DEVELOPMENT OF A CLINICAL APPLICATION FOR PAIN MEDICINE IN PEDIATRICS

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Introduction:
Clinical dashboards and applications have extensively been described for use in quality improvement, administrative optimization and clinical decision making. Pain specific applications has also been utilized to help clinicians improve pain management. However, the development and adoption of these tools have been lacking in pediatrics. At our institution, a quaternary free-standing pediatric hospital, pain medicine physicians and clinical staff have been relying on simple text-based reporting documents from the electronic health record to care for patients. Clinicians then manually interpret the data and develop a clinical picture of each patient. As the clinical practice increased in size, the efficiency of team-based practice needed to be improved while increasing the quality of care delivered. We sought to develop an interactive web-based pain application to augment the ability for pediatric pain medicine clinicians to visualize, understand, and care for children more efficiently.

Methods:
A multidisciplinary team was formed with content expertise to develop the interactive web-based pain application. Initial meetings were held to detail current clinical workflow and processes for clinicians rounding on the inpatient pain service at a free-standing pediatric hospital. Priorities were outlined to define clinical content from our electronic health record (Cerner, North Kansas City, MO) and several iterations of mock designs of the user-interface were created with clinician feedback. A hand-drawn mockup was developed using feedback from team members. Based on this, the informatics team then created an application using Tableau (Seattle, WA). An iterative process followed with the clinical and technical team members collaborating to refine the displays of clinical information while enhancing user interface.
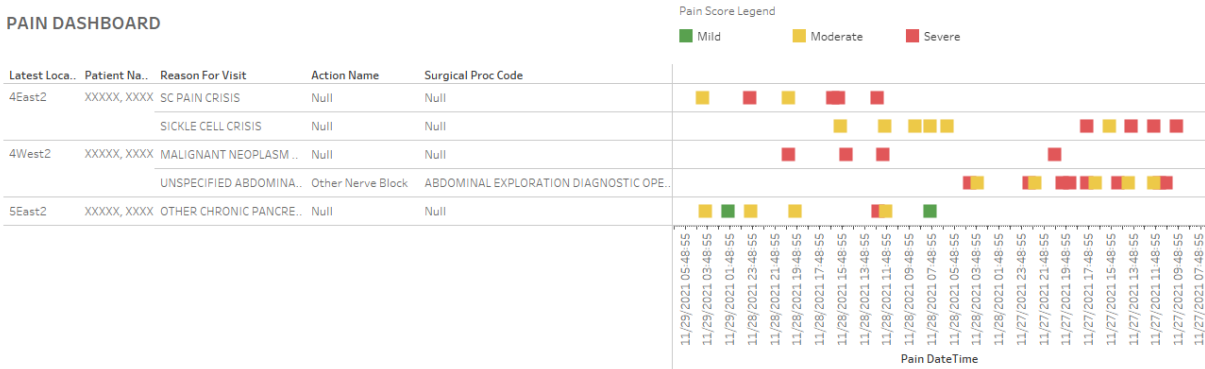
Results:
A continuously updated rounding list consisting of pediatric pain patients that are actively being following by the inpatient pain team was used as a defined population. Their current location and primary diagnosis were including in the opening page to help the team plan for rounding efficiency. Pain scores based on the FLACC, FACES or Verbal Numerical Rating Scale were divided into mild (0-3), moderate (4-7) and severe (8-10) which were coded green, yellow, and red, respectively. These pain scores based on time were displayed with each patient for the last 24 hours. Figure 1, is an example of the opening page that provides a visual analysis of pain scores and the pain experience for clinicians to use.

Discussion:
The development of this pain application allows for quick and efficient visualization of pediatric patients admitted to our institution. Based on color coding, clinicians can use visual analytics to triage and more efficiently address pain concerns in a timely manner as our practice continues to grow and scale across the enterprise. We will continue to improve the applications user interface and content to help pain clinicians with their workflow and support decision making. Further studies are needed to assess whether a visual analytic web-based pain application results in improved patient outcomes, patient experience, and clinician satisfaction.

Figure 1. Color coded visual analytic dashboard of the opening page for pain clinicians to use when rounding in a children's hospital.

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