ANNUAL REPORT 2015

DEPARTMENT OF EMERGENCY MEDICINE

CALGARY ZONE

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Executive Summary

Dr. Eddy S. Lang, MD
Clinical Department Head
Calgary Zone

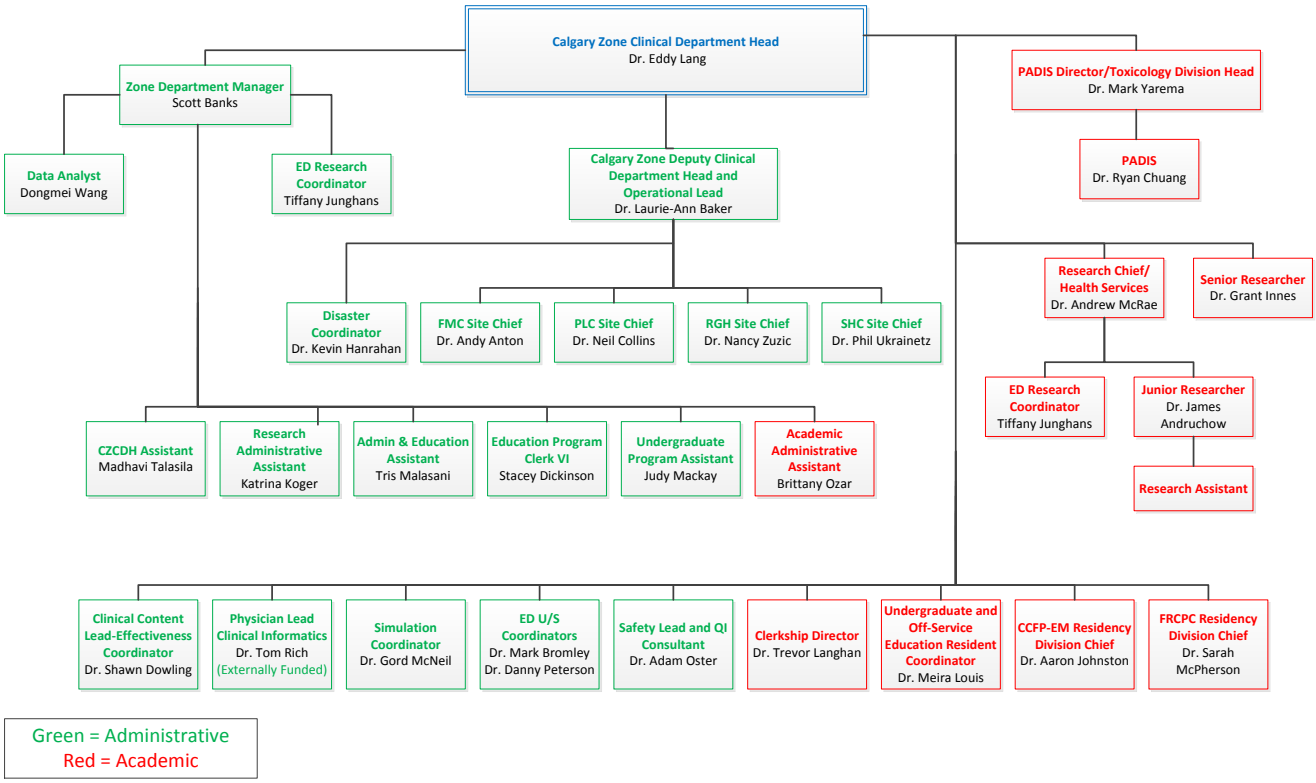
The Calgary Zone Emergency Department has seen continued development and growth on a number of fronts in 2015, but has also faced a number of challenges. Key among these challenges have been related to capacity issues and access block for high acuity patients arriving by EMS. While a great deal of effort has been invested in the AHS 90 x 90 initiative, the existence of hallways holding new arrivals, awaiting physician assessment has seen an important resurgence in 2015. The primary correlate of this problem relates back to the Emergency Inpatient phenomena where in the past 12 months we have returned to levels of admitted patients held in the ED that were not seen since 2011. Late in 2015 we did have the opportunity to meet with the Zone Senior Leadership team and this has opened up a number of initiatives that may help mitigate the risk our patients are facing as a result of being unable to access assessment spaces in the ED. The importance of consultation delay has come to light through the implementation of the 90 x 90 initiative and enhanced analytics and feedback to our supporting admitting services should also promote effort to address this important contribution to throughput delay. Physician manpower issues, a constant source of concern within the Calgary Zone for EM have now seen significant stabilization with our ability to bring on new physicians being limited by shift availability and the orientation of hiring practices now focusing on the extra-clinical skill sets that new additions can bring to the department. Remarkable progress continues to be made on the informatics front in Calgary EDs. Leveraging expertise in evidence-based medicine and alignment with the Emergency Strategic Clinical Network's Clinical Content Development Program we have implemented system level changes that have dramatically reduced unnecessary coagulation testing in our chest pain patients and through improvement in our analgesia order set we have saved Alberta Health Services nearly $200 000. A stable and thriving operational leadership team is guiding continuing improvement at all four of the adult sites.

The academic program in Calgary EM continues to thrive with full accreditation provided to our two residency training programs; one through the Royal College and the other through the College of Family Physicians of Canada. That milestone, along with a thriving clerkship program characterizes some of the excellent educational activities occurring in the department. Our extra-clinical activities extend into active ultrasound training programs and a very popular simulation training program that is seeing full participation by enthusiastic physicians in our group. The department's research enterprise continues to flourish with four clinician scientists and a growing research team continuing to secure grant funding in health services research. Projects, aligned either directly or indirectly with Choosing Wisely Canada seeks to improve CT utilization in the province and re-examine transfusion practices and management decisions in non-variceal upper gastrointestinal bleeding. Additional work is seeking to improve the care of kidney stone patients in Calgary with a focus on mitigating the uniquely high admission rates seen in Calgary. Included as well is activity in the emerging Section of Clinical Pharmacology and Toxicology, rounding out the effort is cutting edge work in cardiac biomarkers and ED crowding metrics funded by the CIHR. Academic productivity is exemplified in the largest number yet of publications and national and international abstract submissions reflecting research activities.

Departmental Structure and Organization

Governance: Physician leads within the Department of Emergency Medicine include a Department Head (Eddy Lang), a Deputy Department Head & Operations Lead (Laurie Ann Baker), a Site Chief at each hospital (RGH – Nancy Zuzic; PLC – Neil Collins, SHC – Phil Ukrainetz, and FMC – Andy Anton, Royal College Residency Directors (Sarah McPherson & Marc Francis), CCFP-EM Residency Director (Aaron Johnston), a Clerkship Director (Trevor Langhan), Director of Off Service Resident Education and Undergraduate Education (Meira Louis), Senior Researcher (Dr. Grant Innes), Research Director (Andrew McRae), Junior Researcher (James Andruchow), ED Ultrasound Coordinators (Mark Bromley, Danny Pederson), Simulation coordinator (Gord McNeil), an Informatics Lead (Tom Rich) an Effectiveness Coordinator (Shawn Dowling), a Quality Improvement & safety Lead (Adam Oster) and a new Disaster Planning Coordinator (Kevin Hanrahan) and a new Department Section Chief of Toxicology (Mark Yarema). Scott Banks, our Department Manager, oversees budget, physician recruitment and management.

Departmental of Emergency Medicine Functional Organization



EM Committees

Six main DEM committees meet monthly or bi-monthly.

The Physician Executive Committee:

The Physician Executive Committee provides leadership, direction and support for all physician-related activities. The Committee is a decision-making body for physician manpower, scheduling, operational, quality, safety and financial aspects of the Zone Department of Emergency Medicine (ZDEM).

The ZDEM Operations Committee:

The Operations Committee is a multi-disciplinary committee including Physician, Nursing and administrative representatives. Duties include strategic planning, prioritization, quality, safety, innovation and oversight of all ED systems and processes.

The Academic Steering Committee:

The Academic Steering Committee guides the development of the EM academic program. Primary agenda items for the 2015 year included strategic planning towards short term and long-term academic goals, faculty development, recruitment to academic positions and educational programming.

The Promotions Committee:

This committee processes faculty appointments and promotion requests for the new Academic Department of Emergency Medicine.

The ZDEM Physician Manpower Committee:

The Physician Manpower Committee is a subcommittee of the Physician Executive Committee. It provides leadership and makes decisions with respect to manpower needs, search and selection, and physician hiring in the Department of Emergency Medicine.

The Quality Assurance Committee:

This committee reports to the ZDEM Operations Committee. It is one of the few departmental QAC's that have been allowed to continue within the new AHS Safety framework.

Department Membership

The Department of Emergency Medicine currently employs 175 plus active physician staff and treats approximately 320,000 patient visits per year (annualized value based on current and projected inflow volumes).

Historically there were two main "practice-groups" (The Foothills-PLC group and the Rocky view group), but an increasingly zone focus and multi-site practice has changed this model. We now have extensive physician cross-coverage of sites, with a variety of site combinations. Currently all of our Emergency Medicine physicians have academic appointments (or appointments in progress).

Highlight of the Year: MD Recruitment and Hiring

Dr. Laurie-Ann Baker, MD
Deputy Department Head, Operational Lead
Calgary Zone

The year 2015 was once again a very active recruitment year for the Calgary Zone Emergency Department. Twelve new physicians started work in the Emergency Department in 2015 and another 17 physicians were recruited to start work in the Calgary Zone Emergency Department in 2016. We completed a very aggressive recruitment campaign to improve our emergency physician staffing levels and we anticipate that in 2016 we will be significantly winding down our recruitment efforts and returning to more moderate recruitment strategies with an increased focus on physician retention.

Our Calgary Zone Emergency Department is now one of, if not the largest, Emergency Departments in Canada with approximately 175 emergency physicians and locums on staff. Despite our successes, we remain very diligent with our recruitment efforts. Dr. Laurie Ann Baker our Deputy Department Head & Operations Lead, completed extensive surveys of our physician group in order to plan for future manpower needs, improved retention strategies and evaluate overall wellness of the physician group. To account for continued growth within the city and both planned and unplanned attrition, we are anticipating that we will need to hire approximately four emergency physicians per year over the next 3 years. Given our recruitment success over the past few years, we are very confident that we will be able to achieve this goal. It is, however, critical that we continue to develop new and innovative ways to differentiate our department so that we can continue to recruit Canada's best and brightest emergency physicians. New recruits will not only need to be exceptional clinicians they must also offer strong extra-clinical skills as well.

The Recruitment Process

Scott H. Banks, MBA, CITP, CHRP
Emergency Medicine Zone Department Manager & Co-Chair Physician Manpower

To attract applicants from our target market, in 2015 we published advertisements in the Canadian Journal of Emergency Medicine (CJEM), the Canadian Medical Association Journal (CMAJ), and online using websites such as CMA careers. Advertisements also appeared throughout the year in the CAEP Communiqué, a bi-weekly newsletter that is emailed to over 1,500 emergency physicians in Canada.

In previous years we recruited by setting up an exhibitor booth at the annual Canadian Association of Emergency Physicians conference but now that we are winding down our recruitment efforts this is no longer necessary. We work closely with emergency medicine Residency Directors across Canada to recruit residents interested in moving to Calgary. With a strong involvement at CAEP, many physicians from other provinces contact us. Calgary has now become a premier destination for emergency physicians to seek employment at the conclusion of their residencies. As a result, we do not anticipate the need to set up a recruitment booth at CAEP 2016 as we are currently getting far more applicants than positions available. This is an extremely favourable position for our Department to be in.

Leading Edge Recruiting Practices

Our Selection Committee tends to be small and has the ability to invite applicants to Calgary quickly after their application file is complete. Exceptional candidates with very good references are provided employment contracts within 24 to 48 hours of their interviews. We believe this expedited process has increased our success rate substantially, as it makes candidates feel highly sought after. Most high quality candidates interview at multiple sites across the country, and most potential employers (EDs) take days or weeks after the interview to make hiring decisions and extend job offers. By making immediate or rapid offers, we are demonstrating to candidates that we are decisive, well prepared, capable of getting things done, and serious about hiring them. These are characteristics that our recruits have indicated that they find appealing. Recruitment Is Important – But retention is equally as Important:

Retention Strategies

To ensure that we maintain a core of experienced EM physicians who can provide mentorship to our new recruits, the manpower committee has adapted its philosophy to focus on the active retention of this important physician group. Retention strategies that have been implemented recently include the option of removing night shifts from regular clinical rotations for those individuals aged 55 years or older and have worked in our department for a minimum of 10 years. For those physicians who qualify for this exclusion but choose to continue to work night shifts, they are offered extended time off during the summer vacation blocks in lieu. Other strategies for some of our older physicians have successfully included the tempering of shift types to support changing practices as they begin to plan for retirement while still maintaining their clinical competence.

For the past two years the Department of Emergency Medicine has held a sold out gala and awards night to recognize individuals with outstanding clinical skills and achievements. These awards included overall clinical excellence, humanitarian, lifelong learning as well as outstanding rookie awards for those physicians who have excelled in their first two years of practice. The success of the evening, that includes attendance of EM physicians and their significant others from all four adult sites as well as Alberta Children's Hospital, is overwhelming and as a result we will continue to offer this very successful event on an annual basis.

Goals and Strategies

Our underlying primary goal is to provide safe and efficient care to all patients that present to a Calgary Zone Emergency Department. We have increased manpower and continue to modify ED shift schedules so that we can better match physician capacity to patient demand. This requires ongoing reassessment of demand but it is also dependent on modifying operations so that added physicians are actually effective (i.e. able to examine patients in care spaces). Our "Surge Strategy" takes effect when patient demand exceeds physician manpower and a minimum number of assessment spaces are available, the departments proceed with a physician call out to assist in the department. This strategy has had some success and we anticipate that it will continue to be better utilized in 2016.

The increased number of admitted patients remaining in the ED because of a shortage of available inpatient beds in 2015 in the Calgary Zone, has been extremely challenging and has crippled many of our previously successful ED and in patient process changes, i.e. Creation of Intake area in all adult ED's; Over Capacity Plan (OCP) triggering and implementation to name a few.

ED overcrowding is not the root of the current crisis rather it is the result of the limited number of available inpatient beds stemming primarily from the province's shortage of long term care beds. Although AHS and the province of Alberta continue to try and find measures to improve access, until more acute care and long term beds are created, we anticipate the situation will worsen over the coming year.

Impact on Other Departments and AHS Resources

Hiring large numbers of ED physicians has an impact on the provincial physician budget (payments are fee for service billings through the Physician Services Branch), but minimal impact on other Calgary Departments and the CMO (Physicians Affairs) budget, as the physicians are fee for service workers increasing in response to growing patient demand. We have required and will continue to require some additional financial resources for ongoing advertising and physician recruitment until this active initiative winds down in June 2016.

Department Progress and News

Quality Improvement Report 2015

1. **Physician Handover Feedback Survey** - this project involves the development and implementation of a physician-designed survey to provide useful feedback to physicians on their handover. It will be sent to the physician receiving handover after every handover they receive and results will be collated over multiple handover events, anonymized and set back to the physician who has handed over. The results will be private and can be used by the physician as they choose.

2. **SEC Advanced Patient Lists** -- this is an SEC enhancement where the ED MD will be able to view a unique list of all patients who they have discharged who have DI final results that come back after discharge. It will essentially allow the physician to review final results on their patients who have been discharged. The physician can also annotate on the DI results in SCM (i.e. "patient following up with GP regarding lung nodule", for example).

3. **Oral Contrast elimination in CT Appenditis protocol.** Ongoing work with DI to co-ordinate the elimination of OC for CT Appe protocolled scan continues with focus on ensuring implementation is monitored for important effects like re-scan rates, neg laparotomies etc.

3. **Real-time, expedited Staff Neuroradiology reads for ED Neuroradiology studies**. Self-explanatory.

4. **Ongoing Patient Safety Quality Assurance Reviews**. Thank you to all who have assisted with reviews and please let me know if you would like to participate in a review.

Disaster Preparedness

Less than one month into the Disaster Coordinator position the following projects have seen some progress made.

- Beginning to liaise with site disaster preparedness nurse practitioners regarding code orange plans and physician involvement in these plans.
- Met with Provincial and Zone ED/M Managers to discuss ongoing preparedness measures and exercises
- There is a myriad of committees at the Provincial, Zone, Site and Department level that deal with disaster preparedness. Beginning to sort out the relevance of these various groups in terms of physician engagement
- Discussed Emergency Department ramification of City wide exercises with EMS, CFD, CEMA and CPS.
- Continued progress with N95 preparedness as approximately 120 of 169 adult site physicians are up to date. Trying to develop more streamlined arrangements for physician testing.
- Setting up initial meeting of the ED Physician Disaster Preparedness Committee with representation from each site.
- Engaging with FMC Site Code orange planners to run a full scale site exercise with funding pending at this time. Further exercises at other sites in subsequent years.
- Working with ED surge planners to develop both electronic and call out procedures for disaster fan out for physicians.
- Assisting R4 residents with developing fellowship programs in both EMS and Disaster Medicine for future residents.

Multidisciplinary Analgesia Working Group

One of the most vibrant committees in the department, this group meets every two month to advance pain management, the most common issue facing care providers in Calgary EDs. The committee has broad representation from nurse, pharmacists and physicians from across the Zone and is currently chaired by Dr. Eddy Lang. While much of the focus in 2015 has been in the evaluation of the revised evidence-based ED analgesia order set accessed several thousand times per month in the Zone, recent activity has placed other issues under the committee's effort. Improving pediatric analgesia practices at the non-pediatric ED sites has become a major focus with an ongoing collaboration with QI leads Antonia Stang and Jennifer Thull-Freedman from the ACH – through a project funded by the CMO office in quality improvement. Additional emphasis is also being placed on the role that EDs can play in addressing the provincial crisis in regards to fentanyl overdoses and the implementation of naloxone take home kits in all Calgary EDs.

Emergency Medicine Clinical Content/Effectiveness

Dr. Shawn Dowling, MD
EM Clinical Content Lead
Effectiveness Coordinator

As a new position, the clinical content role has been busy defining itself and its role within the spheres of SCM, knowledge translation, research and minimizing unnecessary interventions.

Goals:

- Identify gaps in order sets and content of current order sets
- Measure the impact of the interventions
- Develop a process to review proposed changes/additions with MD's, RN's and relevant content experts
- Improve knowledge translation to physicians and RN's regarding various SCM related topics/issues

Projects:

- Working with the provincial Clinical Content/Knowledge Management group – to finalize the 6 robust builds (Afib, Upper GI Bleed, DKA, DVT, PE and Cardiac Chest Pain)
- Developing a pan-departmental Provincial Knowledge topics (Sexually Transmitted Infections)
- Three new order sets (Post-partum hypertension – RN and MD, Anemia) developed and submitted for production (Sept 2015 and Jan 2016). Other OS in development (fever in returning traveler, c diff)
- Numerous modifications to existing ED and ED RN order sets
- Represent the Clinical Content Role at various relevant committees (either as a member or in an ad hoc fashion)– Analgesia committee, ESCN, RN protocol committee

Accomplishments:
The two biggest accomplishments this year have been the work done **1.** Reducing the number of coagulation studies (PTT and INR) in patients with Suspected Cardiac Chest Pain and **2.** Increasing usage of probenecid in outpatients being managed for skin and soft tissue infections. Both of these projects have been submitted as abstracts to CAEP and the coagulation project was also submitted to SAEM.

