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Transformations in Latin American Healthcare: A Retrospective Analysis of Hospital Beds, Medical Doctors, and Nurses from 1960 to 2022

Abstract

Latin America's healthcare systems evolved nonlinearly, influenced by diverse models, historical events, and political regimes. Limited knowledge exists despite national-level efforts, indicating a need for long-term statistics to assess the effects of reforms and understand healthcare changes in the region.

The article contributes to the Actor Network Theory (ANT) claim for better understanding of complex networks through a description of its main long term comparable components with a long term quantitative series for 20 Latin American countries, spanning from 1960 to 2020, on the number of hospital beds, physicians, and nurses (per capita) and healthcare expenditure (in US dollars per capita). The primary goal of this study is to showcase and describe the historical trends and patterns of these variables in the region. The results remain in purpose in this article in a descriptive level, due to the lack of reliable long term series that require in our view to disseminate the data so a broader scientific community may use them to obtain more contextualized interpretations in the different countries involved. The article, nevertheless, shows that there is a very convincing demonstration of the existence of an overall improvement in all the indicators considered and for most Latin American countries. They are leaders in most of the analyses and most of the time, Cuba, Argentina, and Uruguay. They are accompanied, depending on the indicator and the period, by Costa Rica and Panama. On the contrary, there are setbacks in Venezuela and minor progress or stagnation in most Central American countries.

Keywords: Healthcare, Latin America, XX century, XXI century, hospital beds, nurses, physicians, expenditure

Transformaciones en la atención sanitaria en América Latina: un análisis retrospectivo de camas de hospital, médicos y enfermeras de 1960 a 2022

Resumen

Los sistemas de salud de América Latina evolucionaron de manera no lineal, influenciados por diversos modelos, eventos históricos y regímenes políticos. Existe un conocimiento limitado a pesar de los esfuerzos a nivel nacional, lo que indica la necesidad de estadísticas a largo plazo para evaluar los efectos de las reformas y comprender los cambios en el cuidado sanitario en la región.

El artículo contribuye al reclamo de la teoría del actor-red (ANT) para una mejor comprensión de las redes complejas a través de una descripción de sus principales componentes comparables a largo plazo con una serie cuantitativa a largo plazo para 20 países de América Latina, que abarca desde 1960 hasta 2020, sobre el número de camas de hospital, médicos y enfermeras (per cápita) y gastos de atención médica (en dólares estadounidenses per cápita). El objetivo principal de este estudio es mostrar y describir las tendencias y patrones históricos de estas variables en la región. Los resultados se mantienen en el propósito de este artículo a nivel descriptivo, debido a la falta de series confiables a largo plazo que requieren, a nuestro juicio, difundir los datos para que una comunidad científica más amplia pueda utilizarlos para obtener interpretaciones más contextualizadas en los diferentes países involucrados. El artículo, sin embargo, muestra que existe una demostración muy fehaciente de la existencia de una mejora general en todos los indicadores considerados y para la mayoría de los países latinoamericanos. Son líderes en la mayoría de los análisis y la mayor parte del tiempo, Cuba, Argentina y Uruguay; les acompañan, según el indicador y el período, Costa Rica y Panamá. Por el contrario, hay retrocesos en Venezuela y avances menores o estancamiento en la mayoría de los países centroamericanos.

Palabras clave: Sanidad, América Latina, siglo XX, siglo XXI, camas hospitalarias, enfermeras, médicos, gasto

Transformació de l'assistència sanitària llatinoamericana: una anàlisi retrospectiva de llits hospitalaris, metges i infermeres de 1960 a 2022

Resum

Els sistemes sanitaris d'Amèrica Llatina han evolucionat de manera no lineal, influenciats per diversos models, esdeveniments històrics i règims polítics. En tenim un coneixement limitat malgrat els esforços a nivell nacional, cosa que indica la necessitat d'estadístiques a llarg termini per avaluar els efectes de les reformes i entendre els canvis sanitaris a la regió.

L'article contribueix a la reivindicació de la Teoria de la Xarxa d'Actors (ANT) per a una millor comprensió de les xarxes complexes mitjançant una descripció dels seus principals components comparables a llarg termini amb una sèrie quantitativa a llarg termini per a 20 països llatinoamericans, que abasta des del 1960 fins al 2020, sobre el nombre de llits d'hospital, metges i infermeres (per capita) i despesa sanitària (en dòlars dels EUA per capita). L'objectiu principal d'aquest estudi és mostrar i descriure les tendències i patrons històrics d'aquestes variables a la regió. Els resultats es mantenen en l'objectiu d'aquest article a nivell descriptiu, a causa de la manca de sèries fiables a llarg termini que requereixen al nostre punt de vista difondre les dades perquè una comunitat científica més àmplia les pugui utilitzar per obtenir interpretacions més contextualitzades als diferents països implicats. L'article, tanmateix, mostra que hi ha una demostració molt convincent de l'existència d'una millora global en tots els indicadors considerats i per a la majoria de països llatinoamericans. Són líders en la majoria de les anàlisis i la majoria de les vegades, Cuba, Argentina i Uruguai. Els acompanyen, segons l'indicador i el període, Costa Rica i Panamá. Al contrari, hi ha retrocessos a Venezuela i progressos o estancaments menors a la majoria de països centreamericans.

