



# Multi-Stakeholder Multi-Stage Theme-Oriented Telehealth Evaluation Framework

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## INTRODUCTION

Telehealth has revolutionized healthcare delivery by integrating cutting-edge technologies, yet evaluations of its services and programs often lack comprehensive understanding, resulting in unclear standards for quality assurance.

## AIM

We conducted a scoping review to

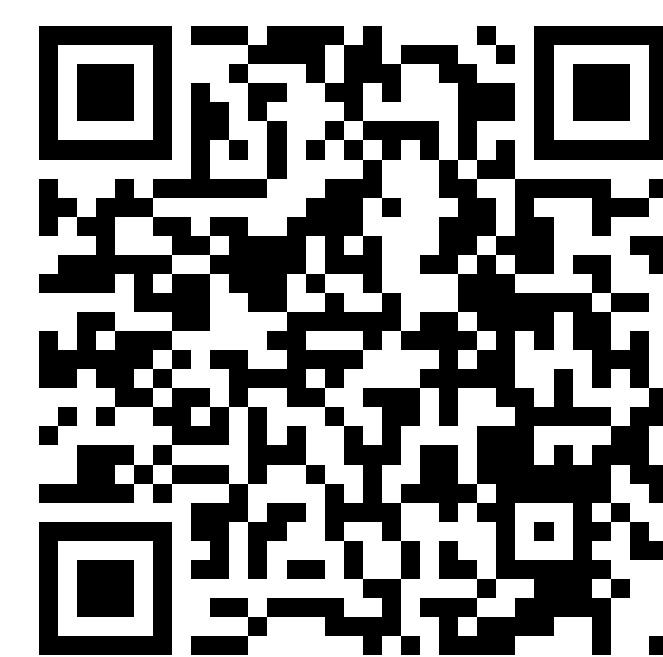
- (1) map the current landscape of telehealth evaluation,
- (2) identify key concepts for evaluation
- (3) synthesize existing frameworks considered in telehealth evaluations across the U.S.

We also propose a **stakeholder-driven multi-stage adaptive real-world theme-oriented (SMART) telehealth evaluation framework** that comprehensively integrates outcomes with perspectives from multiple telehealth stakeholders within the complex U.S. healthcare system.

