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Improving Analgesia Administration for Pediatric Patients in a Rural Emergency Department

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Improving Analgesia Administration for Pediatric Patients in a Rural Emergency

Department

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Abstract

When a child is in pain, parents often seek out treatment at an emergency department. After a detailed chart review it was determined that only 32.53% of the pediatric patients who present to a rural, northern California, ED in pain receive any documented form of analgesia during their time in the ED. A review of the literature revealed that triage nurse-initiated protocols can successfully manage to provide consistent and efficient analgesia to patients who present to an ED with pain. Therefore, a practice improvement project was undertaken to increase of the consistency and efficiency of analgesia administration for pediatric patients who present to the ED in pain, through the implementation of a triage-based protocol. Outcomes of the improvement project included an increase in the percentage of pediatric patients presenting in pain who received documented analgesia from 32.52% to 62.2% and a reduction in the time of analgesia administration from 70 minutes to 59 minutes. The project concluded with highlighting the importance of rapport building with staff members in order to affect a successful engagement of the medical team in the improvement process and increased likelihood of sustainability.

Keywords: emergency department, pediatrics, pain, triage, improvement, protocol, rural

Introduction

Problem Description

An emergency department (ED) in a rural community hospital in Northern California, receives approximately 27,000 patients per year, with 20% of that population being individuals under the age of 18 (California Office of Statewide Health Planning and Development, 2014). A review of the medical charts of the pediatric patients, listed as less than 18 years old, who received care in the ED of that hospital during the months of November and December, 2017, demonstrated that 50% of the pediatric patients had presented for complaints related to pain. Furthermore, upon a detailed review of the pediatric patients, for those with a documented pain score of greater than zero who had presented to the ED between November 1 and November 14, 2017, only 32.53% of the patients received any form of analgesia during their ED visit (refer to Appendix M for complete data table). This implies that 67.47% of all pediatric patients seeking care for pain are not receiving any form of pain control while in the ED at this hospital (see Figure 1). Based on previous practice experience of the project lead and knowledge of the existing literature it was hypothesized that a triage-based protocol could improve the treatment of pediatric pain at this facility.

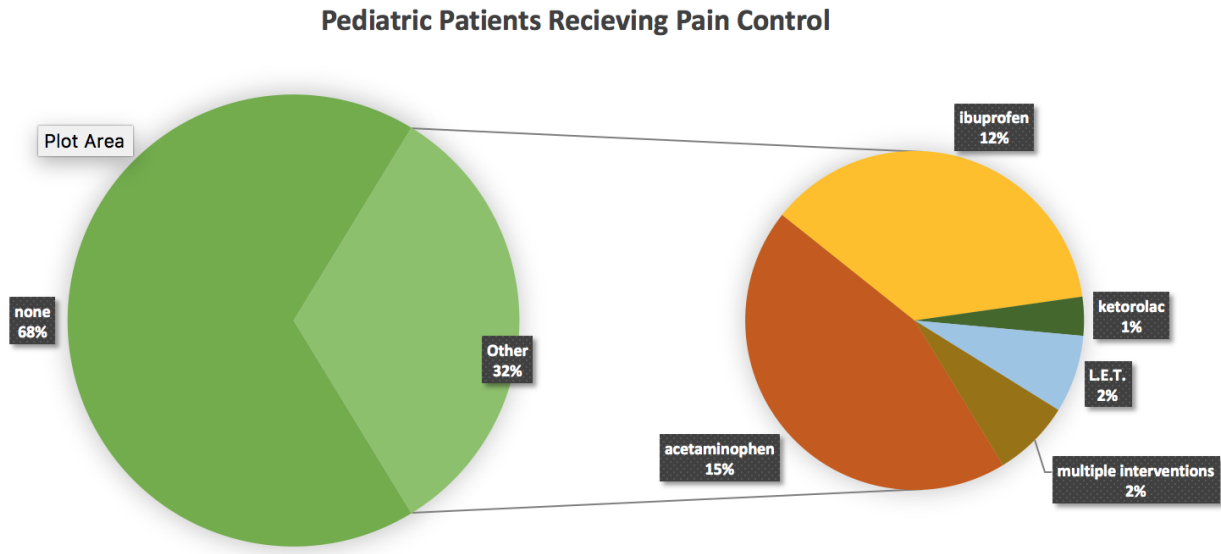


Figure 1. Distribution graph of pediatric pain interventions prior to project implementation,

Available Knowledge

A review of the literature was conducted in order to determine whether initiation of the application of a triage-based protocol can address this lack of pediatric analgesia. The guiding PICO question for this review was the following: Can pediatric patients(P) who present to an emergency department with complaints of pain have improved effectiveness of symptom management (O) through the utilization of triage protocols (I) in comparison with non-triage-protocolized pain management (C)?

Using this guiding question, searches were conducted within the Cumulative Index to Nursing and Allied Health Literature (CINHAL), Pub Med, and Cochrane databases during November, 2017. The key root terms that were used in various combinations were “triage”, “protocol”, “rural”, “emergency”, “department”, “pediatrics”, “child”, “pain”, “management”, “treatment”, “algorithm”, and “guideline”. The search results were confined to articles published in English within the previous 10 years. All abstracts of articles with titles related to pediatric pain and/ or emergency medicine were reviewed. Full articles were read on the condition that the

abstract presented relevance to improvement in pain management through the use of process change or quality goals. In addition, secondary sources, which appeared to be relevant to the guiding PICO question, were reviewed. Over 300 abstracts were evaluated, and 11 articles met the inclusion criteria for this review of literature. These articles include one retrospective analysis, one multi-facility staff survey, one prospective cross-sectional study, two pre- and post-intervention studies, three quality improvement projects, and three systematic reviews (refer to Appendix A for Evidence Evaluation Table).

Barksdale, Hackman, Williams, and Gratton (2016) conducted a retrospective analysis of 23,409 patients, spanning over a 27-month period, presenting to an urban safety-net facility, a healthcare facility that provides services to patients regardless of the patient's capacity to pay the expenses incurred (Institute of Medicine, 2000). The researchers analyzed the effect of triage pain management protocol implementation in the ED. Patients were included in the study if they presented with one or more of six conditions, which included back pain, dental pain, extremity trauma, sore throat, ear pain, or pain from abscess. Patients were started on oral analgesics, which included acetaminophen and/or ibuprofen. Subsequently, they progressed to oral opioid analgesics, such as oxycodone, if required. Results, post intervention, showed a 34% decrease in the time of analgesia administration. Interestingly, the study found that time to administer analgesia decreased even when there was no documentation of protocol use. This suggests that staff awareness of pain management increased simply by virtue of discussing and imparting education regarding the intervention.

Goh, Choo, Lee, and Tham (2007) initiated a quality improvement project in a 1,000-bed hospital in Singapore. The average daily census of this ED was around 350 patients. The intervention studied constituted the use of intramuscular ketorolac at triage for patients

presenting with limb injuries and a pain score of equal to or greater than 5 out of 10. The goal of the study was to decrease the time from registration to analgesia provision. The outcomes reported an overall decrease in time to analgesia administration with no observed adverse effects.

Habich and Letizia (2015) conducted a quality improvement project in a level two trauma center, located in a suburb outside of Chicago, Illinois. The project aimed to improve the practice of consistent use and documentation of pain scales among staff members in the ED. This was accomplished through a 40-minute online educational training. The main topics covered in the training session included the selection of appropriate pain scales, assessment of pediatric pain, strategies for overcoming barriers, non-pharmacologic pain management, family and patient education, and intervention outcomes measurements. The results discovered that staff usage and appropriateness of pain scale selection improved post intervention. However, further interventions were necessary in order to improve the actual treatment of patients' pain.

Heilman, Tanski, Burns, Lin, and Ma (2016) conducted a quality improvement project at the ED of Oregon Health and Science Center Hospital. More than 400 patient charts were reviewed before, during, and after three separate improvement cycles that aimed to decrease the median time for analgesia administration for patients with confirmed long bone fractures. Cycle one focused on increasing nurses' access to ordering and administering analgesics for suspected fractures through the use of triage-initiated protocols. Cycle two concentrated on improving the documentation to better reflect the actual practices taking place in the ED. Primarily, this cycle used daily huddles, monthly emails, and a printed poster located in the triage stations in order to remind staff to document both interventions and refusals of offered analgesics. Cycle three focused on physician acceptance of standardized analgesia selection. This was accomplished through surveys of senior medical staff members, in order to determine existing practice patterns.

These patterns were subsequently organized into standard order sets. These order sets were then disseminated among staff members through email and staff meetings. After the three cycles, median time for the administration of analgesia was reduced by 31%. Heilman, Tanski, Burns, Lin, and May year stated that key lessons learned in this project included the conduct of multiple cycles, in order to address unforeseen problems such as nurses' initial reluctance to administer analgesia for fear of affecting patient *nothing per os* (NPO) times. Additionally, the authors emphasized the importance of weekly staff updates in addressing issues and encouraging adherence to the new workflow.

Krauss, Calligaris, Green, and Barbi (2016) performed a systematic review to determine effective interventions for pediatric pain management in the ED. Interventions such as distraction, physical comfort, and pharmacologic interventions were all examined. Several suggested algorithms were presented for management of various pain levels and standing triage pain management orders were recommended. No list of included articles or sources was provided by the authors. The review cited 118 references; however, no indications of study locations were presented.

Taylor, Taylor, Jao, Goh, and Ward (2013) participated in a pre- and post-intervention study, which was conducted at an Australian tertiary adult and pediatric ED, with 18,000 annual pediatric visits. The intervention constituted a triage nurse-initiated analgesia protocol. This protocol allowed nurses to administer oral and topical analgesics to patients who presented with pain scores of 4 out of 10 or greater, without the requirement of a physician to first assess the patient. In total, 102 patient charts were reviewed, and 48-hour post-ED-discharge follow-up interviews were conducted with families with children between 5 and 17 years of age who presented to the ED in pain. The study concluded that nurse-initiated triage protocols reduced the

time required to administer analgesia, increased patient satisfaction, and reported no adverse effects.

Thomas et al. (2015) employed the survey approach to focus on triage nurses' perception of pediatric pain control in the ED. Paper-based surveys were administered to all triage nurses in three separate hospitals across Canada. The participating hospitals included Stollery Children's Hospital, IWK Health Center, and Children's Hospital of Eastern Ontario. All three hospitals were tertiary academic centers, located in urban environments. Questions in the survey centered on adequacy of triage pain control, acceptable time to administer analgesia, feasibility of facilitating pain control in triage, and nurse comfort with administering various forms of analgesia such as ibuprofen, acetaminophen, morphine, or oxycodone. The results demonstrated a wide variety in practices and opinions. However, in general, adult nurses reported longer acceptable wait times and greater discomfort with administering medications to children in comparison with pediatric nurses. Thomas et al. (2015) concluded that pediatric patients may benefit from receiving care at facilities with dedicated pediatric triage nurses.

Weingarten, Kircher, Drendel, Newton, and Ali (2014) performed a prospective cross-sectional survey of 100 pediatric ED patients who presented to a Canadian tertiary hospital. The survey asked questions related to pediatric pain levels and the pediatric patient's perception of pain management during their time in the ED. In this study, 92% of children confirmed satisfaction with their pain management, 4% reported that they were unhappy with their pain management, and 3% claimed that they were extremely unhappy with their pain management. Children reported improved satisfaction with more rapid administration of pain medication. Additionally, patients and families reported improved satisfaction of pain management related to provider communication skills. High-quality provider communication included asking the patient

about the quality of their pain and allowing the patient and the family to select the pain control intervention method from several options, as opposed to simply being told which pain intervention they would be receiving.

Wente (2013) conducted a systematic review of 14 studies that focused on non-pharmacologic management of pain in the ED, specifically for pediatric patients. The articles ranged in geography from the southwestern United States to central Canada. All the articles that listed specific locations took place in academic centers. The review discovered that various distraction techniques, such as bubbles, interactive toys, or videos, and the use of sucrose solution showed inconsistent results in effectively decreasing pain. Parental comfort holding techniques indeed displayed a consistent decrease in the anxiety and pain experienced before, during, and after uncomfortable procedures. Wente concluded that the non-pharmacologic interventions studied can be initiated by nurses without orders from providers. Such interventions could be beneficial to some patients and require little cost to implement.

Wiler et al. (2010) conducted a systematic review that included 52 individual articles. Article locations included 36 urban, 4 suburban, 2 rural, 2 community centers, 3 not stated, and 5 others. Articles included under the 'other' category constituted individual case studies or studies of specific patient diagnosis and were not specific to a particular location. The review presented the current state of literature with regard to the optimization of ED front-end operations. The optimization techniques studied included both adult and pediatric triage protocols, immediate bedding, fast-track concepts, and communication tools such as kiosks, tracking systems, and wireless communications. The study found that there is a considerable amount of mixed data. The commonly reported drawbacks of triage protocolization included over- and under-ordering of interventions, such as analgesics, x-rays, and labs, by triage nurses in comparison with

provider preferences. Concerns surrounding this approach include possible needless exposure of patients to procedures and radiation. The identified benefits of triage protocolization included decreased time of medication administration, decreased length of stay for patients, increased patient satisfaction, and increased staff satisfaction.

Williams et al. (2012) conducted a pre- and post-intervention study that concerned the implementation of an abdominal pain guideline for emergency nurses at an Australian urban center hospital. Through the utilization of a standardized triage guideline for treatment of abdominal pain, the objective of the study was to increase the consistency of pain documentation at the time of triage, and to reduce time of analgesia administration for patients with abdominal pain to less than 30 minutes from the time of presentation. Chart audits and staff surveys were utilized for the analysis. The authors discovered no statistical improvement in the time of analgesia administration post implementation. However, consistency of pain documentation was observed, and staff-reported competence in terms of pain management indeed improved. Williams et al. noted that although the time of analgesia administration did not improve statistically during their study, this measure did have a marked improvement immediately prior to the commencement of their study. This improvement was hypothesized to be attributable to a national survey indicating that pediatric pain management in Australian EDs was inadequate, thereby providing a motivation, external to the study, for staff to reduce time to analgesia administration.