1. **Coagulation study**: By implementing an evidence based intervention (removing the pre-selected PTT/INR from ED RN Suspected Cardiac Chest Pain Order Set) we were able to reduce INR and PTTÕs by 72% (MD and RN) for patients who had a cardiac chest pain order set used. Rough estimates would suggest a cost savings of $50,000 over the 3 month study period.

2. **Probenecid study:** Order set modifications were done to prompt physicians to consider the usage of probenecid in patients receiving cefazolin. Physician and nursing education documents were also prepared and distributed. In the 90days post order set changes, we noted a 12% increase in probenecid usage (30% to 42%). There was also a significant reduction in ED revisit rates within 72 hours.

News in Cost-Savings Initiative

The Calgary Zone Pain Management in the Emergency Department (ED) Working Group made a number of revisions to the ED Analgesic and Antiemetic order set in Sunrise Clinical Manager. The Working Group identified a number of medication changes that could improve the overall quality of care in ED which would also drastically reduce ED costs. The success was noted in an article titled, "Calgary Zone implements best practices in pain management, improves quality of care for ED patients and saves $180,000 annually" and below is the data that was presented.

Results to date (qualitative and financial)

The new order set was implemented in early December 2014. Averages over the four months prior to and after a six-month uptake phase (Dec 2014 to May 2015) demonstrate the effectiveness of this change:

Medication	Average Medication use Pre-change phase (Aug-Nov 2014) (87,499 ED visits)	Medication use Post-change phase (June-Sept 2015) (87,729 ED visits)	Average Change in medication use
IV hydromorphone (best practice)	1.3%	8.2%	+6.9%
IV morphine	14.2%	8.5%	-5.7%
Ondansetron 4mg IV (best practice)	10.7%	16.0%	+5.7%
Ondansetron 8mg IV	8.9%	2.5%	-6.4%
Ondansetron regular release tab (best practice)	3.0%	4.6%	+1.6%
Ondansetron disintegrating tab	3.9%	1.7%	-2.2%
6-tab Percocet To Go (best practice)	3.7%	3.8%	+.1%
12-tab Percocet To Go	4.7%	3.0%	-1.7%
*The number of Calgary Zone ED visits excludes visits to Alberta Children's Hospital ED			

Beyond the primary goal of delivering better patient care, the changes have also resulted in a projected cost savings* of more than $180,000 per year:

Medication Order Set change	Avg. cost/month Pre (Aug-Nov 2014) (87,499 ED visits)	Avg. cost/month Post (June-Sept 2015) (87,729 ED visits)	Projected annual savings
Hydromorphone vs. morphine	$16,407.66	$8,256.66	$97,812.00
Ondansetron IV 4mg vs. 8mg	$1,610.25	$1,245.83	$4,373.04
Ondansetron regular release vs. disintegrating tablets	$12,094.65	$5,378.42	$80,594.76
Percocet to go packs (6 vs. 12)	$640.85	$482.79	$1,896.72
		Annual Total:	***$184,676.52**

* Savings are based on changes in medication utilization alone. The calculations do not factor in changes to nursing preparation time for the IV medications, nor the costs of additional supplies required for 8mg IV ondansetron administration. Furthermore, potential impacts on ED length of stay or ED revisit rates were not assessed, both of which would hopefully be reduced as a result of better analgesia management.

Distinguished Service Award Letters

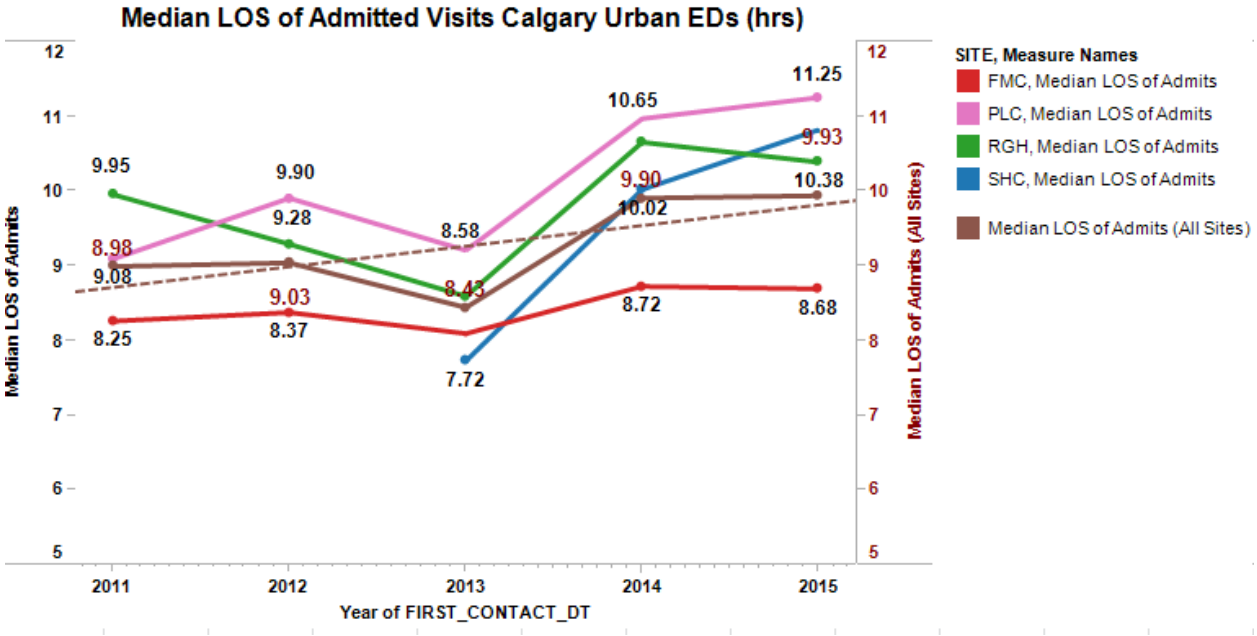
Below shows the UME Teaching Awards for Emergency Medicine since 2013.

Preceptor Name	Distinguished Service Award	Associate Dean Letters of Excellence	Course Name
Azizalrahman, Amani	Bronze	YES	Intro to Clerkship 2015
Bernbaum, Stan	Gold	NO	Integrative Course 2015
Bernbaum, Stan	Silver	YES	Integrative Course 2016
Bossert, Kerri	Bronze	YES	Procedural Skills (Year 1) 2017
Chad, Anthony	Bronze	YES	Procedural Skills (Year 1) 2017
Chad, Anthony	Bronze	Yes	Procedural Skills (Year 2) 2015
Curry, (Donald) Gil	Gold	YES	Integrative Course 2015
Gaudet, Jonathan	Bronze	NO	Course III - CV, RESP 2017 MDCN 370
Huffman, James	Bronze	YES	Course VIII - Comprehensive Clinical Skills Curriculum for Clerkship 2014
Hughes, Shannon	Gold	NO	Integrative Course 2015
Kao, Jesse (Kung-Gin)	Silver	YES	Intro to Clinical Practice 2016: MDCN 490
MacDonald, Ian Robert	Bronze	NO	Family Medicine Clinical Experience (Year 1) 2017
Mayer, Stanley	Bronze	NO	Course VIII - Comprehensive Clinical Skills Curriculum for Clerkship 2014
Mayer, Stanley	Bronze	YES	Intro to Clinical Practice 2016: MDCN 490
McFarlane, Kari	Bronze	YES	Procedural Skills (Year 1) 2017
Minoosepehr, Shabnam	Bronze	Yes	Course VI (Children's and Women's Health) 2015
Patocka, Catherine	Silver	YES	Intro to Clinical Practice 2016: MDCN 490
Ross, Marshall	Bronze	YES	Physical Exam (Year 1) 2017
Sandhu, Naminder	Bronze	YES	Intro to Clerkship 2015
Seto, Anthony	Bronze	YES	Intro to Clinical Practice 2016: MDCN 490
Walker, Ian	Bronze	YES	Physical Exam (Year 2) 2015
Walker, Ian	Bronze	NO	Course III - CV, RESP 2017 MDCN 370
Walker, Ian	Bronze	YES	Course V Neurosciences, Aging and Special Senses Class of 2016
Walker, Ian	Silver	YES	Course III - CV, RESP 2016 MDCN 370
Wertzler, Bill	Bronze	YES	Integrative Course 2016
Wishart, Ian	Bronze	YES	Communications (Year 1) 2017
Wishart, Ian	Bronze	NO	Communications (Year 2) 2015
Wishart, Ian	Bronze	YES	Course III - CV, RESP 2016 MDCN 370
Wishart, Ian	Bronze	NO	Course III - CV, RESP 2017 MDCN 370
Wishart, Ian	Bronze	Yes	Course VI (Children's and Women's Health) 2015
Wishart, Ian	Bronze	YES	Course VI (Children's and Women's Health) 2016
Wishart, Ian	Bronze	YES	Ethics (Year 1) 2017
Wishart, Ian	Bronze	YES	Physical Exam (Year 1) 2017
Wishart, Ian	Bronze	YES	Physical Exam (Year 2) 2015
Wishart, Ian	Bronze	YES	Physical Exam (Year 2) 2016
Wishart, Ian	Bronze	NO	Population Health Class of 2016
Wishart, Ian	Bronze	Yes	Procedural Skills (Year 2) 2015
Wishart, Ian	Bronze	YES	Communications (Year 1) 2017
Wishart, Ian	Bronze	NO	Communications (Year 2) 2015
Wishart, Ian	Bronze	YES	Course III - CV, RESP 2016 MDCN 370
Wishart, Ian	Bronze	NO	Course III - CV, RESP 2017 MDCN 370
Wishart, Ian	Bronze	Yes	Course VI (Children's and Women's Health) 2015
Wishart, Ian	Bronze	YES	Course VI (Children's and Women's Health) 2016
Wishart, Ian	Bronze	YES	Ethics (Year 1) 2017
Wishart, Ian	Bronze	YES	Physical Exam (Year 1) 2017
Wishart, Ian	Bronze	YES	Physical Exam (Year 2) 2015
Wishart, Ian	Bronze	YES	Physical Exam (Year 2) 2016
Wishart, Ian	Bronze	NO	Population Health Class of 2016
Wishart, Ian	Bronze	Yes	Procedural Skills (Year 2) 2015
Wishart, Ian	Gold	NO	Integrative Course 2015
Wishart, Ian	Silver	YES	Integrative Course 2016
Wishart, Ian	Silver	NO	Population Health Class of 2017

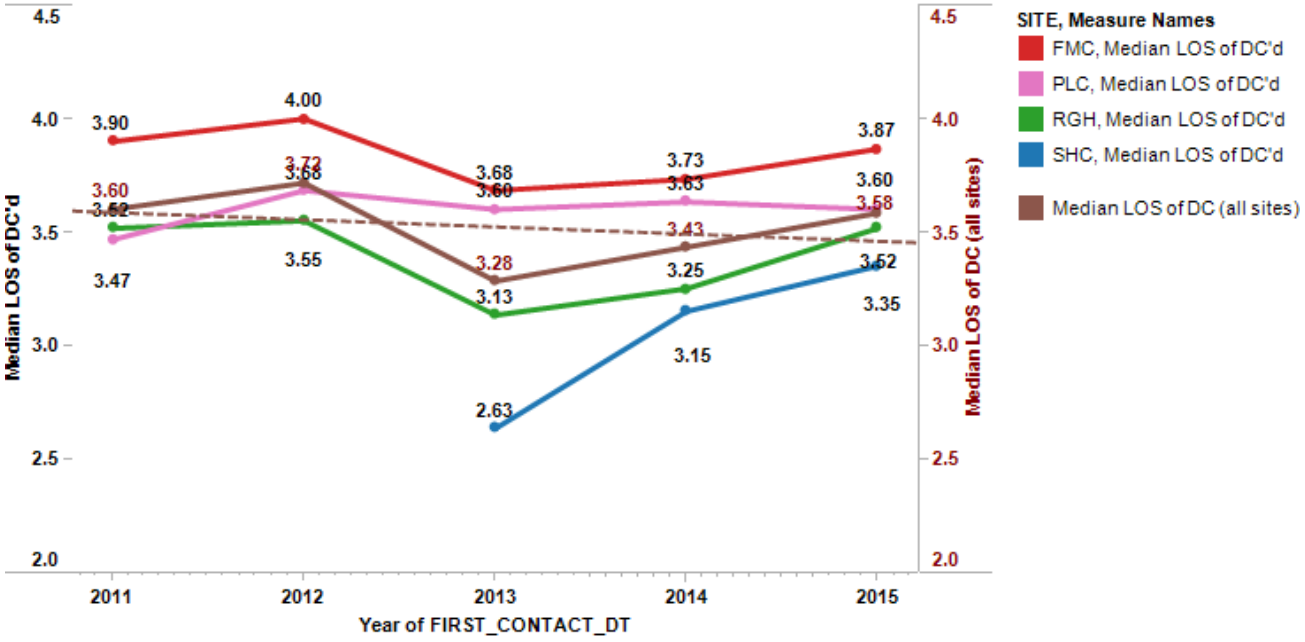
Comparative Annual Data

Dongmei Wang
Data Analyst

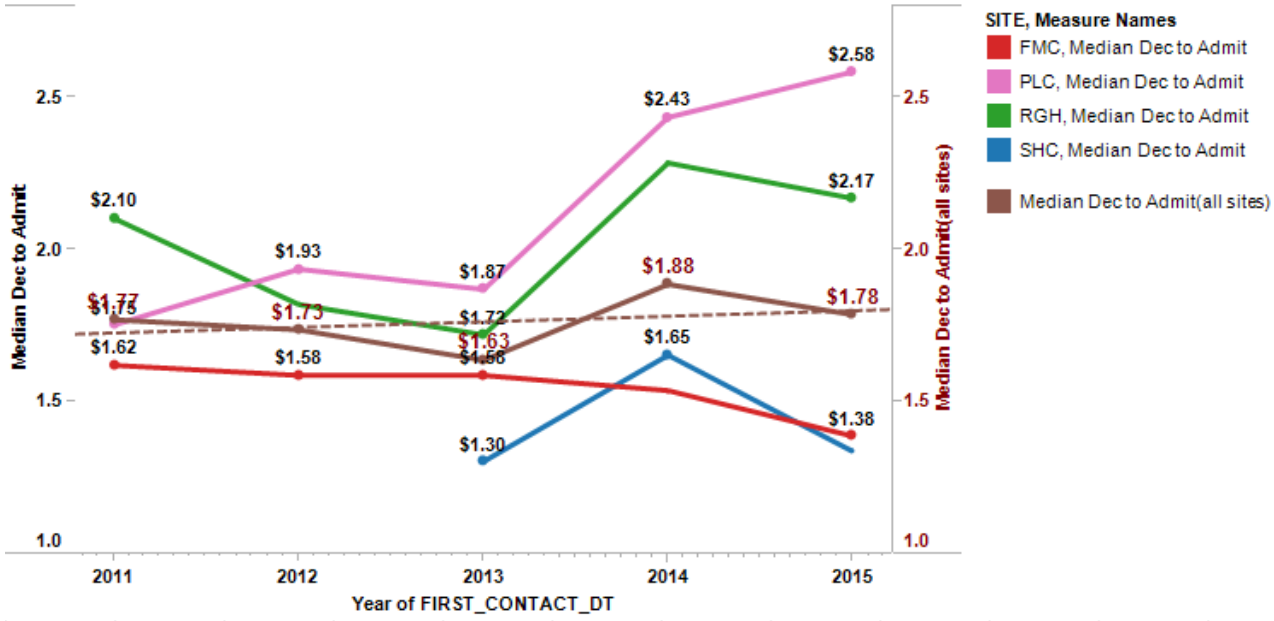
ANNUAL LOS DATA

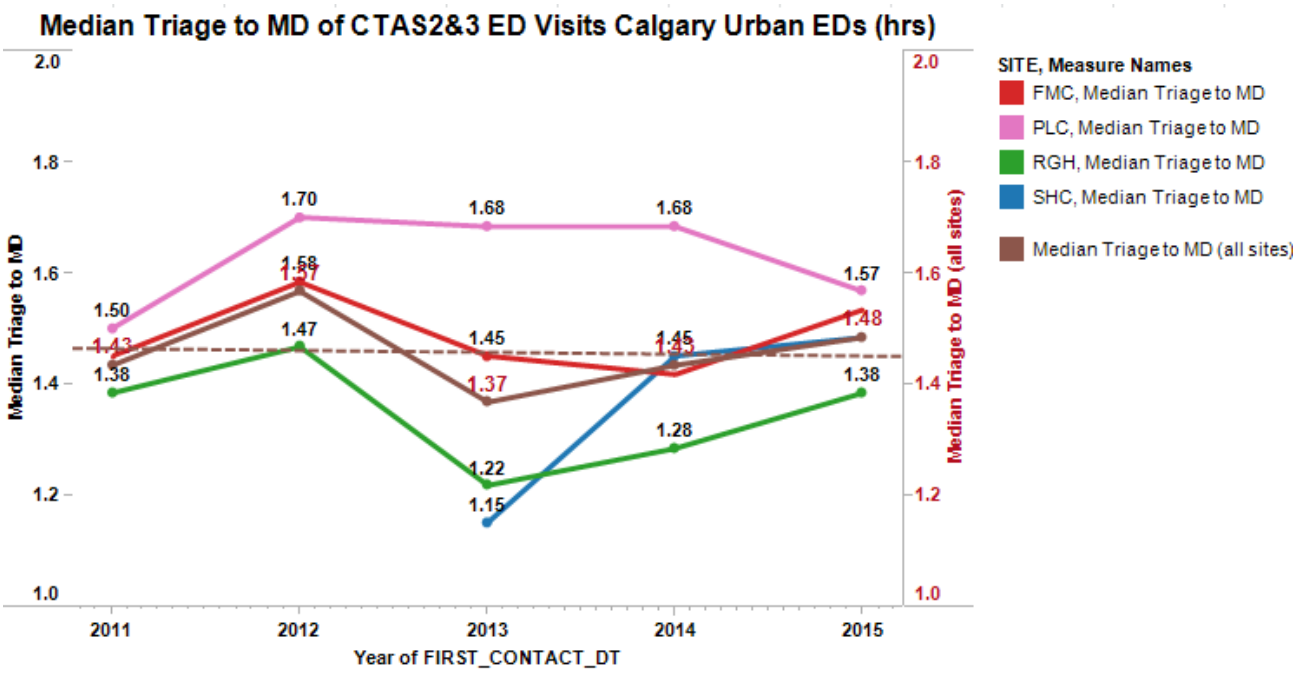


Median LOS of Discharged Visits Calgary Urban EDs (hrs)

