



University of Saskatchewan, Department of Medical Imaging

Resident Research Day 2018  
Book of Abstracts

Friday June 8<sup>th</sup>, 2018

## Acknowledgements:

Thank you again to everyone who has worked to make this a successful research day. This includes the quality research produced by residents, medical students and department radiologists. Our department administrative assistants and Prachi Bandivadekar, Kristen Newman and Jacqueline Esterhuizen organize the details. This year GE healthcare is providing us with food and beverages. Finally, three local radiology groups (Associated Radiologists, University Medical Imaging Consultants, and Saskatoon Medical Imaging) have donated funds for motivational prizes to keep the whole thing interesting.

We are fortunate to have Dr. Jacob Jaremko joining us from the University of Alberta as our distinguished guest. He is a fellowship trained radiologist with a very active research program centered on pediatric and musculoskeletal imaging. We look forward to his insights and comments on the projects this year.

This year we will again be awarding the 'Stuart Houston Award for Medical Imaging Research at the University of Saskatchewan'. Dr. Houston practiced medical imaging at the University of Saskatchewan for 32 years, publishing extensively on medicine and the history of medicine. Dr. Houston is also an Officer of the Order of Canada and a member of the Saskatchewan Order of Merit.

There will also be prizes awarded for the best Quality Assurance project and best medical student project.

On behalf of the University of Saskatchewan residency program and the department of medical imaging I would like to sincerely thank everyone who has contributed to today. We look forward to an excellent day!

Dave Leswick  
Research Director

Financial sponsors for today include:



Friday June 8, 2018

All Presentations in PET CT conference room

8:30-8:40	D Leswick		
	<ul style="list-style-type: none"><li>• Introduction</li></ul>		
8:40-8:50	G Bell		
	<ul style="list-style-type: none"><li>• Missed MRI Appointments: A City-wide Audit</li></ul>	PQI	
8:50-9:00	R Naqvi		
	<ul style="list-style-type: none"><li>• The Effect of Coordinated Investigations for Rural Lung Cancer Patients on Traveling and Time to Staging Completion</li></ul>	PQI	
9:00-9:10	M. Pierce		PQI
	<ul style="list-style-type: none"><li>• CT Reading Room Interruptions</li></ul>		
9:10-9:20	K Kanga		
	<ul style="list-style-type: none"><li>• Clinical Audit Project/PQI: Transrectal Ultrasound Prostate Biopsy: How Good Are We?</li></ul>	PQI	
9:20-9:30	Y Du		
	<ul style="list-style-type: none"><li>• Use of Oral Contrast in the Setting of Undifferentiated Abdominal Pain in the Emergency Room</li></ul>	PQI	
9:30-9:40	S Melendez		
	<ul style="list-style-type: none"><li>• Pediatric consent in ultrasound imaging</li></ul>	PQI	
9:40-9:50	M Du Rand		
	<ul style="list-style-type: none"><li>• Interventional Radiology Inserted Pleural Pigtail Drains? Are We Managing them Correctly?</li></ul>	PQI	
9:50-10:00	M Wesolowski		
	<ul style="list-style-type: none"><li>• Overview of potential research projects with the SieVRt medical viewer</li></ul>	Research & Demo	
10:00-10:30		---- COFFEE BREAK ----	
		---- & HANDS ON WITH SIEVRT MEDICAL VIEWER ----	
10:30-10:40	V Gaja		
	<ul style="list-style-type: none"><li>• A fully automated production of cGMP grade <sup>68</sup>Ga-PSMA-11 with cationic pre-purification for clinical PET/CT imaging</li></ul>	Research	
10:40-10:50	K Barreto		
	<ul style="list-style-type: none"><li>• Formulation of <sup>89</sup>Zr-DFO-Nimotuzumab for a Clinical Trial to Assess Diagnostic PET Imaging Quality</li></ul>	Research	
10:50-11:00	X Yi		
	<ul style="list-style-type: none"><li>• Automatic catheter detection in pediatric radiographs using a scale-recurrent neural network and synthetic data</li></ul>	Research	
11:00-11:10	S Adams		
	<ul style="list-style-type: none"><li>• Access to Ultrasound Imaging: Qualitative Study in Two Northern, Remote Saskatchewan Indigenous Communities</li></ul>	Research	
11:10-11:20	S Adams		
	<ul style="list-style-type: none"><li>• A Crossover Comparison of Standard and Telerobotic Approaches to Prenatal Sonography</li></ul>	Research	
11:20-11:35		----- COFFEE BREAK -----	

11:35-11:45	B Hunter	<ul style="list-style-type: none"> <li>• Patient Symptom Questionnaires Result in Higher ACR and CAR Appropriateness Scores Compared with Physician Requisitions for Knee MRI</li> </ul>	Research (med student)
11:45-11:55	R Navqi	<ul style="list-style-type: none"> <li>• Computed Tomography (CT) on Call: An online, interactive curriculum to prepare medical imaging residents for after-hours CT image interpretation</li> </ul>	Research
11:55-12:05	G Bell	<ul style="list-style-type: none"> <li>• Implementation of a tailored MR stroke protocol</li> </ul>	Research
12:05-12:15	K Kanga	<ul style="list-style-type: none"> <li>• Evaluation of Current Hip Impingement Measurement Techniques in MRI</li> </ul>	Research
12:15-12:25	N Kalra	<ul style="list-style-type: none"> <li>• <i>Appropriateness in Residency Education: An Initiative in Medical Imaging to Promote System Resource Stewardship</i></li> </ul>	Research
----- END OF PRESENTATIONS -----			
Absent	M Wright	<ul style="list-style-type: none"> <li>• Evaluation of Med-Comp, Dignity, Power Injectable Port at Royal University Hospital</li> </ul>	Research
Absent	G Watson	<ul style="list-style-type: none"> <li>• Ultrasound Imaging Features of Soft Tissue Sarcoma with Biopsy Correlation: Imaging Criteria for Malignancy</li> </ul>	Research
Absent	J Wang	<ul style="list-style-type: none"> <li>• Implementing Online TI-RADS Calculator</li> </ul>	Research
Absent	J Wang	<ul style="list-style-type: none"> <li>• Fleischner Criteria Web App</li> </ul>	Research
Absent	B Alport	<ul style="list-style-type: none"> <li>• Knee MRI: How Fast Can We Go? A Comparison of Routine and Fast Knee MRI protocols</li> </ul>	Research
Absent	N Vassos	<ul style="list-style-type: none"> <li>• Soft Tissue Sarcomas: Revisiting MRI Imaging Criteria</li> </ul>	Research
Absent	D Dressler	<ul style="list-style-type: none"> <li>• Prevalence of Bone-Cartilage Mismatch in the Tibial Plateau on Knee MRI</li> </ul>	Research
----- MEETING & LUNCH -----			
12:25-12:35	Judges meeting		
12:30	Lunch & Awards Presentation - Spencer Library		

# **Missed MRI Appointments: A City-wide Audit**

Graeme Bell and Haron Obaid

Department of Medical Imaging, University of Saskatchewan

PQI Project

*BACKGROUND:* Missed appointments are a frustrating, costly and ubiquitous problem facing radiology departments. MRI is a high-cost imaging modality and limited resource, and missed appointments bare not only a financial cost but also serve to perpetuate long wait times and delay patient care.

