Abstract:
In this article, we describe the development and assessment of a 2-year longitudinal quality improvement (QI) and patient safety curriculum that matches didactic education with experiential learning in a pediatric emergency medicine fellowship. The curriculum includes the development of a comprehensive didactic series and an improvement project identified, designed, and implemented by the fellows. The curriculum was assessed through a questionnaire administered before and after participation in the curriculum, along with an evaluation of the clinical impact of the completed project and assessment of a scholarly product. There was an increase in comfort with QI tools including run and control charts and in familiarity with differences between QI and traditional clinical research after completion of the QI curriculum. Fellows agreed that QI would be beneficial to their careers and felt that they were more likely to be involved in a future QI project. The fellow-derived project was integrated into QI efforts within the emergency department and results showed improvement in process outcomes. In summary, a longitudinal QI curriculum combining didactic and project-based learning in a pediatric emergency medicine fellowship was successful in increasing fellow comfort with QI tools and led to a successfully implemented collaborative improvement project.

Keywords:
quality improvement; patient safety; pediatric emergency medicine; fellowship training

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Development of a Longitudinal Quality and Safety Curriculum for Pediatric Emergency Medicine Fellows

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The Institute of Medicine, in its 1999 report *To Err is Human*[1] and 2001 follow-up *Crossing the Quality Chasm*,[2] outlined the critical importance of improving the quality and safety of medical care within the US health care system. The Accreditation Council of Graduate Medical Education (ACGME) acknowledged this need by requiring programs to provide training in patient safety and quality improvement (QI) to allow trainees to develop competency in practice-based learning and improvement.[3]

Pediatric emergency medicine (PEM) has unique safety and quality challenges in that it combines the high patient acuity and volume of emergency medicine with the need for weight, size, and age-based precision required in pediatrics.[4,5] It is therefore

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critical that PEM fellows enter the workforce with the skills necessary to identify, participate in, and lead continuous process improvement efforts within the pediatric emergency department (ED).

The ACGME guidelines do not prescribe how programs should provide practice-based learning and improvement opportunities. To accommodate logistical challenges, and based largely on tradition, many programs have designed rotation-based training dedicating a single block of time to QI. However, learning gains made using such an approach may be difficult to sustain. The ultimate goal of QI is for practitioners to continuously incorporate related efforts into their daily practice. An ideal curriculum would more closely mirror this, with a didactic curriculum serving as the foundation in conjunction with a concurrent longitudinal experiential component.[6] In addition, educational theory has demonstrated the value of spaced education in improving long-term retention and altering behavior.[7-9]

Prior studies have demonstrated the success of longitudinal QI curricula for pediatrics residents.[10-12] However, there is much less literature describing implementation of QI curricula at the fellowship level,[13] although ACGME guidelines also apply to these programs. Fellowships offer several potential advantages in implementing a quality curriculum when compared with residency programs, which may allow for a more robust educational experience for trainees. Fellowships tend to be smaller than residencies, which may help in scheduling group teaching sessions and working collaboratively on a project. Fellows generally spend most of their clinical time within a single department or division, which can facilitate QI project implementation by allowing the project to be conducted largely within the fellows' clinical domain. This is important as within this domain, fellows have greater clinical expertise, more organizational authority, and better understanding of systems of care. There is also often better collaboration with all stakeholders including nursing staff, critical to QI implementation. Finally, the small size of fellowships allows all trainees and their collaborators to be meaningfully involved in each step of the design and implementation process.

Our goal was to describe our experience with the development, implementation, and evaluation of a newly introduced 2-year longitudinal quality and safety curriculum for PEM fellows, which matched a didactic educational series to the development and implementation stages of a group experiential improvement project.

METHODS

Curriculum Development

Our curriculum development was modeled after the approach described by Kern, including an initial needs assessment, defining goals and objectives, identifying optimal educational strategies, implementation, and evaluation.[14]

Needs Assessment

We began by cataloging the previous efforts toward QI education within our program and then identifying an optimal pedagogic model. Prior training in improvement science within the fellowship was previously limited to a 1-month QI block which consisted of assigned readings, attendance at scheduled divisional administrative QI meetings during that period, and dedicated lectures. Fellows would rotate through this QI rotation individually and meet regularly with a faculty preceptor during that month. In addition, fellows were required to join in an ongoing project in quality or safety within the department.

Goals and Structure of the Curriculum

The goals of our curriculum were as follows: (1) to create a comprehensive didactic series to cover key components of patient safety and QI theory and tools, (2) to support fellows in the identification and implementation of a self-created quality project, and (3) to synchronize the didactic component of the curriculum to the stage of the experiential learning project over the entirety of the curriculum.

The fellowship has a weekly 3-hour block of protected academic time that may be used for fellowship-wide activities or education as approved by the program director. These may include one-time educational sessions or components of ongoing, longitudinal curricula such as clinical research or career development. Fellows may use