IMPROVING PATIENT OUTCOMES ONE WARM PATIENT AT A TIME

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INTRODUCTION & BACKGROUND

BACKGROUND: HYPOTHERMIA IN SURGICAL PATIENTS

- Defined as: core body temp < 36°C
- Occurs in up to 90% of patients
- **Causes**
  - Medications-vasodilation
  - Retribution of heat to the environment
  - Physiologic factors: cold IV fluids, cold surface to skin contact, cold OR temps and increased time under general anesthesia.
  - Negative effects of hypothermia
    - Increased morbidity, decreased wound healing**, increased surgical site infection (SSI),** decreased platelet activity, as well as prolonged drug metabolism.

(Brodshaug et al., 2019; Madrid et al., 2016; Nicholson, 2013)

SIGNIFICANCE OF THE PROBLEM

- The Problem: increased incidence of hypothermia in colorectal surgical patients at The University of Tennessee Medical Center (UTMC).
- Initially the facility is 76% compliant with maintaining a **median** core temp of >36°C intraoperatively.
- Incidence of SSI
  - UTMC: **16.7%**
  - State (Tennessee Surgery Quality Collaborative): **14.3%**
  - National (National Surgical Quality Improvement Program): **13.2%**
- SSI's are considered the most expensive of all hospital-acquired infections in the USA
  - Estimated additional $10 billion in healthcare costs.
  - Increased cost of single patient admission by $20,000.

(Hien & Daley, n.d.; UTMC Bowel Surgery Committee, 2019)

PROJECT PURPOSE, AIM, & GOALS

Purpose

Improve and adapt the current protocol compliance in colorectal surgery patients, to maintain a median targeted core temperature of > 36°C intraoperatively.

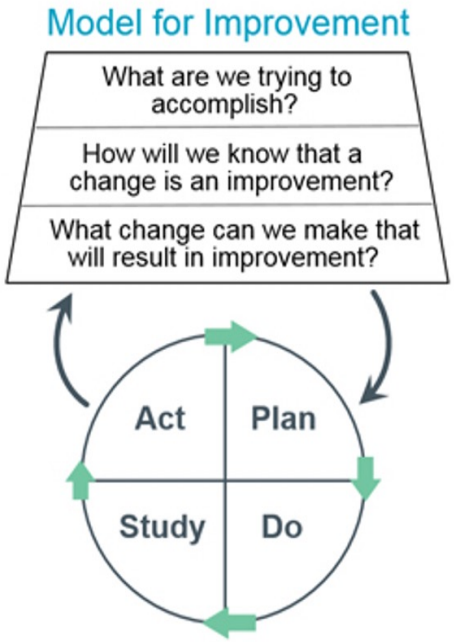
Aim

≥80% of colorectal surgery patients to maintain a median core temperature > 36°C.