*OBJECTIVE:* This project aims to characterize factors contributing to missed MRI appointments locally with the goal of improving appointment attendance rates through targeted interventions.

*METHODS:* An initial audit was performed to characterize MRI no-shows across all 4 MRI scanners in Saskatoon from January 1 to June 30, 2017. Our local RIS and scheduling software was used to collect information including body part scanned, date and time of missed appointment, referring specialty and the patient's age and home postal code.

*RESULTS:* Of 7757 booked outpatients, 295 (3.8%) missed their appointments. No single months were outliers and all 4 scanners were equally likely to experience a missed appointment. Average duration of a missed appointment was 53 minutes. A disproportionate number of patients who missed appointments came from rural areas of the province.

*CONCLUSIONS/FUTURE DIRECTIONS:* Multiple potential interventions are currently being considered including direct-to-patient telephone or text message appointment reminders, facilitating patient access to online systems to view and manage appointments, reiteration of appropriate imaging criteria to referring physicians, patient experience surveys and punitive measures. A re-audit will occur after the implementation of some combination of these interventions.

# **The Effect of Coordinated Investigations for Rural Lung Cancer Patients on Traveling and Time to Staging Completion**

Raza Naqvi<sup>1</sup>, Steven Bharadwaj<sup>2</sup>, Renee Kennedy<sup>2</sup>, Richard Bigsby<sup>2</sup>,  
Paul Babyn<sup>1</sup>, C (Anderson) Tyan<sup>3</sup>

<sup>1</sup>Department of Medical Imaging, <sup>2</sup>Division of Thoracic Surgery, <sup>3</sup>Division of Respiriology,  
Critical Care and Sleep Medicine, University of Saskatchewan

PQI Project (Work in Progress)

*INTRODUCTION:* Lung cancer is the leading cause of cancer death in Canada and Saskatchewan was estimated to have 790 new cases in 2017. The initial diagnostic and staging part of the lung cancer patient's journey will require multiple specialized investigations to be completed in Saskatoon. With rural population making up a third of the Saskatchewan's total population many lung cancer patients will be expected to travel long distance for their way. In this quality improvement study, we aim to assess the effect of coordinated investigations for rural lung cancer patients on traveling and time to staging completion.

*METHODS:* In consultation with the thoracic surgery group, we identified grouping diagnostic and staging investigations on a single day as a driver for change. We then approached pulmonary function lab, medical imaging, nuclear medicine and interventional radiology to assess their limitations in completing their prospective testing. Retrospect data were collected from Nov 2016 to Dec 2017 to establish baseline data. Key data collected includes patient demographics, number of separate trips made to Saskatoon and duration of time from consultation to staging completion. A lung cancer diagnostic form was created to assist with inter-departmental communication for investigations needed for a single patient. The form was brought forth to each department to explain its function. The interventional was started late March 2018 and prospective data is being collected

*PRELIMINARY RESULTS:* 48 patients were included for baseline data. On average, each patient made 3.4 single-day visits (Standard deviation (SD) 1.2) to Saskatoon for lung cancer diagnosis and staging. On average, the time between first consultation date to staging completion date was 37.8 days (SD 27.1). Post-intervention data are being collected.

*CONCLUSION:* Pending.

# CT Reading Room Interruptions

Mark Pearce and Haron Obaid

Department of Medical Imaging, University of Saskatchewan

PQI Project

*OBJECTIVES:* To identify the main sources of CT reading room interruptions, and target interventions towards reducing them.

*METHODS:* The time of day, source, and duration of interruptions were recorded over 3 discontinuous weeks during daytime hours. An online survey of emergency physicians was distributed to elicit clinician feedback regarding proposed interventions to reduce interruptions.

*RESULTS:* On average, there were 2.4 interruptions per hour. Interruptions were more likely to occur between 8 am-9 am, and between 12 pm-1pm. During a 9 hour day, the average amount of time spent dealing with interruptions was 37 minutes per day, up to a maximum of 56 minutes per day. 52% of interruptions were attributable to phone requests for studies, 29% were attributable to outgoing calls required to clarify history, and 15% were secondary to misdirected phone calls. Of the study requests, 52% came from emergency.

Emergency physician survey results revealed that 50% of physicians erroneously assumed they were required to phone for all non-urgent daytime studies (non-urgent being defined as >1 hr). 88% of respondents did not want to phone for non-urgent studies, and 100% of respondents were in favor of physician order entry as opposed to unit clerk ordering of imaging studies.

*CONCLUSIONS/FUTURE DIRECTIONS:* Electronic physician order entry (September 2018) is expected to significantly reduce interruptions from phone call requests/inadequate history. Implementation of an automated phone tree should help to address misdirected phone calls. A re-audit will occur after September.

# **Clinical Audit Project/PQI: Transrectal Ultrasound Prostate Biopsy: How Good Are We?**

Kavita Kanga and Aatif Parvez

Department of Medical Imaging, University of Saskatchewan

PQI Project

*BACKGROUND:* Prostate cancer is one of the most common cancers to affect men, with 1 in 8 Canadian men to be diagnosed in their lifetime. TRUS guided prostatebiopsies remains one of the main modalities for tissue sampling, with an approximate detection rate of 50%. With the role of PSA in constant debate, and the role of imaging becoming increasingly important in this patient population, it is vital to increase the accuracy of image-guided biopsies.

*OBJECTIVE:* To determine whether we are meeting an acceptable detection rate for prostate cancer via ultrasound-guided prostate biopsies.

*METHODS:* Montage was used to retrospectively identify patients who underwent a prostate biopsy in Saskatoon Health Region from July 2012-July 2017 (in progress). A search of each patient's health records was performed to correlate with pathology results to assess if biopsy results were sufficient and the outcome. Note was also made of imaging indication, hospital location and findings. The initial audit will determine where we stand in regards to sensitivity for ultrasound guided prostate biopsies, and direct any future studies in the area.

*RESULTS:* Pending.



# **Use of Oral Contrast in the Setting of Undifferentiated Abdominal Pain in the Emergency Room**

Yang Du, Gage Watson and Paul Babyn

Department of Medical Imaging, University of Saskatchewan

PQI Project

*BACKGROUND:* Recent studies show that oral contrast contributed little in diagnosing undifferentiated abdominal pain in the emergency room. The wait time reduction for patients receiving abdominal CT ranges from 60-120 minutes when oral contrast is not administered.

*OBJECTIVE:* To assess and optimize oral contrast use in abdominal CT in undifferentiated abdominal pain in SHA.

*METHODS:* Montage was used to retrospectively identify patients who underwent abdominal CT imaging for undifferentiated abdominal pain in SHA from January 2016-March 2016. PQI presentation and information package was distributed to Radiologists in the SHA. Subsequent re-audits were performed in April 2017 and April 2018 to assess the effectiveness of the action plan.

*RESULTS:* The original audit revealed 32% (87/274) of patients undergoing abdominal CT received oral contrast with only 3/87 patients having a clear indication for its use. After intervention, re-audit was performed over April 2017 showing only 3.9% (5/128) of studies received oral contrast. The average scan time from the original audit was 65 minutes in 2016, reducing to 49 minutes in 2017. Subsequent re-audit is being performed in April 2018 to assess the persistent effects of the action plan.

