

Handoffs and Transitions in Critical Care – Understanding Scalability

Background

- The process of transferring the patient from the OR to the ICU is called a "handoff," which typically involves an ICU provider, ICU nurse, surgical representative, and anesthesia representative (handoff tetrad). Handoffs involve the transfer of patient information and transfer of patient care responsibilities from the OR team to the ICU team. Handoffs expose patients to preventable harm, which can be avoided with standardization of the handoff.
- Direct admission from the OR to an ICU is common in inpatient surgeries. Standardizing handoffs from the OR team to the ICU team decreases communication failures and improves patient outcomes. Despite this, uptake of handoff protocols is inconsistent across U.S. medical centers. This evidence-to-practice gap translates into patient harm, increased costs, and strain on limited healthcare resources.
- HATRICC-US aims to adapt, implement, and evaluate tailored handoff protocols and implementation strategies. The study team will develop an understanding of the factors needed for successful and sustained use of evidence-based interventions in acute care.

Objectives

- 1. Ascertain determinants of OR-to-ICU handoff protocol adoption and use in 12 adult and pediatric ICUs in five health systems.
- 2. Adapt handoff protocols and select tailored implementation strategies with implementation mapping.
- 3. Test the effectiveness of tailored, multifaceted, multilevel implementation strategies.
- 4. Design and create a digital toolkit for other ICUs to identify implementation determinants, customize OR-to-ICU handoff protocol, and select appropriate implementation strategies.

	Aim 1	_	Aim 2	L	Aim 3	_	
	Exploration	Γ	Preparation	Γ	Implementation & Sustainment		
Questions to be answered	What determines whether ICUs will adopt and use a handoff protocol for patients with cardiopulmonary failure?		How should a handoff protocol be customized to best fit each ICU? Which implementation strategies address each ICU's context?		How does implementation strategy tailoring effect implementation and effectiveness outcomes?		oper ch interve and i widesp
Approach	Contextual inquiry through observations, interviews, focus groups, surveys, document review		Customization using participatory design; Implementation mapping based on Aim 1 determinants		Tailored implementation based on Aim 2 mapping; Type 2 hybrid design, stepped wedge with randomized roll-out		Huma v staka thin
Outcomes [*] & deliverables	Implementation determinants for each ICU		Customized versions of HATRICC for each ICU		Implementation: Fidelity (co-primary) Effectiveness: Incident organ failure in ICU (co-primary)		Digit toolki scier lay p

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Data Measures

- Aim 4
- Toolkit
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- **Fidelity** mediates the relationship between handoff protocols and effectiveness outcomes. It will be measured at the level of the handoff team, because the OR-to-ICU handoff is fundamentally a team interaction. Fidelity is defined as the number of handoff steps followed out of 10.
- Outcomes most likely to be impacted by care decisions **immediately following the handoff.** These decisions relate to maintenance of organs receiving the majority of cardiac output and organs likely to be compromised by surgery and anesthesia: the brain, heart, lungs, kidneys, and blood (e.g. prevention of new-onset organ failure). A composite measure is most appropriate given that handoff-related decisions may affect one or more of these organs.

Data Collection Methods

- **Clinician focus groups:** Clinicians representing each part of the handoff tetrad participate in video conference focus groups to elicit perspectives on post-surgical handoffs, protocols, and clinical quality improvement initiatives
- Interviews of clinical leaders and administrators: Semistructured video interviews asking about their experiences with and impressions of ICU protocols, OR-to-ICU handoff protocols, and potential barriers to and facilitators of HATRICC implementation.
- **Observations by co-investigators:** Via in-person observations, focusing on clinician workflow and information management.
- Acceptability, appropriateness, feasibility, satisfaction, and workload. These measures will influence clinician fidelity to handoff protocols. Measured by self-administered instruments: the Acceptability of Intervention Measure, the Feasibility of Intervention Measure, Intervention Appropriateness Measure, the NASA Task Load Index, and a clinician perspective survey.

	ICU name	Start date: 7/6/21	Step 1 start: 11/8/21	Step 2 start: 12/20/21	Step 3 start: 1/31/22	Step 4 start: 3/14/22	Step 5 start: 4/25/22	Step 6 start: 6/6/22	Step 7 start: 7/18/22	Step 8 start: 8/29/22	Step 9 start: 10/10/22	Step 10 start: 11/21/22	Step 11 start: 1/2/23	Step 12 start: 2/13/23
ICU 1	PPMC TSICU	Baseline	implement	Post	post	Post	Post	Post	Post	Post	Post	Post	Post	Post
2	JHH BV	Baseline	Pre	implement	Post	Post	Post	Post	Post	Post	Post	Post	Post	Post
3	Cooper TICU	Baseline	Pre	Pre	implement	Post	Post	Post	Post	Post	Post	Post	Post	Post
4	Cooper Viner	Baseline	Pre	Pre	Pre	implement	Post	Post	Post	Post	Post	Post	Post	Post
5	Temple	Baseline	Pre	Pre	Pre	Pre	implement	Post	Post	Post	Post	Post	Post	Post
6	JHH Neuro	Baseline	Pre	Pre	Pre	Pre	Pre	implement	Post	Post	Post	Post	Post	Post
7	JHH CV	Baseline	Pre	Pre	Pre	Pre	Pre	Pre	implement	Post	Post	Post	Post	Post
8	JHH PICU	Baseline	Pre	Pre	Pre	Pre	Pre	Pre	Pre	implement	Post	Post	Post	Post
9	РМРН	Baseline	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	implement	Post	Post	Post
10	LGH	Baseline	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	implement	Post	Post
11	Children's Dallas	Baseline	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	implement	Post
12	UTSW	Baseline	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	Pre	implement
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There exists a critical gap in knowledge about effective implementation strategies in the context of critical care, resulting in a performance gap that compromises outcomes for critically ill patients. This project seeks to elucidate and overcome challenges to implementation in the acute care setting for patients with postoperative cardiopulmonary failure, integrating engineering and implementation science approaches to study the implementation of post-surgical handoff protocols.

I would like to thank Dr. Meghan-Lane Fall and the study team for their mentorship and guidance. For more information, please visit hatricc.us.

Study Design

HATRICC-US is a prospective interventional cohort study of OR to ICU handoffs in twelve ICUs in eight hospitals within five academic health systems in three metropolitan areas.

This study will use tailored implementation strategies in a stepped-wedge design with randomized roll-out to facilitate the uptake and sustained use of a customized OR-to-ICU handoff protocol. The study will detect improvements in both implementation and effectiveness outcomes.

Result of site randomization into a stepped-wedge design

Conclusion

Acknowledgements