

National Panorama of Digital Health in Mexico



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MEXICO



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Health for all in the digital age

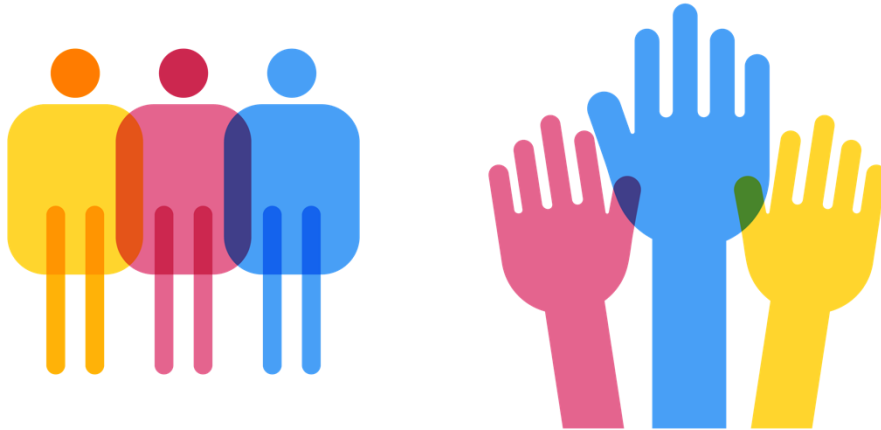
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Credits and acknowledgments



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Executive Summary

Introduction

Universal Health Coverage (UHC) has significantly captured attention on the global health agenda. The WHO defines UHC as the guarantee of access to quality health services for all, from health promotion to rehabilitation and palliative care, without causing economic hardship.

In Mexico, UHC is not only a health objective but also a socioeconomic imperative. The country faces health inequalities, reflecting a similar situation in Latin America. The need to improve health care services, address inequalities, optimise infrastructure, and address public health issues such as diabetes and obesity is highlighted.

Universal Health Coverage: Mexico

Universal Health Coverage: Mexico has an Effective Coverage Index of 61/100. Costa Rica leads with 79 and Haiti has the lowest index with 36.

Access to Health: Data from 2020 indicates that 28.2% of the population lacks access to health.

Demographic transition (according to the 2020 Population and Housing Census, 126,014,024 people live in Mexico. Mexico ranks 11th among the most populous nations in the world): The older adult population(+65 years old) in Mexico represents 12%. It is expected that by 2050 it will be 22.5%. In Mexico, there are 31.2 million adolescents and young people aged 15 to 29, of which 10.8 million are teenagers (15 to 19 years old). Median age in Mexico is 29 years old.

Mexican Health System

The health system is divided into two sectors: public and private. The public sector includes institutions such as Instituto Mexicano del Seguro Social (IMSS), Instituto de Seguridad y Servicios Sociales para los Trabajadores del Estado (ISSSTE), Ministry of Health, Petroleos Mexicanos (PEMEX), Secretaría de Marina (SEMAR) and Secretaría de la Defensa Nacional (SEDENA). The private sector includes insurance companies and service providers in pharmacies, doctor's offices, clinics and private hospitals. Formal health care workers are affiliated with the IMSS. There are parallel

institutions for workers from the federal or state government, PEMEX and the army (SEDENA).

There are government health insurance plans for informal and uninsured workers, such as Seguro Popular and IMSS-Prospera. However, Seguro Popular experienced a decline between 2012 and 2018, leading to policy changes and its dismantling between 2019 and 2020, and the introduction of a new decentralised system, the IMSS-OPD. The objective of which is to combat the fragmentation of the system, turning it into a single system, to achieve the UHC (Universal Health Coverage).

Legislation on digital health in Mexico

The General Health Law in Mexico ([Ley General de Salud, 1984](#)) has undergone significant reforms to promote the integration of Information and Communication Technologies (ICT) in the health sector, with the aim of expanding coverage and improving the quality of medical services.

In the 2013 Constitutional Reform in telecommunications, Article Fourteenth Transitional stipulated the following:

"The Federal Executive shall oversee the policy of universal digital inclusion, encompassing objectives and goals related to infrastructure, accessibility, connectivity, information and communication technologies, digital government programs, open government and data, promotion of public and private investment in telehealth, telemedicine, Electronic Health Records, and the development of digital applications, systems, and content, among other aspects."

However, despite recognizing the role of information and communication technologies in various articles of the General Health Law, the current regulations do not keep up with technological advancements. Additionally, there are infrastructure deficiencies in healthcare, particularly in rural areas, where patients invest significant time and resources to access services.

It is noteworthy that the World Health Organization, adopted the Global Strategy on Digital Health 2020-2025 (in 2020) . This global strategy recognises the pivotal role of digital technologies in healthcare. Therefore, it is imperative to update existing regulations so that Mexican patients can securely, promptly, and affordably access healthcare services and products through digital means.

In Mexico right now a healthcare reform bill is being discussed, it proposes adding various provisions to the General Health Law regarding digital health. The objectives being sought include: (i) establishing a legal framework that allows the ethical, safe, reliable, equitable, and sustainable use of digital technologies in healthcare; (ii) ensuring that information and communication technologies in

healthcare operate transparently, are accessible to all, easily scalable to the general population, and that healthcare technology systems in all regions of the country can interoperate through platforms that use compatible and interoperable computer systems; (iii) adequately protecting sensitive personal data that circulates through these technologies.

Specific initiatives such as electronic prescriptions and telemedicine are being debated in Congress (ongoing). The approval of these could open new opportunities to improve the health system in Mexico. Proposals are being discussed to regulate the use of artificial intelligence in the health sector in Mexico, seeking to establish an ethical and safe regulatory framework that guarantees the protection of personal data of patients and promotes an adequate use of technology in medical care.

Introduction



UHC is a term that has gained significant attention on the global health agenda. Defined by the World Health Organization (WHO) as the guarantee that all people and communities have access to a set of quality health services —ranging from health promotion to prevention, treatment, rehabilitation and care palliative—the UHC aims to achieve these ends without causing economic hardship.

Universal Health Coverage includes three dimensions:

- **Service Coverage:** All people who need health services must be able to receive care, regardless of socioeconomic characteristics, location, wealth or any other vulnerability.
- **Population Coverage:** all people must be safe from financial risk when incurring health care expenses, therefore, the affordability of the service and the mechanisms that facilitate access to care must be prioritised.
- **Financial Coverage:** The quality of health services must be at a level where it is effective in providing care and is also cost-effective and sustainable.

For more than a decade, the concept of UHC has been the subject of intense debate and continues to occupy a prominent place on health agendas. In Mexico, as in many other nations, UHC is not only a health objective but also a socioeconomic imperative.^{1,2}

Mexico faces marked inequality in the field of health, which reflects a similar situation in Latin America as a whole. The challenges that arise in the Mexican health system include the need to improve health care services, with the aim of improving indicators such as life expectancy at birth and reducing infant mortality. It is also necessary to address inequality in access to medical care, optimise the use of infrastructure and improve the performance of the health system. In addition, critical issues such as diabetes and obesity, which are considered public health

¹ World Health Organization: WHO. "Cobertura Sanitaria Universal." Who.int, World Health Organization: WHO, 24 Jan. 2019, [www.who.int/es/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](http://www.who.int/es/news-room/fact-sheets/detail/universal-health-coverage-(uhc)). Accessed 4 Sept. 2023.

² Pan American Health Organization. "PAHO/WHO | Universal Health Coverage - Frequently Asked Questions." Pan American Health Organization / World Health Organization, 2 July 2014, www3.paho.org/hq/index.php?option=com_content&view=article&id=9748:universal-health-coverage-frequent-questions&Itemid=0&lang=en#a#gsc.tab=0. Accessed 4 Sept. 2023

priorities in the country, are highlighted. The management and financing of health, both through public and private resources, pose significant challenges.

It is unfortunately common for patients not to receive the care they need and seek, affecting their accessibility and the quality of care they receive. In this context, the development of new health systems that take advantage of the opportunities offered by digital innovations is presented as an effective, economical and scalable solution to address these critical challenges.

This document aims to delve into the complexities of universal health coverage in Mexico, particularly in the context of digital health. We will explore key indicators, the state of access to healthcare, digital technologies, and the legislative landscape that shapes the healthcare sector in the country.

Insight

UHC is a global priority that seeks to guarantee access to quality health services without economic difficulties. Digital health plays a fundamental role in this objective by improving the accessibility, quality and efficiency of medical care, allowing geographical barriers to be overcome and improving care.

Universal Health Coverage: Mexico



Highlight

1. Constitutional Right to Health: In Mexico, the right to health is enshrined in the 4th article of the Political Constitution of the United Mexican States.³
2. Universal Health Coverage: Mexico has an Effective Universal Health Coverage Index of 61/100, while Costa Rica leads with 79 and Haiti has the lowest index with 36.⁴
3. Access to Health: Figures for 2020 (CONEVAL) indicate a setback in health coverage; The data reflects that 28.2% of the population lacks access to health.⁵
4. Out-of-pocket spending on health: 52.22% of national health spending is paid directly by the user.
 - a. In 2022, the main item of expenditure was food, beverages and tobacco with 37.7%. Health spending was 3.4%.⁶
 - b. The poorest population -Decile I- presents the highest out-of-pocket expenditure on health as a percentage of their quarterly income, with 4.2%. This is a sample of the lack of coverage of health services for the most vulnerable population. (2022)

³ Political Constitution of the United Mexican States. [C.M.] art. 4, 1983.

⁴ Perez Cuevas, Ricardo, et al. "Towards the Future of Health Personnel: Trends and Challenges for the Next Time | Publications." Publications.iadb.org, Inter-American Development Bank, May 2023, publications.iadb.org/publications/spanish/viewer/Rumbo-al-futuro-del-personal-de-salud-trendidas-y-desafios-para-el-next-time.pdf. Accessed 4 Sept. 2023.

⁵ ConsNational axis of Evaluation of the Policy of Social Development. "Poverty Measurement 2018-2020." www.coneval.org.mx, 2020, www.coneval.org.mx/Medicion/MP/Paginas/Pobreza_2020.aspx. Accessed 5 Sept. 2023.

⁶ Results of the National Survey of Household Income and Expenses (ENIGH) 2022.

5. Demographic transition: In Mexico, the older adult population currently represents approximately 12%; however, according to demographic trends for 2050 it will be 22.5%.⁷ In Mexico, there are 31.2 million adolescents and young people aged 15 to 29, of which 10.8 million are teenagers (15 to 19 years old). Median age in Mexico is 29 years old.

Mexican Health System



The right to health protection in Mexico is enshrined in Article 4 of the Political Constitution of the United Mexican States (CPEUM). This right is considered both a human and a fundamental right. Given its magnitude and importance, it is crucial to provide the National Health System with the necessary tools to reach more Mexican men and women promptly, safely and at reasonable costs.

The health system in the country is divided into two large sectors: public and private. The public sector is made up of various institutions such as the IMSS, ISSSTE, the Ministry of Health, PEMEX, SEMAR and SEDENA. In contrast, the private sector includes insurance companies and service providers that operate private pharmacies, doctor's offices, clinics, and hospitals.

Workers in the formal sector in Mexico are required by law to join the Mexican Social Security Institute (IMSS) at the federal level. This social security system is financed by employer and employee payroll taxes, as well as government contributions. In addition, there are parallel government institutions for those who work in the federal or state government, in the state oil company (PEMEX), and in the army and navy (SEDENA and SEMAR). These institutions offer a series of health benefits to their affiliates, including a wide package of prepaid interventions and

⁷ UNFPA. "Ageing: An Opportunity to Ensure the Well-being and Rights of All People." UNFPA Mexico, 22 Dec. 2022. mexico.unfpa.org/es/news/aging-an-opportunity-to-ensure-the-well-being-and-rights-of-all-persons. Accessed 4 Sept. 2023.

access to medicines for catalogued treatments. Workers in the informal sector receive basic health services through the federal and state Health Secretariats, which oversee health responsibilities and the basic health of the entire population.⁸

There are government-sponsored health insurance plans for informal workers and the uninsured population. The program, Seguro Popular, was a government-sponsored voluntary insurance program focused on helping the poor who do not have access to any social security. Seguro Popular was financed mainly by the federal and state governments. Although the program was intended to be prepaid health insurance in which beneficiary contributions to annual payments were based on their ability to pay, this never happened. Health insurance schemes also included other programs for the poor and uninsured, such as IMSS-Prospera.⁹

Between 2012 and 2018, Seguro Popular experienced a decline that revealed the accumulated challenges and the absence of necessary reforms during that period. This panorama led to systemic policy changes and the dismantling of Seguro Popular between 2019 and 2020. Under the administration of President Andrés Manuel López Obrador, the Mexican government began in January 2020 an extensive institutional reorganisation (creation of the Institute of Health for Well-being (INSABI), which has replaced Seguro Popular and intends to establish a fully financed and integrated public health network, however in 2022 INSABI was replaced by the IMSS-Welfare OPD Decentralised Public Organization). The objective is to establish a new program for a free and universal health system that reduces fragmentation, improves services and expands access for all Mexicans. However, the implementation of INSABI in the years 2020-21 made the Mexican health system more vulnerable during the COVID-19 pandemic, highlighting the precariousness of evidence-based decision-making in a context of political polarisation. The INSABI, short for the Instituto de Salud para el Bienestar (Institute of Health for Well-being), officially commenced operations in January 2020. However, it was established without clear operational guidelines, a comprehensive management plan, a comprehensive set of healthcare interventions, or the necessary financial resources to expand and fortify the existing healthcare institutions serving the uninsured population. This reform failed to outline specific criteria for identifying the healthcare needs of the populace, thus leaving a lack of clarity regarding the health conditions and medical interventions that INSABI would encompass.

Furthermore, the government administration initiated the centralization of personal healthcare services delivery through INSABI. This centralization posed various risks, including a potential decrease in effectiveness, operational and

⁸ Gómez Dantés, Octavio, et al. "Mexico Health System." *Public Health of Mexico*, vol. 53, no. suppl.2, 2011,

⁹ Garcia-Diaz, Rocio. "Effective Access to HealthCare in Mexico." *BMC Health Services Research*, vol. 22, no. 1, 12 Aug. 2022

logistical challenges, and potential misalignment with state-level healthcare processes.

In 2020, access to healthcare services through INSABI was only available to 28% of the population, in stark contrast to the 43% coverage achieved through the Seguro Popular in 2018.¹⁰

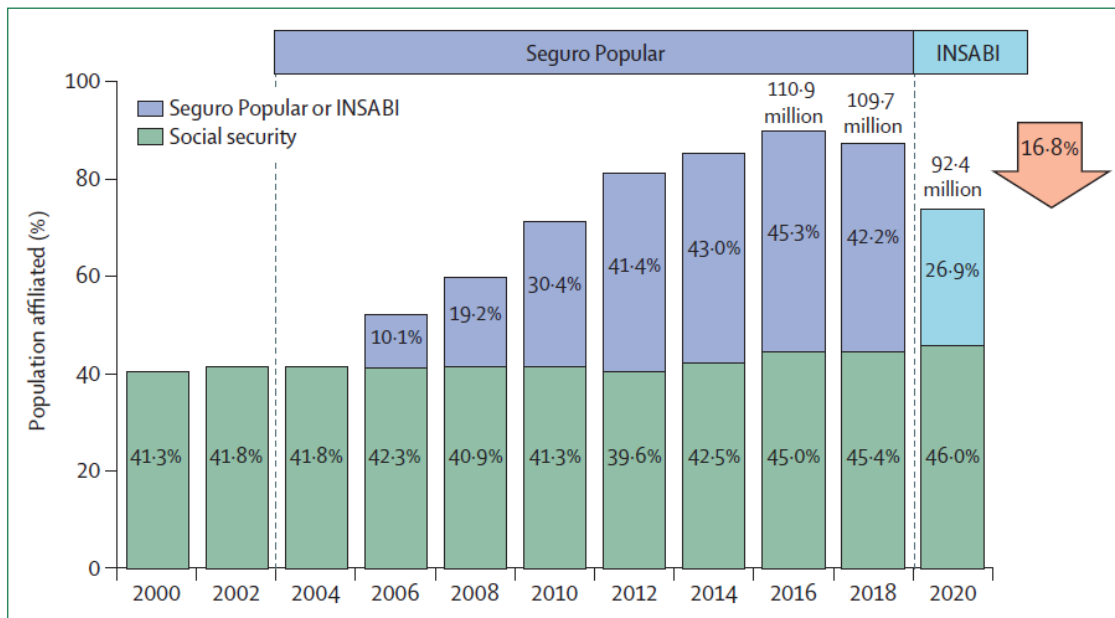


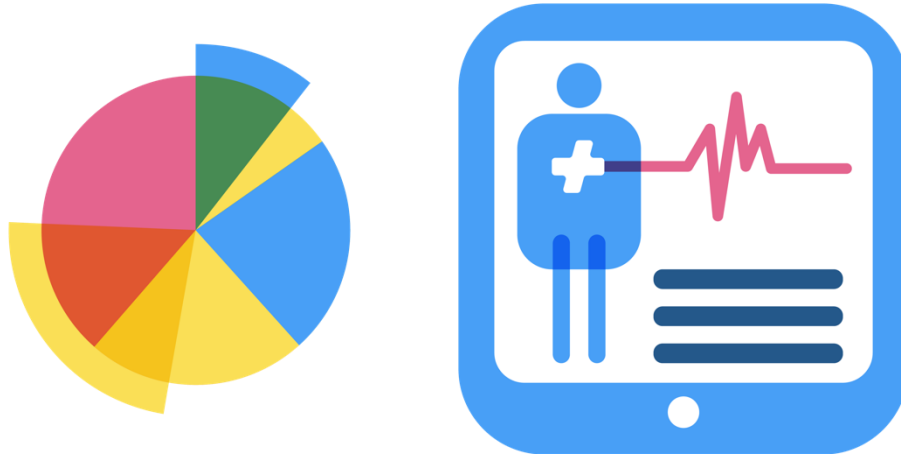
Figure 1: Public health insurance coverage (% of the total population), Mexico 2000-2020.¹¹

The evolution of enrollment in Mexico from 2000 to 2020 is shown, with three different levels: the level prior to Seguro Popular (2000-02), the Seguro Popular level (2004-18) and the level after Seguro Popular or entrance (2020). It is important to note that there was a 16.8% decrease in enrollment during the transition from Seguro Popular to INSABI, which occurred between 2018 and 2020.

