The Alberta Health Services Emergency Strategic Clinical Network™ Quality Improvement and Innovation Forum presented on February 22, 2022.

Andrew Fisher, 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. Despite the challenges presented by the COVID-19 pandemic, 2022 was the fourth 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. This year's forum was, again, held virtually due to the ongoing pandemic. 18 teams provided oral presentations including the ESCN patient advisors who shared details of how to engage patients in quality improvement work.. Not all abstracts are published in this collection, as some abstracts will have been previously published elsewhere.

Strong attendance shows the value practitioners see in the forum. In 2022, approximately 121 educators, managers, nurses, physicians and researchers from across Alberta and British Columbia, attended the forum. Post-event evaluation survey feedback suggests that the online format was greatly appreciated and many of the initiatives presented would be pursued further by participants.

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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Emergency Nursing: A Staff-Led Mentorship Program in a Tertiary Adult and Pediatric Emergency Department

Taylor Peters, Danica Mattiussi, Chad Warford

Background: Emergency Department (ED) nurses are familiar with high levels of turnover and staff burnout. All EDs have faced unprecedented stressors related to the global COVID-19 pandemic including higher patient acuity, senior staff attrition, and increased numbers of less-experienced new hires. In one combined pediatric and adult tertiary ED, senior nursing staff identified a need for integrating formalized mentorship for new staff in the current nursing orientation. Three senior, experienced, Registered Nurses (Mentor Leads) developed and implemented a volunteer-based, staff-led mentorship initiative piloted throughout 2021.

Implementation: Mentor Leads conducted stakeholder consultation with recent new hires and senior staff prior to proposing the mentorship program model to management and the education team in November 2020. Support obtained allocated Mentor Leads two hours of classroom department orientation to conduct virtual presentations with new hires (Mentees). The presentation was structured as a nursing assignment simulation with opportunities for open discussion; it reviewed emergency case scenarios, prioritization/time management, department flow, multidisciplinary communication, and staff roles and resources. Then groups of two to four nursing Mentors, with at least one year of experience in the department, provided sequential in-person and email check-ins throughout the first six-months of the Mentees' employment. Electronic materials, including mentorship expectations and resources, were disseminated to the Mentors to support them during their mentorship term.

Evaluation Methods: Qualitative feedback was sought from Mentors and Mentees at the end of their mentorship term. Both were asked to describe any personal benefit gained from participation in the program, any challenges they recognized, and if/how the program impacted their future employment in the department. In addition, Mentees were asked to provide survey feedback following the orientation presentation.

Results: The mentorship program was applied to all nine orientation groups hired in 2021. A total of 70 new hires participated as Mentees. Twenty-one volunteer Mentors were utilized to lead the orientation groups. Initial qualitative feedback for the orientation presentation and the

six-month follow-up was universally positive. Qualitative themes included enhanced preparedness concerning department realities, feeling welcomed by staff, and improved understanding of department flow and avenues of assistance. One Mentee shared that, without the program they would have considered seeking new opportunities outside of the emergency department setting shortly after orientation.

Mentors expressed a crucial need for the program and shared that their responsibilities and expectations were manageable. Mentors felt the email communication structure was less effective than the in-person check-ins. An incidental benefit of the program's implementation was its positive effect on staff participating as Mentors. They reported that their experience with the program provided them with purpose, decreased levels of burnout, and strengthened their teaching and leadership skills. Qualitative feedback from Mentor Leads and experienced staff report that department mentorship culture as a whole has been enhanced by the program.

Advice and Lessons Learned:

1. Strong partnership with key stakeholders, including management and the nursing education team, was vital to implementing a successful mentorship program in the department. Concerns voiced by Mentors regarding Mentee overall performance and potential practice challenges were escalated to department Clinical Nurse Educators in order to provide targeted educational support for the success of staff.
2. The role of strong and determined Mentor Leads were key to conduct the necessary building, implementation, and preservation of the program. A significant amount of invested time was required to ensure program success. Consideration should be given to fiscal resources to incentivize staff-led grassroots mentorship programs.
3. Future program evaluation hopes to include detailed evaluation of objective data comparing levels of nurse turnover and vacancy rates pre- and post-implementation of the program, and an economic evaluation.
4. Future opportunities for this program are to expand mentorship to staff new to resuscitation, triage, and charge nurse roles within the department, as well as replicate the work to other local and provincial EDs.

