Prewarming Clinical Evidence Summary

3M™ Bair Hugger™ Warming Gown System
Randomized controlled trial

Implementing a prewarming protocol to help reduce unintended hypothermia.\(^1\)

This study tested the efficiency of a preoperative forced-air warming system in preventing perioperative hypothermia. Sixty-eight adult patients undergoing spinal surgery with general anesthesia were randomized to receive either standard care (N=37) or prewarming for 60 minutes at 38°C (N=31) using a 3M™ Bair Hugger™ Warming Gown. All patients received routine warming intraoperatively with a 3M™ Bair Hugger™ Warming Gown.

The results showed that there was a 0.3°C smaller decrease in mean core temperature in the prewarmed group at 40, 60, and 80 minutes post-induction (P≤0.05). Temperature was maintained above the hypothermic threshold of 36°C in 21 (68%) patients in the prewarmed group, compared with 16 (43%) patients in the control group (P<0.05).

Summary of results:

- Preoperative warming with a Bair Hugger gown led to a smaller core temperature decrease intraoperatively
- Prewarming also led to a reduction in perioperative hypothermia for spinal surgery patients under general anesthesia


This randomized controlled trial (RCT) of 94 patients compared the rates of hypothermia (<36°C), patient well-being and the costs of warming for two different groups. The standard warming group utilized cotton blankets in pre-op and 3M™ Bair Hugger™ forced-air warming blankets from anesthesia induction through the end of surgery. The extended warming group utilized the 3M™ Bair Hugger™ System for prewarming, intraoperative warming and post-anesthesia care unit (PACU) recovery until patient discharge.

The rate of hypothermia was reduced by 48% and intraoperative core temperature drop was minimized with the extended warming group. In addition, patients in the extended warming group had decreased anxiety levels and apprehension, with increased patient comfort. Extended warming with the Bair Hugger system also resulted in an estimated cost savings of $84 USD per patient versus standard warming processes in this study.

Summary of results:
- Prewarming with the Bair Hugger gown:
  - Reduced hypothermia rate by 48%
  - Minimized intraoperative core temperature drop
  - Decreased anxiety levels and apprehension
  - Increased patient comfort
  - Provided an estimated cost savings of $84 USD per patient versus standard warming processes in this study

This prospective randomized study focused on the effect of prewarming on 40 healthy pregnant women at greater than 37 weeks gestation who all received a spinal anesthetic. Each participant was randomly assigned to either a control group with no prewarming (n=20), or the experimental group with prewarming (n=20).

The experimental group received prewarming with the 3M™ Bair Hugger™ Warming Gown at 40°C for 30 minutes prior to spinal induction. Prewarming with the Bair Hugger Warming Gown for 30 minutes prior to surgery helped prevent lowering of core body temperature (P<0.001).

Summary of results:
Prewarming with a Bair Hugger gown for 30 minutes prior to anesthesia induction significantly helped prevent unintended hypothermia.

Tympanic temperature

This study was a prospective randomized controlled trial with a sample of 30 adults having a total knee arthroplasty (TKA). The objective of the study was to determine the efficacy of maintaining normothermia with the 3M™ Bair Hugger™ patient adjustable warming gown.

Participants were assigned to either the active pre-warming gown group with the Bair Hugger warming gown (n=15), or the standard cloth gown and warmed cotton blanket group (n=15). The results of the study are outlined below.

**Summary of results:**

Patients warmed with Bair Hugger warming gowns had:

- higher temperatures in the PACU
- reduced opioid use after surgery
- increased satisfaction with their thermal comfort

Effective warming methods should be utilized for all patients.

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Randomized controlled trial

Effects of comfort warming on preoperative patients.\textsuperscript{5}

This study was a randomized controlled trial with 126 surgical patients. They were randomly assigned to one of two preoperative warming treatments.

The treatment group (N=62) were warmed with 3M™ Bair Hugger™ patient adjustable warming gowns for 30 to 60 minutes before the anticipated start of surgery, and if desired, covered with one non-warmed cotton blanket.

The control group (N=64) used one regular cotton hospital gown and were covered with one warmed cotton blanket for 30 to 60 minutes before the anticipated start of surgery.

Summary of results:

This study measured two outcomes; thermal comfort and anxiety.

