JHAD
Health and Development Journal
https://jhad.kmu.ac.ir
10.34172/jhad.1204
JHAD. 2025;14:1204

Letter to the Minister of Health

Smart Healthcare System: A Prerequisite for the Optimal Implementation of the Referral System and Family Physician Program

AliAkbar Haghdoost[1], Vahidreza Borhaninejad[2], Reza Dehnavieh[3], Mohammad Hossein Mehrolhassani[4], Vahid Yazdi-Feyzabadi[5], Rohaneh Rahimisadegh[5*]

[1]Modeling in Health Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran
[2]Social Determinants of Health Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran
[3]Health Foresight and Innovation Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran
[4]Medical Informatics Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran
[5]Health Services Management Research Center, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran

***Corresponding Author:** Rohaneh Rahimisadegh, Email: rhn.rahimi@gmail.com

Abstract

Over the past decades, Iran's health system has faced challenges such as rising costs, inequities in access, imbalances in the quality of health services, weak data management, and the lack of integration among diverse information systems. The implementation of the referral system and the family physician program, considered the main strategy for reforms and achieving universal health coverage, has encountered difficulties in urban and metropolitan areas. These difficulties include inadequate continuity and coordination of care, limitations in recording and tracking patient histories, resistance from some service providers, and an underdeveloped information infrastructure. International experiences demonstrate that the development of smart healthcare systems through technologies such as electronic health records, telehealth and telemedicine, mobile health (M-health), the Internet of Things (IoT), big data, and decision-support systems can enhance need-based access, equity, efficiency, and patient satisfaction, while reducing costs.

For Iran, a comprehensive leap toward digital health is imperative by establishing a dedicated organizational structure for smartification, ensuring people-centered platforms, developing a national data exchange infrastructure, harnessing the domestic innovation ecosystem, and expanding telehealth, telemedicine, and the Internet of Medical Things. Such a smart healthcare system, by optimizing human and financial resources, strengthening the referral system and family physician program, and revitalizing the healthcare network, can address existing challenges and effectively achieve universal health coverage.

Keywords: Smartification, Healthcare system, Referral system, Family physician program

Citation: Haghdoost AA, Borhaninejad V, Dehnavieh R, Mehrolhassani MH, Yazdi-Feyzabadi V, Rahimisadegh R. Smart healthcare system: a prerequisite for the optimal implementation of the referral system and family physician program. Health Dev J. 2025;14:1204. doi:10.34172/jhad.1204

Received: September 9, 2025, **Revised:** September 20, 2025, **Accepted:** October 22, 2025, **ePublished:** December 21, 2025

Introduction

Over the past decades, Iran's health system has faced multiple challenges, including rising healthcare costs, inequities in access to services, inconsistent quality of care, inefficiencies in resource utilization (1), weak data management, and lack of integration among information systems (2). These issues have made structural reforms indispensable (3). Moreover, demographic aging and the epidemiological transition toward non-communicable and chronic diseases are creating new waves of economic pressure and necessitating infrastructure for elderly care (4).

According to upstream policies, the implementation of the referral system, electronic health records, and the family physician program constitutes the main strategy for health system reform. However, evidence from the past two decades shows that the traditional model has failed in rural areas and towns with populations under 20,000, while in metropolitan settings, its implementation with current methods is nearly impossible (5, 6). Nevertheless, the family physician program and referral system are