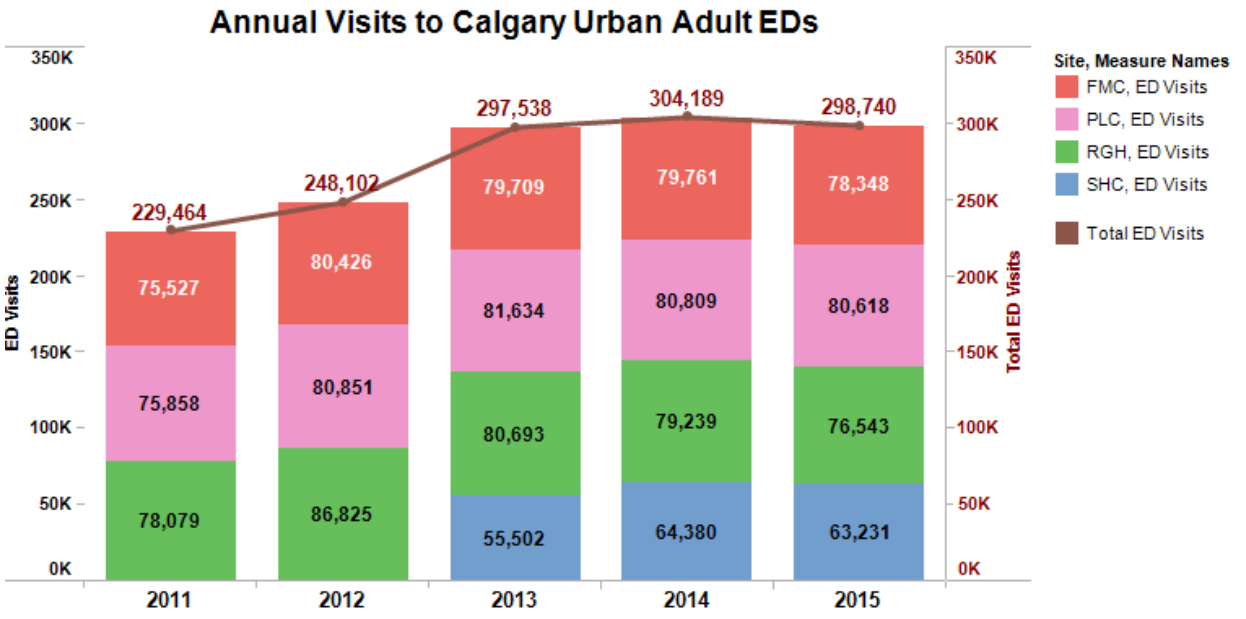


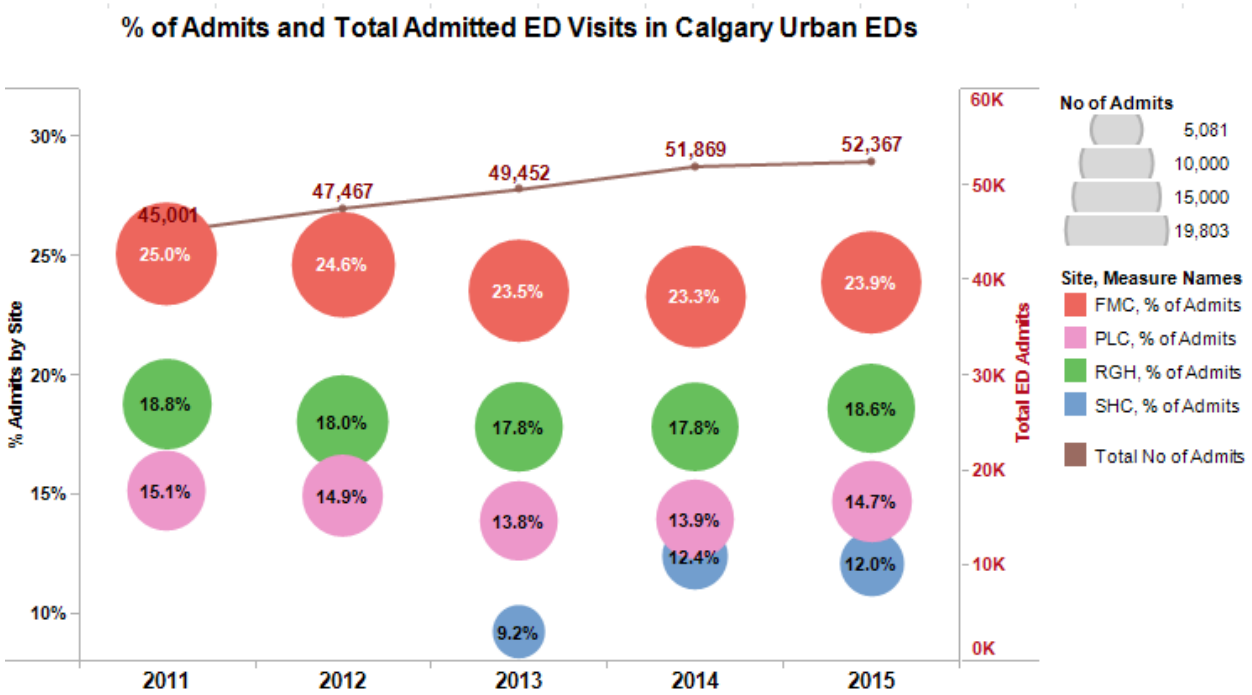
Median Decision to Admit Time Calgary Urban EDs (hrs)



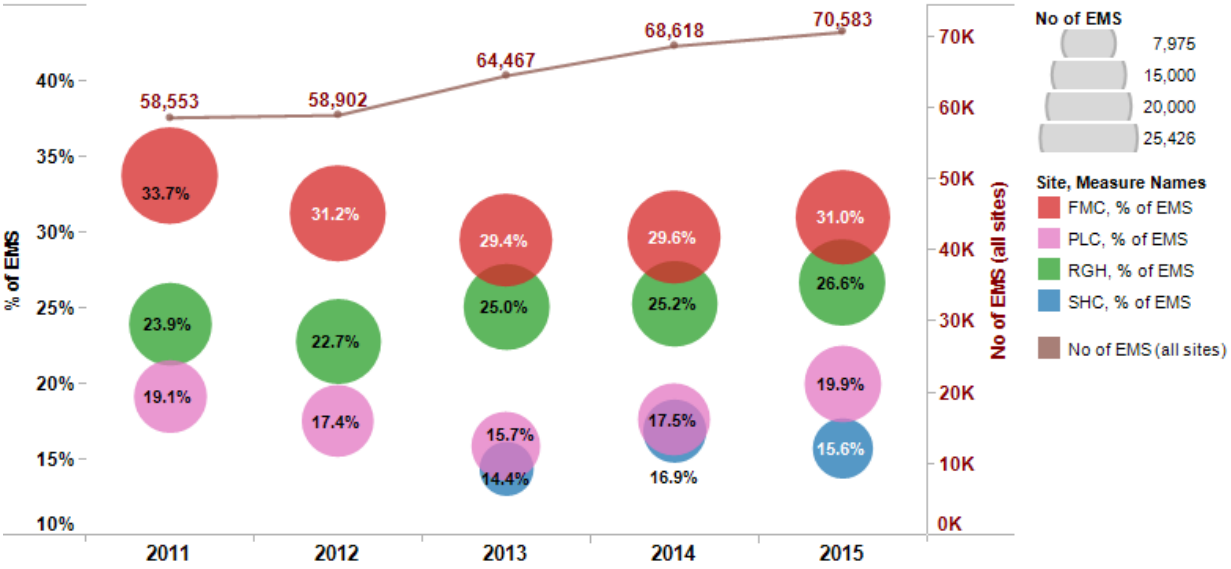

Median Triage to MD of CTAS2&3 ED Visits Calgary Urban EDs (hrs)
Median Triage to MD
Median Triage to MD (all sites)
Year of FIRST_CONTACT_DT
2011
2012
2013
2014
2015
2.0
1.8
1.6
1.4
1.2
1.0
1.70
1.68
1.68
1.57
1.50
1.58
1.57
1.48
1.43
1.47
1.45
1.45
1.38
1.37
1.38
1.28
1.22
1.15
SITE, Measure Names
FMC, Median Triage to MD
PLC, Median Triage to MD
RGH, Median Triage to MD
SHC, Median Triage to MD
Median Triage to MD (all sites)

ANNUAL VISITS TO EDS DATA

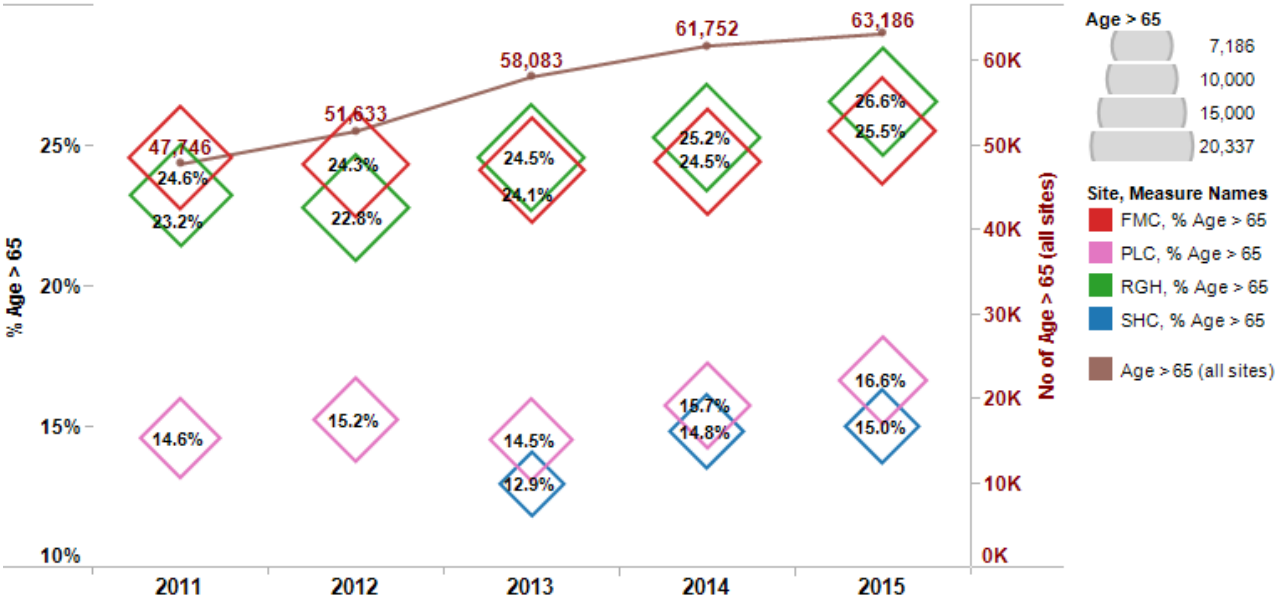




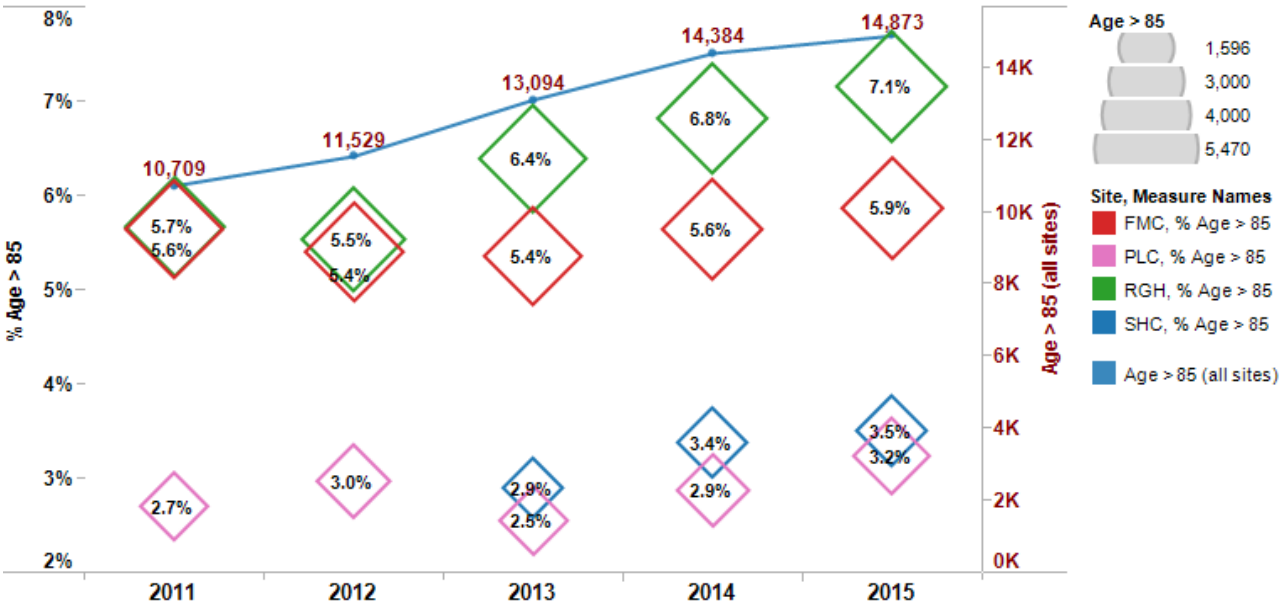
No and % of ED Visits Arrived by EMS Calgary Urban EDs



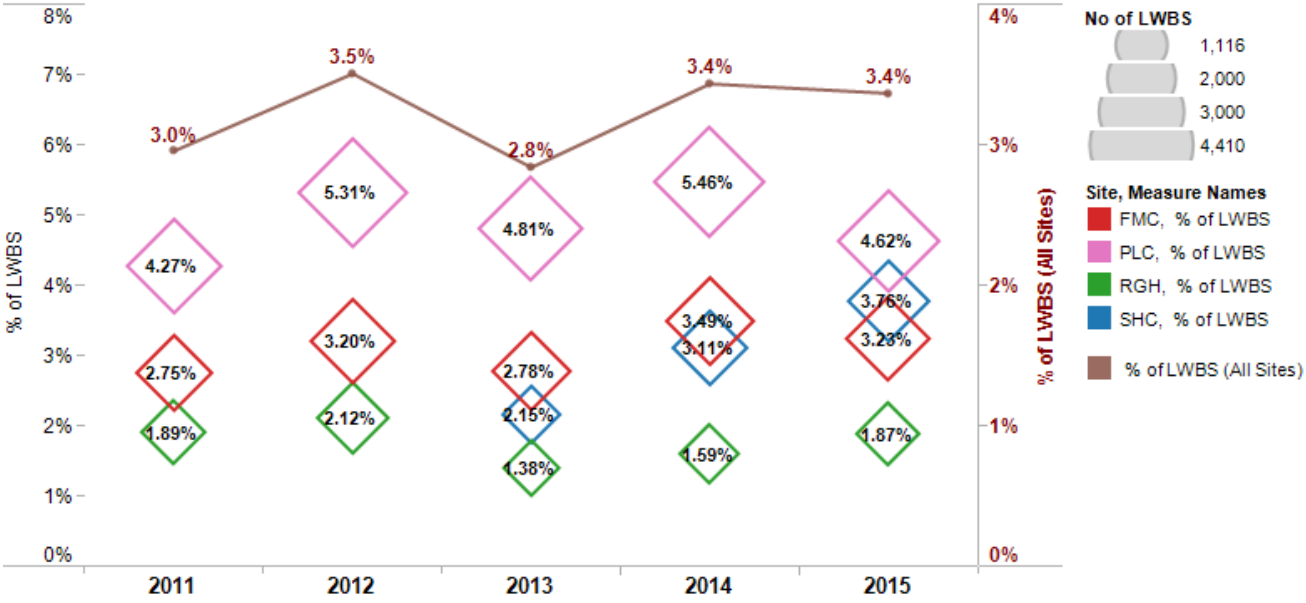
No and % of ED Visits aged over 65 Calgary Urban EDs



No and % of ED Visits aged over 85 Calgary Urban EDs



No and % of ED Visits LWBS at Calgary Urban EDs



Site Updates and Accomplishments

ROCKYVIEW GENERAL HOSPITAL

1) ***Engaging with community partners to support patients: the goal is to work with EMS, PCN's and other services to develop processes to support specific population, including seniors, and patients who use the EDs frequently in order to provide coordinated care across the zone.***

- Physicians continue to use the Community Paramedic program (CPP) as a discharge referral option for post discharge home follow up and treatment. CPP acts as a bridge between ED and home care/primary care services. The ED Pharmacist is assisting in discharging patients with CPP referrals for IV therapy/antibiotics etc.
- Increasing partnership/collaboration with Calgary West Central Primary Care Clinic (CWCPCN):
    - To refer appropriate non-urgent patients from triage to a primary care physician for care. This also provides an opportunity to educate patients on appropriate health care options.
    - To provide post discharge follow up appointments for unattached patients. Since April 2015, ED physicians have referred on average 13 patients per month. Unattached patients are seen at CWCPCN and attached to a PCN based on which geographical quadrant they live in. The ED Pharmacist is also working with ED physicians to refer unattached patients with complex medication histories for follow up at CWCPCN for medication review or management.
    - ED and CWCPCN continually communicate and meet to explore new ways to collaborate and increase linkages with ED and Primary Care.
- Over the past year, RGH ED has partnered with CWCPCN, RGH Diagnostic Imaging and RCA Diagnostics to arrange appropriate follow up for patients who are seen in ED and booked for next day ultrasound appointments. The pilot project began on October 14, 2015 and will conclude January 2016, upon which the hope is to spread the process and increase time slot availability at RCA and CWCPCN.
    - Throughout the pilot approximately 40 patients per month (half of all next day ultrasound patients) have been redirected to care at CWCPCN as opposed to returning to the ED.
    - A "what to expect" handout was developed to improve communication and increase patient understanding of the return for ultrasound process.

2) ***Enhancing clinical documentation accuracy to support safe, effective care for patients.***

- An Audit Team including a Manager, Educator and QI RN (and staff RN when available) completes weekly audits. Current topics include: Med Rec/BPMH, Falls, Domestic Violence and Allergies. Audits are structured to engage staff and provide real time feedback, education and tips to complete clinical documentation, in addition to measuring compliance. Audit data is posted on a bulletin board in ED.
- Allergies
    - Manually auditing allergies reviewed in SCM and application of red allergy band.
    - Allergy documentation reviewed in annual recerts and performance appraisals. Ongoing strategies are discussed at ED Improvement and Safety meetings.
- Falls
    - There is ongoing evaluation re: documentation of screening, prevention strategies, comfort rounds and purple fall risk band application on high risk patients.
    - Awaiting EAR changes (submitted early Fall 2015) that will include Falls Screening directly on the EAR and the hope is to improve documentation by having a dedicated screening section.