*CONCLUSION:* The information package and presentation resulted in reduced oral contrast use and scan time in the first year. Results from the second year re-audit to evaluate the persistent effect of the action plan are pending.

# **Pediatric Consent in Ultrasound Imaging**

Sarah Melendez and Paul Babyn

Department of Medical Imaging, University of Saskatchewan

PQI Project

**BACKGROUND:** Consent is an important but often misunderstood topic in pediatric medicine. The Canadian Pediatric Society and Canadian Medical Protective Association both agree that age is not the only factor that determines whether parental permission is needed in pediatric patient management. In fact, with the exception of Quebec, there is no age below which parental consent must be obtained.

Obtaining consent in invasive ultrasound imaging – specifically endovaginal imaging – is a regular task for any person performing ultrasound studies. They should therefore be aware that they do not require parental consent in order to complete a study as long as the pediatric patient is able to understand the consequences of both accepting and refusing treatment, and any alternatives that may be available.

**OBJECTIVE:** This study is to ensure all relevant parties are aware of and using appropriate consent obtaining procedures for all pediatric patients.

**METHODS:** Audit will be performed at Radiology departments in both university-based and community-based hospitals, as well as community ultrasound clinics. The audit will target sonographers, radiology residents, and staff radiologists in Saskatchewan. A seven question quiz centered around key topics in pediatric consent was developed. It will be distributed to all applicable parties by email. Correct answers will not be provided at the end of the quiz.

**RESULTS:** Pending

**INTERVENTIONS/ACTION PLAN/DISCUSSION:** If the quizzed population is found to be incorrect in their understanding of pediatric consent for invasive ultrasound imaging a seminar will be recorded for distribution regarding the current guidelines in pediatric consent and how to obtain it. A recorded session is thought to help ensure fair distribution to remote sites.

## **Interventional Radiology Inserted Pleural Pigtail Drains? Are We Managing them Correctly?**

Dr. Mia du Rand<sup>1</sup>, Brent Burbridge<sup>1</sup> and C (Anderson) Tyan<sup>2</sup>

Departments of Medical Imaging<sup>1</sup> and Respiriology<sup>2</sup>, University of Saskatchewan

PQI Project

*BACKGROUND:* A practice quality improvement project to assess the outcomes, complications and heterogeneity in management of patients undergoing image-guided pleural small-bore catheter drainage performed at RUH by Interventional Radiology.

*OBJECTIVES:* Goals are to standardize care and post-insertion management of these patient to potentially improve clinical outcomes and length of hospital stay.

*METHODS:* Montage search of Interventional procedures performed at RUH from 1 March 2015 to 1 March 2017. Retrospective chart review of included patients and review of procedural reports. Tube size, drainage systems, time to change of drainage systems to negative pressure systems, post insertion complications, management orders and length of hospital stay were assessed.

*RESULTS:* A total of 70 patients were identified over a 24-month period. Average catheter dwell time in patient was 8,5 days. Outcomes were heterogeneous, with no standardized approach to tube size selection, post insertion management or monitoring. Average patient hospital stay was 27.8 days, with length of hospital stay dependent on clinical indication for tube insertion, not the actual management protocol. Heterogeneity in care and lack of insertion protocol do not align with literature recommendations. Post insertion complications most commonly encountered were blocking requiring Streptokinase and falling out.

*PLAN/INTERVENTION:* Implementation of standardization tool for tube insertion and post insertion management to be done, with a repeat audit in 1 year.

# **Overview of Potential Research Projects with the SieVRt Medical Viewer**

Mike Wesolowski

Department of Medical Imaging, University of Saskatchewan

Research/Demonstration

*BACKGROUND:* Immersive environments and virtual reality (VR) technology can improve learning outcomes and subject retention in medical education. Virtual reality applications may also help reduce operating costs in radiological practice while improving mobility.

*OBJECTIVES:* In partnership with radiologists, we aim to explore the use of VR technology in medical research.

*METHODS:* Luxsonic's "SieVRt" is a VR medical viewer under development. Qualitative and quantitative methods will be used to investigate the applications and efficacy of VR technology in radiological practice.

*RESULTS:* TBD - To establish the appropriateness and usefulness of VR technology in medicine.

*CONCLUSIONS:* This research will explore the potential of VR technology to revolutionize the education, training and practice of medical imaging.

# A fully automated production of cGMP grade $^{68}\text{Ga}$ -PSMA-11 with cationic pre-purification for clinical PET/CT imaging

Vijay Gaja<sup>1</sup>, Varunkumar Bathini<sup>2</sup>, Rajan Rakheja<sup>1</sup>, Humphrey Fonge<sup>1</sup>

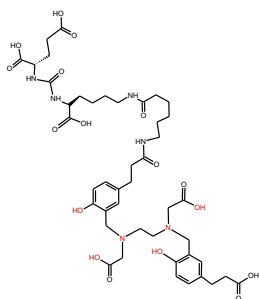
Departments of Medical Imaging and Urology, University of Saskatchewan

## Research Project

**BACKGROUND:** Recent advances in early diagnosis and surgical intervention implies that prostate cancer remains the most commonly diagnosed cancer and second leading cause of cancer-related death in men over 40 years. Prostate specific membrane antigen (PSMA) is a valuable biomarker due to its overexpression in prostate cancer and metastasis.

**OBJECTIVES:** The present study aims at production of current good manufacturing practice (cGMP) grade [ $^{68}\text{Ga}$ ]-PSMA-11 for PET/CT imaging of prostate cancer. The use of [ $^{68}\text{Ga}$ ]-PSMA-11 PET/CT has had a profound influence on the management of patients in jurisdictions where it has been used. Our overall goal is to use cGMP produced [ $^{68}\text{Ga}$ ]-PSMA-11 and PET/CT in a clinical trial in prostate cancer patients at RUH.

**METHODS:** PSMA-11 was labeled with Ga-68 using fully automated module (Trasis miniAio, Belgium). The total synthesis time was approximately 22 minutes. The commercially available iThemba  $^{68}\text{Ge}/^{68}\text{Ga}$  generator was eluted with 0.6M HCl and passed through a Strong cation exchange (SCX) cartridge. Ga-68 eluted using 5M NaCl/HCl solution in the vial containing PSMA-HBED-CC in 1M sodium acetate buffer. The radiolabeling reaction was carried out at 95°C for 5 minutes. The final product was neutralized with 2 mL of sodium phosphate buffer. The radiochemical purity and stability of [ $^{68}\text{Ga}$ ]-PSMA-11 were determined via radio-HPLC.



PSMA-11 ligand



Trasis miniAio radiochemistry module

**RESULTS:** In the present work, Ga-68 was purified using cationic exchange. [ $^{68}\text{Ga}$ ]-PSMA conjugate was prepared with very high radiochemical yield and purity. The product was stable up to four hours at room temperature.