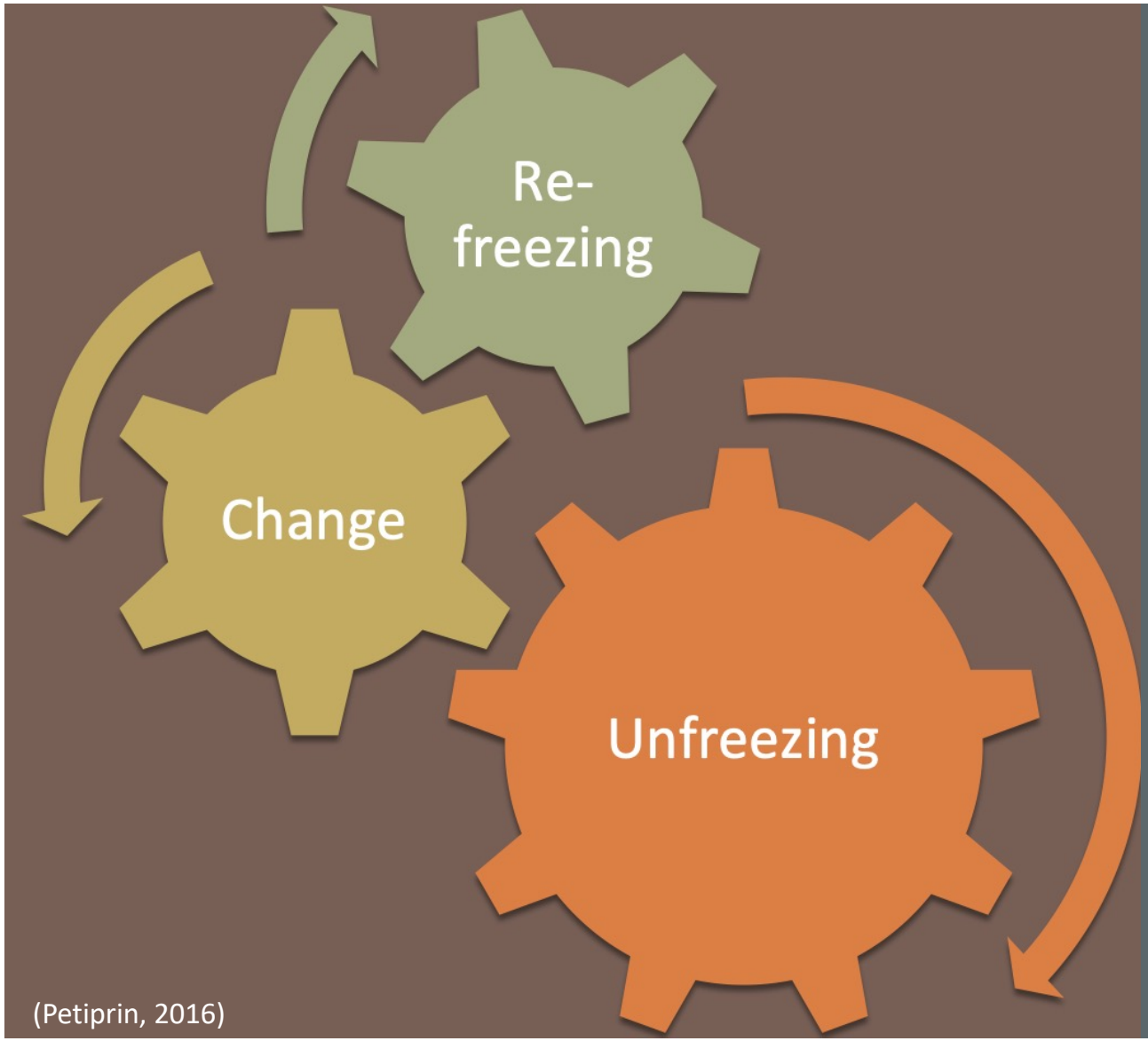
Goals

Utilize the current hypothermia prevention protocol and ensure the best interventions and methods are employed to prevent and combat a decrease in core temperature.

GUIDING FRAMEWORK: PROCESS



Note: This figure demonstrates the framework of The Model for Improvement and PDSA cycles (Institute for Healthcare Improvement, n.d.). Reprinted with permission.



(Petiprin, 2016)