Evaluating referral patterns from Health Link to the emergency departments in Alberta

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Background: In Alberta, Health Link (811) provides a 24-hour, nurse staffed, phone resource to the public for health care advice. Health Link nurses use decision pathway protocols to guide patients to seek further care in the emergency department (ED), follow up with a primary care provider (PCP) or provide self-care (SC) at home. Many healthcare providers working in the ED have predefined beliefs regarding the appropriateness of these referrals. Therefore, the aim of the present work is to provide a descriptive analysis of Health Link referral patterns to the ED, including the identification of geographic trends.

Methods: Using administrative health data from January 1, 2018-December 31, 2019, we categorized Health Link calls as likely appropriate referrals (ED referral with a Canadian Triage and Acuity Scale (CTAS) of <= 3), less-likely appropriate referrals (ED referral with CTAS of >3) or a patient over-ride referral (referred to PCP/SC but then then presented to the ED within 24 hours with a CTAS of <= 3). The primary outcome was the percentage of likely appropriate and less-likely appropriate referrals from the calls received by Health Link that presented to the ED, and the percentage of patient override referrals from the calls referred to PCP or SC. Geographic trend analysis included age, self-identified gender, postal code, location of ED attended, and Canadian Triage Acuity Scale (CTAS) score assigned at ED.

Results: In this period, 900,196 individuals called Health Link, 241,103 were referred to the ED, and 140,614 presented to the ED. This is a 58.3% follow through rate, with Health Link callers constituting 3.4% of the total ED population (4,194,735). Of the Health-Link patients presenting to the ED, 77.3% were determined to be likely appropriate referrals, while 22.7% were determined to be less-likely appropriate referrals. Of the patients sent to the ED, the admission rate was similar to that of the general ED population (8.01% and 9.16% respectively). 86,783 patients presented as patient over-ride referrals, representing 13.2% of all calls referred to PCP or SC.

While there is a greater density of ED usage in rural locations (101.61 visits/100/year) than in urban centers (41.16), there is a greater density of Health Link callers from urban centers (2.48 calls/100/year) than rural locations (2.09). Also, callers advised to present to the ED and assigned a CTAS of </= 3 were concentrated in urban rather than rural locations (1.21 vs. 0.85), while the general ED population presenting with a CTAS </= 3 was denser rurally (35.01) than urban (24.93). A higher density of callers presenting with a CTAS > 3 in rural (0.58) than urban (0.42) regions, with the general ED population CTAS > 3 being denser in rural regions (59.96) than urban (16.01).

Advice and Lessons Learned:

1. Health Link referral population to the ED is similar to the general ED population in respect to admission and CTAS score.
2. A greater density of patients utilize Health Link in urban centers, while rurally a greater density of patients present directly to the ED.

Impact of Calgary's supervised consumption site on opioid-related emergency health care usage

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Background: Opioid overdoses have been an increasing public health problem in North America for several years. Supervised consumption sites (SCSs) – hygienic and medically supervised spaces to use illicit substances – are one harm reduction strategy intended to decrease morbidity and mortality, with literature suggesting they reduce emergency department (ED) visits, overdoses, and deaths. Calgary's sole SCS opened in 2017 and received over 6000 monthly visits prior to the COVID-19 pandemic, but recent provincial policy has jeopardized its longevity. To our knowledge, there has not been an evaluation of its effectiveness, so we sought to investigate its impact on opioid-related ED visits.

Methods: Calgary's SCS was not implemented in our institution specifically. It was implemented for the Calgary region by *Safeworks*, an outreach program under the Alberta Health Services (AHS) umbrella, after obtaining a Health Canada exemption and funding from the provincial government. Implementation also required close collaboration with public services (e.g., Calgary Police Services) and the municipal government.