¹⁰ Martínez-Martínez, Oscar A., and Anidelys Rodríguez-Brito. "Vulnerability in Health and Social Capital: A Qualitative Analysis by Levels of Marginalization in Mexico." *International Journal for Equity in Health*, vol. 19, no. 24, 10 Feb. 2020

¹¹ Knaul, Felicia Marie, et al. "Setbacks in the Quest for Universal Health Coverage in Mexico: Polarised Politics, Policy Upheaval, and Pandemic Disruption." *The Lancet*, vol. 402, no. 10403, 2023

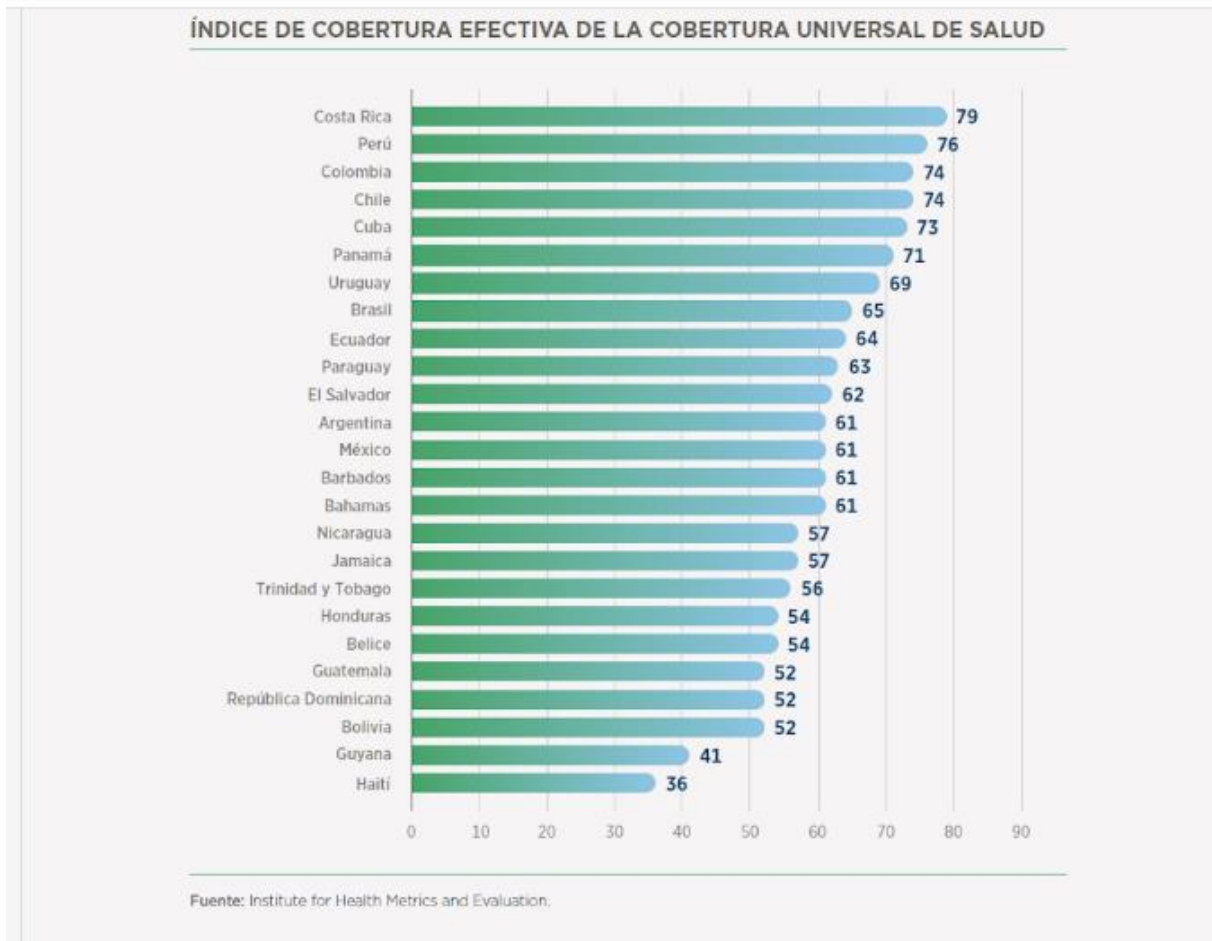
Health Indicators Mexico



In the constant search to evaluate and improve health systems around the world, the concept of Universal Health Coverage (UHC) has become a guiding light. UHC is not limited simply to the availability of medical services, but rather implies the ability of a health system to effectively meet the needs of the population. To measure this effectiveness, the Institute for Health Metrics and Evaluation has developed an UHC Effective Coverage Index, which sheds light on the quality and breadth of health services available in a country. This index is based on 23 indicators that include mortality rates and access to quality services, and its interpretation on a scale of 0 to 100 provides a snapshot of the effectiveness of the system. In this context, Mexico is in an intermediate position, with an index of 61/100, while other countries like Costa Rica lead with 79, and Haiti struggles with a worrying 36. These numbers reflect the complexity of health systems. and raise fundamental questions about healthcare in Mexico and its path toward improving Universal Health Coverage.¹²

Figure 2: CUS INDEX effective coverage in the countries of Latin America and the Caribbean

¹² Perez Cuevas, Ricardo, et al. "Towards the Future of Health Personnel: Trends and Challenges for the Next Time | Publications." Publications.iadb.org. Inter-American Development Bank, May 2023, publications.iadb.org/publications/spanish/viewer/Rumbo-al-futuro-del-personal-de-salud-trendidas-y-desafios-para-el-next-time.pdf. Accessed 4 Sept. 2023.



The ultimate objective of the CUS is to improve the well-being of the population and reduce the elements of risk that affect all demographic groups. Ensuring the availability of medical services, their quality, and financial protection are crucial components for improving the health of the population. However, it is important to keep in mind that several other social factors play a determining role in the overall health status of the population.

The health situation in Mexico is presented below, through a series of key indicators related to the health of the population, and to the CUS, which allow assessing and analysing which areas require more attention, and thus be able to design strategies according to the country's needs. The indicators evaluate five dimensions: population health, coverage and services, financial protection, quality of care, and health inequality. For the evaluation of the indicators it is important to consider that Mexico is undergoing a demographic transition towards an older population.

In Mexico, the older adult population currently represents approximately 12%; however, according to demographic trends for 2050 it will be 22.5%.^{13,14}

Population of México: 128.9 millions (INEGI) people live in Mexico¹⁵

Dimension: Population Health: State of Health

- Life expectancy at birth: life expectancy at birth in Mexico is 72.5 for men and 78.2 for women, while the world average for OECD countries is 76 years. (2021)
- Survival to age 65 in Mexico is 16.7 years for men and 18.7 for women, compared to the OECD average of 17.3 and 20.68, respectively. (2020)
- Infant mortality rate is 12.7 deaths per 1,000 births to children under 1 year of age compared to the OECD average 14 deaths. (2021)

Dimension: Population Health: Determinants of Health

- Smoking in Mexico is relatively low, with 8.6% of daily smokers. (2021)
- Alcohol consumption per capita is 5.1 litres per year, which is moderate compared to other OECD countries. (2021)
- Overweight: 74.1% of the population in Mexico is overweight, compared with the OECD average of 62.0%. (2020)
- Access to drinking water: 96.1% of the population. (2021)¹⁶
- Access to basic sanitation services: 95.2% of the population. (2021)

Dimension: Coverage and Services

- Mexico has 1 (one) hospital bed per 1,000 inhabitants compared to the OECD average of 4.4 per 1,000 inhabitants. (2021)
- Mexico has 2.4 doctors per 1,000 inhabitants compared to the OECD average of 3.7. (2021)
- Mexico has 2.9 nurses per 1,000 inhabitants compared to the OECD average of 8.3. (2020)

¹³ UNFPA. "Aging: An Opportunity to Ensure the Well-being and Rights of All People." UNFPA Mexico, 22 Dec. 2022, mexico.unfpa.org/es/news/aging-an-opportunity-to-ensure-the-well-being-and-rights-of-all-persons. Accessed 4 Sept. 2023

¹⁴ OECD, and The World Bank. Health Panorama: Latin America and the Caribbean 2020. Paris , OECD Publishing, 16 June 2020, www.oecd-ilibrary.org/docserver/740f9640-es.pdf?expires=1693856741&id=id&accname=guest&checksum=7EF6961BBFF7B1E7E6526AA0075DA46 . Accessed 4 Sept. 2023.

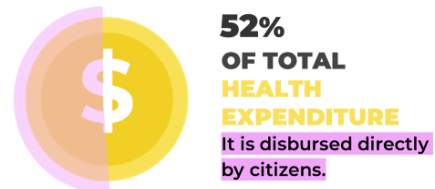
¹⁵ Instituto Nacional de Estadística y Geografía (INEGI). (2023). Encuesta Nacional de Ocupación y Empleo. Marzo 2023 [PDF]. Instituto Nacional de Estadística y Geografía. https://www.inegi.org.mx/contenidos/saladeprensa/aproposito/2023/EAP_8M2023.pdf

¹⁶ Fernández, Diego, et al. Diagnosis of the Provision of Drinking Water and Sewerage Services in Mexico. Economic Commission for Latin America and the Caribbean (ECLAC), 2023

- Mexico has 0.207 psychiatrists for every 1,000 inhabitants. (2017)¹⁷
- % of pregnant women with at least 4 prenatal visits during pregnancy: 88.5% Mexico. (2021)¹⁸

Dimension: Financial Protection

- Health spending in Mexico represents 5.5% of GDP. Where 2.9% is public and 2.6% is private. (2020)
- Health Spending Per Capita: Total health spending per capita in Mexico is US\$1,181, well below the OECD average of \$588,825 per capita. In addition, there is a significant proportion of the population that incurs cadastre expenses for health insurance, which increases poverty rates. (2022)
 - The percentage of individuals dealing with unmanageable healthcare costs went from 2.4% in 2018 to 4.4% in 2020.
- Out-of-pocket spending on health: 52.22% of national health spending is paid directly by the user.
 - In 2022, the main item of expenditure was food, beverages and tobacco with 37.7%. Health spending was 3.4%.¹⁹
 - The poorest population -Decile I- presents the highest out-of-pocket expenditure on health as a percentage of their quarterly income, with 4.2%. This is a sample of the lack of coverage of health services for the most vulnerable population. (2022)



Dimension: Quality of Care

- Vaccination coverage against diphtheria, tetanus and pertussis is 83.4% against the OECD average of 92.0%. (2022)
- Vaccination coverage against measles is 85.8%, against the OECD average of 91.7%. (2022)

¹⁷ World Health Organization . "GHO | by Category | Mental Health Workers - Data by Country." WHO, 2019, apps.who.int/gho/data/view.main.HWF11v. Accessed 5 Sept. 2023.

¹⁸ World Health Organization . "Antenatal Care Coverage - at Least Four Visits (%)." www.who.int/data/gho/data/indicators/indicator-details/GHO/antenatal-care-coverage-at-least-four-visits. Accessed 5 Sept. 2023.

¹⁹ Results of the National Survey of Household Income and Expenses (ENIGH) 2022.

- Regarding five-year survival for breast cancer, in Mexico 81% survive 5 years, compared to 85% in the OECD (2018).²⁰

Other important indicators

- **Chronic diseases**

In the case of Mexico, the main causes of death in 2019 were heart disease, diabetes and malignant tumours, conditions associated with overweight and obesity. In 2022 the prevalence of diagnosed and undiagnosed diabetes was 12.6% and 5.8%, respectively, for a total diabetes prevalence of 18.3%. The prevalence of diagnosed and total diabetes was higher at older ages and lower socioeconomic status. In Mexico the prevalence of prediabetes was 22.1%. A higher prevalence of prediabetes was observed at an older age and in the lower levels of education and socioeconomic level.²¹

- **Health expenditure How much is spent on health, now and in the future; and from what sources?**

In 2019, government spending on health per person was USD 287.53, while out-of-pocket spending was USD 243.48. It is expected that by the year 2050, the government spends USD 387.59 per person and that the own account expenditure will be USD 258.05. Health spending in Mexico represents 5.5% of GDP. Where 2.9% is public and 2.6% is private. (2020)

- **Lack of access to health**

The Mexican National Council for the Evaluation of Social Development Policy (CONEVAL) defines "lack of access to health" as the percentage of the population that does not have health insurance in public or private institutions. This indicator shows that the lack of access to health was decreasing (from 38.4% in 2008 to 16.2% in 2018). However, the 2020 figures show a 28.2% increase in the lack of access to health. In 2022, 38.3% were affiliated with the IMSS; 13.1% of the population had the right to the Institute of Health for Well-being (INSABI); 6.9% to ISSSTE and 0.4% to IMSS-Bienestar.²²

²⁰ Heredia-Caballero, Angel German, et al. "5-Year Survival After Breast Cancer Treatment: Institutional Experience." *Gynecology and Obstetrics of Mexico*, vol. 86, no. 9, 2018, p. 575–583.

²¹ Encuesta Nacional de Salud y Nutrición Ensanut 2023

²² National Council for the Evaluation of Social Development Policy. "Poverty Measurement 2018-2020." www.coneval.org.mx, 2020, www.coneval.org.mx/Medicion/MP/Paginas/Pobreza_2020.aspx. Accessed 5 Sept. 2023.

Insight

The creation of a free and universal health program is a positive step towards reducing fragmentation and improving health services. However, significant challenges persist, such as the deep inequity in health, which negatively affects crucial indicators such as life expectancy and infant mortality. Fragmentation in the Mexican health system is a major barrier to the efficiency and quality of medical care, which requires coordination strategies and optimization of resources. In addition, the demographic transition towards an ageing population poses additional challenges due to the burden of chronic diseases. Insufficient medical infrastructure and low health spending per capita are worrisome, and Therefore, it is imperative to design and implement digital strategies to improve accessibility to health services.

Access to Technologies and Internet



Highlight²³

- Connectivity in Mexico: In 2021, Mexico had 88.6 million Internet users, which represents 75.6% of the population aged six years or older, showing significant advance in the country's Internet connectivity.
- Digital Divide:
 - In urban areas, there are 72.8 million internet users, while in rural areas, there are 15.8 million internet users.
 - 48% of men are connected and 52% of women
 - The age group with the highest percentage of internet users is the 18 to 24-year-olds, with 93.4%.
 - The lowest internet usage is among individuals aged 55 and over, with 42.4%.
- Devices and Connectivity: Smartphones have an adoption rate of over 94% in all socioeconomic segments and have become the main means of connectivity.
- Actions to Improve Connectivity: government programs and actions, such as the 2022-2023 Social Coverage Program and México Conectado, which seek

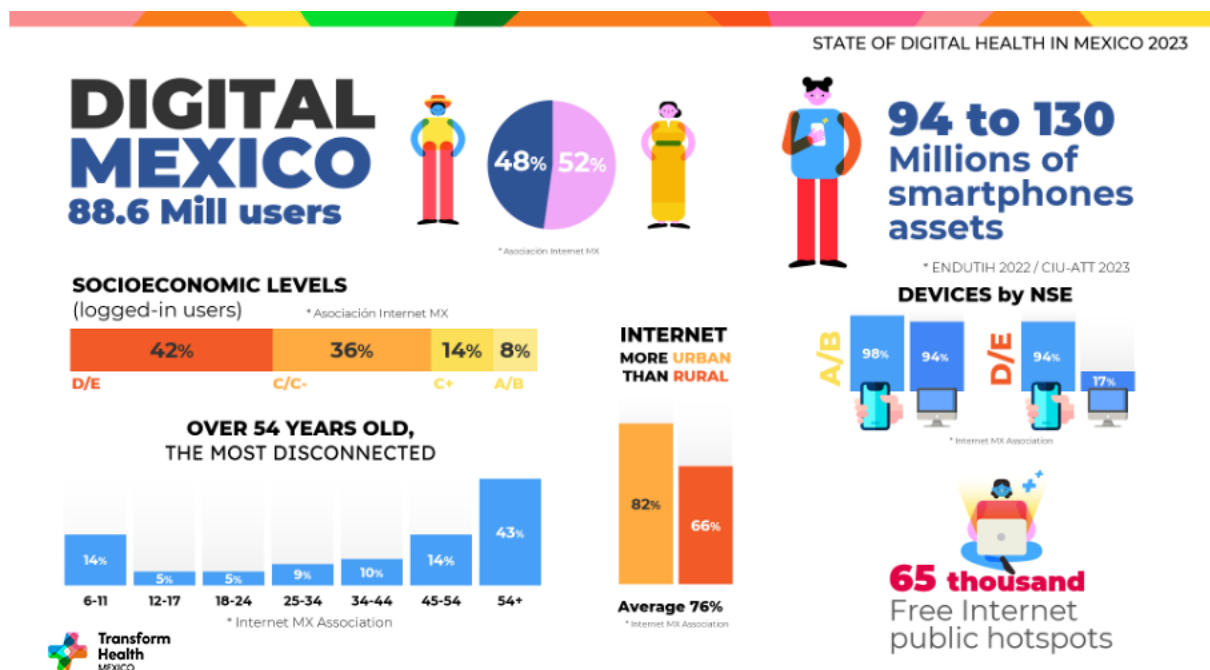
²³ On July 4, 2022, the file of the statement 350/22 National Survey on Availability and Use of Information Technologies in Households EDUTIH 2021 was replaced.

to improve connectivity and promote digital inclusion. The program will be explained in more detail in the text below.

