pulmonary complications of thoracic surgery are likely driven by multiple factors including pre-operative lung function and amount of lung resected. Ventilator induced lung injury (VILI) can occur as a result of mechanical ventilation to two lungs. Thoracic surgery often requires one lung ventilation (OLV). The impact of OLV on development of post-operative pulmonary complications is not well understood. The potential for VILI is high because all of mechanical ventilation is exerted on one lung instead of two and because patients undergoing thoracic surgery often do not have healthy lungs. Reliable biomarkers of VILI caused by OLV may allow us to better detect, prevent and treat it early. Our objective was to perform a systematic scoping review to determine reliable biomarkers of VILI in order to identify appropriate outcomes for future studies of VILI during OLV.

Methods
A systematic scoping review was performed using Cochrane Collaboration methodology. We searched Medline, EMBASE and SCOPUS (inception to June 2018). Gray literature was searched. Studies that analyze biomarkers of VILI in models without pre-existing lung damage were included.

Results
After screening 4013 eligible papers 73 papers were chosen for full text review. Only 18 studies focused on VILI during OLV. Whereas two-lung ventilation studies were predominantly in animal models, 61% (n=11) of OLV studies were conducted in humans in an intra-operative setting. Broncho-alveolar lavage (BAL) & serum analyses with ELISA-based assays were most commonly used. Sixty-one percent (n=11/18) of studies showed that VILI induced increases in proinflammatory cytokines (IL-1, IL-12, TNF-α) in BAL & serum samples. Interestingly 38.9% (n=7/18) also reported increases in anti-inflammatory cytokines.

Conclusion
A systematic review of the state of the evidence demonstrated that future studies of VILI during OLV should focus on pro- and anti-inflammatory cytokines in BAL and serum using multi-plex ELISA assays.
Laparotomy or peritoneal drainage for the management of surgical necrotizing enterocolitis and spontaneous intestinal perforation – a 25-year retrospective chart review

Introduction
Necrotizing enterocolitis (NEC) and spontaneous intestinal perforation (SIP) are disorders of neonatal gastrointestinal tracts and often require surgery. We will determine the best surgical strategy, laparotomy (LAP) or peritoneal drainage (PD), as current evidence is inconclusive.

Methods
A retrospective cohort study of infants with surgical NEC or SIP at HSC from 1991 to 2016 was performed; LAP and PD defined cohorts. The primary outcome measured was survival. Secondary outcomes were length of stay (LOS), days to full enteral feeds (dFEF), and duration of cardiovascular (CV), ventilation, and nutritional support.

Results
102 patients were included, 44 LAP and 58 PD. Survival did not differ between cohorts. Survival after LAP at 30- and 180-days was 37(84.1%) and 29(65.9%), respectively. Survival after PD at 30-, and 180-days was 43(74.1%) and 32(55.2%), respectively. Mean LOS (days±SD) for survivors was 100.3±95.8 for LAP versus 133.7±100.4 for PD (p=0.2). dFEF was shorter for LAP (43.4±28.3) versus 64.9±38.9 for PD (p=0.02). Of the 37 LAP 30-day survivors, 35(94.6%) were off CV support, 25 (67.6%) were extubated, and 9(24.3%) had reached FEF. Of the 43 PD 30-day survivors, 33(76.7%,p=0.06) were off CV support, 14(32.6%,p=0.003) were extubated, and 4(9.3%,p=0.13) had reached FEF. Of the 29 LAP 60-day survivors, none required CV support, 26(89.7%) were extubated, and 21(72.4%) had reached FEF. Of the 36 PD 60-day survivors, 1(2.8%,p=1.0) required CV support, 24(66.7%,p=0.08) were extubated, and 19(52.8%,p=0.17) had reached FEF. Of the 29 LAP 180-day survivors, 28(96.6%) were extubated and 26(89.7%) had reached FEF. Of the 32 PD 180-day survivors, 29(90.6%,p=0.68) were extubated and 30(93.8%,p=0.91) had reached FEF.

Conclusion
Surgical intervention for infants with NEC or SIP does not influence survival at 180 days. However, LAP patients tend toward less respiratory and CV support, LOS, and dFEF; LAP may expedite clinical progress compared to PD.
KAITLIN EDWARDS
Brief Session (9:55—10:00)
Overcoming Barriers to Mentorship for General Surgery Residents: Outcomes of a Formal Mentorship Program

Introduction
Mentorship improves trainee wellbeing and success. Junior and female General Surgery (GS) residents report significantly less mentorship due, in part, to time constraints and difficulty approaching potential mentors, the later more significantly affecting female residents. We hypothesized a mentorship program for junior residents within the University of Manitoba GS Program may increase participant reported mentorship rates with potentially greater benefit for females through assignment of mentors.

Methods
A structured mentorship program was developed and implemented at the PGY1 level in July 2016. The second PGY1 cohort entered in July 2017. Each cohort was assigned a senior resident and practising surgeon as mentors. Group meetings with pre-reading were held quarterly.

A pre-implementation survey was administered to a convenience sample of junior GS residents in 2015 to document the baseline prevalence of mentorship. A post-implementation survey was administered to junior GS residents after the July 2016 cohort completed the two-year program and the July 2017 cohort completed the first year of the program.

Results
A total of 7/10 (70%) junior GS residents completed the pre-implementation survey and 8/10 (80%) completed the post-implementation survey. A total of 4/7 (57%) reported having a mentor prior to implementation compared to 7/8 (88%) post-implementation. The prevalence of mentorship among female junior GS residents increased by 20% (4/5 from 3/5), whereas the prevalence of mentorship for males increased by 50% (3/3 from 1/2). All 5/5 (100%) female junior residents agreed mentors should be assigned compared to only 2/3 (66%) male residents.

Conclusion
The formal mentorship program increased mentorship rates for all junior GS residents. Females, however, continue to report lower rates of mentorship compared to males. Further qualitative study is required to develop targeted strategies to increase mentorship among female residents.
LANDON FALK
Brief Session (10:00—10:05)
Activation of the Aryl Hydrocarbon Receptor is involved in the pathogenesis of CDH

Introduction
Every 10 minutes a baby is born with congenital diaphragmatic hernia (CDH). The involvement of environmental chemicals may explain 70% of CDH cases. The aryl hydrocarbon receptor (AHR) protein, an environmental chemical sensor, may be involved in the development of CDH. Interactions between AHR and associated CDH pathways have been linked, but not proven. We hypothesize that the activation of AHR by environmental factors is involved in the pathogenesis of CDH. AHR expression in CDH patients will be compared to the associated established nitrofen rat model. The activation of known CDH inducing pathways by AHR will be studied.

Methods
We compared the expression of AHR in lung sections near birth from human CDH patients (n = 3, Weeks 39 - 40) and the nitrofen treated rats (n = 3, E21) to age-matched controls using immunofluorescence (IHC/IF). We assessed the response of AHR to nitrofen and known ligands; benzo[α]pyrene and resveratrol in the BEAS-2B human epithelial cell line (n =3). AHR activity within a 24 hour exposure period was assessed with immunocytochemistry (ICC/IF).