  - We continue to have an OT in the emergency department on weekdays who assesses patient mobility, safety and fall risk.
- Medication Reconciliation/BPMH
  - Awaiting EAR changes (submitted early Fall 2015) that will remove medication documentation from EAR which will support the separate Med Rec form being the single source of truth.
  - ED Clinical Pharmacist has been assisting with complex medication reconciliation, medication management, abnormal lab follow up, patient education, insurance approval forms and any questions staff have. Pharmacy is responsible for tracking workload and data for further evaluation and demonstration of need for pharmacy in ED. Pharmacy survey was completed in November and awaiting results.
- Fluids Ins and Outs and IV Documentation
  - Plan to be determined by ED leadership team. Also being discussed at the SEC Working Group to determine how this documentation could be better supported from an IT perspective.

3) ***AHS targets:***

Time to see an Emergency Physician

- EMS Hallway Process continues to manage patients waiting in EMS hallway for an available stretcher. Patients are seen by ED physician and orders initiated in the hallway as appropriate.
- Redistribution of MD work hours to increase MDs on shift during peak hours started September 2015. The REPAC MD Surge process continues to be used to assist with wait times.
- Intake Process Improvement – ongoing work to improve patient flow/throughput and aiming to limit bottlenecks to ensure physicians always have an available assessment space to assess incoming patients.
- With the addition of a Clinical Pharmacist in the ED, daily abnormal lab follow up has been reallocated to the pharmacist. While previously this was shared between the Nurse Clinician and ED Physician, this has freed up time for the ED physician to see patients as opposed to completing lab follow up.

Emergency Department Length of Stay for Admitted Patients

- Identification of constraints for inpatient flow for patients with cognitive impairments and use of Confusion Assessment Method (CAM) score screening in ED.
- Aggressive/ETOH/Mental Health patients – working with Psychiatric Assessment Team and Psychiatry to improve communication with ED staff, and improve flow of patients with mental health/addictions requiring Psychiatric Assessment Team service and Psychiatric admission. Worked with Psychiatry to complete a funding proposal for a project looking at improving sedation for agitated/violent amphetamine users who present to ED – awaiting approval end of December 2015/early January 2016.

Emergency Department Length of Stay for Discharged Patients

- Ongoing discharge teaching work with patients through the "Help us Help You" initiative. Admitting provides patients a handout with three sections 1) a place to document medications 2) health care options/health link information 3) discharge planning items (ie: encouraging patients to think about transportation plan, sick note, questions for the doctor etc.) that assist with discharge sequencing.

- Triage PCN referral process continues to identify patients that can be appropriately referred to the PCN clinic, thereby reducing demand on ED resources.
- Ongoing use of the ED Team Internal Surge Process to manage periods of high demand.
- Ongoing Intake process improvement work to improve the flow of patients through Intake with emphasis on communication, efficient ordering, timely order management and prompt placement into treatment spaces.
- Increasing use of RWR for patients that no longer require a stretcher location. Physicians will notify the RN and note in the MD comments if patients no longer require monitored bed spaces to facilitate movement of patients to an appropriate treatment space to free up main department beds.
- Working with RGH Lab department to improve communication with lab assistant and increase lab utilization in the ED. Trial began late October 2015 with noted improvements to communication and relationship building between ED staff and Lab. There are ongoing efforts to increase utilization of lab assistant to free up nursing time to complete nursing care/tasks in A Area.

4) Emergency Medical Services Offload Target – 90% of Patients offloaded in 90 minutes

- Daily 1400 huddle with EMS supervisor, ED Manager and Nurse Clinician, Housekeeping and Site Flow Coordinator to discuss capacity, challenges for EMS and ED, encourage EMS consolidation and timely bed cleans during peak times etc.
- Weekly phone meetings with EMS liaison/manager to discuss challenges, successes and updates.
- When treatment stretchers are available, staff are reminded to send the patient back to single patient treatment location prior to waiting for full ED registration and chart.
- Ensuring availability of wheelchairs and stretchers to increase efficiency for EMS crews.
- EMS liaison/manager will be attending Nurse Clinician meeting in early 2016 to provide short presentation and discuss issues/challenges.

Accomplishments – Rockyview General Hospital

Dr. Nancy Zuzic, MD
RGH Site Chief

RGH ED volume continues to be stable year to year with 77 146 patient visits in 2015. We continue to see high acuity patients, including a high volume of EMS patients. In 2015, RGH ED, along with the rest of the zone, continued to be challenged with lack of inpatient capacity. This has resulted in decreased patient care spaces in the ED due to the increased length of stay of emergency inpatients.

Due to this lack of stretcher space, higher acuity patients and larger volumes of patients are being sent to Intake, sometimes over 50% of our daily volume. During these times we continued to use the EMS Hallway Process so that incoming EMS patients could be assessed and hallway appropriate treatment started while they waited for an ED stretcher space.

We continue to see approximately 40% of our daily ED patient visits in Intake. The ED Flow Improvement Team continues to monitor Intake flow and ongoing improvements are implemented as required. RGH ED continues to be recognized as a leader in Intake Process and EDs from across the province continue to tour to learn from our successes.

Highlights:

- **Community Paramedic Program** – bridges ED to community/home care services, thereby potentially avoiding acute care admission
- **Three streams of referrals to the Calgary West Central Primary Care Center (CWCPCN)**
    1) **Family Practice Sensitive Condition** – referral completed prior to physician assessment for patients who present with lower acuity complaints that are appropriate for assessment/management at a primary care clinic. An average of 9 patients are referred monthly.
    2) **Discharge Follow Up** – unattached patients are referred by the ED physician to receive follow up by a primary care physician. CWCPCN will provide follow up for these patients and attach them to a family physician. On average 13 patients per month are referred for post discharge follow up at the PCN.
    3) **Community Ultrasound Follow Up** – through collaboration with RGH ED, RGH Diagnostic Imaging, RCA Diagnostics and CWCPCN, patients receiving next day community ultrasounds are provided an appointment at CWCPCN for follow up, as opposed to returning to ED for their results. This has resulted in approximately a **50% reduction in the number of patients returning to the ED post ultrasound.** Pilot project began October 14, 2015 and will complete January 15, 2016; after pilot evaluation is complete there is hope to expand the process to benefit a larger number of patients.
- **EMS 90 x 90 Initiatives** – we continue to build and improve relationships with our EMS partners and have gained site support when ED and EMS are overloaded.
- **EMS Hallway Process** –continued this year due to high number of admitted patients in ED stretcher spaces. Hallway appropriate care is initiated as soon as possible after physician assessment and in some cases patients are able to be discharged directly from this location. With this process we have seen an increase in support and flexibility by all multidisciplinary team members to facilitate caring for these patients in a non-traditional manner at this time of capacity challenges.
- **ED-Lab Process** – we continue to work with Lab services to improve process and efficiency to ensure right person/right task/right time and timely lab draws.
- **Addition of a Clinical Pharmacist to ED team in June 2015** – some examples of the benefits of having a dedicated pharmacist include: medication reviews for complex patients, improved patient teaching, arranging follow up in the community and assistance with completing health insurance forms. The clinical pharmacist has become central to the process of managing abnormal lab results and RGH ED recently completed a pilot project in which abnormal lab values are managed electronically in SCM.
- **Collaboration with DI department** –RGH ED continues to have an excellent working relationship with the DI department. Department site leads and managers meet monthly to discuss issues/ improve flow. Ultrasound is now available 8 am to 11 am 7 days per week. There was a joint education/ collaboration day held in June for DI and ED staff members which was well-received and helped overcome communication barriers.
- In May 2015, we **successfully met all ED Accreditation requirements** and implemented a new Falls Prevention Strategy and Medication Reconciliation process.

Nursing Manpower/Staffing:

RN staffing continues to be based on demand capacity matching. High numbers of EIPs challenge this staffing model and augmentation of staff is often required to meet these additional demands. We streamlined the process for staff replacement using smart phone technology to reduce the workload on Charge Nurse/Clinician and clerical staff. We continue to collaborate with the RGH Cast Clinic to meet both of our ROT staffing requirements.

Physician Manpower/Staffing:
Physician manpower remains stable at the RGH ED with 55 physicians scheduled to work at the site and approximately 90 physicians in total with privileges to work shifts at the RGH ED. Approximately half of the ED shifts begin their first 2 hours in the Intake area. Start times of some shifts were adjusted in order to match patient demand with physician start/ end times. The Intake area continues to have a dedicated physician from 9am to 11pm. There is a dedicated minor treatment physician from 10 am to midnight daily (two 7-hour shifts). Shift times and need for additional shifts continue to be examined on a regular basis. The zone surge protocol is initiated at times when an additional physician is needed due to patient volume.
The RGH ED continues to work with the RGH site as a whole and with the other ED sites at a zone level to provide the best patient care possible and to address the current capacity issues throughout the zone.

FOOTHILLS MEDICAL CENTRE

Engaging with community partners to support patients: the goal is to work with EMS, PCN's and other services to develop processes to support specific population, including seniors, and patients who use the EDs frequently in order to provide coordinated care across the zone.

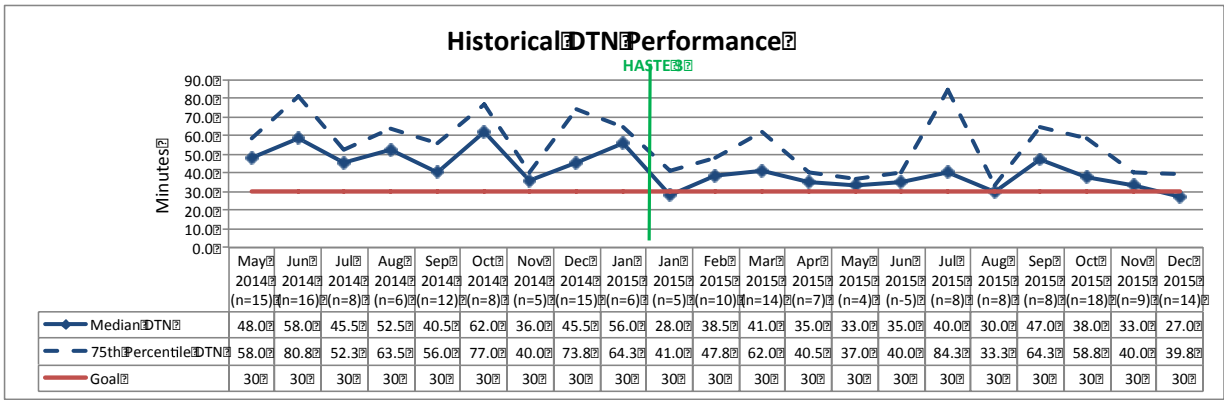
- Foothills Medical Centre Emergency Department has teamed up with the Calgary Case Management Group to focus on providing continuity of care to Familiar Faces that present to the emergency department. This team has representation from EMS, Social Work, The Drop-In Centre, The DOAP Team, AHS. Currently the focus is to align patients with a family physician. The CUPS organization plays a key role with this initiative.
- CUPS referral project- referral project with CUPS nurses to ensure that marginalized individuals that have a health crisis are followed in the community by appropriate resources.
- Primary Care Network referral project: Funding for liaison nurse has ended, ED management continues to work with PCN and referral process- working on additional funding to help spread the work of PCN to other departments (average referral 3-4/day)

Accreditation focused projects to support ROP requirements.

- Falls Prevention screening and identification
- Medication Management- including medication reconciliation and med room improvements and standardization
- Transfer of Information: working on a standardized tool for information transfer between caregivers (EMS to ED, ED- Inpt units, MD-MD, RN-RN etc)
- Infusion Pumps: yearly education and new pumps implemented November 5, 2015
- Two Client identifiers before providing any service or procedure to a patient: Audits indicate poor compliance

Enhancing processes to support safe, effective care for patients.

- Trauma activation call out has been changed to ensure early activation on standardized criteria
- Quality improvements process to create efficiencies in the care of level one trauma patients
- Continued work with HASTE III- improving door to needle time for STAT! Stroke patients.



	May 2014 (n=15)	Jun 2014 (n=16)	Jul 2014 (n=8)	Aug 2014 (n=6)	Sep 2014 (n=12)	Oct 2014 (n=8)	Nov 2014 (n=5)	Dec 2014 (n=15)	Jan 2015 (n=6)	Jan 2015 (n=5)	Feb 2015 (n=10)	Mar 2015 (n=14)	Apr 2015 (n=7)	May 2015 (n=4)	Jun 2015 (n-5)	Jul 2015 (n=8)	Aug 2015 (n=8)	Sep 2015 (n=8)	Oct 2015 (n=18)	Nov 2015 (n=9)	Dec 2015 (n=14)
Median DTN	48.0	58.0	45.5	52.5	40.5	62.0	36.0	45.5	56.0	28.0	38.5	41.0	35.0	33.0	35.0	40.0	30.0	47.0	38.0	33.0	27.0
75th Percentile DTN	58.0	80.8	52.3	63.5	56.0	77.0	40.0	73.8	64.3	41.0	47.8	62.0	40.5	37.0	40.0	84.3	33.3	64.3	58.8	40.0	39.8
Goal	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

- Improved Triage efficiencies to improve timely access of all patients to the emergency department.
- Improvements to ensure that all patients will be assessed by an emergency physician even in non-conventional spaces.
- 90x90- Multi stakeholder meetings to improve flow and transfer of care times for EMS patients.
- Transfer coordinator position developed to help coordinate efficient transfer of all patients out of the department.

AHS targets:

Time to see an Emergency Physician:

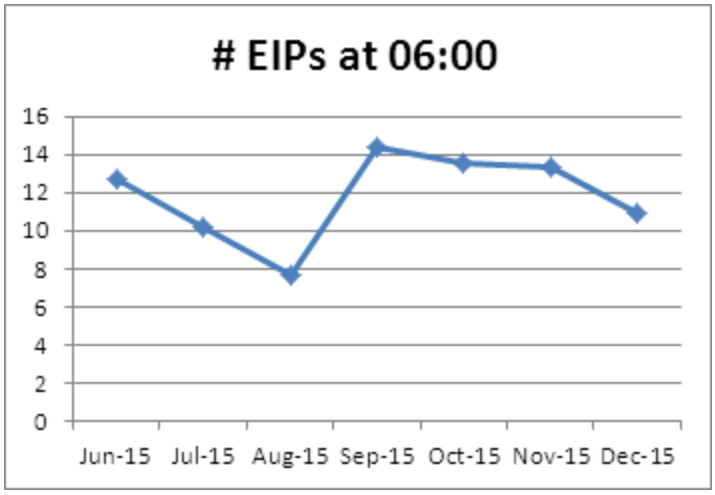
- Ongoing challenges meeting established triage to MD benchmarks, largely due to high occupancy rates of ED treatment spaces by EIPs
- Additional 5 hrs of ED MD coverage added during peak periods (19-24)
- TP 3 (behind the hoarding) is ready to see patients on May 25th at which time we will decommission the existing 20's and EIP area. ED management, Site Chief and support staff will also move. Prior to moving in we will have the opportunity to do Simulation and review process in the new space.
- Next phase of renovations is scheduled to be completed fall 2017, which will afford us an additional 30 spaces.
- Work is ongoing in the ITC meetings in regards to improvement of Intake and MET, and how we can utilize that space in a more productive manner.

Dashboard:

1. **Patient acuity 2015 (% of total volume)**
    - CTAS 1 = 2736 (3.5%)
    - CTAS 2 = 28650 (36.4%)
    - CTAS 3 = 31545 (40.0%)
    - CTAS 4 = 12378 (15.7%)
    - CTAS 5 = 3495 (4.4%)
    - Total Admissions = 19949 (25.3%)
    - total patient volume = 78804

2. **Number of emergency-in-patients (EIPs)**

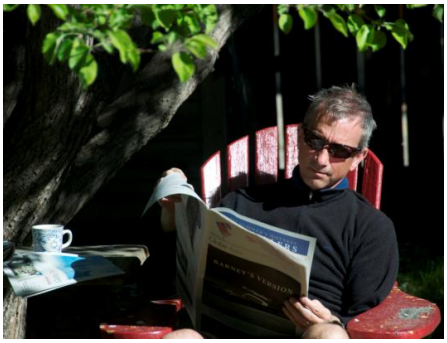
    - This graph depicts the average number of EIP's at 06:00 over the past number of months



3. **Several different targets (90x90, times for admitted/discharged patients, etc.)**
    - 90x90 (download EMS within 90minutes, 90% of the time) = 71% of the time we downloaded EMS within 90min of their arrival
    - Times for admitted patients (target is 8hrs, 90% of time) = 50% of admitted patients leave department within 8hrs
    - Times for discharged patients (target is 4hrs, 90% of time) = 50% of discharged patients leave department within 4hrs

4. **Staffing**
    - Sick time rate = 4.92%
        - This has improved slightly from previous months
        - Target is <3% (as set by AHS)
    - Overtime rate = 4.06%
        - This has improved dramatically since implementation of optimized RN rotations.
        - Target is <2.8% (as set by AHS)

Peter Lougheed Centre



Dr. Neil Collins, MD
PLC Site Chief

The Peter Lougheed Emergency Department is a 34 bed ED in the Northeast quadrant of the city. It is the only Calgary ED that is easily accessible by public transportation and the PLC is the hospital of choice for the inner-city population. It is heavily used by the densely populated communities around it.

The ED sees a mix of adult and pediatric patients with a large number of recently arrived immigrants, inner city dwellers, and patients who do not speak English.

There are over 81000 pt visits per year, making it the busiest ED in the city. It is staffed on average by 14 MD's, 50 RN's, 3 Orthopedic Technologists, 6 Unit clerks, 7 Nursing Attendants, 2 Social Workers and 3 Transition Nurses per day. There is a pool of 64 ED MD's and 150 RN's from which to draw.

Significant Accomplishments 2015:

1. **90X90 Initiative**

The PLC has improved its compliance with this provincial initiative moving from 69% of ambulances downloaded in **60** minutes in 2014 to 82% in December of 2015. We are very close to achieving the **90** minutes goal for most EMS downloads. Importantly, this was achieved despite a 20% increase in the number of ambulances arriving at our ED in the past year.

2. **"Sickest Patients First" Initiative**

ED overcrowding necessitated the construction of a six bed area in the waiting room that is used to rapidly assess arriving patients and initiate investigations and treatment. Traditionally only low acuity patients were seen here. In February 2015 we changed our policy to allow CTAS 2 patients to be seen here. This was a change in culture for the ED staff. It required a sensitive communication roll out to allow people to adjust to the idea that sicker patients could be seen in this non-traditional care space. This initiative and the addition of another 1900 to 0100 ED MD shift resulted in the following year over year improvements:

-Mean Triage to bed-space time for CTAS 2 reduced from 63 min to 46 min
-Mean Bed-space to MD signup for CTAS 2 reduced from 64 min to 45 min

3. **Pediatric Education Initiative**

The PLC has utilized the expertise of several of our adult MD's who are fellowship trained in Pediatric Emergency Medicine to help standardize our protocols for the investigation and treatment of common pediatric problems with those of the Alberta Children's Hospital.

