Improving the treatment of children’s presenting and procedural pain during emergency department visits: A province-wide quality improvement collaborative in Canada

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Introduction
Pediatric pain is often under-treated in emergency departments (EDs). This is known to cause immediate and long-term harm. A recent quality improvement collaborative (QIC) led by our team was successful in improving treatment of children’s pain across 4 EDs in Calgary, Alberta (Figure 1). We next formed a new QIC among general EDs across the province of Alberta to improve treatment of children’s presenting and procedural pain.

Purpose
Aims were to improve the proportion of children <12 years of age who receive topical anesthetic before needle procedures from 13% to 50%; and for children <17 years of age with fractures: to 1) improve the proportion who receive analgesic medication from 35% to 50%; 2) improve the proportion who have a documented pain score from 23% to 50%, and 3) reduce median time to analgesia from 59 minutes to 30 minutes, within 1 year.

Methods
Invitations to participate in the QIC were sent to all 90 EDs in the province of Alberta, Canada, that treat children and had not yet participated. Each site was asked to form a project team, participate in monthly webinars, develop key driver diagrams and project aims, undertake PDSA tests of change, and audit charts to assess performance. The Barker framework for scaling up and spreading health interventions was utilized.

Sites were provided with a monthly list of 20 randomly selected charts for audit. Audit data was entered by local project teams and uploaded to a provincial run chart dashboard. Length of stay for pediatric patients and all patients, and use of opioid medications, were balancing measures. Run charts and control charts were used to detect special cause. Difference in proportions were compared using χ2. Final analysis will include interrupted time series.

Results
36 of 90 invited sites (34%) agreed to participate (Figure 2), including rural and urban sites from all geographic zones; 8417 visits were analyzed. 23/36 sites completed audits before and after tests of change and were included in analysis. Comparing the 12 months following implementation to the preceding year, the proportion of children receiving topical anesthetic prior to needles increased from 11% to 29% (p<0.001, Figure 3). For children with fractures, the proportion with pain scores increased from 20% to 31% (p<0.001), proportion receiving analgesic medication increased from 33% to 38% (p<0.01), and median minutes to analgesia decreased from 62 to 33 (p<0.01, Figure 4). The was no significant increase in length of stay or use of opioid medications.

Conclusions
Special cause was achieved in all aims. A pragmatic, flexible approach encouraging local change leadership was well-received in diverse emergency departments and was a key factor in achieving success. The QIC approach shows promise for improving pain outcomes in children visiting diverse EDs across a large geographic area.

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