**CONCLUSIONS:** We have succeeded in developing [ $^{68}\text{Ga}$ ]PSMA-11 for eventual clinical trial.

## Formulation of $^{89}\text{Zr}$ -DFO-Nimotuzumab for a Clinical Trial to Assess Diagnostic PET Imaging Quality

Kris Barreto<sup>1</sup>, Rufael Chekol<sup>2,3</sup>, Viswas Raja Solomon<sup>2,3</sup>, Elahe Alizadeh<sup>2,3</sup>, Wendy Bernhard<sup>1</sup>, Clarence Ronald Geyer<sup>1</sup>, Humphrey Fonge<sup>2,3</sup>

Departments of Pathology and Laboratory Medicine<sup>1</sup>, Medical Imaging<sup>2</sup>, Saskatchewan Centre for Cyclotron Sciences<sup>3</sup>, University of Saskatchewan

### Research Project

**OBJECTIVE:** The preparation of a PET radiopharmaceutical ( $^{89}\text{Zr}$ -DFO-Nimotuzumab) to diagnose EGFR positive lung and colorectal cancers in a Phase I single site clinical trial at the University of Saskatchewan. The investigational drug,  $^{89}\text{Zr}$ -DFO-Nimotuzumab is comprised of an antibody (Nimotuzumab) targeting the epidermal growth factor receptor (EGFR) a chelator desferoxamine (DFO) and a radionuclide ( $^{89}\text{Zr}$ ).

**METHODS:** A cold-kit (DFO-Nimotuzumab) is formulated in the good manufacturing practice (GMP) space at the Saskatchewan Centre for Cyclotron Sciences (SCCS) and assessed for visual impurities, pH, concentration, volume, purity, identity, and function. The cold-kit is then radiolabeled with Zirconium-89 to produce the final drug product which is tested for visual appearance, pH, radiochemical Identification and purity, strength, bacterial endotoxin and sterility

**RESULTS:** Preparation of processes and documentation to meet Health Canada guidelines for GMP production of this novel imaging agent will be presented. Pre-clinical data including pharmacokinetics, biodistribution, microPET imaging, radiation dosimetry, acute and delayed toxicity, and radiochemical yield were previously obtained using mice and will be highlighted.

**CONCLUSION:** The investigational brochure, and study protocol for the CTA have been completed and Human ethics approval (REB) has been obtained, this work will form the Chemistry and Manufacturing section of the CTA.

# Automatic Catheter Detection in Pediatric Radiographs Using a Scale-Recurrent Neural Network and Synthetic Data

Xin Yi<sup>1</sup>, Scott Adams<sup>1</sup>, Abdul Elnajmi<sup>2</sup>, Paul Babyn<sup>1</sup>

Department of Medical Imaging<sup>1</sup> and College of Medicine<sup>2</sup>, University of Saskatchewan

Research Project

*OBJECTIVE:* To evaluate the potential of a scale-recurrent neural network, trained using synthetic data, to automatically detect catheters on pediatric chest/abdomen radiographs.

*METHODS:* 2D projections of nasogastric tubes, endotracheal tubes, and umbilical arterial and venous catheters were simulated by using a sampled projection profile drawn over a randomly generated B-spline path. These randomly generated catheters were subsequently superimposed on 2515 adult chest radiographs obtained from the NIH Open-i dataset and used as training data. A scale-recurrent neural network was proposed for catheter detection by exploiting the multi-scale information of the radiograph input. Thirty-five pediatric chest/abdomen radiographs from our institution were used for testing the network, and lines and tubes were manually annotated to create groundtruth annotation maps. Catheters detected by the scale-recurrent neural network were represented by detection likelihood maps. The performance of the network at various scales was evaluated by comparing catheters detected by the network with the groundtruth annotation maps using precision, recall, and  $F_\beta$ -measure.

*RESULTS:* The detection likelihood map from the smallest scale contained almost all line-like structures, including not only catheters but also ribs and ECG leads. The detection recall improved by iterating through the scale space of the radiograph input. The network at the highest scale achieved an  $F_\beta$ -measure of 0.8009 with precision 0.8411 and recall 0.6909.

*CONCLUSION:* The proposed scale-recurrent neural network trained using synthetic data achieved promising results for catheter detection on pediatric chest/abdomen radiographs. This approach may be used to develop a solution to automatically prioritize radiographs which have malpositioned catheters.

# **Access to Ultrasound Imaging: Qualitative Study in Two Northern, Remote Saskatchewan Indigenous Communities**

Scott J. Adams<sup>1</sup>, Rachel Tang<sup>2</sup>, Paul Babyn<sup>1</sup> and Brent Burbridge<sup>1</sup>

<sup>1</sup>Department of Medical Imaging<sup>1</sup> and Social Sciences Research Laboratories<sup>2</sup>,  
University of Saskatchewan

## Research Project

*OBJECTIVE:* Access to healthcare services is recognized as an important determinant of health; however, access to care is particularly challenging for residents in rural and remote communities. This study sought to explore perceptions of access, and factors which shape access, to ultrasound imaging in two northern, remote Indigenous communities in Saskatchewan.

*METHODS:* Fourteen semi-structured interviews were conducted in the northern communities of Stony Rapids and Black Lake, Saskatchewan. All participants had an obstetrical ultrasound exam or general diagnostic ultrasound exam performed in the past 10 years. Interviews were audio recorded and interview transcripts were analysed using inductive thematic analysis.

*RESULTS:* Participants connected geographic isolation to the lack of availability of healthcare technologies including ultrasound imaging. This was manifest in the lack of regularly available ultrasound services, as well as barriers which became apparent when participants had to travel for ultrasound, including fear of air travel, isolation from family, financial means, and unfamiliarity with the city. Other barriers such as family and work responsibilities were exacerbated by the barrier of geography. Residents overcame these barriers as they appreciated potential medical benefits of ultrasound, and the ultrasound study brought personal satisfaction in knowing about one's body and reassurance about the health of their baby.

*CONCLUSION:* Geography is a central barrier to northern residents accessing prenatal and general diagnostic ultrasound. This study emphasizes the importance of regularly available local ultrasound services to meet patients' needs, and suggests that future efforts to improve access to imaging should consider barriers of distance.



## **A Crossover Comparison of Standard and Telerobotic Approaches to Prenatal Sonography**

Scott J. Adams<sup>1</sup>, Brent Burbridge<sup>1</sup>, Andreea Badea<sup>1</sup>, Nadine Kanigan<sup>2</sup>, Luis Bustamante<sup>3</sup>, Ivar Mendez<sup>3</sup> and Paul Babyn<sup>1</sup>

Departments of Medical Imaging<sup>1</sup> and Surgery<sup>3</sup>, University of Saskatchewan  
The Ultrasound Centre<sup>2</sup>, Saskatoon Saskatchewan

*OBJECTIVE:* To determine the feasibility of a telerobotic approach to remotely perform prenatal ultrasound examinations.

*METHODS:* Thirty participants were prospectively recruited. Participants underwent a limited examination (assessing biometry, placental location, and amniotic fluid; n=20) or a detailed examination (biometry, placental location, amniotic fluid, and fetal anatomic survey; n=10) performed with a conventional ultrasound system. This examination was followed by an equivalent examination performed with a telerobotic ultrasound system, which enabled sonographers to remotely control all ultrasound settings and fine movements of the ultrasound transducer from a distance. Telerobotic images were read independently from conventional images.