Rationale

The conceptual framework that was utilized to guide this project was Donabedian's Structure-Process-Outcomes model. This framework demonstrates the influential relationship between structures (e.g., physical environment, level of training of the medical team, and

administrative systems), processes (e.g., actions involved in the actual delivery of patient care), and outcomes (e.g., patient health status, return of function, or survival) (see Figure 2). It emphasizes that the creation of change in one element will have a downstream effect on the subsequent elements (Liu et al., 2011). For example, moving a triage station to another area of the ED will possibly influence the process of triage, which will then exert some effect on the outcome of triaged patients.

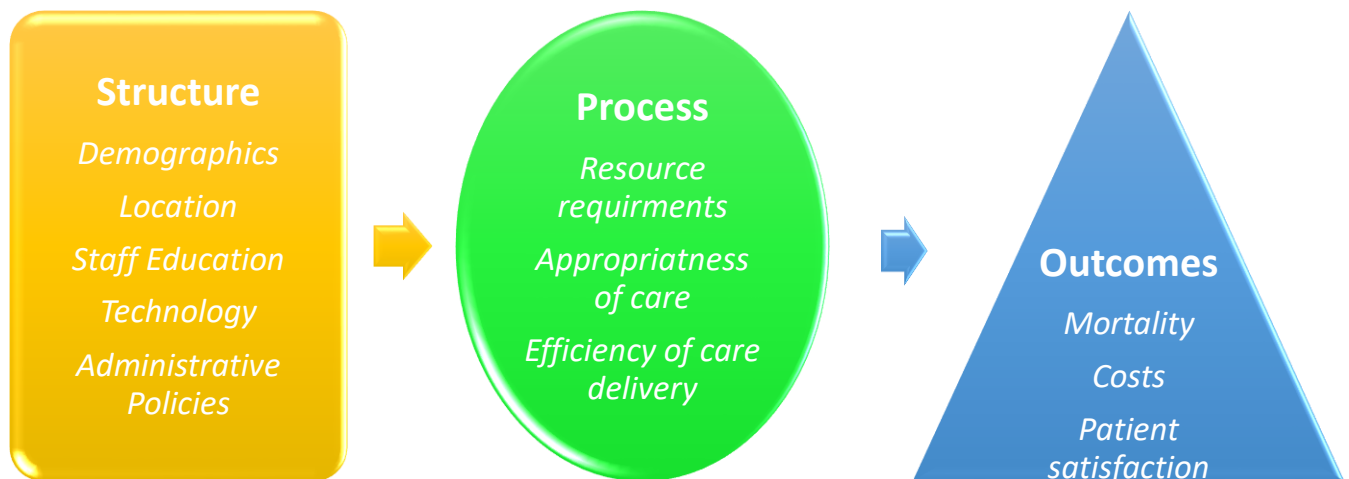


Figure 2. Donabedian's Structure-Process-Outcomes model

Structural interventions of this project included surveys emailed to the nurses and providers of the ED, placement of the new triage-protocol process poster within the nurses' triage station, posting of patient family reminders in the lobby, and informal staff interviews conducted by the project lead during the project intervention period. These interventions had the goal of influencing the triage nurses to alter their processes of delivering analgesia to pediatric patients, which in turn had an effect on the outcomes of pediatric pain management and patient satisfaction regarding the care they received.

This framework was chosen due to several reasons. It is long standing and widely used, and has been heavily applied in the healthcare sector, including application at the national level

for care coordination (McDonald et al., 2007), ways to provide better care for patients presenting in the ED (Liu et al., 2011), and even acute management of trauma patients (Moore et al., 2015). It is a relatively simplistic model in that it only has three key elements, thereby facilitating easy communication of its concepts to all the members of the healthcare team. Yet, this model is nuanced and flexible enough to identify and address all aspects of the quality improvement process.

Specific Aims

The aim of this project was to improve the quality of care provided to children presenting to a rural community hospital ED suffering from pain by February 2018. This primary objective was accomplished by utilization of a triage-initiated analgesia administration protocol. Outcome metrics for this project include:

- 1) At least 80% of the children presenting with complaints of pain will receive documented intervention(s) to address their complaints.
- 2) Pain management interventions will occur within 60 minutes of the initiation of triage.
- 3) ED staff will indicate satisfaction with the practice improvement project from a systems perspective.

Methods

Context

The rural community for the implementation site of this project has a population of 12,861, with a median age of 47.5 (Area Vibes, 2018). In 2017 the community hospital emergency department had an annual census of 24,161, with Medicaid and Medicare comprising 39.52% and 27.85% of the payer mix, respectively (Office of Statewide Health, Planning and Development, 2018). Key stakeholders at the ED site included the medical director (MD),

emergency medicine doctors (EMDs), physicians' assistants (PAs), and registered nurses (RNs), alongside patients and their families. After approaching the staff members and informally discussing the concepts of the project, the general responses of participants fell into two main categories. The initial responses were positive, with staff members at all levels agreeing that quality improvement projects of any kind would be beneficial for their organization and the patients. However, as the conversations became more detailed in nature, (with the introduction of certain questions, such as where do you see opportunities for improvement and/or what ideas do you have to address these areas), most staff members stated that they did not see any obvious areas for improvement. Consequently, they were unsure regarding whether they would support a quality improvement project, as it would require changes in established habits for little to no apparent benefit. This line of conversation was held with all levels of the staff, ranging from nurses to the MD.

After these preliminary conversations, further site-specific data collection was conducted, via chart reviews of all pediatric patients presenting to the ED for care from November 1st through November 14th, 2017, which led to the identification of a lack in the pain management experienced by pediatric patients. This data was then taken to the MD for discussion and attainment of potential support. It was previously indicated by multiple staff members that if any project was to be successful, the MD's support would be the single most important factor. The staff members cited various reasons for the importance of support from the MD. The MD is personally respected by all the members of the ED team, he holds the official authority to influence change, and the 'older docs', anticipated to be the most resistant to change by the majority of the staff members, would only be likely to support the project if the MD showed his support.

After the presentation of key data points to the MD, including the percentage of patients presenting with documented pain, most commonly used forms of analgesia in the ED, and the proportion of patients who received no analgesia during their ED visit, the MD agreed that this data highlighted a gap in patient care that could not, and should not, be ignored. He then stated that he would support any project that aims to enhance the consistency and efficiency of analgesia administration for pediatric patients in the ED, and that he anticipated the support of all the other staff members, RNs, PAs, and EMDs in this project (refer to Appendix B for Official Letter of Support).

Interventions

In order to increase the percentage of children who receive pain control measures from the current rate of 34% to 80%, a gap analysis was first completed. Existing shortcomings identified in the ED included the lack of staff awareness of pain control statistics related to their ED. Consequently, there was a lack of motivation to change current practices, as staff members were unaware of a need for change. Additionally, there was no official process for triage nurses to initiate pain management at time of triage, and no system was in place to monitor pain intervention performance for pediatric patients (refer to Appendix D for Gap Analysis).

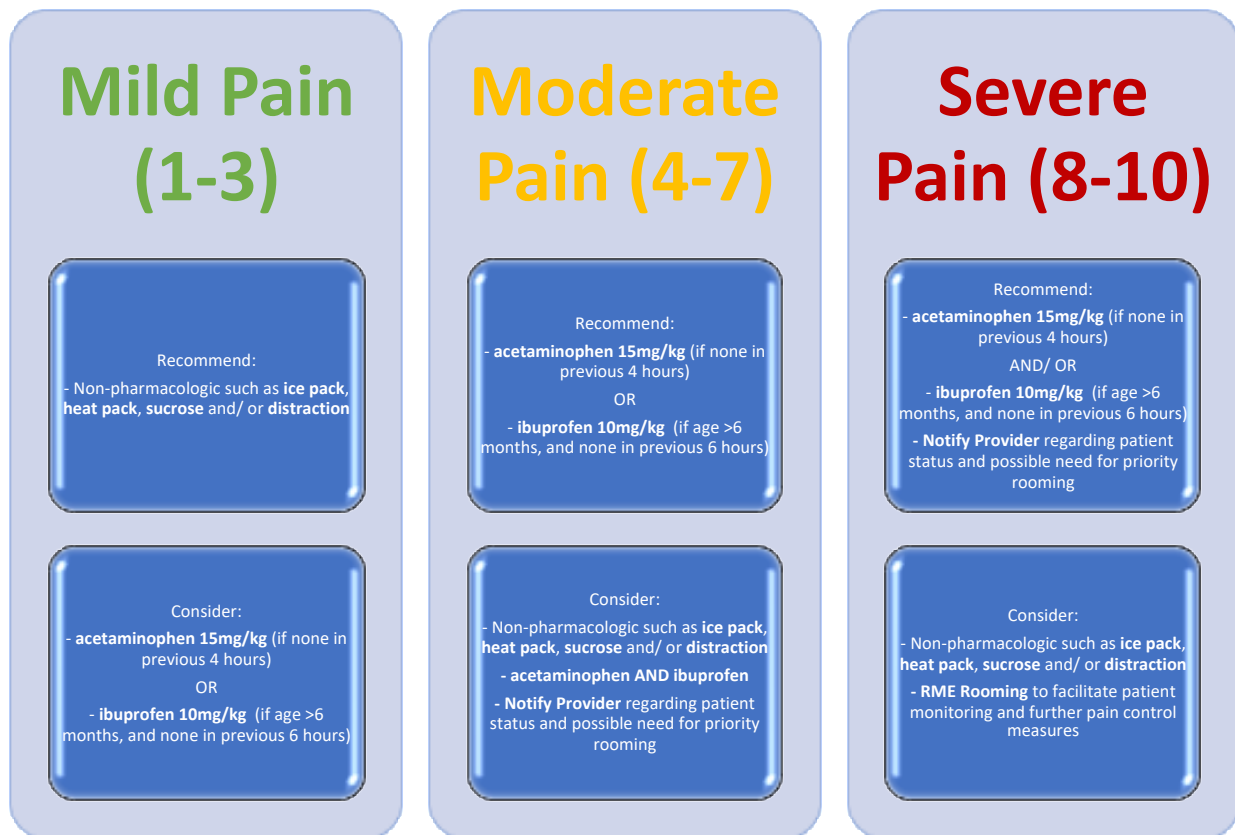
In response to this gap analysis, an action plan was designed in order to devise the type of interventions that were required. The action plan included the necessity to raise staff awareness of the pain management project, create a culture open to change within the ED, design a process that supported and encouraged staff members to provide pain intervention at the time of triage, gain support from the EMD team for any intervention that was required to be performed, conduct constant assessments of staff satisfaction with the project in order to adapt interventions for unforeseen barriers in real time, and provide key stakeholders and staff members with timely and

supportive feedback in terms of the progress of the project.

The initial phase of the project commenced on January 17th, 2018. It focused on the establishment of staff buy-in, which included staff surveys that were disseminated via email, and conducted through an online survey tool. Specific surveys were designed for both providers and nurses. These surveys included questions concerning staff opinions, which were related to current pediatric pain management practices, adequacy of specific pain interventions, and potential advantages and drawbacks of the implementation of a pediatric triage pain protocol. In addition, the nurse survey included voting between multiple visual representations of a pediatric pain assessment tool in order to select the tool that would be implemented at the triage station (refer to Appendix O for staff surveys).

After the completion of staff surveys, the results obtained were discussed with the key stakeholders, including the ED nursing supervisor, ED assistant nursing manager, and ED medical director. After the discussion, it was agreed that no further surveys were necessary, as the majority of staff members strongly supported the proposed interventions, and all the stakeholders approved the proposed visual aids. Therefore, the second phase of interventions began on January 25th and ended on February 7th, 2018. This phase involved staff notification regarding the new workflow process through email and the placement of support materials in the triage room and the waiting area of the ED. These materials took the form of visual aids, which A) reminded the staff members of the new triage pain management process, B) provided a visual representation of the new workflow process, and C) informed patients and families to ask the triage nurse for pain intervention in case their child needed it.

- **Inclusion Criteria:**
 - Patient age less than 18 years old
 - Patient documented pain score greater than 0
- **Exclusion Criteria:**
 - Patient followed by specialty service, such as neurology, nephrology, genetics, hematology, and/ or oncology
 - Intervention contraindicated by patient allergy
 - Head/ Mid-Face trauma, LOC, mental status changes
 - Respiratory distress and/ or airway compromise
 - Concern for possible overdose and/ or ingestion
 - Toxic appearance



- Probable Wound Irrigation
 - Recommend **L.E.T.** application to **Laceration Site(s)** excluding sites of end arterial supply such as digits, penis, nose or ears
- Probable IV Start
 - Recommend **LMX** Cream application on 1-2 potential **IV sites**

Figure 5. Triage Protocol

Is Your Child in Pain?

Please Help Us Help You

**If your child needs pain management
ask the triage nurse for assistance.**

We Want to Partner with You

**Please continue non-medication pain
relief with your child, such as distraction,
rest, ice, compression with ace wraps,
splints, etc.**

Keep Us in The Loop

**If it has been more than 60 min, and
your child's pain has not improved
please let your nurse know .**

Figure 6. Waiting Room Poster

Throughout the second phase of the project, the staff members were interviewed daily during the downtime in the ED, in order to assess their present level of satisfaction with the new process and to gather feedback. The obtained feedback was documented at the time of the

interview, and the identities of all the contributors were kept anonymous. This documentation was then relayed to the key stakeholders through a weekly email. In addition, at the conclusion of the project, a final presentation of the outcomes of the project was given to the MD via phone. Additionally, analysis of the data was performed (refer to Appendix J for Continuous Quality Improvement Plan).

