



Featured Article

# Simulation to Improve Pediatric Patient Outcomes: University and Hospital Collaborative

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## KEYWORDS

collaboration;  
intravenous therapy;  
nursing education;  
pediatric;  
simulation;  
staff development;  
registered nurses

**Abstract:** A collaborative venture between a local university in southwestern Pennsylvania and a rural community hospital enhanced learning and improved pediatric patient outcomes. The partnership led to the development and implementation of an evidence-based pediatric peripheral intravenous (PIV) insertion program. Through the use of simulation technology and debriefing techniques at the pediatric PIV insertion program, pediatric PIV insertion skills of the medical–surgical nursing staff improved, as evidenced by a decreased number of pediatric PIV insertion attempts.

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Improving the quality of patient care is a concept that has been discussed with increasing frequency in the literature (Boxer & Goldfarb, 2011; Cronenwett et al., 2007). In 2003, the Institute of Medicine developed an entire report, *Institute of Medicine 2003*, addressing the essential areas in which health care professionals should be educated in order to improve quality and patient care outcomes. The document emphasizes five core competencies in which all health care professionals should be equipped: deliver patient-centered care, practice in interdisciplinary teams, use evidence-based practice, apply quality improvement initiatives, and use informatics. The competency of applying quality improvement initiatives addresses the importance of identifying and preventing errors, as well as

designing, implementing, and evaluating projects in order to improve health care outcomes (Long, 2003).

Collaborative skills are indispensable to developing and establishing quality patient care (American Association of Colleges of Nursing, 2006a). The newest Institute of Medicine report, *The Future of Nursing: Leading Change, Advancing Health* (Institute of Medicine, 2010), recommends the expansion of nurse-led collaborative improvement opportunities between educational and practice settings; however, collaborative efforts between these two arenas have been limited (American Association of Colleges of Nursing, 2006b, Institute of Medicine, 2010). Historically, the two domains of academe and practice have existed in separate silos, thus limiting the sharing of research and evidence-based scholarship that can be translated into improving quality care outcomes. When academic–practice relationships do develop, they generally occur between large academic health care centers and universities,

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institutions that tend to have greater faculty and physical resources than small community hospitals. However, relationships are beginning to emerge between universities and smaller health care institutions (Jones, 2009).

The purpose of this article is to describe the collaborative relationship between a university and a small rural community hospital that resulted in the development of a project that affected the quality of health care delivery at the hospital. The quality improvement initiative that developed between the two institutions involved the chairperson of the nursing department at the university, the CEO of the hospital, the staff education coordinator at the hospital, a doctoral student in the nursing program, and a member of the hospital foundation.

### Key Points

- Nurses were able to insert a PIV in one attempt on all 9 patients.
- The partnership led to the development and implementation of an evidenced-based pediatric PIV insertion program.
- The simulation technology used in this project permitted the staff nurses to practice the pediatric PIV insertion skill, learn the procedure, make and correct mistakes, and fine-tune PIV skills in a safe environment without harming a patient or risking safety.

### The Quality Improvement Initiative

The university and community hospital are located

approximately 3 miles from each other in rural Pennsylvania, 50 miles from a large urban area. The nursing department's baccalaureate program is on the main campus, and RN-to-BSN, MSN, and doctor of nursing practice (DNP) programs are located at three other sites near the large city, still within 50 miles of the main campus. Enrollment across the various nursing programs totals approximately 800 students. The department chair serves on the hospital's board of trustees, and the CEO of the hospital, a graduate of the baccalaureate program, serves on the community advisory board of the nursing program at the university.

The 68-bed community hospital includes a medical-surgical unit with four pediatric beds, an intensive care unit, a behavioral health unit, a sleep center, home health services, and an emergency express care service. The hospital is accredited by the Joint Commission Center for Transforming Healthcare. Inpatient admissions have increased since the hospital came under new management in 2007, and emergency department visits have grown by 25%.

In response to emergency department growth, the hospital added an emergency express care service in 2008; as the result, pediatric visits and acuity levels increased. With the increase in pediatric acuity levels, a staff nurse educational needs assessment revealed that the institution's RNs lacked experience and skills in pediatric peripheral intravenous

(PIV) insertion. Pediatric patients differ physiologically from adult patients (Jones, 2009), and pediatric PIV access can be difficult (Etzel-Hardman, 2008). It was not unusual for nurses to make several attempts at PIV insertion, resulting in a delay in the administration of fluids and medications and a painful experience for the patient. The delay in PIV treatment could adversely affect patient care outcomes.

The problem was identified by the administration of the hospital and was presented to the department chair of the nursing program at the local university. A team was formed, and key personnel were invited from both institutions. Team members included the CEO, the chief nursing officer, the staff educator from the hospital, the department chair, the simulation laboratory coordinator, a DNP student with patient simulation expertise from the university, and a certified pediatric nurse practitioner. The DNP student was the project leader and expedited university institutional review board approval for the project.

The goal of the collaborative project was to decrease the number of pediatric PIV attempts, improve the start time of PIV therapy, and therefore improve patient safety outcomes for the pediatric population. The focus of the project was to create a safe learning environment for staff nurses at the community hospital through the development and delivery of didactic content, PIV skill training, and a pediatric simulation scenario requiring a PIV insertion.

### Theoretical Underpinning

Nursing educators have long incorporated simulation in some form or another to teach skills and principles of patient care. Simulation techniques used in the past included use of a fresh orange to instruct proper technique of subcutaneous injection administration and role-playing of therapeutic and nontherapeutic communication. A literature review was conducted, and the search term phrase *simulation in nursing education* resulted in an extensive number of articles that included scientific theory supporting simulation in nursing education as a teaching strategy; however, similar to the findings of Durham & Alden (2008), only a limited number of these studies addressed the use of clinical simulation by hospitals to educate RNs. Studies have found that senior-level nursing students using high fidelity simulation acquired skills faster and demonstrated higher performance than did participants who acquired skills through traditional educational approaches (Durham & Alden, 2008). Research indicates simulation methodology is more realistic, enhances both acquisition and retention of knowledge, sharpens critical-thinking and psychomotor skills, and is more enjoyable for the learner (Garrett, MacPhee, & Jackson, 2010). Nurse educators are using simulators in the adult acute care setting to introduce new equipment, instruct on new procedures, and assess competencies of nurses. Simulation as an educational strategy offers the absence of risk to a live patient; the ability to

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