4. **ED Pharmacist Pilot Project**

A dedicated ED Pharmacist at the PLC has been an extremely valuable addition to our team. Jana Rieger has been working in the ED during daytime hours, and has helped with medication reconciliation, patient education, and patient callbacks . She has also provided real time expert advice with polypharmacy morbidity and formulation of complex medication treatment plans. Most notably in the area of oral anticoagulation for venous thromboembolic disease.

Our biggest challenge is providing care for 240 patients a day in a 34 bed Emergency Department that is often holding 20 or more admitted patients. We continue to increase ED manpower by adjusting our daily schedule of ED MD shifts, as well as adding "surge coverage" for periods of unexpected increased demand. Hospital "overcapacity protocols" have aided in reducing ED congestion.

We are proud of the care that we give to a culturally diverse group of patients under challenging conditions. We are carefully monitoring our progress towards Provincial wait time targets, and are striving to reduce the number of patients who "leave without being seen".

We look forward to the time when we can move into the existing shelled out space designated for the new ED when the hospital was renovated 10 years ago. The potential to create an "ED for the 21st Century" in this space is exciting. We look forward to providing a service to our patients from an ED that is designed and supported to a level that is commensurate with the importance of the key role it provides to the citizens of Southern Alberta.

SOUTH HEALTH CAMPUS

1) ***Engaging with community partners to support patients: the goal is to work with EMS, PCN's and other services to develop processes to support specific population, including seniors, and patients who use the EDs frequently in order to provide coordinated care across the zone.***

- Continuing to work with the South Calgary PCN to support follow up/referrals from SHC ED.
- Electronic netcare discharge summaries of emergency visits are being encouraged.
- Academic Family Medicine group will see some patients that present to the ED if they meet specific criteria
- Attempt to meet EMS 90 x 90 benchmark – challenging with lack of ED capacity because of hospital overflow into ED

2) ***Enhancing clinical documentation accuracy to support safe, effective care for patients.***

- Electronic netcare discharge summaries of emergency visits are being encouraged.
- Enhanced SEC systems for more accurate referrals to certain clinics

3) ***AHS targets: (initiatives listed for all below)***

Time to see an Emergency Physician
Emergency Department Length of Stay for Admitted Patients (8.5 hours-median
Emergency Department Length of Stay for Discharged Patients (3.0 hours-median)

- SHC ED re-organized CIA/Intake – improvements to all "Triage to MD" measures have been consistently maintained.
- Looking at modifications to Physician Schedule to better address service gaps.
- Continue to have increased MD shifts on Monday and Tuesday mornings to help with increased patient volumes inherent to the start of the week.
- Appointed a new MD Flow Leader Dr. Arthur Tse.
- Flow Committee Meeting continues to meet regularly.

- Triage Committee continues to meet regularly.
- Continue to refine Early Gestational Assessment to expand criteria safely to help ensure the best care for our Early Gestation patients
- New patient care space in waiting room being developed and hopefully will open in March 2016, this will help offset the beds that are blocked by patients admitted into the hospital but wait in the ED for up to 60 hours.
- Thanks to frontline staffs efforts to adapt and improvise we continue to see about 200 patients/day (25% paediatrics) despite diminishing patient spaces as hospital overflow ties up emergency beds

Clinical Informatics

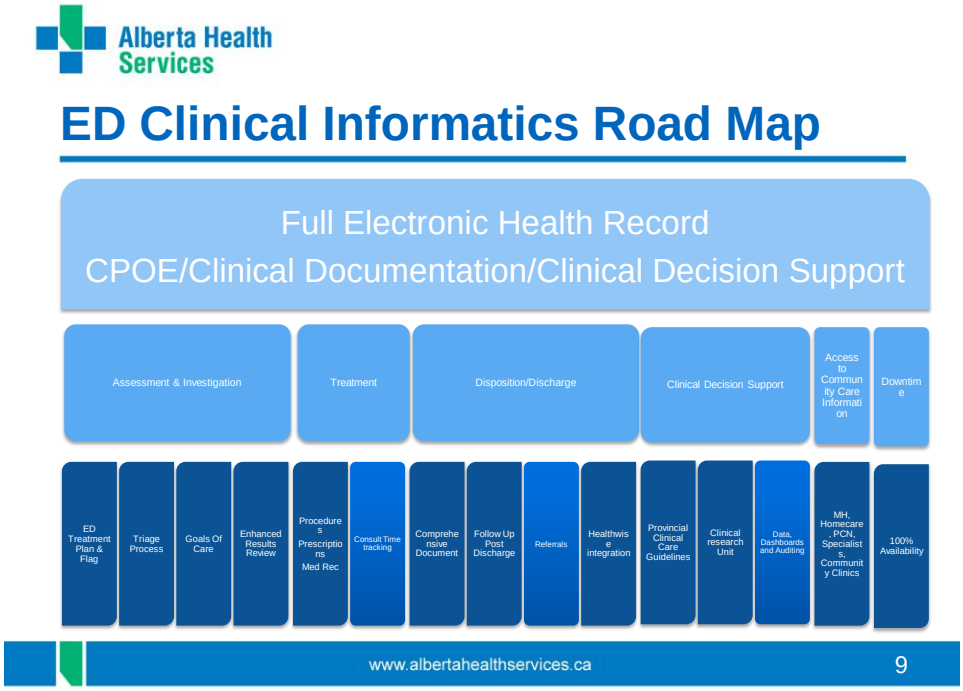
Dr. Tom Rich, MD
Physician Lead
Clinical Informatics

Significant Accomplishment for 2015:

1. Establishment of an ED Clinical Informatics Committee

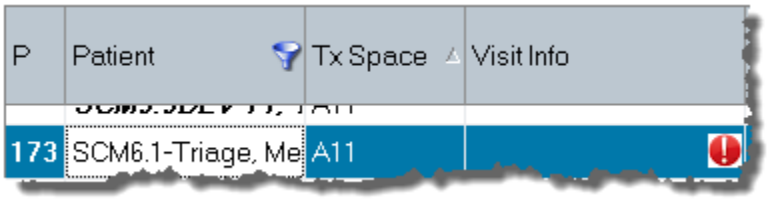
   - **Goal:** Create a process to evaluate, prioritize, and coordinate ED specific IT requests and ensure alignment with Calgary Zone and Provincial IT Priorities

   - **Result:** ED IT Roadmap with short term work, mid-term goals, and long term visions.



2. Introduction of an ED Sepsis Alert that is triggered automatically at Triage based on patient meeting 2 or more SIRS criteria and having a suspected source of infection

    - **Goal:** reduce time to antibiotics in patients meeting criteria for severe sepsis



- **Preliminary results:**

Calgary Zone ED Sepsis Alert Analysis

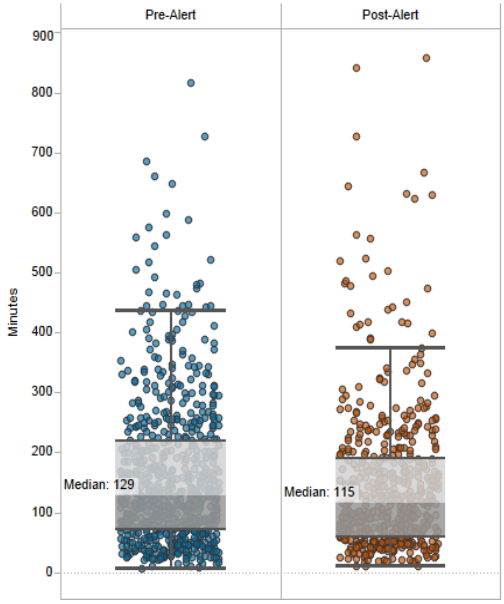
Measure Oveview

	Pre-Alert	Post-Alert
Number of Visits	119,281	94,906
Suspected Sepsis	718	1,813
Severe Sepsis	685	526
Median Triage-First Abx Order	129	115
Median Triage-MD Assessment Minutes	55	49
Median Triage-Treatment Loc Minutes	19	16
Suspected not Severe (False Positive)		88%
Severe not Suspected (False Negative)		59%
EDRN Sepsis Protocol Usage		32%
Median Triage-EDRN Sepsis Protocol		43

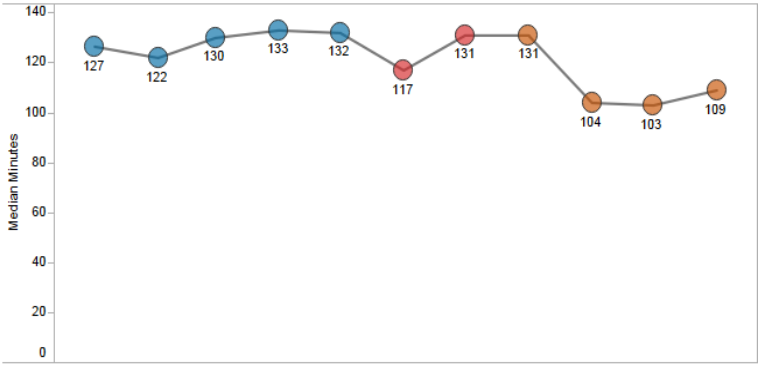
Group
Pre-Alert
Interim
Post-Alert

Filters
Pre-Alert Date Range
Start 01/01/2015 End 01/06/2015
Post Alert Date Range
Start 01/08/2015 End 01/12/2015
Facility
All
Detail Measure to Show
Triage to Abx Minutes

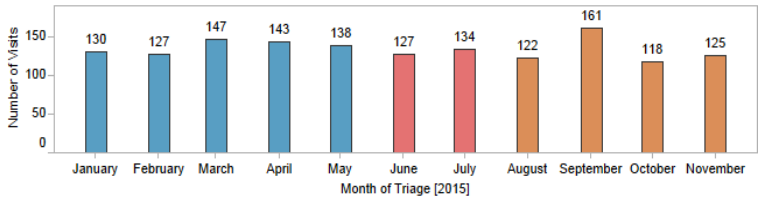
Triage to Abx Minutes by Visit (Severe Sepsis Visits)



Median Triage to Abx Minutes by Month (Severe Sepsis Visits)



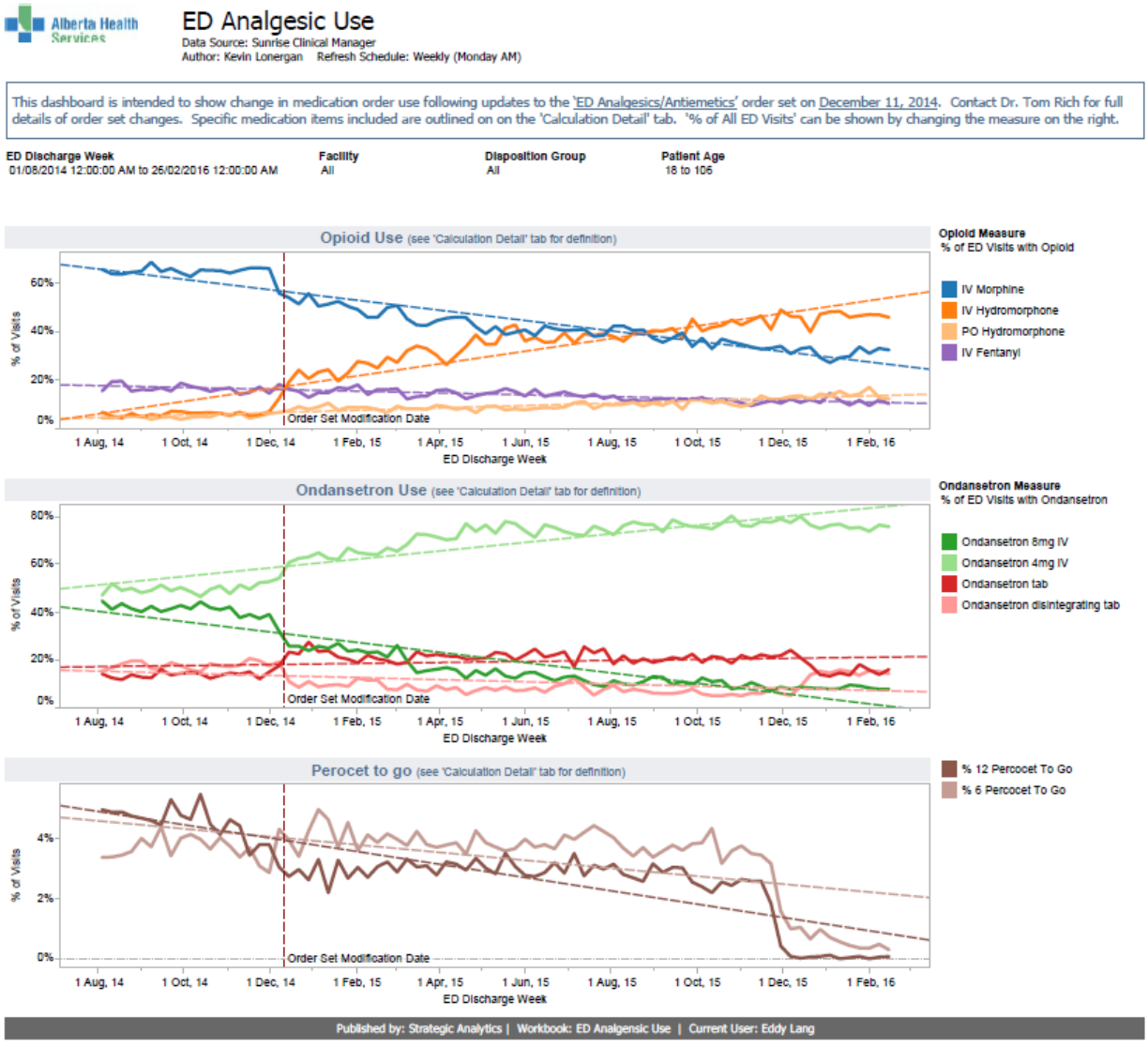
# of Severe Sepsis Visits by Month



3. Revisions of ED Analgesic and Antiemetic order set

    - **Goal:** Increase the use of hydromophone over morphine, and reduce the dose of IV Ondansetron being used

    - **Results:**



4. Increased the number of individual Clinical Physician Performance Indicators

    - **Goal:** to identify and reduce significant variation in practice

Added Categories:

i. Time to Antibiotic in Severe Sepsis Patients

Alberta Health Services

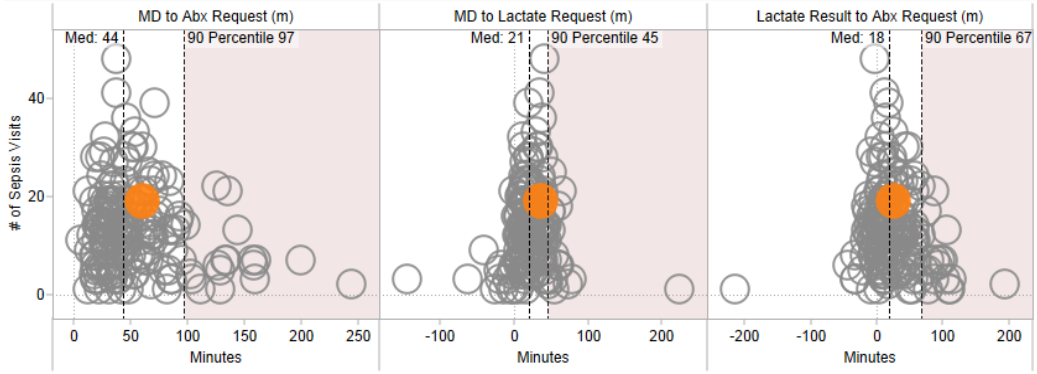
Calgary Zone ED Physician Performance Report
For Physician:
Source: SEC (Sunrise Emergency Care)/SCM (Sunrise Clinical Manager)

Mearsure: Median LOS from MD to Antibiotic(Abx) or Lactate

Measure Details
Sepsis Patients were defined by ICD-10 CA code based on ED Primary Diagnosis (See the Note bellow)
Median MD to Initial Antiboitics Request time: Median minutes between MD Sign-up on the SEC facility board and the first Antibiotic order request time.
Median MD to Lactate Request time: Median minutes between MD Sign-up and inital lactate requested time (negative if requested before MD signup).
Median Lactate Result to Antibiotics Request time: Median minutes between initial lactate result and antibiotics order request time. This value will be negative if an antibiotic was requested prior to the lactate result.

Date Start: March 02, 2014
Date End: August 31, 2015
Color Legend: You, Others

Median LOS from MD to Antibiotics or Lactate



Sepsis Visit Detail

RHRN	Encounter	Visit Date	Site	Diagnosis Description	MD to Abx Request (m)	MD to Lactate Request (m)	Lactate Result to Abx Request (m)
1000198273	100041363139	6/7/2015	RGH	COPD, PNEUMONIA	60	2	48
1000281558	100040392622	10/18/2014	RGH	BACTERIAL PNEUMONIA, HYPOXIA, ?AECOPD	10	93	-87
1002655999	100041392412	6/14/2015	RGH	RULE OUT INTRA-ABDOMINAL SEPSIS/METASTATI..	23	48	-29
1004197792	100039726786	5/9/2014	RGH	UROSEPSIS	31	19	9
1004618250	100040161194	8/23/2014	PLC	FOURNIER'S GANGRENE	129	54	72
1004761100	100040872599	2/11/2015	FMC	SEPSIS NYD	175	128	44
1005516545	100039915788	6/23/2014	RGH	DELERIUM DEMENTIA, AGITATION, URINARY TRA..	97	59	-11,715
1005986516	100040617128	12/10/2014	RGH	UROSEPSIS	54	37	14
1005989569	100041001765	3/13/2015	PLC	PNEUMONIA, IMMUNOCOMPROMISED	110	36	71
1006509523	100040870506	2/11/2015	FMC	DELERIUM / ASCENDING CHOLANGITIS	298	53	240
1007637414	100041032943	3/20/2015	RGH	SEPSIS NYD	131	63	64
1014185902	100040881623	2/13/2015	RGH	COPD ? PNEUMONIA	8	0	4

Inclusion Criteria:
Sepsis visits have been identified using the following criteria:
1.) Patient age >= 18 years
2.) First lactate result greater than or equal to 2 mmol/L
3.) First lactate result during ED encounter
4.) Infection-related most responsible ED diagnosis (list provided by PLP study)
5.) ED requested antibiotics order (either use of an 'ED' order set or requested by an SCM user with an occupation of 'MD-Emergency Medicine' or requested by a resident outside an order set).
Note that because this inclusion criteria depends on an abstracted ED diagnosis from Health Record, there may be a delay in sepsis visits being identified.

ii. Disposition of Patients with Renal Colic

Alberta Health Services

Calgary Zone ED Physician Performance Report
For Physician:
Source: SEC (Sunrise Emergency Care)/SCM (Sunrise Clinical Manager)

Note: Testing Version ONLY
Although this is real production data, it is in the process of validating and could be inaccurate. Please Contact Dongmei Wang for any Concerns or Questions.