In the digital era of the 21st century, access to technology and the Internet has become a fundamental component of daily life and the progress of nations. In Mexico, a country in constant evolution, digital connectivity has become a powerful tool that defines the way in which people communicate, access information and participate in the global economy. With significant growth in the number of Internet and mobile phone users in recent years, the country has experienced notable advances in terms of connectivity. However, this reality is tempered by the persistent digital divide, which reveals marked inequalities between urban and rural areas, as well as socioeconomic challenges that limit access for some segments of the population. The data presented below provide us with a context of the situation and give rise to a series of Insights and definitions of strategies and activities that must be carried out to achieve democratisation of the Internet and technology and with the help of these tools reduce the health gap.

Internet connectivity

In 2021, Mexico had 88.6 million Internet users, which represents 75.6% of the population aged six years or older.

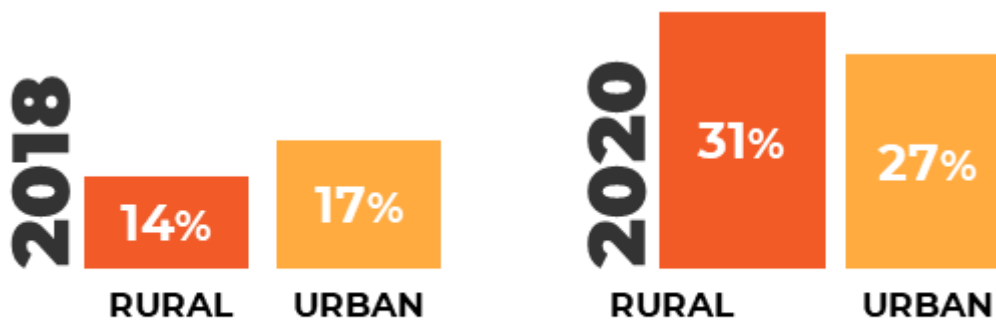


Connectivity in Mobile Telephony

The National Survey on Availability and Use of Information Technologies in Homes (ENDUTIH) recorded that 91.7 million people are mobile phone users, which is equivalent to 78.3% of the population studied.

Digital Divide in Rural and Urban Areas

ENDUTIH 2021 reveals that 72.8 million people in urban areas are Internet users, while in rural areas there are 15.8 million users. In urban areas, 18.4% of the population does not use the Internet, and in rural areas, this percentage rises to 43.5%. These figures show the need for public policies to close the digital divide.



*CONEVAL estimates based on ENIGH 2018 and 2020

Connectivity Quality

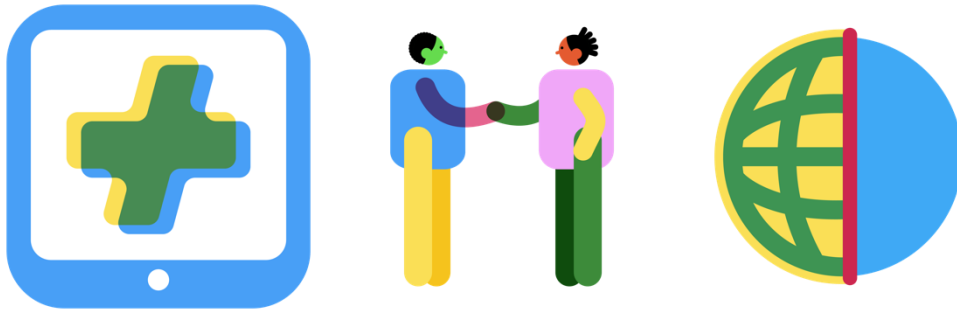
Despite the fact that almost 8 out of 10 Mexicans are Internet users, only 6 out of 10 households in the country have an Internet connection.

Connectivity by Socioeconomic Level

The socioeconomic level is the main factor that explains the lack of connectivity in the country. A decrease in the number of people connected within the C/C- [average \$1,903-872 USD] and D/E [average \$517-360 USD] socioeconomic segments has been observed, indicating that economic barriers to adoption still exist in these groups.²⁴

²⁴ Internet Association Mx. "18th Study on the Habits of Internet Users in Mexico 2022." IRP, May 2022

Democratisation of Internet Access Through Devices



In today's digital age, technology has transformed the way we connect and interact with the online world. Among the various technological tools available, smartphones, computers and Smart TVs play fundamental roles in our daily lives. These devices, with their varying adoption rates and barriers to access, shape our digital experience and reflect the diversity of connectivity in modern society. Understanding the type of tools most used to connect to the Internet allows us to think and design strategies according to the tools that have the greatest adoption and penetration in the country.

Smart Phones

These devices have democratised Internet access and have positioned themselves as the main means of connectivity, with an adoption rate of over 94% in all socioeconomic segments.²⁵

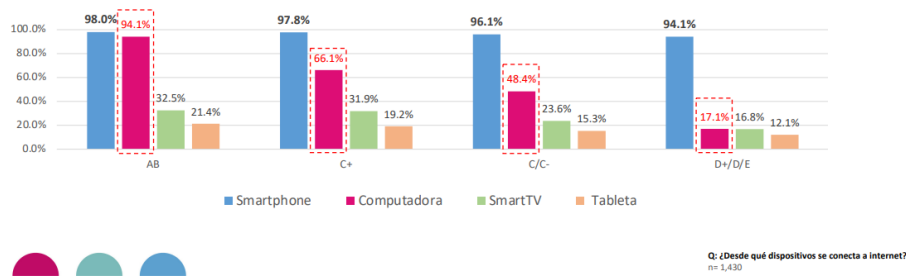
Computers

This device shows the greatest barriers to adoption, especially in segments of lower socioeconomic status. It is possible that this is due to computers being more expensive and less portable. Furthermore, access to home internet is less common in lower socioeconomic strata, because of lack of infrastructure and cost. Household users who subscribe to the service spend an average of 401.7 pesos per month, whereas the average cost for a mobile network plan is 176.0 pesos per month, on average.

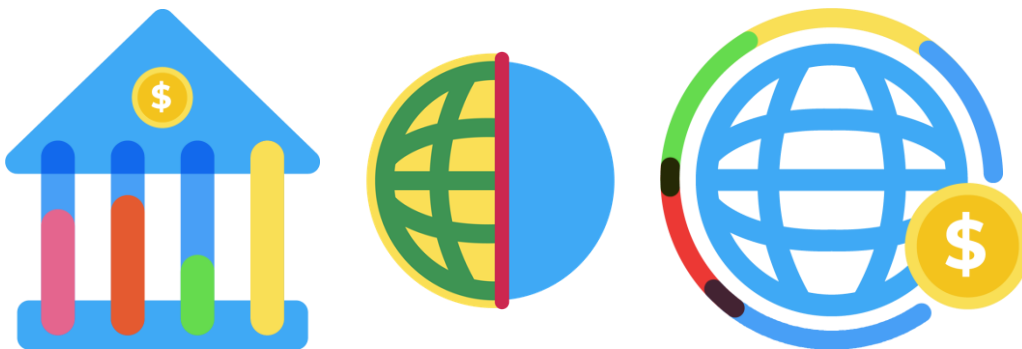
Smart TVs

They have gained relevance and have become the third most used device to access the Internet, after smartphones and computers.

²⁵ Internet Association Mx. "18th Study on the Habits of Internet Users in Mexico 2022." IRP, May 2022



Actions to improve Connectivity.



The 2022-2023 Social Coverage Program ([Acuerdo por el que se da a conocer el Programa de Cobertura Social 2022-2023 de la Secretaría de Infraestructura, Comunicaciones y Transportes.](#)) seeks to overcome the differences between those who are connected to the Internet and those who still lack this benefit. This program contributes to the Universal Digital Inclusion Policy [Acuerdo por el que se expide la Estrategia Digital Nacional 2021- 2024.](#), which aims to make telecommunications a service that is provided under conditions of competition, quality, plurality, universal coverage, interconnection, convergence, continuity, free access and without arbitrary interference.

The Ministry of Communications and Transportation developed the México Conectado program (embedded in the program of social coverage), which seeks to promote Internet access in health services. The goal is to bridge the gap between those who have access to the Internet and those who do not, especially in marginalised rural communities. The Program of Social Coverage (PCS 2022-2023) identified areas of the country lacking Internet coverage and established Priority Attention Zones (ZAP in Spanish) based on the next criteria; to ensure that the most in need get access to the benefits of being connected.

1. Those suffering from a high and very high degree of marginalisation or with a high or very high degree of social deprivation (of 250 or more inhabitants).
2. Areas with a high presence of indigenous and Afro-Mexican population (minimum 40% of the population and with 250 inhabitants or more).

3. Locations located far from areas with internet service (of 250 inhabitants or more and, at a minimum, 20 kilometres away from connected areas).
4. Considered priorities in accordance with the Decree for the Declaration of Priority Care Areas in compliance with the General Law of Social Development (with 250 inhabitants or more).
5. Municipal seats.
6. Areas that have submitted a citizen request for internet service access (with 100 inhabitants or more).²⁶

However, the ability to expand universal access has been constrained by several obstacles. Among these challenges are the substantial costs associated with deploying infrastructure in the country's intricate geographical terrain and the limited profitability of such investments. Consequently, it becomes evident that achieving universal access in these areas can only be realised through the implementation of a policy serving as a means to attain comprehensive coverage.

To comprehend the issue of affordability within our nation, an analysis conducted by the ITU indicates that households should not exceed spending more than 2% of their monthly income on telecommunications services. In Mexico, this scenario varies according to the findings of the 2020 National Household Income and Expenditure Survey (ENIGH), which reveals that Mexican households spend more than 2% of their income on telecommunications services.

It's noteworthy to emphasise a significant disparity in communication spending between the lowest and highest income deciles. On average, the lowest decile expends 142 pesos per month, while the highest decile allocates 1,352 pesos per month, resulting in a disparity of slightly over 1,200 pesos. The results suggest that in households with lower incomes, the percentage of their income allocated to communication services is higher than in households with higher incomes. For instance, while households in the first income decile spend 142 pesos monthly on communication services, representing 3.4% of their income, households in the tenth income decile spend 1,352 pesos per month on these services, but it only accounts for 2.5% of their income.

In this context, to fully harness the opportunities presented by digitalization, progress must be made in various areas. These include expanding telecommunications connectivity, enhancing accessibility, improving communication quality, fostering workforce skills, strengthening cybersecurity, embracing new technologies in the productive sector, and expanding the scope of digital government services. At the heart of digital development lies a shared

²⁶ Secretariat of Infrastructure, Communications and Transportation. "DOF - Official Gazette of the Federation." Dof.gob.mx, 2023, www.dof.gob.mx/nota_detalle.php?codigo=5677160&fecha=16/01/2023#gsc.tab=0. Accessed 5 Sept. 2023

foundation of connectivity infrastructure that ensures coverage, quality, and accessibility for every Mexican citizen.

Ensuring a telecommunications infrastructure that serves everyone equally, regardless of geographical location and socioeconomic status, is a complex task in which various stakeholders in the telecommunications sector must address the challenges of vast territorial expanse, a dispersed rural population, and limited purchasing power.

Insight

Internet access and technology are key factors in achieving UHC. This access is not simply a luxury, but an essential component for the daily life and progress of nations, which highlights the need to ensure that connectivity is available to all.

Despite the progress in connectivity, the disparity between urban and rural areas is notorious. This disparity is not only limited to geographic location, but also reflects socioeconomic challenges that limit access for certain population groups. This inequity in access to technology can exacerbate existing inequalities and make it difficult for some people to take full advantage of the opportunities offered by the digital age. Distance medical care and medical teleconsultation, promoted by the National System of Basic Health Information, represent opportunities to improve medical care and close the gap in access to health services.

Panorama of the digital health



Highlight

- Connectivity in the health sector: According to data from INEGI (2020), approximately 78.1% of hospitals in Mexico have Internet access, while only 43% of health service providers have online connectivity.
- Medical teleconsultations: A FUNSALUD study reveals that 45% of the doctors surveyed make virtual consultations in the digital ecosystem of the health sector in Mexico.²⁷
- Management of clinical records: The study shows that 47% of doctors use physical clinical records, while the rest use digital documents, such as Excel or electronic clinical records specialised in health. This reflects the diversity in medical information management in the industry.
- In 2019, almost 50% of adults in Mexico searched for health information on the Internet, which is above the Latin American average but still below the OECD average. This indicates a growing interest on the part of the population in accessing health resources online and suggests the importance of offering accurate and reliable information online.²⁸

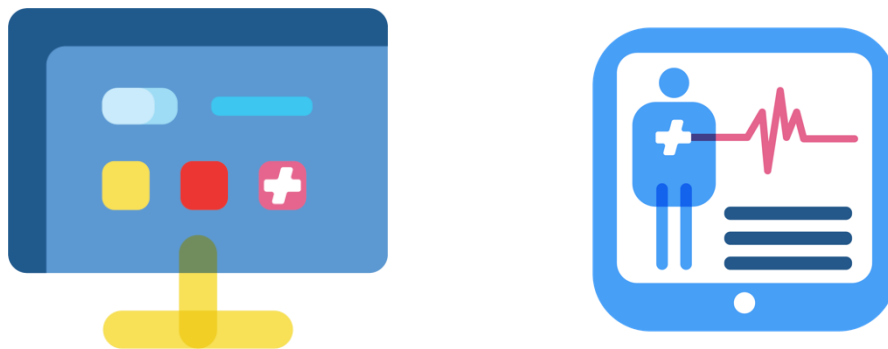
The digitization of healthcare, known as digital health, is playing an increasingly relevant role in improving the quality and accessibility of healthcare services in

²⁷ "Médico@ Digital Study in Mexico." FUNSALUD, FUNSALUD, 5 Oct. 2022, funsalud.org.mx/2022/10/04/estudio-medic-digital-en-mexico/. Accessed 5 Sept. 2023.

²⁸ OECD 2023: Health at a Glance: Latin America and the Caribbean 2023 - OECD 2023, figure 5.2 (Accessed June 2023) Available at: <https://www.oecd.org/health/health-at-a-glance-latin-america-and-the-caribbesn-2023-532b02d.en.htm>

Mexico. As hospitals, clinics, and healthcare professionals plunge into the digital world, it is essential to understand the current landscape of digital health in the country. Below are recent data provided by the National Institute of Geography and Statistics (INEGI) and the Mexican Health Foundation (FUNSALUD) that shed light on connectivity in hospitals, the adoption of telemedicine, the management of electronic clinical records and access to health information online. These data reveal both areas of opportunity and significant progress on the path to more effective and connected healthcare.

Hospitals and health centers connected and quality of the connection.



According to data from the 2019 Economic Census and the 2020 Population Census carried out by the National Institute of Geography and Statistics (INEGI), Internet connectivity in the health sector shows significant areas of opportunity. In detail:

- **Hospitals:** 78.1% of hospitals in Mexico have Internet access.
- **Health Service Providers:** Only 43% of health service providers have Internet connectivity.

The disparity in connectivity may be attributed to the fact that hospitals are generally located in larger cities or urban areas with greater access to technology. On the other hand, the fact that only 43% of healthcare providers have access to connectivity may be related to their diverse work settings, whether public or private, in hospitals, clinics, and other healthcare facilities.

Given this situation, high priority is being given to accelerating and improving connectivity in health centres, both public and private. The goal is to ensure that these establishments have the coverage and network access necessary to provide effective, high-quality medical care to patients.²⁹

²⁹ medical study@ Digital in Mexico." FUNSALUD, FUNSALUD, 5 Oct. 2022, funsalud.org.mx/2022/10/04/estudio-medic-digital-en-mexico/. Accessed 5 Sept. 2023.

Connected Health Professionals.