*RESULTS:* Paired-sample t tests showed no statistically significant difference between conventional and telerobotic measurements of fetal head circumference, biparietal diameter, or single deepest vertical pocket of amniotic fluid; however, a small but statistically significant difference was observed in measurements of abdominal circumference and femur length ( $p < 0.05$ ). Intraclass correlations showed excellent agreement ( $> 0.90$ ) between telerobotic and conventional measurements of all four biometric parameters. Of 21 fetal structures included in the fetal anatomic survey, 80% of the structures attempted across all patients were sufficiently visualized by the telerobotic system (range, 57%–100% per patient). Ninety-seven percent of patients strongly or somewhat agreed that they would be willing to have another telerobotic examination in the future.

*CONCLUSIONS:* A telerobotic approach is feasible for remotely performing prenatal ultrasound examinations. Telerobotic sonography may allow for the development of satellite ultrasound clinics in rural, remote, or low volume communities, thereby increasing access to prenatal imaging in underserved communities.

# **Computed Tomography (CT) on Call: An Online, Interactive Curriculum to Prepare Medical Imaging Residents for After-Hours CT Image Interpretation**

Raza Naqvi, Neil Kalra, and Dr. Brent Burbridge

Department of Medical Imaging, University of Saskatchewan

Research Project (Work in Progress)

*BACKGROUND:* Diagnostic radiology residents begin their overnight CT call shifts in their second year of residency (PGY2), after six months of exposure to medical imaging training. During this initial six-month period of training, residents are exposed to a designated two month clinical rotation in CT at the University of Saskatchewan. Presently, there is a lack of formal curriculum to prepare the residents for CT on-call shifts aside from their designated time in CT.

## *OBJECTIVES:*

1. To implement an online, interactive curriculum that exposes residents to on-call type cases and prevent gaps in their knowledge that may occur related to the variability in clinical cases encountered during their introductory CT rotation.
2. To develop an assessment tool that allows radiology residents to objectively demonstrate their competency.

## *METHODS:*

1. This is an educational project and exempted from Ethics Review as per the REB.
2. Develop a CT on Call Curriculum with interactive CT cases and an Assessment tool on Blackboard that showcase frequent pathologies encountered by residents on CT call.
3. Execute an on-site Pilot among local PGY2 residents
4. Send an invitation to the Diagnostic Radiology Program Directors at the Canadian institutions
5. All participants shall write a pre-test at the start of PGY2 prior to starting their first CT rotation
6. Randomly divide the participants into two groups:
  - a. Group 1: Exposed to the curriculum
  - b. Group 2: No exposure to the curriculum
7. All participants shall write a post-test after 1 month of CT rotation

*RESULTS:* Pending.

*CONCLUSION:* Pending.

# Patient Symptom Questionnaires Result in Higher ACR and CAR Appropriateness Scores Compared with Physician Requisitions for Knee MRI

Bjorn Hunter<sup>1</sup>, Neil Kalra<sup>2</sup> and David Leswick<sup>2</sup>

College of Medicine<sup>1</sup> and Department of Medical Imaging<sup>2</sup>, University of Saskatchewan

Research Project

**OBJECTIVES:** The primary objective was to determine if patient symptom questionnaires score better than physician requisitions for appropriateness guidelines. The secondary objective was to determine if there was any difference in appropriateness based on referring physician specialty.

**METHODS:** 253 knee MRI examinations performed at Royal University Hospital were reviewed on PACS. ACR and CAR appropriateness scores were calculated separately for both the information provided on the MRI requisition and the patient symptom questionnaire. If provided information was inadequate to score, it was ranked as “uncertain”. Statistical analysis was performed using Chi-square analysis via SPSS (v.24).

**RESULTS:** Use of the patient questionnaire versus requisition resulted fewer uncertain scores for both CAR (0% vs 4.3%) and ACR (0% vs 5.1%) appropriateness. Patient questionnaire produced higher ACR with percentage increases in ACR 7-9 and 4-6, while results for CAR appropriateness were mixed with slight drop in level B and increases in level C appropriateness scores (Table 1). Data analysis regarding appropriateness by specialty is pending.

**CONCLUSIONS:** In addition to providing clinical information to radiologists, patient questionnaires also allow for all MRIs to be scored for appropriateness, and in some cases can show the study to have higher appropriateness scores than the MRI requisitions alone.

Clinical Scores	Levels of Evidence	Patient Questionnaire	Physician Requisition	Percent Change with Patient Questionnaire
CAR	A	0 (0)	0 (0)	0%
	B	222 (87.7)	231 (91.3)	-3.6%
	C	31 (12.3)	11 (4.3)	8%
	Uncertain	0 (0)	11 (4.3)	-4.3%
	<b>Total</b>	253 (100)	253 (100)	
ACR	7-9	248 (98)	240 (94.9)	3.1%
	4-6	5 (2)	0 (0)	5%
	1-3	0 (0)	0 (0)	0%
	Uncertain	0 (0)	13 (5.1)	-5.1%
	<b>Total</b>	253 (100)	253 (100)	

Table 1: Frequency and percentages of CAR and ACR appropriateness scores by levels of evidence for physician requisitions and patient questionnaires.

# **Implementation of a tailored MR stroke protocol**

Graeme Bell and Kyle Moulton

Department of Medical Imaging, University of Saskatchewan

Research Project

*OBJECTIVE:* Patients with acute stroke benefit from prompt diagnosis and treatment, yet there is a lack of universally accepted practice guidelines on MR stroke imaging. Current MR protocols are lengthier than required and contain sequences that add time but do not routinely contribute clinical information in the setting of stroke. We hypothesize that the creation and implementation of a dedicated protocol using fewer, more specialized sequences (DWI, FLAIR, and SWI) can improve the stroke clinical and imaging pathway by facilitating prompt diagnosis and triage.

*METHODS:* Institutional radiologists were encouraged to use the new protocol beginning in late January 2018. Our RIS database was searched for reports generated for unenhanced MRI brain exams performed at RUH for acute stroke. Two months of preliminary data have been analyzed.

*RESULTS:* Of 45 MRIs performed for acute stroke, 17 (38%) used the new specialized stroke protocol, while 28 (62%) used the pre-existing routine brain protocol. The new protocol amounted to a per-study savings of 3 minutes and 42 seconds on the 1.5 T magnet, and 3 minutes and 18 seconds on the 3 T magnet. No non-diagnostic studies or recalls occurred with the new protocol.

*CONCLUSIONS/FUTURE DIRECTIONS:* Implications of this research include an optimized acute stroke pathway resulting in more timely care and improved access to imaging and diagnosis, as well as potential technical quality improvements. A complete analysis will be performed in September.

# **Evaluation of Current Hip Impingement Measurement Techniques in MRI**

Kavita Kanga and Haron Obaid

Department of Medical Imaging, University of Saskatchewan

Research Project

**BACKGROUND:** There are multiple different MRI techniques to measure Femoral Neck Anteversion in adults with hip impingement including the posterior lesser trochanteric line which requires only hip imaging and the epicondylar/retrocondylar line which requires knee and hip imaging.

**OBJECTIVE:** This study is to assess concordance of the multiple techniques to measure femoral neck anteversion in an adult non-arthroplasty joint. If there is concordance between measuring techniques, this may decrease the need for both knee and hip imaging, which may result in a decrease in imaging wait times.

