The Alberta Health Services Emergency Strategic Clinical Network Quality Improvement and Innovation forum 2021.

Patrick McLane and Eddy Lang on behalf of the Emergency Strategic Clinical Network

Evidence-based research and quality improvement work are pivotal to health systems meeting their goals. Translating findings and disseminating innovative practices to new settings occurs in part through knowledge translation events, such as conferences and workshops.

The Emergency Strategic Clinical Network™ (ESCN) Quality Improvement and Innovation forum fills a gap between local and national events. It is devoted to sharing methods and results of emergency department projects in Alberta among those working in emergency care. 2021 was the third consecutive year the ESCN has held this event.

The event provides an opportunity for those working on quality improvement in emergency medicine to network with one another, share innovative projects, share know how and translate promising works to new settings. In addition, the event provides an opportunity to identify projects for potential development through local, provincial, or national funding opportunities.

In light of the ongoing pandemic, this year's forum was held virtually with the support of the University of Calgary Continuing Medical Education group. Funding was kindly provided by the College of Physicians and Surgeons of Alberta. Nineteen teams presented their projects orally. Invited nurse and clinician scientists ranked all submissions to the forum, and the top ranked submissions were recognized in the following categories:

Category	Awardee(s)	Project Title
Nurse Led	Christopher Picard	*The clinical effects of CPR meter on chest compression quality: a QI project*
Rural Project	Monika Johnson, Sharon Reece, Kristin Simard, Simon Ward	*Use of virtually-facilitated simulation to improve COVID-19 preparedness in rural and remote Canada*
Resident Ked	Jason Elizinga	*Increasing rates of computed tomography use in the emergency department: identifying targets for quality improvement*
Medical Student Led	Megg Wiley	*Practice variation in the management of incomplete and missed spontaneous abortion: a multisite quality improvement project*

Submissions by ESCN staff and the event sponsor were not eligible for recognition.

A new feature this year was a presentation by ESCN patient advisors on their perspectives on quality improvement, which was well received by all.

Strong attendance shows the value practitioners see in the forum. In 2021, the forum was attended by approximately 140 educators, managers, nurses, physicians and researchers from across Alberta. This is a marked increase over previous years. Post-event evaluation survey feedback suggests that the online format was greatly appreciated and made the event more

accessible. Requests for more rural oriented content in event feedback may also indicate that the event drew more rural attendees this year.

We are pleased to partner with the Canadian Journal of Emergency Nursing to make abstracts from the event widely available. Individual presenters have had the option of submitting their abstracts for publication in CJEN. In some instances, abstracts have already been published through other conferences and so could not be submitted to CJEN.

The findings presented in the abstracts are solely the work of the submitting authors. The ESCN does not guarantee the accuracy of any reported information. The views expressed in the abstracts are solely the views of the authors and do not represent the ESCN or Alberta Health Services.

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A better way to care for Long Term Care residents (LTC) in times of medical urgency: improving acute care for LTC residents.

Leanna Wyer, Shawna Reid, Abraham Munene, Eddy Lang, Vivian Ewa, Heather Hair, Greta Cummings, Patrick McLane, Eldon Spackman, Peter Faris, Dominic Alaazi, Marian George, Jayna Holroyd-Leduc

Background: Many LTC residents are transferred to Emergency Departments (EDs) with conditions that could be cared for in LTC, perhaps with additional support (e.g. Community Paramedics). Communication between sites and EDs has also been lacking. These lead to long lengths of stay in EDs, unnecessary use of resources, and sub-optimal health outcomes. Two INTERACT tools will support initial management of the concern at the LTC site. Then a Care and Referral Pathway will help facilitate needed conversations and optimal transfers between LTC and ED.

Implementation: Beginning in April 2019, standalone LTC sites in Calgary and Central zones have been invited to participate. Using a randomized stepped wedge design, we implement at 4-5 new sites every 3 months, with a total goal of implementing this change in 40 sites in Calgary and 9 sites in the Central zone. Early engagement with site medical directors, LTC and ED physicians, and managers at RAAPID (Referral, Access, Advice, Placement, Information and Destination) call centre and Community Paramedics was instrumental in getting the project initiated. Quarterly meetings with a project steering committee assists with ongoing project details and risk/issues. Operational leads and unit managers meet with our Senior Practice Consultant to be introduced to the project. This is followed by an implementation session at which site staff are given information about the specific tools and pathway, potential barriers are mitigated, and a site implementation plan is developed. Quarterly reports using data from a project Tableau dashboard are prepared by our Research Coordinator and distributed to LTC sites for them to monitor their performance compared to zone averages on a number of performance indicators.