The Mexican Foundation for Health (FUNSALUD) carried out the first statistical study on the uses, habits and attitudes of more than 2,000 doctors in the digital ecosystem of the health sector. This study covers both public and private institutions and yields significant results in various areas:

Teleconsultation

- **General:** 45% of the doctors surveyed perform virtual consultations.
- **By specialty:** Psychiatrists lead in this regard, with 94% performing virtual consultations.
- **Frequency:** Most doctors who perform these consultations have between 1 and 5 virtual sessions per week.
- **By industry:** Only 19% of doctors in the public sector carry out teleconsultations, while in the private sector or with a hybrid practice (public and private), this number rises to 47%. This disparity is partly due to the socioeconomic diversity of patients who visit public hospitals. In these settings, it is more challenging for individuals to access teleconsultation platforms due to financial constraints and lower levels of digital literacy. On the other hand, in private hospitals, there is greater flexibility to explore alternative solutions as long as they comply with established regulations. However, in public hospitals, protocols are often less flexible, making it difficult to adopt technological advancements, even when they could benefit a large number of patients. The complexity and high patient volume in public healthcare systems sometimes hinder the swift implementation of technology, despite its potential advantages.

Management of Clinical Records

- 47% of doctors use physical clinical records.
- The rest use some type of digital document, such as Excel or electronic clinical records specialised in health.

This behaviour may be attributed to the fact that the use of electronic medical records is not mandatory, and there are no incentives to encourage doctors to transition from their traditional practices to digital documentation. Moreover, while some electronic medical record platforms are starting to be used, they do not fully meet the needs of healthcare professionals. Guidelines exist on how electronic medical records should be, but achieving uniformity and homogeneity among them and across the public sector is challenging. Many systems lack interoperability, especially at the level of public hospitals. These reasons may be preventing doctors from using electronic health records.

Use of Applications

- 26% of doctors use patient tracking apps several times a day.
- 27% never use these applications.
- 10% use a specialised application to give remote consultations.

Regarding applications, there are still a variety of apps available for teleconsultations, online prescribing, patient tracking, and more. However, many of these applications are not interconnected, requiring doctors and patients to use multiple apps for different medical procedures. In the public sector, the use of applications appears to be more complex, because doctors are required to use internal systems, and for populations with lower socioeconomic status, downloading apps can be more challenging due to economic and technological literacy issues.

Electronic Clinical Record in Primary Care

- According to data from the OECD in 2021, 30.25% of primary care medical offices in Mexico use electronic clinical records.

Internet Health Information Search by Adults

- In 2019, 49.88% of adults in Mexico searched for health information on the Internet. This percentage is higher than the Latin American average (41.63%) but lower than that of the OECD (58.56%).³⁰

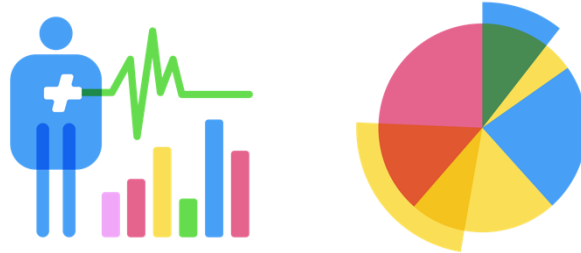
Digital health is experiencing significant growth in Mexico, with notable advances and areas of opportunity in various aspects. Connectivity in hospitals and health centres shows an improvement in terms of Internet access, although there is still room for expansion, especially among health service providers. The adoption of telemedicine is increasingly common, with a high percentage of doctors doing

³⁰ OECD 2023 document entitled: Health at a Glance: Latin America and the Caribbean 2023 - © OECD 2023, figure 5.2 (Consulted June 2023) Available at: <https://www.oecd.org/health/health-at-a-glance-latin-america-and-the-caribbean-2023-532b02d.en.htm>

virtual consultations, although the gap between the public and private sectors is evident, and some of the reasons, as mentioned before are:

1. **Socioeconomic Differences:** Patients who utilise public healthcare services often come from lower socioeconomic backgrounds and may have limited access to digital devices, internet connectivity, and the necessary technology for telemedicine consultations. In contrast, private healthcare patients generally have better access to these resources.
2. **Financial Constraints:** Public healthcare institutions often face budget constraints, which can limit their ability to invest in and adopt telemedicine technology. Private hospitals and clinics may have more financial resources to implement such technologies.
3. **Regulatory and Administrative Differences:** Public healthcare systems typically have more bureaucratic processes and stricter regulatory oversight, which can slow down the adoption of new technologies. Private healthcare providers may have more flexibility to implement telemedicine solutions, provided they adhere to regulatory guidelines.
4. **Patient Volume and Complexity:** Public healthcare facilities often serve a larger volume of patients with a wide range of medical conditions. Managing the implementation of telemedicine across a large and diverse patient population can be more challenging in the public sector compared to private healthcare, where patient loads may be more manageable.
5. **Flexibility and Innovation:** Private healthcare providers tend to be more agile and willing to experiment with innovative solutions. They can adapt quickly to changing healthcare technology trends and patient demands, which may not be as feasible in public healthcare systems due to their size and administrative structure.

Global Digital Health Index



The Global Digital Health Monitor (GDHM) is an interactive digital resource that helps countries prioritise and monitor their digital health interventions and enablers, using the WHO/ITU eHealth Strategy Toolkit as the underlying foundational framework. The tool consists of 23 indicators in areas such as leadership and governance; strategy and investment; legislation, policies and compliance; labour force; standards and interoperability; infrastructure; services and applications; and cross-cutting issues such as emerging technology and equity.

The objectives of the Global Digital Health Monitor are:

- Monitor and improve the quality of digital health at the country level.
- Track progress towards comprehensive and complete digital health systems.
- Identify areas of need for financing and technical assistance within and between countries.
- Foster better alignment between policy makers, donors and implementers in the field of digital health, in line with the Principles for Digital Development and Donor Alignment for Digital Health.
- Highlight potential risk areas for investment at the country level.

In 2022, the tool underwent a year-long platform and indicator review and redesign process to align the indicators with the WHO Global Digital Health Strategy, as a complement to the WHO Digital Health Atlas, and to include a greater focus on artificial intelligence, equity, gender and Universal Health Coverage. The updated

GDHM includes country-by-country performance visualisations and regional comparisons.³¹

The score of Mexico in the GDHI



General Score: 4

In the context of the Global Digital Health Index, which evaluates digital health globally, Mexico presents a score of 4/5 in the general phase of digital health.

This evaluation compares the performance of Mexico with the global average in various categories that include leadership and governance, strategy and investment, legislation and compliance, infrastructure, services and applications, among other crucial aspects for the development of digital health in the country. The main indicator in each category is used to calculate the general average of the country. Each country can be compared to the global average or to countries within a selected category.³²

³¹ Global Digital Health Monitor . “Global Digital Health Monitor.” monitor.digitalhealthmonitor.org, May 2023, Accessed 5 Sept. 2023.

³² Global Digital Health Monitor . “Global Digital Health Monitor.” [monitor.digital healthmonitor.org](https://monitor.digitalhealthmonitor.org/country_profile/MEX), May 2023, monitor.digitalhealthmonitor.org/country_profile/MEX. Accessed 5 Sept. 2023.

Category: Leadership and Governance



Score: 3

Mexico obtains a score of 3 in the Digital Health Leadership and Governance index of the Global Digital Health Index. This result indicates that, although efforts are underway, there are still significant areas of opportunity for improvement. Next we will discuss the indicators in detail:

1. Governance Mechanisms Mexico: N/A (Global Average: 4)

Mexico has not yet established a department, agency or national working group specific to digital health. This gap in the governance structure contrasts with a global average of 4 and points to the need to institutionalise digital health at the national level. In the context of digital health in Mexico, it is crucial to highlight that, while there is no specific department responsible for this area, the Mexican Institute for Access to Information (INAI) plays a pivotal role in this regard. INAI assumes the responsibility of facilitating access to various categories of information, including patient data, underscoring its relevance in this field.

However, it is essential to acknowledge the need to establish a specialised entity dedicated exclusively to digital health. Currently, in the 2024 Federal Budget, there is no specific allocation for this purpose, although it could be considered as part of the resources allocated to Information and Communication Technologies (ICTs). The management of digital health in Mexico is a collaborative effort among several Ministries, in conjunction with the Digital Strategy of the Office of the Presidency. Nevertheless, it is evident that efforts in this area are not yet adequately coordinated and harmonised.

Therefore, it is imperative to promote the creation of a specialised body in digital health that centralises and effectively coordinates initiatives related to this topic. This would ensure better access to digital health information and, ultimately, improve healthcare and the quality of life for Mexican citizens.

2. Planning and National Budget Mexico: N/A (Global Average: 4)

Digital health is not fully integrated or budgeted for in national health strategies and plans. This aspect is also below the global average of 4, indicating that digital health needs to be a priority in national planning and budgeting. Since they are not included in the Federal Budget (PEF), they are not earmarked, which means that some public hospitals procure certain services and equipment. National Center of Technological Excellence in Health (CENETEC) is an entity within the Ministry of Health that occasionally provides guidance and reviews various equipment options or participates in procurement committees. It is essential for digital health to have a budget allocation in the PEF to gain a clearer understanding of the procurement process.

Moreover, digital health interventions, especially in terms of applications or platforms, fall within the private sector. Given this situation, they pose a significant challenge as sources of financing must be identified, sometimes sponsored by the pharmaceutical industry or other entities interested in treating specific medical conditions.

a. Digital Transformation and Data Governance N/A

There is no information available on whether national digital transformation and data governance policies and approaches consider and address the potential benefits and risks for public and individual health.

However, to the best of our knowledge, the discussion regarding Digital Transformation, does consider the benefits and the risk of digital transformation and also the risk of not undergoing a digital transformation are also being included. Also, most of the efforts made in digital health are aimed at bringing healthcare platforms closer to patients and achieving more timely patient care, so the benefits are indeed taken into account.

3. Emerging Technologies Mexico: N/A (Global Average: 2)

Mexico does not have a specific national plan for the adoption and governance of emerging technologies such as artificial intelligence, wearable devices, blockchain, and IoT to support public health goals. The

average score for this aspect is 2, which suggests an area for significant improvement. Nevertheless, there is some discussion in the congress regarding these new technology regulations such as blockchain, IA.

4. Diversity, Equity and Human Rights Mexico: 3 (Global Average: 4)

Mexico has obtained a score of 3 in this aspect, slightly below the global average of 4. This indicates that although there are efforts to consider equity and human rights in digital health strategies, there is still room for improvement.

One of the key elements worth emphasising and fully utilising is the emphasis on providing equal access, eliminating discrimination, and caring for vulnerable populations. This approach has demonstrated its effectiveness in many low-income countries, including Mexico.

A significant portion of the efforts in the digital health field has been directed towards communities residing in remote regions of the country, which have historically lacked adequate healthcare services throughout their lives. These initiatives reflect a sincere commitment to fairness and justice, aiming to address disparities in healthcare access and uphold the fundamental rights of all citizens. However, due to changes being implemented in the public health sector, despite plans to reach the most disadvantaged, it has become increasingly difficult to deliver doctors and medicine to the areas where they are most needed

a. Gender Considerations N/A

There is no information available on whether the country includes gender considerations in its national digital health strategy or in its governance, which suggests a possible area for improvement in the inclusion of gender in digital health policies.

General Law for Gender Equality: This law aims to regulate and ensure equal opportunities and treatment between women and men in Mexico [Ley General para la Igualdad entre Mujeres y Hombres](#).³³

³³ Cámara de Diputados del H. Congreso de la Unión. (2015). Ley General de Infraestructura de la Calidad [PDF]. Cámara de Diputados. <https://www.diputados.gob.mx/LeyesBiblio/pdf/LGIMH.pdf>

Strategy and Investment in Digital Health in Mexico



Score: N/A

In the area of Strategy and Investment, Mexico has not yet been assigned a score in the Global Digital Health Index. This suggests that there may not be a budget allocated to the digital health sector.

1. National Digital Health Strategy: N/A (Global Average: 3)

Mexico still does not have a defined and budgeted digital health strategy or framework. This aspect is below the global average of 3, which indicates an urgent need to establish a national strategy in this area. As mentioned above, Mexico does not have a specific budget allocated for a digital health strategy. Digital health is the responsibility of several Ministries, however, the efforts are not adequately harmonised.

a. Alignment with Universal Health Coverage: N/A

There is no information available to indicate whether Mexico's national digital health strategy is aligned with the core components of Universal Health Coverage (UHC). This raises questions about how digital health could contribute to the broader goals of public health in the country.

2. Public Financing: N/A (Global Average: 3)

There is also no data available on whether public financing, including loans, is sufficient for digital health strategies, priorities, or budget plans in Mexico.

This aspect also has a global average of 3, which suggests that financing is a concern in many countries, including Mexico.

a. **Private Sector Participation and Investment: 2**

In terms of private sector participation and investment in digital health activities, Mexico scores a 2. This indicates that, although there is some level of private sector participation, it is likely not enough to meet the needs and priorities of the country in terms of digital health.

The private healthcare sector is regulated by numerous mechanisms, which can vary from individual practices to large hospital chains. However, in all cases, they are obligated to provide information to the user or patient. There are interoperable data sharing systems, especially with platforms for electronic record keeping, where images or studies can be uploaded.

At FUNSALUD, we are building this relationship. There are several international initiatives for interoperability, but it has not yet been widely adopted in Mexico, and there is still much work to be done. Other areas of opportunity include the development of databases that comply with international standards and data science.

Legislation, Policy and Compliance in Digital Health in Mexico

Score: 5

Mexico stands out with a score of 5 in the field of Legislation, Policy and Compliance according to the Global Digital Health Index, which indicates an advanced level in this regard.

1. **Legal Framework for Data Protection (Security / Cybersecurity): 5 (Global Average 4)**

Mexico has a data security law that covers the entire life cycle of data, from collection to destruction. This law is especially relevant for digital health and exceeds the global average with a score of 5 compared to an average of 4.

Electronic health data is protected by the Norma Oficial Mexicana (NOM Official Mexican Standard) and is owned by the patient. However, it is crucial to recognize that certain sensitive data could be exposed during some healthcare processes, highlighting the need to enhance strategies aimed at safeguarding patient information. In public institutions, the responsibility for providing this information falls under the National Institute for Transparency, Access to Information, and Personal Data Protection (INAI), as

the data belongs to the patient. In the private sector, circumstances may vary, but it is imperative that the patient always has access to their information, as this principle is fundamental in the doctor-patient relationship.

Overall, the performance of INAI is satisfactory, and the foundations for personal data protection, including health data, are in an acceptable state. However, the primary challenge in the healthcare field lies in data interoperability and the existence of over 60 formats of Electronic Health Records. It would be feasible to consider the application of cloud-based services and European Parliament standards in Mexico, although this would require additional infrastructure and software to ensure an optimal level of security. To achieve this, it is essential to have the political will and collaboration from various areas of the Federal Executive, not limited exclusively to the healthcare sector.

2. Laws or Regulations for Privacy, Consent, Confidentiality and Access to Health Information: 5 (Global Average 4)

The country also has a law that protects individual privacy, regulating ownership, consent, access, and sharing of individually identifiable digital health data. As in the previous case, Mexico exceeds the global average with a score of 5 compared to an average of 4.

[Ley Federal de Protección de Datos Personales en Posesión de los Particulares](#)

[Ley General de Protección de Datos Personales en Posesión de Sujetos Obligados](#)

The Law data protection in Mexico, indicates that Individuals are the owners of their information and have the right to access their data; however, sometimes there is a lack of awareness about these points. For a few years now, INAI has had an office in each public hospital to make the dissemination of this information more apparent and to provide patients with easier and direct access to their studies and documents.

Despite having a legal framework regarding the protection of personal data and its security, there is a need for more awareness among stakeholders in the healthcare sector and the general population. Many laws exist, but sometimes they remain unimplemented. We must promote transparency and accountability in these matters because they do not always manifest in practice.

3. Protocol to Regulate or Certify Health Devices and/or Services: 3 (Global Average 3)

Mexico has accepted protocols, policies, frameworks or processes that govern the clinical use and patient care of connected medical devices and health services, such as telemedicine and applications. These protocols include considerations for safety, data integrity, and quality of care. The score in this aspect is 3, which coincides with the global average.

a. Protocol to Regulate and Certify Artificial Intelligence in Health Services: N/A

There is no information available on whether there are specific protocols regulating the use of Artificial Intelligence (AI) within health systems and services, especially in relation to ethics, equity, security, data integrity and quality of attention. There is some discussion being held up right now about IA. In the section of digital health we will talk in more detail.

4. Security and Cross-Border Data Sharing: N/A (Global Average 3)

There is also no information available on whether there are protocols to support the secure sharing and storage of health data across borders, while protecting individual privacy. The global average for this aspect is 3, which suggests that it is an area of interest and concern in many countries.

Training and Workforce in Digital Health in Mexico

Score: N/A

In the field of training and the workforce in digital health in Mexico, the available data present a panorama that requires further development and evaluation. Mexico does not have a specific rating registered in the "Labor Force" category according to the Global Digital Health Index. This implies a lack of detailed information on the current situation of digital health professionals in the country and speaks to the lack of training on digital issues for health professionals and all those involved.

A suitable regulatory framework and training programs for healthcare professionals and digital health system users are needed.

Some universities are starting to implement and develop educational programs with the integrations of digital technologies and their application in health. Although some universities have their own program, there is not a framework for the development of the digital training for health professionals in all their

educational cycle. Which is very relevant not only to expand the potential of digital health but also the opportunities of work for the health professionals.

1. Pre-Service Training (during training) Health: N/A (Global Average 2)

Regarding the integration of digital health in pre-health service training, the score is classified as "N/A", which suggests that no information has been provided on whether digital health is included in the plan of studies for health professionals and support related to health in training in Mexico. The average score for this category is 2, indicating a lack of specific data in this area.