GUIDING FRAMEWORK: THEORETICAL

Lewins Change Theory

PICOT QUESTION #1

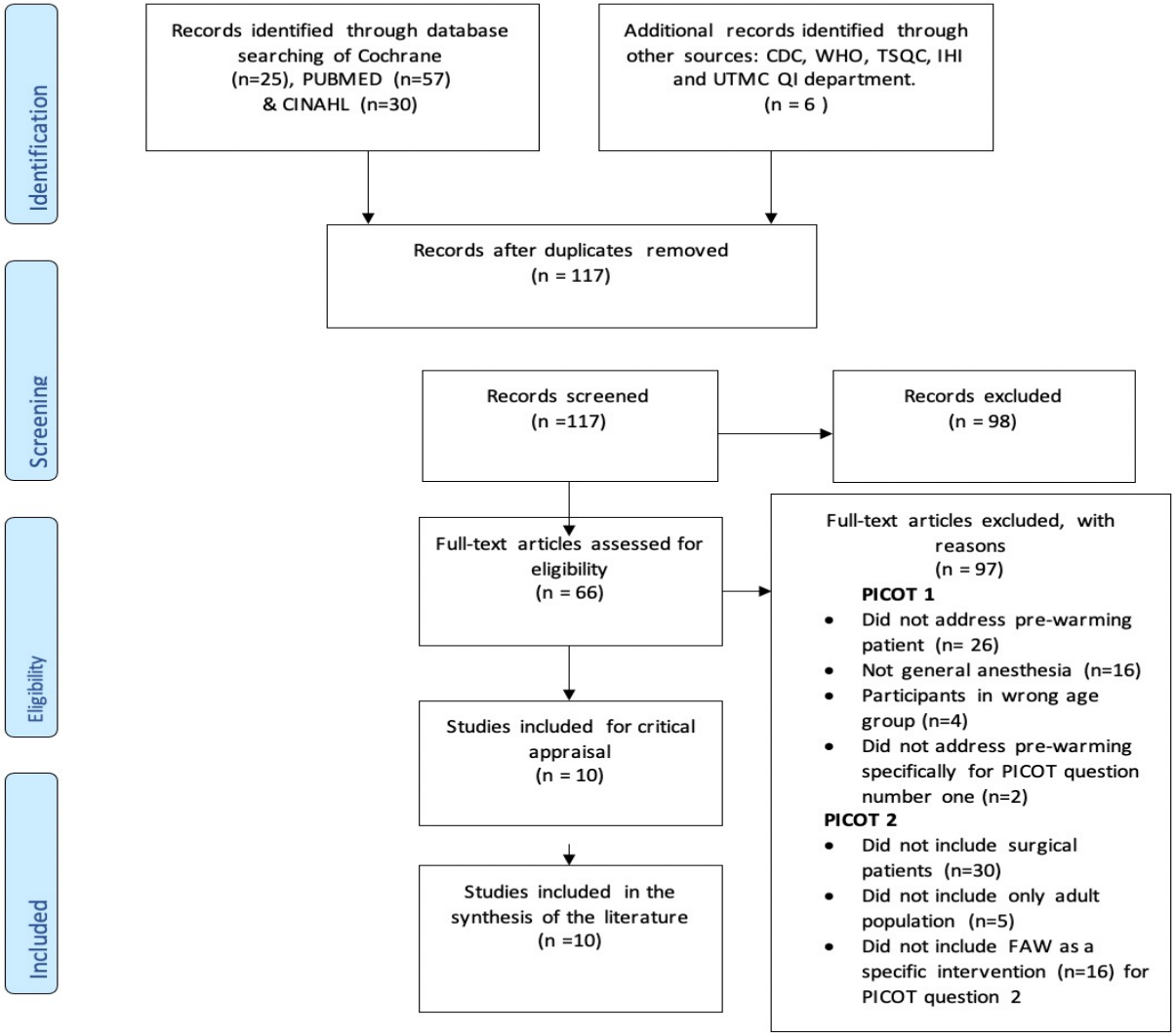
"In the Colorectal Surgery Patient, how do prewarming strategies compare to not prewarming affect intraoperative hypothermia rates over three months?"

PICOT QUESTION #2

- "In colorectal surgery patients how does increased compliance with the standardized hypothermia prevention protocol compared to current practice affect surgical hypothermia compliance rates over 3 months?"

EVIDENCE

LITERATURE SEARCH STRATEGY



CRITICAL APPRAISAL OF LITERATURE

- Critical Appraisal via the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) critical appraisal tool
  - All Quantitative Studies
  - All articles Level of evidence II or above
  - All articles received a quality letter grade of an A or B
    - High or good quality of evidence

SYNTHESIS OF THE EVIDENCE

- Synthesis of evidence pertinent to PICOT questions 1 & 2 is listed in tables 3 & 4, respectively.
- PICOT Question 1: Evidence suggests that prewarming unanimously decreases the incidence of perioperative hypothermia.
- PICOT Question 2: Intraoperative active body surface warming ABSW, using the forced air method (FAW) had a statistically significant effect on decreasing the incidence of hypothermia.

PATIENT PREFERENCES & VALUES

- "Improving patient operative outcomes is the foundation for this project. Increasing health literacy will be a large portion of the implementation phase. Educating patients on the benefits of maintaining normothermia and the reasons for inadvertent hypothermia will greatly aid the patient in making decisions and involve them in their care".

RECOMMENDATION FOR PRACTICE CHANGE

- Based on the JHNEBP level of evidence and quality ratings a "strong" level of evidence was found to support the practice change; increasing compliance with hypothermia prevention protocols and methods via use of FAW devices.
- PICOT One
  - It is **recommended** that all colorectal surgery patients should be pre-warmed using a forced air warming device at least 30 minutes prior to anesthesia induction.
- PICOT Two
  - It is **recommended** that all colorectal surgical patients maintain a core body temperature ≥36 C through increased compliance with current hypothermia prevention protocols and methods via application of FAW devices.