## METHODS

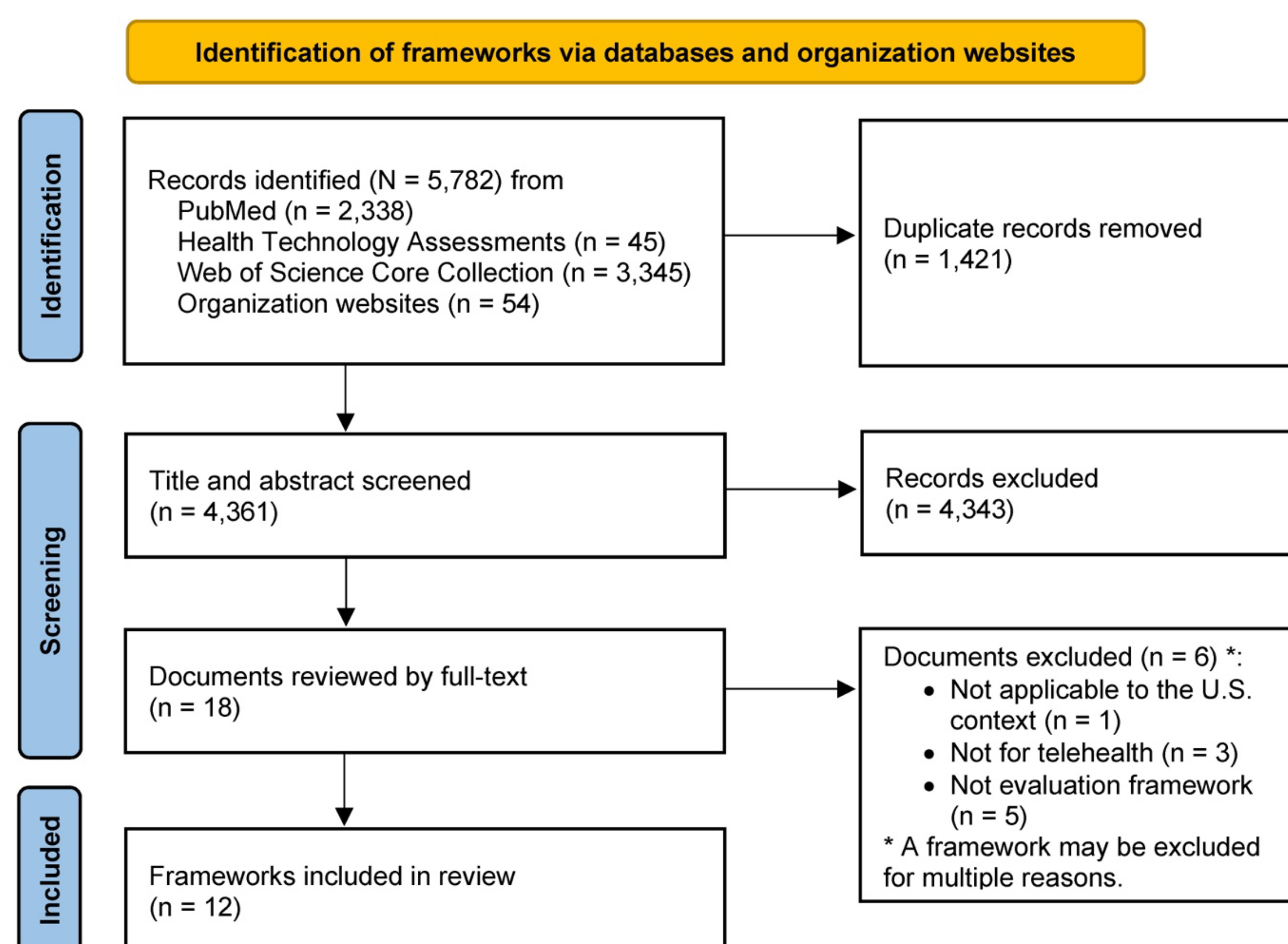
### Scoping review eligibility criteria:

- Reviews, reports, and white papers related to telehealth evaluation frameworks and associated measurements.
- Focusing on telehealth services and programs delivering healthcare services through a variety of modalities as well as emerging innovations.
- Published in English from January 1, 2019, to December 1, 2023