not ultimate goals; rather, they serve as instruments for achieving universal health coverage (7). Universal Health Coverage (UHC) has predominantly been institutionalized in liberal and neoliberal countries and was subsequently recognized as the dominant discourse within the World Health Organization (WHO). In contrast, Primary Health Care (PHC) has been more extensively developed in countries with socialist systems and continues to play a central role in such contexts, as well as in systems like that of the United Kingdom, where the referral system and family physician model constitute the cornerstone of the national health system. Given that Iran's health system and family physician program have been implemented within the framework of PHC, it is essential to examine, with precision and from the perspective of theoretical foundations and the philosophy of health, the relationship between this system and UHC, as well as the potential integration of these two discourses. It is noteworthy that the introduction of the family physician system in Iran was initiated by family medicine specialists within the framework of PHC and with a justice-oriented approach, although grounded in liberal political premises, during the administration of President Khatami. The National Health Service (NHS) of the United Kingdom represents a successful example of implementing a referral and family physician system within a national health framework, wherein non-emergency health services are managed under the authority of family physicians, and which is regarded as one of the justice-based models in health. The World Health Organization (WHO) has also identified them as central objectives of 21st-century health systems (8), since emphasizing primary healthcare, ensuring equity in access to services, and managing costs make the family physician program and referral system the most suitable path forward for Iran (9).

Despite broad recognition of this necessity, the traditional implementation of the family physician program in Iran has faced persistent obstacles such as inadequate continuity and coordination of care and limited capacity for recording and tracking patient histories, preventing it from becoming widespread and sustainable (10–12). Other barriers include resistance from some service providers, insufficient information infrastructure, and the absence of comprehensive electronic health records, weak coordination between the Ministry of Health and insurance organizations, inadequate training of general practitioners and other human resources, as well as managerial, human, and financial instability (10, 13–16) (Figure 1).

Figure 1. Barriers to the Implementation of the Referral System and Family Physician Program in Iran

Health Smartification: An Essential Prerequisite

Under current conditions, the development of smart healthcare system constitutes one of the fundamental prerequisites for the successful implementation of the referral system and family physician program. In its global strategy on digital health, the WHO conceives smartification as extending beyond artificial intelligence, encompassing technologies such as electronic health records (EHRs), telehealth (TH) and telemedicine ™, the Internet of Things (IoT), big data, decision-support systems (DSS), and mobile health applications (17). In Iran, however, comprehensive electronic health records and the broader infrastructure for digital health have not yet been developed. Experience has shown that gradual and fragmented approaches are ineffective; hence, there is a pressing need for a comprehensive and integrated leap. This is particularly significant considering that many countries have undertaken such a leap during the past decade, achieving remarkable progress. Notable examples include:

- **Estonia**: The establishment of a national electronic health record enabled integrated access to health information, reduced duplicate laboratory visits by 50 percent, and generated substantial cost savings (18, 19).
- **India**: The national telemedicine platform *eSanjeevani*, operating under a hub-and-spoke model, has provided over 276 million consultations and, by equipping rural health centers, has facilitated access to specialist services while reducing geographic inequities (20).
- **United Kingdom**: Digitalization through online appointment booking, electronic prescribing, and chronic disease monitoring has led to reduced costs and increased patient satisfaction (21).
- **Canada**: The widespread adoption of telemedicine has resulted in direct annual savings of approximately USD 147 million, while simultaneously reducing unnecessary emergency visits and patient waiting

times (22).

- **OECD countries**: According to OECD reports, smartification has reduced the demand for administrative human resources by 15–20 percent and enhanced equity in service delivery (23).

The experiences of different countries demonstrate that digital health, beyond reducing costs, strengthens health equity by improving accessibility and mitigating geographic disparities (24). Consequently, in today's world, smartification has become the principal instrument for realizing Universal Health Coverage (UHC) (25), while providing the optimal foundation for implementing the family physician program and the referral system (26).

Characteristics of a Smart Healthcare System

A smart healthcare system must encompass three primary target groups and provide services tailored to them (Figure 2).

Policy Recommendations for Senior Health System Managers at the Ministry of Health and Universities of Medical Sciences

Based on the foregoing discussion, the following recommendations may be offered to senior managers of the Iranian health system:

Establishing a Dedicated Organizational Structure for Smartification

It is recommended that a specialized deputy or advisor for smartification be established within the Ministry of Health and Medical Universities. This structure should maintain integrated linkages with areas such as strategic planning, the Center for Health Statistics and Information, the Center for Disease Control, and the boards of trustees. Designing this body as a secretariat with an inter-institutional structure could facilitate coordination with insurance organizations and other relevant institutions. Such an arrangement would foster coherence, enhance efficiency, and contribute to achieving the developmental objectives of health smartification.