(Dang & Dearholt, 2018)

S.M.A.R.T. AIM

- ≥80% of colorectal surgery patients to maintain a median core temperature > 36°C.
  - Implementation Date: August 2021

IMPLEMENTATION

PROJECT SETTING & PARTICIPANTS

- Setting
  - The University of Tennessee Medical Center
    - 685 Beds
    - Level one trauma, stroke center, and heart hospital, with magnet designated status.
    - Approximately 40 regularly scheduled operating suites.
    - Admits 24,000 patients annually and performs 8,500 inpatient surgeries.
    - Regulatory Guidance: NSQIP, TSQC, & MPOG.
- Participants
  - Colorectal surgery patient (≥ 18 years old) during the preoperative and intraoperative timeframe.
    - Colorectal surgery patient: any patient receiving open, laparoscopic or otherwise robotic assisted surgery on the colon, anus, or rectum that results in the anastomosis of the bowel.

(The University of Tennessee Medical Center, n.d.)

STAKEHOLDERS & PROJECT TEAM

- Key project site team members
  - DNP Students 1 & 2
  - Anesthesia Project Chair
  - Anesthesia Quality Improvement Department Chair
- Additional Team Members
  - Staff Management
  - Site Providers and Staff
  - UTK Statistician
  - Bowel Surgery Committee
- Stakeholders not on Project Team
  - Colorectal Surgical Patients
  - NSQIP
  - TSQC
  - ASPIRE

BARRIERS & FACILITATORS

- Barriers
  - Lack of Knowledge & Skills
  - Beliefs-Culture
  - Attitudes-Resistance to Change
  - Organizational Influences
  - Lack of Resources
  - Departmental Turnover
  - Pandemic
- Facilitators
  - Adequate Knowledge & Skills
  - Positive Culture & Beliefs
  - Attitudes-Welcome Change and Opportunity
  - Organizational Influences-Strong leadership
  - Resources-Adequate Monetary Resource Distribution

SWOT ANALYSIS

INTERNAL FACTORS	
STRENGTHS (+)	WEAKNESSES (-)
· Institutional Support for project development and implementation · UTMC working with the TSCQ to meet evidence-based core measures · The presence of an actively involved, anesthesia specific, quality improvement coordinator · One of the region's top medical centers · As a top referral center, magnet recognized, level one trauma center and teaching hospital resources are in place to optimize quality of care and implement change initiatives and projects	· Lack of patient and staff education in regard to hypothermia as a risk factor for increased SSI · Lack of compliance with current colorectal surgery protocol · Lack of standardized hypothermia intervention implementation methods · Lack of access to a physical hypothermia prevention protocol · Provider bias in their own way of combatting hypothermia
EXTERNAL FACTORS	
OPPORTUNITIES (+)	THREATS (-)
· Quarterly meetings of the Multicenter Perioperative Outcomes Group (MPOG), to analyze multi center data to improve perioperative patient outcomes · Quarterly meetings of the Bowel Surgery Committee to assess and improve current bowel surgery outcomes · Provider education regarding most effective hypothermia prevention techniques · Perioperative nurse hypothermia, and prevention technique education · Warming patients preoperatively, to improve normothermia compliance	· High staff turnover rates · Staff resistance to and decreased interest in education · Provider resistance to change · Provider fatigue and burnout · Large provider and nurse population to educate · Competition from medical residents in pursuing a quality improvement project

IMPLEMENTATION TIMELINE

- March 2021: Final adjustments and schedule proposal defense.
- April 2021: Proposal Defense
- July 2021 Submit IRB application
- August-October 2021: PDSA cycles and education implementation.
- December 2021: Data analysis, Project Defense & Dissemination of Findings

IMPLEMENTATION PROCESS

PDSA Cycles

Research current protocol/practice adherence

Develop educational materials

Implement

Distribute Educational Handout

Evaluate & Disseminate

Evaluate post-implementation data collected by the Bowel Surgery Committee

Compare Pre implementation and post implementation bowel surgery committee data

Disseminate findings to team members and stakeholders

EDUCATION

WHO ?

ANY patient undergoing surgery resulting in anastomosis of their bowel

WHAT?