The *Safeworks* SCS opened on October 30, 2017 and remains the only supervised consumption facility in the Calgary region. It is currently located in the Sheldon Chumir Health Centre in downtown Calgary. In addition to supervised consumption, the SCS also offers all clients harm reduction supplies (e.g., naloxone kits), health services (e.g., testing and counselling for sexually transmitted infections, referral to Calgary Opioid Dependency Program), education (e.g., vein care), and access to social services (e.g., housing supports).

Evaluation Methods: This was a retrospective observational study examining the impact of the SCS on two markers of opioid related morbidity (EMS responses and ED visits). Calgary EMS responses, wherein the opioid overdose protocol was activated or naloxone was administered, were queried from the Alberta Health Services (AHS) information management database. ED visits due to opioid toxicity were queried from AHS using ICD-10 codes T40.0-T40.4 and T40.6. Data was collected from January 2014 to February 2020. The impact of Calgary's SCS was analyzed with an interrupted time series using ordinary least squares regression with Newey-West standard errors.

Results: Our data query yielded 9208 EMS responses and 8442 ED visits related to opioid use over the 74-month period. There were no months with missing data. Prior to the opening of Calgary's SCS, monthly EMS responses and ED visits increased significantly by 3.69 [3.08, 4.30] and 7.09 [5.92, 8.26] visits/month, respectively ($p<0.001$). After the SCS' opening, the trends in EMS responses and ED visits declined significantly, relative to the pre-intervention trends, by 7.14 [5.72, 8.56] ($p<0.001$) and 15.34 [12.21, 18.48] ($p<0.001$) visits/month,

respectively. After the intervention, EMS responses declined at a rate of 3.45 visits per month ($p < 0.001$) and ED visits declined at a rate of 8.25 visits per month ($p < 0.001$).

Our interrupted time series suggest that Calgary's SCS led to a significant change (and in fact, a reversal) in the trends of opioid-related EMS responses and ED visits. This evidence suggests that ongoing access to Calgary's SCS has a favourable impact.

Advice and Lessons Learned:

1. Similar studies in the future should consider partnering with their local SCSs (e.g., *Safeworks*) to conduct a multi-faceted program evaluation, including organization-driven outcomes. This could also facilitate respectful and ethical patient engagement.
2. Evaluating mortality data or other more direct markers of morbidity in addition to ED visits may be high yield in future research as it provides greater insight into the breadth of medical outcomes and further informs advocacy efforts.
3. Our study did not consider the impacts of other opioid-related interventions in Calgary/Alberta. This was a deliberate choice, however it is ultimately difficult to estimate the impact of an isolated intervention. One option would be to evaluate all relevant interventions as a *group* of interventions, given that substance misuse and associated harms is a multifaceted problem that requires a multidisciplinary approach

Impact of COVID19-related non-pharmacologic interventions on healthcare utilization for other virally-triggered respiratory illnesses

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Background: Acute and chronic respiratory illnesses are a leading cause of morbidity and mortality in Canada. While non-pharmacological interventions (NPIs) such as masking and physical distancing have effectively stemmed the spread of COVID19, the efficacy of NPIs in preventing other virally-triggered respiratory illnesses (VRIs) is less well understood. As the world moves into what may be the endemic phase of the COVID19 pandemic, better evidence is needed to inform rapidly-evolving public policy recommendations on the role of NPIs in infection control.

Methods: This study assessed the impact of NPI implementation on VRI-related healthcare utilization during the COVID19 pandemic. Following ethics approval from the Conjoined Health Research Ethics Board of Alberta (CHREB), long-term retrospective tableau data was extracted from the Alberta Health Services (AHS) data analytics enterprise data warehouse. International classification of disease (ICD-10) codes were used to identify patients who presented to an acute care facility in Alberta during the pandemic (Mar 2020-2021) and pre-pandemic (Feb 2015-2020) periods with a primary complaint of asthma, community-acquired pneumonia, influenza, or chronic obstructive pulmonary disease (COPD). Heart failure (HF) and acute appendicitis (AA) served as controls. The study team consisted of a medical student, an undergraduate student, a principal investigator from the Department of Emergency Medicine at the University of Calgary, members of the AHS provincial research data services team, and collaborating faculty members.