Paraules clau: Sanitat, Amèrica Llatina, segle XX, segle XXI, llits hospitalaris, infermeres, metges, despesa

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1. Introduction

The history of healthcare systems and institutions in advanced economies has been examined by a diversity of analytical perspectives in a variety of scientific disciplines (Vilar-Rodríguez and Pons 2018; Donzé and Fernández Pérez 2022).

The history of medicine, first of all, with research on the development of human health treatment and the evolution of medical education and professions, such as medical doctors and other sanitarian experts. Pioneering studies in this field include the works of Osler (1921), Castiglioni (1941), and Rosen (1958), while more recent contributions include Lane's (2001) research and Carney's (2023) book.

A second approach in the literature is from the field of contemporary history and the history of science, within which a significant stream of research has been describing since the 1980s and 1990s the creation and development of influential Western healthcare models, particularly the National Health Service in the United Kingdom, Medicaid and Medicare in the United States, and National Health Insurance in Germany (Moran 1999; Webster 1998; Walzer and Numbers 1983; Pauly, Kissick and Roper 1989).

There is also an abundant literature specialized in the history of hospitals within the fields of Organization, Public Health, and Business History. Often this literature incorporates elements from the fields of history, health studies, management, organization studies, and economics (Vilar-Rodríguez and Pons 2018; Donzé and Fernández Pérez 2019 and 2022). Most of the works analyze the long-term evolution of hospitals in a specific country or region, focusing on their organization and characteristics as business enterprises (Granshaw and Porter 1999; Risse 1999; Fernández-Perez 2021; Vilar and Pons 2018).



The fourth, institutional cross-national approach, englobe works with comparison analysis, often through classification schemes. One the most representative author in this field was Roemer (1991), who described and classified all the world's healthcare systems, from the Soviet Union to the United States in the 1990s. Recently, Sun (2020) and Johnson, Stokskopf, and Shi (2018) have incorporated some Latin American cases into their international summaries of healthcare systems.

Production of knowledge in not developed countries is less abundant. The literature gap between advanced economies and the rest of the world is confirmed by De Carvalho, Schmid and Fischer (2021), who, after reviewing more than 40 international healthcare classifications, conclude that most of them are not relevant in relation to the global south. The scientific production in Latin American countries (LAC) is scarce. Except for Roemer's work (1991), none of the studies using any of the above-described four perspectives examines widely the way in which healthcare systems are and were organized and financed in the region in the long term.

However, there are related works that build a basis of analysis in LAC. From a history of medicine approach, Cueto (1996) and Cueto and Palmer (2015) studied the history of medicine in the region, from indigenous medicine to the global health issues of the 20th century. Another approach is that of Mesa-Lago (2008, 2009), who proposed a social protection classification that jointly considered healthcare and pension coverage. He classified countries according to the moment in history in which pension/health systems were created (categories of pioneers, intermediate and latecomers), but the economic and institutional organization and the evolution of the different models in time were not discussed. With a regional perspective, it is possible to mention the book by Matus-López and Cid (2020), which analyzed the literature on the sources



of funding and fiscal space for healthcare systems in the region and the monographic of Matus-Lopez (2023), that make a brief historical review of the mayor national reforms of healthcare systems in countries in LAC.

At a country level, studies are numerous. The effort made by the journal *Revista de Salud Pública de México* to describe how the models around year 2010 operate in Chile (Becerril-Montekio, Reyes and Annik 2011), Uruguay (Aran and Laca 2011), Ecuador (Lucio, Villacrés and Henríquez 2011) and Costa Rica (Sáenz et al. 2011) should be underlined. Other interesting national analyses include those by Illanes (2010) and Molina (2010) on Chile, Veronelli and Veronelli (2004) on Argentina, and Botey (2020) on Costa Rica.

This article aims to study data about hospitals, hospital beds, and human capital in hospitals in Latin America between the 1960s and the 2020s, with a long term comparative approach that is, mainly, descriptive. Description is at this stage extremely necessary to have a dynamic, evolutionary perspective of health infrastructure and human capital in the hospital systems of any continent. Particularly in Latin America. There are abundant series for leading OECD countries about hospitals, hospital beds, or sanitary staff, that allows international comparisons and in-depth approaches using national and international statistics (Fernández Pérez 2021). However, there are not abundant comparable series for Central and South American countries (not to speak of Asia, or Africa) with a very long term perspective due to the lack of comparable statistical criteria regarding definitions and methodologies. The lack of descriptive data has an obvious scientific implication: the invisibility of a process of creation and development of heterogenous and complex hospital and health care systems, and ignorance about structural dynamic change or inertias. Without comparable international long term data the whole Latin America region is used as a homogeneous concept, hiding the advances, the lack of advance,