Mearsure: Renal Colic Patients Management

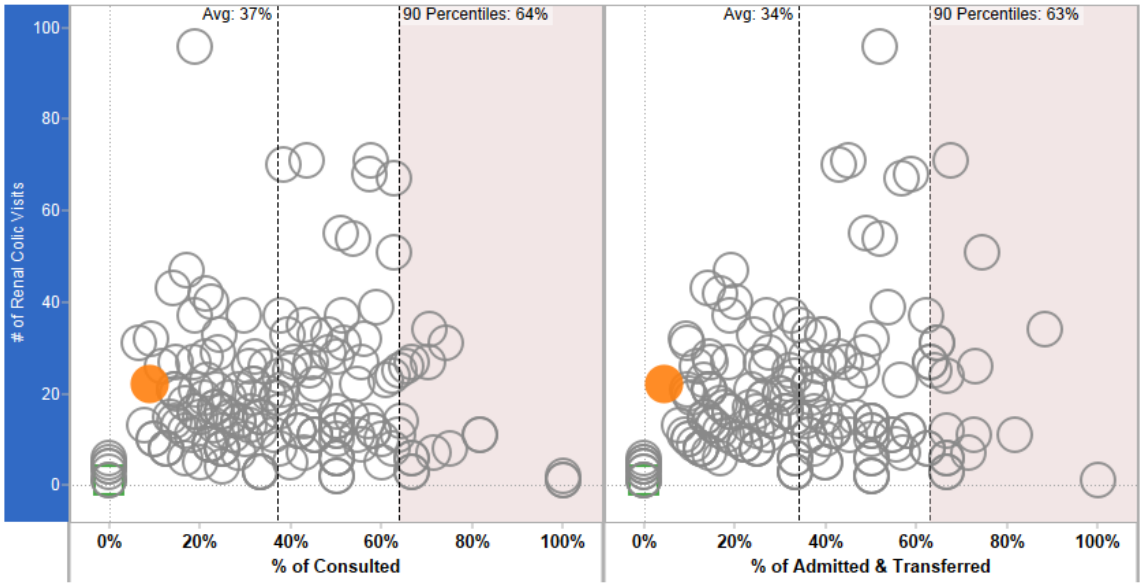
Measure Details
Renal Colic Patients were defined by ICD-10 CA code based on ED Primary Diagnosis ('N21%', 'N22%', 'N23%' & 'N132%')
% of Consulted: % of First Seen Renal Colic Patients with consultation recorded.
% of Admitted/Transferred: % of First Seen Renal Colic Patients were admitted or transferred to other acute sites.
1 or more DI: % of First Seen Renal Colic patients with at least one of the DI orderred.
% of IP LOS < 24 hrs:% of Admitted Renal Colic patients with IP LOS < 24 hours.

Date Start: March 02, 2014
Date End: August 31, 2015
Colour Legend: You, Others

Renal Colic Visit Measures

	You	Others
# of Visits	22	3,260
% of Consulted	9.1%	38.4%
% of Admit/Transfer	4.5%	37.8%
1 or more CT	72.7%	55.3%
1 or more GR	0.0%	12.1%
1 or more US	4.5%	15.7%
1 or more DI	77.3%	71.9%
% of IP LOS < 24 Hrs	4.5%	24.1%

Percentage (%) of Renal Colic Visits Consulted and Admitted/Transferred



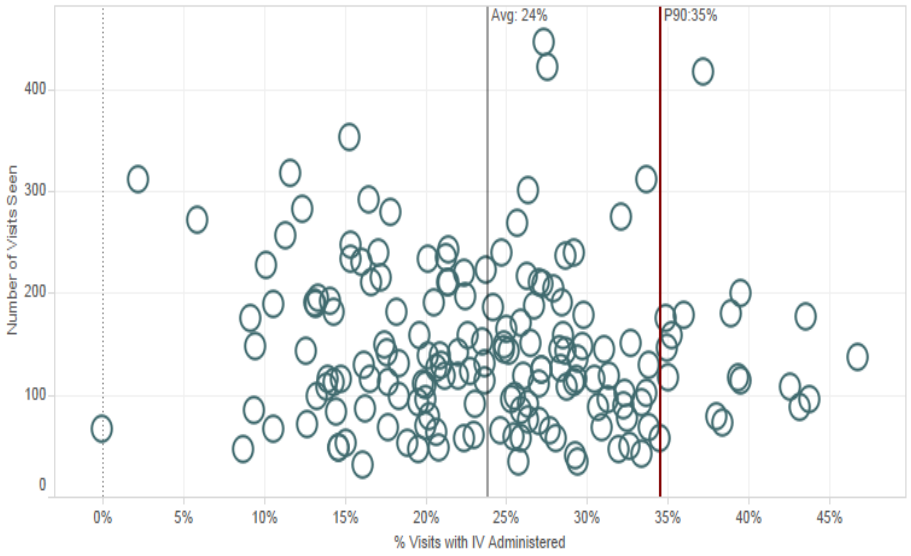
iii. IV Therapy use in Low Acuity Patients

ED IV Therapy Use Variation by ED Physicians

Comparison between IV Used vs Non-IV used

	IV	Non IV	Grand Total
Number of Visits	8,477	16,334	24,811
% of Total Number of Visits ..	34.17%	65.83%	100.00%
% CTAS 3	84.99%	80.26%	82.63%
Mean of Pts Age	39.5	36.7	37.7
SD of Pts Age	16.4	18.4	17.8
Median Pts Age	35.4	33.5	34.2
Number of ED Physicians	181	187	187
% Female	65.51%	63.77%	64.64%
% Post3Visit	8.98%	6.83%	7.57%
% Post3Admit	2.23%	0.89%	1.35%
% Post7Visit	12.91%	9.50%	10.66%
% Post7Admit	3.01%	1.27%	1.86%
Avg. ED LOS	6.28	4.20	4.92
S.D. of LOS	3.10	2.22	2.74
Median ED LOS	5.63	3.83	4.40

ED Physician Practice Variability



Day of First Contact
1/1/2014 12:00:00 AM to 12/3/2015 11:59:59..

Select CTAS Level (s):
- [x] 3
- [x] 4

INIT_TREAT_LOC_GRP
- [x] Intake
- [ ] Main
- [ ] MET

Select Single or Multiple Sites:
- [ ] Alberta Children's Hospital
- [x] Foothills Medical Centre
- [x] Peter Lougheed Centre
- [x] Rockyview General Hospital
- [x] South Health Campus

Select Min # of Visits by MD:
From 10

Select MD Name:
All

5. Establishment of an SCM electronic automated method of tracking positive microbiology results on ED patients discharged from the ED. Current process is paper/fax/manual based and has lead to several Patient Safety reports and missed and delayed response to positive results with adverse outcomes.

    - **Goal:** create an IT assisted system that is more efficient, more rapid, reduces misses, better documentation, and is standardized across all sides

    - **Progress:** Pilot system has been developed and tested at RGH with excellent results. A patient list of all positive results on ED patients discharge from the ED is automatically created and managed in SCM. All documentation of followup is also made in SCM.

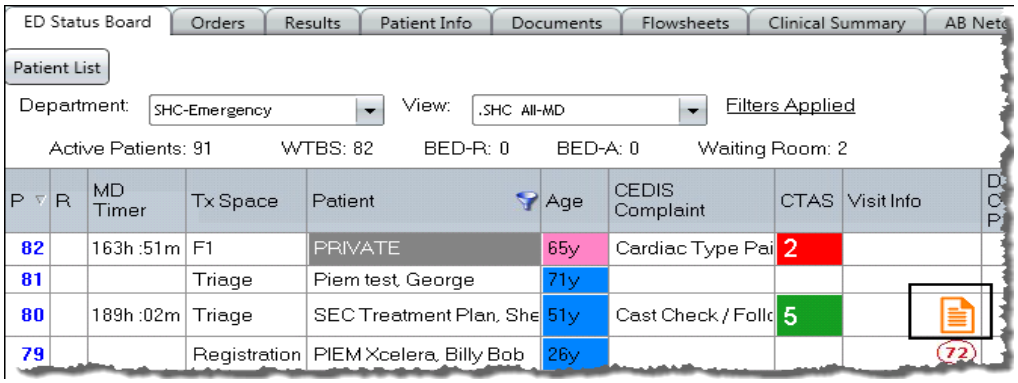
    - **Next Steps:** Based on end user feedback, minor revisions are being made to the list and process. Currently planning a roll out strategy to all ED sites.

6. Establishment of ED Treatment Plans that are patient specific and automatically trigger when a patient registers. These treatment plans direct ED physicians to specific treatment requirements of patients that may have a rare disorder, or a specific complex care plan.

    - **Goal:** standardize and improve patient care of complex or patients with rare disorders

    - **Progress:** Have instituted Care Plans for Adult and Pediatrics Hematology Patients

    - **Next Steps:** Work with EMS on establishing ED treatment plans for complex high frequency ED patients



7. Continued work with ESCN (Emergency Strategic Clinical Network) on Provincial Clinical Knowledge Topics

    - **Goal:** standardize provincial care of patients based on Best Practice
    - **Progress:** Clinical reviews and order sets revisions have been started on the following clinical topics

    ii. Atrial Fibrillation
    iii. COPD
    iv. GI Bleed

8. Using the Choosing Wisely Campaign as guidance, work on reducing unnecessary testing in the ED

    - Have started the review process of all ED order sets to remove unnecessary PTT/INR ordering

Priorities for 2016:

1. Roll out the SCM Abnormal Microbiology Follow-up Process to all ED sites
    a. Currently establishing a rollout schedule with each site and hope to have fully implemented by end of April 2016.

2. Develop an Abnormal DI Report Process that builds off the Abnormal Microbiology Process for the identification and timely follow-up, and documentation of follow-up, of abnormal DI reports.]

3. Continue work on ED Treatment Plans
    a. Currently working with EMS on high volume ED patients to establish comprehensive and multi-disciplinary team approach to patients in hopes of improving patient care, and reducing the frequency of ED visits.
    b. Working with other partners on introducing more ED Treatment Plans into SCM

4. Development of a comprehensive Triage Infectious Disease screening tool and appropriate isolation requirements for all patients presenting to the ED

5. Continued work with ESCN (Emergency Strategic Clinic Network) on standardization of patient care using Order Set Content and electronic Clinical Decision Support, focusing on Provincial established priorities

6. Continued work with Choosing Wisely Campaign to reduce unnecessary testing and treatments in the ED focusing on PTT/INR

7. Continued enhancement of a comprehensive discharge process

CCFP-EM Program

Stacey Dickinson
Education Program Coordinator

The University of Calgary CCFP-EM program continues to be a top program in the country. Notable transitions this year included the departure of Drs. Margriet Gredanius and Todd Peterson after successful terms as Program Directors. Dr. Aaron Johnston has now taken on the role of CCFP-EM Program Director following a transition period. This year we received 132 applications to the residency program, interviewed 24 applicants and successfully filled 8 spots. We strive to take applicants coming directly from residency as well as return from practice physicians. Our interview process this year incorporated both a traditional interview format as well as a multiple mini interview (MMI) format with the goal of continuing to develop a robust and fair process for candidate selection.

Our strong academic tradition continues with EKG, Tintinalli rounds and ultrasound training embedded in the full day academic teaching. The monthly HPS (Human patient simulation) exposes our residents to disease processes they may not encounter during their training and fine tune crisis resource management skills. We continue to work to improve the CCFP-EM program and this year have focused on enhancing our relationship with our rural and regional training sites in Banff, Red Deer and Lethbridge. We have also added an additional site for the upcoming year in Medicine Hat. Finally, a few highlights of the year include the resident retreat and year-end barbeque. We are very fortunate to have a large group of very dedicated teachers and educators who go above and beyond to train our residents.

FRCP - Emergency Medicine Residency Program

The FRCP program enjoyed another successful year. Dr Sarah McPherson took over the role of program Director and was joined by Dr Marc Francis in the role of Assistant Program Director. Stacey Dickinson, Judy MacKay and Tris Malasani provide much appreciate administrative support to the team. There are currently 22 residents enrolled in the program. In the 2015 CaRMS match we recruited four candidates from varied backgrounds. They come from UBC, UofC and two from UWO. They have been a great addition to the resident team. The three senior residents who completed the program in 2015 were all successful at the national exams and are now department members. They have brought expertise in Ultrasound, Sports Medicine and Pediatric Emergency Medicine to the department.

Highlights of the year included a successful and full accreditation from the Royal College, our joint Annual UofC/UofA residents' retreat, and our annual longitudinal preceptors' dinner. Through these venues we have completed a comprehensive overview of the program. A consistently identified strength has been the commitment to education of our department's faculty and the positive, collegial relationship with our residents. This year Calgary was the primary lead in the development of the national practice written exam (CITE) used nationally by all the FRCP emergency medicine programs. This large endeavour was spear headed by Dr Catherine Patocka . Our program was also successful in securing $52,000.00 in grants from the PGME office to purchase an ultrasound for resident training, equipment for our cadaver procedure lab and to support core simulation education leads to pursue further training at the Centre for Medical Simulation at Harvard.

Off-Service and elective medical Education (2014-2015)

Rotations in the Calgary Zone adult emergency departments continue to be highly sought after by University of Calgary residents and their home training programs. The Department of Emergency Medicine hosted 142 mandatory off-service learners during the 2014-2015 academic year, up from 112 the year before. This represents approximately 16,000 hours of direct 1:1 learner supervision by our teaching faculty. The majority of these resident physicians were from the family medicine residency training program (85 learners), while the remainder came from internal medicine (33 learners), orthopedic surgery (5 learners), general surgery (6 learners), neurology (3 learners), pediatric emergency medicine (3 learners), dermatology (3 learners), dental medicine (2 learners) and cardiac and vascular surgery (1 learner each). The addition of the South Health Campus has permitted our Department to handle this increased demand while maintaining a 1:1 preceptor to learner ratio for most shifts.

As emergency medicine remains popular among Canadian medical students and family practice residents the demand for medical student and resident electives in our Department remains high. In the 2014-2015 academic year, the Department of Emergency Medicine received elective requests from 81 residents (mostly family medicine) and 77% of these residents were offered electives. We hosted 52 elective residents (up from 24 in 2013-2014) from the University of Calgary (18 residents), UBC (12 residents), U of A (11 residents), U of T (4 residents), U of O (3 residents), as well as American schools (2 residents). On the medical students side, in the 2014-2015 academic year the Department of Emergency Medicine received elective requests from 222 medical students and 65% of these students were offered electives. We hosted 97 elective students (up from 70 in 2013-2014) from the University of Calgary (34 clerks), U of A (23 clerks), UWO (7 clerks), U of M (8 clerks), McMaster (8 clerks), Dalhousie (5 clerks), as well as a few clerks from each of U of O, UBC, U of T, NOSM and McGill. The 149 elective learners we hosted in 2014-2015 represent over 10,500 hours of direct 1:1 learner supervision by our teaching faculty. This increase in demand for electives remains consistent and at this point in the 2015-2016 academic year, the department has received 55 elective requests from family medicine residents and 141 elective requests from medical students.

Overall, both the mandatory and elective adult emergency medicine rotations are highly regarded by our learners, who appreciate the diversity of patients, high quality bedside teaching, and one-on-one direct staff supervision around the clock. In total, our teaching faculty provided well over 26,000 hours of direct 1:1 learner supervision in the 2014-2015 academic year, and this figure does not include the hundreds of hours our faculty spent on the direct supervision of pre-clerkship level students through the University of Calgary summer pre-clerkship elective program as well as the many U of C medical students who request informal shadowing of an emergency physician throughout the year.

ROTATION EVALUATION FORM

This information is collected as part of the PGY1 Residency Program's Annual Quality Review, as mandated by the Royal College of Physicians and Surgeons of Canada. Group data is reported biannually and is used by the RTC and teaching sites in order to continually improve our program. Your individual response is confidential and anonymous. Please provide us with your comments whenever possible.

I. The Goals & Objectives were:

	1 Poor	2 Weak	3 Neutral	4 Good	5 Excellent	N	Mean
Clearly stated	0	0	3	22	6	**31**	**4.1**
Met by me during the rotation	0	1	3	24	3	**31**	**3.9**
Appropriate	0	0	2	24	5	**31**	**4.1**
	0	1	8	70	14	**93**	**4.0**

Comments:

II. Teaching

	1 Poor	2 Weak	3 Neutral	4 Good	5 Excellent	N	Mean
Overall quality of teaching	0	0	1	20	9	**30**	**4.3**
Nature of the teaching environment	0	0	3	18	10	**31**	**4.2**
Accessibility of teaching faculty	0	0	4	14	12	**30**	**4.3**
Supportiveness of the healthcare team toward education	0	0	4	14	12	**30**	**4.3**
Appropriate level of supervision	0	0	3	16	11	**30**	**4.3**
Basic sciences, pathophysiology, mechanisms of disease	0	0	7	16	7	**30**	**4.0**
Therapeutics, clinical pharmacology	0	0	7	15	8	**30**	**4.0**
Clinical Skills	0	2	2	16	11	**31**	**4.2**
Procedures	0	2	4	18	7	**31**	**4.0**
Bioethics	0	2	8	14	6	**30**	**3.8**
	0	6	43	161	93	**303**	**4.1**

Comments:

III. Clinical Experience

	1 Poor	2 Weak	3 Neutral	4 Good	5 Excellent	N	Mean
There was an appropriate mix of cases	0	0	2	22	7	**31**	**4.2**
The volume of work was appropriate	0	0	3	15	13	**31**	**4.3**
The amount of call was appropriate	0	0	2	15	13	**30**	**4.4**
The amount of responsibility was appropriate	0	0	2	16	13	**31**	**4.4**
Adequate opportunity to participate early in the care of patients	0	0	2	15	14	**31**	**4.4**
	0	0	11	83	60	**154**	**4.3**

Comments:

- Had vacation during the rotation and missed four shifts - would have been nice to have those distributed as much as possible in the rest of the rotation as I had extra time off.

IV. Performance feedback on this rotation was:

	1 Poor	2 Weak	3 Neutral	4 Good	5 Excellent	N	Mean
Timely	0	0	3	10	18	**31**	**4.5**
Informative	0	1	2	13	15	**31**	**4.4**
Constructive	0	1	2	13	13	**29**	**4.3**
	0	2	7	36	46	**91**	**4.4**

Comments:

- Excellent rotation!
- it would be great to work with a few preceptors rather than a new one everyday to make for more holistic, informative feedback
- I have already completed this form

Who do you feel provided you with an excellent teaching experience?