- Both prewarming treatments had a positive impact on the patient’s thermal comfort

- Patients who used the patient-controlled warming gown experienced a significant reduction in anxiety, compared to the control group (p=0.0002)

Prewarming with the 3M™ Bair Hugger™ Gown as part of a surgical care bundle can help lower the risk of an SSI for colorectal surgical patients.  

This systematic review and cohort meta-analysis analyzed 16 studies and 8,515 patients to determine the effectiveness of an evidence-based surgical care bundle in reducing surgical site infection (SSI) rates in colorectal surgery patients.

The majority of study bundles reviewed in this meta-analysis included core interventions, which are also recognized by the Institute for Healthcare Improvement, including:

- normothermia
- prophylaxis antibiotic
- glycemic control
- appropriate hair clipping

**Summary of results:**

This systematic review and cohort meta-analysis demonstrated that an evidence-based surgical care bundle group had a reduced SSI rate of 7.0% compared to 15.1% in the baseline group.

Quality improvement

Prewarming with the 3M™ Bair Hugger™ Gown as part of a surgical care bundle can help lower SSI risk in total joint surgery.\textsuperscript{7}

The project goal was to implement clinical processes that result in SSI rates in the total hip arthroplasty/total knee arthroplasty (THA/TKA) implant population at the 10th percentile or less. To accomplish this goal, a collaborative multidisciplinary team was formed and these surgeries were not performed for nearly 3 months, allowing the team to conduct a thorough investigation and develop a plan to meet the project goal.

The investigation resulted in development of a comprehensive THA/TKA checklist that included five elements in addition to The Surgical Care Improvement Project (SCIP) standards of care.

The following five elements were included:
- Patient preoperative skin preparation product with chlorhexidine gluconate (CGH) the night before and morning of surgery.
- 3M™ Skin and Nasal Antiseptic applied in preop*
- Patient warming 30 minutes preop and during surgery using 3M™ Bair Hugger™ Gowns
- Antibiotic infusion completed 10 minutes prior to incision
- Team huddle to review completion of checklist and coordination of start time for opening of instruments

*Equivalent product in Canada is 3M™ SoluPrep™ Nasal containing 5% Providone-Iodine.

The prevention of unintended perioperative hypothermia is a common concern for perioperative nurses. This quality improvement project evaluated the impact of prewarming on helping to reduce postoperative hypothermia rates.

The quality improvement project evaluated 149 colorectal surgery patients. The authors compared temperatures of patients (n=72) who received standard care with no prewarming to temperatures of patients (n=77) who received 60 minutes of prewarming with a 3M™ Bair Hugger™ Gown. Both groups of patients were similar, with no significant differences in age, gender or weight.

Summary of results:
- Prewarming with the 3M™ Bair Hugger™ Gown resulted in a lower rate of postoperative hypothermia of 12% compared to 49% in the group with no prewarming.
- This project follows The American Society of PeriAnesthesia Nurses (ASPAN) clinical practice guidelines which support prewarming as a way to prevent hypothermia.
- The perioperative nurse has an important role in caring for patients and ensuring normothermia is maintained.

This quality improvement project was focused on implementing prewarming to maintain patient normothermia in a pediatric specialty hospital. The facility had been utilizing cotton blankets in the pre-op and 3M™ Bair Hugger™ Pediatric Blankets in the OR.

The staff initiated a short trial period to evaluate the 3M™ Bair Hugger™ Pediatric Gowns in place of Bair Hugger blankets. They were able to standardize warming to only the Bair Hugger gown to warm the patient from pre-op to OR to PACU.

The rate of active warming compliance nearly doubled (57.7%), and feedback was positive from both parents and patients. The trial data was presented to the Nurse Manager, and agreement was reached to permanently implement prewarming with the Bair Hugger pediatric gown.

This project highlighted how working with an interprofessional team resulted in the implementation of a successful perioperative practice change.

At 3M, we use science to help you influence the most important aspects of a patient’s experience — the outcomes — with clinically proven solutions that help safeguard them during surgery.

The 3M™ Bair Hugger™ Warming Gown system helps maintain patient normothermia throughout the surgical process to avoid the expensive, and often preventable, complications associated with unintended hypothermia.

For additional information, please contact your 3M representative, call 1-800-364-3577 or visit bairhugger.com.