the losses, and the real needs. Descriptive data is a need in science, required prior to any diagnosis or design of global strategies of improvement. For this reason, this article applies key insights of the Actor-Network Theory (ANT), used in sociology, health sciences, and urban studies, among other scientific disciplines (Latour 2005). Particularly, the methodological call of the ANT for the utility of the description of actors and networks in the understanding of complex realities and organizations, to elaborate data with which to present reliable long term indicators of the evolution of Latin American health systems since the 1960s until our century. The ANT approach, despite limitations, helps understand complex realities and organisations, in which there are similar actors whose different numbers and trainings produce different combinations and impacts in the health care networks in which they are, which result in different roles, relations and outcomes. In this theory inanimate objects and technologies (like hospitals, or hospital beds) have the role of actors that play a role in the network, and in the performance of the other actors in the network. The application of this theory to the understanding of healthcare systems has been demonstrated (Cresswell, Worth and Sheikh 2010). This article combines the relevance to description of main actors and networks from the ANT methodological approach, that involves knowing, by describing, complex realities and organizations to what we believe is one of the most complete first long term descriptions of relevant protagonists involved the complex health care systems of Latin America in the last six decades: the number of hospitals and hospital beds per capita, as well as the number of physicians and auxiliary medical staff.

This study presents quantitative information of human and physical capital for all the region for 70 years. In fact, we construct series of hospital beds, physician, and nurses, from 1960 to 2020, for 17 Latin American countries. Additionally, we construct a series of health national

expenditure for the same period. Original data for the 17 LAC of the four series, in the period 1960-2020, are presented in Annex 1.

2. Methodology

2.1 Sources

The information was extracted from official reports and cross-country databases. Official reports were available in digital format in the Institutional Repository for Information Sharing (IRIS) of Pan American Health Organization (PAHO). They were summary of four-year reports on Health Conditions in the Americas (PAHO 1962, 1966, 1970, 1974, 1978, 1982, 1986, 1990, 1994, 1998, 2002a), annual reports of Basic Indicators (PAHO 2002b, 2007, 2008, 2010, 2013), Health in South America (PAHO 2012) and Core Indicators (PAHO 2016). Databases were Open Data Portal of the Pan American Health Organization (PLISA) (PAHO 2023), Core Indicator Database provided directly by PAHO (PAHO 2022), Data Portal of National Health Workforce Accounts of the World Health Organization (NHWA) (WHO 2022), and the Global Health Expenditure Database of the World Health Organization (GHED) (WHO 2023). Methodological notes for year, series and countries are described in Annex 2. Raw data is available in Excel format at <https://zenodo.org/record/7985339>

2.2 Definitions of the series

Serie 1. Hospital Beds per 1,000 inhabitants. General and specialty hospital beds, public and private sector, divided by the total population (in thousand). However, depending on the year and the country, complete information is provided or only referred to public or government hospitals. See methodological notes.

Serie 2. Physicians per 10,000 inhabitants. Physician in hospitals and primary care centres, public and private, divided by the total population (in ten thousand). However, depending on

the year and the country, some reports listed only those working in Ministries of Health or the government. See methodological notes.

Serie 3. Nurses per 10,000 inhabitants. Nurses in hospitals and primary care centres or health services, public and private, divided by the total population (in ten thousand). Depending on the year and the country, some reports listed only those working in Ministries of Health or in the government. In PAHO (1962), the information is based on the classifications of graduated nurses provided by the countries (but sometimes it includes nursing assistants). In the report of PAHO (1966, 2002b, 2007, 2013), it is not explicit what was included as nurses. In the database WHO (2022) it refers to professional nurses, but sometimes countries only provide nurses personnel not further defined. See details in methodological notes in Annex 2.

Serie 4. Government spending on health, per capita. Health expenditures, in national currency and US dollars, divided by the total population. For 1960-72, the items included differ considerably owing to the nature of the programs and services provided. Expenditure statistics should be considered with great caution. Most countries in the region fund their public health systems through fragmented financial structures, primarily relying on pay-roll taxes. However, this crucial information is often excluded from PAHO reports, particularly those predating the year 2000. Since 2000 the source is the same (PAHO 2023) and the figures refers to resources from Government schemes and compulsory contributory health care financing schemes. The values are presented in constant US dollars of 2020, according to Consumer Price Index retroactive series of US Census Bureau (2023).

2.3 Selection criteria

About sources. In periods where two or more reports coincide, the source that had been used prevailed. The switch to another source was made when the new source had more information

(more countries) than the current source. Additionally, the missing data in the main source were completed with specific reports. Detail of the source of each data and series is presented in methodological notes (see Annex 2).

Years. It corresponds to those provided in the quadrennial PAHO reports between 1960 and 1982 and the annual reports until 1996. Since 2000, efforts have been made to select five-year periods.

2.4 Method

To conduct the analysis, we computed descriptive statistics. For comparative analysis, regional averages were calculated with respect to the United States of America standard. Additionally, we carried out a case/country graphical evolution of each series from 1960 to 2020 (see Annex 3) and a comparative graphical analysis for the year 1964, 1980, 2000 and 2020. The year 1964 was chosen as the starting point for the comparative analysis due to the higher data quality reported in that year compared to 1960.