Results
Both CDH patients and rat lung sections have increased AHR abundance in the mesenchyme and smaller airways compared to controls. AHR activation was observed by ICC/IF in BEAS-2B cells within one hour of treatment. The signal transition from the cytoplasm to the nucleus indicates activation through ligand binding. After 24 hours of treatment, the signal detected was strictly cytosolic and decreased.

Conclusion
The dysregulated expression of AHR is involved in CDH. Lung sections exhibited increased abundance of AHR in CDH patients and the rat model. A comparison of nitrofen to known ligands implicates environmental activators of AHR in the development of CDH.
Introduction
Several hydroxyapatite (HA) coated femoral stems from a single manufacturer were identified to have aseptically loosened at mid-term follow-up despite prior radiographic appearance of osseointegration. Possible causes and associated risk factors for stem loosening were explored through radiographic review and implant retrieval analysis.

Methods
Forty-six retrieved hip stems (Corail, DePuy-Synthes) were identified and grouped by bearing type. Post-operative radiographs were reviewed and graded for stem lucency up to the time of revision. Stems were examined for stripping of the HA coating, taper corrosion, and bearing wear in metal-on-metal (MoM) cases. Pertinent patient, implant, and surgical details were collected from electronic databases and patient charts.

Results
Aseptic loosening occurred in 37% of cases examined. MoM bearings were associated with 7.25 times greater risk of loosening compared to other bearing types. Stem radiolucency was more prevalent for MoM cases and although not statistically significant, demonstrated progressive lucency. Taper corrosion appeared more severe for MoM cases and correlated with proximal stem radiolucency. Removal of the HA coating from the stems was associated with both taper corrosion and MoM bearing wear. Length of implantation was a confounding factor for the MoM cases.

Conclusion
This study has demonstrated a high risk of mid-term loosening of previously osseointegrated HA-coated femoral stems when paired with a MoM bearing. The mechanism of loosening appears progressive in nature and related to metal ion release from wear or corrosion with possible interaction with the HA coating. If such loosening is recognized early, rapid revision may allow for retention of the femoral stem.
Regulating transplacental transport of nanoparticle as a novel therapy during pregnancy.

Introduction
More than 80% of medications used during pregnancy readily cross the placenta; contributing to 2-3% of congenital malformations. We propose nanoparticles, nanoscale drug chauffeurs, introduced into the maternal circulation as a minimally invasive novel therapeutic strategy. We hypothesize the transplacental transport mechanisms of nanoparticles can be harnessed to deliver lifesaving drugs to the fetus and limit unintentional maternal exposure.

Methods
Nanoparticle-placental interactions were assessed with the human placental epithelial BeWo cell line. Therapeutic nanoparticles synthesized from chitosan (75-85% deacetylated) under different conditions were chemically modified with anti-human IgG antibodies onto the surface. The anti-IgG antibodies provide cell specificity for targeted drug delivery. Relative viability after 24 hours of exposure to nanoparticles (up to 300 μg/mL) was evaluated with the colorimetric MTT assay (n = 3). Epithelial integrity and transplacental potential will be determined in a transwell model. Statistical significance was determined at the 95% confidence interval.

Results
Therapeutic nanoparticles modified with anti-IgG pose no threat to placental cell viability. 2-way ANOVA analysis of cells treated with nanoparticles of various sizes and concentrations did not significantly affect viability (p = 0.5791). Viability was consistently 90% or greater at concentrations up to 300 μg/mL. We expect the anti-IgG to induce the maternal transfer of passive immunity for transplacental transport of nanoparticles. This is reflected in the movement of nanoparticles loaded into the apical chamber of the transwell model into the basolateral chamber.

Conclusion
The anti-IgG modified nanoparticles are a viable candidate for the safe transplacental delivery of drugs to the fetus. This mechanism may also serve to limit fetal exposure by localizing the drug within the mother. Investigation of nanoparticle-placental interactions will elude generalized parameters regulating transplacental transport of nanoparticles.
Introduction
To determine whether variation in laparoscopic skill acquisition was associated with subject's learning styles.

Methods
Nineteen medical students performed 10 repetitions of the object transfer task over a month using a validated laparoscopic simulator. The main exposure was participants' learning style categorized according to the Fleming VARK-learning style inventory. VARK (V=visual, A=aural, R=read/write, K=kinesthetic) is a validated learning style model that identifies four different learning styles. The main outcome measures that reflected laparoscopic skill acquisition were task completion time (<107 seconds) and total instrument distance (<2.03 m) obtained from SurgTrac® motion analysis software. To determine whether participants' laparoscopic proficiency was associated with learning style we used chi-square tests for categorical variables and t-tests for continuous variables.

Results
Nineteen participants completed the inventory, 37% (7) were classified as kinesthetic and/or visual learners, while 63% (12) were considered multimodal or read/write learners. Participants classified as visual/kinesthetic were 4 years older than participants classified as multimodal or read/write learners. No gender differences were observed between the groups. Eighty-five percent (6) of participants with a kinesthetic and/or visual learning style reached the proficiency level for task completion time while only 17% (2) of participants with multimodal or read/write learning style performed the task in <107 seconds (chi-square = 8.7; P = .003). Regarding total instrument distance, 85% (6) of participants classified as kinesthetic and/or visual learners and 67% (8) of participants classified as multimodal or read/write learners performed the task in <2.03 m (P = .36).

Conclusion
Our study suggests that trainees' learning style may affect the ability to acquire laparoscopic skill proficiency. Larger studies are needed to confirm these preliminary observations.
Introduction
Merkel cell carcinoma (MCC) is a rare and highly aggressive cutaneous malignancy. There is limited consensus in diagnosis and treatment algorithms. The purpose of this study was to gain a better understanding of patient characteristics, treatments and outcomes of MCC in Manitoba.

Methods
This is a retrospective case series. Data was collected from the Manitoba Cancer Care registry between 2000 and 2015. Bivariate descriptive analyses, Kaplan-Meier survival probabilities and log rank tests were used to compare subgroups.

Results
Sixty-three (59% male) cases were identified. Mean age at diagnosis was 78 (± 13). The most common stage at presentation was stage I (n=18,34%) and III (n=18,34%) followed by stages II (n=11,21%) and IV (n=6,11%). Median survival for stage I was > 10 years, followed by 2.3 years for stage II, 8.4 months for stage III and 7.2 months for stage IV(p= 0.05). The median survival did not vary between those diagnosed with lesions located on the head and neck (n=36,57%), extremities(n=21,33%) or trunk (n=4,6%)(p=0.097).

Management of the primary lesion included surgery ± adjuvant treatment or radiation (RT) alone. Median survival was 10 years in patients who received adjuvant RT compared to 2.3 years in those who did not(p=0.04). Management of lymph nodes (LN) included up front dissection for palpable nodes, sentinel LNbiopsy(SLNB), or observation. There was a nonsignificant trend towards longer survival for those without palpable nodes who received a SLNB (10 years versus 2.3 years, p=0.17).

