

Reducing Perioperative Hypothermia using Preoperative Warming: An Improvement Project in a Veteran Affairs Medical Center

Keleigh A. Galloway BSN, SRNA; Christopher C. Myers BSN, SRNA; Jacob A. Reece BSN, SRNA; Jim Alberding, DNP, APRN, CRNA; Renee Dixon BSN, MSN, FPP, FPA, APRN, CRNA

BACKGROUND

- Perioperative hypothermia is a common surgical complication that can lead to many adverse effects for patients, such as life-threatening cardiac abnormalities, surgical site infections, and impaired wound healing.
- Hypothermia is defined as a core temperature of less than 36.0° C during the perioperative period.
- Globally, colorectal patients, under general anesthesia, have an incidence rate of hypothermia between 67-74%

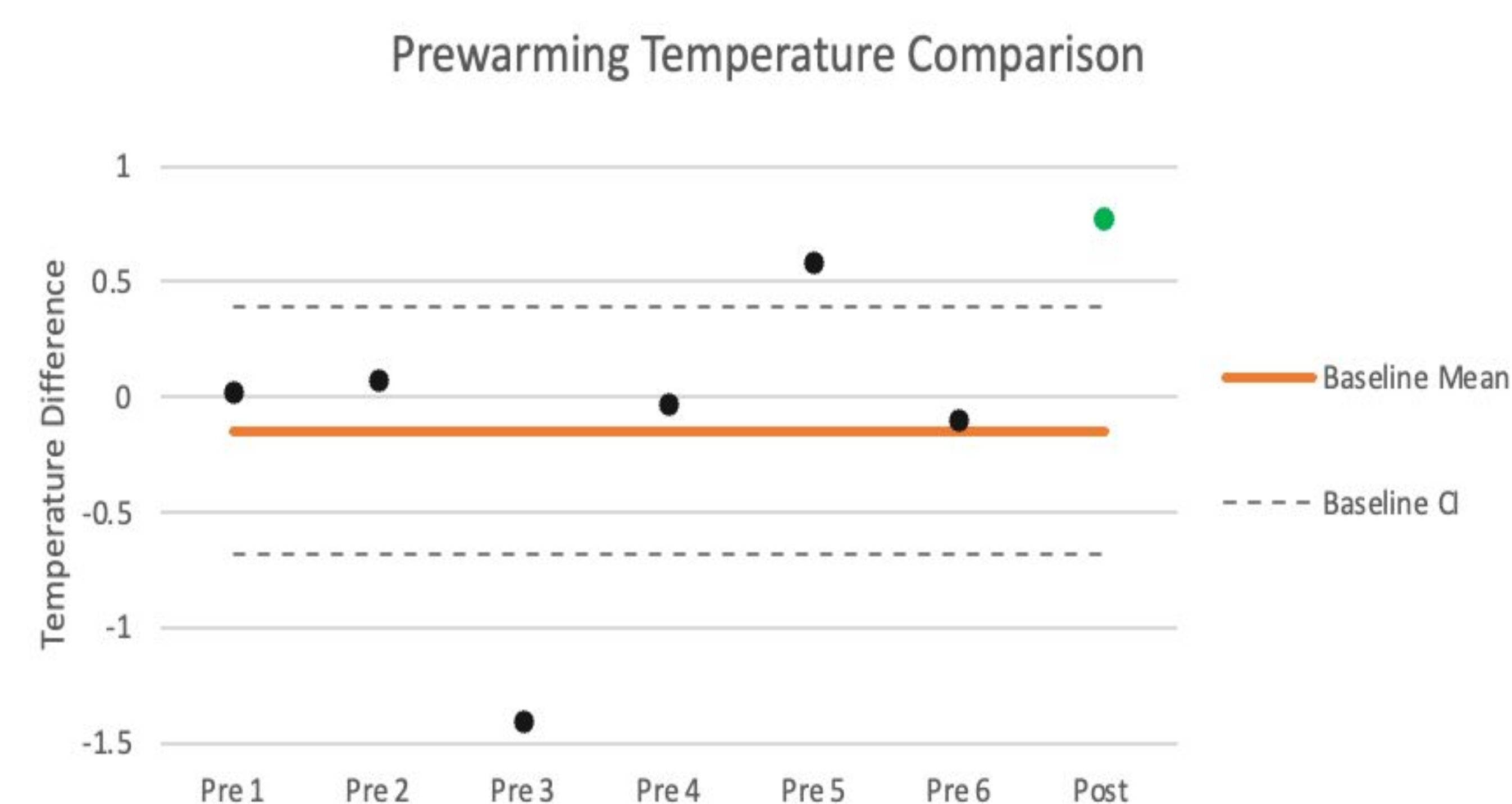
LOCAL PROBLEM

- The site for this evidence-based practice improvement (EBPI) project is an acute care tertiary Veteran's hospital.
- After performing a strengths, weaknesses, opportunities, and threats (SWOT) analysis, the project team identified a lack of standardization in the amount of time a patient is pre-warmed in the preoperative area.
- The purpose of this project was to implement a standardized 30 minutes of forced-air warming (FAW) in the preoperative period before patients undergo general anesthesia for a colorectal procedure.