This plan was designed with not only the current literature and site-specific data in mind, but also site-specific strengths, weaknesses, opportunities, and threats. The strengths identified included strong personal ties between the staff members and the community, relative autonomy in practice in relation to the nature of a rural community hospital, a large amount of experience amongst the staff pool, diverse mix of the staff, which is capable of ordering medications, and the active operation of electronic health charting.

Weaknesses included well-engrained current processes, which made any change potentially difficult, unfamiliarity of staff members with quality improvement concepts, lack of dedicated pediatric staff members, shortcomings of the protocols currently used, and therefore, lack of familiarization of the staff with a similar workflow process, the great distance between the medication room and the triage room, ED intake, small size of waiting rooms relative to average ED census, outsider status of the project lead in relation to established ED staff, and relatively short timeframe for improvement project given need to complete project planning and implementation in one university semester.

Opportunities identified included a gap in current pain care practices at the ED, stated MD and staff support for the project after presentation of baseline data, a national movement toward value-based reimbursement, which endowed this project with value and context within the current healthcare industry. Moreover, patient satisfaction is key to fulfilling the strategic

healthcare objectives of hospitals. Furthermore, there is a national movement toward data-driven outcomes. In addition, triage protocols are common in most large hospitals, and online patient satisfaction scores are readily accessible to the public and staff members.

Lastly, threats included the minimal motivation of staff members by healthcare organization level goals, lack of complete autonomy of the ED (as the ED must comply with facilities goals and processes), and the scheduled remodeling of the intake and waiting area during project implementation, which would potentially cause conflicts between the project design and new, unforeseeable, workflow changes (refer to Appendix H for SWOT Analysis).

Budget

The budget for this project involved three sources. The first was that all hours of the project lead incurred no cost to the ED; as the researcher was a graduate student and was required to complete this project as part of an academic program. Additionally, the researcher was ultimately responsible for all aspects of the project (refer to Appendix G for Responsibility Matrix).

Physical supplies required for the project were minimal: only six small posters. These posters were purchased by the researcher out of their personal funding for their education.

The final portion of the project budget was staff time. Staff members were instructed to use the downtime they experienced during their working hours to complete the online survey and read relevant emails. Staff feedback was voluntary, kept anonymous, and obtained through email and informal interviews. This feedback was also obtained during the downtime experienced by staff members, throughout the course of project (refer to Appendix I for Budget).

Hospital administration was unwilling to release financial data related to the cost of procuring or administering analgesia (i.e. cost of acetaminophen, ibuprofen, ice packs, etc. to the

hospital) for the purposes of this project. However, it was assumed that any intervention, given and documented within the established workflow processes of the emergency department, would generate a net profit for the hospital; as this would be essential for the ongoing operation of any business. Therefore, any increases in administered analgesia can be assumed to create a net increase in hospital profit.

Return on investment (ROI) for this project was difficult to calculate with the use of discrete financial amounts, as ED budget reports were not accessible to the project lead. However, considering that the total cost incurred from the ED budget was negligible, it was impossible for the project to have a negative impact on the ED budget. In addition, improvements in the treatment of pediatric pain created a moral ROI that affected not only the patient, but also their family members as well. This was highlighted during the final presentation of data to the MD, when he commented, “During the last week of the project I had the mother of a pediatric patient with arm pain tell me that she was so impressed, and thankful, that the triage nurse gave her son pain medication right away” (J. Britton, personal communication, March 7, 2018).

Study of Interventions

All patient documentation at the facility is maintained within the Cerner electronic health records system. Pain scores are documented when the triage nurse records the initial set of vital signs, alongside the nurse’s subjective assessment, which can include discussions with the patient/ family regarding the pain management options offered at the time of triage. As such, the most precise and practical way to study the outcomes of this project were through detailed reviews of the electronic patient chart. These reviews were conducted as convenience samples of all pediatric patients presenting to the ED during the baseline data collection period and during

the project implementation period.

Measures

Inclusion criteria for the project necessitated the patients to be aged less than 17 years, with an initial documented pain score greater than zero. Specific data measures for included patients included date of visit, patient age in years at time of visit, type of chief complaint (i.e., burn, laceration, ear pain, and so on), time of first documented vital signs, indication at time of triage if pain management options were offered and/or refused, documentation of first non-pharmacologic pain intervention, if any, and documentation of first pharmacologic pain intervention, if any.

All patient conditions and time points used were drawn from the official electronic medical record. As such, the data utilized was extremely valid and reliable. Data was obtained through the use of the internal Cerner data reporting function. Each weekly report was generated through the “Ed activity log” found in the Cerner Explorer Menu. This list contained the details of all patients presenting to the ED from 00:00 on January 25th to 23:59 on February 7th. The patients were then organized according to age, from the oldest to the youngest. Chart reviews were conducted for all patients from 17 years old to the youngest patient, in order to determine patient inclusion or exclusion and relevant data points. Specific data points, or lack thereof, were documented in an Excel sheet that was set up for this purpose. No personal patient identification information (i.e., name, date of birth, medical record number, and so on) was documented in the Excel sheet. This review and compilation provided the project with a complete and systematic representation of all pertinent data points related to the project.

Throughout the intervention phase of the project, informal staff interviews were conducted by the lead investigator, with the intention to solicit feedback regarding the project.

Examples of interview questions include, “How has the new triage process been going?”, “What aspects to you feel are working? What aspects aren’t working?”, “Are there any barriers you are encountering frequently?”, and “Do you have ideas for ways to improve the project, or the triage process?”. All staff feedback was documented in paper and relayed to the key stakeholders. Staff members were informed that any feedback provided to key stakeholders, or included in any formal documents, would remain anonymous. The objective of this anonymity was to illicit complete and honest feedback from all staff members.

Analysis

Descriptive statistics were completed on patient age, gender, chief complaint, and pain score.

After the completion of the project, discrete data (i.e., whether or not patients were offered pain control) was analyzed for statistical significance through a chi square calculation, using an alpha of 0.5. Continuous data (i.e., time of pharmacologic analgesia administration) was analyzed for statistical significance via a one-tailed, unpaired t-test. This t-test was compared to a statistically significant alpha of 0.05. The software used for these analyses was Microsoft Excel.

A post-hoc power analysis was completed using G-software to test for adequate power to avoid a type II error.

Ethical Considerations

The emergency medical team, consisting of RNs, PAs, and medical doctors, maintained full autonomy in implementing the project according to the dictates of their professional medical judgment. At no point did this project override the standard medical decision-making for any medical team member. In addition, this project was pre-approved by a doctor of the nursing practice committee as a non-research, practice improvement project, which negates the necessity

for a formal IRB review.

The overall process of patient triage and treatment remained unchanged, thereby eliminating any concerns over patient privacy during the course of the treatment. With regard to patient data, chart reviews were only conducted by persons who had undergone HIPPA compliance training and had approved access to the electronic medical records system. Furthermore, the patient data collected for assessment and monitoring of project goals did not include any personal patient identifiers, such as name, medical record number, birth date, among other factors. This ensured that patient privacy was respected in reporting the data.

This project supported the Jesuit mission of *cura personalis* or “care of the whole person” (University of San Francisco, 2017). Emergency medicine often focuses on only the aspects of care that prevent a person from dying. This is a crucial part of providing care to patients in the ED. However, this project sought to expand emergency care beyond only life-saving measures, in order to provide a more complete care to a suffering child. In improving the consistency and completeness of care for pediatric patients presenting with pain, this project upholds the ethical value of *cura personalis*.

The Code of Ethics of the American Nurses Association contains nine provisions, several of which are relevant for this project. However, provision four applies to the study in the most direct manner. Provision four states, “The nurse has authority, accountability, and responsibility for nursing practice; makes decisions, and takes action consistent with the obligation to promote health and to provide optimal care” (American Nurses Association, 2017, p.7). By providing the ED nurses with the support and tools to more optimally and independently deliver pain relief to their patients, this project supported this ethical provision to its fullest capacity.

Results

The initial phase of the project involved staff surveys to solicit feedback on potential interventions and generate staff engagement in the project. Of the 14 ED providers, six responded to the survey; representing 42%. Of the 47 ED nurses, only nine responded to the survey email, which represents 19% of the nursing staff. Because of the low response rate, it was decided by the project lead and key stakeholders that further feedback from staff would be best obtained through informal, in-person interviews conducted by the project lead during downtime in the ED.

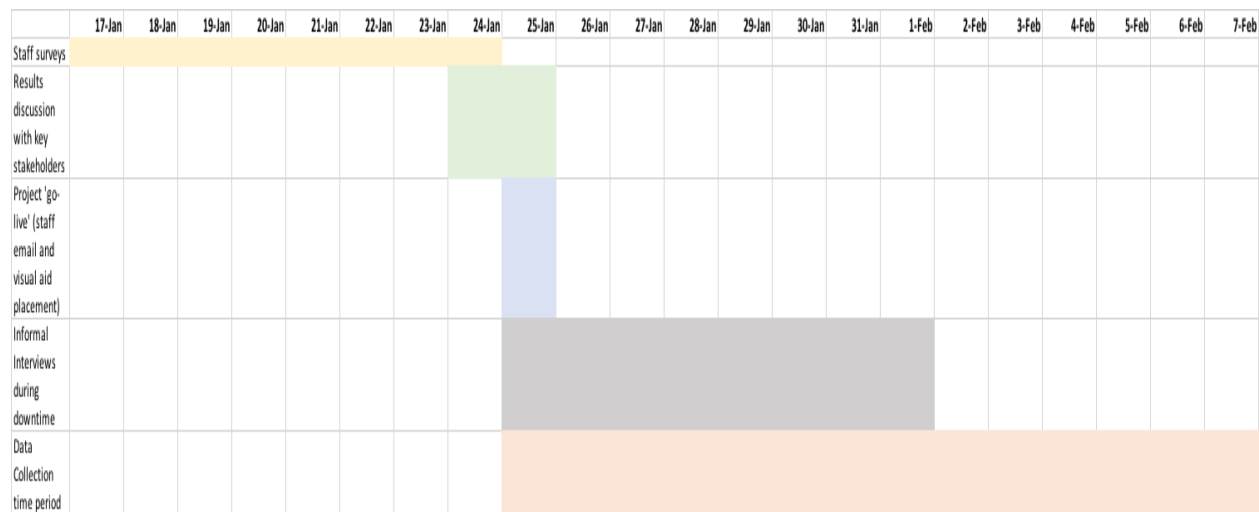


Figure 7. Project implementation timeline chart.

Over the eight days of informal interviews, 22 nurses were engaged in discussion about the progress of the project. Of the 22 nurses individually interviewed, 21 stated they felt generally positive about the project. One nurse stated they did not see value in administering analgesia to pediatric patients based on any formalized protocol. Fourteen of the 22 nurses stated that the protocol was being used mostly during times of low census in the ED. However, when more than three patients were present in the waiting room, they felt that the triage nurse was unable to implement the protocol, as their attention was needed to monitor the waiting patients. Upon receiving this feedback, the project lead discussed it with all charge nurses working during

the eight days of interviews. Charge nurses consistently stated that they would allocate additional staff to the triage position if able during times of high patient volume. However, charge nurses also stated that this allocation was unlikely to be possible because of lack of staffing in other areas of the ED, which would have higher priority during high patient volume times.

During the eight days of informal interviews, 10 providers were engaged in discussion about the progress of the project. All 10 of the providers stated they observed no increase in perceived workload related to the implementation of the project. One provider was able to cite a specific patient's family that commented on their happiness related to the efficiency of analgesia their child received during triage. Two additional providers stated they felt a perceived decrease in the total number of children in pain at the time of their examinations over the preceding week, a timeframe largely encompassed by the intervention period. However, they were not able to state specific patients or dates of exam.

| Qualitative Response Themes | Staff |
|--|--------------|
| Overall support of project and goals | All |
| Interventions mostly occurring during times of low ED census | Nurses |
| No perceived increase in workload | Providers |

Figure 8. Chart of qualitative theme results from staff interviews

Baseline data for this project, November 1st through November 14th, 2018, demonstrated that 32.53% of pediatric patients presenting to the ED with a documented pain score greater than zero received documented analgesia while in the ED. During the intervention period, January 25th through February 7th, 127 pediatric patients presented to the ED with documented pain scores greater than zero.

| Age (yr) | Count |
|--------------|------------|
| 0 | 4 |
| 1 | 8 |
| 2 | 5 |
| 3 | 11 |
| 4 | 8 |
| 5 | 9 |
| 6 | 5 |
| 7 | 3 |
| 8 | 8 |
| 9 | 10 |
| 10 | 10 |
| 11 | 6 |
| 12 | 7 |
| 13 | 4 |
| 14 | 5 |
| 15 | 7 |
| 16 | 11 |
| 17 | 6 |
| Total | 127 |
| Gender | Count |
| Femal | 74 |
| Male | 53 |
| Total | 127 |