Conclusion
MCC in Manitoba has variable treatment algorithms and relatively poor prognosis. This valuable data is being combined with similar datasets across the country to allow for a more in-depth study of this rare malignancy.
Introduction
The high mortality and morbidity in congenital diaphragmatic hernia (CDH) are caused by pulmonary hypertension (PH) resulting from heart failure and vascular remodeling in the lung. We have shown that microRNA-200b (miR-200b) is an epigenetic factor linked to the pathogenesis of CDH. We hypothesized that changes in the pulmonary vasculature are associated with decreased miR-200b. We aim to 1) evaluate the morphological changes of the vasculature in lungs of miR-200b/- mice; and 2) to determine the role of miR-200b in PH by regulation of VEGF signaling pathway.

Methods
Changes in the cardiac function and size were assessed with echocardiography during systole and diastole (n=6). We used micro-computed tomography to demonstrate the complexity of the pulmonary vasculature at the microlevel with high resolution, quantitative, three-dimensional images. Verhoeff-van Gieson (VVG) staining was used to measure the medial and adventitial thickness of the lung vessels. VEGFR-1 expression was assessed using Western blotting and immunohistochemistry (IHC).

Results
Echocardiography revealed that miR-200b/- mice with PH have 14% increased cardiac output (p=0.0057) and shortened pulmonary acceleration time by 24% (p<0.0001). Also, right ventricular internal diameter significantly increased during systole (p=0.0383) and diastole (p=0.024). Morphometric assessment showed that miR-200b/- lungs have 29% increased medial wall thickness and 32% adventitial wall thickness in pulmonary arteries compared to normal lung vasculature (p<0.05). IHC showed that VEGFR1 expression was higher in the bronchiolar epithelial cells, parenchyma and vascular endothelial cells of miR-200b/- lungs. Western blot results indicated that the expression of VEGFR1 was higher in miR-200b/- compared to WT (non significant).

Conclusion
Changes in vascular morphology in miR-200b mice are associated with PH. Our results suggest that miR-200b is involved in the alteration of the VEGF signaling pathway and thus can contribute to abnormal pulmonary vasculature development.
Introduction
Intertrochanteric hip fractures are a major socio-economic burden, and a significant source of morbidity and mortality. Treatment is generally surgical, with either a dynamic hip screw or a cephalomedullary hip nail. Recently, there is a trend toward use of hip nails. The use of short nails over long nails, which span the length of the femur, remains a source of controversy. Historically, short nails were associated with a higher periprosthetic fracture rate compared with long nails, however newer nail designs, appear to have solved this issue. Small retrospective studies show a refracture rate similar in both long and short nails. A bigger database review would help settle the issue, help surgeons choose between long and short nails.

Methods
The Winnipeg Regional Hip Fracture Registry was reviewed. All patients with an intertrochanteric fracture treated with a cephalomedullary nail from June 2009 to January 2017 were included. Patient demographics were compared using a t-test. Fracture rate was compared using chi square test.

Results
473 short nails and 73 long nails were reviewed. The short nail (SN) group was older than the long nail group (LN) (SN: 81, LN 76 p<0.001). The refracture rate was the same in each group (1% per group). There was less blood transfused (SN39% LN 45% p=0.5) and a shorter procedure time in the short nail group (SN: 1h12 LN: 1h40 p<0.001). The length of stay was similar in both groups (SN18 days, LN 21days p=0.5).

Conclusions
This study did not find a difference in periprosthetic fracture rate when comparing short and long cephalomedullary nails for the treatment of intertrochanteric fractures. The length of the procedure was quicker in the SN group. However, no difference in hospital stay or blood transfusion was noted between types of nail. Based these findings, surgeons can use the nail of their choice. Further study on long-term longevity could help us decide on which nail should be use.
Introduction
Musculoskeletal ultrasound (MSK-US) can have many uses for orthopaedic surgeons, but orthopaedic trainees are rarely exposed to this modality. The purpose of this project was to assess the usefulness in clinical education of a newly implemented MSK-US course in an orthopaedic surgery program.

Methods
An MSK-US course for orthopaedic surgery residents was developed by an interdisciplinary team. Online videos were created to be viewed by residents prior to a half-day long practical course. An online survey covering the level of training of the resident and their previous use of ultrasound (total hours) was filled by the participants prior to the course. Resident’s knowledge acquisition was measured with a written pre-course, same-day post-course and six-month follow-up tests. Residents were also scored on a practical shoulder examination immediately after the course and at six-month follow-up. Change in test scores were calculated using an ANOVA and a Wilcoxon signed-rank test.

Results
Ten orthopaedic surgery residents underwent the MSK-US curriculum. Pre-course interest to MSK-US was moderate (65%) and prior exposure was low (1.5 hours mean total experience). Written test scores improved significantly from 50.7 ± 17.0% to 84.0 ± 10.7% immediately after the course (p<0.001) and suffered no significant drop at six months (score 75.0 ± 8.7%; p=0.303). Average post-course practical exam score was 78.8 ± 3.1% and decreased to 66.2 ± 11.3% at six months (p=0.012). Residents significantly improved their subjective comfort level with all aspects of ultrasound use at six months (p=0.007-0.018) but did not significantly increase clinical usage frequency.

Conclusion
An MSK-US curriculum was successfully developed and implemented using an interdisciplinary approach. The course succeeded in improving the residents’ knowledge, skills, and comfort with MSK-US. This improvement was maintained at six months on the written test, but did not result in higher frequency of use by the residents.
CARLY LODEWYKS  
Brief Session (11:25—11:30)  
The Incidence and Prevalence of Thoracic Aortic Disease in Manitoba, Canada: a Population Based Study

Introduction
The incidence and prevalence of thoracic aortic disease (TAD) in Manitoba is unknown. Understanding trends in epidemiology facilitates the evaluation of existing healthcare programs and planning for future health care delivery. The objective of this study was to develop a case definition and describe the long term trends in TAD over 19 years at a single center.

Methods
Hospital records and medical claims at the Manitoba Centre for Health Policy (MCHP), along with data from the Manitoba Thoracic Aortic Clinic (MTAC) were used to develop a case definition and identify patients with degenerative TAD in Manitoba. The annual incidence and prevalence of TAD was examined with stratification by age, sex and health region from 1998 to 2016.

Results
4264 patients had a diagnosis of degenerative TAD according to our case definition. The age standardized incidence has increased 45% overall. Incidence in males is significantly higher than in females, however the incidence has increased to a greater extent in females, 68% vs 27% over 19 years. The average annual incidence is two times higher in males, peaking at 42 cases per 100 000 in 2013. The age standardized prevalence has quadrupled in both sexes over the course of the study. When stratified by region, the Incidence was highly variable with prevalence consistently higher in the Prairie Mountain region.

