Quality Metrics for Remote Patient Monitoring within Hospital at Home: Implementation, **Barriers, and Motivations**

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Introduction

The adoption of the hospital at home (HaH) care model has accelerated in recent years. Remote patient monitoring (RPM) of HaH patients holds potential in improving safety and quality of care, as well as enabling the care of higher acuity patients^{1,2}. However, limited studies exist on the implementation of remote patient monitoring in HaH and how its impact is measured.

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As such, we sought to characterize ongoing quality monitoring programs among RPM programs for HaH, specifically:

- Quality domains in which metrics are used
- Barriers to quality measurement

We identified experienced leaders at existing HaH service lines through the published literature and professional networks. We developed and piloted an interview guide to assess RPM for HaH operational structure, quality metric implementation, as well as motivations and challenges around measuring quality. We then conducted semistructured interviews with study participants about the approach to quality measurement in their respective HaH care model. We classified quality metrics monitored according to the National Quality Forum (NQF) Telehealth Measurement Framework. We developed a codebook from interview transcripts which we used to classify motivations for and barriers to quality measurement.

We held 9 qualitative interviews with 16 HaH leaders representing 9 institutions with significant HaH experience. The majority of institutions operated a remote patient monitoring program within their HaH care model for greater than 2 years (6/9). All sites monitored patients' vital signs remotely; a minority of programs used continuous single lead EKG or fall detection monitoring. Sites primarily reported using quality metrics focused on effectiveness (5/9) and experience (4/9). Only 2 institutions tracked metrics related to access to care and 1 institution assessed the financial impact of RPM. Qualitative analysis revealed varied motivations for quality monitoring for RPM for HaH and found IT limitations, data fidelity and lack of benchmarks as the main barriers.

Table 2: RPM for HaH: Implemented Metrics Aggregated by NQF Domains of Quality Measurement

	Institutions		Institutions
NQF Domain	Measuring Metric	NQF Subdomains	Measuring Metric
	in Domain		in Subdomain
Access to Care	2 (22%)	Access for patient, family, and/or caregiver	2 (22%)
		Access for care team	0 (0%)
		Access to information	0 (0%)
Financial Impact/Cost	1 (0%)	Financial impact to patient, family, and/or caregiver	0 (0%)
		Financial impact to care team	0 (0%)
		Financial impact to health system/payer	1 (11%)
		Financial impact to society	0 (0%)
Experience	4 (44%)	Patient, family, and/or caregiver experience	4 (44%)
		Care team member experience	1 (11%)
		Community experience	0 (0%)
Effectiveness	5 (56%)	System effectiveness	0 (0%)
		Clinical effectiveness	0 (0%)
		Operational effectiveness	4 (44%)
		Technical effectiveness	3 (33%)

Objectives

Motivation for quality measurement

Methods

Results

Table 3: Motivations for and Barriers to RPM for HaH Quality Measurement

	JIS IOI and Dairies to Ki
Motivation for Quality Measurement	
Patient Experience	 There is a patient expectation someone is going to response to measure re
Quality Outcomes	 We want to prove the qua Interested in understanding intervention for deteriora
Stakeholder Buy-in	 Showing quality metrics a very important as they are virtual care for HaH
Improve Access	Want to understand impa
Clinical Productivity	 Understanding operationa efficiency"
Device Measurement Accuracy	 I think as there is newer a of the equipment is proba about
Barriers to Quality Measurement	
IT Limitations	 Current [RPM] software s resolution for RPM alert Current RPM vendors req metrics. They have to allo
Data Fidelity	 Data reliability from RPM skepticism in metrics deri Connectivity issues can in
Lack of Benchmarks	Difficult to make apples to environment quality metrics

Limitations

The majority of institutions represented were based in the United States and therefore the ability to apply our findings to describe the state of quality measurement of RPM for HaH for international programs is limited. Furthermore, the majority of programs have been established for 2 or more years. Given the rapid rise of HaH programs, the findings from our study may not describe the use of quality metrics for many programs still in their nascency.

Conclusions

We identified variation in use and content of quality metrics assessing remote patient monitoring in HaH. Institutions primarily captured quality metrics related to operational effectiveness and patient/clinician experience of their remote patient monitoring systems. These findings may be valuable to support prioritization of institution-level quality metrics for development, as well as standardization of metrics to enable program benchmarking.

Resources





Examples

- ation that if an alert is going off that oond and they are going to be taken care of response times
- experience of patients with RPM equipment ach out to help troubleshoot
- uality of our [RPM] system to the patients ing whether RPM can allow earlier
- ating patients and prevent escalation in care
- and all the data to our institutional leaders is re skeptical about leveraging RPM and
- act of RPM on increasing census
- al metrics could help improve nursing team
- and newer products out there, the accuracy bably something that we want to know more

Examples

- systems limit accurate tracking of time to
- quire "active effort" to capture quality ow for passive capture.
- vendors is variable leading to some ived from this data mpact metrics
- to apples comparison to in-hospital trics

^{1.} Conley J. Snyder GD, Whitehead D, Levine DM. Technology-enabled Hospital at Home: Innovation for Acute Care at Home. NEJM Catalyst. 2022

^{2.} Whitehead D, Conley J. The Next Frontier of Remote Patient Monitoring: Hospital at Home. JMIR. 2023