NAPCRG 52nd Annual Meeting — Abstracts of Completed Research 2024.

**Submission Id:** 6092

## Title

*A Framework for AI-enabled Digital Twins in Clinical Decision-making*

## Priority 1 (Research Category)

Systematic review, meta-analysis, or scoping review

## Presenters

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## Abstract

Context: Digital Twins (DTs) are innovative tools that blend physical and virtual objects, with potential to transform health care. Despite the growing interest in DTs, the healthcare sector lacks unified frameworks that can explain the development, evaluation, and implementation of DTs in clinical decision-making. Objective: This study aims to map the existing knowledge on DTs in clinical decision-making, and establish a comprehensive framework for AI-enabled DTs in clinical decision-making. Study Design: We performed a scoping review searching three electronic databases. Dataset: We systematically searched PubMed, Embase (Ovid), and IEEE Xplore on August 4, 2023. Population studied: We included studies reporting results on the development, evaluation, and implementation of DTs for clinical decision-making. The study selection and data extraction was carried out by one reviewer and verified by a second reviewer and disagreements were resolved through meetings. Outcome Measures: A descriptive analysis was performed. Key steps in DT development and their function were identified and combined to create a framework. Results: Out of 271 records found, 193 were screened, leading to the inclusion of seven reviews and four empirical studies, all published from 2020 onwards. The reviews contained either a framework or information that was used to construct our newly developed framework for AI-enabled Digital Twins in Clinical Decision-making. Three empirical studies reported the development of a DT, and one reported a common infrastructure for a wide range of applications for a DT. Conclusion: We developed a framework that requires further investigations, such as validation and implementation in different use cases. The steps that we have identified could serve as a guide to future researchers. Strengthening and standardizing DTs in clinical decision-making is important, as is assessing their effects on different populations and environments.