Shifting Information Systems Toward People-Centeredness

Information systems within the Ministry of Health must, similar to electronic banking systems, become transparent and citizen-centered so that individuals may exercise oversight over their own health records. Both service providers and citizens should have the capacity to enter and update information. Furthermore, slogans and non-expert promotional campaigns in the field of smartification should be avoided; instead, real and operational projects with direct benefits for the public should be prioritized. This approach has the potential to enhance service quality, improve public satisfaction, and create the conditions necessary for achieving Universal Health Coverage (UHC).

Developing a Smart Data Exchange Platform

Rather than attempting to build a single, unified electronic health record, efforts should be directed toward designing a platform that enables data exchange across existing systems. Eliminating large systems is practically impossible, and no single system can fully address all needs. Therefore, only a smart platform can ensure purposeful and effective data exchange. Such a platform should provide a foundation for data governance and digital health, prevent monopolization by specific companies, and strengthen the position of the Ministry of Health. Past unsuccessful outsourcing experiences must serve as valuable lessons for policymakers.

Leveraging the Domestic Science and Technology Ecosystem

Digital health cannot succeed without sustained and robust support for the domestic innovation ecosystem. Knowledge-based companies, incubators, and science and technology parks must be genuinely supported through financial resources, reduced administrative bureaucracy, and mechanisms for collaboration between the technology and health sectors. The outcome of such support should be the development of national digital health platforms and applications with data integration capabilities.

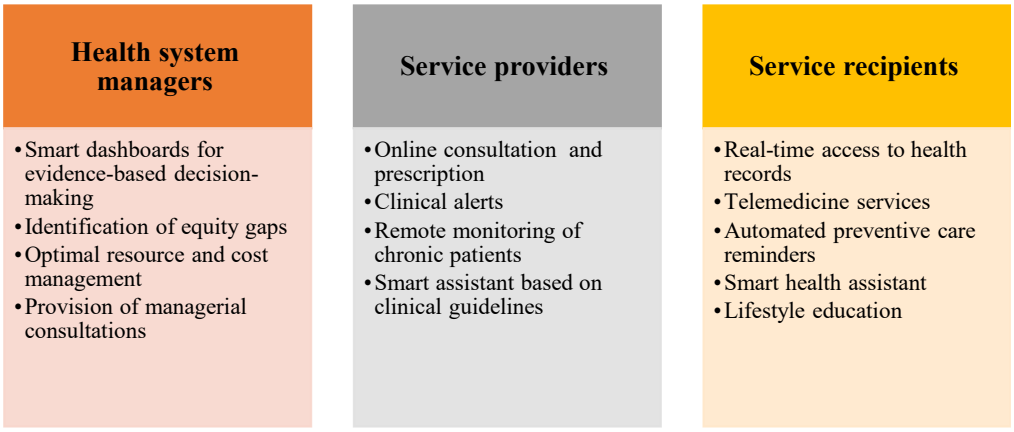

Figure 2. Target groups and services provided to them in a smart healthcare system

Moreover, investment in artificial intelligence, big data, and predictive analytics can enhance decision-making and health management in the country, while reducing dependence on foreign technologies.

Investing in Telemedicine, Smart Assistants, and the Internet of Medical Things (IoMT)

Investment in emerging technologies such as telemedicine, smart assistants, and IoMT can fundamentally transform the quality of health services. Telemedicine, in particular, offers an effective alternative to in-person visits for underserved regions, while mobile health applications foster more effective interaction between providers and recipients of care. AI-based chatbots can assist patients in decision-making. The development of IoMT is essential for monitoring chronic patients and older adults. Alongside these advances, the formulation of legal and ethical frameworks and the strengthening of data security, through technologies such as blockchain, are vital for building public trust.

Conclusion

Based on the findings of the studies, the implementation of the referral system and the family physician program in Iran through traditional methods has not achieved the necessary efficiency and has, to some extent, reached an impasse. One of the essential prerequisites for overcoming this situation is a decisive leap toward the development of the smart healthcare system. This trajectory not only reduces financial and human burdens but also enhances equity, transparency, and efficiency. The proposed smart system, by providing unparalleled capabilities for the public, various levels of service providers, and health system managers, optimizes intellectual resources, harnesses the expertise of artificial intelligence specialists, and ensures the effective utilization of allocated financial resources in this domain. Such an approach yields short- and medium-term outcomes that are incomparable to any other method. Beyond improving and strengthening the referral system and the family physician program through smartification, the genuine revitalization of the country's health network legacy, particularly in cities and metropolitan areas, will further augment the value and depth of this transformation, enabling it to play an effective role in addressing the challenges facing Iran's healthcare system.

Acknowledgements

The Persian version of this article has undergone all stages of peer review and has been evaluated in the same manner as the original version.

Authors' Contribution

Conceptualization: Ali Akbar Haghdoost.
Writing–original draft: Ali Akbar Haghdoost.
Writing–review & editing: Ali Akbar Haghdoost, Vahidreza Borhaninejad, Reza Dehnavieh, Mohammad Hossein Mehrolhassani, Vahid Yazdi-Feyzabadi, Rohaneh Rahimisadegh.

Competing Interests

The authors declare no competing interests.

Ethical Approval

Not applicable.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Supplementary File

Supplementary File. The Persian version of this article

References

1. Akhavan S. Iranian healthcare system and raising wave of privatization: a literature review. Health Scope. 2021;10(3):e111545. doi: 10.5812/jhealthscope.111545.
2. Khankeh HR, Bagheri Lankarani K, Zarei N, Joulaei H. Three decades of healthcare system reform in Iran from the perspective of universal health coverage: a macro-qualitative study. Iran J Med Sci. 2021;46(3):198-206. doi: 10.30476/ijms.2020.84023.1342.
3. Askarzade E, Nabizade Z, Goharinezhad S, Mostaghim S. Universal health coverage in Iran: a review of strengths, weaknesses, opportunities, and threats. Med J Islam Repub Iran. 2023;37:6. doi: 10.47176/mjiri.37.6.
4. Dehghan Bonadaki M. Studying the Status of Aging in Future Iran and its Challenges. Tehran: Research Center of the Islamic Consultative Assembly; 2023.
5. Heshmati B, Joulaei H. Iran's health-care system in transition. Lancet. 2016;387(10013):29-30. doi: 10.1016/s0140-6736(15)01297-0.
6. Yazdi Feyzabadi V, Mehrolhassani MH, Baneshi MR, Mirzaei S, Oroomiei N. Association between pilot urban family physician program and health financial protection measures in Fars and Mazandaran provinces. Iran J Epidemiol. 2018;13(5):48-58.
7. Takian A, Doshmangir L, Rashidian A. Implementing family physician programme in rural Iran: exploring the role of an existing primary health care network. Fam Pract. 2013;30(5):551-9. doi: 10.1093/fampra/cmt025.
8. World Health Organization (WHO). Universal Health Coverage. Geneva: WHO; 2021.
9. Kabir MJ, Malekafzali H, Mohagheghi MA, Heidari A, Jafari N, Tabrizchi N, et al. Effective implementation of family medicine program in Iran: requirements and implementation of strategies. Iranian Journal of Culture and Health Promotion. 2021;5(3):353-60.
10. Heidarzadeh A, Hedayati B, Alvandi M, Rezaei M, Farrokhi B, Dadgaran I, et al. Referral system challenges of the family physician program in Iran: a systematic review. Med J Islam Repub Iran. 2023;37:49. doi: 10.47176/mjiri.37.49.
11. Kohpeima Jahromi V, Mehrolhassani MH, Dehnavieh R, Saberi Anari H. Continuity of care evaluation: the view of patients and professionals about urban family physician program. Int J Prev Med. 2017;8:7. doi: 10.4103/2008-7802.200525.
12. Kohpeima Jahromi V, Dehnavieh R, Mehrolhassani MH. Evaluation of urban family physician program in Iran using primary care evaluation tool. Iran J Epidemiol. 2018;13(5):134-44.
13. Mehrolhassani MH, Kohpeima Jahromi V, Dehnavieh R, Iranmanesh M. Underlying factors and challenges of implementing the urban family physician program in Iran. BMC Health Serv Res. 2021;21(1):1336. doi: 10.1186/

s12913-021-07367-3.
14. Shams L, Nasiri T, Amiri MM, Abdolahi Z. Challenges of rural family physician policy in Iran. Int J Prev Med. 2023;14:43. doi: 10.4103/ijpvm.ijpvm_24_22.
15. Mohammadibakhsh R, Aryankhesal A, Sohrabi R, Alihosseini S, Behzadifar M. Implementation challenges of family physician program: a systematic review on global evidence. Med J Islam Repub Iran. 2023;37:21. doi: 10.47176/mjiri.37.21.
16. Heidarzadeh A, Hedayati B, Sirous S, Huntington MK, Alvandi M, Arabi A, et al. Financial challenges in the family physician programme in Iran: a systematic review of qualitative research. Malays Fam Physician. 2023;18:59. doi: 10.51866/rv.254.
17. World Health Organization (WHO). Global Strategy on Digital Health 2020-2025. WHO; 2021.
18. Tiik M, Ross P. Patient opportunities in the Estonian electronic health record system. Stud Health Technol Inform. 2010;156:171-7.
19. Oja M, Tamm S, Mooses K, Pajusalu M, Talvik HA, Ott A, et al. Transforming Estonian health data to the Observational Medical Outcomes Partnership (OMOP) common data model: lessons learned. JAMIA Open. 2023;6(4):ooad100. doi: 10.1093/jamiaopen/ooad100.
20. Dastidar BG, Jani AR, Suri S, Nagaraja VH. Reimagining India's National Telemedicine Service to improve access to care. Lancet Reg Health Southeast Asia. 2024;30:100480. doi: 10.1016/j.lansea.2024.100480.
21. Imison C, Castle-Clarke S, Watson R, Edwards N. Delivering the Benefits of Digital Health Care. London: Nuffield Trust; 2016.
22. Hafner M, Yerushalmi E, Dufresne E, Gkousis E. The potential socio-economic impact of telemedicine in Canada. Rand Health Q. 2022;9(3):6.
23. OECD. The Digital Transformation of SMEs, OECD Studies on SMEs and Entrepreneurship. Paris: OECD Publishing; 2021. doi: 10.1787/bdb9256a-en.
24. Bitomsky L, Pfitzer E, Nißen M, Kowatsch T. Advancing health equity and the role of digital health technologies: a scoping review. BMJ Open. 2025;15(6):e099306. doi: 10.1136/bmjopen-2025-099306.
25. Badr J, Motulsky A, Denis JL. Digital health technologies and inequalities: a scoping review of potential impacts and policy recommendations. Health Policy. 2024;146:105122. doi: 10.1016/j.healthpol.2024.105122.
26. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Care Services; Committee on Implementing High-Quality Primary Care; Robinson SK, Meisnere M, Phillips RL Jr, et al, eds. Implementing High-Quality Primary Care: Rebuilding the Foundation of Health Care. Washington, DC: National Academies Press (US); 2021. 7, Digital Health and Primary Care. Available from: https://www.ncbi.nlm.nih.gov/books/NBK571817/.