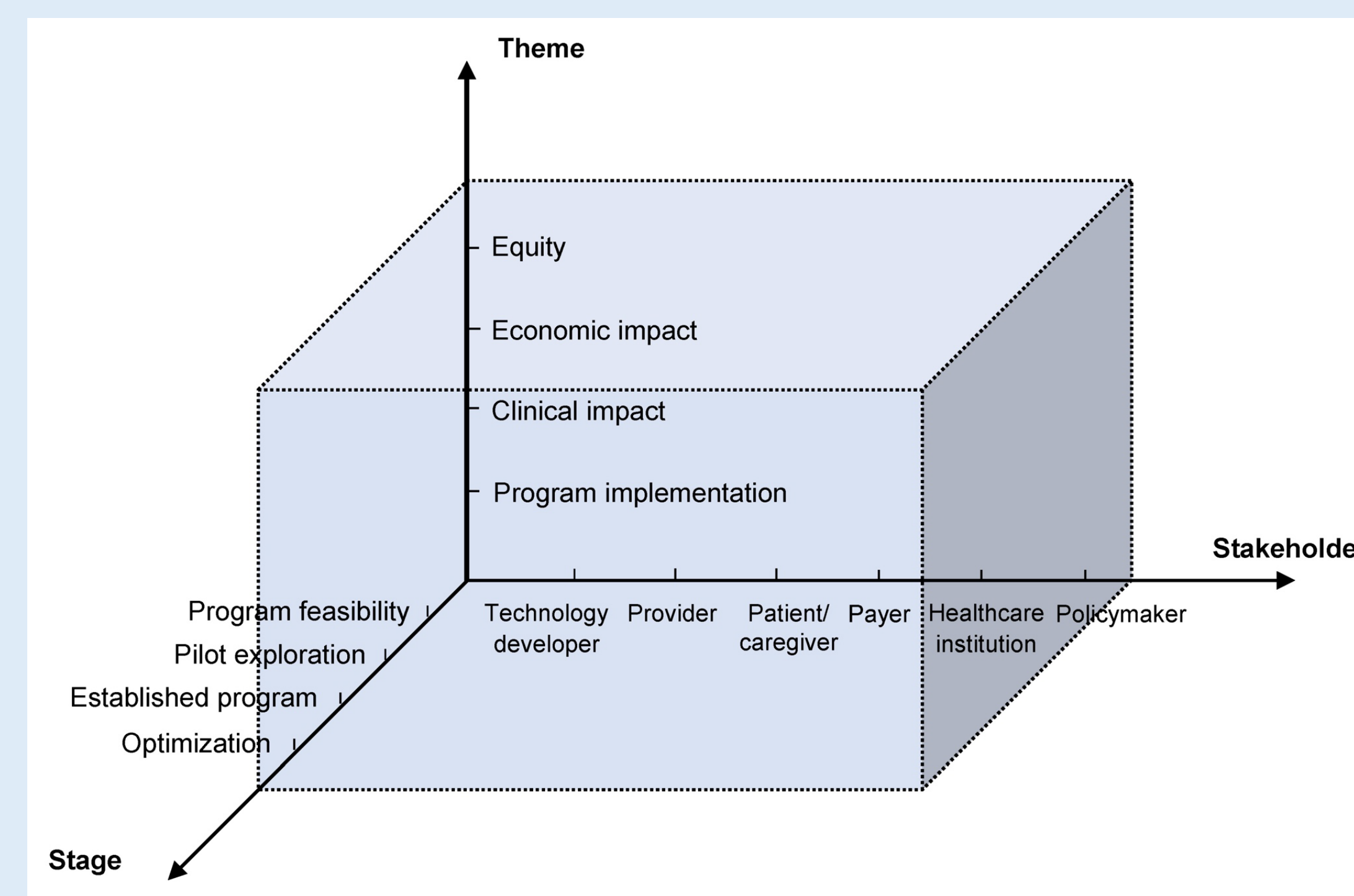
Scan for the published review protocol<sup>1</sup>

Figure 1. PRISMA flowchart



## RESULTS

### SMART Telehealth Evaluation Framework



- In addition to considering perspectives from different **stakeholders**, we employed two auxiliary frameworks to facilitate data synthesis: the sustainable telehealth development framework by Zhang et al. and the telehealth maturity framework by Harvey et al.<sup>2-5</sup>
- The sustainable telehealth development auxiliary framework provided a foundation that guided the initial categorization of domains across the included frameworks,<sup>2</sup> resulting in four **key themes**. The telehealth maturity auxiliary framework was subsequently used to structure the **developmental stages** of telehealth services and programs.<sup>3-5</sup>
- The resulting SMART telehealth evaluation framework offers an inclusive and adaptive approach to evaluate telehealth services and programs, designed to meet the varied needs of a broad spectrum of telehealth stakeholders.
- A use case of the SMART framework on a remote patient monitoring program will be detailed in our forthcoming manuscript.<sup>6</sup>

Figure 2 Multi-stakeholder interactions in telehealth services and programs.