Conclusions
The incidence and prevalence of degenerative TAD is increasing in Manitoba, especially in females and the Prairie Mountain region. These findings may represent a correlation between the availability of imaging and the frequency of diagnosis, which will be the focus of future research. Going forward, resources should be allocated to expand the reach of the MTAC to ensure appropriate monitoring, treatment and follow up for the growing number of patients diagnosed with TAD.
Introduction
Previous systematic reviews looking at timing of Anterior cruciate ligament (ACL) examined the functional outcomes and range of motion, however, few have quantified the effect of timing of surgery. The goal of this study was to analyze the effects of early ACL repair (ACLR) vs delayed ACLR on the incidence of meniscal and chondral lesions.

Methods
We searched MEDLINE, EMBASE, and CINAHL for randomized control trials (RCTs) which compared early and delayed ACLR in a skeletally mature population. Two reviewers independently identified trials, extracted trial level data, performed risk of bias assessments using the Cochrane Risk of Bias tool and evaluated the study methodology using the Detsky scale. A meta-analysis was performed using a random-effects model with the primary outcome being the total number of meniscal and chondral lesions per group.

Results
Of 1887 citations identified from electronic and hand-searches, we included four unique RCTs (303 patients). We considered early reconstruction as <3 weeks and delayed reconstruction as >6 weeks following injury. There was no evidence of a difference between Early and late ACL reconstruction with regards the incidence of meniscal (RR 0.98, 95%CI 0.74 to 1.29) or chondral lesions (RR 0.88, 95%CI 0.59 to 1.29), post-operative infection, graft rupture, functional outcomes or range of motion.

Conclusion
We found no evidence of benefit of early ACL reconstruction. Further studies may consider delaying surgery even further (e.g. >3 months) to determine if there are any real benefits to earlier reconstruction.
Introduction
The purpose was to evaluate cardiovascular fitness of recreational athletes from injury to 12-months post anterior cruciate ligament reconstruction (ACLR).

Methods
Nineteen patients (6 male/13 female; age 22.9 (SD4.8) years) involved in aerobic sport at least twice a week were recruited to this prospective case series with ACL rupture confirmed on MRI. Study points were baseline (as soon after injury as possible), 6- and 12-months post-ACLR. Primary outcome was relative VO2peak measured during a graded aerobic exercise test on a bike ergometer (Monark, Ergonomic 894E) using a metabolic measurement system (Oxycon Mobile, Carefusion). Secondary outcomes were Tegner score and ACL-Quality of Life. Repeated measures ANOVA and Fisher’s Exact Test were performed to compare groups between time points, depending on level of data.

Results
Baseline testing and surgery were performed 78 (SD48) and 152 (SD81) days post injury, respectively. Preoperative relative VO2peak was 33.7 (SD6.3)mL/kg/min, at 6-months was 32.7 (SD8.9) mL/ kg/min and at 12-months was 32.7(SD9.3) mL/kg/min (p=NS for all comparisons). Based on ACSM cardiovascular fitness classification by age and gender, there was no change in distribution from pre- to 12- months (p=0.88) with 70% of participants ranked as “poor” throughout. Tegner scores decreased from pre-injury (7.6 (SD1.5)) to baseline (3.2(SD1.9); p<0.001), and improved by 12-months (5.1(SD2.1); p=0.003), but not to pre-injury level (p<0.001). ACL-QOL increased incrementally from baseline (32.9(SD15.5) to 12- months (79.3 (SD15.7)p=0.008) post-operative.

Conclusion
Recreational athletes were aerobically de-conditioned at two-months post-ACL rupture and did not improve with 12-months of rehabilitation following ACLR. Pre-injury aerobic fitness level could not be determined, but participants may have become de-conditioned waiting for surgery. Without a conscious effort to promote aerobic fitness, recreational athletes may return to play at a suboptimal performance level with increased risk of injury.
Incidence of Total Knee Replacement in Patients with Previous Anterior Cruciate Ligament Reconstruction

Introduction
Anterior cruciate ligament (ACL) deficient knees are at an increased risk of developing osteoarthritis (OA). Total knee replacement (TKR) treats end stage OA, and therefore, can be used as a surrogate measure to gauge the clinical severity of knee degeneration after ACL reconstruction (ACL-R). Our objectives were to (1) determine the rate of TKR after ACL-R compared to the general population and (2) determine whether there are other risk factors that increase risk of TKR after ACL-R.

Methods
This is a retrospective review that used surgical and physician billing codes stored in the Manitoba Center for Health Policy Database from 1980 - 2015. Patient factors gathered at time of surgery included: age, gender, urban or rural residence, neighbourhood income quintile, and resource utilization band. Each person was matched with up to five people from the general population who had never had ACL-R and had not had a TKR at the time of the case ACL-R.

Results
Overall from 1980-2015, 8,500 ACL-R were identified within the 16-60 age group and time frame with a resultant 42,497 population matches. Gender was predominantly male. The mean age at the time of ACL-R that went on to have a TKR was 36.9 (SD 10.2), while the mean age of the group that also had ACL-R, but not TKR was 29.2 (SD 9.9), P<0.0001. Those with ACL-R were 4.85 times more likely to go on to have TKR after adjusting for age, sex, year of case surgery, region of residence and income quintile. Apart from age, no other risk factors examined appeared to increase risk of TKR after ACL-R.

Conclusion
We found that patients who underwent ACL-R were five times more likely to undergo TKR with older age. No other identifiable factors in our database were risk factors for future total knee replacements.
Introduction
There is a resurgence of popularity in performing bicruciate-retaining (2C) total knee arthroplasty (TKA) as opposed to the more common posterior-stabilized (PS). 2C TKA restores knee kinematics better than other prosthetic designs. However there are reports that knees with a 2C implant were stiffer and more painful than with a PS. No study conducted shows clear clinical differences between 2C and PS TKA. This study aims to clarify this point of contention. We hypothesize that clinically there is no significant differences between 2C and PS TKA.

Method
This randomized control trial study was conducted at the Centre Hospitalier de l'Université de Montréal. Two surgeons operated using gap-balancing technique with initial tibial cut and spacer blocks. Hermes implants (Ceraver Osteal) were used in 77 knees on 47 patients, either the 2C (38 knees) or the PS (39 knees). Clinical parameters and scores (KOOS and Knee Society (KS)) were obtained at the preoperative visit and the postoperative appointments up to 2 years plus.

Results
2C knees had worse KOOS scores for pain and symptoms at six weeks but equalized with PS knees in subsequent follow-ups. The KS Knee and Function scores showed no differences at every step. Postoperative stiffening was more pronounced for 2C knees: while significantly inferior at the six-week, six-month, and one-year follow-ups in the 2C knees, maximal knee flexion equalized with PS after 2 years. Complications were similar for the two implants except knee mobilization under anesthesia (MUA) that was performed more often for 2C knees.

Conclusion
A transitory postoperative stiffening phenomenon was observed for 2C knees. The two-year outcome was however similar to that of PS knees for all the measured parameters making 2C TKAs a viable surgical option. However the transitory stiffening phenomenon’s etiology and solution need to be further investigated to improve the outcome of this tissue-preserving arthroplasty alternative.
Introduction
Pedicle screws are more likely to loosen in osteoporotic bone. We designed a novel test method to evaluate pullout strength after cyclic loading with different bone densities and screw designs. To our knowledge, there are no previous studies on pullout strength after cyclic loading with different screw designs and bone densities.