2. Training in Health Service: N/A (Global Average 2)

Similarly, regarding the integration of digital health in health service training, the score is also recorded as "N/A". This means that there is no information on whether digital health is part of the curriculum for health-related health and support professionals in the general workforce, which would include community health workers, nurses, doctors, health professionals, allied health professionals, health administrators and technologists. The average score in this category is 2.

3. Workforce Training in Digital Health: N/A (Global Average 3)

In terms of eHealth workforce training, we again see an "N/A" score. This indicates a lack of data on whether degree programs in digital health, health informatics, health information systems, or biomedical informatics, in both public and private institutions, are producing workers trained in digital health. The average score in this area is 3, signalling the need for more information on the state of digital health training in the country.

4. Maturity of Professional Careers in Digital Health in the Public Sector: N/A (Global Average 2)

Regarding the maturity of digital health careers in the public sector, the score is classified as "N/A", suggesting that there are no specific digital health professional titles or career paths in the public sector in Mexico. The average score for this category is 2.

Standards and Interoperability

Score: N/A

Mexico does not have a specific qualification registered in the category of "Standards and Interoperability" according to the Global Digital Health Index. This

indicates a lack of detailed information on the status of digital health standards and interoperability in the country.

Mexico is working towards establishing national standards and catalogues that ensure the interoperability of existing applications at the various public health institutions. The lack of clear regulations is one of the key barriers holding back widespread clinical adoption of digital health solutions in Mexico. To enable interoperability, it is essential to guarantee that patient information is digitised in standard and secure formats. Health Level Seven (HL7) is an international standard for the transfer of clinical data that can be used to ensure interoperability. The need for a true interoperable digital health ecosystem that includes e-prescriptions, telemedicine, drug codes, and EHR is what brought HL7 to Mexico. Regulations, governance, data-usage agreements, and trust of each participant in interconnectivity processes are needed to ensure interoperability

1. National Digital Health Architecture and/or Health Information Exchange: N/A (Global Average 3)

In regards to the existence of a national digital health architecture and/or health information exchange, the score is classified as "N/A". This suggests that no information has been provided on whether Mexico has established a national digital health (eHealth) architectural framework and/or a health information exchange (HIE) system. The average score for this category is 3, indicating that, on average, countries tend to have some type of architectural framework or information-sharing system for digital health.

2. Health Information Standards: N/A (Global Average 3)

Regarding health information standards, a score of "N/A" is again observed. This means that there is no data available on whether there are digital health standards for data exchange, transmission, messaging, security, privacy, and hardware in Mexico. The average score in this category is 3, which suggests that, in general, countries tend to have health information standards in digital health.

The lack of specific information on these aspects indicates the need for further evaluation and development in the field of standards and interoperability in digital health in Mexico. It is important to advance in the definition and adoption of standards and architectures that facilitate interoperability and the secure exchange of information in the country's digital health system.

Infrastructure in Digital Health in Mexico



Score: 4

In the field of digital health infrastructure in Mexico, the available data indicates a relatively solid level.

Mexico scores 4 in the "Infrastructure" category according to the Global Digital Health Index. This suggests that the country has an adequate digital health infrastructure base to support the implementation and expansion of digital solutions in the health sector.

1. Network Preparation: 3 (Global Average 4)

For network readiness, a score of 3 is drawn from the Technology Pillar of the Portland Institute's Network Readiness Index. This score is in line with an average of 4 in this category. It indicates that, in terms of network preparation, Mexico presents an average level compared to other countries, which suggests that there are areas for potential improvement in this regard.

The Network Readiness Index is a composite index constructed with three levels that seeks to assess the level of technology that is a sine qua non for a country's participation in the global economy. The Technology Pillar of the Network Readiness Index assesses the level of technology that is available in a country and is essential for its participation in the global economy. some strengths of Mexico's current network readiness:

Mobile tariffs: Mexico benefits from relatively low mobile tariff costs, which can contribute to greater accessibility to mobile services.

Internet access in schools: Mexico has made significant strides in providing internet access in educational institutions, thereby enhancing digital literacy and skills, especially among young people. Additionally, the Sectoral Program for Education 2020-2024 [Programa Sectorial de Educación 2020-2024](#) includes various plans related to digital education, such as:

- Establishing a digital educational ecosystem through the management of a content platform in multiple formats (internet, social networks, EDUSAT network, radio, and television).
- Supporting access and meaningful, sustainable use of ICTs in everyday life with a critical perspective on the available content and materials in electronic media, virtual platforms, and social networks.
- Promoting intersectoral actions involving public and private organisations and institutions to reduce the digital divide in educational centers across the country.

Active Mobile Broadband Subscriptions Count: Mexico boasts a high number of active mobile broadband subscriptions, indicating robust mobile connectivity.

AI talent concentration: Mexico enjoys a significant concentration of AI talent, which can drive innovation and technological development in the country's tech sector.

However there still some areas of opportunity such as:

Broadband and mobile coverage: Another area that requires improvement is expanding broadband and mobile coverage to Mexico's most geographically inaccessible and impoverished regions.

Professionalizing technology transfer offices: To create a proper business community that promotes innovation, Mexico needs to professionalise technology transfer offices, improving their negotiation

Internet access: To increase internet access across Mexico, both national and state-level governments could provide private companies with specific incentives for investing in broadband networks in marginalised communities, such as Chiapas and Oaxaca

2. Planning and Support for the Ongoing Maintenance of the Digital Health Infrastructure: 4 (Global Average 4)

When it comes to planning and supporting the ongoing maintenance of the digital health infrastructure, Mexico receives a score of 4. This indicates that the country has an articulated plan to support the expansion of the digital

health infrastructure, which includes the provision and maintenance of equipment such as computers, tablets, phones, supplies, software, devices, among others, in all public health care facilities. The average score for this category is 4, indicating that the country is in line with the global average in terms of planning and support for digital health infrastructure.

Mexico shows an adequate level of digital health infrastructure, with a clear focus on planning and continued support to maintain and expand this infrastructure. However, there are still opportunities to improve network readiness compared to global averages in this regard.

Services and Applications in Digital Health in Mexico

Score: N/A

Regarding digital health services and applications in Mexico, the available data indicates a lack of detailed information on the situation in the country. Mexico's score in the "Services and Applications" category according to the Global Digital Health Index is recorded as "N/A". This suggests that specific information on the quality and availability of digital health services and applications in Mexico has not been provided.

Mexico currently lacks comprehensive and dedicated regulations for digital health, which poses a significant barrier to the widespread adoption of digital health solutions in the country. The existing health regulatory framework in Mexico covers a wide range of product and service categories, potentially encompassing digital health applications. From a regulatory perspective, the absence of clear rules and a backlog of regulations are impeding the extensive implementation of digital health solutions in Mexico. Several policies aimed at developing a digital healthcare system in Mexico have succeeded in reducing bureaucracy-related costs. In summary, while Mexico's digital health market shows growth potential, the nation faces challenges in achieving universal access to digital health services and applications due to inequalities, resource limitations, and a lack of digital infrastructure. The absence of well-defined regulations is also a substantial hurdle to the widespread adoption of digital health solutions. Moreover, access to digital health services is a complex task due to disparities in internet access and service quality between urban and rural areas.

1. National Digital Health Systems: N/A (Global Average 3)

When it comes to digital health systems at the national level, a score of "N/A" is obtained. This indicates that there is no information on whether public sector priorities are supported by digital health systems at the national level in Mexico. The average score for this category is 3, which suggests that, on average, countries tend to have digital health systems at the national level.

2. Digital Identity Management of Service Providers, Administrators and Facilities for Digital Health, including Location Data for GIS Mapping: N/A (Global Average 3)

In relation to digital identity management of digital health service providers, administrators and facilities, as well as geolocation data for GIS mapping, the score is "N/A". This indicates that there is no information available on the availability, accessibility and currency of records of health providers, administrators and facilities, and if the data is geolocated to facilitate GIS mapping. The average score in this area is 3.

3. Digital Identity Management of Individuals for Health: N/A (Global Average 3)

Regarding the management of the digital identity of individuals for health, the score is also classified as "N/A". This means that there is no information on the availability, accessibility, and timeliness of unique identification records of individuals for health purposes in Mexico. The average score in this category is 3. In Mexico there is not a unique individual ID for health, due to the fragmented systems and the lack of intraoperative systems to share information and to make it available for the patient.

a. Digital identity management in health: N/A (Global Average 3)

The evaluation of whether there are secure records or a master index of patients with unique identification of individuals, fully representative of the population, accessible and updated for use in health matters in Mexico, is classified as "N/A". This suggests that there is no specific information available on the availability and quality of unique patient identification registries in the country, and whether these registries meet the aforementioned criteria. The average score for this category is 3.

Master Unique ID Patient Index

Additionally, the specific question on whether there is a secure, accessible, and up-to-date master patient index for uniquely identifiable individuals for use in healthcare is also rated "N/A." This indicates that there is no information on the existence of a master index of patients with unique identification in Mexico that meets the aforementioned criteria.

Registry of Births and deaths of Unique Identification

Likewise, specific questions about whether there is a secure record of births for uniquely identifiable individuals, as well as a secure record of deaths for uniquely identifiable individuals, both available, accessible and up-to-date for use in health matters, are also classified as "N/A". This suggests the lack of information on the existence of such records in Mexico.

4. Safe Patient Feedback Systems: N/A (Global Average 2)

For the existence of safe patient feedback systems, the score is "N/A". This suggests that there is no information on whether Mexico has secure patient feedback systems that are available and accessible. The average score for this category is 2, indicating that patient feedback is an area for improvement in many countries.

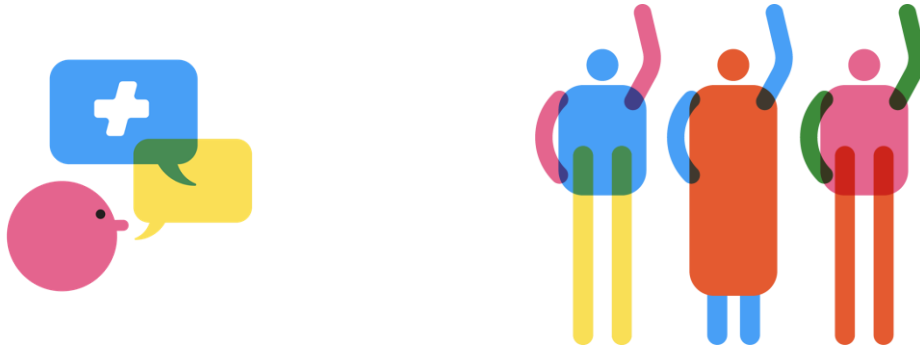
5. Contribution of Digital Health to Population Health Management: N/A (Global Average 3)

Regarding the contribution of the country's digital health initiatives to population health management, the score is "N/A". This indicates that there is no information on whether digital health initiatives in Mexico currently contribute to public health reporting and decision making. The average score in this category is 3.

In summary, the lack of specific information on these aspects reflects the need for further evaluation and development in the field of digital health services and applications in Mexico. It is essential to obtain more data to better understand the availability and quality of digital health services, as well as their contribution to population health management.³⁴

³⁴ Global Digital Health Monitor . "Global Digital Health Monitor." [monitor.digital healthmonitor.org](https://monitor.digitalhealthmonitor.org), May 2023, monitor.digitalhealthmonitor.org/country_profile/MEX. Accessed 5 Sept. 2023.

Legislation on digital health in Mexico



Highlight

1. In Mexico right now a healthcare reform bill is being discussed, it proposes adding various provisions to the General Health Law regarding digital health. The objectives being sought include: (i) establishing a legal framework that allows the ethical, safe, reliable, equitable, and sustainable use of digital technologies in healthcare; (ii) ensuring that information and communication technologies in healthcare operate transparently, are accessible to all, easily scalable to the general population, and that healthcare technology systems in all regions of the country can interoperate through platforms that use compatible and interoperable computer systems; (iii) adequately protecting sensitive personal data that circulates through these technologies.
2. There are numerous initiatives that can be divided into two groups: general ones that encompass various elements of the digital health ecosystem, more comprehensive in nature. The second group consists of specific initiatives such as electronic prescriptions and telemedicine, among others. The approval of specific initiatives in the short term will gradually pave the way for the approval of other elements of the digital health ecosystem. This requires political will and presenting legislators with all the necessary elements to promote them (advantages, cost-effectiveness studies, cost-benefit analysis, and cost-utility analysis, as well as assessing the risks of not incorporating digital health, access, vulnerable groups, equity, and non-discrimination).

Legislative Cycle:

- a. Presentation of the initiative to the House of Commons
 1. Discussion and analysis in committees

- b. Voting in the plenary session of the House of Commons
 1. If approved, it proceeds to the House of Lords
 - c. Repeating the process of discussion and analysis
 1. If approved by both houses, sent to the Federal Executive
 - d. Promulgation and publication in the Official Gazette of the Federation
 - e. Initiative becomes law.
3. In the Mexican Congress there is some debate over specific initiatives, such as electronic prescriptions and telemedicine. The approval of these initiatives could open new opportunities to improve the health system in our country.
 4. The General Health Law ([Ley General de Salud, 1984](#)) in Mexico has undergone significant reforms to promote the integration of Information and Communication Technologies (ICT) in the health sector, with the aim of expanding coverage and improving the quality of medical services.
 5. Proposals to regulate the use of artificial intelligence in the health sector in Mexico, are being discussed with the aim of establishing an ethical and safe regulatory framework that guarantees the protection of personal data of patients and promotes an adequate use of technology in medical attention.

The rapid advance of digital technology has permeated all aspects of modern society, and the field of health is no exception. Within the framework of the changes driven by the technological revolution, the World Health Organization (WHO) has recognized the importance of digital health as a crucial component to improve medical care, protection in emergency situations and the general well-being of the population. In 2019, the United Nations General Assembly adopted the global digital health strategy 2020-2025, in line with technological advances and the transformative potential of healthcare.

In this context, Mexico has taken significant steps to align its health regulatory framework with technological advances. The General Health Law has undergone reforms that promote the integration of Information and Communication Technologies (ICT) in the health sector, with the aim of expanding coverage and improving the quality of medical services. These reforms, which include the promotion of scientific and technological activities in health, as well as the incorporation and use of ICTs in health services, reflect the country's commitment to embrace digital health as a means to achieve more efficient medical care. and equitable.

In addition, specific provisions have been established that allow health service providers to use electronic means and biometric records for the identification of

users and the management of health information. These measures seek to guarantee the interoperability, proper processing and security of electronic clinical records.

In this context, we present in more detail the regulatory framework related to digital health in Mexico and how the legal provisions seek to support technological advances in the health sector for the benefit of the Mexican population.

1. **Article 6 of the General Health Law**, in its fraction IX. Promote the development of health services based on the integration of Information and Communication Technologies to expand coverage and improve the quality of health care; Fraction added DOF 01-15-2013. Reformed DOF 10-14-2015.
2. **Article 7 of the General Health Law**, the coordination of the National Health System will be in charge of the Ministry of Health, corresponding to it. VIII. Promote scientific and technological activities in the field of health; VIII bis. Promote the incorporation, use and exploitation of Information and Communication Technologies in Health services; Fraction added DOF 01-15-2013.
3. **Article 32 of the General Health Law**, establishes that health service providers may rely on electronic media in accordance with the official Mexican standards issued by the Ministry of Health for that purpose.
4. **Article 53 Bis. of the General Health Law**, health service providers, for the purpose of identifying users of health services, including beneficiaries of social security agencies, may implement biometric records and other means of electronic identification.
5. **Article 109 Bis. of the General Health Law** It corresponds to the Ministry of Health to issue the regulations to which the electronic registration information systems used by the institutions of the National Health System must be subject, in order to guarantee the interoperability, processing, interpretation and security of the information contained in the electronic clinical records.
6. **Proposed Chapter III bis. Article 49 Bis.** It is understood by digital health the set of activities related to health services, for the prevention, diagnosis, treatment and rehabilitation of patients, by health professionals, which are carried out in person or remotely, with the support of information and communication technologies. Information and communication technologies are understood as the set of resources, tools, equipment, computer programs, applications, networks and media, including the Internet, as defined in the Federal Telecommunications and Broadcasting Law or any means of communication , which allow the compilation,

processing, storage, transmission of information such as voice, data, text, video and images. Digital health service providers are any of the providers described in articles 34 and 79 of the General Health Law, which provide said health services with the support of information and communication technologies. The establishments where said digital health services are provided must have the authorizations described in articles 47, 200 bis and 257 of this law. Information and communication technologies may be used in activities related to the matters described in article 3 of this Law, as applicable.³⁵

For these initiatives to happen and become actions, Changes in general and secondary regulations are crucial in the legislative strategy of initiatives related to health. This strategy involves making modifications and adjustments first in the main regulations, namely the General Health Law, and then in secondary regulations, which include official standards and guidelines issued by various agencies related to the main regulations.

An illustrative example of this dynamic can be found in Article 6 of the law, which addresses health digital aspects in a general manner. Health digital is not treated as an independent entity in this context, as it is intrinsically linked to various chapters, such as hospital infrastructure. In this regard, the provision of computers to hospitals is considered part of strengthening their structure.