To supplement the comparative graphical analysis, a cluster analysis was conducted for the year 1964, 1980, 2000, and 2020. Cluster Analysis classified different countries into similar groups (clusters), based on endowments of doctors, nurses, and hospital beds (per inhabitant), and health expenditure (US dollar constant 2020, per capita). A hierarchical model was carried and euclidian distance method was used. The number of clusters to be formed was specified in advance, corresponding to upper, middle, and lower values. SPSS version 23.0 was used for it. Four adjustments were made to the original data for the cluster analyses. First, bed rates were expressed to 10 thousand inhabitants (such as doctors and nurses). Second, square root transformations were applied (logarithmic transformation for expenditure). Third, Haiti was

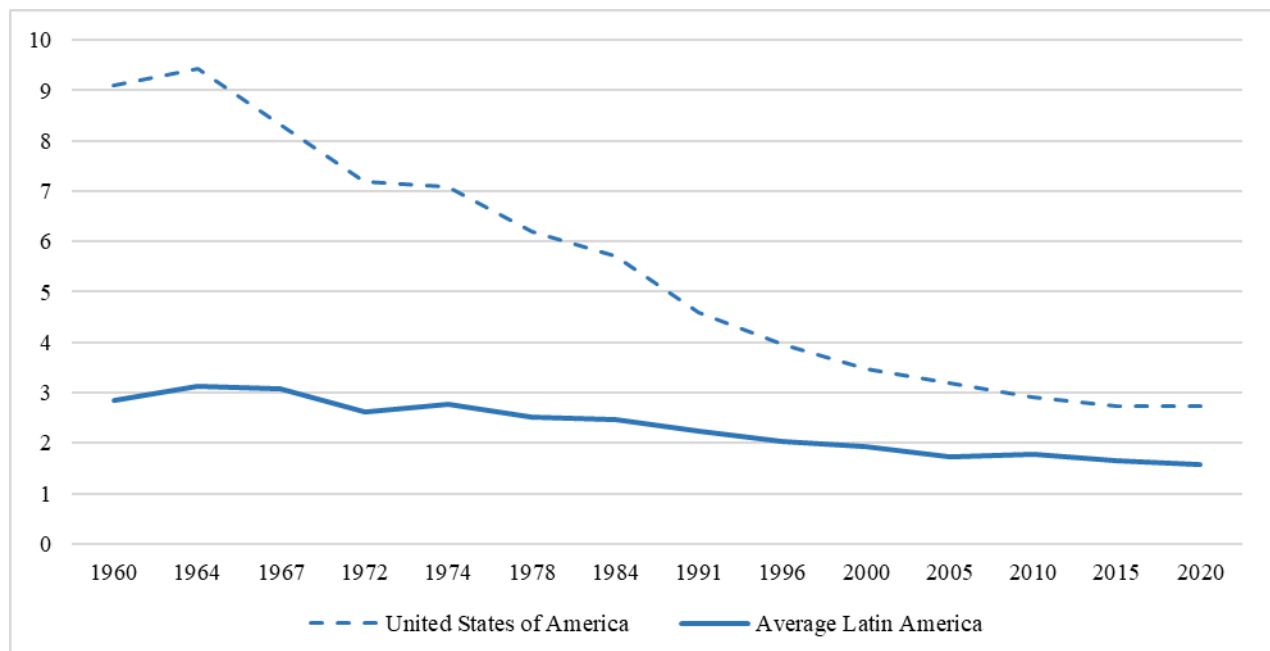
excluded due to outlier values. Fourth, the missing values were completed with the averages between the previous and subsequent years.

3. Results

3.1 Hospital beds (per 1,000 inhabitants).

The evolution of the number of beds in the region exhibits a declining trend, which is a long-term phenomenon observed globally. Nevertheless, the difference in the region is that the initial number of beds was lower compared to that of wealthy countries. For instance, in 1960, the number of hospital beds per 1,000 population was three times higher in the United States than the average in LA. Although this ratio decreased to 1.8 times by 2000, it has remained relatively constant in the past decade (Graph 1).

GRAPH 1. Hospital beds per 1,000 inhabitants. United States of America and average of LAC (20 countries). 1960-2020



Source: PAHO (1964/2023), WHO (2022, 2023).

The number of beds per 1,000 inhabitants has decreased in all countries, with more pronounced reductions observed in some countries. For example, from 1960 to 2020, Costa Rica

experienced a reduction from 5.1 to 1.1 beds per 1,000 inhabitants, while Argentina saw a decrease from 6.4 to 3.2 beds and Chile from 5.0 to 2.0 beds per 1,000 inhabitants (see Annex 3).

GRAPH 2. Hospital beds per 1,000 inhabitants. Ranking of countries based on value (higher to lower value) and classification according to cluster analysis. Year 1964, 1974, 1984, 2000 and 2020. Latin America



Source: PAHO (1964/2023), WHO (2022, 2023).



