

- Title** Remote Monitoring Programs for Cardiac Conditions
- Agency** CADTH  
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## Aim

The objective of this Health Technology Assessment (HTA) was to inform decisions on how remote monitoring programs for patients living in rural, remote, and urban settings should be implemented. The HTA included a series of analyses, including a Realist Review of remote monitoring programs for cardiac conditions; a qualitative evidence synthesis of the perspectives and experiences of those participating in remote monitoring programs for cardiac conditions, including patients, informal caregivers, and health care providers; and an analysis of ethical considerations. These analyses were informed by the results of a CADTH Environmental Scan of remote monitoring programs for cardiac conditions in Canada.

## Conclusions and Results

The realist review concluded that remote monitoring programs across cardiac conditions were consistently found or perceived by the vast majority of sampled patients, caregivers, and health professionals (often 80 to 90%) to be easy to use and beneficial to health.

In terms of the key mechanisms, adequate program technology was necessary but insufficient to foster positive outcomes. To ensure program effectiveness, technology had to integrate well with patients' daily life patterns, home, and promote understanding in patients not only of their condition but also of their personal health status. The main issues around technological uptake related far less to general fears about the technology than frustrations around common but technically straightforward issues, notably: unstable connectivity of devices and poor battery life.

For cardiac rehabilitation, programs were seen to focus predominantly on promoting healthy lifestyle behaviours with the capacity of technology to facilitate these outcomes being dependent on their ability to integrate with patients' life patterns. Programs were most effective when motivated patients received highly individualized program content and components and leveraged existing strengths in relationships between healthcare providers and patients.

Patients' experiences of heart failure were far more ambiguous and programs were seen to provide vital support for daily ongoing self-care and knowledge. Programs tended to be more complex but nevertheless were most effective when technological aspects of programs were easy to use, supported adequately and crucially were highly unobtrusive in patients' lives. Similar to cardiac rehabilitation programs, heart failure programs were viewed as adjuncts and not replacements for traditional face-to-face health care provision; however, unlike cardiac rehabilitation programs, remote monitoring programs for heart failure provided useful knowledge to interpret symptoms and guide self-care daily.

Evidence regarding atrial fibrillation programs was scant but ease of technological use guided patients' uptake of platforms and was also seen to complement face-to-face healthcare.

The review of perspectives and experiences pointed to opportunities to develop programs that account for and anticipate potential challenges and provide the needed level of support and technological options that facilitate engagement with remote monitoring technologies. Findings highlight the need for programs to provide adequate time to facilitate the process of self-management as well as the potential for longer-term technologies to support motivation and provide reminders. Remote monitoring was not an addendum to care but was experienced as a model of providing health care for patients with chronic cardiac conditions. Findings also revealed opportunities to maximize the success of remote monitoring programs by taking the number and length of patient consultations into account and ensuring appropriate integration, particularly with electronic health records, within health care systems

The ethics analysis indicated that the goals of remote monitoring programs are not always clear. For decision-makers to implement their program with a good chance of success, they should pause to assess what gaps exist in current care and what options exist to meet those needs (technological, human resource,

transportation, others). Remote monitoring programs are often framed as a solution to provide care to patients in their own homes or communities, and to increase their access to high-quality services. Remote monitoring programs are not necessarily a solution to healthcare access challenges. Programs that involve private third-party technology raise concerns around privacy and informed consent.

### **Recommendations**

Considering the evidence, CADTH's Health Technology Expert Review Panel (HTERP) suggests that the design and implementation of remote monitoring programs for patients with chronic cardiac conditions includes a broad range of stakeholder voices with considerations across several key domains. If remote monitoring is implemented, it is suggested that it be an integral part of the care pathway for chronic cardiac conditions, with processes and policies to support it. It is also recommended that jurisdictions understand and be transparent about information flow and keep patient data use and privacy at the forefront of service contract negotiations, and that remote monitoring programs for cardiac conditions avoid creating or exacerbating inequities in health care. HTERP recommends that remote monitoring programs include an evaluation component to ensure program aims are met.

### **Methods**

A realist review was conducted to identify key perceived or actual mechanisms of remote monitoring programs for adult persons living with, or persons who care for those living with, a chronic cardiac condition or who are participating in cardiac rehabilitation.

A perspectives and experiences review was conducted using a thematic synthesis of primary qualitative research to understand and describe peoples' experiences with and perspectives on remote monitoring programs for chronic cardiac conditions and cardiac rehabilitation

An ethical analysis was conducted building from a literature review of articles with either explicit normative analysis of ethical issues arising in the use of remote monitoring, either generally or for the treatment of the conditions of interest, or empirical research that included ethical issues arising in the use of remote monitoring.

### **Further Research and Reviews Required**

Limited evidence on remote monitoring programs delivered in rural or remote settings is significant from a public policy standpoint, given common assertions that these programs increase access to specialist care in rural and remote populations. Similarly, the gap in evidence around the perspectives, experiences, and needs of family and other informal caregivers is also significant. There is little evidence on the potential moderating effects of patient age, sex and/or gender, race and/or ethnicity, and income on program use and effectiveness. Although programs may ultimately reduce avoidable hospitalization, there is a strong likelihood that without careful pathway design and expectations management, remote monitoring programs may increase net costs and workload for host providers during set-up and operational phases. More research is needed to identify the costs and cost-effectiveness of remote monitoring programs across chronic cardiac conditions.

### **Written by**

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