

# Prewarming in a Pediatric Hospital: Process Improvement Through Interprofessional Collaboration

Cheryl Tveit, RN, MSN, CAPA, John Belew, RN, MS, PhD, Cindy Noble, RN, CRNA

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*A quality improvement project intended to promote maintenance of normothermia through active prewarming was carried out at a pediatric specialty hospital. An alternative active, forced-air warming product (Bair Paws warming gowns) was trialed in place of the existing active warming product (Bair Hugger blankets). Converting to the new product was intended to improve patient and staff compliance with prewarming recommendations. The alternative forced air active warming product was favored by both staff and patients, and the rate of compliance with this practice nearly doubled following the change in product. Extensive interprofessional collaboration and problem solving were required to go from an idea to a fully implemented change. The project demonstrated the importance of collaboration among various disciplines and the positive impact interprofessional collaboration can have on compliance with practice changes.*

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**A GROWING BODY OF EVIDENCE** has demonstrated the benefits of maintaining patients in a normothermic state (core body temperature between 96.8 and 100.4 F<sup>1</sup>) throughout the perioperative experience. In addition to decreased comfort and satisfaction,<sup>1-3</sup> hypothermia has been linked to an increased risk for surgical site infections, bleeding, pressure ulcers, longer recovery room stays, and increased rates of hospital admissions.<sup>4</sup> Hypothermia can also affect medication metabolism and alter tissue and oxygen demands.<sup>5</sup>

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*Cheryl Tveit, RN, MSN, CAPA, a PreAnesthesia, Phase II Same Day Surgery, Advanced Imaging Charge Nurse, John Belew, RN, MS, PhD, a Nursing Research Specialist, and Cindy Noble, RN, CRNA, a Certified Registered Nurse Anesthetist, Gillette Children's Specialty Healthcare, 200 E. University Ave, St. Paul, MN 55101.*

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*Address correspondence to Cheryl Tveit, Gillette Children's Specialty Healthcare, 200 E. University Ave, St. Paul, MN 55101; e-mail address: [ctveit@gillettechildrens.com](mailto:ctveit@gillettechildrens.com).*

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The ASPAN Clinical Practice Guideline for the Promotion of Perioperative Normothermia recommends that patients receive a minimum of 30 minutes of prewarming to reduce the risk of subsequent hypothermia.<sup>6</sup> Active warming measures are defined in the ASPAN guideline as "... the application of forced-air convection warming systems and circulating-water mattresses, resistive heating blankets, radiant warmers, negative-pressure warming systems, and warmed, humidified, inspired oxygen."<sup>7</sup> Warmed cotton blankets have long been used to keep patients comfortable, but are considered a passive warming measure that has been shown to be less effective than active forced-air warming measures, such as the Bair Hugger (3M) blankets (Arizant Healthcare, Inc, Eden Prairie, MN).<sup>8,9</sup>

## Interprofessional Collaboration

"Collaboration" is defined by Merriam-Webster as work that is done "jointly with others or together especially in an intellectual endeavor."<sup>10</sup> Interprofessional collaboration was used in this quality

improvement (QI) project to ensure all affected staff were included in decision making. Key representatives of the hospital's purchasing, materials management, anesthesia, surgical nursing, and perianesthesia departments; surgeons; and members of the infection prevention committee formed the interprofessional QI team dedicated to this project. In 2011, the Interprofessional Education Collaborative published "Core Competencies for Interprofessional Collaborative Practice."<sup>11</sup> Interprofessional teams have been encouraged and supported in the organization. This document outlines the importance of working as a team and deliberately working toward a common goal. Forming an interprofessional team can assist professions to practice to their full scope of expertise and has been shown to enhance patient care outcomes.

### **Prewarming QI Project**

An interprofessional QI project was carried out to promote maintenance of normothermia through active prewarming and improve compliance with this intervention. The project hospital provides pediatric specialty services for children and young adults who have a wide range of conditions, including cerebral palsy, spina bifida, neuromuscular disease, and craniofacial abnormalities. These individuals are likely to have multiple surgical procedures throughout childhood, and the risks for complications such as surgical site infection are compounded with each additional procedure. At the time the project started, the hospital had an established commitment to the maintenance of perioperative normothermia through the routine implementation of active warming measures. However, compliance with active warming measures was unsatisfactory.

Patient comfort has always been a priority at the pediatric specialty hospital where the QI project took place. Surgical patients were routinely provided with warmed cotton blankets as a comfort measure. While warmed cotton blankets offered some comfort, they did not provide consistently warm temperatures that were adequate for active warming.<sup>9</sup> The evidence related to reduced risk for surgery-related infections prompted the organization to commit to maintenance of normothermia as a goal for all surgical patients who met the criteria for active warming measures. In 2007, active prewarming of surgical patients was imple-

mented using Bair Hugger blankets. The blankets were also used intraoperatively and postoperatively to prevent hypothermia. These active warming measures corresponded with a significant decrease in surgical site infections. After this practice had been in place for nearly 5 years, however, QI audits revealed that active warming with the Bair Hugger blankets was only implemented in 35% of those patients who met the criteria.

### **Barriers to Compliance**

The interprofessional QI team surveyed perianesthesia nursing staff to learn about the reasons patients were not receiving active prewarming. In addition, chart audits were conducted that identified documented reasons for refusal by patients for prewarming. The chart audits and surveys revealed that patients, families, and staff found the Bair Hugger blankets to be noisy, bulky, and disruptive. Hospital policies were geared toward active parental involvement during anesthesia induction and during recovery in the PACU. In both of these areas parents were encouraged to hold their child when appropriate. The loud blowing sound of the blankets frightened and startled sensitive patients and the blankets could also easily slide off of children when they were being held in a parent's lap.

The Bair Hugger blankets were also easily damaged during the course of surgery. The blankets initiated in the presurgical area were frequently unusable by the time the patient arrived in PACU. The blankets were frequently taped onto the OR tables to prevent them falling onto the ground. Once the tape was removed the blankets frequently had holes in them and were not able to be used in PACU. A replacement blanket was needed for 53% of those patients who had used the Bair Hugger preoperatively once they arrived in PACU.

### **Promoting Compliance**

The interprofessional QI team began exploring additional strategies to support improved compliance with normothermic practices for all surgical patients. At the 2010 ASPAN National Conference, two nurses learned about the 3M Bair Paws gown (Arizant Healthcare, Inc.). The Bair Paws gown uses warm air for active warming, but unlike the Bair Hugger blanket that rests on top of the patient, the device is actually built into the patient

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