Methods
We will evaluate pullout strength following cyclic loading and standard pullout strength as per ASTM standard F543-13. It will be performed in normal and osteoporotic synthetic bone models that have been validated to cadaver lumbar spines.

Results
As bone density decreased, there was a proportionate decrease in pullout strength (mild OP ~ 75% of normal, moderate OP ~ 50% of normal, severe OP ~ 25% of normal). Cyclic loading significantly altered the pullout strength for each of the screws tested, especially in osteoporotic bone. The cylindrical V thread design outperformed the conical V-to-square thread design after cyclic loading.

Conclusion
Osteoporotic bone requires increased fixation, as decreased bone density directly reduces pullout strength. Current standards for assessing pedicle screw design should be reevaluated due to the significant differences noted in testing pullout strength before and after cyclic loading. Our study proposes a novel, but simple test method for that purpose. Finally, we conclude that a cylindrical V thread design results in improved pullout strength after cyclic loading compared to a conical V-to-square thread design.
Interventions to address burnout among surgical trainees: a systematic review and meta-analysis

Introduction
Burnout is prevalent within the medical community, and is associated with a number of significant personal and professional consequences. Research has suggested that rates of burnout are highest during training. The objective of this study was to identify successful interventions to address burnout in surgical trainees.

Methods
Databases were searched systematically from inception to August 2018 with PRISMA guidance. Two reviewers independently reviewed articles using predefined inclusion and exclusion criteria. Risk of bias was assessed using the Cochrane Risk of Bias Tool and the New-Castle Ottawa Scale. A random effects model with inverse-variance was used to pool homogenous data reported at the shortest interval post-intervention across studies. Results were expressed as standardized mean difference (SMD) with 95% confidence intervals (CI). Heterogeneity was assessed using I2. Publication bias was not assessed as too few studies could be meta-analyzed.

Results
9,136 articles were identified, 17 of which met inclusion criteria. Sources included 3 randomized controlled trials and 14 cohort studies, incorporating a total of 1780 participants (including 937 confirmed surgical trainees).
Burnout was reported most commonly using three categories: emotional exhaustion, personal achievement and depersonalization. Meta-analysis was possible for four studies reporting emotional exhaustion and three studies reporting personal achievement and depersonalization. There was a small, but significant, decrease in emotional exhaustion seen post-intervention (SMD -0.29, 95% CI -0.5 to -0.07, p=0.01, I2=9% ), and no significant change in personal achievement (SMD -0.23, 95% CI -0.6 to 0.13, p=0.21, I2=55%) or depersonalization (SMD -0.21, 95% CI -0.45 to 0.02, p=0.07, I2= 0%).

Conclusion
Interventions to address burnout have demonstrated variable effectiveness. The results of this review are limited by the lack of an agreed upon definition and diagnostic criteria for burnout, highlighting the need for future high-quality studies.
Impact of pre-surgical self-reported exercise on post-surgical outcomes in patients with cervical pathology

Introduction
It is unknown if preoperative physical fitness impacts cervical spine surgery outcomes. We hypothesize that patients who report exercise prior to cervical spine surgery will demonstrate less pain, improved health state and/or less disability following surgery compared to patients who do not exercise.

Methods
Retrospective review of prospectively collected data from the Canadian Spine Outcomes and Research Network. Inclusion criteria: elective adult cervical surgery patients with degenerative pathology. Outcome measures: visual analog scales (VAS) for neck and arm pain, Neck Disability Index (NDI), and EuroQOL health state score at baseline and 3, 12 and 24 months post-op (n=460). Statistics: student’s t-tests to compare the mean scores of the outcome measures, and ANOVA for subgroup comparisons (p<0.05).

Results
Those who exercised demonstrated more favorable VAS neck and arm pain scores pre-operatively (neck:5.55 vs 6.11, p<0.001) (arm: 5.69 vs 6.04, p=0.011), but no difference at 24 months post-operatively. Significantly improved NDI and EuroQOL Index scores were seen in the exercise group versus no exercise group pre-operatively (NDI: 39 vs 48, p<0.001)(EuroQOL: 0.60 vs 0.50, p<0.001) and up to 24 months post-op (NDI: 24 vs 31, p=0.007)(EuroQOL: 0.75 vs 0.68, p=0.001). Compared to the “no exercise due to physical limitation” group, the “twice or more per week” exercise group showed favorable NDI and EuroQOL scores up to 24 months post-op (NDI: 24.32 vs 32.33, p=0.001)(EuroQOL: 0.76 vs 0.66, p=0.001), whereas the “once or less times per week” group did not demonstrate significant difference at 24 months.

Conclusion
Self-reported exercise prior to cervical spine surgery does not predict improved long-term neck and arm pain at 2 years post-op. However, self-reported exercise does demonstrate less disability and improved health state at baseline and up to 2 years post-op and this relationship is dose dependent.
Introduction
Despite similarities between aortic stenosis (AS) and atherosclerosis, randomized controlled trials lowering lipids did not slow rate of progression of AS. Recognizing the antibody component to valve failure in rheumatic aortic valve disease and bioprosthetic heart valve failure and the similarities of these valves to AS on gross pathology, we hypothesized that AS may have an antibody component to the pathophysiology.

Methods
Surgically removed AS and aortic insufficiency (AI) valves (neg control) were examined for human IgG antibody binding using immunohistochemistry. The slides were read (blinded) by an experienced pathologist and scored from 0 (no staining) to 3 (strong staining). Demographic (eg. gender) and clinical variables (eg. autoimmune disease) were correlated to the extent of staining.

Results
Most AI valves had no IgG staining (Fig la). There was no human IgG antibody binding (lb) in 9/48 (19%) AS valves despite having significant inflammation with most valves being in males with established atherosclerotic disease (EAD). IgG was found on cells {le) and connective tissue (collagen and elastin) in variable amounts (ld-lf) in 39/48 (81%) AS valves. Stronger staining (score 1.5 -3.0-n=22) vs. weaker staining (0-1-n=26) valves were more common in: females (69% vs. 36% -p=0.02), those with higher mean aortic valve gradients [44 (35-52) vs. 36 (29-42) mm Hg -p=0.01), those with confirmed and possible autoimmune disease (50% vs. 18% -p=0.02) and those with less EAD (50% vs. 73% -p=0.11).

Conclusion
Human IgG antibody binding to collagen and elastin in AS valves suggest an autoantigen may be involved in the pathophysiology of AS especially in females with other autoimmune disease. The pathophysiology of AS may be different in males with established atherosclerotic disease vs. females with other autoimmune disease. The latter may be candidates for management of early AS with immunosuppression.
Introduction
To evaluate outcomes and prognosticators in patients who underwent radical nephrectomy (RN) with a pathological T4 (pT4) Renal Cell Carcinoma (RCC) outcome using a multi-institutional prospectively maintained database.