**METHODS:** Montage was used to retrospectively identify patients who underwent bilateral hip and knee MRIs in Saskatoon Health Region from September - March 2015 with a sample size of 100, excluding those with prior arthroplasty, inadequate study or pathology. The lines were remeasured for the purpose of this study by a single trained radiology resident.

**RESULTS:** Pending.

## **Appropriateness in Residency Education: An Initiative in Medical Imaging to Promote System Resource Stewardship**

Neil Kalra<sup>1</sup>, Juan-Nicolas Pena-Sanchez<sup>2</sup>, Andreea Badea<sup>1</sup>, Sonia Vanderby<sup>1,3</sup>, and Paul Babyn<sup>1,4</sup>

Department of Medical Imaging<sup>1</sup>, College of Medicine<sup>2</sup>, Mechanical Engineering<sup>3</sup>, University of Saskatchewan. Saskatchewan Health Authority<sup>4</sup>

### Research Project

**BACKGROUND:** Recent CanMEDS guidelines for resident education include system resource stewardship. For the medical imaging (MI) specialty, this often translates to ensuring exam appropriateness.

**OBJECTIVES:** The objectives of our study were to 1) gain insight into how quality improvement concepts fit into MI residency education and 2) illustrate ways that MI system resources, specifically magnetic resonance imaging (MRI) given its high cost and resultant healthcare system burden, can be improved in terms of radiologist/resident practices, operational processes, and appropriateness at time of ordering.

**METHODS:** The literature related to both MI educational environments and appropriateness was reviewed. Data was obtained from a novel nationwide study exploring current faculty and facility practice variation among MRI-related operations, with 13 Canadian academic MI departments participating. Information related to MRI ordering at each site was also analyzed.

**RESULTS:** Appropriateness training within Canadian MI residency programs appears scarce, with few strategies or methods currently available to enhance resident involvement.

Great variability is evident in MRI-related physician practices and utilization including prioritization/triaging/approval processes, use of referral appropriateness guidelines, scanner operating hours, and requisition forms.

From 1087 ordered MRI exams, 87.0% to 87.4% were appropriate while 6.6% to 12.6% were inappropriate, based on the American College of Radiology (ACR) Appropriateness Criteria and Canadian Association of Radiology (CAR) Referral Guidelines respectively.

**CONCLUSION:** This study highlights the need for more MI resident training and involvement in appropriateness initiatives/resource stewardship. Our study also revealed opportunities to create more standardized and consistent processes across Canada to minimize the occurrence of inappropriate MRI exams.

# Evaluation of Med-Comp, Dignity, Power Injectable Port at Royal University Hospital

Matt Wright and Brent Burbridge

Department of Medical Imaging, University of Saskatchewan

Research Project

**BACKGROUND:** Implanted venous port devices are commonly requested by referring oncologists, largely for chemotherapy administration. Recently the standard arm port at Royal University Hospital (RUH) was changed to the Med-Comp, Dignity port. This port was chosen due to the discontinuation of a previously supplied port. In addition, the Dignity port has an updated design which is power injectable and is made of a light weight polymer. The hypothesized benefits will be: to utilize the port for power injected contrast administration for CT examinations, provide a more comfortable patient experience due to the ports light weight, and encounter fewer complications.

**METHODS:** All patients who receive a Med-Comp arm port at RUH between October 1, 2017 and September 30, 2019 will be followed. To evaluate for potential complications, Philips Intellispace PACS will be queried to determine the in-situ duration, if the port required imaging assessment (removal, adjustment, contrast injection, or arm venous Doppler ultrasound) and whether the port was used for contrast power injection. Complication rates will be calculated and compared to previously published data.

**RELEVANCE:** It is important to ensure non-inferior performance of the newly established arm port. Since polymer based power injectable port housings have not been used by this group yet it is important to document similar or improved complication rates to justify continuing to use this device, modifying our techniques, or using a different port for the benefit of our patients. As it stands within the first 4 months there have been 47 port insertions, two catheter related arm deep venous thrombosis (4.3%), and two port infections (4.3%). These complication rate are on par with meta-analysis data of 2.73% and 4.83% respectively<sup>1</sup>. We will continue to assess for complications to determine if rates fall within the range of previously published data.

## References:

(1) B Burbridge, G Stoneham, HJ Lim, C Lee, 2015 (Jun). Radiology-Implanted Arm Ports: A Review of the Literature. Journal of the Association for Vascular Access, 20: 80-90

## **Ultrasound Imaging Features of Soft Tissue Sarcoma with Biopsy Correlation: Imaging Criteria for Malignancy**

Gage Watson\*, Nicholas Vassos\*, Nicolette Sinclair\*\*, Haron Obaid\*

University of Saskatchewan Department of Medical Imaging\* & Associated Radiologists\*\*

Research Study (Work in Progress)

*OBJECTIVES:* To establish Ultrasound imaging criteria for soft tissues neoplasms which predict the likelihood of malignancy.

*METHODS:* This is a retrospective study which is compliant with the HIPA as per the Research Ethics Board. A montage search was performed using the search terms "soft tissue tumor", "soft tissue sarcoma", and "soft tissue mass". 1229 reports were identified which were individually evaluated on PACS. Retroperitoneal and solid organ based lesions, lymphoma, and if no pre-treatment or pre-biopsy imaging was available, then these subjects were excluded.

*RESULTS:* In total, 111 patients were left in the study who met our criteria. The following Ultrasound imaging characteristics will be assessed: size, fascial relationship, margins, echotexture, shape, orientation, posterior features, calcifications, doppler vascularity, and architectural distortion. Once this data has been compiled, it will be sent to statistics for further analysis.



## **Implementing Online TI-RADS Calculator**

Jimmy Tanche Wang<sup>1</sup>, Tasha Ellchuk<sup>1</sup>, Robert Otani<sup>1</sup>, Gary Groot<sup>2</sup>, Paul S. Babyn<sup>1</sup>

Departments of Medical Imaging<sup>1</sup> and Surgery<sup>2</sup>, University of Saskatchewan

Research Project

*PURPOSE:* Implement an online calculator ([www.TIRADSCalculator.com](http://www.TIRADSCalculator.com)) for Thyroid Imaging, Reporting and Data System (TI-RADS) with images and descriptions of each of the ultrasound features as a clinical and educational tool to guide management of incidental thyroid nodules.

*DESCRIPTION:* Thyroid nodules are common and fine needle aspiration (FNA) or surgery are used to assess for malignancy. Thyroid Imaging, Reporting and Data System (TI-RADS) uses ultrasound for non-invasive risk stratification of thyroid nodules and reduce unnecessary biopsies. This project used an online calculator and education to facilitate the application of TI-RADS in clinical practice.

Retrospective review defined the baseline reporting of thyroid nodule ultrasound features. Web-based resource and presentation were used to integrate TI-RADS in reporting thyroid ultrasounds and measure the improvements in comprehensive reporting of thyroid nodules and guiding management.

*RESULTS:* The percentage of thyroid ultrasound reporting using TI-RADS within six months increased from 0% to 27% during the project period. Reports with TI-RADS provided twice as many recommendations compared to reports without TI-RADS. The online TI-RADS calculator is utilized internationally with over 2000 visitors per month.