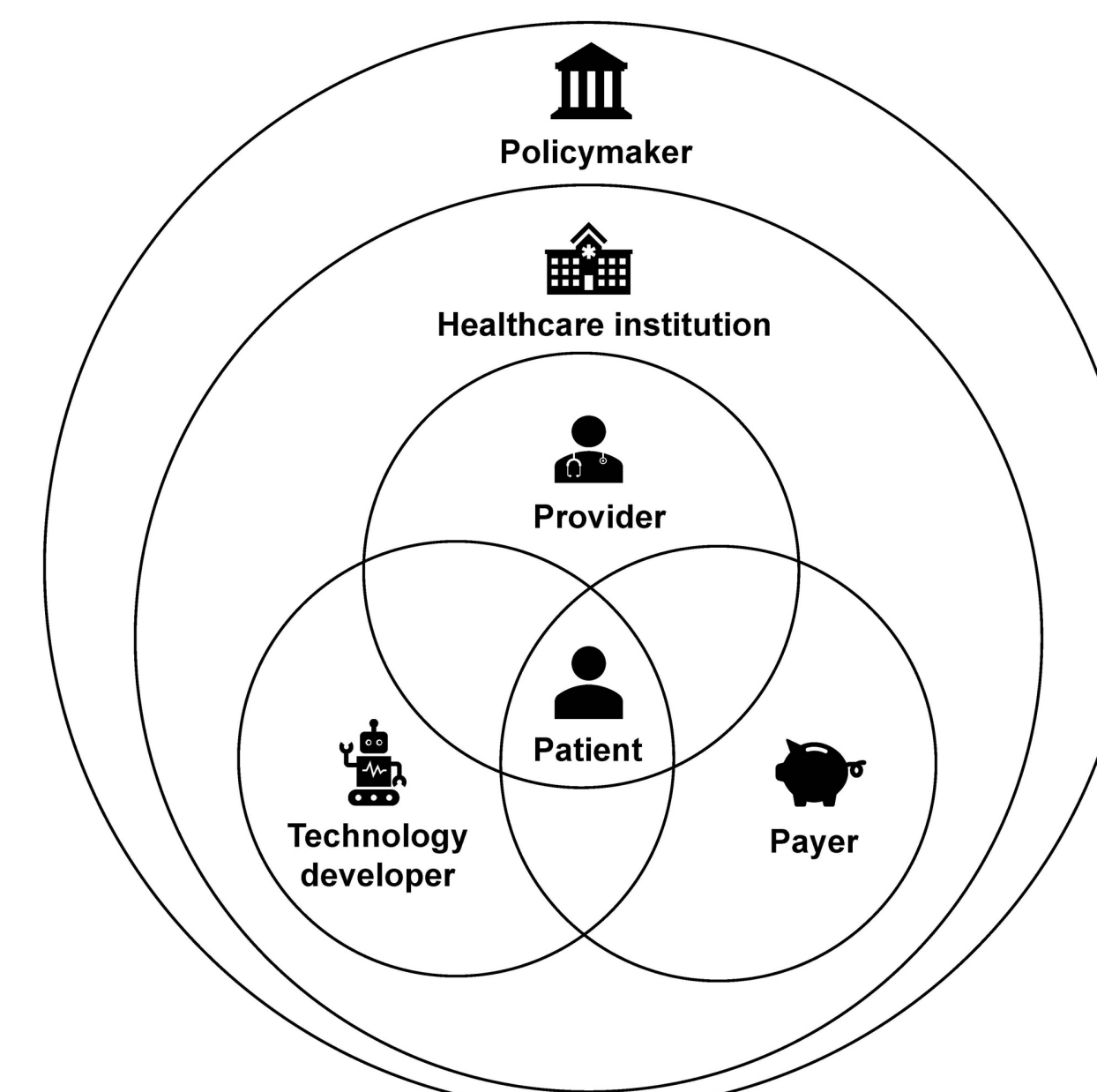


Table 1. Characteristics summary of included frameworks (N = 12)

Characteristics	Number of frameworks (%)
Context	
U.S.	10 (83)
Global	2 (17)
Telehealth modality	
Mobile applications	3 (25)
Digital health technologies	2 (17)
General	7 (58)
Rural health	2 (17)
Target stakeholder	
Technology developer	3 (25)
Provider	12 (100)
Patient/caregiver	6 (50)
Payer	5 (42)
Healthcare institution	7 (58)
Policymakers	5 (42)

Table 2. Summary of key themes of included frameworks (N = 12)

Themes	Number of frameworks (%)
Program implementation	12 (100)
Regulatory compliance	6 (50)
Technology stability and safety	6 (50)
Interoperability and integration	7 (58)
Usability and accessibility	11 (92)
Implementation and program performance	4 (33)
Clinical impact	12 (100)
Clinical safety	8 (67)
Clinical effectiveness	12 (100)
Individual experience	8 (67)
Economic impact	11 (92)
Financial impact	11 (92)
Economic sustainability	5 (42)
Equity	7 (58)

## REFERENCES

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2. Zhang Y, Chandra S, Peña MT, Lal L, Summers RL, Swint JM. Framework for evaluating and developing sustainable telehealth programs. *Telemedicine and e-Health* 2023.
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