- Dr. Peterson
  Dr. Fauteux
- Dr. Tony Chad, Dr. Dave Choi, Dr. Nancy Zuzic, Dr. Matt Hall
- The staff as a whole are dedicated to teaching and mentoring residents. In particular, Grant Kennedy, Jamie Fox, Jon Lubin, Jabril Sharif, Marta Broniewska, and Matt Hall were enthusiastic and went out of their way to do teaching in addition to clinical discussion around patients. Very evidence-based teaching and practice.
- Dr. Choi was the best for sure!
- Dr. Saleh, Dr. Lubin. Both were excellent preceptors, willing to take the time to explain their thought process, and allow for personal growth and a certain autonomy over patients which was quite helpful.
- Dr. Stuart Turner
- It was great. Obviously missed some exposures that you would get at other sites like traumas. But still had great experiences you can only get at RGH like lots of urology and ophthalmology.
- Dr Jas Fauteux
  Dr Jon Lubin
  Dr Tayo Dawodu
- everyone that I worked with
- Grant Kennedy, Aaron Johnston, Mark Scott, Nancy Zuzic, Jason Mitchell, S Backlin

University of Calgary Emergency Medicine Clerkship

The Emergency Medicine Clerkship course was once again a rousing success. Students have shown overwhelming support for the program, and consistently rate the clerkship among the top of all clerkships offered in medical school. On a yearly rating scale, the EM clerkship is in the top 2 of mandatory rotations. Overall rating score was 4.2 on 5 point scale.

Highlights include the breadth of patient care as well as the direct preceptor interaction of academic faculty with students. Students are involved in the investigation and treatment of acutely unwell, often critically ill patients. They also have the demonstration of procedural skills essential to competent physicians (i.e. suturing, casting, fracture reduction, EKG interpretation, etc.).

The number of students participating in the EM clerkship continues to grow. The graduating class of 2014 had 177 students, and the class of 2015 had 174 students. We are anticipating class sizes of 155 and 167 for students for the graduating classes of 2016 and 2017 respectively.

Emergency Ultrasound

Dr. Mark Bromley
ED Ultrasound Coordinator

Administration:

- We have purchased new batteries to upgrade each of our existing machines. This should make a significant difference to the performance of our existing systems.
- Q-path – wireless image archiving system - is now up and running.
- Please see the following tutorials for further information.
  - https://www.youtube.com/watch?v=h2yB0_1Co_k
  - https://www.youtube.com/watch?v=snpRGURitW4

Education:

- Dr. Kasia Lenz completing a focused year in point of care ultrasound.
- Another successful EDE I resident course and two Staff EDE I courses.
- The EDE II course is scheduled to run February of this year.
- We have also run courses for the Neurology and the General Pediatrics groups.
- Dr. Kip Rodgers has implemented a senior resident ultrasound curriculum.

Dr. Danny Peterson, MD
ED Ultrasound Coordinator

Research:

- We are studying the performance of ultrasound in the assessment of inflammatory bowel disease with Dr. Keri Novak (GI)

- Plan to start training physicians in the assessment of hydronephrosis to support the renal colic study (Dr. Grant Innes)

Publications:

1) Critical care ultrasonography. **Peterson D**, Arntfield RT. Emerg Med Clin North Am. 2014 Nov;32(4):907-26. doi: 10.1016/j.emc.2014.07.011. Epub 2014 Aug 28. Review. PMID: 25441042

2) Ross P, **Bromley M**, Carter J, Croteau S, Haager M, Hall G, Olszynski P, **Peterson D**, Pham C, Rogers P, Skinner A, Wiss R. Can Assoc Radiol J. 2014 Aug;65(3):287-8. doi: 10.1016/j.carj.2014.05.002. PMID: 25063743

3) Diagnosis of occult scaphoid fractures: a randomized, controlled trial comparing bone scans to radiographs for diagnosis. Hiscox C, LaMothe J, White N, **Bromley M**, Oddone Paolucci E, Hildebrand K. CJEM. 2014 Jul;16(4):296-303.

Future Directions:

- The Canadian Emergency Ultrasound Society plans to release a certification process for the advanced indications – IP2. We will be developing educational hands on opportunities to assist interested staff in obtaining IP2 certification.

- We are exploring alternate funding sources to increase the number of ultrasound machines at each of our sites. We will keep you posted as this develops.

Simulation

The Emergency Medicine Staff Interdisciplinary Simulation program continues to grow and is established as one of the most developed continuing medical education programs for Emergency staff in the country. The weekly sessions gather Emergency physicians, Emergency nurses, respiratory therapists and pharmacists to participate in sessions that focus on enhancing teamwork skills, practicing procedural skills and expanding knowledge bases. Over 125 Emergency physicians and 450 nurses have participated in the last 5 years. The team is exposed to critical care scenarios and is encouraged to practice in real time the skills they will need to use in their daily practice of Emergency Medicine. The program is now expanding to collaborate with other specialties such as trauma services, obstetrics and gynecology and the acute stroke team to improve care and communication through the medical system. Our team of facilitators continues to expand and are now well recognized as valuable teachers for a variety of simulation courses. They have become speakers at international simulation events and are involved in multi-site resident research projects.

Clinical Pharmacology and Toxicology

Dr. Mark Yarema, MD
PADIS Medical Director

2015 was another successful year for the Poison and Drug Information Service (PADIS) and for Clinical Pharmacology and Toxicology in Calgary. We welcomed 39 residents from Emergency Medicine, Internal Medicine, Anesthesia, Pediatric Emergency Medicine and Critical Care Medicine for our popular Medical Toxicology rotation. This rotation involves a combination of bedside medical toxicology consultations in Calgary hospitals and small-group teaching sessions on management of common poisonings.

In 2015, the Medical Toxicology Clinic saw 10 patients. This monthly clinic was developed to provide evaluation, diagnosis, and management of adult patients in Alberta with toxic exposures, adverse drug events, follow care after hospitalization for poisonings, and interpretation of toxicology tests performed in the community. Common exposure this year included arsenic, lead, cobalt, carbon monoxide, and hydraulic fracturing by-products. In 2016 we will be working with our partners in Calgary Lab Services to identify physician groups that order common environmental toxicology tests such as lead, arsenic, mercury, cobalt and chromium to inform them about the clinic.

In 2015, PADIS toxicologists and Calgary emergency physicians had four abstracts accepted for poster presentations at the annual North American Congress of Clinical Toxicology in New Orleans, LA. All abstracts were published in the August 2015 issue of Clinical Toxicology. In addition, PADIS toxicologists were authors on several manuscripts.

Abstracts:

Haws J, Chuang R. Two Cases of Tinzaparin Overdose. Clinical Toxicology 2015, 53: 718.

Al Deeb, M, Huffman J,Kholaif N, Garlich F, Chuang R. Status Epilepticus and Transient Cardiomyopathy Associated with Synthetic Cannabinoid UR-144. Clinical Toxicology, 2015, 53: 675.

Besserer F, Chuang R, Mink M, Massey L, Cload B. Tilmicosin Toxicity Successfully Treated with Calcium, Insulin, and Lipid Emulsion. Clinical Toxicology, 2015, 53: 711.

Noble C, Weber M, Johnson D. High dose intravenous deferoxamine after a large iron overdose. Clinical Toxicology 2015;53: 709.

Book chapters:

Buchanan JA, Chuang R. Chapter 74, Cardiovascular Toxicity, Emergency Medicine Secrets, 6th Edition, Elsevier, Dec 17, 2015.

Manuscripts:

Gosselin S, Morris M, Nesbitt-Miller A, Hoffman RS, Hayes BD, Turgeon AF, Gilfix BM, Grunbaum AM, Bania TC, Thomas SHL, Morais JA, Graudins A, Bailey B, Megarbane B, Calello DP, Levine M, Stellpflug SJ, Hoegberg LCG, Chuang R, Stork C, Bhalla A, Rollins CJ, Lavergne V as part of the AACT Lipid Emulsion Therapy Workgroup. "AACT Evidence-Based Recommendations on the use of Lipid Emulsion Therapy in Poisoning Methodology," Clinical Toxicology, Vol 53, Issue 6, pgs 557-564, July 2015.

Ghannoum M, Lavergne V, Gosselin S, Mowry J, Hoegberg L, Yarema M, Thompson M, Murphy N, Thompson J, Purssell R, Hoffman R. Practice Trends in the Use of Extracorporeal Treatments for Poisoning in Four Countries. Sem Dial 2015 Nov 9; doi: 10.1111/sdi.12448.

Ruzycki S, Yarema M, Dunham M, Sadrzadeh H, Tremblay A. Intranasal Fentanyl Intoxication Leading to Diffuse Alveolar Hemorrhage. J Med Toxicol 2015; DOI 10.1007/s13181-015-0509-5

Nicol J, Yarema MC, Jones G, Purssell R, Martz W, Wishart I, MacDonald J, Durigon M, Tzemis D, Buxton J. Para-methoxymethamphetamine (PMMA) fatalities in Alberta and British Columbia, Canada. CMAJ Open 2015;3(1):E83-90.

In October 2015, Dr. Mark Yarema was the recipient of an Alberta Innovates – Health Solutions Community Engagement and Conference Grant. This project involves a partnership with the Alberta Adolescent Recovery Centre (AARC) to develop a monthly workshop series to Calgarians focusing on the dangers of substance abuse and the disease of addiction. Additionally, Dr. Mark Yarema received an award for Off-Service Preceptor of the Year from the Department of Critical Care Medicine in recognition of the off-service preceptor who contributed the most to the DCCM residency program.

Finally, a search for Chief of the new Section of Clinical Pharmacology and Toxicology was conducted in late 2015. Dr. Mark Yarema was the successful candidate and commenced his position on January 1, 2016. The first steps will involve an official request to the AHS-Calgary Zone for formal recognition of this Section and development of criteria for appointment of medical and academic staff to the Section. The major goal remains the development of a Royal College CPT residency in Calgary by no later than 2020.

Emergency Medicine Research

Andrew McRae, MD, PhD
Research Chief

The 2015 calendar year again saw substantial growth in scholarly output and research grant funding. The Department of Emergency Medicine continues to develop as a center of excellence and expertise in emergency department operations and quality improvement research, with project leadership from Drs. Lang, Innes, Andruchow, Dowling and McRae. Ongoing research programs address the identification of optimal assessment pathways for patients with suspected acute coronary syndromes (Andruchow, McRae), evidence-based CT utilization for pulmonary embolism and minor head injury (Lang, Andruchow), optimal metrics for the measurement of ED crowding (McRae), development of clinical pathways for evaluation of suspected urinary stone disease (Innes, Andruchow), and reduction of unnecessary laboratory testing (Dowling). Ongoing multicenter research projects include a comparative evaluation of care programs for high-needs ED patients with housing and addiction problems (Dr. Jen Nicol). These projects are supported by almost 1 million dollars in annual research funding.

Investigator-initiated research by clinical faculty and trainees continues to have impressive output with presentations at national and international meetings in spite of an absence of direct funding.

Research Day 2015 was the best-attended Emergency Medicine Research Day to date, with over 150 attendees. Dr. James Ducharme of McMaster University gave a thought-provoking plenary lecture on evidence-based management of acute and chronic pain in the ED. Dr. Ducharme also joined Dr. Teresa Chan of McMaster University, Dr. Rob Orman of Denver, CO and our own Dr. Chris Bond in a panel discussion of the power of social media for disseminating research findings.

In 2015 we welcomed to the team Dr. Heidi Boyda and Katrina Koger. Heidi has joined Tiffany Junghans as a research coordinator while Katrina is the new research program administrator. We are very excited to welcome these two capable individuals who have already made substantial positive impacts on the team's productivity.

Ongoing Research Work and Grants of 2015

Tiffany Junghans
Research Coordinator

1. **PROJECT:** Reassessment of Clinical Practices for Patient Presenting to the Emergency Department with Upper Gastrointestinal Bleeding.
   INVESTIGATORS: Lang ES, Bullard MJ, Ghosh S, Hebert MA, Innes G, Kaplan GG, McRae AD, Novak K, Zanten SV.
   FUNDING AGENCY: Alberta Innovates – Health Solutions PRIHS
   TOTAL AMOUNT GRANTED: $699,000
   PERIOD: 2015-2017 (3 years)

2. **PROJECT:** Improving the Stewardship of Diagnostic Imaging Resources in Alberta Emergency Departments
   INVESTIGATORS: Lang ES, McRae A, Holroyd B, Rowe B, Emery D, Andruchow J, Bullard M, Sevick R.
   FUNDING AGENCY: Alberta Innovates Health Solutions (AIHS) - Partnership for Research and Innovation in the Health System (PRIHS)
   TOTAL AMOUNT GRANTED: $750,000
   PERIOD: 2014-2017

3. **PROJECT:** High-sensitivity troponin T: Associations with mortality and optimal assay utilization in emergency department patients
   INVESTIGATORS: McRae A, Andruchow J, Clark S, Faris P, Graham M, Lang E.
   FUNDING AGENCY: Peer Review Committees and Mandates - Open Operating Grant Program (OOGP)
   TOTAL AMOUNT GRANTED: $169,530
   PERIOD: 2013-2015

4. **PROJECT:** Empirical Validation of Emergency Department Crowding Metrics
   INVESTIGATORS: McRae A, Andruchow J, Innes G, Lang E, Rosychuk R, Rowe B, Schull M.
   FUNDING AGENCY: Peer Review Committees and Mandates - Open Operating Grant Program (OOGP)
   TOTAL AMOUNT GRANTED: $197,073
   PERIOD: 2014-2016

5. **PROJECT:** Empirical Validation of Emergency Department Crowding Metrics
   INVESTIGATORS: McRae A, Andruchow J, Innes G, Lang E, Rosychuk R, Rowe B, Schull M.
   FUNDING AGENCY: University of Calgary, Faculty of Medicine Seed Grants
   TOTAL AMOUNT GRANTED: $20,000
   PERIOD: 2014-2016

6. **PROJECT:** Identifying the Optimal Treatment of Emergency Department Patients with Renal Colic
   INVESTIGATORS: Innes G, Andruchow J, Grafstein E, Law M, Carlson K, Dickhoff P, Ward D, Lang E, Teichman J, McRae A, Dotchin J, Cuthbetson L.
   FUNDING AGENCY: MSI Foundation
   TOTAL AMOUNT GRANTED: $98,000
   PERIOD: 2015-2016

7. **PROJECT:** Utility of a clinical diagnostic algorithm to reduce CT imaging for ED patients with suspected Renal Colic
   INVESTIGATORS: Innes G, Andruchow J.
   FUNDING AGENCY: KTA
   TOTAL AMOUNT GRANTED: $25,000
   PERIOD: 2014-2016

8. **PROJECT:** ED-directed interventions to improve outcomes after asthma exacerbations.
   INVESTIGATORS: Rowe B, Bhutani M, Borgundvaag B, Lang E, Leigh R, Majumdar SR, McCabe C, Rosychuk R, Villa-Roel C.
   FUNDING AGENCY: Peer Review Committees and Mandates - Open Operating Grant Program (OOGP)
   TOTAL AMOUNT GRANTED: $445,972
   PERIOD: 2011-2015

9. **PROJECT:** D-dimer testing, tailored to clinical pretest probability, to reduce use of CT pulmonary angiography in suspected pulmonary embolism: A management study. (PE Graduated D-dimer [PEGeD] Study)
   INVESTIGATORS: Kearon C, Afilalo M, Bates S, Carrier M, Douketis J, Gafni A, Hirsch A, Julian J, Kahn S, Kovacs M, Lang E, Lazo-Langner A, Le Gal G, Linkins L, Rodger M, Schulman S, Shivakumar S, Takach-Lapner S, Wells P, Wu C.
   FUNDING AGENCY: Peer Review Committees and Mandates - Open Operating Grant Program (OOGP)
   TOTAL AMOUNT GRANTED: $329,928
   PERIOD: 2013-2017

10. **PROJECT:** D-dimer testing, tailored to clinical pretest probability, to minimize initial and follow-up ultrasound testing in suspected deep vein thrombosis: A management study.
    INVESTIGATORS: Kearon C, Afilalo M, Bates S, Carrier M, Douketis J, Gafni A, Julian J, Kahn S, Kovacs M, Lang E, Lazo-Langner A, Le Gal G, Linkins L, Rodger M, Schulman S, Shivakumar S, Wells P, Wu C.
    FUNDING AGENCY: Peer Review Committes and Mandates – Open Operating Grant Program (OOGP)
    TOTAL AMOUNT GRANTED: $424,757
    PERIOD: 2013-2016

11. **PROJECT:** Translating Emergency Knowledge for Kids - TREKK
    INVESTIGATORS: Klassen T, Lang E
    FUNDING AGENCY: Networks of Centers of Excellence
    TOTAL AMOUNT GRANTED: $1,599,584
    PERIOD: 2011-2015

12. **PROJECT:** Reassessment of Clinical Practices for Patient Presenting to the Emergency Department with Upper Gastrointestinal Bleeding
    INVESTIGATORS: Lang E, Bullard M, Ghosh S, Hebert M, Innes G, Kaplan G, McRae A, Novak K, Zanten S
    FUNDING AGENCY: AIHS-PRIHS
    TOTAL AMOUNT GRANTED: $699,000
    PERIOD: 2014-2015

13. **PROJECT:** ACHIEVE (AmbulanCe Housed Ischemic Stroke TrEatment with intraVEnious Thrombolysis) – Quality Improvement – Clinical Research (QuICR) Alberta Stroke Team
    INVESTIGATORS: Hill M, Lang E, et al.
    FUNDING AGENCY: QuICR CRIO
    TOTAL AMOUNT GRANTED: TBD
    PERIOD: 2014-2015

14. **PROJECT:** The RASET TRIAL: A Phase III, Multi-centre, Randomized Trial to Compare Rivaroxaban with Placebo for the Treatment of Symptomatic Leg superficial Vein Thrombosis.
    INVESTIGATORS: Kearon C, Julian J, Land E, et al.
    FUNDING AGENCY: Ontario Clinical Oncology Group, Bayer Inc.
    TOTAL AMOUNT GRANTED: TBD
    PERIOD: 2014-2015

15. **PROJECT:** Drivers behind practice variations and barriers and facilitator of guidelines use. Subset of study: Reassessment of clinical practices for patients presenting to the emergency department with upper gastrointestinal bleeding.
    INVESTIGATORS: Lang, E, Nikoo S.
    FUNDING AGENCY: Emergency Strategic Clinical Network Summer Studentship award - AHS
    TOTAL AMOUNT GRANTED: $1,400
    PERIOD: Summer 2015

16. **PROJECT:** Understanding physician perspectives on adherence to a clinical intervention advancing decision support tool in the Emergency Department.
    INVESTIGATORS: Lang E, Trumble D.
    FUNDING AGENCY: 2015 AIHS Summer Studentship Award
    TOTAL AMOUNT GRANTED: $5,600
    PERIOD: Summer 2015

17. **PROJECT:** The Canadian Emergency Departments team initiative (CETI) of mobility after an injury in seniors.
    INVESTIGATORS: Emond M, Griffith L, Lee J, Perry J, Sirios M-J, Veillette N, Verreault R, Balion C, Daoust R, Lamontagne M, Lang E, Le Sage N, Liu B, Moore L, Morin J, Naglie G, Ouellet M, Raina P, Ryan D, Tarride J-E, Widling L, Worster A.
    FUNDING AGENCY: Emerging Team Grant: Alliances in Mobility in aging
    TOTAL AMOUNT GRANTED: $1,125,000
    PERIOD: 2010-2016