Evaluation Methods: The final study dataset comprised 585,809 ED visits and 175,456 hospitalizations. The primary outcome of interest was the change in ED visits and hospitalizations between the pandemic and pre-pandemic period for VRIs and controls. This was evaluated using quasi-experimental interrupted time-series analyses. A secondary outcome of interest was the cost-reduction associated with NPI implementation, for which multivariable regression models were constructed. These evaluation methods aimed to identify whether NPI implementation can (i) improve patient outcomes by preventing VRI-related ED visits and hospitalizations (ii) alleviate the strain on an already-constrained healthcare system by reducing VRI-associated healthcare spending.

Results: Triage acuity and comorbidity index scores were similar between the two periods. While a substantial decrease in healthcare utilization was observed in the early months of the pandemic for both VRIs and controls, a rapid rebound towards pre-

pandemic caseloads was observed only for controls, while VRI-related health utilization remained consistently low. Overall, there was a 43-62% and 41-84% decrease in weekly ED visits and hospitalizations for individual VRIs during the pandemic period (all $P<0.001$). ED visits and hospitalizations for HF declined by a small magnitude of 6% ($P=0.002$) and 8% ($P<0.001$), respectively. In contrast, an 11% increase in ED visits ($P<0.001$) and 3% increase in hospitalizations ($P=0.046$) was observed for AA. The decrease in VRI-related healthcare utilization resulted in $121 million in cost reduction. Surprisingly, even after accounting for COVID19, there was a significant decrease of 19,391 ED visits and 1,524 hospitalizations for respiratory illnesses during the pandemic period ($P<0.001$).

Advice and Lessons Learned:

1. NPI implementation was followed by a substantial decrease in healthcare utilization for VRIs. This resulted in substantial decrease in healthcare utilization costs and likely prevented significant patient morbidity and mortality.

2. The greater magnitude decrease for VRIs than controls as well as the fact that acuity/comorbidity scores did not increase indicates that the observed decrease I healthcare utilization was primary driven by NPI implementation rather than an avoidance of healthcare settings due to fears of nosocomial COVID19 acquisition.

3. NPIs appear to be an effective method of reducing the perennial burden of common respiratory illnesses. These findings provide a strong foundation for public policy recommendations on NPI use and establish the rationale for randomized studies on NPI use for preventing VRIs.

Improving mental health assessments and follow-up in a pediatric ED

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Background: Although the number of children presenting to emergency departments (ED) with mental health (MH) concerns has been on the rise, EDs have not in turn responded with approaches that address patient needs. A lack of standardized processes for risk stratification, assessment, and follow-up poses barriers for providing safe care. With PRIHS funding, our team endeavored to improve how ED-based MH care is delivered through the implementation of an evidence-based care bundle that involves risk screening at triage, streamlining MH assessments, and eliminating gaps in follow-up care by booking all patients in need into post-ED visit appointment within 96 hours.

Methods: A quality improvement (QI) approach was chosen for implementation. We used the Model for Improvement to test and implement each bundle practice: a suicide-risk screening tool (Ask Suicide Screening Questions [ASQ]) at ED triage; a standardized MH assessment tool (HEADS-ED); and an urgent, single-session 'Choice Appointment' with a MH professional for patients lacking access to appropriate and timely MH follow-up care. Each new practice was introduced sequentially over a 2- week period. For each practice, we identified 1 to 2 improvement aims, developed key driver diagrams, and selected primary outcomes and measures. Each practice was implemented using Plan-Do-Study-Act (PDSA) cycles with initial tests of change starting small and becoming larger as learning accrued from previous cycles. Our implementation team included families with lived experience, patient care and unit managers, nurse educators, frontline healthcare providers, content experts, and clinical leaders who supported staff and led change management strategies. A nurse was hired as a QI lead to support execution of PDSA cycles. A sustainability plan was developed and involved embedding education regarding new practices in new healthcare staff orientation, having a measurement strategy to ensure that improvement was maintained, and transition of responsibility for new processes to operational and medical leadership. Patient surveys conducted by the Emergency and Addiction and Mental Health SCNs informed the selection and prioritization of bundle components. The new care bundle was further refined during a ESCN Quality and Innovation Forum Presentation Proposal • 3 meeting with patient representatives and implementation team members at an in-person (pre-COVID) meeting in Red Deer. Patient partners helped select the outcome measures, assessment tools and timelines. During bundle implementation, feedback on care and processes was collected from youth and parents/guardians during each PDSA cycle. This feedback informed the development of new patient resources (brochures, handouts), change management strategies with healthcare staff, and revisions to clinical workflows. Patient resources were developed in consultation with patient advisors and partners from Edmonton-

based Children Youth and Families Advisory Councils. Implementation results from the PDSA cycles were communicated regularly with frontline healthcare staff.

