What More Can be Done to Implement Remote Patient Monitoring?
A Workshop to Define the Research Agenda.

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Abstract. Remote Patient Monitoring (RPM) involves the collection, transmission, evaluation, and communication of individual health data from patients to their healthcare providers or extended care teams. Despite significant growth in research related to RPM, there remains limited research on the implementation and scaling up telemonitoring projects in Europe. The Covid-19 pandemic has accelerated the adoption of digital technologies in healthcare, emphasizing the importance of RPM. This workshop aims to involve Medical Informatics (MI) experts in shaping the field's future by addressing research gaps in RPM implementation. A world café methodology will be used. Research gaps will be structured using the Non-adoption, Abandonment, and challenges to Scale-up, Spread, and Sustainability (NASSS) framework.

1. Introduction

Remote Patient Monitoring (RPM) is defined as the collection, transmission, evaluation, and communication of individual health data from a patient to their healthcare provider or extended care team from outside a hospital or clinical office (i.e., the patient's home) using personal health technologies including wireless devices, wearable sensors, implanted health monitors, smartphones, and mobile apps. [1]

Bibliometric studies indicate a significant growth in research related to wireless device monitoring, wearables, telemonitoring, or remote patient monitoring since 2015.[2, 3] However, there has been limited research on the implementation and scaling up telemonitoring. [4] Several barriers and challenges associated with implementing and scaling telemonitoring projects in Europe exist, and large scale, nationwide implementation is not always successful. [5-9]

Ahmed et al. described challenges and opportunities for improving eHealth implementation in a systematic review. Although their 2018 study remains relevant, the recommendations are no longer up-to-date. The Covid-19 pandemic has accelerated the adoption of digital technologies in healthcare.[10]

Subsequently, SWOT analyses, technology priorities, and literature reviews have been conducted to outline a research agenda for digital transformation in healthcare. [11-13] Although these studies are highly relevant, it still provides limited insight into actionable possibilities in the field of Medical Informatics (MI).

To analyse the implementation of new technologies in healthcare and assess its complexity, the framework for Non-adoption, Abandonment and challenges to Scale-up, Spread and Sustainability (NASSS framework) was developed. [14]

2. Rationale and outcomes

The aim of this workshop is to provide an overview of the current gaps in the field of research pertaining to the implementation of remote patient monitoring. Additionally, it will explore the potential roles that MI experts may play in accelerating this implementation. The outcome of this workshop will be a list of research questions within the domains of the NASSS framework, which we will submit to the participants of the workshop for review after the workshop.

3. Program

The workshop commences with an introduction to the problem and a description of the most recent literature on the implementation of remote patient monitoring. Subsequently, an explanation of the workshop session will be provided. A world café methodology will be used for the collection of research questions. [15] This approach was chosen in order to bridge the gap between research and practice, and to involve MI experts from the field in the drafting of research questions. The world café method is a participatory action research approach. It has been successfully employed in several research agenda-setting studies. [16-18]

A group of experts is convened in smaller, more intimate gatherings at separate tables. In this context, participants are invited to identify research gaps within the seven domains of the NASSS framework.

The workshop is brought to a close with a plenary summary of all subgroups.

Table 1. Workshop schedule and activities

Duration (min)	Activity	Description
10	Introduction and questions to the audience	Introduction to remote patient monitoring and implementation science and the NASSS framework.
2x20	Group activity: drafting research questions	Participants are divided in subgroups and discuss research gaps.
10	Wrap up	Summary of findings

4. Workshop team

Harm Gijsbers is an assistant professor Medical Informatics at the Amsterdam UMC, location University of Amsterdam, for the eHealth Living & Learning Lab. He coordinates and teaches courses on the subjects of eHealth implementation. He will introduce the topic by discussing recent literature and the research agenda. He will guide the discussion and wrap up the workshop.

Minke Holleboom is a lecturer in Medical Informatics at the Amsterdam UMC, location University of Amsterdam, and teaches courses on eHealth and remote monitoring. In addition, Minkes PhD-track focuses on continuous remote monitoring. Minke will guide subgroup in drafting research questions during the workshop.

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