18. **PROJECT:** A Multicenter Prospective Cohort Study of Adverse Events Among Patients Discharged with Sentinel Cardiovascular Emergency Department Diagnoses
    INVESTIGATORS: Calder L, Borgundvaag B, Daoust R, Emond M, Forster A, Lang E, Perry J, Rowe B, Sivliotti M, Stiell I, Taljaard M, Thiruganasambandamoorthy V, Wells G.
    FUNDING AGENCY: Canadian Institutes of Health Research (CIHR) – Operating Grant
    TOTAL AMOUNT GRANTED: $428,830
    PERIOD: 2012-2016

19. **PROJECT:** CanVECTOR (Canadian Venous Thromboembolism Clinical Trials and Outcomes Research) Network
    INVESTIGATORS: Kahn S, Rodger M, Lang E, et al..
    FUNDING AGENCY: ICRH Community Development Program Grants
    TOTAL AMOUNT GRANTED: $150,000
    PERIOD: 2015-2016

20. **PROJECT:** Canadian Atrial Fibrillation Stroke Prevention (CAF-SPIN)
    INVESTIGATORS: Birnie D, Dorian P, Healey J, Sheldon R, Tang A, Andrade J, Atzema C, Connolly S, Dolovich L, Essebag V, Exner D, Gladstone D, Goeree R, Graham I, Ha A, Hart R, Hill M, Huynh T, Ivers N, Khairy P, Krahn A, Mcrae A, Meshkat N, Morillo C, Nieuwlaat R, Parkash R, Philippon F, Quinn F, Redfearn D, Sandhu R, Sharma M, Talajic M, Thabane L, Tobe S, Verma A, Whitlock R, Wilton S.
    FUNDING AGENCY: Canadian Institutes of Health Research (CIHR) Network Grants
    TOTAL AMOUNT GRANTED: $4,350,000
    PERIOD: 2013-2018

21. **PROJECT:** A Randomized, Controlled Comparison of Electrical versus Pharmacological Cardioversion for Emergency Department Patients with Recent-Onset Atrial Fibrilation
    INVESTIGATORS: Perry J, Birnie D, Borgunvaag B, Brison R, Hohl C, Macle L, Mcrae A, Rowe B, Sivlotti M, Stiell I, Vadeboncoeur A, Wells G.
    FUNDING AGENCY: Canadian Institutes of Health Research (CIHR) Open Operating Grants
    TOTAL AMOUNT GRANTED: $414,179
    PERIOD: 2015-2018

22. **PROJECT:** Optimal Management of Low-risk Syncope Patients
    INVESTIGATORS: Thiruganasamandamoorthy V, Sivilotti M, Morris J, Hohl C, Huang P, Lesage N, Krahn A, McRae A, Rowe B, Morillo C, Taljaard M, Kednapa Thavorn J, Brehaut J, Stacey D.
    FUNDING AGENCY: Network for Centres of Excellence (NCE), Canadian Arrhythmia Network (CANEt)
    TOTAL AMOUNT GRANTED: $730,344
    PERIOD: 2015-2018

23. **PROJECT:** Enhanced Multidisciplinary Care for Inner City Patients with High Acute Care Use
    INVESTIGATORS: Salvalaggio G, McCabe C, McRae A, et al.
    FUNDING AGENCY: Alberta Innovates – Health Solutions (PRIHS)
    TOTAL AMOUNT GRANTED: $750,000
    PERIOD: 2015-2018

24. **PROJECT:** Stewardship of Emergency Department CT Scan Utilization
    INVESTIGATORS: :Lang E, McRae A, Andruchow J, Innes G.
    FUNDING AGENCY: Alberta Innovates – Health Solutions (PRIHS)
    TOTAL AMOUNT GRANTED: $750,000
    PERIOD: 2014-2017

25. **PROJECT:** How does Management of Chronic Obstructive Pulmonary Disease Hospitalizations
    INVESTIGATORS: Strickland M, Lang E.
    FUNDING AGENCY: Alberta Innovates – Health Solutions CRIO: Collaborative Research and Innovation Opportunities
    TOTAL AMOUNT GRANTED: $250,000
    PERIOD: 2012-2015

Publications in 2015

1. Scott N. Lucyk, MD, Mark C. Yarema, MD, Marco L.A. Sivilotti, MD, MSc, David W. Johnson, MD, Alberto Nettel-Aguirre, PhD, PStat, Charlemaigne Victorino, PhD, Benoit Bailey, MD, MSc, Richard C. Dart, MD, PhD, Kennon Heard, MD, PhD, Daniel A. Spyker, MD, PhD, Barry H. Rumack, MD. Outcomes of patients with premature discontinuation of the 21-h intravenous n-acetaminophen overdose. The Journal of Emergency Medicine. doi:10.1016/j.jemermed.2015.12.004.

2. McMurtry C.M., Taddio A., Noel M., Antony M.M., Chambers C.T., Asmundson G.J.G., Pillai Riddell R., Shah V., MacDonald N.E., Rogers J., Bucci L.M., Mousmanis P., Lang E., Halperin S., Bowles S., Halpert C., Ipp M., Rieder M.J., Robson K., Uleryk E., Votta Bleeker E., Dubey V., Hanrahan A., Lockett D., Scott J. (in press). Exposure-based interventions for the management of individuals with high levels of needle fear across the lifespan: A clinical practice guideline and call for further research. Cognitive Behaviour Therapy. 2015.

3. Carlton EW, Khattab A, Greaves K. Identifying patients suitable for discharge after a single-presentation high-sensitivity troponin result: a comparison of five established risk scores and two high-sensitivity assays. Ann Emerg Med. 2015;66:635-45 (Commentary by Dr. Eddy Lang)

4. Scheuermeyer FX, Grunau B, Raju R, Choy S, Naoum C, Blanke P, Hague C, Heilbron B, Taylor C, Kalla D, Christenson J, Innes G, Hanakova M, Leipsic J. Safety and efficiency of outpatient versus emergency department-based coronary CT angiography for evaluation of patients with potential ischemic chest pain. J Cardiovasc Comput Tomogr. 2015 Nov-Dec;9(6):534-7. doi: 10.1016/j.jcct.2015.08.001. Epub 2015 Aug 17. PMID: 26310589

5. Vaillancourt C, Rowe BH, Artz JD, Green R, Émond M, Thiruganasambandamoorthy V, Innes G, Perry JJ, Calder LA, Stiell IG. CAEP 2014 Academic symposium: "How to make research succeed in your department: How to fund your research program". CJEM. 2015 Jul;17(4):453-61. doi: 10.1017/cem.2015.58. PMID: 26134058

6. Ali H, Kircher J, Meyers C, MacLellan J, Ali S. Canadian Emergency Medicine Residents' Perspectives on Pediatric Pain Management. CJEM. 2015:Mar. DOI 10.1017/cem.2015.2

7. Innes G. Sorry--we're full! Access block and accountability failure in the health care system. Can J Emerg Med. 2015 Mar;17(2):171-9. doi: 10.2310/8000.2014.141390. PMID: 25927261

8. Bayat Z, Lang E. Guidelines helping clinicians make the GRADE. Intern Emerg Med. 2015:Feb;10(1):87-92.

9. Berthelot S, Lang ES, Quan H, Stelfox HT. What are emergency-sensitive conditions? A survey of Canadian emergency physicians and nurses. CJEM. 2015:17(2):154-160.

10. Brown GM, Lang E, Patel K, McRae A, Chung B, Yoon P, Dong S, Blouin D, Sherbino J, Hicks C, Bandiera G, Meyers C: A National Faculty Development Needs Assessment in Emergency Medicine. CJEM. 2015 Sep 9:1-22

11. Cheng A, Lockey A, Bhanji F, Lin Y, Hunt EA, Lang E. The use of high-fidelity manikins for advanced life support training-A systematic review and meta-analysis. Resuscitation. 2015:Apr 14. pii: S0300-9572(15)00152-5. doi: 10.1016/j.resuscitation.2015.04.004. [Epub ahead of print].

12. Crowder K, Jones T, Innes G, Wang D, Slark SM, McMeekin J, Graham MM, McRae A. The Impact of a High-Sensitivity Troponin Assay on Hospital Operations and Patient Outcomes in Three Large Urban Emergency Department. J Am Coll Cardiol. 2015:33:0.

13. Crowder K, Jones T, Wang D, McMeekin J, Clark SM, Graham M, Innes G, Lang E, McRae A. (2015). The Impact of High-Sensitivity Troponin Implementation on Hospital Operations and Patient Outcomes in Three Tertiary Care Centers. American Journal of Emergency Medicine. 2015:0:0.

14. Donnino MW, Andersen LW, Berg KM, Reynolds JC, Nolan JP, Morley PT, Lang E, Cocchi MN, Xanthos T, Callaway CW, Soar J; FRCA; FFICM; FRCP; ILCOR ALS Task Force: Temperature Management After Cardiac Arrest An Advisory Statement by the Advanced Life Support Task Force of the International Liaison Committee on Resuscitation and the American Heart Association Emergency Cardiovascular Care Committee and the Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation. Resuscitation. 2015:Oct 5. pii: S0300-9572(15)00817-5. doi: 10.1016/j.resuscitation.2015.09.396.

15. Harris D, Hall C, Lobay K, McRae A, Monroe T, Perry J, Shearing A, Wollam G, Goddard T, Lang E. Canadian Association of Emergency Physicians position statement on Acute Ischemic Stroke. CJEM. 2015:March;17(02):217-26.

16. Hohl CM1, Wickham ME, Sobolev B, Perry JJ, Sivilotti ML, Garrison S, Lang E, Brasher P, Doyle-Waters MM, Brar B, Rowe BH, Lexchin J, Holland R. The Effect of Early in-Hospital Medication Review on Health Outcomes: A Systematic Review. Br J Clin Pharmacol. 2015:Jan 7. doi: 10.1111/bcp.12585.

17. Iorio A, Spencer FA, Falavigna M, Alba C, Lang E, Burnand B, McGinn T, Hayden J, Williams K, Shea B, Wolff R, Kujpers T, Perel P, Vandbik PO, Glaziou P, Schunemann H, Guyatt G. Use of GRADE for assessment of evidence about prognosis: rating confidence in estimates of eventrates in broad categories of patients. BMJ (Clinical Research Ed.) 2015:350:h870.

18. Jervis A, Lang E. Does Aminophylline Improve Survival for Out-of-Hospital Bradyasystolic Arrests in Adults?. Ann Emerg Med. 2015:Jan;(65)1:30-1.

19. Kamal N, Hill MD, Blacquiere DP, Boulanger JM, Boyle K, Buck B, Butcher K, Camden MC, Casaubon LK, Côté R, Demchuk AM, Dowlatshahi D, Dubuc V, Field TS, Ghrooda E, Gioia L, Gladstone DJ, Goyal M, Gubitz GJ, Harris D, Hart RG, Hunter G, Jeerakathil T, Jin A, Khan K, Lang E, Lanthier S, Lindsay MP, Mackey A, Mandzia J, Mehdiratta M, Minuk J, Oczkowski W, Odier C, Penn A, Perry J, Pettersen JA, Phillips SJ, Poppe AY, Saposnik G, Selchen D, Shamy M, Sharma M, Shoamanesh A, Shuaib A, Silver F, Stotts G, Swartz R, Tamayo A, Teitelbaum J, Verreault S, Wein T, Yip S, Coutts SB: Rapid Assessment and Treatment of Transient Ischemic Attacks and Minor Stroke in Canadian Emergency Departments: Time for a Paradigm Shift. Stroke. 2015:Aug 27. pii: STROKEAHA.115.010454

20. Lang A, Macdonald M, Marck P, Toon L, Griffin M, Easty T, Fraser K, MacKinnon N, Mitchell J, Lang E, Goodwin S. Seniors managing multiple medications: using mixed methods to view the home care safety lens. BMC Health Serv Res. 2015:Dec 12;15(1):548.

21. Lee J, Sirois MJ, Moore L, Perry J, Daoust R, Griffith L, Worster A, Lang E, Emond M, Return to the ED and hospitalisation following minor injuries among older persons treated in the emergency department: predictors among independent seniors within 6 months., Age Ageing. 2015:May 07. PubMed PMID: 25944869

22. Lenz K, McRae A, Wang D, Higgins B, Cooke T, Innes G, Lang E. Slow or Swift, Your Patients' Experience Won't Drift: Absence of Correlation Between ED MD Productivity And The Patient Experience. Poster Presentation at SAEM 2015.

23. Lenz K, McRae A, Wang D, Higgins B, Cooke T, Innes G, Lang E. Slow or Swift, Your Patients' Experience Won't Drift: Absence of Correlation Between ED MD Productivity And The Patient Experience. Conference presentation at CAEP 2015.

24. Lin K, Lang E. Review: In acute ischemic stroke, adding endovascular therapy to t-PA improves functional independence at 90 days. Ann Intern Med. 2015:163(8):ppJC4.

25. McClurg C, Powelson S, Lang E, Aghajafari F, Edworthy S, Evaluating effectiveness of small group information literacy instruction for Undergraduate Medical Education students using a pre- and post-survey study design., Health Info Libr J. 2015:Jun 03;32(2):120-30. PubMed PMID: 25809567

26. McClurg C, Powelson S, Lang E, Aghajafari F, Edworthy S. Evaluating effectiveness of small group information literacy instruction for Undergraduate Medical Education students using a pre- and post-survery study design. Health Info Libr J. 2015:Mar 23.

27. McGowan J, Muratov S, Tsepke A, Issina A, Slawecki E, Lang E. Clinical practice guideline were adapted and implemented meeting country specific requirements - the example of Kazakhstan. J Clin Epidemiol 2015: May 7.

28. McKenna P, MacLeod K, Le C, Tok K, Ursenbach J, Sutherland L, Gaudet L, Couperthwaite S, Villa-Roel C, Rowe BH. Management of acute exacerbation of COPD in rural Alberta emergency departments. Can J Rural Med. 2015:Winter:20(1):7-14.

29. McRae A, Andruchow J. Highly-sensitive troponin T algorithm facilitates early discharge of lowrisk chest pain patients within 1 h of emergency department arrival. Evidence-Based Medicine. 2015:20(4): 144.

30. Minhas R, Vogelaar G, Wang D, Almansoori W, Lang E, Blanchard IE, Lazarenko G, McRae A. (2015). A Prehospital Treat-and-Release Protocol for Supraventricular Tachycardia. Can J Emerg Med. 2015:17(4): 395-402.

31. Nicol JJ, Yarema MC, Jones GR, Martz W, Purssell RA, MacDonald JC, Wishart I, Durigon M, Tzemis D, Buxton JA. Deaths from exposure to paramethoxymethamphetamine in Alberta and British Columbia, Canada: a case series. CMAJ Open. 2015:Jan 13;3(1):E83-90.

32. Ross M, Selby S, Poonai N, Liu H, Minoosepehr S, Boag G, Eccles R, Thompson GC. The Effect of a Full Bladder on Proportions of Diagnostic Ultrasound Studies in Children with Suspected Appendicitis. Poster Presentation: Australian College of Emergency Medicine (2014). Can Jour Emerg Med.2015: In Press.

33. Rowe BH, Singh M, Villa-Roel C, Leiter LA, Hramiak I, Edmonds ML, Lang E, Sivilotti M, Scheuermeyer F, Worster A, Riley J, Afilalo M, Stiell I, Yale JF, Woo VC, Campbell S; Canadian Association of Emergency Physicians Research Consortium. Acute management and outcomes of patients with diabetes mellitus presenting to canadian emergency departments with hypoglycemia. Can J Diabetes. 2015:Feb;39(1):55-64. doi: 10.1016/j.jcjd.2014.04.001. Epub 2014 Aug 29.

34. Rowe BH, Villa-Roel C, Majumdar SR, Abu-Laban RB, Aaron SD, Stiell IG, Johnson J, Senthilselvan A; AIR Investigators; AIR Investigators. Rates and Correlates of Relapse Following ED Discharge for Acute Asthma: A Canadian 20-Site Prospective Cohort Study. Chest. 2015:Jan 1;147(1):140-9. doi: 10.1378/chest.14-0843.

35. Rusconi AM, Bossi I, Lampard JG, Szava-Kovats M, Bellone A, Lang E, Early goal-directed therapy vs usual care in the treatment of severe sepsis and septic shock: a systematic review and meta-analysis., Intern Emerg Med. 2015:May 18. PubMed PMID: 25982917

36. Scheuermeyer FX, Grunau BE, Findlay T, Grafstein E, Christenson J, Lang E, Rowe B, Ho K. Speed and accuracy of text-messaging emergency department electrocardiograms from a small community hospital to a provincial referral center. J Telemed Telecare. 2015:May 29. pii: 1357633X15587626

37. Seadon S, Lang E. Clopidogrel with aspirin versus aspirin alone in prevention of stroke following transient ischemic attack or acute minor stroke. CJEM. 2015:17(3):213-7.

38. Seiberlich L, Keay V, Kallos S, Junghans T, Lang E, McRae A. Clinical Performance of a New Blood Control Peripheral Intravenous Catheter: A Prospective, Randomized, Controlled Study. Int Emerg Nursing. 2015: 23:0.

39. Taddio A, McMurtry CM, Shah V, Riddell RB, Chambers CT, Noel M, MacDonald N, Rogers J, Bucci L, Mousmanis P, Lang E , Halperin SA, Bowles S, Halpert C, Ipp M, Asmundson GJG, Rieder MJ, Robson K, Uleryk E, Antony MM, Dubey V, Hanrahan A, Lockett D, Scott J, Bleeker EV: Reducing Pain During Vaccine Injections: Clinical Practice Guideline. CMAJ.150391; Aug, 2015:doi:10.1503

40. Taddio A, McMurtry CM, Shah V, Yoon EW, Uleryk E, Pillai Riddell R, Lang E, Chambers CT, Noel M, MacDonald NE; HELPinKids&Adults Team.: Methodology for Knowledge Synthesis of the Management of Vaccination Pain and Needle Fear. Clin J Pain. 2015:Oct;31(10 Suppl):S12-9. doi: 10.1097

41. Thiruganasambandamoorthy V, Taljaard M, Stiell IG, Sivilotti ML, Murray H, Vaidyanathan A, Rowe BH, Calder LA, Lang E, McRae A, Sheldon R, Wells GA. Emergency department management of syncope: need for standardization and improved risk stratification. Internal and Emergency Medicine. 2015:10(5): 619-627.

42. Wadhwani A, Guo L, Saude E, Hein E,McRae A, Lang E, Bhayana D. Intravenous and Oral Contrast vs Intravenous Contrast Alone Computed Tomography for the Visualization of Appendix and Diagnosis of Appendicitis in Adult Emergency Department Patients. Canadian Association of Radiologists' Journal. 2015:66: 0.

43. Wyer PC, Umscheid CA, Wrights S, Silva SA, Lang E. Teaching Evidence Assimilation for Collaborative Health Care (TEACH) 2009-2014: Building Evidence-Based Capacity within Health Care Provider Organizations. EGEMS (Wash DC). 2015:Jul 6;3(2):1165. doi: 10.13063/2327-9214.1165. eCollection 2015