Open camera or QR reader and
scan code to access this article
and other resources online.

Assessing Cross-Border Telemedicine Data Exchange in the European Union: A Call to Action

Simon Lewerenz, MSc, Diogo Martins, MSc,
and Henrique Martins, MD, PhD

Iscte - University Institute of Lisbon, Lisbon, Portugal.

Abstract

Background: Telemedicine offers potential benefits for health care delivery. However, evidence of cross-border telemedicine data exchange within the European Union (EU) remains limited. The objective of this communication provides a brief outline of the regulatory framework, initiatives, and challenges associated with cross-border telemedicine data exchange in the EU, setting the stage for a comprehensive evidence assessment.

Methods: We explore the current regulatory landscape (European Health Data Space), existing initiatives (the European Electronic Health Record Exchange Format), and interoperability challenges (e.g., legal, technical, semantic) facing EU cross-border telemedicine data exchange.

Results: There is a need for thorough evidence assessment of cross-border telemedicine and related data movements.

Conclusion: Understanding the current landscape of cross-border telemedicine is crucial. This article highlights the need for evidence assessment through a formal review to inform future research and policy initiatives in this domain.

Keywords: *telemedicine, cross-border data exchange, European Union, evidence assessment, European Health Data Space*

Introduction

Telemedicine has emerged as a promising tool in modern health care delivery, offering opportunities for improved patient outcomes, increased efficiency, and cost savings.[1] Within the European Union (EU), where the movement of citizens across borders is facilitated, the potential for cross-border telemedicine services holds particular significance. However, despite the increasing interest, there are hints that related cross-border data sharing remains limited.[2] In fact, evidence on this topic appears scarce.

The EU's proposals to promote interoperability and data exchange in the European Health Data Space (EHDS) regulation, using the European Electronic Health Record Exchange Format (EEHRxF), provide the means for making further progress. An understanding of the current landscape of cross-border telemedicine data exchange within the EU is critical to be able to assess how to encourage further uptake and hence deliver improved patient outcomes.

This brief communication seeks to outline the regulatory framework, initiatives, and challenges associated with cross-border telemedicine data exchange in the EU. By clarifying the need for evidence assessment in this domain, this article will pave the way for a comprehensive scoping review, providing a deeper understanding of the factors influencing cross-border telemedicine and informing future research and policy initiatives.

Cross-Border Health Data Exchange in the EU

EHDS REGULATORY FRAMEWORK

The EU has been actively working toward harmonizing regulations and standards to facilitate the exchange of health

data across national borders. Representative of this effort is the EHDS regulation, which seeks to create an empowering environment, promoting interoperability, ensuring data security and privacy, and facilitating cross-border access to and use of health data. The EHDS regulation, proposed in 2022 and adopted in April 2024, sets out a comprehensive framework for the secure and interoperable exchange of health data across the EU.[3–6] Its objectives include improving access to health data for citizens (natural persons) and health care professionals, fostering innovation in health care delivery and research, and enhancing the efficiency and sustainability of health care systems.

INTEROPERABILITY AND COMMON STANDARDS: THE EUROPEAN ELECTRONIC HEALTH RECORD EXCHANGE FORMAT

The EHDS establishes a framework for interoperability, with accompanying governance structures and mechanisms, conforming to requirements such as those in the General Data Protection Regulation (GDPR). This framework provides the development and adoption of common standards and technical specifications to enable the seamless sharing of health data within the EU and interoperability between different electronic health record systems and data sources.

The EEHRxF comprises a set of requirements and technical specifications supporting both structured and unstructured data types. One of the notable aspects of the format is the translation of data across languages. A number of publicly funded projects are collaborating across countries, stakeholders, and practice to develop and disseminate it.

The format's scope is based on six priority categories of personal electronic health data in the EHDS: patient summaries; electronic prescriptions; electronic dispensations; medical imaging studies and related imaging reports; medical test results, including laboratory and other diagnostic results and related reports; and discharge reports. These domains encompass many use cases and will be able to support numerous digital health applications.

Telemedicine in Europe

CONTEXT AND RELEVANCE

Telemedicine is particularly relevant in Europe because of the continent's high burden of chronic diseases, nurturing the need for innovative health care solutions. With a rapidly aging population and increasing prevalence of chronic conditions such as diabetes, cardiovascular diseases, and respiratory illnesses, there is a growing demand for effective approaches to manage these conditions and improve patient outcomes.[7–9]

Telemedicine is recognized as a key component in managing chronic diseases and enhancing the continuity of care in Europe.[10–12] It allows the remote monitoring of patients' health status and vital signs using technology, enabling health care providers to track disease progression, monitor treatment efficacy, and intervene proactively when necessary. This is particularly crucial in a region characterized by free movement across countries, where patients may seek health care services in different member states.

