How to scale up telemedicine for cancer prevention and care? Recommendations for sustainably implementing telemedicine services within EU health systems

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ABSTRACT

Cancer is the second leading cause of mortality in Europe after cardiovascular diseases. Significant disparities exist across European countries in cancer prevention, diagnostics, treatment, and care, which impact patient outcomes. The Europe's Beating Cancer Plan aims to improve cancer prevention and care through innovative approaches including telemedicine (TM). TM services, such as teleconsultation and telemonitoring, offer opportunities to enhance patient-centered care, improve access to health services, and empower patients. However, challenges remain, including inadequate IT infrastructure, legal uncertainties, funding issues, and varying levels of digital literacy among the population. The eCAN Joint Action (JA), involving 16 European countries, was launched in September 2022 to strengthen eHealth solutions for cancer prevention and care. This JA focused on improving teleconsultation and remote monitoring, building healthcare capacity, and developing interoperable TM solutions. A key outcome was the eCAN policy dashboard, offering a country-specific overview of cancer-related and eHealth policies in European countries. Additionally, the eCAN roadmap proposed 16 recommendations across six intervention areas, addressing regulatory frameworks, stakeholder engagement, infrastructure development, training requirements, healthcare system integration, and outcomes evaluation. These recommendations aim to facilitate TM adoption across Europe. The upcoming JA eCAN+ initiative, starting in 2025, will further build on eCAN's work, advancing the sustainable implementation of TM services in cancer prevention and care in Europe.

1. Context

Cancer is a major public health concern and the second leading cause of mortality across European countries after cardiovascular diseases [1]. In Europe, disparities in preventive policies and access to advanced diagnostics, treatments, and care lead to significant differences in the timeliness of cancer diagnoses and survival rates [2]. The Europe's Beating Cancer Plan (EBCP) is the European Union's (EU) response to fight cancer and aims to tackle the entire disease pathway [3]. Alongside the EBCP, the European Commission (EC) is also working on the digital

transformation of health and care, to improve access to and quality of care [4]. Complementing the traditional health services, telemedicine (TM) services[2] can improve cancer prevention and care by facilitating the delivery of more efficient and effective patient centered care [5,6]. TM services include remote assistance referring to teleconsultation (i.e. remote follow-up, diagnosis or treatment of patients) and telemonitoring services recording parameters of patients [5]. The expected benefits of TM services include easier access to information and personalized care for patients, as well as giving them more control and empowerment over their own health [5,6]. According to the most recent

World Health Organization (WHO) Europe's report on digital health in the WHO European Region, 78 % of Member States (40 out 51) directly address TM in their policies or strategies and 77 % of Member States (39 out 51) use telemedicine or remote patient monitoring [7].

1.1. Opportunities and challenges

As demonstrated during the COVID-19 pandemic, the expanded use of TM services presents a novel opportunity to address public health crises [8]. In times of crisis, TM services have proven crucial in ensuring continuity of healthcare services through online consultations and real-time clinical data exchange. But there is still significant potential to improve digital interventions for cancer patients across Europe [9,10]. Yet, supporting widespread TM adoption across EU health systems is not without challenges. A key issue, for instance, is the need for better IT infrastructure to ensure the availability of robust and interoperable technical solutions. Furthermore, equally critical challenges include: establishing clear and supportive legal and regulatory frameworks, as well as effective financing and reimbursement systems at national and EU level; raising awareness among end-users (both healthcare professionals and patients); and enhancing trust and digital literacy among the population through targeted education and communication efforts. Finally, the successful adoption of TM requires alignment between policy support and patient openness, which varies widely due to cultural and generational differences. These challenges highlight the need for overarching recommendations to guide stakeholders in sustainably implementing TM for cancer prevention and care across Europe.

1.2. The eCAN Joint Action

The Joint Action (JA) called 'Strengthening eHealth including telemedicine and remote monitoring for healthcare systems for CANcer prevention and care (eCAN)' was aimed at reducing cancer care inequities across 16 European countries by exploring the use of teleconsultation and telemonitoring among cancer patients. The project ran from September 2022 to December 2024. One of the aims was to better understand the complexity of TM, collecting relevant data and developing scalable and sustainable TM solutions. The specific objectives of eCAN were [1] to enhance teleconsultation and remote monitoring specifically in cancer care, ensuring the services meet the quality expectations and needs of users, [2] to increase the health workforce's capacity to manage isolated or remotely located cancer patients effectively, and [3] to foster the development of modular and interoperable TM solutions that can be adapted to various contexts. Ultimately, the project seeks to facilitate the uptake and delivery of TM services across the EU to support cancer patients.

The sustainability work package of the eCAN JA (WP4) developed country factsheets with key insights into the current state of eHealth in each EU Member State (MS). Results are publicly available in the eCAN policy dashboard [11]. WP4 also conducted a foresight exercise to gain insights into national dynamics and give recommendations for a sustainable and scaled implementation of TM services for cancer patients in the EU. These recommendations are part of the eCAN roadmap, a strategic document offering a comprehensive overview of current TM practices, envisioning the future of digital health in the EU, and outlining key steps to transition to a more advanced and integrated system.