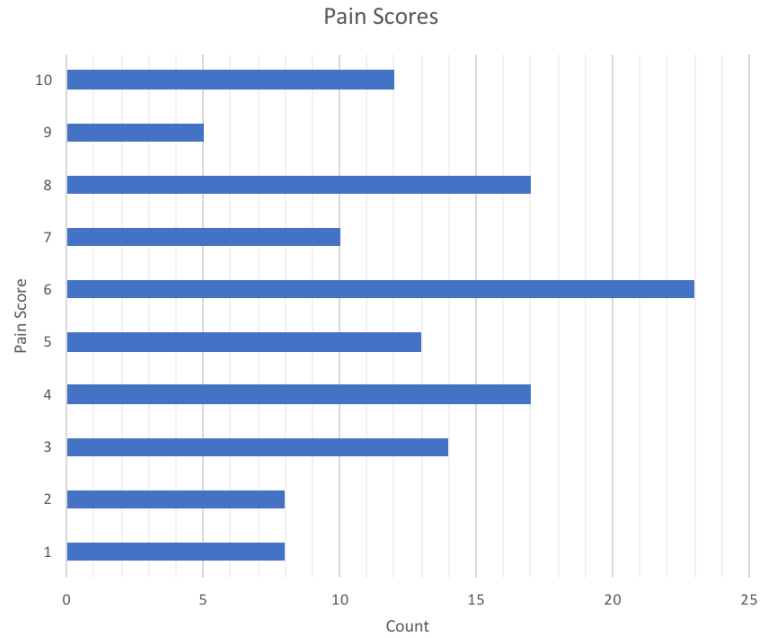


Figure 9. Age, gender, and pain score demographics during project implementation

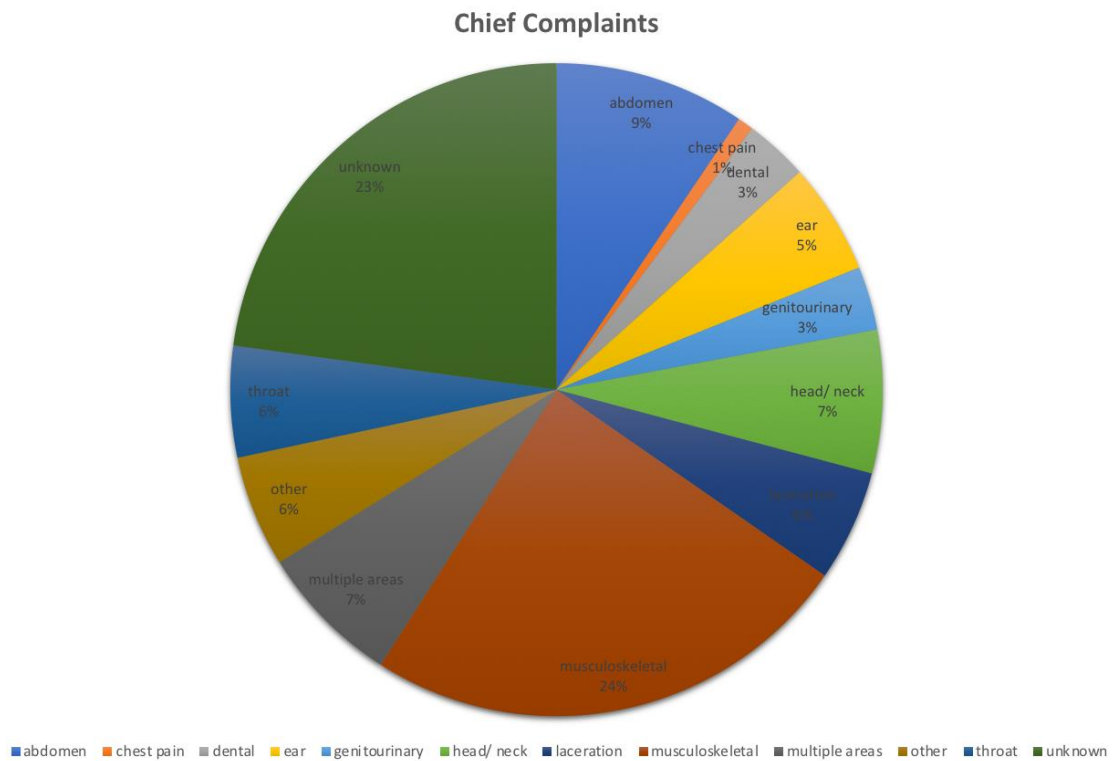


Figure 10. Reported percentages of chief complaints

Of the total 127 patients, 62.2% received documented analgesia; a 29.67% increase in

documented pain interventions. A chi square calculation was completed to analyze for statistical significance which resulted in a p-value of <0.001 . This represents a statistically significant improvement in documented analgesia during the post-intervention period as compared to the pre-intervention period.

For those patients who received documented analgesia, the baseline mean time from triage to intervention was 70 minutes. During the intervention period this mean time decreased to 59 minutes. A one-tailed, unpaired, t-test was used to calculate a p-value of 0.218. This demonstrates a statistically non-significant reduction in mean time to analgesia (see Appendix N for complete data table). G*Power 3.1 software was used to perform a post-hoc power analysis. This analysis resulted in a power of 0.682, indicating that this project sample was underpowered to accurately determine a statistical significance. Using an effect size of 0.3, an alpha of .05, and a desired power of 0.8 a priori calculation determined that a pre-intervention sample size of 124 or greater, and a post-intervention sample size of 158 or greater would be needed to sufficiently power this study in order to accurately determine statistical significance.

Discussion

Summary

The aim of this project was to improve the quality of care provided to children suffering from pain in a rural community hospital ED by utilizing a triage-initiated analgesia protocol, with at least 80% of children presenting with complaints of pain having documented intervention(s) to address their complaint within 60 minutes of starting triage. After the intervention, the proportion of children receiving pain intervention(s) rose from 32.53% to 62.2%. Although this did not meet the target of 80%, it did represent a statistically significant improvement. For those patients who did receive pain intervention, mean time to administration

decreased from 70 minutes to 59 minutes. Although this did meet the project goal of less than 60 minutes, the project sample size was insufficiently powered to determine statistical significance.

The primary barrier encountered during project implementation was establishing an effective and reliable means of communication with the staff, particularly the nursing staff. During project design, it was thought that email would be an effective tool to communicate project ideas and results in near real time with all staff members. However, after the initial staff survey, it became apparent that this method of communication was not regularly monitored by staff members. After discussion between the project lead and key stakeholders, a new communication plan was devised. Since no formal staff meetings would be held during the project intervention timeframe, and management was unable to budget specific staff time for education related to the project, it was decided that informal interviews would be the most effective way available to communicate with staff. In order to maximize the number of staff interviewed, the project lead timed the interviews to occur at the time of shift change, thereby capturing both on-going and off-going staff members. In addition, it was recommended by key stakeholders that the interviews be as informal as possible. This was recommended for two reasons. Firstly, the nursing management strongly felt that the staff should not feel the interviews were adding to their official responsibilities in any way, and therefore they should not be conducted as a formal process. Secondly, all key stakeholders agreed that given the small-town nature of the ED and its surrounding community, informal interviews would allow the project lead opportunity to build rapport with the staff. This would then motivate the staff to fully participate in the improvement project, and thereby make the project as successful as possible.

This approach, with its focus on rapport building, and integration of the project lead into the community of staff members was likely a significant factor in the success achieved by this

project. This was evidenced during the informal interviews when staff, upon seeing the project lead, would often independently remark with enthusiasm that they had recently given pain control to a child during triage. However, when asked if they were able to meet the specific timeframe goals of the project, the staff would exhibit little or no understanding of these metrics. This engagement with the overall goal of the project demonstrated the staff's focus on providing care to their community rather than meeting a goal set by the management or a project lead. Furthermore, this engagement was also deemed to provide the best chance of outcome sustainability for the project as any continued updates regarding metrics or processes done via email were unlikely to be effectively received by staff. As such, staff discussions with colleagues, key stakeholders, and community members was understood to necessarily be the primary plan for project sustainability.

Interpretations

This project is consistent with available literature in that a triage-based protocol was able to produce a statistically significant improvement in administering more consistent analgesia to pediatric patients presenting to an ED (Barksdale, et al., 2016, Heilman, et al., 2016, Krauss, et al., 2016, Taylor, et al., 2013, and Wiler et al., 2010). Although much literature exists supporting the use of triage protocols for pain management, the novel aspect of this project was its site. The majority of literature on process improvement occurs at large tertiary teaching centers, with an existing culture of evidence review and continuous improvement. This project contributes to the existing body of evidence by providing a detailed example of how process improvement projects can be applied in rural environments, along with stating the unique advantages and barriers encountered.

Implications from this study for future improvement projects include the importance of

understanding current communication systems and their effectiveness within an organization and the necessity of building rapport with staff prior, during, and after project initiation for the successful achievement and sustainability of project goals.

Limitations

Several limitations in study design became apparent by the conclusion of this project, primarily those related to imprecision in data collection during the intervention period. Electronic medical record data was obtained as designed, and without unforeseen difficulties. However, even at best, these data are secondary to the input practices of the medical staff. As such, it is possible that additional interventions, such as ice packs, may have been administered without being reflected in the electronic medical record. In addition, barriers related to staff communication and the collection of staff feedback were significant. Were this study to be done again, staff interviews would continue to be done in an informal manner, however a more standardized method for recording staff feedback would benefit the post intervention analysis and allow for a more precise statistical analysis of the trends observed.

Conclusions

This study made significant progress in reducing the undertreatment of pediatric pain in this ED. Further study would be needed to determine how best to maximize the rapport building approach thought to be beneficial to the success and sustainability of this project. Other projects, both within healthcare and in other contexts, will find useful the emergence of personal communications over electronic as a preferred method for engaging staff in process improvement. Professionals in all stages of their careers will benefit from the example that human factors, and not project or facility metrics, are the dominant factors in motivating change within the healthcare environment.

Other Information

Funding

Funding for all project lead hours associated with this project was provided by the California Office of Statewide Health Planning and Development, via the Song-Brown Grant. The mission of the Song-Brown Grant is threefold: To attract minorities and people from underserved communities into the nursing workforce, training nursing students to work in underserved areas, and ultimately placing nursing graduates into underserved communities (Office of Statewide Health Planning and Development, 2017). This project contributed to all of these goals. By improving the quality of care provided to rural pediatric patients this project worked to enhance the image of nurses within the underserved community it was implemented in, and thereby endeavored to motivate members of that community to pursue nursing as a profession. By its very nature, providing care to an underserved community, the project provided front-line training for the graduate nursing student involved in the project. Lastly, through the act of building relationships with the project's affected community, it significantly raised the likelihood of the student involved in the project eventually working in this, or similar, communities in the future.

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[6723.12103/abstract;jsessionid=4448789F32DD4745F3988CDBEE642DB0.f04t02](http://onlinelibrary.wiley.com/doi/10.1111/1742-6723.12103/abstract;jsessionid=4448789F32DD4745F3988CDBEE642DB0.f04t02)

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Appendix A

DNP Statement of Non-Research Determination Form

Student Name: Alvin Walters

Title of Project: Making a Rural Emergency Department Kid Friendly: First Steps

Brief Description of Project: This project will seek to improve the quality and consistency of care received by pediatric patients in a rural emergency department. It will accomplish this by implementing a bundle of interventions, supported by evidence and approved by the medical staff, to initiate pain control, fever reduction, and asthma prevention education for patients/ families at time of triage.

A) Aim statement: By February 2018, Sierra Nevada Memorial Hospital's Emergency Department will improve the quality of care provided to children suffering from pain, fever, and/ or asthma. Eighty percent of children presenting with complaints of pain, fever, or asthma will have documented interventions to address these complaints within 30 minutes of starting triage.

B) Description of intervention: Triage protocols will be agreed upon by the ED staff. Then patients identified during triage to be experiencing pain, fever, or asthma symptoms will have pain interventions, antipyretics, or the asthma home-trigger checklist administered, respectively, to them within 30minutes of starting triage.

C) How will this intervention change practice? Currently there are no triage protocols in place to allow rapid and/ or consistent administration of analgesia, antipyretics, or asthma education to children and families presenting to the emergency department. This project will both educate and empower staff to provide better quality care to pediatric patients through the use of agreed upon protocolized interventions at the time of triage.

D) Outcome measurements: Chart reviews will be done for pediatric patients presenting to the emergency department with chief complaints related to pain, fever, or respiratory problems in the two months prior to project implementation, and the two months post project implementation. Outcome measures will include total number of patients with documented pain, fever or asthma education interventions, as well as the timing of these interventions related to triage start time.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used:

(<http://answers.hhs.gov/ohrp/categories/1569>)

This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

| Project Title: Reducing Time to Analgesia for Pediatric Patients in a Rural Emergency Department | YES | NO |
|--|------------|-----------|
| The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes. | x | |
| The specific aim is to improve performance on a specific service or program and is a part of usual care . ALL participants will receive standard of care. | x | |
| The project is NOT designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does NOT follow a protocol that overrides clinical decision-making. | x | |
| The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does NOT develop paradigms or untested methods or new untested standards. | x | |
| The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does NOT seek to test an intervention that is beyond current science and experience. | x | |
| The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP. | x | |
| The project has NO funding from federal agencies or research-focused organizations and is not receiving funding for implementation research. | x | |
| The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., not a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients. | x | |
| If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: <i>“This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board.”</i> | x | |

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print): Alvin Walters

Signature of Student:



DATE: 12/21/2017

SUPERVISING FACULTY MEMBER (CHAIR) NAME (Please print): Alexa Curtis

Signature of Supervising Faculty Member (Chair):

DATE: 12/21/2017

Appendix B
Letter of Support

To Whom It May Concern:

This letter is to state the official support of Sierra Nevada Memorial Hospital's Emergency Department for the Doctorate of Nursing Practice (DNP) student project of Alvin Walters.

Mr. Walters will be working to improve the 'kid friendliness' of the Sierra Nevada Memorial Hospital Emergency Department. The goal of this project will be to provide children presenting to the emergency department with complaints of pain prompt and evidence supported care.

Sincerely,

?

Joseph C. Britton, M.D.

?