Methods
From 2009 to 2016, we identified patients in the Canadian Kidney Cancer information system (CKCis) who underwent RN and were found to have pT4 RCC. Clinical, operative, and pathologic variables were analyzed with univariable and multivariable Cox proportional hazard models to identify factors associated with overall survival (OS). Survival curves were created using Kaplan-Meier methods and compared using the log-rank test.

Results
82 patients were included in the study cohort. Median patient age was 62 years (IQR 55,70). The majority of patients had clear cell histology, 50 (61%), and 14 (17%) had sarcomatoid characteristics. Median follow-up was 12 months (IQR 3,24). At last follow-up, 8 (10%) patients were alive with no evidence of disease, 27 (33%) are alive with disease, 4 (5%) were lost to follow-up, 36 (44%) died of disease, and 7 (8%) died of other causes. Patients with sarcomatoid characteristics (p=0.027), non-clear cell histology (p=0.03), and presence of systemic symptoms (p=0.045) had a significantly worse OS. Tumor histologic subtype (non-clear cell vs. clear cell) (p=0.0032), larger tumor size (cm) (p=0.012), and Fuhrman grade (G2-G3 vs. G4) (p=0.045) were significantly associated with mortality in a multivariable Cox regression model.

Conclusion
For patients with pT4 RCC after RN, survival is poor. Sarcomatoid features, non-clear cell histology, and presence of systemic symptoms were associated with worse OS.
Introduction
Social Complexity in health outcomes has been attributed to greater risk of injury, adverse health outcomes and early death in a variety of populations. To determine what social determinants of health (SDoH) have been associated with burn injury in children a systematic review of the literature was performed.

Methods
PubMed and SCOPUS were searched for articles related to environmental and social determinants of burn injury. Selected literature was examined SC to establish the strength of evidence in relation to incidence of burn injury in children. The most common social complexities were reviewed.

Results
The 641 manuscripts found in Pubmed and 327 from SCOPUS were initially reviewed for duplication and English language. Subsequently, manuscripts were selected for relevance based on titles followed by abstracts. 41 manuscripts were finally reviewed in their entirety. The literature supports a relationship between social complexity and an increased incidence of paediatric burns in lower income families, children with behavioral disorders, fewer years of parental education and children residing in a rural setting. The majority of reports came from Europe followed by Australia and scattered information from other countries.

Conclusion
SDoH in the environment of the child are associated with an increased risk of burn injury. The literature supports the influence of lower income, lower parental education, behavioral disorders and living rurally with an increased incidence of injury.
Introduction
Arterial thoracic outlet syndrome (aTOS) results from compression of the subclavian artery causing thrombosis, distal embolization, or aneurysm formation. Treatment considerations include cervical or first rib removal+-arterial reconstruction. In venous TOS (vTOS), the subclavian vein is often traumatized by repetitive arm movements leading to deep venous thrombosis (DVT). Treatment considerations include anticoagulation, thrombolysis, thrombectomy, and decompressive surgery.
Hypothesis: The effectiveness of surgical decompression for vascular TOS outweighs the risks.

Methods
A retrospective chart review was completed on all vascular TOS procedures in Manitoba from 2009-2018.

Results
Twenty-five patients underwent first rib resection from 2009-2018; 4 for aTOS (3F: 1M) and 19 for vTOS (10F: 9M); 2 were lost to follow-up. All aTOS had cervical ribs, and had either aneurysm formation (1) or arterial occlusion (3). Three required arterial reconstruction. At 6 weeks 75% were improved.
All vTOS patients presented with DVT and were anticoagulated. Eleven patients underwent thrombolysis and 8 underwent thrombectomy. Preoperative venograms showed 12 with stenosis and one occlusion. Fourteen had either occlusion or worsening stenosis in Adson's maneuver. Operative complications included 9 pneumothoraces; 4 required chest tubes. Five had neurologic dysfunction.
At 6 weeks, 13 were symptomatically improved and 3 unchanged. Venograms showed stenosis in 5 and occlusion in 1; 7 demonstrated a positive Adson's. Five patients required venoplasties. At final follow-up, 15 of 18 patients had improved symptoms; 5 without stenosis or positive Adson's, 5 with stenosis, 1 with occlusion, and 6 with a positive Adson's. Of those with improvement, 5 patients had a normal venogram. Of patients that did not improve, 2 had stenoses, and one had a positive Adson's.

Conclusion
Decompression improves symptoms but not venous stenosis in vTOS, and has high complication rates. A prospective series with contemporary venous reconstruction may help determine the utility of vTOS decompression.
Introduction
Traumatic intracranial dural venous sinus thrombosis is a common and potentially serious condition with fatal outcomes described in the literature. Attempts to study this condition are hampered by inconsistent nomenclature for the description of types of sinus thrombosis. This results in heterogeneous reports of natural history and treatment outcomes. A standard classification of traumatic sinus thrombosis is proposed in order to facilitate communication amongst clinicians and researchers.

Methods
We assessed the included studies in a recently published systematic review for author descriptions of types of traumatic sinus injuries. We applied the proposed standard classification scheme to these author descriptors and categorized the number of cases that could be described under the new scheme.

Results
Of the nine studies included in the systematic review, five studies included attempts at describing types of traumatic sinus thrombosis. Within these five studies, 213 instances of traumatic sinus thrombosis were identified. The author descriptors as well as all 213 instances of traumatic sinus thrombosis were re-classified into a single typology under the standard classification scheme.

Conclusion
The standard classification scheme is both flexible and comprehensive for the description of traumatic sinus thrombosis.
Introduction
Tracheoesophageal fistula with or without esophageal atresia (TEF±EA) is a congenital anomaly requiring surgical intervention in the neonatal period. These patients frequently have associated medical conditions and require multidisciplinary care. Their post-operative course may be complicated by gastroesophageal reflux (GER) or anastomotic strictures. We present our institutional experience from the last 23 years.

Methods
With ethics approval a retrospective chart review was performed for all patients with TEF±EA treated in Winnipeg since 1991. Data assessed included surgical management and post-operative outcomes (mortality, incidence of anastomotic stricture, time to achieve full feeds and length of stay (LOS), GER and lower respiratory tract infection (LRTI). Descriptive statistics were performed.

Results
Forty-eight charts were reviewed; 54.17% were male. The mean gestational age was 37.46 (±3.19) weeks, and the mean birth weight was 2732.47 (±707.63) grams. The proportion of TEF±EA types was: 68.75% distal TEF, 14.58% H-type fistula, 10.42% proximal TEF and 6.25% EA alone. Anti-reflux medication was started in 20.83% of patients. The mortality was 4.17% and 6.25% at 1 month and 6 months respectively. Strictures were diagnosed in 45.83% all of whom underwent dilatations. The median time to achieve full oral feeds was 22.5 days (range 6-3728) (N=36 patients); data was not available for 12 patients due to death, discharge to different hospital, or missing data. Post-operative complications included LRTI (29.17%), GER/feeding difficulties (14.58%), recurrent fistula (8.33%) and anastomotic leak (4.17%). The median LOS for initial admission was 26 days (range 1-294).