Currently, we are in a process where health digital is gaining relevance and becoming a priority. However, it is important to note that if an issue is not specified in the law, it will not be reflected in the health budget. Therefore, modifications are first made to the law through legislative initiatives. Once these initiatives are approved, they will be more reflected in the budget. This process includes the development of secondary regulations that regulate aspects such as infrastructure, communication technologies, and information in the field of health.

At this time, there is no specific allocation for digital health, as we are in the process of incorporating it more solidly into the Constitution and the General Health Law.

For example, there isn't specific information available regarding the budget of IMSS in Mexico for the development of technologies, ICTs, and health applications. Nonetheless, there are some relevant insights related to the budget and research capabilities of IMSS and the healthcare sector in Mexico:

- IMSS has allocated a budget of US\$ 37.4 million for research and technological development.³⁶

³⁵ Integrantes de la Comisión de Salud. Proyecto Dictamen de la Comisión de Salud por el que se reforman y adicionan diversas disposiciones de la Ley General de Salud en materia de salud digital. 2023.

³⁶ OECD (2012), Public Procurement Review of the Mexican Institute of Social Security. Enhancing Efficiency and Integrity for Better Health Care. Highlights, OECD Publishing.

- Mexico's 2022 budget plan includes a 14.6% rise in resources for the health sector, primarily for Covid-19 relief, with a focus on primary and secondary care for high-specialty diseases such as diabetes, cancer, and heart disease.³⁷
- A study on health research funding in Mexico revealed that the research budget has supported numerous small and diverse projects, indicating an unclear definition of priorities.³⁸

While the search results provide some information on the budget and research capacity of IMSS and the healthcare sector in Mexico in general, there is no specific information on the budget of IMSS in Mexico for the development of technologies, TICs, and applications in health.

Digital Health Initiatives



This timeline shows the evolution of digital health initiatives in Mexico from their initial presentation to the analysis process and possible commission approval. Regulation in this field is essential to promote the appropriate use of technology in the health sector.

1. November 4, 2020: Senator Miguel Ángel Mancera Espinoza presented an initiative to add a Chapter II Bis to the Third Title of the General Health Law, regarding medical teleconsultations.
2. March 18, 2021: Senator Alejandra Noemí Reynoso Sánchez presents an initiative on health services through information and communication technologies.
3. November 25, 2021: Legislators of the LXV Legislature present the Initiative with a Draft Decree that reforms and adds various provisions of the General Health Law on Digital Health.

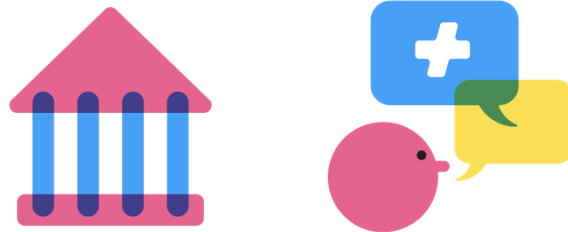
³⁷ Country Commercial Guides: Mexico - Healthcare Products & Services. (2023, 25 de septiembre). U.S. Department of Commerce, International Trade Administration. <https://www.trade.gov/country-commercial-guides/mexico-healthcare-products-services>

³⁸ Martínez-Martínez, E., Zaragoza, M. L., Solano, E., Figueroa, B., Zúñiga, P., & Laclette, J. P. (2012). Health research funding in Mexico: the need for a long-term agenda. *PloS one*, 7(12), e51195. <https://doi.org/10.1371/journal.pone.0051195>

4. December 2, 2021: The initiative is referred to the Health Commission of the Chamber of Deputies for its analysis and opinion.
 - a. October 2022: Opinion for approval in commission.
5. IA In Mexico, several proposals are being discussed to regulate the use of artificial intelligence in the health sector. Some of the specific proposals are:
 - a. The creation of the Mexican Council of Ethics for Artificial Intelligence and Robotics (CMETIAR), which would be in charge of establishing ethical and security guidelines for the use of artificial intelligence in Mexico.
 - b. The issuance of the Law for the Ethical Regulation of Artificial Intelligence, which would establish a flexible regulatory framework to guarantee the ethics, security and protection of the personal data of patients.
 - c. The initiative for the Law for the Ethical Regulation of Artificial Intelligence for the United Mexican States, which seeks to establish public policy guidelines for the ethical regulation of the use of artificial intelligence and robotics in Mexico.
 - d. The reform of the General Health Law to regulate the safe and ethical use of artificial intelligence in the National Health System.
 - e. In general, these proposals seek to establish an ethical and safe regulatory framework for the use of artificial intelligence in the health sector in Mexico, and guarantee the protection of patients' personal data.³⁹

³⁹ Integrantes de la Comisión de Salud. Proyecto Dictamen de la Comisión de Salud por el que se reforman y adicionan diversas disposiciones de la Ley General de Salud en materia de salud digital. 2023.

Constitutional Reform on Telecommunications



June 11, 2013 marked a significant milestone in the evolution of technology policies in Mexico, when a constitutional reform on telecommunications was published in the Official Gazette of the Federation. This reform introduced key provisions that laid the foundations for the implementation of a universal digital inclusion policy in the country. One of the most outstanding aspects of this reform was the responsibility that the federal government assumed in the promotion and development of information and communication technologies (ICT), especially in crucial areas such as telehealth, telemedicine and the Electronic Medical Record.

Within the framework of this reform, the National Digital Strategy [Acuerdo por el que se expide la Estrategia Digital Nacional 2021- 2024](#). (EDN) was brought to life, which became a fundamental pillar to guide the government's efforts in the digital transformation of the nation. The EDN established five sub-goals ranging from modernising government to promoting the digital economy, improving education and healthcare, and fostering citizen engagement and civic innovation.

1. On June 11, 2013, the constitutional reform on telecommunications was published in the Federal Official Gazette, which incorporated explicit provisions in its fourteenth transitory article for the federal government to assume responsibility for implementing a universal digital inclusion policy, with objectives and goals in terms of promoting public and private investment in telehealth, telemedicine and Electronic Medical Record applications, and development of applications, systems and digital content, among other aspects.

As a result of said reform, the National Digital Strategy ("EDN") was created, with five secondary objectives: (i) Government Transformation; (ii) Digital economy; (iii) educational transformation; (iv) universal and effective health; (v) civic innovation and civic participation.

2. In 2013, with the constitutional reform on telecommunications, provisions were established for the federal government to implement a universal

digital inclusion policy, promoting investment in telehealth, telemedicine and Electronic Medical Record applications.

In the 2013 constitutional reform on telecommunications, the following was established in its fourteenth transitory article:

"The federal Executive will be in charge of the universal digital inclusion policy, which will include the objectives and goals in terms of infrastructure, accessibility and connectivity, information and communication technologies, and digital skills, as well as government programs digital, government and open data, promotion of public and private investment in telehealth, telemedicine and electronic clinical record applications and development of applications, systems and digital content, among other aspects".⁴⁰

Strategies and programs for the integration of health information systems



1. The Ministry of Communications and Transportation developed the México Conectado program, which seeks to promote Internet access in services; however, operational problems have been identified in the field, mainly in rural areas.
2. National System of Basic Information on Health.
3. The Carlos Slim Foundation developed and implemented the use of the electronic vaccination record.
4. NOM-024-SSA3-2012, Electronic health record information systems, was issued. Health information exchange.
5. NOM-035-SSA3-2012, Regarding health information, was issued.

⁴⁰ Official Gazette of the Federation of June 11, 2013.

6. NOM-017-SSA2-2012, For epidemiological surveillance, was issued.
7. Electronic medical record: NOM-024-SSA3-2012, Electronic Record Information Systems for health. Health information exchanges.⁴¹
8. At the end of 2020, the Pharmacopoeia supplement was published detailing an operational change and specifying that electronic medical prescriptions must comply with the data retention standards of NOM-151-SCFI-2016.

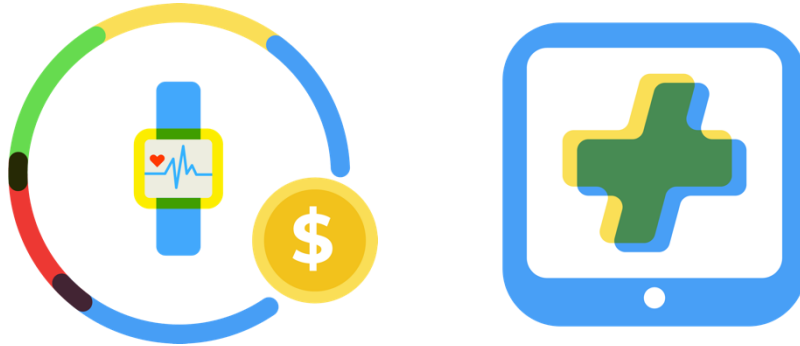
Mexico digital health programs

1. In 1978 medical support through radio links (COPLAMAR).
2. In 1986 the Medical Tele-teaching System at the Children's Hospital of Mexico.
3. In 1991 the Radiocommunication Network of the Expansion Program (SSA).
4. In 1995 the Telemedicine Pilot Program (ISSSTE).
5. In 2001 the National Telehealth Program (ISSSTE).
6. In 2002 the Family Medicine Information System (IMSS), Launch of e-Mexico Portal e-Salud, National e-Health Telemedicine Action Program.
7. In 2003 the Strategy for multilingualism in the health system.
8. In 2004 the National System of Electronic Health Records.
9. In 2005 the National Telemedicine Network.
10. In 2006 the Electronic Prescription (Popular Insurance).
11. In 2013 the use of social networks to promote health and the National Digital Strategy.
12. In 2015 the Telemedicine Service in 21 entities, use of e-learning for health students.
13. In 2018 the use of digital tools in health: AsISSSTE INFARTO, IMSS DIGITAL, App Seguro Popular and RadarCiSalud.
14. In 2019 the use of Big Data, IoT, Machine Learning, electronic analytical and

⁴¹ Secretaría de salud (2012, noviembre 30). Sistemas de información de registro electrónico para la salud. Intercambio de información en salud. (NOM-024-SSA3-2012)

information systems in the health system.⁴²

Advances in digitalization in health



Electronic Medical Prescription

The reform proposal related to the electronic medical prescription in Mexico was presented in December 2022 by members of various political parties, it was approved in the Health Commission of the Chamber of Deputies in February 2023. The key points of the reform include:

1. The possibility of issuing medical prescriptions electronically, which modernises the medication prescription process.
2. It establishes that medicines and supplies prescribed in electronic medical prescriptions will have the same validity as traditional physical prescriptions, providing greater flexibility in medical care.
3. Patients have the option to request the prescription in physical format if they wish, which guarantees the choice of the patient in terms of how to receive their prescription.
4. The Ministry of Health will be responsible for developing the necessary technological means to promote access and rational use of medicines and health supplies, which can improve the management and availability of these resources.
5. Pharmacies and health sector establishments will be required to keep an electronic record of the dispensing of medicines and products prescribed in

⁴² Knaul, Felicia Marie , et al. "Setbacks in the Quest for Universal Health Coverage in Mexico: Polarised Politics, Policy Upheaval, and Pandemic Disruption." *The Lancet*, vol. 402, no. 10403, 2023

electronic medical prescriptions, which could improve monitoring and safety in the distribution of medicines.

6. The Ministry of Health will issue general guidelines related to the infrastructure and characteristics of the electronic signature, which will help to standardise and regulate the implementation of the electronic medical prescription.

This reform proposal seeks to modernise and regulate the electronic medical prescription in Mexico, providing benefits for both health professionals and patients, while guaranteeing an adequate and safe use of medicines and medical supplies.

Telemedicine

There is an initiative related to telemedicine in Mexico, presented by various political parties in February and April 2023 and approved by the Health Commission in April 2023. Key aspects of this initiative include:

1. The National Health System (SNS) aims to promote remote medical care services, using Information and Communication Technologies (ICTs).
2. "Medical teleconsultation" is defined as the provision of remote medical care services through the use of ICTs.
3. The right of patients to receive medical teleconsultation services in conditions of safety, quality, efficacy, equity, non-discrimination and inclusion is guaranteed.
4. It is emphasised that medical teleconsultation does not replace face-to-face medical care, recognizing the importance of both approaches.
5. The Ministry of Health will be responsible for determining the health care services that can be offered through medical teleconsultation and will issue the corresponding guidelines for their implementation.

This initiative seeks to regulate and promote telemedicine in Mexico, establishing fundamental principles, patient rights and the responsibility of the Ministry of Health in the definition and regulation of distance medical care services.⁴³

⁴³ Integrantes de la Comisión de Salud. Proyecto Dictamen de la Comisión de Salud por el que se reforman y adicionan diversas disposiciones de la Ley General de Salud en materia de salud digital. 2023.

Insight

In the context of the transformation of the health system in our country, two key phases have been identified. In the first phase, it focuses on reforming the General Health Law in relation to digital health, which implies the formulation of policies and strategies at the national level to improve medical care and health services in general. The second phase, equally relevant, focuses on secondary regulations. Official standards, guidelines and regulations related to medical research and information security in the field of health are established here. The correct elaboration and application of these regulations is essential to guarantee the efficiency and quality of health services. In addition, the importance of collaborating with other sectors is highlighted, especially with the Ministry of Telecommunications and Transportation, to address key issues such as interoperability and connectivity in telemedicine and other digital health services. The ultimate goal is to achieve "Internet for All in Health", which requires strong inter-institutional collaboration and proper allocation of budgetary resources to realise this vision and significantly improve health services in the country.

Stakeholders



In the context of healthcare, it is imperative to overcome the limitations of traditional clinical care models. The healthcare system is in need of innovation as healthcare plans, providers, life sciences companies, and the government grapple with rising costs and inconsistent outcomes.

Healthcare leaders should consider creating ecosystems that involve non-traditional actors and external sources of knowledge beyond their usual environment. Additionally, stakeholders should contemplate piloting projects before embarking on large-scale investments, be willing to adapt to change, and assess new revenue streams. It's imperative to find synergies between the stakeholders to get closer to a UHC.

Main stakeholders in México:

1. Government / Public Sector
 - a. Health Secretary
 - b. Secretary of Telecommunications and Transport
 - c. National Institute for Transparency, Access to Information, and Personal Data Protection (INAI)
2. Private Sector:
 - a. Hospitals
 - b. Pharmaceutical industry
 - c. Insurance companies
 - d. Clinical and office analysis laboratories
 - e. Startups
 - f. Pharmacies and offices attached to pharmacies
3. Civil associations:
 - a. Health associations
 - b. Medical associations
 - c. Health Tec Associations
 - d. Patient associations
4. Universities

Importance of each stakeholder for digital health transformation

Government / Public Sector



Ministry of Health: As a government entity responsible for formulating health policies, regulating the sector, and managing resources for medical care, its role in digital transformation is paramount. It must ensure that reforms are applied to the entire population, defining guidelines for their proper implementation and patient care. This includes the implementation of electronic patient record systems, telemedicine, and health data management to facilitate medical practice and provide tools to both healthcare providers and patients for quality healthcare.

Public hospitals: In Mexico, 92,582,812 people are affiliated with health services. Among them, 97.7% are affiliated with some public service, which includes levels 1, 2, and 3 of attention.⁴⁴ Moreover, the public system in Mexico is fragmented, making some interventions difficult to implement and follow throughout the entire system. However, the public system is the one that has the capacity to decide to implement a “system” and then make others follow; the difficulty lies in convincing these hospitals to change. On the other hand, we are transitioning to a unified health system, which includes ensuring access to health for the most in need. This includes primary care, which may be a good opportunity to initiate something and then start scaling.

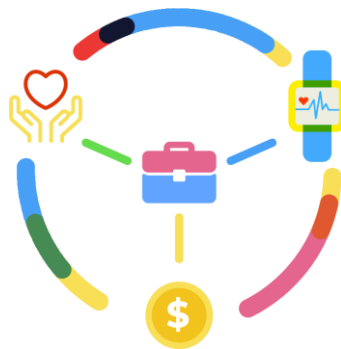
Ministry of Telecommunications and Transport: Its role is to provide the necessary technological infrastructure for the expansion of digital health, including network connectivity for telemedicine and health information security. Without a

⁴⁴ Código F. (s.f.). En México, 33 millones de personas sin acceso a servicios públicos o privados de salud: INEGI. Código F. <https://codigof.mx/en-mexico-33-millones-de-personas-sin-acceso-a-servicios-publicos-o-privados-de-salud-inegi/>

strategy to ensure population access, affordability, and digital literacy, we won't achieve Universal Health Coverage (UHC).

National Institute for Transparency, Access to Information, and Personal Data Protection (INAI): An autonomous public body responsible for facilitating and ensuring people's access to public information and access to and protection of personal data. Regulation and data protection in healthcare are essential to safeguarding the privacy and security of medical information. This entity should establish regulations that promote the safe adoption of digital technologies in healthcare.

Private Sector



Private Hospitals: Hospitals must invest in information systems and medical technology to optimise patient care, appointment management, electronic health records, and seek public-private partnerships to carry out more efficient healthcare processes for the population.

Pharmaceutical Industry: The implementation of innovative health technologies and models benefits both healthcare professionals and patients.

Insurance Companies: Digital transformation in the health insurance sector involves automating claims processes, telemedicine for medical consultations, and data management to assess risks and premiums.

Clinical Laboratories and Imaging Centers: Digitization of results and interoperability with electronic medical record systems are essential to improve the efficiency and accuracy of diagnoses.