2. eCAN policy dashboard: a state of play

As mentioned above, a dashboard on eHealth was developed including information in key areas such as governance; strategies and policies; solutions; implementation; and legislation. Here, indicators were developed in each of the key categories to allow for a comprehensive and structured overview of the current state of play across the 29 included countries. Furthermore, a curated list of cancer specific eHealth solutions for each country was compiled. The information for

each country was gathered from existing literature and subsequently reviewed and validated by country experts (for most countries). In sum, the dashboard provides an overview of the current state of TM policy implementation and solutions across Europe. The Dashboard has several functions and sections on policy, eHealth solution and cancer and eHealth related aspects and is available on the eCAN JA webpage (Reference here as link: For Policymakers – eCAN).

3. eCAN roadmap and recommendations

3.1. Overview

For the development of the eCAN roadmap, a foresight exercise was conducted starting with a review of academic literature on TM implementation and analysing key barriers and facilitators. In a second step, patients, healthcare professionals and policymakers were engaged to co-create possible future scenarios, aiming at envisioning a healthcare system in which TM services are part of standard care, used routinely by healthcare professionals and cancer patients.

Based on insights gained from this exercise and other work within the eCAN project, a set of recommendations were proposed to facilitate the transition from the current state of TM to an optimal scenario: one in which patients and healthcare professionals are highly receptive to adopting TM tools, and the policy environment actively supports this adoption.

The extent to which these recommendations must be implemented in European countries depends on the situation in each country, so two meetings were also organized with the eCAN Governmental Board,[3] consisting of representatives of health authorities from European countries to discuss the relevance of the recommendations and potential actions that can be taken to implement them. The participants validated the roadmap and contributed to it by sharing their national experience.

The 16 eCAN recommendations spanned six areas of intervention and are presented in Fig. 1:

1) Regulatory, governance and policy framework
2) Stakeholders' engagement an awareness to prioritize the integration of telemedicine into healthcare systems
3) Infrastructure and technology development
4) Training and education
5) Implementation and integration into healthcare systems
6) Evaluation and continuous improvement

These recommendations aim to overcome the challenges and leverage facilitators associated with the implementation of TM in cancer prevention and care and to ensure equitable and efficient healthcare delivery. More information on the development of the eCAN roadmap and recommendations is available on the eCAN website [11].

4. Conclusion

The eCAN JA explored the role of TM services within EU health systems by providing an overview of current TM practices, envisioning a future where these practices are widely used and their use is broadly supported, and outlining steps that need to be taken to realize this vision. While the recommendations provide a clear framework for advancing TM in cancer prevention and care, their impact depends on effective implementation and sustained collaboration. Stakeholders from each EU Member State are encouraged to contribute towards this

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[3] The eCAN Governmental Board is composed of telemedicine experts affiliated with health authorities from different European countries (namely Austria, Belgium, Croatia, Cyprus, Czechia, Denmark, Hungary, Italy, Luxembourg, Malta, Norway, Slovakia, and Spain) and was assembled to externally validate the eCAN roadmap.

ROADMAP RECOMMENDATIONS

REGULATORY, GOVERNANCE AND POLICY FRAMEWORK

- Prioritising telemedicine by decision-makers for its integration into healthcare systems
- Developing guidelines addressing privacy, data protection, and patient rights aligned with GDPR
- Enacting clear rules and legislation with respect to telemedicine services

INFRASTRUCTURE AND TECHNOLOGY DEVELOPMENT

- Providing technological support and equipment to end-users, such as patients, caregivers and HCPs
- Developing telemedicine platforms with interactive interfaces to provide more engaging & personal experiences
- Ensuring the development of solid IT infrastructures for telemedicine services and the exchange of health data among EU MS

STAKEHOLDERS' ENGAGEMENT AND AWARENESS TO INTEGRATE TELEMEDICINE

- Establishing a collaborative framework with stakeholders for comprehensive telemedicine integration
- Engaging patients in the design and testing of telemedicine services
- Focusing on access to digital health technologies and improving health literacy for all population groups

TRAINING AND EDUCATION

- Implementing strategies to enhance patient openness to telemedicine
- Offering specialised training and resources to healthcare providers & caregivers to assist patients in adopting technology
- Improving digital health literacy among patients, caregivers and healthcare providers

IMPLEMENTATION & INTEGRATION INTO HEALTHCARE SYSTEMS

- Address hospital workload challenges
- Use telemedicine for follow-up monitoring & consultations in and out of hospitals for evidence-based integration into the care pathway