Conclusions
With advances in neonatal care, the mortality of patients with TEF±EA is low; however, these children suffer from post-operative complications including anastomotic strictures, delayed enteral nutrition, prolonged hospitalization, LRTI, GER, and recurrent fistulas. Further assessment of ante- and post-natal risk factors may assist in predicting the frequency and severity of post-operative complications.
Impact of time-to-surgery and surgical delay on oncologic outcomes for renal cell carcinoma

Introduction
Surgical wait times (SWT) are a major issue for many patients within Canadian healthcare, with systems and hospitals burdened by aging populations and limited resources. This is especially important in the oncologic setting, where surgical delay can lead to disease progression and potential metastasis. There have been few previous reports on the effect of prolonged SWT for renal cancer surgery on oncologic outcomes, all of which were on a single institution level. We aimed to evaluate whether SWT is associated with treatment outcomes for renal masses in the Canadian setting.

Methods
The Canadian Kidney information system (CKCis) was used to identify a historical cohort of patients who underwent surgery for >= stage T1b renal cell carcinoma (RCC) from 2011 onwards. Time from final imaging prior to surgery to the date of surgery was used as a surrogate for SWT. Oncologic outcomes such as recurrence-free survival, cancer-specific survival, and overall survival were stratified by clinical stage and wait time to assess for associations between SWT and outcomes.

Results
Of 1,395 patients included in the analysis, 664 (47.6%) were categorized as stage cT1b, 387 (27.7%) as stage cT2, and 344 (24.7%) as stage cT3/4. Mean SWT was 61.6 days, 39.3 days, and 31.5 days for stage cT1b, cT2, and cT3/4, respectively. Among cT1b and cT2 patients, there was no association between SWT and recurrence-free survival, cancer-specific survival or overall survival. Among cT3/4 patients, those who waited 13-24 weeks for surgery had worse overall survival compared to those who waited <4 weeks (hazard ratio [HR] 4.26; 95% confidence interval [CI] 2.24-8.08; p-value <0.001). Margin status and lymph node status were not associated with SWT.

Conclusion
Prolonged SWT may be associated with poor overall survival in patients with locally advanced RCC. However, for locally non-advanced RCC, SWT is not associated with adverse oncologic outcomes.
A theranostic nanofibrous wound dressing for wound infection detection and treatment

Introduction
Bacterial infection is a serious issue in chronic wound healing. Contaminated wounds delay healing, increase pain and cause life-threatening infections. Therefore, detection of infections at early stage and their management is beneficial to patients. However, conventional practices for infection detection are not only time consuming but also painful and do not necessarily reflect the activity in the wound. Herein, we develop a theranostic wound dressing (TH-WD) capable of visually detecting infection promptly and releasing antibiotics in response to bacterial infections.

Methods
The TH-WD was fabricated by electrospinning a mixture of chromogenic probe A and prodrug B with polyurethane (PU). Probe A is a hemi-cyanine based dye derivative for visual detection of infections while B is a prodrug of ciprofloxacin for antibacterial effect. Both A and B were rendered inactive by conjugation with a covalent linkage responsive to bacterial enzymatic action.

Results
The chemical structures of both A and B were confirmed by nuclear magnetic resonance. The probe A appeared yellow and exhibited absorption at 424 nm in DMSO/PBS, while it appeared red and exhibited absorption at 575 nm in DMSO/PBS/ enzyme. TH-WD exhibited good color change from yellow to green and finally to red after overnight incubation at 0.5 mg/mL enzyme medium, while in medium without enzyme, TH-WD only exhibited yellow. When investigated in P. aeruginosa (108 CFU/mL) medium, TH-WD exhibited color change from yellow to green after 4h incubation, and meanwhile killed 99.98% of the bacteria.

Conclusions
TH-WD showed significant antibacterial effect against P. aeruginosa whilst providing a prompt visual detection of wound infections via a simple color change from yellow to green. This was attributed to the activation of the dye and ciprofloxacin via enzyme-mediated hydrolysis of probe A and prodrug B. This TH-WD is also selective as it responds only when the pathogenic bacteria exist.
MEAGAN WIEBE  
Plenary Session (3:35—3:45)  
The impact of distance on post-operative follow-up in pediatric general surgery patients: a retrospective review

Introduction
Although consolidation of medical services has been shown to decrease overall system healthcare costs, many Canadians must now travel large distances for care, and therefore may attend less appointments resulting in disparate care. We sought to determine whether children who live farther away are offered and attend fewer follow-up appointments than those living closer to the Winnipeg Children’s Hospital.

Methods
All children less than 17 years of age referred as an outpatient to the pediatric general surgery clinic at the Winnipeg Children’s Hospital between January 1st, 2016 and December 31st, 2017 who underwent a surgical procedure were reviewed. Demographic, surgical, follow-up, and complication variables were extracted. Descriptive statistics and analysis were performed.

Results
723 patients were identified. The majority were male (61%), median age 7 years (range 18 days–16 years), and from Winnipeg (56.3%). The median distance travelled to hospital for patients from within the city was 8.9 kilometres (range 0.9–22), and 119.5 kilometres (range 20.3–1950) for patients from outside of Winnipeg. Patients from Winnipeg were offered significantly more follow-up appointments (72.5% vs 60.8%, p<0.05). There was no significant difference in follow-up attendance for patients from the city (89.1%), compared to those from further away (89%), p=0.97. There was no significant difference in post-operative complication rates between patients from Winnipeg (9.8%), and those from outside the city (9.2%), p=0.78. There were no deaths.

Conclusion
Patients living farther away are not offered the same rate of follow-up; however, they attend an equivalent number of follow-up appointments when offered one. Telehealth or remote follow-up are under-utilized approaches to increase follow-up rates, while reducing expenses, and employment and school absenteeism for patients and their families. Family and patient input regarding these modalities should be sought out.
Introduction
Every 10 minutes, a baby is born with Congenital Diaphragmatic Hernia (CDH), a disease characterized by a hole in the diaphragm and underdeveloped lungs. Of these babies, 30 - 50% still die. Epigenetic factors are involved in the pathogenesis. Circular RNAs are powerful epigenetic regulators of gene expression, especially in embryonic development. Their involvement in abnormal lung development is still unknown. We hypothesized that circular RNA profiles of human CDH lungs are dysregulated and can serve as potential biomarkers for CDH in the future.

Methods
Lung tissues for CDH (n=6) and healthy Controls (n=6) were obtained for mid-pregnancy cases and end-pregnancy cases from deceased subjects. After total RNA isolation we profiled the circular RNA expression via circular RNA microarray (Arraystar Inc., Rockville, MD, USA). In depth statistical data analysis was performed with R Studio. Pathway analysis was accomplished with KEGG and Ingenuity Pathway Analysis (Qiagen).