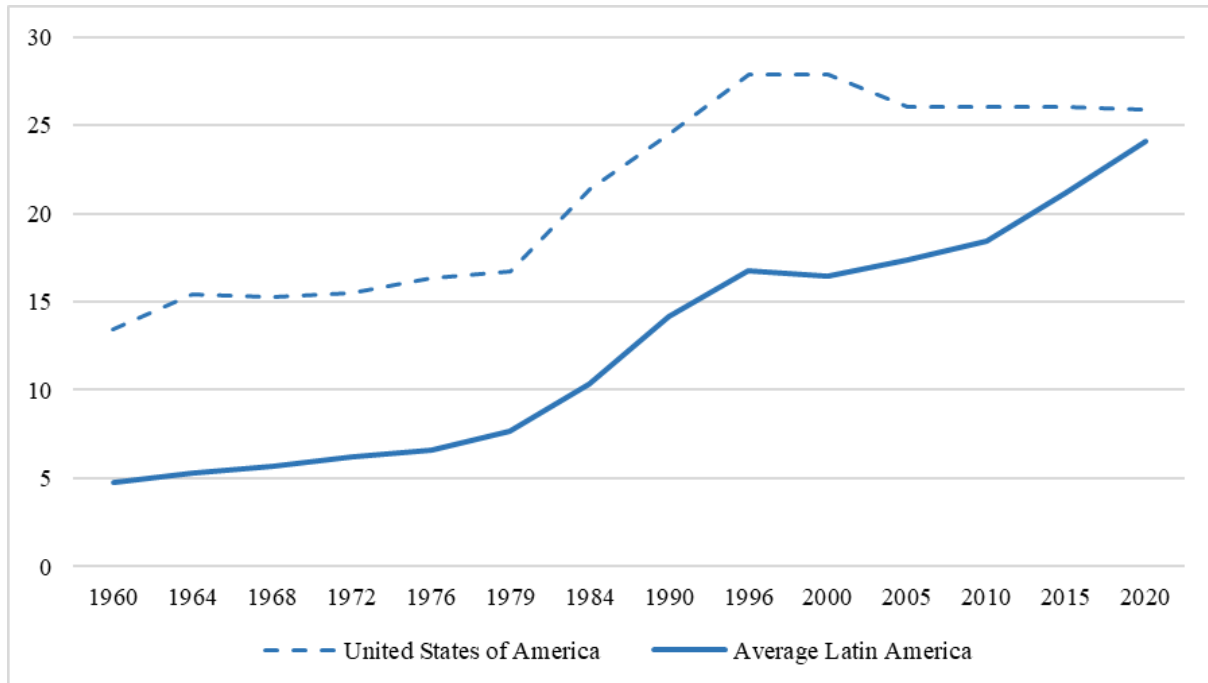
In the longitudinal analysis, Cuba, Argentina, and Uruguay consistently recorded the highest values throughout the period, with Brazil, Chile, and Panama following closely behind in most years. However, Costa Rica, which ranked fourth in 1964, experienced a faster decline than the other countries and dropped to 12th place by 2020. Similarly, Venezuela fell from seventh place to 16th place over the same period (Graph 2).

In the long run, the differences between countries have been narrowing. This is due to the decreasing trend of the values in a series that is always positive by definition, i.e., the reduction in the number of beds per 1,000 inhabitants from an average of 2.9 in 1960 to 1.6 in 2020, which brought the values of all countries closer together. Consequently, the standard deviation, absolute deviation, and deviation from the average decreased from that year. As a result, the cluster analysis of three categories described a cluster that grouped more countries over time (cluster 3), with 11 countries in 1984 and 17 countries in 2020. On the contrary, there seems to be some narrowing of the differences between 1960 and 1984. However, given the caution of the sources regarding the values of the first years, it is important to be cautious in the conclusions.

3.2 Physicians (per 10,000 inhabitants)

The trend in the number of physicians per 10,000 inhabitants in the region has been increasing over time. Although the gap with the United States has been narrowing throughout the period, it has been narrowing at a faster rate in the last decade. In 1960, the number of physicians per 10,000 inhabitants was almost three times higher in the United States than the average in Latin America. By 2000, this ratio had fallen to 1.7 times, and in 2020, it was 1.1 times higher in the United States than the Latin American average (Graph 3).

GRAPH 3. Hospital beds per 1,000 inhabitants. Ranking of countries based on value (higher to lower value) and classification according to cluster analysis. Year 1964, 1974, 1984, 2000 and 2020. Latin America



Source: PAHO (1964/2023), WHO (2022, 2023).

Increases in the number of physicians per 10,000 inhabitants have occurred in all countries, with greater increases observed in countries that had higher initial levels of medical resources. From 1960 to 2020, the indicator increased from 9.7 to 74.5 in Cuba, from 11.4 to 53.2 in Uruguay, and from 13 to 40.6 in Argentina. The exception is El Salvador, which increased from 18 in 1960 to 28.7 in 2020. None of the countries experienced a decrease in the value of this indicator, although increases of less than 10 points were observed in Bolivia, Peru, Honduras, and Haiti (see Annex 3).