*SUMMARY:* Online TI-RADS calculator and education has successfully facilitated the integration of TI-RADS in thyroid ultrasound reporting to provide more accurate and comprehensive reports and guide management.

## **Fleischner Criteria Web App**

Jimmy Tanche Wang, Tasha Ellchuk, Geoff Karjala, and Derek Fladeland

University of Saskatchewan Department of Medical Imaging

Research Project

### **PURPOSE:**

1. Introduce a web based application for the latest 2017 Fleischner Society Guideline for the management of pulmonary nodules
2. Raise awareness of the revision of the Fleischner Society Guideline for the management of pulmonary nodules

**DESCRIPTION:** The Fleischner Society Guidelines for management of pulmonary nodules has been revised in 2017 based on new data and accumulated experience. The guidelines represent the consensus of the Fleischner Society which incorporates the opinions on the multidisciplinary international group of thoracic radiologists, pulmonologists, surgeons, pathologists, and other specialists. The guidelines apply to incidental pulmonary nodules with specific management recommendations based on a multiple of factors including the nodule type, multiplicity, size thresholds and clinical risk. A web based application ([www.fleischnerapp.com](http://www.fleischnerapp.com)) was developed to facilitate the dissemination and application of the latest Fleischner Society Guidelines for the management of pulmonary nodules.

**SUMMARY:** A web based application was developed to facilitate the dissemination and application of the latest 2017 Fleischner Society Guideline for the management of pulmonary nodules.

## **Knee MRI: How Fast Can We Go? Comparison of Routine and Fast Knee MRI protocols**

Brie Alport<sup>1</sup>, David Leswick<sup>1</sup>, Haron Obaid<sup>1</sup>, Shawn Kisch<sup>1</sup>, Rhonda Bryce<sup>2</sup> and Hyun Lim<sup>2</sup>

Departments of Medical Imaging<sup>1</sup> and Community Health and Epidemiology<sup>2</sup>  
University of Saskatchewan

Research Project – Work in progress

*BACKGROUND:* MRI studies are limited by high cost, availability and high demand. Advances in MRI technology have led to reduced MRI scan times and improved image quality. This raised the question of whether we can reduce the routine knee protocol time without significantly altering image quality or diagnostic interpretation. This would allow for increased patient throughput and decreased patient wait times by improving scan efficiency.

*OBJECTIVE:* To assess lesion detectability in routine and modified fast MRI knee protocols.

*METHODS:* Approval was obtained from SHR and University of Saskatchewan Biomedical Research Ethics Boards. A series of test protocols were conducted on each sequence utilizing parallel MRI imaging techniques. After qualitative analysis the protocol with the shortest scan time without significant subjective compromise in image quality was selected as the fast protocol for this study. Thirty patients between the ages 7 and 50 with symptoms related to knee trauma were scanned using the routine and fast knee protocols on RUH's 3T Siemens Skyra system (Erlangen, Germany).

Using a structured reporting system, the image protocols will be interpreted by two MSK trained radiologists. Assessment will include image quality of each sequence, confidence of visualization of several structures and lesion detection when lesions are present. The results will be compared between the protocols.

## Soft Tissue Sarcomas: Revisiting MRI Imaging Criteria

Nick Vassos<sup>1</sup>, Haron Obaid<sup>1</sup>, Achala Donuru<sup>2</sup> and Nicolette Sinclair<sup>3</sup>

Department of Medical Imaging<sup>1</sup> University of Saskatchewan, Thomas Jefferson University Hospital (Philadelphia, USA)<sup>2</sup> and St Paul's Hospital<sup>3</sup>

Research Project

**INTRODUCTION:** To identify the magnetic resonance imaging (MRI) characteristics of soft tissue sarcomas which may allow differentiation between aggressive from less aggressive lesions.

**METHOD:** A total of 134 consecutive patients referred to a regional musculoskeletal oncology center over a 10-year period from January 2008 to December 2017 with a suspected soft-tissue neoplasm were reviewed and included in the retrospective study. Features analyzed included patient demographics, patient symptoms, lesion size, MRI signal characteristics, margins, lobulation, hemorrhage, necrosis, fascial edema, relationship to the fascia, as well as involvement of the neurovascular bundle, bones and joints. Comparison was then made with the final histological diagnosis. Univariate comparisons of characteristics by final malignant status were made using the t-test for continuous variables and the Chi-square test for categorical variables.

**RESULTS:** Of the patients reviewed, 19 did not have pathology. Of the 115 patients with pathology, 59 were male and 56 were female. Age of the patients ranged from 8 to 94 years. The mean age of patients with malignant lesions was 58.5 years and mean age of patients for non-neoplastic and benign lesions was 48.7 (p value 0.007). A significant relationship was identified between malignancy and large tumor size, >5cm (p<0.0001), involvement of the deep fascia (p<0.0001), neurovascular involvement (p =0.0001), necrosis (p<0.0001), edema (p<0.0001).

**CONCLUSIONS:** Current guidelines suggest the most important variables for assessing risk of malignancy in a soft-tissue lesion include size, depth in relation to the fascia, increasing size, and pain. The current study suggests that while lesions more than 5 cm have increased likelihood of being malignant, for every one centimeter increase in size, the odds of malignancy are increased by 19%, controlling for enhancement and edema.

## **Prevalence of Bone-Cartilage Mismatch in the Medial Tibial Plateau on Knee MRI**

Danielle Dressler, Haron Obaid, Michael Shepel, and Emily McWalter

Department of Medical Imaging, University of Saskatchewan  
Research Project

*PURPOSE:* Bone-cartilage mismatch is a joint abnormality in which the surface curvature of the articular cartilage is incongruent with the subchondral bone. Mismatch between bony and cartilaginous morphology has previously been reported in the femoral trochlea and found to be associated with symptomatic patellar instability. However, this phenomenon has not yet been studied in the tibial plateau. The purpose of the study is to investigate the prevalence of bone-cartilage mismatch in the tibial plateau on knee MRI.

*METHODS:* A retrospective analysis of 98 knee MRI scans (3T) was obtained for patients who met the following criteria: (a) age between 20 and 49, (b) no history of knee trauma, surgery, or infection, (c) no cartilage degeneration in the tibiofemoral compartment, and (d) no meniscal tear, cruciate or collateral ligamentous injury. The medial plateau was visually assessed by three patterns: (1) Concave bone and concave cartilage; (2) Concave bone and flat cartilage; (3) Concave bone and convex cartilage. Measurements of bone and cartilage depth were also obtained.

*RESULTS:* In total, 56% of individuals were type 1 morphology (concave bone/concave cartilage), 39% were type 2 morphology (concave bone/flat cartilage), and 5% were type 3 morphology (concave bone/convex cartilage). Bone concavity depth ranged from 0.5 to 4 mm with a mean of 2.3 mm. Cartilage depth ranged from 2.5 mm concavity to 1.6 mm of convexity with an average of 0.6 mm concavity. Results are currently undergoing statistical analysis for interobserver variability.

*CONCLUSION:* We hypothesize that bone-cartilage mismatch in the tibial plateau affects the strain biomechanics of the knee. Further kinematic studies will be needed to confirm our findings and may be a next step in future research.