Moreover, telemedicine plays a pivotal role in the EU's digital health strategy, which aims to create an integrated market for digital health services to enhance the quality of care and patient safety. Leveraging digital technologies to facilitate remote monitoring and data exchange contributes to the EU's broader objectives of promoting digital innovation in health care and improving access to high-quality care for all citizens.

CHALLENGES AND BARRIERS

The challenges and barriers to EU cross-border telemedicine data exchange are multifaceted, encompassing legal, technical, and semantic issues. Legal concerns revolve around data protection and privacy laws, which can vary significantly across EU member states, leading to regulatory fragmentation and inconsistencies in data governance practices. This variation poses challenges for health care providers and patients seeking cross-border telemedicine services, as differing legal requirements may impede the seamless exchange of health data. The upscaling of telemedicine requires aligning with GDPR and ensuring ethical and legal norms of good care.[11,13]

There are significant technical challenges to EU cross-border telemedicine data exchange. The lack of standardized technologies and systems that can seamlessly integrate and communicate with one another hinders interoperability and data exchange possibilities between different health care providers and systems. Specifically, semantic misalignment or other semantic-related factors may be playing a role in impeding seamless data exchange. Moreover, the diversity of health care standards within the EU makes it difficult to establish a unified telemedicine framework that can operate effectively across borders.[11]

These challenges have profound implications for the effective implementation of telemedicine across EU territories. Legal barriers, including differing national legislation, privacy laws, and commitments, can result in restrictions on data flows, impeding the continuity of care for patients moving across borders and limiting their access to telemedicine services. Technical and semantic issues, which encompass

lack of common standards, differing languages, and varying levels of access to infrastructure and bandwidth, can hinder the real-time sharing of health data, which is essential, in particular, for managing chronic diseases and ensuring timely medical interventions (e.g., in pandemic response).

To address these challenges and promote cross-border telemedicine data exchange, there is a need for harmonized legal frameworks, investment in compatible technologies, and the development of EU-wide standards.[11,14] By overcoming these barriers, Europe can harness the full potential of telemedicine to improve patient outcomes, enhance health care efficiency, and promote cross-border collaboration in health care delivery.

Need for Evidence Assessment

RATIONALE FOR SCOPING REVIEW

The necessity of conducting a scoping review to assess the evidence of cross-border telemedicine data exchange is integral to the growing need to understand its place and implications within health care. Such a review will offer a comprehensive overview of the current state of research, identifying the extent, range, and nature of research activity, while pinpointing gaps that can guide future research priorities. It is particularly relevant for informing policymakers and health care providers about the effectiveness, challenges, and best practices of telemedicine across borders, leading to more informed and effective decisions.

IMPLICATIONS OF LACK OF EVIDENCE

Evidence-based decision making is pivotal in enhancing health care policy and practice, ensuring that decisions are informed by the best available evidence, supporting improved health outcomes, and resource allocation.[15] The absence of evidence can lead to uninformed policies that may not effectively address the challenges or opportunities associated with cross-border telemedicine. This lack of evidence can result in missed opportunities for optimizing health care delivery, leading to inefficiencies and reduced quality of care. Without robust evidence, it is challenging to measure the impact of cross-border telemedicine on the health systems' efficacy, making it difficult to implement improvements or innovations. Robust evidence is thus necessary to guide the development and implementation of cross-border telemedicine initiatives, ensuring they are effective and aligned with the relevant strategic goals.

In conclusion, a scoping review is a critical step toward building the knowledge necessary for understanding the impact and potential of cross-border telemedicine, ensuring that future initiatives are evidence-based, support the goals of improving health care delivery and patient outcomes, and are aligned with the strategy and values of the EU.

PRELIMINARY FINDINGS FROM REVIEW

As the work on the aforementioned review is already ongoing, we can start communicating some preliminary ideas. The main guiding directions for this work are as follows: (1) to summarize previous research focusing on technical aspects, standards, and guidelines for cross-border telemedicine solutions and (2) to review studies covering the use and impact of interoperable telemedicine solutions across different health care providers and contexts, including evidence of technical artifacts, architectures, and international standards for data sharing.

Out of 861 records identified through protocolled database searching, 64 full texts were evaluated, and 25 studies ended being included in a qualitative synthesis. Preliminary findings appear to confirm that there is a glaring lack of evidence concerning cross-border sharing of telemedicine data in the EU. The analysis to be presented in the forthcoming article will help point to potentially explanatory factors, supporting further research and decision making in the field.

Preliminary analysis outlines the matter by legal, organizational, semantic, and technical issues. Further technical breakdown may uncover details regarding data and communication standards; Information and Communications Technology infrastructure, frameworks, and architecture; interoperability standards; and transport types.

Conclusions

This brief communication highlights the current situation regarding telemedicine data movement in the EU, raising important questions about the accessibility and movement of health data in an era of widespread telemedicine use.

While there are measures to facilitate data movement within the EHDS, assessments for current evidence of telemedicine data movement remain scarce. This gap underscores the need for a thorough assessment to better inform policymaking and health care provision. Exploring the underlying reasons behind this lack of evidence is crucial, as it will help evaluate current systems and plans for future improvements. An outcome may be that this inquiry reveals a well-established system that does not require data movement, and alternatively, that existing barriers are hindering telemedicine data exchange and should be tackled. By addressing these issues, we can better prepare for the future of telemedicine and health in Europe, ensuring that health care data can flow freely across borders and improve patient care and health care delivery throughout the EU.

REFERENCES

1. Meystre S. The current state of telemonitoring: A comment on the literature. Telemed J E Health 2005;11(1):63–69; doi: 10.1089/tmj.2005.11.63

2. Choudhary P, Bellido V, Graner M, et al. The challenge of sustainable access to telemonitoring tools for people with diabetes in Europe: Lessons from COVID-19 and beyond. Diabetes Ther 2021;12(9):2311–2327; doi: 10.1007/s13300-021-01132-9

3. European Commission. Commission welcomes European parliament's adoption of the European health data space and regulation on substances of human origin. 2021. Available from: https://ec.europa.eu/commission/presscorner/detail/en/IP_24_2250 [Last accessed: June 10, 2024].

4. European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions—A European Strategy for Data. European Commission: Brussels; 2020. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0066 [Last accessed: June 10, 2024].

5. European Commission. Proposal for a Regulation of the European Parliament and of the Council on the European Health Data Space. 2022. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52022PC0197 [Last accessed: June 10, 2024].

6. European Commission. Commission Recommendation of 6.2.2019 on a European Electronic Health Record Exchange Format. 2019. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019H0243 [Last accessed: June 10, 2024].

7. European Observatory on Health Systems and Policies, Richardson E, Aissat D, Williams GA, et al. Keeping what works: Remote consultations during the COVID-19 pandemic. Eurohealth 2020;26(2):73–76. World Health Organization. Regional Office for Europe. Available from: https://iris.who.int/handle/10665/336301 [Last accessed: June 10, 2024].

8. Christensen J. The emergence and unfolding of telemonitoring practices in different healthcare organizations. Int J Environ Res Public Health 2018;15(1):61; doi: 10.3390/ijerph15010061

9. Huygens MWJ, Voogdt-Pruis HR, Wouters M, et al. The uptake and use of telemonitoring in chronic care between 2014 and 2019: Nationwide survey among patients and health care professionals in the Netherlands. J Med Internet Res 2021;23(5):e24908; doi: 10.2196/24908

10. Creber A, Leo DG, Buckley BJR, et al. Use of telemonitoring in patient self-management of chronic disease: A qualitative meta-synthesis. BMC Cardiovasc Disord 2023;23(1):469; doi: 10.1186/s12872-023-03486-3

11. Carrasqueiro S, Ramalho A, Esteves A, et al. Report on EU state of play on telemedicine services and uptake recommendations. 2017. Available from: https://health.ec.europa.eu/document/download/1d9999a1-0063-4b18-aea1-f1eec5e3c540_en [Last accessed: June 10, 2024].

12. Leo DG, Buckley BJR, Chowdhury M, et al. Interactive remote patient monitoring devices for managing chronic health conditions: Systematic review and meta-analysis. J Med Internet Res 2022;24(11):e35508; doi: 10.2196/35508

13. Bolt I, Specker J, Schermer M. Telemonitoring: Ethical lessons from the COVID-19 pandemic. BMC Digit Health 2023;1(1):47; doi: 10.1186/s44247-023-00046-9

14. Zippel-Schultz B, Schultz C, Helms TM. Aktueller stand und zukunft des telemonitoring. Herzschr Elektrophys 2017;28(3):245–256; doi: 10.1007/s00399-017-0520-4

15. Françoise M, Frambourt C, Goodwin P, et al. Evidence based policy making during times of uncertainty through the lens of future policy makers: Four recommendations to harmonise and guide health policy making in the future. Arch Public Health 2022;80(1):140; doi: 10.1186/s13690-022-00898-z

Address correspondence to:
Simon Lewerenz, MSc
Iscte - University Institute of Lisbon
Lisbon 1649-026
Portugal

E-mail: slewerenz@ucp.pt