In the longitudinal analysis, similarly to the number of beds, Cuba, Argentina, and Uruguay consistently recorded the highest values throughout the period. However, in the following group, the ranking changes depending on the time period examined, as the differences between the remaining countries are relatively small. Notably, Venezuela stood out, as it was among the

five countries with the highest values until the year 2000, but dropped to 11th place in the last two decades (Graph 4).

GRAPH 4. Physicians per 10,000 inhabitants. Ranking of countries based on value (higher to lower value) and classification according to cluster analysis. Year 1964, 1974, 1984, 2000 and 2020. Latin America



Source: PAHO (1964/2023), WHO (2022, 2023).



Over the long term, the number of physicians per 10,000 inhabitants in Cuba, and to a lesser extent in Uruguay and Argentina, has consistently exceeded those of other countries in the region. The average value increased from 5.3 in 1960 to 24.1 in year 2020, but surpassed 40 in the aforementioned three countries. Consequently, the standard deviation in absolute terms has increased over the period. As a result, when applying a cluster analysis with three categories, the model identified a third cluster that included an increasing number of countries (cluster 2 in 1964 and cluster three in the other years). In 1964, this cluster comprised 14 countries, while in 2020, it encompassed 16 countries.

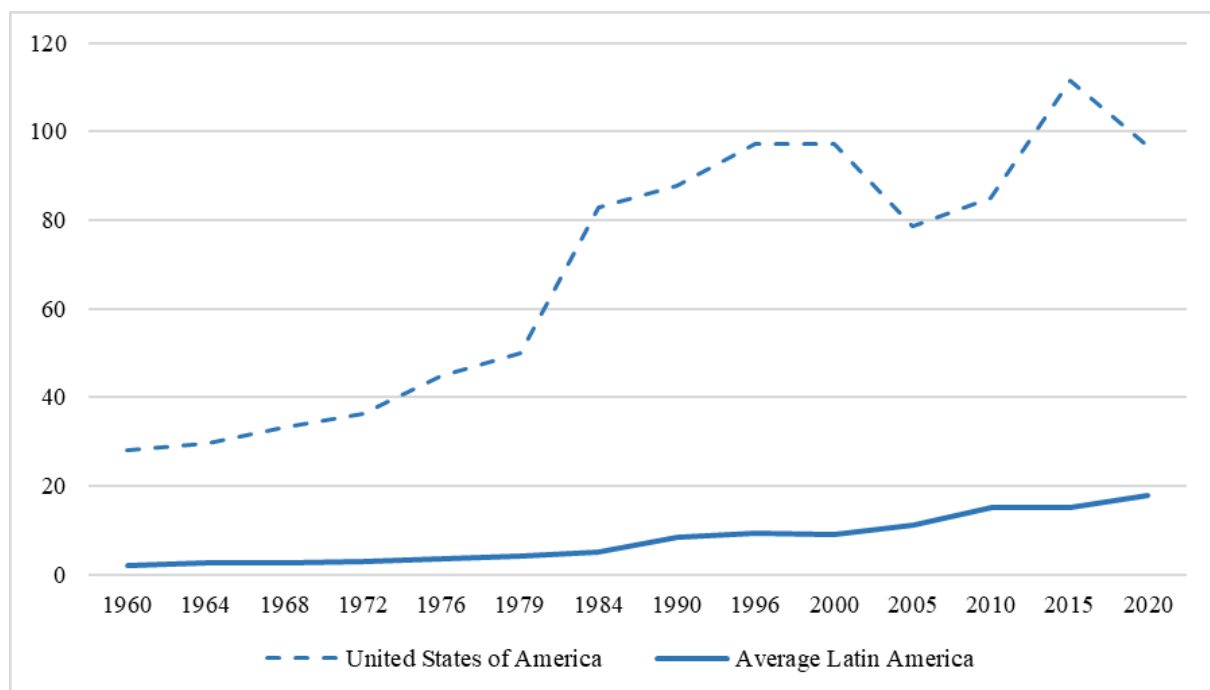
3.3 Nurses (per 10,000 inhabitants)

The number of nurses in the Latin American region reveals a trend of growth, although at a slower pace than that of physicians. However, the region's gap with the United States widened for most of the period studied. In year 1960, the number of nurses per 10,000 inhabitants was almost 14 times higher in the United States than the Latin American average. By 2000, this ratio had increased to 17 times. While there was a narrowing of the gap in the 1990s due to an increase in the Latin American average, the trend reversed at the end of the decade. Since then, the number of nurses has increased at a greater rate in Latin America than in the United States, leading to a decrease in the ratio to 7.3 times in 2020. (Graph 5).