Results
CDH lungs showed an altered circular RNA profile compared to lungs from healthy controls. Partial least squares discriminant analysis segregated clearly into two independent clusters. VIP-score analysis revealed the most important circular RNAs responsible for the profile alterations. In total, 16 circular RNAs were significantly altered (Fold change > 1.5; p-value < 0.05) at mid-pregnancy and 35 circular RNAs at end-pregnancy.

Conclusion
Circular RNA profiling of human hypoplastic CDH lungs and healthy controls at two different developmental time points reveals significant differences between the two groups. Future studies will include prenatal circular RNA assessment of maternal plasma and thus may uncover potential non-invasive and early biomarkers for CDH.
Introduction
Frailty is increasingly used for risk assessment in elective surgery, but little is known of the effect frailty has in our acute care surgery population. We aimed to evaluate the effect of frailty on patient-centered outcomes in acute care surgery (ACS).

Methods
A retrospective cohort study of patients >60 years-old admitted to an ACS service between January and June 2016 in Manitoba was conducted through chart review. The primary predictor was frailty defined as a score of >4 on the clinical frailty scale. We controlled for age, sex, BMI, and type of OR (none, minor and endoscopy, or major). Outcomes included length of stay (LOS), in-hospital complications, and discharge with a higher level of care (e.g. independent community dweller discharged to rehabilitation service). Complications were defined using the Clavien-Dindo classification. Univariable and multivariable logistic and negative binomial regression were used to assess outcomes and expressed as odds ratios (OR) and incidence rate ratios (IRR), respectively.

Results
A total of 234 patients were included, 172 (73%) were frail. Mean age of frail and non-frail patients was 76 (SD 12) and 67 (SD 6, p<0.01). There was no significant difference in type of OR (none vs minor + endoscopy vs major) between frail and non-frail patients (p=0.72). Frail patients were at 16% higher risk of longer LOS (IRR 1.17, 95% CI 1.07-1.28, p<0.01); 40% higher odds of any complication (OR 1.40 95% CI 1.11-1.75 p<0.01); and 62% higher odds of discharge to a higher level of care (OR 1.62 95% CI 1.16-2.27, p<0.01). Age was not a significant predictor of any outcome.

Conclusion
In our cohort of acute care surgery patients, frailty is associated with morbidity independent of age. Future efforts should focus on identifying frail individuals, recognizing their high risk of complications and identifying early interventions to mitigate those complications.
The Advantage of Adventitia; A 3D-Microsurgical Simulation Model

Introduction
Surgical simulation provides residents the opportunity to improve their operative skills in a safe environment. Simulation of microvascular anastomosis has become increasingly popular, currently there are several living and silicone models available. Current silicone models fail to accurately reproduce a vessel’s adventitial layer, resulting in a loss of fidelity. This may lead to the development of improper microsurgical technique. Reproduction of the adventitia allows for realistic grasp and manipulation of the vessel, and practice preparing the vessel for anastomosis.

Methods
Computer design and 3D printing were used to create molds for multiple vessels with varying diameters. Vessel layer thickness and design were based on histologic references. Each vessel layer was then sequentially replicated using several silicones and inorganic additives. Layer thickness and silicone properties were adjusted to create both an arterial and venous model. In some variations, arterial and venous structures were combined to create a realistic vascular bundle which could be dissected. Both resident physicians and experienced microsurgeons evaluated the model and then completed a semi-structured questionnaire to assess their experiences.

Results
A high fidelity microvascular anastomosis simulator was manufactured using 3D printed molds and inorganic materials. Two variations of the model were created. Our model was compared to a silastic tube with no adventitia. Residents and experienced microsurgeons evaluated the models. Analysis included: simulation realism, educational utility, and overall reactions. Responses in all domains were favourable, suggesting the utility of this model.

Conclusion
We created an high fidelity microvascular anastomosis simulator that is low cost and easily reproducible. Initial feedback is encouraging. Further evaluation is require to assess overall effectiveness in residency education and transfer of skills to the operating room.
EVALUATION & CERTIFICATE OF ATTENDANCE

As an accredited event, an evaluation of today’s Surgery Research Day 2019 must be completed at the end of the event. Your input is invaluable to help us know this event met your expectations and to enrich future Department of Surgery Annual Research Days for surgeons, fellows, residents, medical students, researchers and staff.

At the end of the on-line survey, a certificate of attendance will be available for you to save and print for your records. Instructions have been provided in the survey and on the Department of Surgery Research Day webpage. An email reminder will be sent to all participants following the event.

To evaluate and obtain your CME credit for attending the Department of Surgery Research Day, use the link or scan QR Codes below:

Overall Research Day Experience Surgery  
http://uofm.ventis.ca/ee/YDRQE8

Scaling Safety: The Science of Surgical Safety Checklist Implementation  
http://uofm.ventis.ca/ee/22H7T4

Using data to enhance performance of surgical teams and improve patient safety  
http://uofm.ventis.ca/ee/96U3FG

On behalf of the Surgery Research Day 2019 Planning Committee we appreciate your support and thank you for attending our event.
The Annual Surgery Research Day has provided a platform for residents, faculty, fellows and medical students to present their clinical, educational and basic science research achievements in the Department. It has also been an opportunity to discuss with colleagues the advances in surgery in a collaborative surgery research environment. The invited speakers have presented innovative and advanced techniques and technology as part of the day as well as judged the research presentations.

### HISTORY OF SURGERY RESEARCH DAYS

2010  Dr. Cy Frank, University of Toronto
2011  Dr. Ian Alwayn, Dalhousie University
2012  Dr. Harry Henteleff, Dalhousie University
2013  Dr. BJ Hancock, American College of Surgeons
2014  Dr. Chad Ball, University of Calgary
       Dr. Mohit Bhandari, McMaster University
2015  Dr. Hans Kreder, University of Toronto
       Dr. Allan Okrainec, University of Toronto
2016  Dr. Alan Dardik, Yale University
       Dr. Gerald Fried, McGill University
2017  Dr. Rodney Breau, University of Ottawa
       Dr. Deepak Dath, McMaster University
2018  Dr James Drake, University of Toronto
       Dr Kazuhiro Yasufuku, University of Toronto
Congratulations to last year’s presentation award winners!

Plenary

First Place  Megan Delisle, General Surgery & Master of Science
Does hospital volume impact the risk of local recurrence of rectal cancer? A retrospective cohort study

Second Place  Shannon Stogryn, General Surgery & Master of Science
Advancement in the quality of operative documentation: A systematic review and meta-analysis of synoptic versus narrative operative reporting

Third Place  Gabriel Larose, Orthopedic Surgery
The relationship between injury to surgery time and the incidence of secondary joint injury in an ACL injured population: A randomized control trial

Brief

First Place  Courtney Chernos, General Surgery
Program director consensus on the status of flexible endoscopy training in general surgery residency programs in Canada

Second Place  Kaitlin Edwards, General Surgery
Long-term outcome of geriatric patients managed non-operatively for choledocolithiasis
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This event is supported by:

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Thorlakson Chair
in Surgical Research

University Medical Group
Department of Surgery