Bair Hugger

Maintain Core Body Temperature > 36°C

WHEN?

Prewarming: ≥ 30 minutes prior to anesthesia induction

Intraoperatively: ASAP maximizing body surface covered

WHERE?

Ambulatory Surgery Unit

Preoperative Unit

Operating Room

TIME OUT

WHY?

Improve Patient Outcomes

Decrease SSI

Improved Patient Satisfaction

GREEN SHEET

Bowel Surgery Protocol Checklist

- ❑ ***Does this surgery result in the anastomosis of the bowel?***
  - ***If yes, follow this checklist.***

- ❑ ***Patient pre-warmed using forced air warming for ≥ 30 minutes before anesthesia induction?***

- ❑ ***Use of Bowel Protocol mentioned during timeout?***
  - ***Maintain Temperature > 36 (Intraop and Postop).***
  - ***Maintain FiO2 >80% for all portions of the case.***
  - ***Maintain Glucose <200.***
  - ***Ensure timely redosing of Antibiotics.***

- ❑ ***Intraoperative use of forced air warming?***
  - ***Timely application***
  - ***Maximize body surface area covered.***

EVALUATION

MEASUREMENT OF SUCCESS

- Outcome
  - The primary outcome measures of this project is for ≥80% of colorectal surgery patients to maintain a median core target temperature above 36 degrees Celsius.
- Process
  - Provider/ Staff adherence to the existing facility bowel protocol.

DATA EVALUATION

- Data Collection
  - Retrospective data collection and evaluation.
  - Data collection during implementation x 3 months.
- Data Variables
  - Colorectal Surgical Patient.
  - FAW received or not received.
  - Month of implementation process.
  - Timeframe of data collection (pre-implementation or post-implementation)
  - **Compliant with maintain core temperature >36°C or not compliant.**

DATA ANALYSIS & SECURITY

DATA ANALYSIS

- Descriptive variables were statistically analyzed in the SPSS software.
- Chi-square test were performed to compare pre- and post-implementation data.
- A Chi squared test was performed to measure the overall success of the project and generate a P value.

DATA SECURITY

- HIPAA training completed by all parties with access to data.
- Data spreadsheet is contained within the facilities password-protected, HIPPA compliant, OneDrive account.

RESULTS

- **Chi-square Test = 3.747, df=1, p=0.065**
- **Statistical Significance**
  - Marginal
- **Clinical Significance**
  - MET
- **Strengths & Weaknesses'**

% Compliance Across Time: Crosstabulation

			Temperature Compliance		
			.00	1.00	Total
Time	*2020*	Cases	56	173	229
		%	24.5%	75.5%	100.0%
	2021	Cases	39	189	228
		%	17.1%	82.9%	100.0%
Total		Cases	95	362	457
		% within time	20.8%	79.2%	100.0%

SIGNIFICANCE & IMPLICATION OF THE PROJECT

- Hypothermia increases risk of poor surgical outcomes such as SSI. Leading to precipitating patient factors such as increased cost and length of stay. The main aim of this project is focused on improving these patient outcomes.
  - SSI most expensive HAI
    - Increased single patient admission cost up to $20,000
  - Increased LOS

(Ban et al. 2017)

SUSTAINABILITY AND DISSEMINATION

SUSTAINABILITY

- Cost...Minimal
  - Will use existing infrastructure for current protocol guidance and data collection.
- Possibility of passing this project down to another DNP group incorporating other aspects.
  - Continued data tracking
- Lewins Change Theory
  - Adopt change to make practice a new normal.

DISSEMINATION

- Initially: Presentation to stakeholders within the project.
- Project results will be shared with the facility and all departments involved:
  - Anesthesia, Perioperative Nursing, the Bowel Surgery Committee and the Colorectal Surgical Team

DISCUSSION

Maintaining normothermia has been proven to improve surgical outcomes in colorectal patients.

By increasing compliance with existing bowel protocol via the education card mentioned previously patient outcomes can be improved.

Utilizing the Model for Improvement and PDSA cycles, along with Lewin's Change Theory, sustained improvement to current practices and protocol can be achieved

This project aligns with the value the practice site places on quality improvement, quality care, and the best patient outcomes.

CONCLUSION

REFERENCES

- PLEASE REFER TO REFERENCE PAGES OF THE PROPOSAL DOCUMENT.