Startups & Technology Enterprises: Innovative companies can develop applications, devices, and technological solutions for healthcare that address various needs, from appointment management to chronic patient monitoring. Startups should consider Mexico's high level of marginalisation to create solutions tailored to the country's healthcare needs. Investing in Technology: Technology companies can invest in technology for the healthcare sector. Technology

investment can help improve the efficiency of the sector and reduce healthcare costs. Collaborating with the Healthcare Sector: Technology companies can collaborate with the healthcare sector to develop digital solutions that meet the sector's needs. Collaboration can include participation in joint projects, identifying needs and opportunities, and creating customised solutions.

Pharmacies and Pharmacy-Attached Clinics: Digitization can improve inventory management, enable online pharmaceutical product sales, and facilitate patient communication through mobile applications. Additionally, they can promote health through treatment adherence programs and patient follow-up to prevent complications, among other initiatives.

Civil Associations & NGO's

Health Associations: These organisations can promote the adoption of digital health technologies and advocate for investment in technological infrastructure in the public healthcare system. Furthermore, they consist of experts in the field of digital health, making their opinions and future technology visions highly relevant for the proper promotion of digital transformation.

Health Tech Associations: These associations are specifically focused on promoting and developing health technologies, including telemedicine, artificial intelligence, and cybersecurity in healthcare.

Medical Associations: Physicians play a significant role in the implementation of digital technologies in clinical practice, and these associations can promote training and adoption of electronic medical record systems. They can also advocate for the adoption of technologies and advocate for the rights and protection of medical practice (doctor-patient), as well as support the development of cost-effective digital interventions that align with good medical practice clinical guidelines and bring healthcare closer to remote areas.

Patient Associations: They represent patients and can advocate for access to electronic medical records, education on digital health, and active patient participation in their medical care. Their opinion is highly relevant as they are users of healthcare services. These associations should inform patients about their healthcare rights and data rights, so patients advocate for the right to health

Universities (medical and technological)



Education and Training: It is essential to train healthcare professionals in the use of digital technologies and electronic health systems. This includes ongoing training programs for doctors, nurses, and healthcare personnel, as well as promoting digital literacy among the general population.

Promoting Innovation: Innovation in the digital health sector should be encouraged by promoting collaboration among startups, technology companies, universities, and hospitals. This may include establishing healthcare innovation centres and funding research and development projects.

Strengths and Opportunities

Mexico's adoption of the global digital health strategy 2020-2025, in line with the United Nations General Assembly, demonstrates a commitment to aligning its healthcare system with global technological trends. This alignment can help Mexico leverage international expertise and resources. Moreover, the reforms in the General Health Law, particularly Article 6, emphasise the expansion of healthcare coverage through the integration of ICT. Also, the proposed Chapter III bis, Article 49 Bis, provides a comprehensive definition of digital health, encompassing a wide range of activities and technologies. This clarity is essential in guiding the implementation of digital health services.

Within the national legal framework, the reforms in the General Health Law, particularly Article 6, signal a significant move towards integrating information and communication technology (ICT) into healthcare. This emphasis on incorporating digital solutions creates a robust foundation for the modernization of the healthcare system. By leveraging ICT, Mexico can enhance healthcare coverage,

especially in underserved and remote areas, bridging geographical gaps and ensuring that healthcare services are more widely accessible.

The proposed Chapter III bis, Article 49 Bis, is a noteworthy addition, providing a comprehensive definition of digital health that encompasses a broad spectrum of activities and technologies. This clarity is crucial for guiding the implementation of digital health services, offering a framework that can adapt to evolving technologies and innovations. The inclusive definition sets the stage for the development and integration of diverse digital health applications, from electronic health records to telemedicine platforms, fostering a holistic approach to healthcare delivery.

One notable opportunity arising from this digital health initiative is the potential for data-driven decision-making. With the integration of digital health technologies, there is an increased capacity to collect, analyse, and interpret health data. This wealth of information can be instrumental in identifying public health trends, optimising resource allocation, and enhancing the overall efficiency of the healthcare system.

However, challenges persist, and successful implementation requires addressing issues such as the fragmented system, data security, privacy concerns, and ensuring equitable access to digital health services across diverse socio-economic strata. Overcoming these challenges will be essential for realising the full potential of digitalization in Mexican healthcare.

Barriers and Challenges

There are some opportunities, but the fragmented system makes implementation very challenging. Additionally, the legal process is quite slow, requiring both chambers to review and decide on proposals. Despite some progress and political will, there's a significant ongoing process in Mexico towards transitioning to a unified public healthcare system. However, there is still insufficient clarity on how it will operate. The primary focus is on facilitating the transition and persuading Mexican states to incorporate these changes. Complicating matters, Mexico is currently in the midst of presidential elections, diverting attention away from healthcare initiatives.

Infrastructure: the implementation of digital health services requires a robust ICT infrastructure. Ensuring equitable access to these services, especially in rural and marginalised areas, remains a challenge considering that Mexico has a total of 189,432 localities, with 185,243 considered rural (97.7% of the total), housing approximately 26.9 million inhabitants. Moreover, a total of 21.5% of Mexican youth (aged 15-24) live in rural localities, which amounts to 4.5 million people. The young population in rural areas constitutes approximately 17% of the total rural

population, meaning that nearly 2 out of every 10 people in these areas are young. Having a young generation in rural areas, can be an area of opportunity due to their nativeness in using smartphones and other technologies.⁴⁵

Fragmented system: The fragmented healthcare system in Mexico presents significant challenges in achieving Universal Health Coverage (UHC) and, of course, acts as a barrier to interoperability between systems.

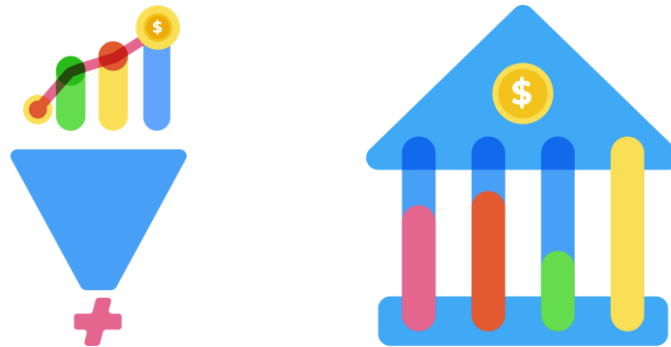
Some issues related to the fragmentation of the system are:

- **Unequal Access to Healthcare:** In a fragmented system, the quality and availability of healthcare services can vary significantly from one region to another. This means that some people may receive adequate medical care, while others may struggle to access basic health services.
- **Inefficiency in Service Delivery:** Lack of coordination among different components of the healthcare system can lead to duplicated services, inadequate patient follow-ups, and inefficient allocation of available resources.
- **Data Management Challenges:** Fragmented systems often use different technologies and records, making data management and sharing information between healthcare professionals difficult. This can negatively impact the quality of care and medical decision-making.
- **Inequality in Access to Specialized Medicine:** People residing in rural or low-income areas may face difficulties accessing specialist medical care due to lack of infrastructure and resources in their local areas. This can lead to delays in the diagnosis and treatment of serious illnesses.

A fragmented healthcare system can pose significant challenges in terms of equity, efficiency, and quality of medical care. Unification and improved coordination among different components of the system are essential to addressing these issues and providing effective and equitable healthcare for all citizens.

⁴⁵ Qué nos dice el Censo de Población sobre la juventud rural de nuestro país. (2023, 25 de septiembre). Gobierno de México, Secretaría de Agricultura y Desarrollo Rural. <https://www.gob.mx/siap/articulos/que-nos-dice-el-censo-de-poblacion-sobre-la-juventud-rural-de-nuestro-pais?idiom=es>

Legislation Barriers and Next Steps for Digital Health



Within the realm of healthcare digitisation, Mexico faces a critical challenge due to the fragmentation within its national healthcare system. The diversity of existing systems hampers communication between them and creates disparities in resource management based on the user's system. Four crucial areas, requiring urgent attention, have been identified to progress towards digital transformation and approach the goal of Universal Health Coverage (UHC).

1. Lack of a National Digital Health Strategy/Programme:

While there is a National Digital Strategy, it lacks a specific focus on digital health. Current initiatives primarily concentrate on expanding connectivity, lacking a clear strategy for implementing digital solutions in healthcare. **Next step:** It is imperative to develop a national strategy enabling the implementation of digital solutions accessible to all.

2. Inequitable Resource Distribution and Absence of Budget for Digital Health:

The absence of a specific national strategy hampers the allocation of funds for digital health. Presently, funds are distributed across various sectors such as telecommunications and transport, aiming to enhance connectivity in vulnerable areas, including primary healthcare centres. However, this allocation is not earmarked as part of the healthcare programme, complicating the implementation of digital technologies in healthcare.

Next step: There is an urgent need to define a national strategy including a budget for digital transformation, providing clarity in resource usage and enabling the assessment of the economic impact of digital technologies in the country.

3. Low Demand for Digitisation Among Professionals and Users:

The absence of regulation and digital literacy has led to non-uniform adoption of health technologies. The lack of mandatory regulations has resulted in diversity in technology usage, creating challenges for both healthcare professionals and patients.

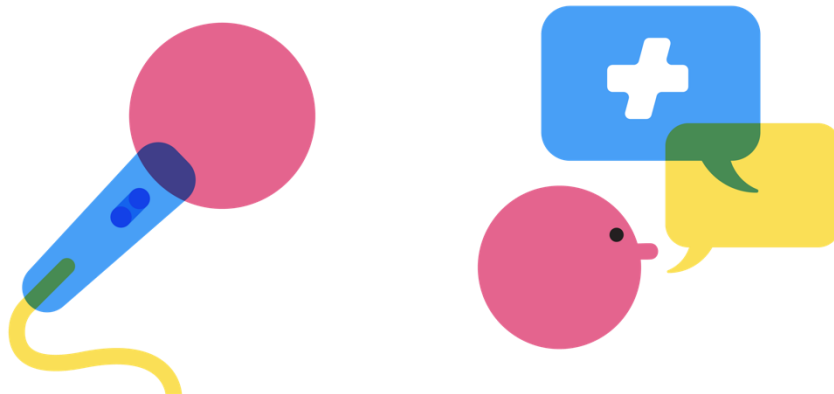
Next step: Continuous education for professionals and society at large is necessary to promote the uniform adoption of health technologies.

4. Lack of Clear Regulatory and Normative Framework:

The absence of a clear regulatory framework has created uncertainty in the use of digital technologies in healthcare. The lack of structure and incentives has resulted in these technologies often involving more administrative work instead of improving services for patients. Moreover, lack of information has led to patients being unaware of how their data is used and protected.

Next step: It is essential to establish clear regulations safeguarding people's well-being, in addition to educating patients about the ownership and use of their data.

Key Opinion Leaders Inputs



The next questions were posed to healthcare opinion leaders from various sectors, including the public and academic domains, to obtain their perspectives on how digital transformation in healthcare should unfold:

1. What actions should we take in Mexico to move closer to Universal Health Coverage?
2. How can technology assist us in bridging the healthcare gap in Mexico?
3. What do you consider to be the most crucial areas for realising healthcare transformation with the support of technology?
4. Which areas do you deem essential to regulate in order to ensure that digital health (e.g., telemedicine) safeguards both healthcare providers and patients (e.g., sensitive data)?

Experts were consulted, and they agree that the main problems to achieve digital health transformation in Mexico are mainly related to:

- Legal and institutional fragmentation, leading to inequity and inefficiency.
- Lack of investment.
- Lack of a legal framework necessary to guarantee the privacy, confidentiality, and integrity of health data.

There is also a recognition of the necessity to have the transformation, and that digitalization poses great benefits for the healthcare system, especially for the users, particularly for those more vulnerable, because it should be closer and more accessible. However, for that to happen, the infrastructure should be assured. Additionally, key recommendations include increasing public health budgets for digital health, prioritising essential interventions, ensuring comprehensive coverage, and promoting coordination between public and private sectors for efficient healthcare delivery.

Questions	KOL	Input
<p>1. What actions should we take in Mexico to move closer to Universal Health Coverage?</p>	<p>Dr. Éctor Jaime Ramírez Barba</p> <p>Member of Parliament, LXV Legislature of the Congress of the Union, District 05 León, Gto. PAN</p>	<p>This is a significant challenge with several relevant aspects to consider, one of which is the legal and institutional fragmentation within our healthcare system, leading to inequity and inefficiency.</p> <p>The legal fragmentation is reflected in the institutional fragmentation prevailing in our healthcare system. It is crucial to evaluate whether the constitutional mandates giving life to various laws, which in turn shape health protection for beneficiaries, need to be maintained as they are or modified to establish the constitutional basis for universal healthcare coverage.</p> <p>The institutional fragmentation stemming from legal disparities poses another significant challenge to advancing towards universal coverage with quality services. Healthcare institutions must overcome deficiencies in their structure and functioning, along with limitations in healthcare personnel and essential resources for effective medical care.</p> <p>This fragmentation results in disparities in healthcare access and quality, leading to inequity, discrimination, and exclusion, especially for populations at greater risk and vulnerability.</p> <p>It is necessary to analyse and discuss the separation of the right to healthcare from employment status, and to legally and functionally disentangle healthcare provision from other social benefits provided by social security institutions.</p> <p>Clarifying the authorities' roles and responsibilities at the three levels of government is essential; public health is a concurrent matter requiring harmonious participation of federal and local authorities. Therefore, the Parliament must</p>

		<p>clearly define the foundations and modalities of each level of government's involvement.</p> <p>Additionally, there is a need to bolster healthcare services financing so that legal changes and institutions ensure effective access to medical care and medications, thereby progressing towards universal coverage.</p>
	<p>María Rebecca Alcaide Cruz</p> <p>Technical Secretary of the Health Committee LXV Legislature of the Congress of the Union</p>	<p>Expand Healthcare Infrastructure: Build and enhance hospitals and clinics, particularly in rural and underserved areas, to provide more people with access to nearby healthcare services.</p> <p>Improve Health Workforce Training and Retention: Ensure an adequate and well-trained medical workforce and create incentives for healthcare professionals to work in resource-scarce areas.</p> <p>Promote Prevention: Invest in public health programs that educate the population about healthy habits and disease prevention, which can reduce the burden on the healthcare system.</p> <p>Extend Health Insurance Coverage: Work on expanding accessible and affordable health insurance programs for the population, especially those who lack access to healthcare.</p> <p>Reduce Economic Barriers: Implement strategies to lower the direct and indirect costs of healthcare, such as eliminating excessive co-payments and providing access to affordable medications.</p> <p>Utilise Technology: Modernise healthcare systems by incorporating information and communication technologies to enhance data management, telemedicine, and remote healthcare.</p> <p>Monitoring and Evaluation: Establish a monitoring and evaluation system to measure progress towards Universal Health Coverage and adjust policies as needed.</p> <p>These are some of the actions that can help Mexico move towards Universal Health Coverage, but it is a complex process that requires long-term planning and cooperation among multiple stakeholders.</p>
	<p>Eduardo González Pier</p> <p>Senior Technical Director of Health Finance at Palladium Group and Global Fellow</p>	<p>Increase Public Health Budget: Allocating more public funds to healthcare is crucial to improve the quality and accessibility of healthcare services.</p> <p>Prioritise Interventions and Ensure Coverage: Identifying and prioritising essential healthcare interventions and ensuring their comprehensive coverage can lead to better health</p>

	<p>at the Wilson Center</p>	<p>outcomes for the population.</p> <p>Promote Greater Coordination of Coverage Between Public and Private Sectors: Encouraging collaboration and coordination between the public and private sectors in providing healthcare coverage can enhance the efficiency and effectiveness of healthcare delivery.</p>
	<p>BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA</p> <p>Dr. María Lilia Cedillo Ramírez, Rectora.</p> <p>Vice Chancellor for Teaching and Learning.</p> <p>Coordination for Liaison with the Health Sector.</p>	<p>Developing a public policy for the short, medium, and long term, based on structured analysis involving:</p> <ul style="list-style-type: none"> · All three levels of government. · All three branches of government. · The healthcare sector, including all institutions that make up the national healthcare system, both public and private institutions. · The education sector, particularly regarding the training of healthcare professionals. · Civil society, involving various groups. <p>Following the analysis, promoting a healthcare model that prioritises health preservation and the timely detection of diseases, i.e., a primary healthcare model. This should include a review of the national healthcare system, specifically the system of clinics and hospitals at the secondary and tertiary levels of care, strengthening the healthcare workforce in all areas.</p> <p>Additionally, there should be a comprehensive review of infrastructure and equipment, timely provision of supplies and medications, and the integration of a research program encompassing all basic and clinical research groups, directing knowledge-generating lines based on the morbidity and mortality profile of the general population, as well as regional profiles. An intelligent budget program aimed at effectively addressing critical operational points of the system as a whole.</p> <p>The national education and healthcare sectors must work together effectively based on an assessment of the current state of healthcare workforce training and general and regional requirements.</p> <p>Institutions of higher education that train healthcare professionals in all areas should conduct a thorough review of their educational offerings and the relevance of their study plans and programs. The healthcare sector should be integrated into the education sector's review of educational offerings and provide the necessary support, starting with an update of the regulatory framework for clinical field access at all levels of healthcare workforce training.</p>