- The project group identified two aims for this project: (1) 50% of colorectal surgical patients undergoing general anesthesia at the project site will have a core temperature greater than 36°C, and (2) 60% of perioperative staff will meet the 30-minute standardized pre-warming requirement in the preoperative area.

METHODS

- The Evidence-Based Practice Improvement (EBPI) process model was used as the framework for this project.
- Literature search, critical appraisal, and clinical expertise demonstrated strong evidence supporting the standardization of prewarming.
- Plan-do-study-act (PDSA) cycles were utilized for implementation and data collection.
- Two on-site education visits were conducted and implementation was performed over 12 weeks.
- Preoperative temperatures were measured before FAW, anesthesia start time was documented (ensuring 30 minutes of prewarming was performed) and a final temperature was taken at the anesthesia end time.
- Data was collected through a manual chart review utilizing a checklist created by the project team.

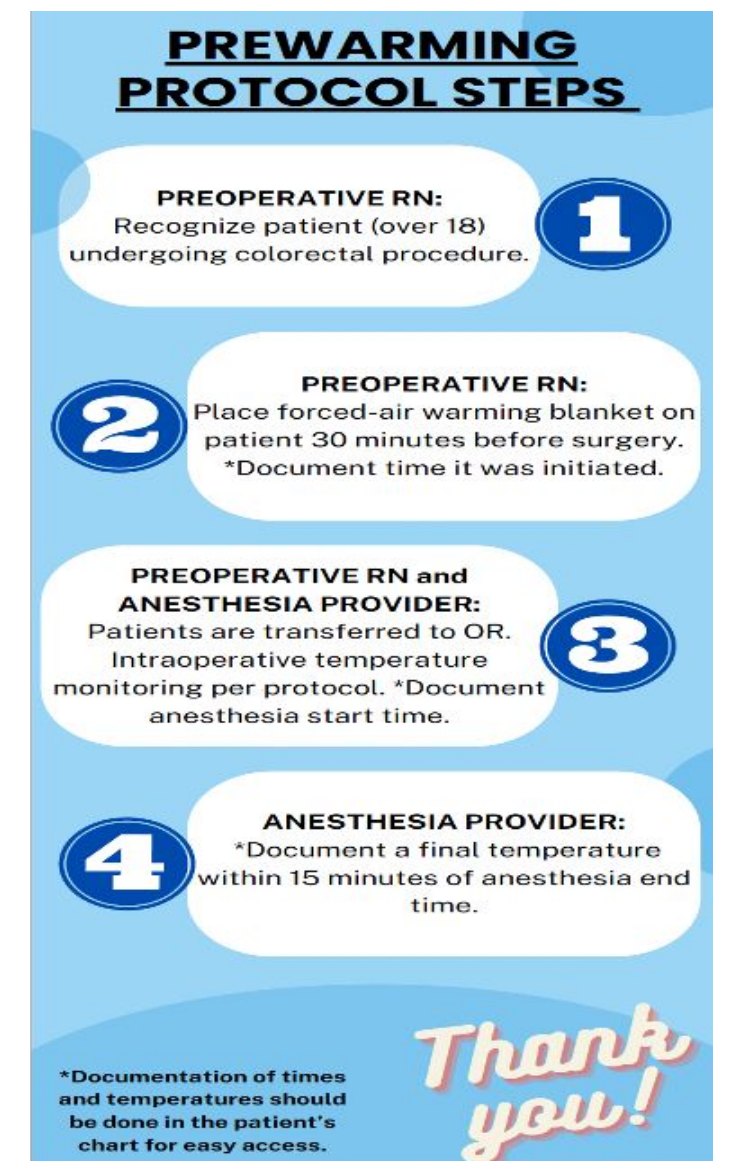
An effective way to **prevent perioperative hypothermia** is through **active forced-air warming** for a **minimum of 30 minutes** before undergoing general anesthesia for colorectal procedures.