Medical Director, Emergency Services

Medical Director, Case Management

Immediate Post-Chief of Staff, SNMH

Board Certified Emergency Physician, SNMH

Appendix C
Evaluation Table

| Evidence Evaluation Table | | | | | | | | | |
|---|---------------------------|----------------------|--------------------------------|---|--|---|---|--|---------------------------------------|
| Reference | Location(s) | Conceptual Framework | Design/ Method | Sample/ Setting | Major Variables Studied | Measurement | Data Analysis | Findings | Appraisal: Worth to Practice |
| Barksdale, Aaron Nathan, Jeff Lee Hackman, Karen Williams, Matt Christopher Gratton (2016). ED triage pain protocol reduces time to receiving analgesics in patients with painful conditions. <i>American Journal of Emergency Medicine</i> . Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/27663766 | Urban safety net facility | none | retrospective analysis | 23,409 patients over a 27 month period presenting to a safety net facility ED | pre and post triage protocol intervention for pain control | time to analgesia administration | a predictive model using linear regression | triage protocol decreased admin time by 34% (60min). Although overall reduction in time was seen post-implementation with our without protocol use suggesting project increased RN awareness of pain control. | John's Hopkins Non-Research: Level VB |
| Goh, H.K., S.E. Choo, I. Lee, K.Y. Tham (2007). Emergency department triage nurse initiated pain management. <i>Hong Kong Journal of Emergency Medicine</i> . Retrieved from: https://www.researchgate.net/profile/Kum_Ying_Tham/publication/228500776_Emergency_Department_Triage_Nurse_Initiated_Pain_Management/links/571a21b308aeea3456c00b92/Emergency-Department-Triage-Nurse-Initiated-Pain-Management.pdf | Urban Singapore | none | quality improvement initiative | 1,000 bed Singapore hospital ED with average daily ED census of 350 patients | administration of IM ketorolac by triage nurse compared with physician consultation prior to administration | time from registration and triage to administration of IM ketorolac | SPSS v13, two-tailed t test for continuous variables with CI 95% and P<0.05 | Triage protocol decreased admin time of analgesia without any reported adverse affects | John's Hopkins Non-Research: Level VB |
| Habich, Michele and MariJo Letizia (2015). Pediatric pain assessment in the emergency department: A nursing evidence-based practice protocol. <i>Pediatric Nursing</i> . Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/26470469 | Suburb west of Chicago | none | quality improvement project | 100 ED staff nurses and 60 patient charts at a Community Hospital near Chicago which is also a Level II trauma center | staff education on pain assessment, proper pain scale, documentation of pain characteristics and frequency of pain documentation | frequency, appropriate pain scale selection, and documentation of pain characteristics for pediatric patients in ED | percentages of desired documentation compared with incomplete or inaccurate documentation | computer driven nurse education programs can significantly improve the documentation of pain for pediatric patients in the ED, however more improvement is needed to raise level of pain intervention for patients | John's Hopkins Non-Research: Level VB |

| | | | | | | | | | |
|---|---|-------------|---|--|---|---|--|--|--|
| <p>Krauss, Baruch S., Lorenzo Calligaris, Steven M. Green, and Egidio Barbi (2016). Current concepts in management of pain in children in the emergency department. <i>The Lancet</i>. Retrieved from: http://www.thelancet.com/journals/lancet/article/PIIS140-6736(14)61686-X/fulltext</p> | <p>No indication of any study locations, 118 references cited, 0 giving indication of location, words rural/ urban/ suburb/ nonrural used 0 times in article or references</p> | <p>none</p> | <p>Systematic Review</p> | <p>Cochrane, Medline, PubMed, and other journals. Also referenced review articles, editorials, and book chapters. Excluded case reports and abstracts, but did review articles referenced in primary articles read</p> | <p>pain, pain management, chronic pain, pain scores, pediatric pain, emergency management</p> | <p>none</p> | <p>Author review</p> | <p>Pharmacologic, physical comfort, distraction, and effective communication are discussed in detail, standing triage nurse protocols are recommended</p> | <p>John's Hopkins Non-Research: Level VB</p> |
| <p>Taylor S.E., Taylor D.M., Jao K., Goh S., Ward M. (2013). Nurse-initiated analgesia pathway for paediatric patients in the emergency department: A clinical intervention trial. <i>Emergency Medicine Australasia</i>. Retrieved from: http://onlinelibrary.wiley.com/doi/10.1111/1742-6723.12103/abstract;jsessionid=4448789F32DD4745F3988CDBEE642DB0.f0402</p> | <p>Tertiary Australian facility with 18,000 pediatric visits annually</p> | <p>none</p> | <p>Pre and Post Intervention Study</p> | <p>102 patients, 51 pre and 51 post intervention in an Australian tertiary adult/ pediatric ED</p> | <p>percent of patients 5-17 years old who received nurse initiated analgesia, time to analgesia, patient report of receiving 'adequate analgesia' and family satisfaction with pain management while in ED</p> | <p>chart review and parental survey 48 hours post discharge</p> | <p>unknown</p> | <p>nurse initiated analgesia protocols decreased time to analgesia, increased family satisfaction, and reported no adverse affects</p> | <p>John's Hopkins Research: Level IIIB</p> |
| <p>Thomas, Daina, Janeva Kircher, Amy C. Pflint, Eleanor Fitzpatrick, Amanda S. Newton, Rhonda J. Rosychuk, Simran Grewal, and Samina Ali (2015). Pediatric pain management in the emergency department: The triage nurse's perspective. <i>Journal of Emergency Nursing</i>. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/25837698</p> | <p>Stollery Children's Hospital, JWK Health Center, and Children's Hospital of Eastern Ontario. Their 2011 census' were 29,197, 28,00, and 65,949 respectively. All hospitals are tertiary academic centers</p> | <p>none</p> | <p>survey</p> | <p>All triage nurses at three separate Canadian pediatric emergency departments</p> | <p>adequacy of triage pain control, acceptable time to analgesia admin., feasibility with administering pain control at triage, comfort with administering tylenol, ibuprofen, morphine, and oxycodone at triage.</p> | <p>responses were scored using a 100mm visual analog scale</p> | <p>Mean, median, standard deviation, and interquartile range were used to describe continuous data and proportions were used to describe categorical data. One-way analysis and Kruskal-Wallis testes were used to compare continuous data between hospitals, and X2 or Fischer exact tests were used to compare categorical data between hospitals.</p> | <p>triage practices vary widely across settings and between general and pediatric triage nurses. General triage nurses demonstrated longer acceptable wait times to analgesia and more discomfort with administering pain control to children as compared to pediatric triage nurses.</p> | <p>John's Hopkins Non-Research: Level VA</p> |
| <p>Weingarten, Laura, Janeva Kircher, Amy L. Drendel, Amanda S. Newton, and Samina Ali (2014). A survey of children's perspectives on pain management in the emergency department. <i>Elsevier</i>. Retrieved from: http://dx.doi.org/10.1016/j.jemermed.2014.01.038</p> | <p>tertiary canadian hospital</p> | <p>none</p> | <p>prospective cross-sectional survey</p> | <p>100 pediatric ED patients, convenience sample from a Canadian tertiary pediatric ED</p> | <p>patient demographics, quality of pain, pain scores and satisfaction with pain management</p> | <p>100mm visual analog scale for pain level and total pain quality management questionnaire- modified</p> | <p>IBM software, means, standard deviations, confidence interval of 95 percent, t-tests for continuous data, chi-square and Fischer exact tests for categorical data. P<.05 statistically significant.</p> | <p>Children report improved satisfaction with pain management with faster administration times and faster medication onset. More importantly families reported increased pain management satisfaction with improved provider communication e.g. asking about quality of pain, and offering pain management options</p> | <p>John's Hopkins Non-Research: Level VB</p> |

| | | | | | | | | | |
|--|---|-------------|--|--|---|--|--|---|--|
| <p>Wente, Sarah J. K. and Richfield (2013). Nonpharmacologic pediatric pain management in emergency departments: A systematic review. <i>Journal of Emergency Nursing</i>. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/23199786</p> | <p>The review and its reference list used the words "rural", "urban", "suburban", and "nonrural" or "non-rural" zero times. All articles cited were reviewed for location. Articles ranged in geography from the Southwestern United States to Central Canada. All articles which listed specific locations took place in academic centers.</p> | <p>none</p> | <p>systematic Review</p> | <p>14 studies, from literature review search including CINHAL, PubMed, and Cochrane</p> | <p>nonpharmacologic pain management of patients birth to 18yr old presenting to emergency departments</p> | <p>use of nonpharmacologic pain management of patients birth to 18yr old presenting to emergency departments</p> | <p>descriptive explanation of various study results</p> | <p>Distraction had mixed results with some studies finding decrease pain levels and others not. Sucrose also had mixed results. Parent comfort holding showed reduction in pain/ anxiety pre, during and post painful procedures.</p> | <p>John's Hopkins Research: Level IIIB</p> |
| <p>Wiler Jennifer L., Christopher Gentle, James M. Halfpenny, Alan Heins, Abhi Mehrotra, Michael G. Mikhail, Diana Fite (2010). Optimizing emergency department front-end operations. <i>Annals of Emergency Medicine</i>. Retrieved from: http://0-www.sciencedirect.com.ignacio.usfca.edu/science/article/pii/S0196064409005319?via%3Dihub</p> | <p>systematic review which included 52 individual articles. Article locations included: 36 urban, 4 suburban, 2 rural, 2 community centers, 3 not stated, and 5 others. Articles included under other were individual case studies, or studies of specific patient diagnosis, and not specific to any location</p> | <p>none</p> | <p>Systematic Review</p> | <p>52 individual articles were included</p> | <p>Immediate bedding, triage protocols, practitioner at triage, fast track, communication tools: tracking systems, kiosks, wireless communications,</p> | <p>systematic review by authors and narrative of the current body of literature</p> | <p>ACEP clinical policy review tool was used to rate individual articles</p> | <p>In regards to triage protocols, current literature is limited to reports of single facilities, and data varies. General findings include over and under ordering of triage nurses with concern for needless exposure to radiation and lab draws. Consistent benefits include decreased LOS, time to treatment, and increased patient satisfaction, and increased staff satisfaction.</p> | <p>John's Hopkins Non-Research: Level VB</p> |
| <p>Williams, Suzanne, Child & Yih Hih Nursing, Kerri Holzhauser, Donna Bonney, Elizabeth Burmeister, Yuri Gilhota, Randall Oliver, Kerry Gordon (2012). Improving pain management of abdominal pain in children presenting to the paediatric emergency department: A pre-post interventional study. <i>Elsevier</i>. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/22947686</p> | <p>Australian, urban center, hospital</p> | <p>none</p> | <p>pre and Post Intervention Study</p> | <p>160 charts were selected in total, 80 pre and 80 post at Mater Children's Hospital in Australia</p> | <p>nursing surveys, documentation of pain score and time from triage to admin. Of analgesia</p> | <p>time from triage to analgesia admin</p> | <p>STATA software, non parametric tests for continuous data, and chi square for discrete data.</p> | <p>no significant improvement in pre and post data time to analgesia admin.</p> | <p>John's Hopkins Non-Research: Level VB</p> |

Appendix D
Gap Analysis



Current State

- 37% of children receive documented pain control

Gap

- Staff unaware of gap
- Staff lack current motivation to change practices
- No current official process for initiating treatment at triage
- No current system in place to regularly monitor performance or provide realtime feedback

• ACTION PLAN

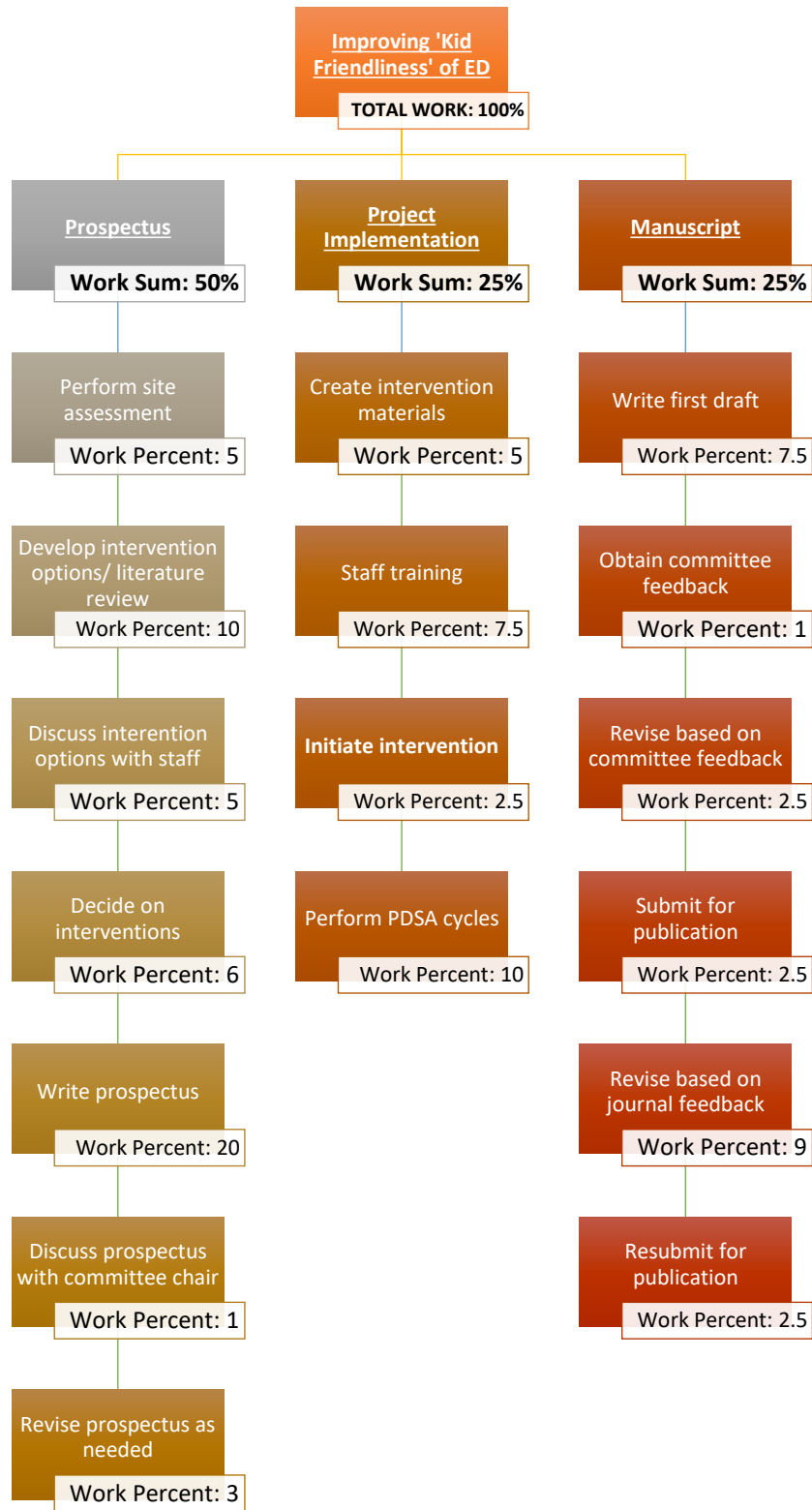
- Raise staff awareness through online survey and brief video
- Create culture of change via exemplar
- Design processes that encourage staff to intervene
- Obtain medical team support for change in process through data, collaborative brainstorming, and key stakeholder/ sponsor support
- Perform PDSA cycles
- Provide staff with timely and constructive feedback