The number of nurses per 10,000 inhabitants underwent a significant increase between 1964 and 1984, doubling during this period. Subsequently, between 1984 and 2000, the rate of growth slowed, with the increase primarily attributable to the rise in endowment in Cuba that had commenced during the 1990s. Excluding Cuba, the average number of nurses per 10,000 inhabitants in the region would have been only 5.5 in 2000. More recently, other countries have followed this trend, resulting in an average of 17.7 nurses per 10,000 inhabitants. Notably,

Argentina increased from 5.9 to 37.2, Chile from 2.4 to 35.3, and Costa Rica from 11.7 to 35.2, indicating significant progress in enhancing nurse-to-population ratios across these countries (see Annex 3).

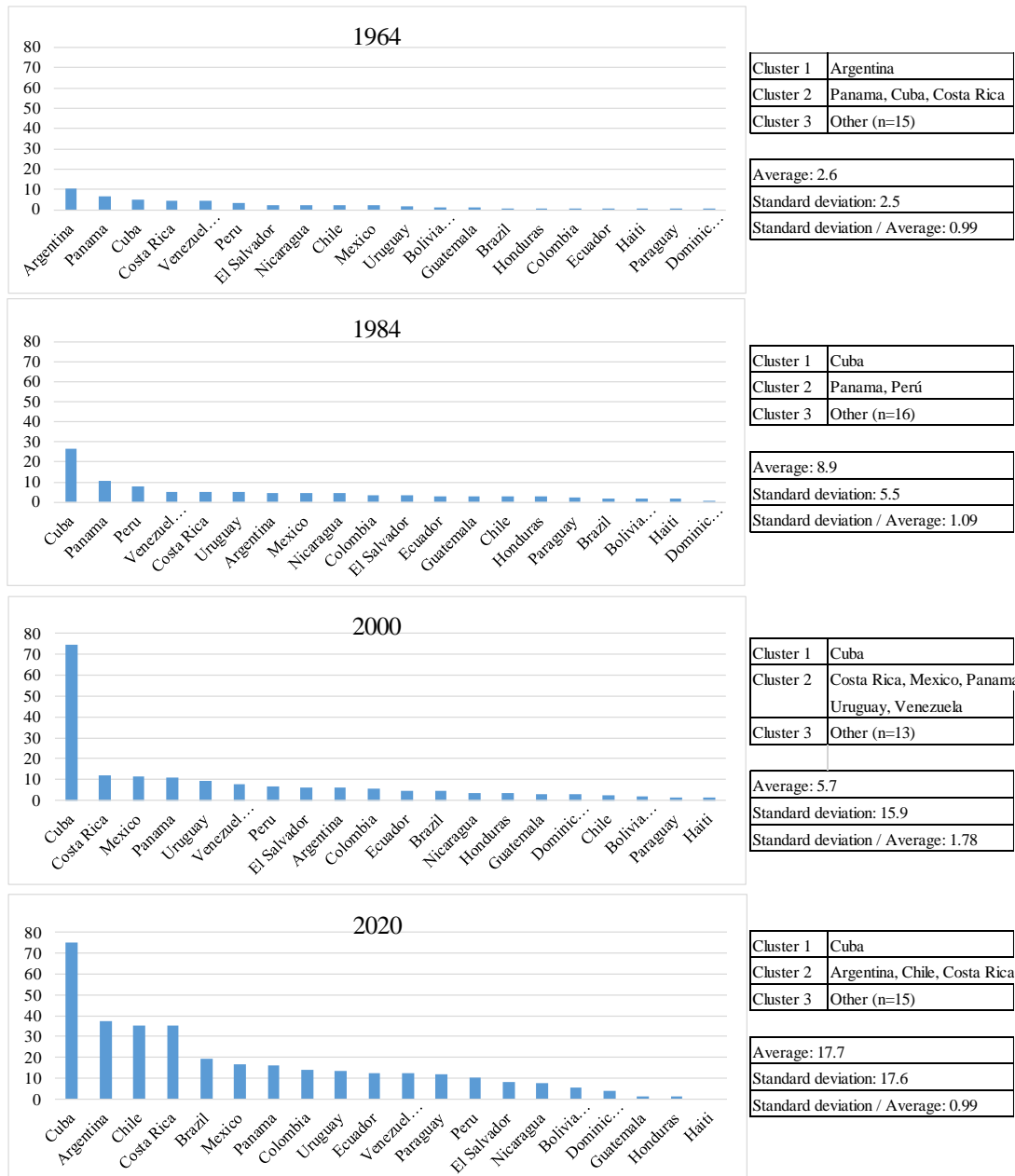
GRAPH 5. Nurses per 10,000 inhabitants. United States of America and average of LAC (20 countries). 1960-2020



Source: PAHO (1964/2023), WHO (2022, 2023).

In the longitudinal analysis, there are notable differences with the other indicators. While Cuba is the only country that consistently remains in the top three throughout the period, Panama, Argentina, and Costa Rica also exhibit high endowments. The cases of Peru and Venezuela in 1984 and Mexico in 2000 are striking, with comparatively high values. Over the past twenty years, the number of nurses per inhabitant has exhibited a behavior similar to that of doctors, with Cuba, Argentina, and Costa Rica continuing to occupy the top four positions, and Chile now joining them in the third position. Conversely, Mexico has experienced a relative loss of position, falling from second place in 2000 to sixth in 2020, and Uruguay has fallen from fourth to ninth in the same period (Graph 6).

