



China Center Policy Brief Series

HOPE¹ Project's Output

Telemedicine and COVID-19 as a Wild Card: *Insights from Europe, China and the United States*

Introduction

WHO defines telemedicine as “the delivery of health care services, where distance is a critical factor, by all healthcare professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and the continuing education of health care workers, to advance the health of individuals and communities” (WHO, 2010, p. 9). This definition is continuously evolving due to technological developments (WHO, 2010). Data analytics, artificial intelligence (AI) and the Internet of Things (IoT) are changing traditional medical operations towards Health 4.0 (Rayan et al., 2023).

After the COVID-19 outbreak, there was a major shift towards telemedicine since many in-person healthcare services were delayed or cancelled. To allow this transition, governments around the world introduced new legislation and revised existing laws (OECD, 2023). This policy brief provides insights into the development of telemedicine in Europe, China and the United States, considering COVID-19 as a turning point. Indeed, the pandemic can be viewed as the wild card namely an event with a low chance of happening but producing a high impact (Rockfellow, 1994).

Europe

European advancements in telemedicine are concentrated mainly in Western Europe with Germany, Italy, Spain, and the United Kingdom as leading countries (Francesc Saigí-Rubió et al., 2022). COVID-19 accelerated the trend towards telemedicine services. On average across 23 EU countries in-person consultations decreased by 17% in 2020, ranging from a reduction of 3% in Germany to up to 50% in Italy (OECD/European Commission, 2022). Countries such as Estonia, Hungary, Ireland and Luxembourg that allowed only in-person consultations dropped this restriction. At the same time, France, Germany and Lithuania relaxed a prerequisite according to which patients were allowed to have teleconsultations with physicians they had already consulted in person (OECD, 2023).

However, compared with other industries, healthcare in the EU needs to catch up in digitalisation. Despite basic broadband being available for all, there is a digital divide in terms of the quality and affordability of broadband networks. Moreover, the pandemic has raised concerns related to cybersecurity incidents and the convergence between confidential medical data and consumer health applications (European Parliament, 2021). It is also necessary to consider the potential risks related to technologies combined with telemedicine, such as AI. The European Commission (2022) study identified a set of risks related to AI faults, misapplication of medical AI tools, bias and perpetuation of inequities, lack of transparency, privacy and security, gaps in accountability, and obstacles in implementation. When dealing with telemedicine and AI data, security is crucial since the information managed is identifying and sensitive. In this field, the European General Data Protection Regulation (GDPR, Regulation (EU) 2016/679) established detailed requirements for companies and organisations regarding collecting, storing and managing personal data, and recognises data concerning health as a special category.

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To address the existing barriers and risks, the Regional Digital Health Action Plan for 2023–2030 was introduced by WHO and the European Commission. This plan identifies as priorities setting norms and developing technical guidance, enhancing country capacities for governing digital transformation, advancing digital health literacy, building networks and knowledge exchange, and performing horizon-scanning and landscape analysis for scalable patient-centred solutions (WHO, 2022). Furthermore, great developments are expected in telemedicine from the Horizon Europe framework, the EU's key funding programme for research and innovation. Telemedicine covers a key role referring to both clusters “Health” and “Digital, Industry and Space” (European Commission, 2023).

China

In China, telemedicine offers a solution to the unequal allocation of healthcare resources, becoming a possibility to close the gap between rural and urban in both the capability and quality of medical services. Above all, telemedicine promotes the implementation of the Healthy China strategy, and thereby it is recognised as an effective way to ensure that everyone enjoys equal rights and opportunities for high-quality healthcare services (Gao et al., 2022). Together with telemedicine, AI technologies, are expected to overcome the current limitations of the distribution of medical resources and relieve the pressure associated with obtaining high-quality health care (Li et al. 2020).

During the pandemic, doctors in China started to explore new methods to maintain communication with their patients. In 2020, some hospitals launched online visual contact events with the support of live-stream platforms. Hospitals, health organizations, and doctors registered accounts and produced live-stream events. The pandemic has fostered the use of online platforms to ensure the continuation of healthcare for vulnerable groups. Remarkably, during the pandemic, both healthcare professionals and the general public have seen the benefit of technology in healthcare (Chen & Jiang, 2022). However, there are many challenges for the uptake of telemedicine, as reviewed by Xiao et al. (2023). Above all, the government needs to increase investments and establish a long-term operating mechanism to ensure the sustainable development of telemedicine. Moreover, more appropriate telemedicine standards are required. Furthermore, it is necessary to include telemedicine services in the scope of medical insurance reimbursement, improve telemedicine business processes, and provide policy guarantees for the development of telemedicine.

US

In the US health care services delivered through telemedicine, often mentioned interchangeably with telehealth, are regulated at the federal and state levels. Coverage and reimbursement policies differ according to different payers/plans and may be defined by state telehealth parity laws. In particular, restrictions placed on provider reimbursement have been cited as the number one barrier to adoption (VanderWerf et al., 2022).