EVALUATION AND CONTINUOUS IMPROVEMENT

- Defining clear metrics and evaluation criteria before telemedicine implementation
- Conducting through evaluations of health outcomes of new telemedicine services before and after integration
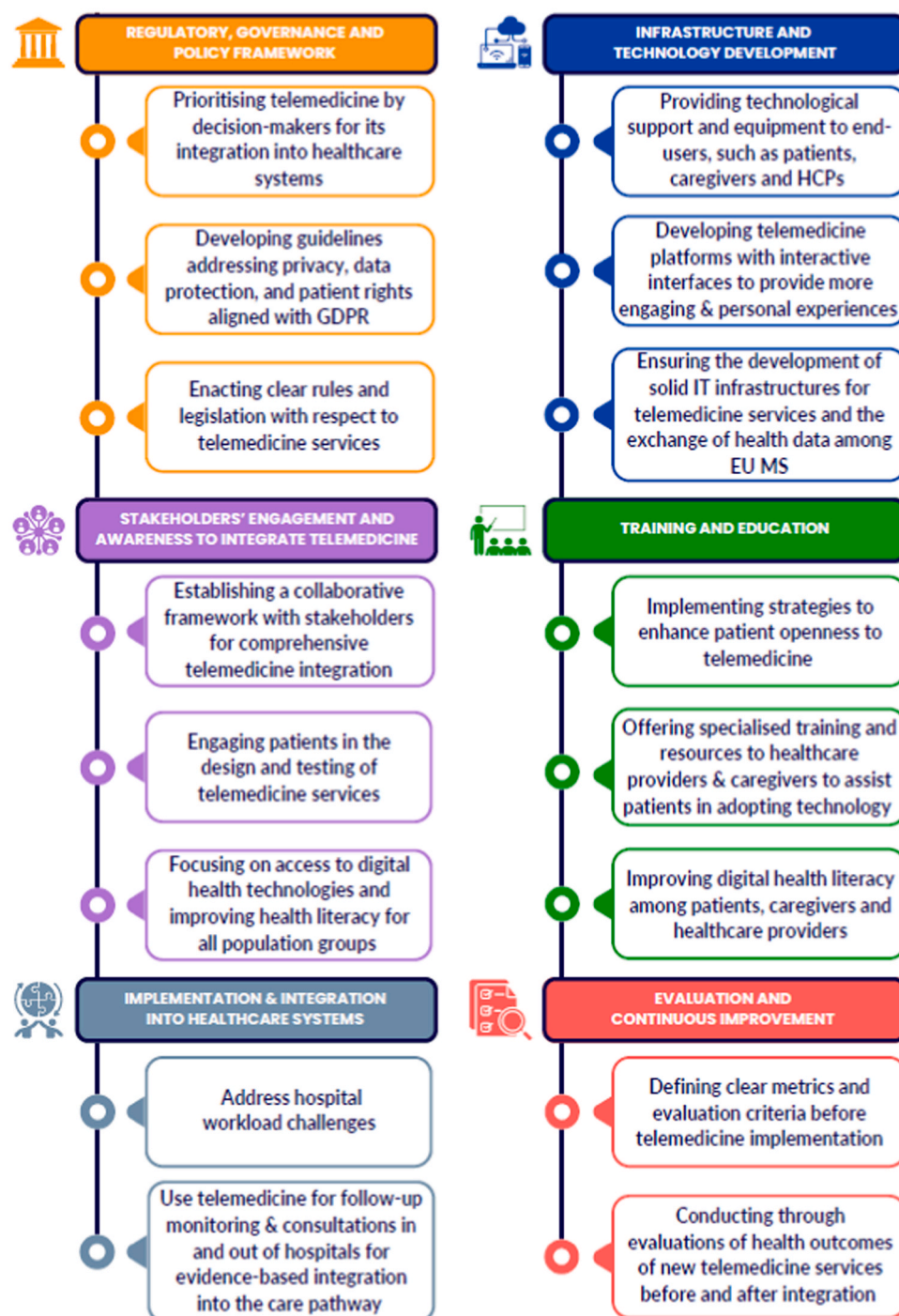
Fig. 1. eCAN recommendations.

implementation by reviewing each recommendation and taking action to stimulate the acceptance and uptake of TM. National policymakers can play a major role in this regard by launching or funding relevant initiatives. At the European level, a new project - the Joint Action eCAN+- will be launched in 2025. This project will build on the work done in eCAN and already take up and address several of the eCAN recommendations.

CRediT authorship contribution statement

Anita Gottlob: Conceptualization, Formal analysis, Investigation, Methodology, Writing – review & editing. **Marc Van den Bulcke:** Funding acquisition, Methodology, Supervision, Validation, Writing – review & editing. **Katharina Habimana:** Conceptualization, Formal analysis, Investigation, Methodology, Supervision, Validation, Writing – review & editing. **Claudia Habl:** Funding acquisition, Methodology, Supervision, Writing – review & editing. **Victoria Leclercq:** Conceptualization, Formal analysis, Investigation, Methodology, Project

administration, Validation, Writing – original draft, Writing – review & editing. **Marie Delnord:** Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Supervision, Validation, Writing – original draft, Writing – review & editing. **Robbe Saesen:** Conceptualization, Formal analysis, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing. **Tugce Schmitt:** Conceptualization, Formal analysis, Investigation, Methodology.

Disclaimer

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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