		<p>Educational offerings and the training of healthcare professionals in specific regions of the country should include cognitive and comprehensive training elements that respect the interculturality of the population. In this regard, healthcare workforce training should aim to root healthcare professionals in communities.</p> <p>The entire system should develop a program to support the training and impact on population health indicators, allowing for feedback from the entire system and ensuring transparency and accountability mechanisms.</p> <p>The system as a whole should include those who have historically participated in providing care to the population, such as traditional doctors and midwives, through a professionalisation program involving institutions of higher education with comprehensive plans and programs that include training in native languages. The healthcare system should include this professionalised personnel in its salary scales.</p> <p>The system as a whole should develop a program for ongoing education and training, allowing for effective certification of healthcare personnel in all areas.</p> <p>The national education system for healthcare workforce training and the national healthcare system should reach all communities through the creation of a comprehensive regionalization system that prioritises primary healthcare, timely disease detection and treatment, and the systematic and effective control of chronic and degenerative diseases to limit their complications and sequelae, ultimately improving the quality of life for individuals, families, and the community as a whole.</p>
<p>2. How can technology help us bridge the healthcare gap in Mexico?</p>	<p>Dr. Éctor Jaime Ramírez Barba</p> <p>Member of Parliament, LXV Legislature of the Congress of the Union, District 05 León, Gto. PAN</p>	<p>Technology is a valuable tool for enhancing healthcare processes, particularly in improving access. The recent pandemic highlighted realities and revealed opportunities, showcasing the potential of technology in healthcare. It aims to strengthen information systems and healthcare service management, bridging gaps in access.</p> <p>These technologies facilitate safe and effective disease diagnosis and treatment, promoting equity in timely and quality healthcare access, ultimately leading to effective coverage. Digital tools hold immense potential in addressing challenges, especially in managing prevalent non-communicable or chronic diseases, which often require complex and costly treatments. They are a key factor in ensuring universal healthcare coverage.</p>
	<p>María Rebecca Alcaide Cruz</p> <p>Technical</p>	<p>Technology can play a pivotal role in closing the healthcare gap in Mexico in several ways:</p> <p>Telemedicine: Facilitates access to healthcare in remote or</p>

	<p>Secretary of the Health Committee LXV Legislature of the Congress of the Union</p>	<p>rural areas by allowing patients to communicate with healthcare professionals through video conferencing or other online tools. This improves accessibility and the timeliness of medical care.</p> <p>Electronic Health Records: Electronic record-keeping allows doctors to access patient information more quickly and accurately, which can lead to more effective diagnoses and treatments.</p> <p>Remote Patient Monitoring: Connected medical devices enable doctors to remotely monitor patients' health, which is especially valuable for chronic patients or the elderly who require constant monitoring.</p> <p>Health Apps: There is a wealth of mobile applications that provide health information, medication reminders, and tracking of healthy lifestyle habits, empowering individuals to better care for their health.</p> <p>Big Data and Analytics: Large-scale health data analysis can identify disease trends and patterns, enabling more informed decision-making for public health policies.</p> <p>Online Education: Online platforms can offer training and education programs for healthcare professionals, helping improve the quality of healthcare.</p> <p>Robotic Surgery: High-precision surgical robots can be used by surgeons to perform safer and more precise procedures.</p> <p>Artificial Intelligence: AI can be used for early disease detection, medical image analysis, and hospital process optimization.</p> <p>However, it is important to address challenges related to data privacy, cybersecurity, and equitable access to technology to ensure that these technological solutions are effective and accessible to all communities in Mexico.</p>
	<p>Eduardo González Pier</p> <p>Senior Technical Director of Health Finance at Palladium Group and Global Fellow at the Wilson Center</p>	<p>Lowering Healthcare Costs: Reducing the cost of healthcare services can make them more affordable and accessible to a wider population.</p> <p>Utilising Virtual Platforms to Reach Underserved Populations: Leveraging virtual platforms can help deliver services to populations with limited access to healthcare, bridging geographical and resource gaps.</p> <p>Early Detection of Infectious and Non-Communicable Diseases: Identifying infectious and non-communicable diseases in their early stages through proactive screening and monitoring can lead to more effective treatments and better health outcomes.</p>

	<p>BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA</p> <p>Dr. María Lilia Cedillo Ramírez, Rectora.</p> <p>Vice Chancellor for Teaching and Learning.</p> <p>Coordination for Liaison with the Health Sector.</p>	<p>The use of telecommunications systems and information technologies is essential in the development of human life in the current era, spanning virtually all human activities.</p> <p>In the field of education, these are indispensable tools for the development of curricula and study programs, compelling educational institutions in general, and particularly institutions of higher education, to review and update their study plans and programs. This goes beyond content revision and involves a reconsideration of learning strategies, in-class and distance activities, as well as the training of teaching staff with the relevant knowledge and skills for using these tools. Learning assessment systems should also be updated and optimised in light of the application of this technology.</p> <p>Furthermore, the use of these tools should extend beyond classrooms and be actively promoted in clinical settings through a coordinated system between higher education institutions and the healthcare sector as a whole.</p> <p>In the practice of the healthcare professions, the use of telecommunications and this technology should be integrated to enhance the performance of healthcare professionals in providing quality and effective care while retaining a humanistic approach.</p> <p>Closing the healthcare gap through the use of these tools must be based on a national policy with short, medium, and long-term actions and goals.</p> <p>Public policy must have the necessary funding, surveillance systems, and controls to ensure the proper execution of the program. Its focus should include:</p> <ul style="list-style-type: none"> · Reviewing the telecommunications infrastructure by region in the country. · Implementing a strategy for immediate attention that ensures similar facilities and connectivity throughout the country, supported by a preventive and corrective maintenance program for the entire system. · Ensuring the training of human resources with the relevant professional competencies to guarantee the operation of the entire system. · Incorporating this technology into the national healthcare system at all its units and levels of care, while ensuring the protection of national data systems in accordance with personal data protection regulations.
<p>3. What are the key areas you consider most</p>	<p>Dr. Éctor Jaime Ramírez Barba</p>	<p>Advancing in digital transformation within the healthcare sector requires overcoming identified limitations. It's crucial</p>

<p>important to realise healthcare transformation with the support of technologies?</p>	<p>Member of Parliament, LXV Legislature of the Congress of the Union, District 05 León, Gto. PAN</p>	<p>to establish a telecommunications infrastructure ensuring broadband internet access, especially for rural and remote communities. Digital literacy programs are essential for these communities. Increasing investment in secure digital infrastructure and platforms is vital. Secure data management models are needed for decision-making processes.</p> <p>Addressing healthcare professionals' resistance to digital transformation is essential, requiring support tailored to their needs. Furthermore, a robust legal and regulatory framework is necessary to ensure certainty in healthcare digital transformation. This framework should protect privacy, confidentiality, integrity, availability, and the handling of individuals' health and genetic data. Addressing issues like interoperability, cybersecurity, accountability, and governance is also essential.</p>
	<p>María Rebecca Alcaide Cruz</p> <p>Technical Secretary of the Health Committee LXV Legislature of the Congress of the Union</p>	<p>Interoperability of Electronic Health Records: Facilitate secure information exchange between healthcare systems and providers to ensure coordinated and efficient care.</p> <p>Artificial Intelligence and Data Analysis: Utilise AI to analyse large healthcare datasets to identify patterns, trends, and potentially more accurate diagnoses.</p> <p>Healthcare Cybersecurity: Ensuring the security of healthcare data is crucial to protect patient privacy and maintain the integrity of medical records.</p> <p>Policies and Regulations: Establish clear regulations and policies addressing issues such as data privacy, AI ethics, and equitable access to technology-based healthcare.</p> <p>The transformation of healthcare through technology is an evolving process that requires a multidisciplinary approach and collaboration among healthcare professionals, technologists, and policymakers to achieve a more efficient and accessible healthcare system.</p>
	<p>Eduardo González Pier</p> <p>Senior Technical Director of Health Finance at Palladium Group and Global Fellow at the Wilson Center</p>	<p>Promotion of Healthy Behaviours: Implementing interventions to promote healthy behaviours and lifestyles can help prevent the onset of various health conditions.</p> <p>Expansion of Access to Preventive Interventions at the Primary Care Level: Increasing access to preventive interventions and healthcare services at the primary care level can help detect and address health issues at an earlier stage, ultimately improving health outcomes.</p> <p>Enhancements in the Quality of Healthcare in Hospitals: Improving the quality of healthcare services in hospitals, including patient care, medical facilities, and treatment options, is essential for providing effective and safe medical</p>

		care to patients.
	<p>BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA</p> <p>Dr. María Lilia Cedillo Ramírez, Rectora.</p> <p>Vice Chancellor for Teaching and Learning.</p> <p>Coordination for Liaison with the Health Sector.</p>	<p>Ensure the existence of infrastructure and connectivity throughout the country.</p> <p>Include in the curricula of all healthcare disciplines the use of telecommunications and applicable technology related to diagnostic studies, laboratory work, and other areas.</p> <p>Ensure the training of human resources, both for education and for the managerial and operational staff of the national healthcare system. The use of technology and tools in the development of planning, programming, and administration activities of the system is essential.</p>
<p>4. What key areas do you consider essential to regulate in order to ensure digital health?</p>	<p>Dr. Éctor Jaime Ramírez Barba</p> <p>Member of Parliament, LXV Legislature of the Congress of the Union, District 05 León, Gto. PAN</p>	<p>An essential aspect to ensure the viability of the digital healthcare ecosystem relates to information systems and interoperability among various digital tools. This interoperability maximises the potential of technologies, positively impacting the healthcare system, enhancing its efficiency and quality.</p> <p>In legislative projects I have championed in Congress, I've emphasised several areas requiring regulation for their adoption certainty, including:</p> <ul style="list-style-type: none"> · The right of every individual to equal access and use of technologies for healthcare services. · Health regulatory control over information and communication technologies used in healthcare, adhering to human rights principles. · The responsibility of federal health authorities to promote technology development in public, social, and private sectors, enabling healthcare services both in-person and remotely. · Clear regulations on responsibilities, privacy, confidentiality of personal data, contact protocols, emergency procedures, responses to technological failures (including communication), and risks related to confidentiality breaches. · Regulation of electronic health records, electronic prescriptions, telehealth-telemedicine, Software as a Medical Device, electronic registry information systems, and digital platforms, among others. <p>Digital transformation is an irreversible reality. The benefits of</p>

		<p>technology should no longer be the privilege of a few but the heritage and right of all.</p>
	<p>María Rebecca Alcaide Cruz</p> <p>Technical Secretary of the Health Committee LXV Legislature of the Congress of the Union</p>	<p>Regulation in areas such as data privacy, informed consent, cybersecurity, quality, effectiveness, ethics in AI, and interoperability is essential to ensure digital healthcare. These regulations must strike a balance between technological innovation, patient protection, and the quality of digital healthcare.</p> <p>Collaboration among governments, healthcare professionals, and the technology industry is crucial for developing effective and adaptive regulations that drive the positive transformation of digital healthcare.</p>
	<p>Eduardo González Pier</p> <p>Senior Technical Director of Health Finance at Palladium Group and Global Fellow at the Wilson Center</p>	<p>Medical Guidance Services, Tele-Diagnosis, and Teleconsultation via Artificial Intelligence: Utilising artificial intelligence for medical guidance, tele-diagnosis, and teleconsultations can enhance access to healthcare expertise and facilitate remote healthcare consultations.</p> <p>Medication Dispensing through Virtual Pharmacies: Enabling medication dispensing through virtual pharmacies can improve convenience and access to essential medications.</p> <p>Electronic Health Records: Implementing electronic health records (EHRs) allows for more efficient and accurate management of patient health information, improving the overall quality of healthcare.</p>
	<p>BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA</p> <p>Dr. María Lilia Cedillo Ramírez, Rectora.</p> <p>Vice Chancellor for Teaching and Learning.</p> <p>Coordination for Liaison with the Health Sector.</p>	<p>Prioritise respect for human rights, ensuring inclusive access to these services while respecting interculturality.</p> <p>Guarantee the proper handling of personal data and access to information in accordance with applicable regulations.</p> <p>Review and update the regulations governing the provision of healthcare services, which should include public and private higher education institutions, the healthcare system as a whole, social organisations, councils, and professional healthcare societies through activities that ensure the effective participation of all mentioned sectors.</p>

Conclusion

The population in Mexico continues to grow, and also a demographic transition with an increase in chronic diseases is being seen. These ailments are a result of our longer life expectancy, as well as an unhealthy lifestyle and an inefficient healthcare system.

Coupled with underinvestment in healthcare and inefficient operation, which translates into high out-of-pocket expenses for users, this is creating a time bomb that, if not addressed now, may become unsustainable for any budget. Hence, there is a need to change paradigms and view health from different angles to tackle the complex issue it represents, and to aim for a healthcare system based on primary care with the assistance of technology to reach more people and move closer to universal healthcare coverage.

Technology is a powerful tool to bridge the gap. Among the main challenges faced by Mexico in the implementation of digital healthcare is the lack of a robust information and communication technology (ICT) infrastructure, hindering equitable access to these services, especially in rural and marginalised areas.

Additionally, the fragmentation of the national healthcare system hampers communication between them and creates disparities in resource management based on the user system. However, there are areas of opportunity for healthcare digitalisation in Mexico. The adoption of the 2020-2025 global digital health strategy, in line with the United Nations General Assembly, demonstrates the country's commitment to align its healthcare system with global technological trends. Furthermore, reforms in the General Health Law, particularly Article 6, emphasise expanding healthcare coverage through the integration of ICT, presenting a significant opportunity to reach underserved populations, especially in remote areas, and improve access to healthcare services.

To carry out digital transformation in Mexico, a series of strategies and laws are required to enable the implementation and adoption of digital technologies in the healthcare sector. Right now, the healthcare reform in Mexico proposes adding several provisions to the General Health Law regarding digital health, with the aim of establishing a legal framework that enables the ethical, safe, reliable, equitable, and sustainable use of digital technologies in healthcare. Also, laws should focus on providing incentives for healthcare providers to adopt digital technologies, such as tax benefits or subsidies for implementing electronic health record systems. Simultaneously, there should be regulations to safeguard against potential misuse of digital health data, ensuring the ethical use of technology in patient care and research.

Furthermore, the legislation must address issues related to telemedicine, outlining the guidelines for remote consultations, online prescriptions, and digital communication between healthcare professionals and patients. By creating a robust legal framework that addresses these concerns, Mexico can pave the way for a successful digital transformation in its healthcare sector, ultimately improving patient outcomes and overall healthcare efficiency.

Actions to be taken

Below, we describe the four actions that must be taken to achieve digital transformation in Mexico and, in doing so, bring healthcare closer to everyone.

1. Establishment of Clear Policies and Regulations:

It is crucial to establish clear policies and regulations that enable the ethical, safe, reliable, equitable, and sustainable use of digital technologies in healthcare. These regulations must also adequately safeguard sensitive personal data circulating through these technologies.

Building consensus and driving political will are essential steps in fostering an environment conducive to the digital transformation of healthcare. By engaging with stakeholders, policymakers, and the public, it's possible to create awareness about the benefits of digital health initiatives. Political will is crucial as it can lead to policy changes, funding allocations, and the establishment of necessary infrastructures. Through open dialogues, education, and collaboration, it is possible to garner support and enthusiasm for embracing digital transformation in the healthcare sector.

2. Investment in Digital Technologies:

It is essential to promote investment in digital technologies for healthcare, including telemedicine, artificial intelligence, and data analytics. This investment aims to enhance the efficiency and quality of healthcare services.

Advocating for increased and coordinated investment in digital health is vital to realising the full potential of technology in healthcare. For the investment to happen it's very important to continue to advocate for the inclusion in the law of digital health, and also to think about creating a ministry dedicated to digital healthcare. Coordinated investment ensures that resources are allocated efficiently, avoiding duplication of efforts and maximising the impact of digital initiatives. This funding can be directed towards developing healthcare apps, telemedicine platforms, electronic

health records systems, and other innovative technologies that enhance patient care, improve healthcare delivery, and ultimately save lives.

Promotion of collaboration between the public and private sectors, It's necessary to promote efficiency in delivering health care.

3. Strengthening ICT infrastructure:

It is necessary to improve ICT infrastructure nationwide to ensure equitable access to digital healthcare services, especially in rural and marginalised areas. Technology well implemented is the key to UHC.

4. Training and education of healthcare professionals:

Develop a curriculum to train in digital healthcare capacities.

Training and developing the necessary capacities for the healthcare providers to use technology in a safe and effective way for all.

It is important to train healthcare professionals in the use of digital technologies to enhance the quality of healthcare and ensure the security of patient data.

In summary, technology is a valuable tool for improving processes in healthcare, particularly for enhancing access. The recent pandemic highlighted realities and allowed opportunities to be visualised. The use of technology in the healthcare sector aims to become a useful tool in strengthening information systems and healthcare service management to enhance access to healthcare services, thereby bridging the existing gap in such access.

Technologies facilitate the diagnosis and treatment of diseases in a safe and effective manner. They are tools that enable greater equity in accessing timely and quality medical care, leading to effective coverage. Digital technologies and tools offer significant potential for addressing challenges such as the burden of morbidity dominated by non-communicable or chronic diseases, whose treatment is complex and costly. Digital technologies are a key factor in ensuring universal healthcare coverage, but for these tools to be used for its full potential, a clear legislation and norms for the use and implementation, for the sake of the common it's imperative.



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Health for all in the digital age

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