

UMSAEP Activities Report November 2024

Enhancing Health IT Integration using Implementation Science

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Background and Project Goals

Scientific Background

Health information technology, including information systems and AI tools, is a key public health research priority in South Africa (2021-2025). Despite its potential to improve decisionmaking, communication, and health outcomes, its effectiveness is hindered by challenges like interoperability, workflow integration, low digital literacy, insufficient training, and ethical concerns.

As AI technologies advance, integrating them into healthcare systems necessitates understanding factors influencing adoption, including attitudes, behaviors, and alignment with clinical needs.

- *Patterson:* My background in implementation science uniquely positions me to address and investigate the barriers surgeons face when adopting AI tools. Building on my previous work assessing barriers and facilitators for integrating community health workers into vaccination education within community pharmacies, I can apply similar methods such as surveys and assessment tools to promote AI tool adoption among surgeons.

Goal of the Project

Our research project aims to bridge the gap between Health IT and Implementation Science collaboratively developing Health IT implementation strategies that integrate concepts from Information Systems, Computer Science, Artificial Intelligence systems, and Implementation Science.

Specific Aims

- Identify shared and distinct barriers, facilitators, and implementation strategies influencing the successful adoption of diverse health IT tools across different settings and purposes comparing Implementation Science studies conducted at UMKC and UWC.
- Foster collaboration between UMKC and UWC, working collaboratively to share knowledge and disseminate findings, establishing a connection between the fields of health IT and implementation science.

Rationale

By combining interdisciplinary expertise in qualitative analysis, health IT tool design, and technology adoption in healthcare, we can leverage implementation science methods to identify barriers and facilitators to AI adoption for making. Additionally, we can recommend strategies to enhance AI adoption across various job sectors. Utilizing implementation science frameworks such as TICD and COM we will develop a systematic approach to pinpoint organizational and individual level barriers, informing strategies for interventions that improve AI adoption rates.

Outcomes

Preliminary Research Completed Prior to Trip

- *Implementation Framework Selection:* In order to identify determinants (e.g., barriers and facilitators) to AI tool adoption we initially selected a framework tailored to Implementation for Chronic Diseases (TICD) framework to focus on organizational and individual factors affecting AI tool use.

Figure 1: TICD Domains¹

Domain	Definition
Individual Health Professional Factors	Characteristics of the healthcare providers, including knowledge, skills, and attitudes, influencing implementation.
Patient Factors	Attributes of patients that impact implementation, such as preferences, resources, and beliefs.
Guideline Factors	Features of the clinical guidelines themselves, including clarity, relevance, and feasibility.
Incentives and Resources	External incentives and material resources that facilitate implementation.
Capacity for Organizational Change Social, Political, and Legal Factors	The organization's readiness and ability to implement change, including leadership and culture.

Figure 2: COM-B Model²

Domain	Definition
Capability	The individual's psychological and physical capacity to engage in activity required for behavior change. Includes knowledge and skills.
Opportunity	External factors that make the behavior possible or prompt it, in physical and social environments.
Motivation	Internal processes that influence behavior, such as intentions, habits, and emotional responses.
Behavior	The observable action or practice that is influenced by capability, opportunity, and motivation.

Activities During Visit Exchange

Dr. Patterson participated in an exchange visit, staying in Cape Town, South Africa from August 6th to August 21st during which he worked together with Prof. [Name] on the following activities and deliverables:

- *Seminar Delivery:* Dr. Patterson presented a seminar titled "Attitudes Toward AI and Implementation Science Approaches for Evaluation" to UWC faculty and postgraduate students. The seminar highlighted the relevance of the COM-B model over traditional I

Postvisit deliverables and activities

- *Survey Deployment:* Deployed the survey in mid-October using Qualtrics, collecting preliminary results from stakeholders in the education sector through the SAAIR network

Figure 3: COM-B Survey Questions with Associated COMB Domains

Question	COM-B Domain
I am concerned about relying too much on AI tools for professional decisions	

Figure 5: Preliminary finding from survey respondents (N=32)

Question	Min	Max	Median	IQR	CQV	Variability
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Future Directions

Short-term Goals

- **Manuscript submission to JHIR**: Plan to submit the AI attitudes findings to the *Journal of Health Informatics Research* (JHIR)- Human Factors, following a rejection from the GIRA thematic issue. The focus of the new submission will be on the methods used to develop the COM-B survey, along with the preliminary results from the subgroup of education stakeholders. The emphasis will be on insights gained from the education subgroup
- **Algorithm Paper Submission** Complete and submit a paper focused on calculating the ROC of various machine learning algorithms used to predict post-complications.

Long-term Goals

- **Survey Development and Refinement** Validate and potentially copyright the COM-B-based survey instrument by assessing its psychometric properties.
- **Expanded Deployment**: Deploy the survey to a larger, more diverse cohort across various sectors and countries. Conduct subgroup analyses to evaluate differing attitudes toward AI adoption.
- **Behavior Change Wheel Integration**: Utilize the Behavior Change Wheel to map COM-B domains to evidence-based intervention strategies, informing policies aimed at improving AI adoption.
- **Collaborative Network Building**