Desired State

- >80% of children receive documented pain control within 30 minutes of starting triage

Appendix F

Work Breakdown Structure



Appendix G
Responsibility Matrix

| Function | Project Lead -Alvin Walters | Committee Chair -Alexa Curtis | Committee Member -Jodie Sandhu | Site Sponsor -Joseph Britton |
|--------------------------------------|--|--|---|---|
| Develop prospectus | RA | C | C | I |
| Site evaluation | RA | C | I | C |
| Initiate Project | RA | C | C | C |
| Identify area of opportunity | RA | I | I | C |
| Design intervention | RA | C | I | C |
| Train staff on proposed intervention | RA | C | I | C |
| Implement intervention | RA | I | I | C |
| Perform PDSA cycles | RA | C | C | C |
| Perform review of intervention | RA | I | I | I |
| Write manuscript | RA | C | C | I |
| Submit manuscript for publication | RA | C | C | I |

R – responsible, A–accountable, C–consulted, I–informed

Appendix H
SWOT Analysis

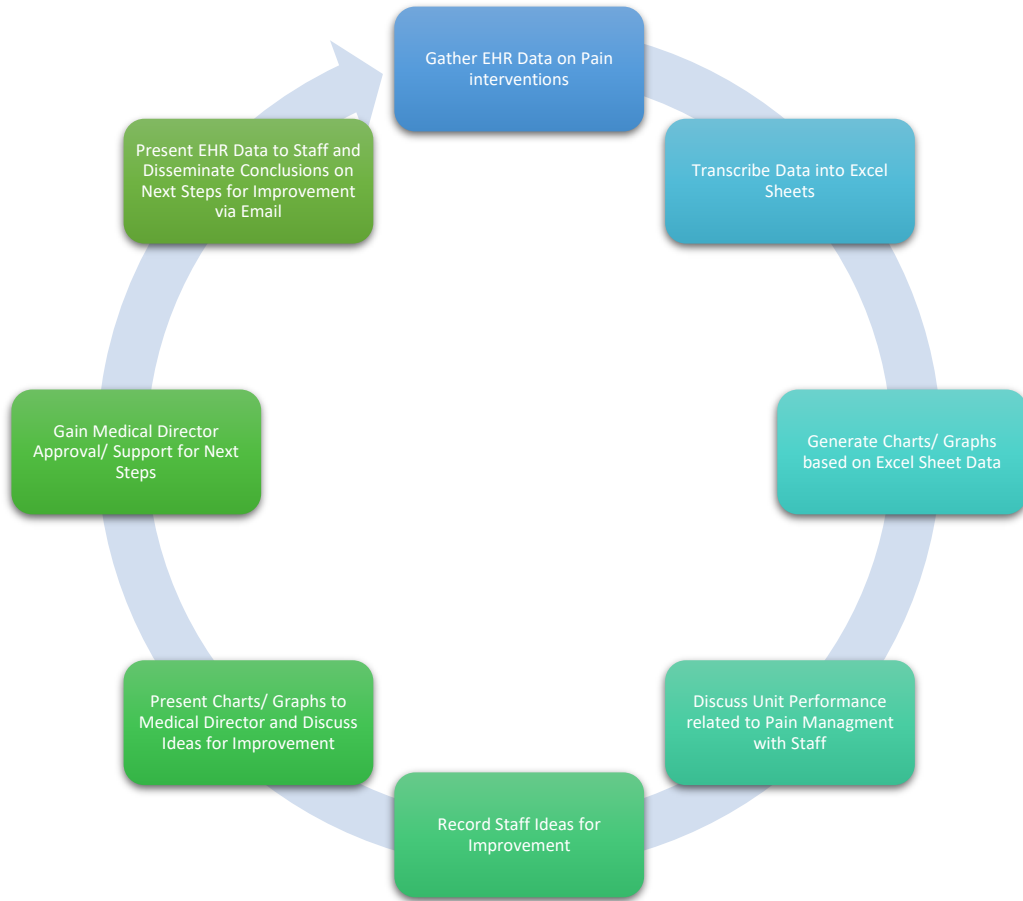
| | |
|--|---|
| <p>Strengths</p> <ul style="list-style-type: none"> • Staff are part of the community they serve • Staff have relative autonomy in practice • Medication order to administration time very efficient • Small staffing pool • Experienced staff • Diverse order capable staffing mix (RN's, PA's, and MD's) • Electronic health charting, with medication checks, already in place | <p>Weaknesses</p> <ul style="list-style-type: none"> • Well engrained current processes and practices • Staff unfamiliar with quality improvement concepts • Lack of dedicated pediatric staff or facilities • Lack of established protocols • Difficult access to medications from triage station • Emergency department intake and waiting area is undersized and inefficient for patient volume |
| <p>Opportunities</p> <ul style="list-style-type: none"> • National movement toward service-based reimbursement for hospitals • Efficiency and patient satisfaction paramount in any strategic healthcare organization's goals • National movement toward data-driven outcomes • Triage protocols standard at most large hospitals for efficiency of quality service • Online patient satisfaction scores readily available | <p>Threats</p> <ul style="list-style-type: none"> • Many other facilities already have protocols and improvements in place • Lack of full autonomy; must comply with facility Health goals and processes • Intake and waiting area will not be remodeled for several years • Staff are not motivated by healthcare organization level goals • Online patient satisfaction scores readily available |

Appendix I
Project Budget

| Item | Staff | Labor (hrs) | Labor (\$/hr) | Labor Total | Materials (\$) |
|--|----------------------|--------------|---------------|-------------|-----------------|
| Chart Reviewing - 2hr per weeks' worth of chart reviews x 17 weeks total | Grad student | 34 | \$ - | \$ - | \$ - |
| Interviews with staff during downtime at ED | Grad student | 4 | \$ - | \$ - | \$ - |
| Intervention Design | Grad student | 10 | \$ - | \$ - | \$ - |
| Intervention Implementation | Grad student | 2 | \$ - | \$ - | \$ - |
| Staff surveys to be completed during downtime at ED | RN's, PA's, and MD's | 0 | \$ - | \$ - | \$ - |
| One printed protocol workflow sheet for triage station | Grad student | 0.33 | \$ - | \$ - | \$ 7.25 |
| One poster for triage station | Grad student | 0.33 | \$ - | \$ - | \$ 7.25 |
| Four posters for ED lobby | Grad student | 0.33 | \$ - | \$ - | \$ 29.00 |
| Totals | | 50.99 | \$ - | \$ - | \$ 43.50 |

Appendix J

Continuous Quality Improvement Method



*CQI cycle to occur weekly

Appendix K

Failure Modes Effects Analysis

| Pain Failure Modes Effects Analysis | | | | | | | | | | | |
|-------------------------------------|--|--|--------------------------------|--|-----------------------------|---|----------------------------|-------------------------------------|------------------------|--|--|
| Function | Potential Failure Mode | Potential Effects of Failure | Severity 1= low 10= high | Potential Causes of Failure | Occurrence 1 low 10 high | Current Process Controls | Detection 1 high 10 low | Risk Priority Number = S x O x D | Criticality = S x O | Recommended Actions | Target Completion Date |
| Vital Signs | no documented pain level | undocumented/ unknown pain level | 3 | Failure of RN to complete vitals | 2 | If pertinent to chief complaint, provider requests vitals | 2 | 12 | 6 | Raise awareness of need for improved pain management via email presentation of project | 1/16/18 |
| Documentation of intervention | RN offers pain control, but does not document it | data does not reflect success of team | 2 | failure of RN to document intervention(s) | 5 | none | 9 | 90 | 10 | Educate importance of 'if it's not documented it didn't happen' concept with team via email presentation | 1/16/18 |
| Patient receives pain intervention | Medical team does not order pain intervention | patient does not receive pain intervention | 10 | Failure of RN/ PA/ MD to order intervention | 6 | medical team judgment and/ or priorities | 2 | 120 | 60 | Email presentation, and CQ/ PDSA cycles to update staff on data performance and motivation for continual improvement | 01/16/2017, 01/23/2018, 01/30/2018, 02/06/2018, 02/13/2018 |
| | Medical team does not administer pain intervention | patient does not receive pain intervention | 10 | Failure of RN to administer intervention | 1 | medical team judgment and/ or priorities | 1 | 10 | 10 | Email presentation, and CQ/ PDSA cycles to update staff on data performance and motivation for continual improvement | 01/16/2017, 01/23/2018, 01/30/2018, 02/06/2018, 02/13/2019 |
| | Medical team administers pain intervention outside 30min target goal | Patient suffers in pain beyond target goal, but eventually receives intervention | 8 | Failure of medical team to order intervention within target goal and/ or failure of RN to administer intervention within target goal | 2 | medical team judgment and/ or priorities | 1 | 16 | 16 | Email presentation, and CQ/ PDSA cycles to update staff on data performance and motivation for continual improvement | 01/16/2017, 01/23/2018, 01/30/2018, 02/06/2018, 02/13/2020 |

Appendix L

Plan Do Study Act Cycle



Appendix M

| Pre-Intervention Data | | | | | |
|-----------------------|-----------------|--------------|-------------|---------------|--|
| Date | Triage complete | Intervention | Admin. Time | Time to admin | |
| 11/1/17 | 22:26 | #N/A | #N/A | #N/A | |
| 11/1/17 | 2:37 | #N/A | #N/A | #N/A | |
| 11/1/17 | 18:24 | #N/A | #N/A | #N/A | |
| 11/2/17 | 2:03 | mult | 3:13 | 1:10 | |
| 11/2/17 | 11:05 | #N/A | #N/A | #N/A | |
| 11/2/17 | 19:39 | #N/A | #N/A | #N/A | |
| 11/2/17 | 9:24 | #N/A | #N/A | #N/A | |
| 11/2/17 | 17:01 | #N/A | #N/A | #N/A | |
| 11/2/17 | 6:22 | #N/A | #N/A | #N/A | |
| 11/2/17 | 8:19 | #N/A | #N/A | #N/A | |
| 11/3/17 | 10:54 | ibu | 12:08 | 1:14 | |
| 11/3/17 | 16:59 | #N/A | #N/A | #N/A | |
| 11/3/17 | 18:44 | #N/A | #N/A | #N/A | |
| 11/3/17 | 8:47 | #N/A | #N/A | #N/A | |
| 11/3/17 | 3:15 | #N/A | #N/A | #N/A | |
| 11/3/17 | 18:10 | #N/A | #N/A | #N/A | |
| 11/3/17 | 15:49 | #N/A | #N/A | #N/A | |
| 11/3/17 | 9:37 | #N/A | #N/A | #N/A | |
| 11/4/17 | 21:50 | ibu | 22:16 | 0:26 | |
| 11/4/17 | 22:44 | fam | 23:42 | 0:58 | |
| 11/4/17 | 18:58 | apap | 20:24 | 1:26 | |
| 11/4/17 | 12:29 | #N/A | #N/A | #N/A | |
| 11/4/17 | 16:50 | #N/A | #N/A | #N/A | |
| 11/4/17 | 17:33 | #N/A | #N/A | #N/A | |
| 11/5/17 | 17:41 | let | 19:24 | 1:43 | |
| 11/5/17 | 15:04 | ibu | 16:49 | 1:45 | |
| 11/5/17 | 18:36 | ibu | 20:36 | 2:00 | |
| 11/5/17 | 19:11 | apap | 21:37 | 2:26 | |
| 11/5/17 | 16:57 | ket | #N/A | #N/A | |
| 11/5/17 | 15:12 | #N/A | #N/A | #N/A | |
| 11/5/17 | 16:15 | #N/A | #N/A | #N/A | |
| 11/5/17 | 19:00 | #N/A | #N/A | #N/A | |
| 11/6/17 | 20:30 | apap | 21:19 | 0:49 | |
| 11/6/17 | 16:51 | ibu | 17:58 | 1:07 | |