Due to the COVID-19 outbreak, the US Department of Health and Human Services carried out a set of administrative steps to expedite the adoption and awareness of telehealth. Some of these flexibilities have been made permanent while others were introduced as temporary. In particular, the crisis triggered rapid federal and state-level temporary policy changes that lifted many legacy coverage and payment barriers and accelerated adoption during the outbreak. Removing long-standing regulatory constraints on payment for telehealth services resulted in high nationwide adoption rates during the COVID-19 pandemic (VanderWerf et al., 2022). In fact, from 2019 to 2021, telemedicine use in the US among physicians increased from 15.4% to 86.5%. Data shows that there were some differences in terms of satisfaction. Primary care and medical specialists were more likely to be satisfied with telemedicine technology than surgical specialists (Myrick et al., 2024).

However, studies show that there were disparities in the use of telemedicine services. In particular patients at the highest risk of being underserved with telehealth are those who fall into specific socioeconomically disadvantaged groups (Harris et al., 2023). In this sense, as underlined by VanderWerf et al. (2022) the COVID-19 pandemic presented an opportunity for data collection and analysis since it is the first extensive implementation of telemedicine in the US. This means there is a chance to measure the impact of telemedicine on care delivery and analyse disparities and costs.



Some preliminary conclusions

Given the advancements and challenges in telemedicine, it's clear that the COVID-19 pandemic has acted as a catalyst for its accelerated adoption across Europe, China, and the US. Each region has distinctively leveraged technology to expand healthcare access, demonstrating telemedicine's critical role in modern healthcare systems. However, challenges such as equity in access and regulatory barriers persist. Addressing these challenges requires a unified approach that includes technological innovation, policy reform, and international collaboration to fully realize telemedicine's potential in improving healthcare delivery.

References

- Chen, R., Jiang, Q. Evolution of telemedicine in China during COVID-19 pandemic: from 2020 to 2022. *J Public Health Pol* 43, 469–472. <https://doi.org/10.1057/s41271-022-00353-x>.
- Li, R., Yang, Y., Wu, S., Huang, K., Chen, W., Liu, Y., & Lin, H. (2020). Using artificial intelligence to improve medical services in China. *Annals of Translational Medicine*, 8(11).
- Myrick, K., Mahar, M., & DeFrances, C. (2024). Telemedicine usage among physicians by physician specialty: United States, 2021. National Center for Health Statistics (U.S.). <https://doi.org/10.15620/cdc:141934>.
- OECD (2023), The COVID-19 Pandemic and the Future of Telemedicine, OECD Health Policy Studies, OECD Publishing, Paris, <https://doi.org/10.1787/ac8b0a27-en>.
- OECD/European Union (2022), Health at a Glance: Europe 2022: State of Health in the EU Cycle, OECD Publishing, Paris, <https://doi.org/10.1787/507433b0-en>.
- Saigí-Rubió, F., Borges do Nascimento, I. J., Robles, N., Ivanovska, K., Katz, C., Azzopardi-Muscat, N., & Novillo Ortiz, D. (2022). The current status of telemedicine technology use across the World Health Organization European Region: An overview of Systematic Reviews. *Journal of medical Internet research*, 24(10), e40877.
- VanderWerf, M., Bernard, J., Barta, D. T., Berg, J., Collins, T., Dowdy, M., Feiler, K., Moore, D. L., Sifri, C., Spargo, G., Taylor, C. W., Towle, C. B., & Wiberly, K. H. (2022). Pandemic Action Plan Policy and Regulatory Summary Telehealth Policy and Regulatory Considerations During a Pandemic. *Telemedicine and E-Health*, 28(4), 457–466. <https://doi.org/10.1089/tmj.2021.0216>.
- WHO (2010). Telemedicine opportunities an development in Member States, https://iris.who.int/bitstream/handle/10665/44497/9789241564144_eng.pdf?sequence=1.
- WHO (2022). Regional digital health action plan for the WHO European Region 2023–2030. <https://iris.who.int/bitstream/handle/10665/360950/72wd05e-DigitalHealth-220529.pdf?sequence=2>.
- European Commission (2023). Horizon Europe – Work programme. https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2023-2024/wp-4-health_horizon-2023-2024_en.pdf.
- European Parliament (2021). The rise of digital health technologies during the pandemic. Briefing, [https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/690548/EPRS_BRI\(2021\)690548_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/690548/EPRS_BRI(2021)690548_EN.pdf).
- European Parliament (2022). Artificial intelligence in healthcare. doi:10.2861/568473.
- Gao, J., Fan, C., Chen, B., Fan, Z., Li, L., Wang, L., ... & Zhao, J. (2022). Telemedicine is becoming an increasingly popular way to resolve the unequal distribution of healthcare resources: Evidence from China. *Frontiers in Public Health*, 10, 916303.
- Rayan, R. A., Zafar, I., & Tsagkaris, C. (2023). Industry 4.0 technologies for healthcare: Applications, opportunities, and challenges. In *Blockchain Technology Solutions for the Security of IoT-Based Healthcare Systems* (pp. 23–44). Elsevier. <https://doi.org/10.1016/B978-0-323-99199-5.00011-2>.
- Rockfellow, J. D. (1994). Wild Cards: Preparing for the Big One. *The Futurist*, 28(1), 14.