Evaluation Methods: The project will be evaluated using both qualitative and quantitative measures. Key Performance Indicators include a reduction in transfers to EDs, improved satisfaction, and increased use of available resources. Residents, families and healthcare providers will participate in interviews or focus groups to assess their experiences with the interventions. Quantitative evaluation includes an economic analysis to determine how the interventions have led to cost savings within the healthcare system, as well as examination of the number transfers to ED, hospital admissions, calls to RAAPID, and visits by Community Paramedics. This will help to determine if the intervention has led to better resource utilization, increased satisfaction among residents and families, and improved patient and health system outcomes. At this stage of the project, no unintended consequences have been identified.

Results: Currently, we have implemented at 6 of 11 Cohorts (26 sites). Data from April 2019 (start of project) until December 2020 show a downward trend in number of ED visits and

hospital admissions, as well as increased utilization of RAAPID. Formal evaluation will be completed when the project ends in June 2022. Given the COVID-19 pandemic, it is important to note that this may have an effect on our current trends and this will further be explored at the end of the project period. Anecdotal evidence is also beginning to indicate success of the right care being provided in the right place.

Advice and Lessons Learned:

1) Firstly, partnerships with key stakeholders are vital to ensure successful utilization of the LTC-ED Care and Referral pathway. Specifically, RAAPID is key to the facilitation of communication between LTC sites and the EDs, and the services provided by Community Paramedics allow many residents to remain at their LTC homes.

2) Secondly, good engagement with Site Medical Directors and Operational leads is needed to ensure LTC staff and physicians are supported to use the interventions, and to care for their residents on site if appropriate.

3) Finally, tailored implementation strategies for each individual LTC site (and units in some cases) help mitigate site specific barriers, leverage strengths, and work within the site culture.

Geriatric Recovery and Enhancement Alliance in Trauma (GREAT) multidisciplinary quality improvement initiative: improving rates of successful resuscitation, rehabilitation and reintegration of geriatric trauma patients across the trauma spectrum of care.

Sandy Widder, Kristin E. Morch, Nori L Bradley, Lauren Ternan, Ni Thuyen Lam

Background: Traumatic injuries are a significant cause of morbidity and mortality in the elderly, with the risk of poor outcomes increasing with advanced age. Using a multidisciplinary geriatric trauma care approach, led by a dedicated nursing coordinator, standardized order sets were implemented to reduce in-hospital complications and screening tools applied early to identify patient specific care needs. Specifically, early trauma consult, identification of injuries, appropriate opioid ordering, polypharmacy avoidance, delirium prevention, mental health issues, and mobility needs were addressed

The goal was to improve geriatric trauma awareness, decrease in-hospital complications and improve the likelihood of return to home and baseline function

Implementation: Through stakeholder consultation process, it was recognized that the hospital needed a coordinated, geriatric trauma team process. The geriatric trauma navigator (GTN) role was created to lead these quality improvement initiatives. This included the development of educational strategies for frontline staff and physicians to highlight the unique challenges of trauma patient management and to introduce the GREAT study for optimized patient care. Patients 65 years of age or older with a traumatic mechanism were enrolled. GREAT patients then followed a protocol designed for tracking and implementing standardized processes, including early ED and in-patient order sets, engagement of trauma services, and the application of screening tools and specialty consultations. Screening tools (Identification of Seniors At Risk (ISAR), Confusion Assessment Method (CAM), Mini-Cog, Patient Health Questionnaire (PHQ-2), Geriatric Depression Scale (GDS-15), Alcohol Use Disorders Identification Test- Concise (AUDIT-C), Canadian Nutrition Screening Tool (CNST), Clinical Frailty Scale, ADL/IDLs) were administered to identify at-risk patients and to inform consultation with geriatrics and psychiatry, and allied health services (occupation therapy, physical therapy, nutrition services, pharmacy). The study team evaluated data on a monthly basis and met quarterly to evaluate and implement changes.