| | | | | |
|----------|-------|------|-------|------|
| 11/6/17 | 12:32 | apap | 14:46 | 2:14 |
| 11/6/17 | 15:51 | #N/A | #N/A | #N/A |
| 11/6/17 | 18:27 | #N/A | #N/A | #N/A |
| 11/6/17 | 9:08 | #N/A | #N/A | #N/A |
| 11/6/17 | 14:02 | #N/A | #N/A | #N/A |
| 11/7/17 | 13:25 | ibu | 14:23 | 0:58 |
| 11/7/17 | 9:37 | apap | 10:44 | 1:07 |
| 11/7/17 | 16:15 | ibu | 17:54 | 1:39 |
| 11/7/17 | 18:36 | ibu | 20:29 | 1:53 |
| 11/7/17 | 15:17 | #N/A | #N/A | #N/A |
| 11/7/17 | 10:23 | #N/A | #N/A | #N/A |
| 11/7/17 | 11:01 | #N/A | #N/A | #N/A |
| 11/7/17 | 11:30 | #N/A | #N/A | #N/A |
| 11/7/17 | 20:49 | #N/A | #N/A | #N/A |
| 11/7/17 | 11:55 | #N/A | #N/A | #N/A |
| 11/7/17 | 18:44 | #N/A | #N/A | #N/A |
| 11/8/17 | 18:20 | apap | 18:36 | 0:16 |
| 11/8/17 | 20:40 | apap | 21:40 | 1:00 |
| 11/8/17 | 13:03 | #N/A | #N/A | #N/A |
| 11/8/17 | 15:32 | #N/A | #N/A | #N/A |
| 11/8/17 | 10:53 | #N/A | #N/A | #N/A |
| 11/9/17 | 22:28 | #N/A | #N/A | #N/A |
| 11/9/17 | 19:57 | #N/A | #N/A | #N/A |
| 11/9/17 | 13:12 | #N/A | #N/A | #N/A |
| 11/10/17 | 16:31 | apap | 17:42 | 1:11 |
| 11/10/17 | 20:50 | #N/A | #N/A | #N/A |
| 11/11/17 | 15:47 | apap | 15:53 | 0:06 |
| 11/11/17 | 13:05 | apap | 13:16 | 0:11 |
| 11/11/17 | 22:26 | let | 22:50 | 0:24 |
| 11/11/17 | 7:03 | apap | 7:45 | 0:42 |
| 11/11/17 | 21:00 | ibu | 22:20 | 1:20 |
| 11/11/17 | 17:24 | #N/A | #N/A | #N/A |
| 11/11/17 | 11:53 | #N/A | #N/A | #N/A |
| 11/12/17 | 14:35 | #N/A | #N/A | #N/A |
| 11/12/17 | 12:06 | #N/A | #N/A | #N/A |
| 11/12/17 | 11:07 | #N/A | #N/A | #N/A |
| 11/12/17 | 10:12 | #N/A | #N/A | #N/A |
| 11/12/17 | 14:53 | #N/A | #N/A | #N/A |
| 11/13/17 | 12:55 | ibu | 13:48 | 0:53 |

| | | | | |
|----------|---------------------------------|----------------------|------------------------------------|---------------------|
| 11/13/17 | 8:27 | mult | 9:48 | 1:21 |
| 11/13/17 | 18:27 | #N/A | #N/A | #N/A |
| 11/13/17 | 7:30 | #N/A | #N/A | #N/A |
| 11/14/17 | 16:46 | apap | 16:56 | 0:10 |
| 11/14/17 | 8:57 | #N/A | #N/A | #N/A |
| 11/14/17 | 15:59 | #N/A | #N/A | #N/A |
| 11/14/17 | 12:14 | #N/A | #N/A | #N/A |
| 11/14/17 | 21:47 | #N/A | #N/A | #N/A |
| 11/14/17 | 9:06 | #N/A | #N/A | #N/A |
| 11/14/17 | 5:04 | #N/A | #N/A | #N/A |
| 11/14/17 | 19:06 | #N/A | #N/A | #N/A |
| | | | Mean time to administration | 70 minutes |
| | Intervention Key | Interventions | Count (pre-data) | % (pre-data) |
| | acetaminophen | apap | 12 | 14.46% |
| | none given | #N/A | 56 | 67.47% |
| | albuterol | alb | 0 | 0.00% |
| | ibuprofen | ibu | 10 | 12.05% |
| | lidocain/epinephrine/tetracaine | let | 2 | 2.41% |
| | Multiple | mult | 2 | 2.41% |
| | ketorolac | ket | 1 | 1.20% |
| | | Total = | 83 | 100.00% |

Appendix N

| Post-Intervention Data | | | | |
|------------------------|-----------------|--------------|-------------|---------------|
| Date | Triage complete | Intervention | Admin. Time | Time to admin |
| 1/25/18 | 12:53 | alb | 15:57 | 3:04 |
| 1/25/18 | 9:41 | ibu | 9:45 | 0:04 |
| 1/25/18 | 16:45 | ibu | 17:01 | 0:16 |
| 1/25/18 | 16:38 | ice | 16:38 | 0:00 |
| 1/25/18 | 14:22 | ice | 14:22 | 0:00 |
| 1/25/18 | 17:02 | let | 17:42 | 0:40 |
| 1/25/18 | 1:52 | ond | 2:24 | 0:32 |
| 1/25/18 | 21:46 | prior | #N/A | #N/A |
| 1/25/18 | 21:12 | prior | #N/A | #N/A |
| 1/25/18 | 8:20 | prior | #N/A | #N/A |
| 1/25/18 | 15:18 | #N/A | #N/A | #N/A |
| 1/25/18 | 12:23 | #N/A | #N/A | #N/A |
| 1/25/18 | 8:32 | #N/A | #N/A | #N/A |
| 1/25/18 | 10:37 | #N/A | #N/A | #N/A |
| 1/25/18 | 9:53 | #N/A | #N/A | #N/A |
| 1/26/18 | 11:26 | apap | 13:25 | 1:59 |
| 1/26/18 | 0:00 | ibu | 0:23 | 0:23 |
| 1/26/18 | 13:40 | mult | 14:32 | 0:52 |
| 1/26/18 | 9:57 | mult | 12:03 | 2:06 |
| 1/26/18 | 11:43 | #N/A | #N/A | #N/A |
| 1/26/18 | 14:20 | dec | #N/A | #N/A |
| 1/26/18 | 10:28 | dec | #N/A | #N/A |
| 1/27/18 | 23:16 | prior | #N/A | #N/A |
| 1/27/18 | 10:05 | #N/A | #N/A | #N/A |
| 1/27/18 | 20:12 | #N/A | #N/A | #N/A |
| 1/27/18 | 11:35 | #N/A | #N/A | #N/A |
| 1/27/18 | 22:06 | #N/A | #N/A | #N/A |
| 1/27/18 | 20:46 | #N/A | #N/A | #N/A |
| 1/27/18 | 21:41 | #N/A | #N/A | #N/A |
| 1/27/18 | 6:47 | #N/A | #N/A | #N/A |
| 1/27/18 | 19:36 | dec | #N/A | #N/A |
| 1/28/18 | 17:57 | alb | 19:41 | 1:44 |
| 1/28/18 | 14:40 | apap | 14:43 | 0:03 |
| 1/28/18 | 16:18 | apap | 17:47 | 1:29 |

| | | | | |
|---------|-------|-------|----------|------|
| 1/28/18 | 23:30 | mult | 24:52:00 | 1:22 |
| 1/28/18 | 16:13 | ond | 18:46 | 2:33 |
| 1/28/18 | 12:41 | prior | #N/A | #N/A |
| 1/28/18 | 11:51 | prior | #N/A | #N/A |
| 1/28/18 | 10:27 | prior | #N/A | #N/A |
| 1/28/18 | 7:41 | prior | #N/A | #N/A |
| 1/28/18 | 18:41 | #N/A | #N/A | #N/A |
| 1/28/18 | 19:35 | #N/A | #N/A | #N/A |
| 1/28/18 | 18:04 | #N/A | #N/A | #N/A |
| 1/28/18 | 9:36 | #N/A | #N/A | #N/A |
| 1/29/18 | 20:35 | apap | 22:39 | 2:04 |
| 1/29/18 | 19:20 | ibu | 21:12 | 1:52 |
| 1/29/18 | 14:48 | mult | 14:48 | 0:00 |
| 1/29/18 | 22:09 | mult | 0:21 | 2:12 |
| 1/29/18 | 23:01 | prior | #N/A | #N/A |
| 1/29/18 | 10:36 | prior | #N/A | #N/A |
| 1/30/18 | 16:38 | mult | 19:46 | 3:08 |
| 1/30/18 | 1:09 | ond | 1:24 | 0:15 |
| 1/30/18 | 12:30 | #N/A | #N/A | #N/A |
| 1/30/18 | 20:10 | #N/A | #N/A | #N/A |
| 1/30/18 | 15:26 | #N/A | #N/A | #N/A |
| 1/30/18 | 15:14 | #N/A | #N/A | #N/A |
| 1/30/18 | 19:07 | #N/A | #N/A | #N/A |
| 1/30/18 | 15:35 | #N/A | #N/A | #N/A |
| 1/31/18 | 9:21 | apap | 10:06 | 0:45 |
| 1/31/18 | 16:41 | ice | 16:41 | 0:00 |
| 1/31/18 | 18:38 | let | 19:14 | 0:36 |
| 1/31/18 | 16:17 | #N/A | #N/A | #N/A |
| 1/31/18 | 20:29 | #N/A | #N/A | #N/A |
| 1/31/18 | 19:05 | #N/A | #N/A | #N/A |
| 1/31/18 | 20:19 | #N/A | #N/A | #N/A |
| 1/31/18 | 16:32 | #N/A | #N/A | #N/A |
| 1/31/18 | 22:28 | dec | #N/A | #N/A |
| 2/1/18 | 0:20 | alb | #N/A | #N/A |
| 2/1/18 | 7:02 | apap | 7:07 | 0:05 |
| 2/1/18 | 15:07 | apap | 15:37 | 0:30 |
| 2/1/18 | 15:47 | apap | 16:26 | 0:39 |
| 2/1/18 | 19:24 | ibu | 21:00 | 1:36 |
| 2/1/18 | 8:45 | ice | 10:46 | 2:01 |

| | | | | |
|--------|-------|-------|-------|------|
| 2/1/18 | 19:57 | other | 20:42 | 0:45 |
| 2/1/18 | 0:24 | prior | #N/A | #N/A |
| 2/1/18 | 21:03 | #N/A | #N/A | #N/A |
| 2/1/18 | 14:55 | #N/A | #N/A | #N/A |
| 2/1/18 | 6:17 | #N/A | #N/A | #N/A |
| 2/1/18 | 16:58 | #N/A | #N/A | #N/A |
| 2/1/18 | 15:25 | #N/A | #N/A | #N/A |
| 2/2/18 | 17:34 | ibu | 18:26 | 0:52 |
| 2/2/18 | 21:50 | prior | #N/A | #N/A |
| 2/2/18 | 20:17 | prior | #N/A | #N/A |
| 2/2/18 | 16:26 | prior | #N/A | #N/A |
| 2/2/18 | 12:49 | #N/A | #N/A | #N/A |
| 2/2/18 | 11:21 | #N/A | #N/A | #N/A |
| 2/2/18 | 18:37 | #N/A | #N/A | #N/A |
| 2/2/18 | 15:32 | #N/A | #N/A | #N/A |
| 2/3/18 | 14:15 | apap | 14:16 | 0:01 |
| 2/3/18 | 12:25 | apap | 13:11 | 0:46 |
| 2/3/18 | 10:37 | mult | #N/A | #N/A |
| 2/3/18 | 17:29 | prior | #N/A | #N/A |
| 2/3/18 | 14:34 | prior | #N/A | #N/A |
| 2/3/18 | 6:29 | #N/A | #N/A | #N/A |
| 2/3/18 | 17:14 | #N/A | #N/A | #N/A |
| 2/3/18 | 16:22 | #N/A | #N/A | #N/A |
| 2/3/18 | 15:29 | #N/A | #N/A | #N/A |
| 2/4/18 | 17:22 | apap | 17:26 | 0:04 |
| 2/4/18 | 15:14 | apap | 15:18 | 0:04 |
| 2/4/18 | 18:46 | apap | 19:29 | 0:43 |
| 2/4/18 | 17:01 | let | 17:07 | 0:06 |
| 2/4/18 | 20:46 | prior | #N/A | #N/A |
| 2/4/18 | 10:12 | #N/A | #N/A | #N/A |
| 2/5/18 | 23:25 | apap | 23:47 | 0:22 |
| 2/5/18 | 5:19 | apap | 6:02 | 0:43 |
| 2/5/18 | 9:37 | ibu | 10:25 | 0:48 |
| 2/5/18 | 2:44 | other | 2:39 | #N/A |
| 2/5/18 | 19:44 | prior | #N/A | #N/A |
| 2/5/18 | 10:42 | prior | #N/A | #N/A |
| 2/5/18 | 16:37 | #N/A | #N/A | #N/A |
| 2/5/18 | 15:02 | #N/A | #N/A | #N/A |
| 2/5/18 | 20:02 | #N/A | #N/A | #N/A |

| | | | | |
|--------|----------------------------------|----------------------|------------------------------------|----------------------|
| 2/6/18 | 15:47 | alb | 17:05 | 1:18 |
| 2/6/18 | 12:44 | ond | 13:31 | 0:47 |
| 2/6/18 | 17:52 | prior | #N/A | #N/A |
| 2/6/18 | 9:07 | dec | #N/A | #N/A |
| 2/7/18 | 17:24 | alb | 20:14 | 2:50 |
| 2/7/18 | 23:15 | apap | 23:36 | 0:21 |
| 2/7/18 | 7:10 | apap | 7:46 | 0:36 |
| 2/7/18 | 22:00 | ice | 22:01 | 0:01 |
| 2/7/18 | 16:06 | let | 19:45 | 3:39 |
| 2/7/18 | 13:12 | mult | 13:12 | 0:00 |
| 2/7/18 | 18:50 | ond | 20:30 | 1:40 |
| 2/7/18 | 13:30 | prior | #N/A | #N/A |
| 2/7/18 | 21:14 | #N/A | #N/A | #N/A |
| 2/7/18 | 21:00 | #N/A | #N/A | #N/A |
| 2/7/18 | 11:23 | #N/A | #N/A | #N/A |
| | | | Mean time to administration | 59 minutes |
| | Intervention Key | Interventions | Count (post-data) | % (post-data) |
| | albuterol | alb | 5 | 3.94% |
| | acetaminophen | apap | 17 | 13.39% |
| | ibuprofen | ibu | 7 | 5.51% |
| | ice pack | ice | 5 | 3.94% |
| | lidocaine/epinephrine/tetracaine | let | 4 | 3.15% |
| | multiple | mult | 8 | 6.30% |
| | ondansetron | ond | 5 | 3.94% |
| | other intervention | other | 2 | 1.57% |
| | analgesia prior to arrival | prior | 21 | 16.54% |
| | declined analgesia | dec | 5 | 3.94% |
| | none given | #N/A | 48 | 37.80% |
| | | Total = | 127 | 100.00% |