Evaluation Methods: We used clinical data from Connect Care and experience data collected via surveys to determine if the aims for each practice were achieved. We included balancing measures to test whether changes in care in one part of the system introduced unintended consequences in other parts of the system. We calculated results for the primary outcomes using run charts to rapidly detect signals of improvement according to established rules for detecting special cause. The results from each PDSA cycle were discussed in the context of existing healthcare resources to support each bundle practice. The two ED-based bundle elements do not require additional resources or funding and are expected to reduce length of stay. The follow-up clinic option for ED patients without resources is intended to prevent crisis escalation and match patients with supports. Results from the larger PRIHS initiative, including patient impacts, will be reported upon initiative completion.

Results: All three bundle practices have been implemented. Tests of change for use of ASQ screening began February 1st, 2021 with the tool fully implemented by April 2021. Initial use of ASQ was 77% of target patients, and over time, improved to 93% (shift noted in September 2021). Tests of change to introduce the HEADS-ED began February 16th, 2021. Initial performance upon implementation was 81% and improved to 87% (shift detected beginning August 2021). The new option for post-ED follow-up care, an urgent, single-session 'Choice Appointment', was offered to patients who did not have timely and access to urgent follow-up with an existing mental healthcare provider. Of eligible patients, 86.9% had an appointment booked for within 96 hours of the ED visit.

Advice and Lessons Learned

1. A robust strategy to develop proposed changes based on best evidence combined with patient and staff engagement;
2. A comprehensive QI strategy to test, measure, and implement changes; and
3. Regular communication and collaboration among ED staff, mental healthcare staff, patients/families, and hospital leadership.

Patient caregiver preferences on discharge instructions from the Alberta Children's Hospital Emergency Department

Michelle Fric, Jennifer Thull-Freedman

Background: Greater than 90% of children who visit a pediatric emergency department (ED) are discharged home. Effective discharge teaching is an opportunity to provide caregivers with the information that they need to provide care for their child at home, ensure appropriate follow-up, and achieve the best outcomes for the child. Discharge instructions should be in a format that families will find accessible and useful, and not result in unnecessary healthcare system costs. As a new electronic health record is being adopted in our ED, this is an opportune time to optimize and standardize discharge instructions.

Methods: The study design was an anonymous, self-reported, 10-item cross-sectional survey in the ACH ED. Caregivers of patients aged 0-17 years were eligible to complete the survey and approached consecutively during shifts selected by availability of the project lead. Families who required an interpreter to communicate in English were not approached to complete the survey; instead, this was recorded to reflect those who would require translated resources. A sample size of 100 caregivers was chosen to provide a 95% confidence interval of +/- 10%. Survey questions covered preference of discharge instruction modality (verbal, print, electronic, or combination) and likelihood of using instructions if given in print or electronic format. We asked the caregiver's primary language spoken at home and whether they would be able to use English-language resources. Finally, we tested the caregiver's ability to use QR codes with a question that could only be answered after successfully accessing a QR code. The project was exempted from research ethics board review due to its classification as quality improvement.

Descriptive analysis was performed, including calculations of proportions and confidence intervals. Results were analyzed using IBM SPSS software.

Results: Of the 117 caregivers approached, 104 completed the survey (89%). Caregivers had a strong preference for written discharge instructions, with 98% supporting either electronic or printed resources in addition to verbal instructions, as opposed to verbal only. There was similar interest for both printed and electronic resources with the likelihood of utilizing that modality being reported as 75% and 79%, respectively.

Three percent of families were unable to complete the survey due to a language barrier. Of the 104 completed surveys, 19% noted that their primary spoken language at home was not English. Nonetheless, 100% of participants who did not primarily speak English but were able to complete the survey reported that they would use English-written discharge resources.

Eighty percent of the participants were able to successfully use the QR code and provide a correct answer to the test question. Of those who could not access the QR code, several reported that their inability was due to devices needing to be charged.

Advice and Lessons Learned

1. Caregivers of patients in our ED have a strong preference to receive discharge instructions in writing, whether printed or electronic.

2. There was not a significant difference in preference for electronic versus paper written instructions.

3. Some families will require translated resources, though many who do not speak English at home would still be able to use English resources. This does not diminish the importance of providing discharge instructions in a family's preferred language.

4. QR codes could be an effective tool for distributing electronic resources for most families, but there is still a sizeable proportion of families who are unable to use a QR code.

Scale and spread of quality improvement initiatives for bronchiolitis management in Alberta emergency departments

Nathan Solbak, Erin Thompson, Lindsay Long, J.A. Michelle Bailey, Daina Thomas, David Johnson

Background: Acute viral bronchiolitis is among the most common illnesses seen in the emergency department (ED) and is the leading cause of infant hospitalization in Canada. Practice guidelines do not recommend routine use of certain diagnostic tests and medications in managing bronchiolitis, yet prior studies suggest that low-value interventions are routinely administered to patients with bronchiolitis. Successful implementation of quality improvement at the Alberta Children's Hospital suggested that low-value interventions and tests can be improved. Yet, practice variation and potential opportunities to improve bronchiolitis management are likely present in EDs in urban and rural settings.

Implementation: The project is a collaboration between the Maternal Newborn Child and Youth Strategic Clinical Network (MNCY SCN), the Improving Health Outcomes Together Team (IHOT), and Physician Learning Program (PLP) under the umbrella of the AHS Ernst & Young Clinical Appropriateness Theme recommendations to expand and scale initiatives to reduce unnecessary tests to improve patient safety. A provincial Bronchiolitis Steering Committee, led by two Physician Initiative Leads, was formed to guide the project and implementation at 16 facilities across Alberta.

Site implementation includes two key aspects:

1. Audit & Feedback (A&F) – review practice data, facilitated discussion with clinicians, and identify enablers and barriers to practice change
2. Site Specific Implementation Plan – options for sites include use of posters, tools, resources; utilization of ConnectCare (order sets); and staff and physician education

Qualitative interviews with site-champions will provide perspectives and feedback on enablers and barriers to change. Discussions from the A&F sessions, in addition to the qualitative interviews will be coded and analyzed based on the Consolidated Framework for Implementation Research and Theoretical Domains Framework.

Resources required included clinical leads, project management, data/dashboards, educational posters, updated order sets, and a central location for staff and physician to access bronchiolitis materials (via SharePoint).

Evaluation Methods: The primary objective of the study is a reduction of chest x-ray utilization. Chest x-rays utilization can be readily obtained from administrative data at all sites in the project. Secondary measures include medications (PIN) and respiratory viral testing. There is strong evidence to support that medications and respiratory viral testing do not impact bronchiolitis management. The project addresses patient safety and outcomes by reducing the

use of low-value interventions and tests in the ED and enables resources to be directed towards evidence-based care. As ConnectCare is phased into all facilities across Alberta, additional metrics will be incorporated into reports and updates to participating sites.

Results: The first phase of the project took place from September to November 2021, with rollout to six facilities (four EDs and two inpatient units). A total of 151 physicians attended the audit and group feedback sessions. Site-specific planning sessions and qualitative interviews with site-champions are planned, and the next phase of the project will continue with spread and scale to regional EDs (n=5), urban (n=2) and rural (n=4) locations in fall 2022.

Advice and Lessons Learned:

1. The partnership with MNCY SCN, PLP, IHOT, and two Clinician Leads has been beneficial for establishing a team-based multi-disciplinary approach to address needs as they arise and the ability to work together with site champions.
2. Identifying and collaborating with site champions is necessary for establishing relationships and trust prior to conducting audit and feedback sessions and addressing practice change. Site champions understand the contextual factors of their facility and how to best utilize enablers or address barriers for practice change. Initiation of these working relationships need to take place months before implementation and ideally develop through existing networks.
3. Timing and flexibility are crucial for successful implementation. Rescheduling launch dates, adjusting session time, validating data, and adjusting to external factors such as delays in ConnectCare rollouts and pressures on the healthcare system brought on by the COVID-19 pandemic were experienced in the planning and initiating phases of the project. These lessons will be carried forward as we plan for the second part of spread and scale in Fall 2022.

Use of rational subgrouping to identify areas for improving time to ultrasound performance

Keon Ma, Erin Pols, Jennifer Thull-Freedman

Background: Safe, high-quality care within emergency departments includes the provision of efficient diagnostic and testing. At the Alberta Children's Hospital, emergency department (ED) and radiology staff have anecdotally noted delays for some patients in the completion of abdominal and pelvic ultrasounds. Rational subgrouping is an approach that stratifies data into multiple groups for display in control charts to minimize in-group variability and maximize between-group variability. The aim of this project was to identify subgroups based on demographic factors, shift type, and disposition status that experience longer time to completion, in order to identify targeted areas for improvement.

Methods: A working group of interprofessional stakeholders was formed, including emergency physicians, an emergency QI nurse, a radiologist and a sonographer. Existing protocols were reviewed. These included recent changes that had been implemented but not yet systemically evaluated, including specifying ultrasound indications that require bladder filling, revising bladder filling protocols, specifying requirements for radiologist approval, and clarifying flow and communication processes.

Abdominal and pelvic ultrasounds conducted in the Alberta Children's Hospital ED from May 2019 to April 2021 were included. This range encapsulated data points both before and after the declaration of the COVID-19 pandemic on Mar 11, 2020, which notably reduced ED volumes. Time stamps were obtained from the electronic health record for the time of physician assessment, time of study request and the time of study result. Data was subdivided based on rational subgroups for (1) sex, (2) age (3) shift time availability, and (4) disposition status. Cases with excessive delay were identified and a chart review was conducted to confirm time stamp validity and to identify unique circumstances contributing to delay. An exemption for ethics board review was obtained from the Conjoint Health Research Ethics Board at the University of Calgary due to the primary purpose of the project being quality improvement.

Evaluation Methods: Statistical process control charts (X-bar and S-chart) were used to establish mean and variation in time from ultrasound order to study result in the total population and each subgroup, measured in minutes. Scrotal ultrasounds were analyzed as a comparator to understand the most efficient time expected from ultrasound order to completion, given that they are typically highly prioritized. Rules to detect special causes were applied, including: (1) Single point outside control limits, defined as 3-sigma (2) Eight or more points above or below the centre line (mean) (3) Six consecutive points that are increasing (trend up) or decreasing (trend down) (4) Two out of three consecutive points near the outer third of a control limit (5) 15 consecutive points in the inner third nearest the centre line (mean).

Results: The mean time from ordering an abdominal/pelvic ultrasound to having reported findings was 203 minutes, compared to 103 minutes for scrotal ultrasounds. The mean time from physician assessment to having a reported study was 279 minutes, compared to 135 minutes for scrotal ultrasounds. Using subgrouping by sex for abdominal/pelvic ultrasounds, females had an

mean order to result time of 226 minutes, versus 178 minutes for males. For the 0 to 3 year age group, the mean order to result time was 167 minutes, which increased for ages 4 to 11 to 193 minutes and for children greater than 12 years old, it was 223 minutes. By shift type, day shifts had a mean order to result time of 157 minutes, evening shifts 142 minutes and night shifts 317 minutes. Using rational subgrouping for disposition status, the order to result time for admitted patients was shorter at 190 minutes compared to discharged patients, which was 214 minutes.

Advice and Lessons Learned:

1. This initiative highlights the benefits of using rational subgrouping for emergency department quality improvement projects. By separating our data based on sex, age, time of care, and disposition status, considerable variability was revealed between subgroups that would have otherwise been hidden.

2. Groups more likely to experience longer wait times for abdominal or pelvic ultrasounds included females, patients arriving at night, and adolescents.

3. Rational subgrouping with baseline data enables a targeted approach when designing plan-do-study-act cycles.