Evaluation Methods: Data was prospectively collected and compared to control data from the Alberta Trauma Registry and Trauma Quality Improvement Program (American College of Surgeons). Data tabulation and statistical analysis was performed using Stat59 (STAT59 Services Ltd, Edmonton, AB, Canada).

Outcome measures

- provision of timely and comprehensive care: rates of trauma team activations, emergency department and in-hospital length of stay

- reduction of hospital complications: UTI, DVT/PE, pneumonia, pressure ulcers, ICU admission, unexpected readmission to hospital
- improvement of functionality upon discharge: in-hospital and 30 day mortality rates, return to function, disposition (home versus long term care)

Process measures

- time to diet and ambulation
- tracking of number of days of urinary catheter in situ
- compliance with GOC discussions
- use of assessment screening tools
- spinal clearance <24 hours

Results: Enrollment of patients into GREAT based on study criteria lowered the threshold for triggering a trauma team consult, improving the recognition rate of geriatric trauma. This was reflected in the decreased average ISS scores and higher rate of trauma consults. Ground level falls, which previously did not typically activate a trauma consult, are now be recognized as major trauma. With the GTN, we determined that gaps exist in the current monitoring of key performance measures. Through the GREAT data collection process, we were able to establish baseline data and target PDSA changes to address these gaps.

Advice and Lessons Learned: This quality initiative was designed as a proof of concept model for early identification of the geriatric trauma patient and a collaborative team approach to optimize care processes, and in turn minimize complications. The GTN role was vital to identify patients, implement screening tools, and coordinate care. With limited resources and increasing work loads for all programs, the additional GTN role required site leadership and stakeholder support. Ideally, a protocolized geriatric trauma team activation and admission process would ensure all patients receive screening tools as part of their in-patient orders for early assessments and interventions. Further educational campaigns will need to be developed to increase awareness of the importance of geriatric trauma. Additionally, processes need to be streamlined for data gathering and monitoring of performance measures. Access to screening tools and order sets need to be user friendly, built into currently existing workflows, and evaluated for optimization.

The patient journey map: Improving the emergency department communication experience for patients and their family and friends.

Stephanie VandenBerg, Heather Hair, Gillian Harvey, Eddy Lang, David Stringer

Background: The 2013 Urban and Regional Emergency Department (ED) Patient Experience Report indicates that the most important factor influencing a patients' ED experience is a combination of staff care and communication. Lack of communication in the emergency room experience can be addressed by design methods and processes. The Emergency Strategic Care Network™ assembled an interdisciplinary team of experts from various clinical, academic, and information design backgrounds to engage patients, families and providers to improve the ED intake experience. This innovative partnership resulted in the development of a graphic information system that directs, informs and educates patients in EDs in Alberta.

Implementation: Using the Plan-Do-Study-Act (PDSA) framework, focus groups were conducted to understand the communication needs of emergency department patients. An information design specialist co-created a graphic information system (the patient journey map) and worked with AHS communications to ensure it met AHS guidelines. Patients were then approached to participate in a 14-question survey about the usability and accuracy of the journey map as well as the impact it had on their ED visit.

Our team consisted of Heather Hair, Executive Director of the (ESCN) who provided leadership in identifying communication as a key area for improvement and coordinating ED partners and patient involvement. Gillian Harvey is an assistant professor of Design Studies at the University of Alberta. She used the data collected in focus groups to design a 2-D communication map. David Stringer acted as project manager for the implementation and evaluation of the journey map. Stephanie Vandenberg is an emergency physician and was responsible for designing the evaluation strategy including research methods and data analysis. An official journey map is now available to print for emergency departments across Alberta.

Evaluation Methods: The objective was to understand what information ED patients require during their visit to better understand the process by which they are triaged and receive care. Data collection consisted of a 10-minute, 14 question interview. Each question allowed for positive, neutral or negative feedback to capture unintended consequences of the journey map. Quantitative demographic and journey map-specific variables were collected and reported as frequencies. Qualitative data was analyzed using thematic analysis with thematic codes developed and assigned to the qualitative responses. Both quantitative and qualitative analysis was undertaken by two members of the research team. Responses were analyzed against the demographic variable of age category to determine if age impacts communication needs and desired medium of communication in the ED.

Results: Seven hospitals took part in this survey, conducted between September 1, 2019 and May 5, 2020. 162 emergency department patients participated. Most people agreed that the

journey map clarified the ED patient process and accurately reflected their experience of the ED journey. The journey map did not seem to make the wait less confusing. Participants reported the journey map was good at helping them understand the overall emergency department intake process and did a good job of helping them understand the reason for waiting/delays. The journey map was excellent at helping the participant understand why specific tests/treatments were needed but was poor at helping them to understand the total time it would take them to be seen.

The clinical effects of CPR meter on chest compression quality: a QI project.

Christopher Picard, Richard Drew, Domhnall O'Dochartaigh, Matthew J Douma, Candice Keddie, Colleen Norris.

Background: High-quality chest compressions are the cornerstone of resuscitation. Training guidelines require CPR feedback, and pre-clinical data shows that feedback devices improve chest compression quality; but devices are not being used in many emergency departments, and their impact on clinical care is less well understood. Some services use defibrillator generated reports for quality improvement, but these measurements may be limited in scope and have not been rigorously compared to other tools.

Methods: Laerdal CPRMeter 2 chest compression feedback devices were purchased using funds made available by a zone QI initiative. Initial training for implementation consisted of staff performing one minute of blinded chest compression using the feedback device, followed by one minute of chest compression unblinded. Staff were shown the raw percentage of chest compressions meeting target depth, release, and rate under both conditions as well as overall improvement. Following initial orientation, devices were incorporated into clinical care and all subsequent staff simulation and training. Clinically, use of the feedback device and completion or QI tracking forms was not mandated but was encouraged by drawing code participant names from completed forms for a free ACLS or PALS course. Data from all codes were automatically collected by the LifePak 20, data from any resuscitation using the Laerdal CPRmeter 2 were also automatically recorded when the device was used: these data were downloaded weekly. Completed questionnaire forms were submitted to the Clinical Educators and extracted as received.

Evaluation Methods: Chest compression quality data was collected in two ways: first, using a Laerdal CPRMeter2, second, by downloading and analyzing cardiac arrest data from a LifePak20 defibrillator using CodeStatTM software. Device data were matched and synthesized by an emergency department CNE using Microsoft excel and IBM SPSS 26. Descriptive statistics (mean and standard deviations) are used to describe the data. Differences in chest compression quality and duration of resuscitations between resuscitation that did or did not use a feedback device or a backboard were compared using independent t-testing. Differences in chest compressions at the target depth, release, and rate between the numbers of staff involved were assessed using ANOVA. Agreement between devices (CPRMeter2 and LifePak) used during the resuscitations were evaluated using paired t-testing, Pearson correlations, and Bland-Altman plots. All tests were two-tailed with predetermined significance levels set at a=0.05.

Results: Data collection occurred between August 2019 and December 2020. There were a total of 50 cardiac arrests included, 36 had questionnaire data returned, 36 had data collected from the CPR meter 2, 24 had data collected from the LifePak, and 10 had data collected using all three methods. The average duration of resuscitation (number of chest compressions) was 1079.56 (SD=858.25); there was no difference in the duration of resuscitation (number of chest

compressions) between resuscitations using versus not using CPR feedback devices (p=0.673). Resuscitations utilizing chest compression feedback had a higher percentage of chest compressions at the target rate compared to resuscitations not using feedback (74.08% vs 42.18%, p=0.007). Resuscitations that utilized a backboard had a higher percentage of chest compressions at target depth (72.92% vs 48.73%, p=0.048). There were no differences noted in the duration of resuscitation attempt (p=0.167) or percentages of chest compressions at the target depth (p=0.181), release (p=0.538), or rate (p=0.656) between resuscitations with different sized teams (4-5, 6-7, 8-9, >10 staff involved). There was a strong positive correlation (r=0.771, p=0.005, n=11) between the two measurement methods and chest compression rates, and no statistically significant difference in measured scores (p=0.999), with 100% of values falling within the Bland-Altman confidence intervals of 36.72 and -36.72, n=11. Interpretation of the levels of agreement between these two device measures methods should be done cautiously however, given the small sample size and wide confidence intervals.

Implications

1) Incorporation of visual chest compression feedback and use of a backboard are fast and affordable and significantly improved the percentage of chest compression at the target rate and depth.
2) There was no correlation between the size of the resuscitation team and the percentage of chest compressions at the target depth, release or rate; nor was the feedback device use associated with the duration of the resuscitation attempt.
3) The implications of improvement with the CPR meter suggests that areas or service not using feedback should consider implementing its use to achieve the target compression rate.
4) Compared to LifePak feedback alone the CPRMeter2 will also allow services to target depth and release targets as well as rate.

An electronic audit tool to track the donning and doffing practices of personal protective equipment in the emergency department.

Maya Jusza, Ramya Sridhar, Jennifer Woods, Sharon Drury

Background: Maintaining the safety of patients and healthcare professionals is a priority in all healthcare settings. Infection prevention measures such as donning and doffing practices of personal protective equipment (PPE) have become even more imperative in light of the SARS-CoV-2 pandemic. Potential PPE breaches and the degree of frontline compliance are currently being analyzed through the use of paper PPE audit tools which can be laborious and time-consuming. The development of an electronic alternative would improve frontline safety and enhance the efficiency of data collection, while optimizing the ability to share these observations with the frontline team in real time. Two nursing leadership students from the University of Alberta were tasked with developing an electronic PPE audit tool prototype for the University of Alberta Hospital's emergency department.

Implementation: An electronic PPE audit tool prototype was developed using Google Forms which provided a user-friendly interface. Google applications were used as no confidential or patient data was collected during PPE audits. The prototype auto-populated the data entries into linked spreadsheets and interactive data dashboards that visualized the data using graphs in real time. This enabled users to easily identify trends and direct educational interventions as required. Instructional one pagers and screencast videos were also created to accompany the prototype.

The prototype was reviewed by and received extensive support from: Unit Managers, Patient Care Managers, Process Improvement Nurses, Infection Prevention Control (IPC), the Executive Director of the University of Alberta Hospital and Stollery emergency department and Edmonton Zone medicine programs, and the University of Alberta Hospital and Mazankowski Executive Leadership Team. Several changes and improvements were made using the Plan-Do-Study-Act cycle. This prototype has currently been replicated onto an Alberta Health Services (AHS) server and has completed the formal testing phase with a planned application launch date.

Evaluation Methods: Plan-Do-Study-Act cycles were used to guide the implementation of this audit tool prototype. After development, the prototype was tested and revised which included six rounds of audit trials at the University of Alberta Hospital's emergency department and on some inpatient medicine units. This prototype was consistently evaluated at various stages of development and changes were made to include feedback. After approval was received to recreate this prototype onto an AHS compatible server, additional changes were made to ensure functionality. These changes included adding designations and simplifying certain questions. IPC was consulted to ensure the steps outlined for donning and doffing in the prototype were accurate and reflected requirements in the clinical environment.

Results: This audit tool prototype has gathered tremendous support through various demonstrations of its ability to streamline data collection in the healthcare setting. This data is

relevant to the safety of both frontline workers and patients as it identifies inconsistencies in donning and doffing practices. In addition, the prototype also complements the Edmonton zone-wide PPE coaching initiative by allowing for a quantitative measurement of its efficacy. This has prompted the fast-tracked replication of an AHS compatible version with the assistance of a dedicated team that includes the creators of the prototype tool, IPC, Quality Assurance, Information Technology, and Clinical Services Development. This version has a scheduled launch date on March 22, 2021 and is to be initially rolled out to University of Alberta's emergency department and medicine units. The objective is to eventually make this the standardized PPE audit tool throughout Alberta.

Advice and Lessons Learned:

1) In order to be sustainable and implemented site-wide, an AHS compatible tool is required. The use of Google applications is not preferred as data will be stored outside of the AHS server. Even though there is no confidential information, wide-spread use may overwhelm the Google platform and a Gmail account is required to view data. An in-house AHS alternative has been developed.

2) Several discussions took place regarding discretions on what steps can be audited according to IPC protocols. For example, some clinical nurse educators prefer hand hygiene to be completed between donning steps, while this is not mandatory or auditable according to IPC. In addition, several discussions took place to identify the operational and business owners of this tool which are required to support the AHS compatible version of the application.

3) PPE audits are vital across all hospital departments to improve the quality of healthcare. The use of PPE during patient care has grown exponentially due to the SARS-CoV2 pandemic and has amplified the need for an electronic alternative to the existing paper PPE audit tool. The electronic audit tool offers an innovative way to accurately and efficiently collect and display data which will promote an improved quality of care.

Practice variation and trends in the management of incomplete and missed spontaneous abortion: Informing a multisite quality improvement project.

Megg Wylie, Amelia Srajer, Kevin Lonergan, Philippa Brain, Eddy Lang

Background: Practice variation in the management of spontaneous abortion exists in the Emergency Department (ED). We developed a multisite retrospective study to assess how the management of spontaneous abortion has changed over 2014-2019 across four Calgary EDs, with emphasis on assessing variation and trends between non-operative (medical/expectant) and operative (dilatation and curettage) management. Medical management has been increasingly indicated as effective, yet a knowledge gap exists regarding its use. Knowledge of that proportion and physician-level practice variation will facilitate educational and audit and feedback style initiatives. Results provide justification and supporting data for said initiatives, which may be extrapolated to elsewhere.

Implementation: Two medical students are heading the day to day work of this project, with support from a principal investigator with the Department of Emergency Medicine in Calgary. We also have the support of a data manager and the head of pregnancy loss in the region. This study was implemented as a quality improvement project. Therefore, the Conjoint Health Research Ethics Board at the University of Calgary was consulted to ensure the project qualified as a quality improvement and that our privacy protections were appropriate. With approval from the ethics board, we needed the data to analyze and assess. To do so, we utilized Sunrise Clinical Manager (SCM) to retrospectively collect data. Sunrise Clinical Manager, a system utilized in Calgary EDs to track patient and department information, was accessed to collect administrative data. Sustaining this work will involve the continued efforts of the described team, largely in writing up the results and disseminating them via audit and feedback procedures.

Evaluation Methods: Using SCM, data were retrospectively collected for patients coded with International Classification of Disease (ICD-10) codes O03.4 (incomplete spontaneous abortion without complication) or O02.1 (missed abortion) who presented to an ED in Calgary (Foothills Medical Centre, Peter Lougheed Centre, South Calgary Hospital, and Rockyview General Hospital) over 2014-2019. We collected patient and environmental factors to allow for the examination of unintended associations. Hemoglobin, HCG level, CTAS code, PIA (time to MD), and U/S result (to confirm diagnosis) were collected. Variables regarding length of stay, procedures received (D&Cs, or other), and returns to care (within 72 hours, and 7 days) were collected. Return to care for future D&C was considered a proxy for failed non-operative management. Demographic and practice data were collected on ED physicians who saw a minimum of 15 patients from our cohort, to gain understanding of trends in practice. Data were analyzed using Chi-square and Mann-Whitney U tests.

Results: Within our cohort, 1110 (28.9%) patients received a D&C. The remaining 2735 (71.1%) patients were managed non-operatively. Variation and trends were present between sites, with rates of D&Cs ranging from 15.8% to 33.5% ($p < 0.001$). The rate of D&Cs decreased from 34.2% in 2014 to 22.6% in 2019 across all sites ($p < 0.001$), and 11.6% absolute and 33.9% relative reduction; yet there was minimal variation over time in rates of ED returns and returns resulting in D&Cs. 78.6% of physicians who saw ≥ 15 patients were female, with female physicians responding to 81.8% of our cohort

Advice and Lessons Learned:

1) Our first suggested lesson is to have a clear plan regarding deadlines and timelines, but to also have room for flexibility. At some times the work on this project was slowed to allow effective collaboration with the obstetrics and gyneocology department, or to allow for the refinement of data management. By setting realistic timelines, team members were encouraged to progress the work in a timely fashion. However, by having flexibility the team was able to adapt to roadblocks along the way.

2) A second lesson would be the importance of meaningful collaboration between departments. Though the setting of the project was within Calgary EDs, the topic and content have clear relevance to obstetics and gynaecology. By consulting with members of the obstetrics and gynaecology department we were able to clarify our objectives and have a better understanding of local contextual factors that influenced our results.

The utility of telemedicine in pediatric emergency care: A scoping review.

Owen Robinson, Shaelynn Zouboules, Hailey Lafave, Roger Galbraith, Eddy Lang

Background: Widespread public health measures to combat COVID-19 and escalated parental fear in seeking medical care have compromised access to acute healthcare, leading clinicians to search for alternative methods of delivery. Pediatric emergency departments (ED) have seen significant reductions in documented visits without evidence of a reduction in needs. In Alberta, average daily visits to pediatric emergency and urgent care departments decreased 69.6%, from 952.2 in December 2019 to 289.6 in April 2020. While pediatric emergency telemedicine (PET) programs have the potential to alleviate said gaps in care, it is critical that these technologies are evaluated to ensure patient safety and efficacy.

Implementation: This study aimed to serve as an implementation framework for future PET programs. A scoping review was conducted in accordance with the preferred reporting items for systematic reviews and meta-analysis extension for scoping reviews (PRISMA-ScR). The primary objective was to map the existing literature and identify research gaps pertaining to the use of telemedicine in pediatric emergency departments. Primary areas of focus included direct-to-consumer (DTC) telemedicine, rural/regional applications, general ED utility, transfer of care and specialist consultation. This presentation focused on the aspects of DTC telemedicine, and its ability to potentially alleviate the present barriers to in-person presentations to EDs for acute pediatric health concerns. Our team consisted of two University of Calgary affiliated emergency physicians, three University of Calgary medical students, Canadian Agency for Drugs and Technology in Health research consultants, and a university librarian.

Evaluation Methods: The outcomes of interest that we used to evaluate the relevant literature included: prevalence of PET; current applications; patient outcomes; patient satisfaction; provider satisfaction; and feasibility, challenges and barriers to implementation. In addition, we aimed to determine the proportion of literature focusing on DTC telemedicine, as this would be the desirable telemedicine application that could be used to supplement the gap in pediatric ED visits during the pandemic and mitigate the resulting health impacts. Lastly, we aimed to characterize both successes and challenges associated with DTC telemedicine in order to provide guidance for future research and policy.

Results: Searches of the electronic databases returned 1617 studies. Following the two-step screening process, 37 studies met our inclusion criteria and six focused on DTC telemedicine. Study designs were all observational with all published in 2015 or later. The number of studies reporting data on the outcomes of interest were as follows: patient satisfaction (N=0); prevalence (N=1); provider satisfaction (N=1); patient outcomes (N=2); current applications (N=6); feasibility, challenges and barriers (N=6). Respiratory presentations were the most prevalent application. Three of six studies demonstrated agreement between telemedicine and in-person providers during acute assessments, demonstrating reliability of telemedicine. Conversely, two

studies conveyed antimicrobial stewardship with conflicting results. Overall, results were largely positive with important challenges identified.

Advice and Lessons Learned: Based on the lessons learned from our research, we recommend the following:

1) Implentation of a DTC telemedicine program can provide timely access to care, while minimizing the health risks associated with visting the ED during the COVID-19 pandemic.
2) Respiratory complaints were among the most common presentations and thus we recommend developing diagnostic and management algorithms to standardize the virtual care provided.
3) Continue quality improvement measures upon implementing a telemedicine program through timely feedback regarding physicians' experiences and challenges in order to address concerns early and optimize efficacy of the program.

Time modifier billing code: Interrupted time series analysis.

Terrence McDonald, Brendan Cord Lethebe, Alistair McGuire, Lee Green

Background: Alberta has the highest percentage of fee-for-service Family Physicians in Canada at over 80%. In 2019 as part of a cost containment strategy, the Alberta government proposed a policy change to eliminate the most used fee code that compensates family physicians for extended visit times (16-25 minutes). Optimal length for patient visit times varies throughout the world and countries with health systems that place emphasis on relational continuity demonstrate a trend towards longer appointment times. In Canada, the relationship between visit length and outcomes is not known.

Implementation: What would be the likely consequences of eliminating the extended visit code? We examined this question using two different observational methods, to improve confidence in our findings: a retrospective longitudinal cohort (time series) around the time the code was introduced in 2009, and a cross-sectional cohort at current time. We explored the usage patterns of that fee code, its association with the outcomes of emergency department visits and hospitalizations, along with physician billings.

Results: We found rates of emergency department visits decreased after the time-modifier code was implemented starting in 2010. This effect was maintained in the years that followed. A similar but less pronounced effect was observed in the hospitalization rates. The cross-sectional analysis had to include an interaction term because family physicians selectively extend visits for patients at risk, but when that is accounted for, the same effect is observed as in longitudinal results. The code was not used ubiquitously among primary care providers, especially in rural areas. Female physicians used it more often. Users use it for an average of 40% of 03.03A office visits. Non-users of the code earned more income than their user-colleagues.