## **Lunch & Prizes:**

Please join us for lunch and prizes in the department's Spencer Library starting at 12:30 for a lunch and the best medical student project award. This year GE Healthcare has kindly provided us with a grant for research day that was used towards organization costs, and the lunch and snacks throughout the day. The best medical student project will be presented at the lunch, with the remainder of prizes at the departmental event the following week.

Prizes are as follows:

'Stuart Houston Award for Medical Imaging Research at the University of Saskatchewan'

- awarded to best resident project:
- \$750 - cosponsored by Associated Radiologists and University Medical Imaging Consultants

Best Quality Assurance Project:

- \$250 - Cosponsored by Associated Radiologists and University Medical Imaging Consultants

Best Medical Student Project:

- \$500 – Sponsored by Saskatoon Medical Imaging

RSNA Roentgen Research Award:

- Sponsored by the RSNA

## Past Prize Winners

We would like to again recognize prize winners from previous years as follows:

### *Stuart Houston Award for Medical Imaging Research at the University of Saskatchewan*

- 2017: Neil Kalra (with JN Pena-Sanchez, A Badea, S Vanderby, and P Babyn) for the project “A Day in MR: Exam Variation and Appropriateness of MRI Exams in Canada”
- 2016: Meredith Lynch (with D Leswick, S Kisch, R Bryce & H Lim) for the project “Image Quality in Day Optimizing Throughput (Dot) Knee MRI vs Routine Knee MRI”
- 2015: Navdeep Sahota and Nasir Khan (with M Shepel and H Obaid) for the project “Posterior Ankle Labral Changes at MRI: A Preliminary Study”
- 2014: Christopher Plewes (with B Burbridge) for the project “Comparison of a Power Injectable Versus a Non Power Injectable Totally Implanted Venous Access Device in the Upper Arm”
- 2013: Nasir Khan (with H Obaid, M Shepel & D Leswick) for the project “An MRI Study to Correlate between Increased Lateral Tibial Slope and Articular Cartilage Changes in the Knee”
- 2012: Christopher Plewes for the project “Towards Efficient MR Utilization”
- 2011: Darin White (with D Fladeland) for the project “Dual-Energy CT Pulmonary Angiography – Part I: Image Quality”
- 2010: Adelaine Wong (with D Leswick, H Nikota & S Webster) for the project “Dose Reduction in Scoliosis Surveys”

### *Best Quality Assurance Project*

- 2017: Jimmy Wang (with T Ellchuk, R Otani, G Groot and P Babyn) for the project “On-line TI-RADS Calculator”
- 2016: Navdeep Sahota (with H Obaid) for the project “Pre-MRI Patient Questionnaire: Clinical Audit”
- 2015: James Huynh (with D Leswick and F Rashidi) for the project “Retrospectively Conducted First Cycle of Practice Quality Improvement Evaluating the Technique of Liver Span Measurement Used by Sonographers at a Single Institution”
- 2014: Meredith Lynch (with B Burbridge) for the project “Use of Power Injectable Ports for Contrast Enhanced CT and MR”
- 2013: Brandy Sessford (with V Chow) for the project “Management of Asymptomatic Adnexal Cysts identified on Ultrasound: A Clinical Audit Project at the Saskatoon Health Region”

## Past Prize Winners

### *Best Medical Student Project*

- 2017: Jaques Van Heerden (with M Shepel and H Obaid) for the project “The Utility of Dual Energy CT in Visualizing the Menisci in Patients Unfit for MRI”.
- 2016: Scott Adams (with B Burbridge, A Badea, L Langford, L Bustamante, I Mendez & P Babyn for the project “Initial experience using a telerobotic ultrasound system to perform adult abdominal examinations”
- 2015: Haven Roy (with B Burbridge) for the project “To CT, or not to CT? The influence of computed tomography on the diagnosis of appendicitis in obese pediatric patients”
- 2014: Danielle Dressler (with D Leswick) for the project “Canadian Association of Radiologists (CAR) Annual Scientific Meetings: How Many Abstracts Go On to Publication?”
- 2013 (split award): David Horne (with D Leswick & H Lim) for the project “The Case Breast Radioprotection During Abdominal CT”
- 2013 (split award): Neil Kalra (with B Burbridge, D Pinelle, G Malin & K Trinder) for the project “USRC: A Novel Method for Incorporating Diagnostic Radiology Images into the Medical School Curriculum”
- 2012: Anuj Dixit (with P Babyn) for the project “Contrast Media Safety and Education”
- 2011 (split award): Larissa Breanne Irving (with D Leswick, D Fladeland & H Lim) for the project “Knowing the Enemy: Health Care Provider Knowledge of CT Dose & Associated Risks”
- 2011 (split award): James Zheng (with D Leswick & D Fladeland) for the project “CT Dose to Patients Receiving Scans of Multiple Body Sites at a Single Visit in Saskatoon”
- 2010: Patricia Jo (with D Leswick, D Fladeland, R Otani & H Lim) for the project “Reduced Dose with Maintained Image Quality Utilizing 100 kVp Carotid CT Angiography”
- 2009: Chance Dumaine (with D Fladeland, D Leswick, and H Lim) for the project “Improving Radiation Dose from Diagnostic CT Examinations in Saskatchewan”
- 2008: Sumeer Mann (with Grant Stoneham) for his projects “Reproduction of a Phantom and Development of a 3D CT Reconstruction Protocol for the Assessment of Ventricular Volumes” and “Comparison of CT 3D Volumetric Analysis of Ventricular Size to Visual Radiological Assessment” and “Correlation of Frontal and Occipital (F/O) Horn Ratio to Ventricular Volume in Patients of Varying Ages, and Comparison with Evan’s Ratio”



## Past Prize Winners

### *Resident Research Award (awarded 2007 to 2009)*

- 2009: Leslie Chatterson (with D Leswick\*, D Fladeland, M Hunt & S Webster) for the project “Lead Versus RADPAD® Shielding for Fetal Dose Reduction during Maternal CT Pulmonary Angiography”
- 2008: Jennifer Tynan (with M Duncan and B Burbridge) for the project “Reduction of Adult Fingers Visualized on Pediatric Intensive Care Unit (PICU) Chest X-rays Following Radiation Technologist and PICU Staff Radiation Safety Education”
- 2007: Greg Kraushaar (with C King) for the project “Back to the Future: Shortening the Z Axis on Helical CT PE Studies without Compromising Diagnostic Power”

### *Resident Research Second Place Award (awarded 2008 to 2012)*

- 2012: Nicolette Sinclair (with B Burbridge) for the project “Fluoroscopy of the Cook Vital Arm Port at the time of Removal”
- 2011: Andrew Scott (with D Leswick) for the project “Shaken or Swirled? Mixing Gadolinium for Arthrography”
- 2010: Aileen Rankin (with D Leswick) for the project “Patient Positioning in CT and the Induction of Sternoclavicular Joint Pneumatosis”
- 2009: Christina Theoret (with G Stoneham) for the project “Fibroid Size Reproducibility US vs MRI at Royal University Hospital”
- 2008: Sharon Goo for the project “Does Percutaneous Balloon Cryoplasty Improve Hemodialysis Access Longevity”

### *RSNA Roentgen Research Award:*

- 2016:
- 2015:
- 2014:
- 2013:
- 2012:
- 2011:
- 2010: