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NARRATIVE/SYSTEMATIC REVIEWS/META-ANALYSIS

# Telemedicine Post-COVID-19 as a Strategic Lever for Transforming Access to Healthcare

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*Abstract*

**Background:** The Moroccan health system faces significant structural problems, including major regional disparities in access to primary healthcare, the persistence of "medical deserts" (rural areas in extreme conditions, especially mountainous regions), and a rapidly growing burden of chronic diseases. The physician density (ratio of 7.8 per 10,000 people) is far below the World Health Organization's minimum recommendation of 23 per 10,000, with a shortage of healthcare workers estimated to exceed 97,000 (1,2).
**Methods:** This study examines the role of telemedicine as a technology-based solution to address these systemic weaknesses. It analyses the structural limitations of the existing healthcare model in Morocco, drawing on public health data and the impact of the COVID-19 outbreak as a catalyst for reform.
**Results:** The findings highlight that telemedicine is now considered an essential component of healthcare delivery. It offers a strategic means of enhancing access to care, particularly in underserved and remote areas, while supporting the development of a more equitable and patient-centered healthcare system.
**Conclusions:** Telemedicine represents a promising and necessary approach to overcoming Morocco's healthcare challenges. Its structured adoption can help bridge the gap between urban and rural healthcare access, reduce the burden on the existing workforce, and improve patient outcomes across the country.

*Plain Language Summary*

Morocco faces a critical shortage of healthcare workers, with a physician density of only 7.8 per 10,000—far below the World Health Organization's recommendation of 23 per 10,000. It is imperative that Morocco determine how to implement telemedicine equitably, efficiently, and strategically.
Here, the authors report that telemedicine is a promising and necessary approach to overcoming Morocco's healthcare challenges. Its structured adoption can improve healthcare several ways.

- access to urban and rural healthcare,
- reduced the burden on the existing workforce, and
- improved patient outcomes across the country.

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Worldwide, many people adopted telemedicine during the COVID-19 pandemic. Despite the different types of healthcare systems in various countries, all have been impacted dramatically by the pandemic, and each country has had a large increase in planning and utilizing telemedicine.[1,2]

In the United States, before the pandemic, telemedicine represented only 0.3% of all medical visits, but during the early phases of the pandemic, telemedicine comprised 23.6%—nearly an increase of 80 times,[3] of all medical visits. On March 20, 2020,[4] it was reported that in France, telemedicine accounted for 11–12% of the total visits compared to 0% 1 week before the pandemic occurred. Before the pandemic in 2019, in Canada, the percentage of the total care provided in Canada through virtual healthcare was 10–20%, whereas on July 1, 2020, it increased to approximately 60%.[5] In Saudi Arabia, there has been a 24-fold increase in the percentage of the population utilizing telemedicine services; telemedicine usage went from approximately 2% to approximately 48%[6] (Figure 1).

As illustrated in Figure 1, the adoption of telemedicine experienced a dramatic surge across diverse healthcare systems during the height of the pandemic in 2020. For instance, Canada saw the most significant absolute adoption rate, peaking at 60.0%, while Saudi Arabia followed closely at 48.0%. The United States and France also demonstrated substantial relative growth, reaching 23.6 and 11.0%, respectively. This global trend indicates that telemedicine continues to be an

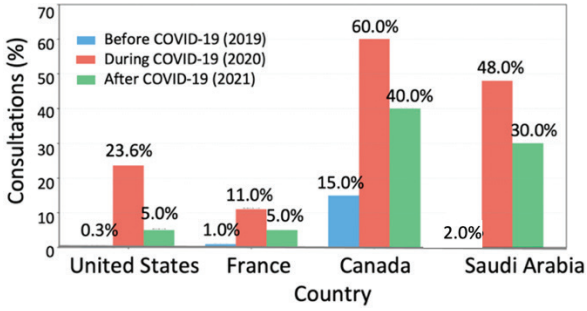


*Fig. 1.* Adoption of telemedicine before, during, and after the COVID-19 pandemic: an international comparison.

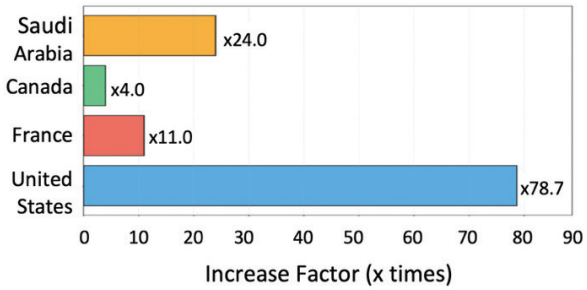


*Fig. 2.* Increase in teleconsultations during the COVID-19 pandemic (2019–2020).

effective method of providing care during crises. While telemedicine usage decreased slightly during the aftermath of the COVID-19 pandemic (2021), it remains at an elevated level compared to before 2019 across all surveyed nations. For example, Canada and Saudi Arabia maintained high adoption rates of 40.0 and 30.0%, respectively, post-pandemic, indicating a permanent shift toward telemedicine as a method of healthcare delivery into the future.

The global trend illustrated in the data indicates that telemedicine continues to be an effective method of providing care during crises. While telemedicine use decreased slightly during the aftermath of the COVID-19 pandemic, it remains at an elevated level compared to before 2019, indicating a shift toward telemedicine as a method of healthcare delivery into the future (Figure 2).

This paradigm shift is further emphasized when examining the relative growth rates. Figure 2 highlights the staggering multiplication factors of teleconsultations between 2019 and 2020. The United States experienced an unprecedented 78.7-fold increase, reflecting a massive and rapid mobilization of digital health resources from a near-zero baseline. Saudi Arabia and France also recorded exponential growth, with increases of 24.0 and 11.0 times, respectively. Even in Canada, where the baseline adoption was already higher, the volume quadrupled (x4.0). These figures collectively underscore that the pandemic acted as a universal catalyst, overcoming previous barriers to adoption and permanently altering the trajectory of global healthcare delivery.

## The Impact of Telemedicine on the Efficiency of the Healthcare System

Telemedicine goes beyond simply providing continuity of care; it has also proved capable of solving long-standing problems with efficiency in today's medical systems. A systematic review of the studies on telemedicine showed that telemedicine quantitatively improves wait times for outpatient consultations,[7] with one study reporting that wait times decreased by 43%, from an average of 48.4 days to an average of 27.7 days.[8] Furthermore, telemedicine has also greatly improved attendance rates. The percentage of no-shows for in-person visits fell from 36.1% to just 7.5% for teleconsultations (almost an 80% decrease).[9] This improved efficiency of telemedicine will help to maximize the utilization of limited medical resources (Figure 3).

The tangible benefits of this efficiency are clearly demonstrated in Figure 3. Panel A visually quantifies the substantial improvements in operational metrics, showing a 43% reduction in waiting periods and a remarkable 79% drop in absenteeism rates when comparing traditional care to telemedicine. This reduction in missed appointments directly translates to optimized physician schedules and better patient outcomes. Furthermore, Figure 3 Panel B illustrates the sustained, long-term growth of e-consultations in Saudi Arabia, which rose steadily from 0.79 million users in 2019 to a projected 1.30 million in 2024. This continuous upward trajectory suggests that once patients and providers experience the efficiency and convenience of telemedicine, adoption continues to grow organically, solidifying its role as a core component of effective healthcare delivery.

## Morocco: An Opportunity for Equitable Access to Healthcare

Digital transformation creates opportunities for equitable access to healthcare in Morocco. The country has specific challenges that position it well to take advantage of the digital transformation. More than 50% of doctors practice along the Casablanca-Rabat corridor, creating a disparity in the availability of healthcare services throughout the country.[2] Telemedicine provides an excellent opportunity to begin closing this disparity by providing direct access to physicians where there is limited access to healthcare resources and expertise.

The Moroccan regulatory framework enabling telemedicine initiatives was established by Law 131-13 in 2015, reinforced with Decree 2-18-378 in 2018, and updated in 2021. Along with the growing number of telemedicine initiatives in the country and throughout North Africa, this establishes the foundation for deploying telemedicine services in Morocco.[1,10]

Telemedicine offers significant opportunities to boost physician productivity, increase consultation capacity, and reduce wait times for chronic care patients. However, nationwide deployment in Morocco remains slow.

Suppose that the structured adoption of telemedicine initiatives occurs. In that case, as illustrated in Figure 3 Panel A, structured telemedicine adoption could increase a physician's annual consultation capacity from approximately 1,200–1,800 consultations, a 50% gain. This projection is based on the reduction of administrative overhead and no-show rates demonstrated internationally combined with the critical need to compensate for Morocco's physician density of only 7.8 per 10,000 inhabitants (Figure 3, Panel B) and the geographic maldistribution where 83% of physicians are concentrated in urban areas (Figure 3, Panel C). However, achieving this target requires adequate digital infrastructure, streamlined

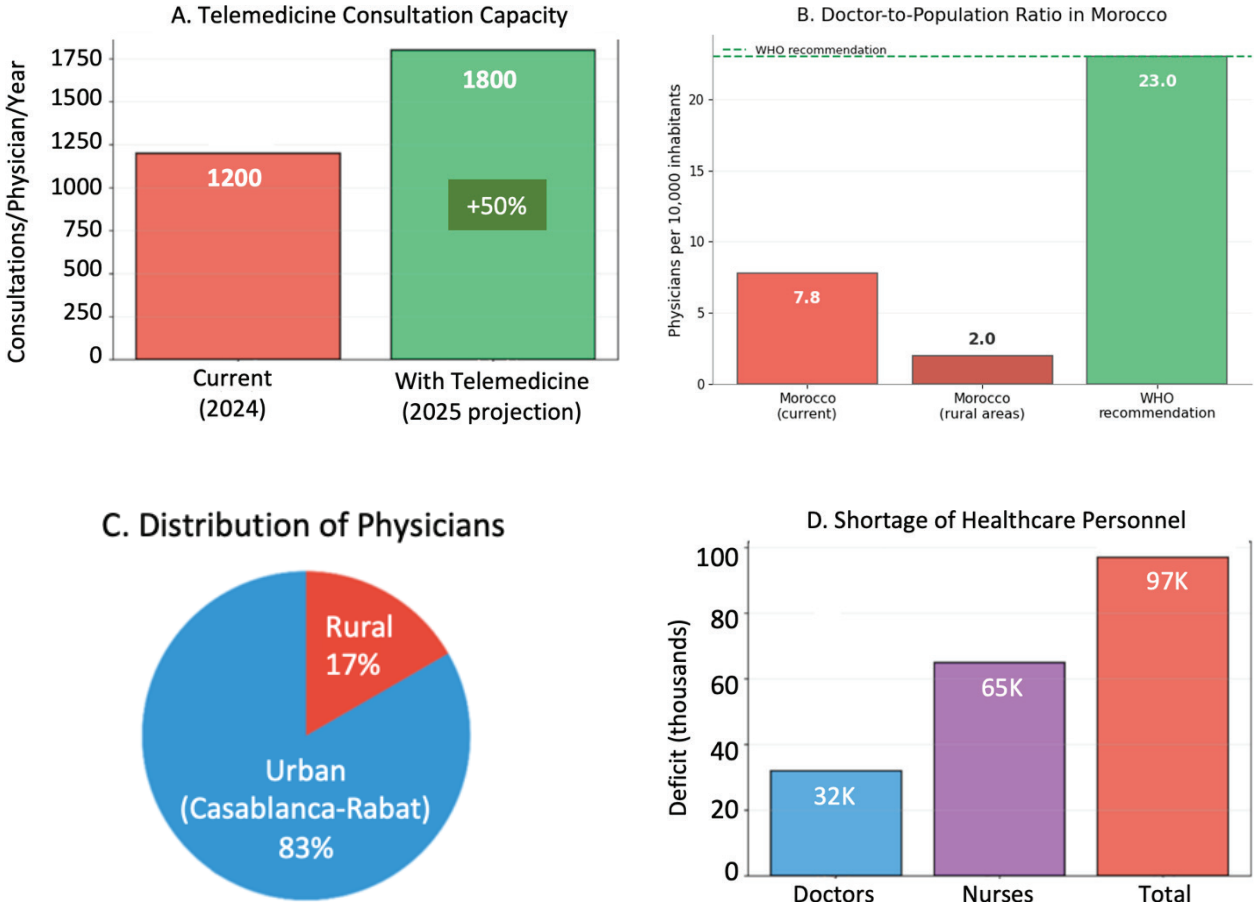


*Fig. 3.* Challenges facing the Moroccan healthcare system and the potential of telemedicine.

triage processes, and dedicated tele-assistants to support physicians.

The critical need for such an intervention in Morocco is comprehensively detailed in Figure 3. Panel B reveals the stark reality of medical density: while the national average is only 7.8 physicians per 10,000 inhabitants, rural areas suffer even more acutely with a mere 2.0, both falling drastically short of the World Health Organization (WHO) recommendation of 23.0. This deficit is quantified in Figure 3, Panel D, which highlights a staggering shortage of 97,000 health personnel (including 32,000 doctors and 65,000 nurses). Compounding this shortage is the severe geographic maldistribution shown in Figure 3, Panel C, where 83% of physicians are concentrated in urban centers such as Casablanca and Rabat, leaving only 17% to serve rural populations. However, Panel A offers a promising solution: by integrating telemedicine, the annual consultation capacity per physician could increase by 50%, from 1,200 to 1,800 consultations. This significant boost in productivity presents a viable strategy to mitigate the severe personnel shortages and bridge the geographic divide, bringing essential medical expertise to underserved rural communities.

## Recommendations for an Ambitious National Strategy

To fully leverage telemedicine's immense potential, Morocco must create a clear, ambitious national telemedicine strategy that combines financial integration, governance and interoperability, workforce education and training, and digital access to reduce the digital divide.

*Financial Integration*

Telemedicine must be integrated into Compulsory Health Insurance (AMO) codes in Morocco. Establishing clear reimbursement processes will incentivize providers and patients. The Ministry of Health and the National Health Insurance Agency—Morocco—should spearhead this initiative within 12–18 months.[11,12] Governance and Interoperability—Creating governance through aligning telemedicine systems with International Health Standards, e.g., Health Level Seven/Fast Healthcare Interoperability Resources (HL7/FHIR)—will help to promote interoperable health information systems, which is necessary for the WHO Global Strategy. Privacy of patient data should be a high priority and be governed by the National Commission for the Control of Personal Data Protection Guidelines (CNDP) and General Data Protection Regulation (GDPR) as a starting point.[11,12] Education and Training—a national program to educate healthcare providers on the proper and ethical use of telemedicine tools—will be implemented, and medical schools and professional associations should collaborate to integrate these modules into their curricula. Digital access—a national initiative to eliminate the digital divide in Morocco—will be implemented to ensure that everyone can access reliable internet service and affordable equipment, especially in rural areas. Telecommunication companies and government agencies must work together to expand infrastructure.

## Conclusion

Telemedicine was rapidly growing as a means of delivering healthcare before the COVID-19 epidemic, but the global

experience of this pandemic has confirmed many of the assertions made concerning telemedicine. Rather than debating whether telemedicine should be incorporated into the existing healthcare systems in Morocco today, it is imperative that Morocco determine how to implement telemedicine in a method that is equitable, efficient, and strategic. In addition, Morocco must build upon lessons learned from the experience of other countries when determining its own implementation approach and utilize the existing regulatory structure of Morocco. The time for action is now; stakeholders must unite to transform this potential into a sustainable reality for the benefit of the entire population.

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## Data Availability Statement (DAS), Data Sharing, Reproducibility, and Data Repositories

No new datasets were generated or analyzed during the preparation of this manuscript. The article is based on a narrative and strategic analysis using information from publicly available sources and previously published literature cited in the manuscript. Therefore, data sharing is not applicable.

## Application of AI-Generated Text or Related Technology

AI-assisted tools were used solely for language editing, formatting support, and refinement of the revised manuscript. The authors carefully reviewed, verified, and approved all AI-assisted edits and took full responsibility for the accuracy, integrity, originality, and scientific content of the final manuscript. No AI-assisted tool was used to generate original research data, conduct data analysis, produce scientific conclusions, or replace the authors' intellectual contribution and scientific judgment.

## Contributions

El Mehdi Abiza contributed to the conceptualization, literature review, drafting, revision, and final approval of the manuscript. Zouhayr Souirti contributed to the conceptualization, critical review, intellectual revision, supervision, and final approval of the manuscript. Both authors approved the final version submitted for publication and agreed to be accountable for all aspects of the work.

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