Conclusion: We believe our findings will fill an important gap in informing the importance of an extended time service billing code in a fee-for-service system in reducing ED visits and hospitalizations.

Advice and Lessons Learned:

The fee-for-service time-modifier code, introduced in 2009, resulted in reduced ED visits and hospitalizations. It is likely that discontinuing the code would result in increased ED and hospital utilization, costing much more than removing the code would save. Usage of the time-modifier code was not uniform among primary care. Users of the code had different practice patterns and provider demographics. Our next step is to model the uptake of the code by primary care providers and explore the health system utilization and down-stream costs between users and non-users of the code.

An analysis of individual and department triage variances to identify, quantify, and improve markers of nurse triage accuracy.

Rebecca Cotton, Richard Drew, Matthew Douma, Domhnall O'Dochartaigh, Candice Keddie, Karen Muncaster, Christopher Picard

Background: Canadian Emergency Departments (ED) use the five-point Canadian Triage Acuity Scale (CTAS) to sort and prioritize patients according to acuity. CTAS scores are used to make decisions on patient flow, staffing complement, and funding. Despite this, there is a paucity of literature describing how CTAS data can be audited, and how the data can inform quality improvement/assurance (QI/QA).

Implementation: Triage data downloaded from Tableau were analyzed using Microsoft Excel and IBM SPSS 26. Staff were informed of the audit using email and social media, and invited to discuss the results with educators and administrators. Staff identified for intervention were approached individually with the administrative plan. Anonymized versions of the work plan were posted on the departmental audit board. Nurses triaging greater than 50% department average were offered the option to triage less frequently, while nurses triaging less than 50% the department average were preferentially placed in triage. Nurses triaging fewer than 100 patients per year were informed they would be relieved of triage responsibility unless their rates increased above threshold. Nurses "down-triaging" patients at rates greater than 2 SD were informed that if their practice remained outside 2 SD at repeat audit they would be relieved of triage responsibility until they voluntarily completed CTAS refresher training. Nurses with average assigned CTAS scores > 2 SD department average had 20 visits randomly audited per month for error/appropriateness.

Evaluation Method: Computer-assisted analysis of complete triage records was conducted for August 2019 to August 2020 at the Misericordia Hospital Emergency. Complete triage entries of every patient triaged by all triage trained nurses in the department were examined. Nurse's with practice variation two deviations from department mean were identified and received additional detailed audits. Items examined for error were: FTE adjusted triage frequency; average CTAS score assigned; triage score manual override "down/up-triage" rate; proportion of absent Numeric Pain Scores (NPS) for patients with primary presenting complaints of pain; and vital signs modifier error rates. Initial department averages were used for benchmarking individual nurses; zone averages were used to benchmark department performance. Nurses were interviewed, audit results and action plans were posted. Repeat audits were performed on a three-month basis and benchmarked to initial measures, and a staff awareness campaign was enacted to improve NPS scoring. Data were extracted using text-parsing algorithms programmed into Microsoft Excel and analyzed using IBM SPSS 26. Data were normally distributed and descriptive statistics were calculated using means and standard deviations. T-testing was used for comparisons, and all testing was two-tailed with a pre-defined significance set at 0.05.

Results: After the 3rd quarterly audit and associated interventions, global improvements were

appreciated in triage nurse practice. There was a 68% reduction in the need for administrative action (n=51, n=18) with reduced variance in individual nurse triage rates and a 50% reduction in nurses who triaged >50% more patients than their peers. 50% fewer nurses had a mean triage rate >.02 above or below department average, there was an 86% reduction in high risk vital sign error rates, a 78% reduction in ”down-triage” rates, and a 6.5% improvement in documentation of numerical pain scores.

Advice and Lessons Learned

1) Triage data analytics can rapidly identify staff with significant deviations from the average, making auditing and QI/QA activities more efficient and effective.
2) Having a concrete performance management framework and dissemination plan in place are essential for auditing to have a significant impact on triage consistency and quality over time.
3) Future QI/QA work should consider expanding computer-assisted text parsing to identify patients at risk for mis-triage for reasons other than vital sign derangement, which will allow for broader ED rollout across the Edmonton Zone and beyond.