Appendix O

Staff Surveys

| SNMH ED Providers Survey | | | |
|---|----------------|--------------|--------------|
| Q1. On a scale of 0 to 10, where 0= not safe at all and 10= very safe, how safe do you feel it is for triage nurses to administer non-pharmacologic pain interventions, such as ice packs, to pediatric patients at time of triage by following a protocol, and without first consulting a provider? | | | |
| (no label) | Average Number | Total Number | Responses |
| | 9.833333333 | | 59 100.00% 6 |
| | | | Answered 6 |
| | | | Skipped 0 |
| Tags | | | |
| Respondents | | | |
| 1 | 9 | | |
| 2 | 10 | | |
| 3 | 10 | | |
| 4 | 10 | | |
| 5 | 10 | | |
| 6 | 10 | | |
| Q2. On a scale of 0 to 10, where 0= not safe at all and 10= very safe, how safe do you feel it is for triage nurses to administer acetaminophen to pediatric patients at time of triage by following a protocol, and without first consulting a provider? | | | |
| (no label) | Average Number | Total Number | Responses |
| | 9.5 | | 57 100.00% 6 |
| | | | Answered 6 |
| | | | Skipped 0 |
| Tags | | | |
| Respondents | | | |
| 1 | 9 | | |
| 2 | 10 | | |
| 3 | 10 | | |
| 4 | 8 | | |
| 5 | 10 | | |
| 6 | 10 | | |
| Q3. On a scale of 0 to 10, where 0= not safe at all and 10= very safe, how safe do you feel it is for triage nurses to administer ibuprofen to pediatric patients at time of triage by following a protocol, and without first consulting a provider? | | | |
| (no label) | Average Number | Total Number | Responses |
| | 8.333333333 | | 50 100.00% 6 |
| | | | Answered 6 |
| | | | Skipped 0 |
| Tags | | | |
| Respondents | | | |
| 1 | 8 | | |
| 2 | 10 | | |
| 3 | 8 | | |
| 4 | 8 | | |
| 5 | 10 | | |
| 6 | 6 | | |
| Q4. On a scale of 0 to 10, where 0= not safe at all and 10= very safe, how safe do you feel it is for triage nurses to administer lidocaine/epinephrine/tetracaine (L.E.T) to open skin for patients they anticipate will need irrigation of wounds, such as lacerations, at time of triage by following a protocol, and without first consulting a provider? | | | |
| (no label) | Average Number | Total Number | Responses |
| | 9.833333333 | | 59 100.00% 6 |
| | | | Answered 6 |
| | | | Skipped 0 |
| Tags | | | |
| Respondents | | | |
| 1 | 10 | | |
| 2 | 10 | | |
| 3 | 10 | | |
| 4 | 9 | | |
| 5 | 10 | | |
| 6 | 10 | | |
| Q5. On a scale of 0 to 10, where 0= not safe at all and 10= very safe, how safe do you feel it is for triage nurses to administer lidocaine 4% (LMX) cream to closed skin for patients they anticipate will need IV placement at time of triage by following a protocol, and without first consulting a provider? | | | |
| (no label) | Average Number | Total Number | Responses |
| | 9.833333333 | | 59 100.00% 6 |
| | | | Answered 6 |
| | | | Skipped 0 |
| Tags | | | |
| Respondents | | | |
| 1 | 10 | | |
| 2 | 10 | | |
| 3 | 10 | | |
| 4 | 9 | | |
| 5 | 10 | | |
| 6 | 10 | | |

| | | | |
|--|---------|---|----------|
| Q6. Do you see potential benefit(s) from implementing pediatric triage pain management protocols at SNMH? | | | |
| Answer Choices | | Responses | |
| Yes | 100.00% | | 6 |
| No | 0.00% | | 0 |
| | | Answered | 6 |
| | | Skipped | 0 |
| Q7. If yes, can you briefly describe the benefit(s) | | | |
| Answered | | 6 | |
| Skipped | | 0 | |
| Respondents | | Responses | |
| | | | Tags |
| 1 | | Patient (parent) satisfaction increased. Earlier mobilization of pain and fever control. happier patients | |
| 2 | | Better pain control for our patients. | |
| 3 | | increased pain control and patient satisfaction | |
| 4 | | Increased patient and parent satisfaction | |
| 5 | | Faster analgesia, better first exam. | |
| 6 | | | |
| Q8. Do you see potential drawback(s) from implementing pediatric triage pain management protocols at SNMH? | | | |
| Answer Choices | | Responses | |
| Yes | 50.00% | | 3 |
| No | 50.00% | | 3 |
| | | Answered | 6 |
| | | Skipped | 0 |
| Q9. If yes, can you briefly describe the drawback(s) | | | |
| Answered | | 4 | |
| Skipped | | 2 | |
| Respondents | | Responses | |
| | | | Tags |
| 1 | | If ibuprofen given to <6 mo patient. Possible overdosing if incomplete medication history attained. | |
| 2 | | I don't like using ibuprofen for a variety of reasons. This is already an issue for fever management, although not a big one. | |
| 3 | | unintended/unrecognised allergies. | |
| 4 | | None | |
| Q10. Do you support the implementation of pediatric triage pain management protocols, utilizing the interventions discussed in this survey, at the Sierra Nevada Memorial Hospital Emergency Department? | | | |
| Answer Choices | | Responses | |
| Yes | 100.00% | | 6 |
| No | 0.00% | | 0 |
| | | Answered | 6 |
| | | Skipped | 0 |

| SNMH ED Nurses Survey | | | | |
|---|-----------------|--------------|-----------------|----------|
| Q1. For children who present to the SNMH ED with documented pain levels greater than 0 at time of triage, what percentage of the time do you estimate they receive documented pain interventions while in the ED? | | | | |
| Answer Choices | Average Number | Total Number | Responses | |
| (no label) | 48.11111111 | 433 | 100.00% | 9 |
| | | | Answered | 9 |
| | | | Skipped | 0 |
| Respondents | | | | |
| 1 | 60 | | | |
| 2 | 75 | | | |
| 3 | 50 | | | |
| 4 | 30 | | | |
| 5 | 15 | | | |
| 6 | 60 | | | |
| 7 | 73 | | | |
| 8 | 20 | | | |
| 9 | 50 | | | |
| Q2. Which pain scale image do you like best? | | | | |
| Answer Choices | Average Number | Total Number | Responses | |
| | 0.00% | 0 | | |
| | 66.67% | 6 | | |
| | 33.33% | 3 | | |
| | Answered | 9 | | |
| | Skipped | 0 | | |

| | | | | |
|---|---|----------------|--------------|-------------------|
| Q3. On a scale of 0 to 10, where 0= not safe at all and 10= very safe, how safe do you feel it is for triage nurses to administer non-pharmacologic pain interventions, such as ice packs, to pediatric patients at time of triage by following a protocol, and without first consulting a provider? | | | | |
| Answer Choices | | Average Number | Total Number | Responses |
| (no label) | | 10 | 90 | 100.00% 9 |
| | | | | Answered 9 |
| | | | | Skipped 0 |
| Respondents | | | | |
| | 1 | 10 | | |
| | 2 | 10 | | |
| | 3 | 10 | | |
| | 4 | 10 | | |
| | 5 | 10 | | |
| | 6 | 10 | | |
| | 7 | 10 | | |
| | 8 | 10 | | |
| | 9 | 10 | | |
| Q4. On a scale of 0 to 10, where 0= not safe at all and 10= very safe, how safe do you feel it is for triage nurses to administer acetaminophen and/ or ibuprofen to pediatric patients at time of triage by following a protocol, and without first consulting a provider? | | | | |
| Answer Choices | | Average Number | Total Number | Responses |
| (no label) | | 8.666666667 | 78 | 100.00% 9 |
| | | | | Answered 9 |
| | | | | Skipped 0 |
| Respondents | | | | |
| | 1 | 8 | | |
| | 2 | 8 | | |
| | 3 | 7 | | |
| | 4 | 10 | | |
| | 5 | 9 | | |
| | 6 | 8 | | |
| | 7 | 10 | | |
| | 8 | 10 | | |
| | 9 | 8 | | |
| Q5. On a scale of 0 to 10, where 0= not safe at all and 10= very safe, how safe do you feel it is for triage nurses to administer lidocaine/epinephrine/tetracaine (L.E.T) to open skin for patients they anticipate will need irrigation of wounds, such as lacerations, at time of triage by following a protocol, and without first consulting a provider? | | | | |
| Answer Choices | | Average Number | Total Number | Responses |
| (no label) | | 9.111111111 | 82 | 100.00% 9 |
| | | | | Answered 9 |
| | | | | Skipped 0 |
| Respondents | | | | |
| | 1 | 7 | | |
| | 2 | 10 | | |
| | 3 | 9 | | |
| | 4 | 10 | | |
| | 5 | 9 | | |
| | 6 | 8 | | |
| | 7 | 10 | | |
| | 8 | 10 | | |
| | 9 | 9 | | |

| | | | | |
|--|---|---|--------------|-----------------|
| Q6. On a scale of 0 to 10, where 0= not safe at all and 10= very safe, how safe do you feel it is for triage nurses to administer lidocaine 4% (LMX) cream to closed skin for patients they anticipate will need IV placement, at time of triage by following a protocol, and without first consulting a provider? | | | | |
| Answer Choices | | Average Number | Total Number | Responses |
| (no label) | | 9 | 81 | 100.00% |
| | | | | Answered |
| | | | | 9 |
| | | | | Skipped |
| | | | | 0 |
| Respondents | | | | |
| | 1 | 9 | | |
| | 2 | 10 | | |
| | 3 | 10 | | |
| | 4 | 10 | | |
| | 5 | 10 | | |
| | 6 | 5 | | |
| | 7 | 10 | | |
| | 8 | 7 | | |
| | 9 | 10 | | |
| Q7. Do you see potential benefit(s) from implementing pediatric triage pain management protocols at SNMH? | | | | |
| Answer Choices | | Responses | | |
| Yes | | 88.89% | 8 | |
| No | | 11.11% | 1 | |
| | | Answered | 9 | |
| | | Skipped | 0 | |
| Q8. If yes, can you briefly describe the benefit(s) | | | | |
| Answered | | 8 | | |
| Skipped | | 1 | | |
| Respondents | | Responses | | |
| | 1 | I think as nurses it would empower us to properly manage pain if there was a protocol. | | |
| | 2 | increased patient satisfaction and a happier kid | | |
| | 3 | pain management in children allows healing, decreases their time in ER and also diminishes the anxiety associated with pain. | | |
| | 4 | Patients will gain relief from pain more quickly if RN's are able to medicate from triage | | |
| | 5 | more power to the nurses improves flow, pediatric pain seems to be under treated | | |
| | 6 | Pt (and parent) feel taken care of and feel better knowing something is happening right away | | |
| | 7 | I though we had for suspected long bone fx's, I would avoid the lidocaine for IV's as you have no idea at triage what site would be used and lido toxicity. Most pain conditions do not require treatment at triage | | |
| | 8 | Children will be treated for their pain just like an adult would be! | | |

| | | | | |
|--|--------|--|----------|--|
| Q9. Do you see potential drawback(s) from implementing pediatric triage pain management protocols at SNMH? | | | | |
| Answer Choices | | Responses | | |
| Yes | 55.56% | 5 | | |
| No | 44.44% | 4 | | |
| | | Answered | 9 | |
| | | Skipped | 0 | |
| | | | | |
| Q10. If yes, can you briefly describe the drawback(s) | | | | |
| Answered | | 6 | | |
| Skipped | | 3 | | |
| Respondents | | Responses | | |
| 1 | | I think if the protocols are clearly outlined, it should be successful. Sometimes, time management is of concern. | | |
| 2 | | slows down the triage process during peak times. | | |
| 3 | | TIME!!! DELAY IN WHOLE TRIAGE PROCESS AND SPEED!!! If it is deemed necessary for pain mngment, then a 2ND NURSE NEEDS TO DO IT!!! | | |
| 4 | | we already medicate for fevers,fractures etc | | |
| 5 | | Dont rely on any number, almost all kids are crying at tirage, go by the type of complaint or injury to determine pain med use | | |
| 6 | | We do have a couple of physicians who will not appreciate nurses medicating patients prior their order(s). We have one physician who will not prescribe Ibuprofen to children. | | |