INTERVENTIONS

- All colorectal surgical patients (≥ 18) undergoing general anesthesia had a preoperative temperature taken and then FAW blankets were applied.
- Application of FAW time was charted, and an anesthesia start time was documented.
 - 3 minutes was subtracted for travel time.
 - 30 minutes of prewarming was verified based on the times documented from FAW application to anesthesia start.
- A final anesthesia end time (within 15-minutes) temperature was taken for comparison.

Normothermia Protocol Checklist		Week 1	Week 2	Week 3	Week 4
Patient 1	1). Colorectal patient undergoing general anesthesia, aged 18 or older?	1. Yes ☐ or No ☐	1. Yes ☐ or No ☐	1. Yes ☐ or No ☐	1. Yes ☐ or No ☐
	2). Time that pre-warming was initiated.	2. Pre-warming initiated start time: _____	2. Pre-warming initiated start time: _____	2. Pre-warming initiated start time: _____	2. Pre-warming initiated start time: _____
	3). Time patient arrived in the OR.	3. OR Arrival time: _____	3. OR Arrival time: _____	3. OR Arrival time: _____	3. OR Arrival time: _____
	4). Highest intraoperative temperature within 15 minutes of anesthesia stop time.	4. Final intraoperative temperature: _____	4. Final intraoperative temperature: _____	4. Final intraoperative temperature: _____	4. Final intraoperative temperature: _____
Patient 2	1). Colorectal patient undergoing general anesthesia, aged 18 or older?	1. Yes ☐ or No ☐	1. Yes ☐ or No ☐	1. Yes ☐ or No ☐	1. Yes ☐ or No ☐
	2). Time that pre-warming was initiated.	2. Pre-warming initiated start time: _____	2. Pre-warming initiated start time: _____	2. Pre-warming initiated start time: _____	2. Pre-warming initiated start time: _____
	3). Time patient arrived in the OR.	3. OR Arrival time: _____	3. OR Arrival time: _____	3. OR Arrival time: _____	3. OR Arrival time: _____
	4). Highest intraoperative temperature within 15 minutes of anesthesia stop time.	4. Final intraoperative temperature: _____	4. Final intraoperative temperature: _____	4. Final intraoperative temperature: _____	4. Final intraoperative temperature: _____
Patient 3	1). Colorectal patient undergoing general anesthesia, aged 18 or older?	1. Yes ☐ or No ☐	1. Yes ☐ or No ☐	1. Yes ☐ or No ☐	1. Yes ☐ or No ☐
	2). Time that pre-warming was initiated.	2. Pre-warming initiated start time: _____	2. Pre-warming initiated start time: _____	2. Pre-warming initiated start time: _____	2. Pre-warming initiated start time: _____
	3). Time patient arrived in the OR.	3. OR Arrival time: _____	3. OR Arrival time: _____	3. OR Arrival time: _____	3. OR Arrival time: _____
	4). Highest intraoperative temperature within 15 minutes of anesthesia stop time.	4. Final intraoperative temperature: _____	4. Final intraoperative temperature: _____	4. Final intraoperative temperature: _____	4. Final intraoperative temperature: _____



RESULTS

- Three total colorectal patients; two refused and one received FAW.
- All patients had a core temperature > 36.0°C.
- The one patient who used the FAW blanket for the requisite 30 minutes had a final operating room temperature higher than the other three patients
- Consistent with our aims, 100% of participating patients were pre-warmed for at least 30 minutes and had a final operating room temperature > 36.0°C.

CONCLUSIONS

- Even with our limited patient participation, 30 minutes of preoperative warming maintained normothermia and had increased final operative core temperatures, consistent with our literature review.
- Patient participation was an unanticipated challenge for this project.
- Incorporating pre-anesthesia patient education regarding the use of FAW may be another avenue for future projects.
- Patient education and biannual preoperative nurse education will create a foundation for sustainability at our project site.