GRAPH 6. Nurses per 10,000 inhabitants. Ranking of countries based on value (higher to lower value) and classification according to cluster analysis. Year 1964 to 2000. Latin America



Source: PAHO (1964/2023), WHO (2022, 2023).

As a result, when performing a three-category cluster analysis, the model described a third cluster that grouped almost all countries throughout the period (between 14 and 16 countries).

Cuba stands out as the country that distances itself the most from this main group, due to its high endowment of nurses, especially since the year 2000. The other countries that distance



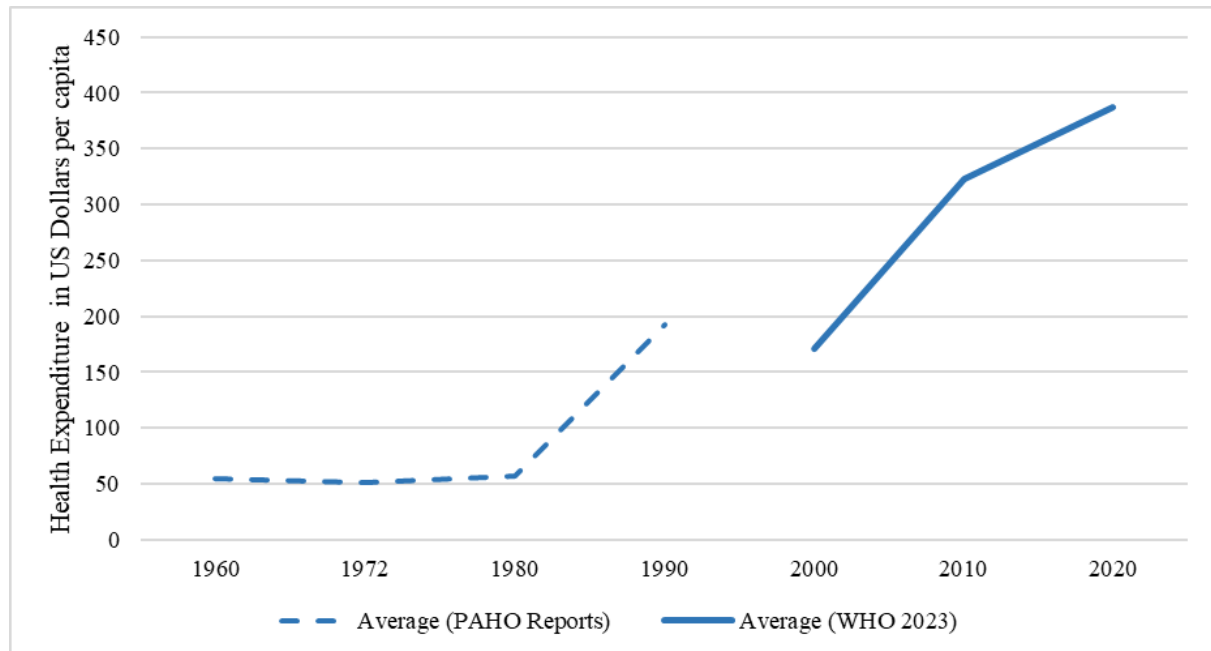
themselves from this main group are Panama between 1964 and 2000, and Costa Rica in most years. In 2020, Argentina, Chile, and Costa Rica are approaching Cuba's standard. The rest of the countries remain below values of 20 nurses per 10,000 inhabitants.

3.4 Expenditure per capita (US dollars)

It is important to exercise caution when interpreting health expenditure statistics (see Methodology), as values prior to 2000 are often influenced by varying criteria used by individual countries and may not account for the fragmentation of national health systems or private expenditure. Despite this, certain trends can be observed in the description of the series. Per capita spending on health in Latin America experienced two periods of growth: the first occurred between 1980 and 1990, during which spending increased from \$54 to \$192 per capita (a 3.5-fold increase), and the second took place between 2000 and 2020, during which spending increased from \$170 to \$386 per capita (a 2.2-fold increase) (Graph 7). Nevertheless, these values remain relatively low, with the 2020 per capita spending in Latin America amounting to less than 1% of that in the United States.

The average health expenditure per capita in the region increased significantly between 2000 and 2020. In constant terms, it rose from an average of \$3,022 to \$9,919 per capita, representing a 3.3-fold increase during this period. Seventeen out of the twenty countries in the region experienced an increase in this indicator, with Ecuador recording the largest variation of 12 times. Cuba, Bolivia, and Peru increased their per capita spending on health by over 3 times compared to 2000, while Paraguay, Dominican Republic, Costa Rica, and Chile also saw significant increases ranging from 1.9 to 2.6 times. In contrast, Venezuela experienced the greatest fall of -74.3%, followed by Argentina (-1.2%) and Haiti (-3.3%) (see Annex 3).

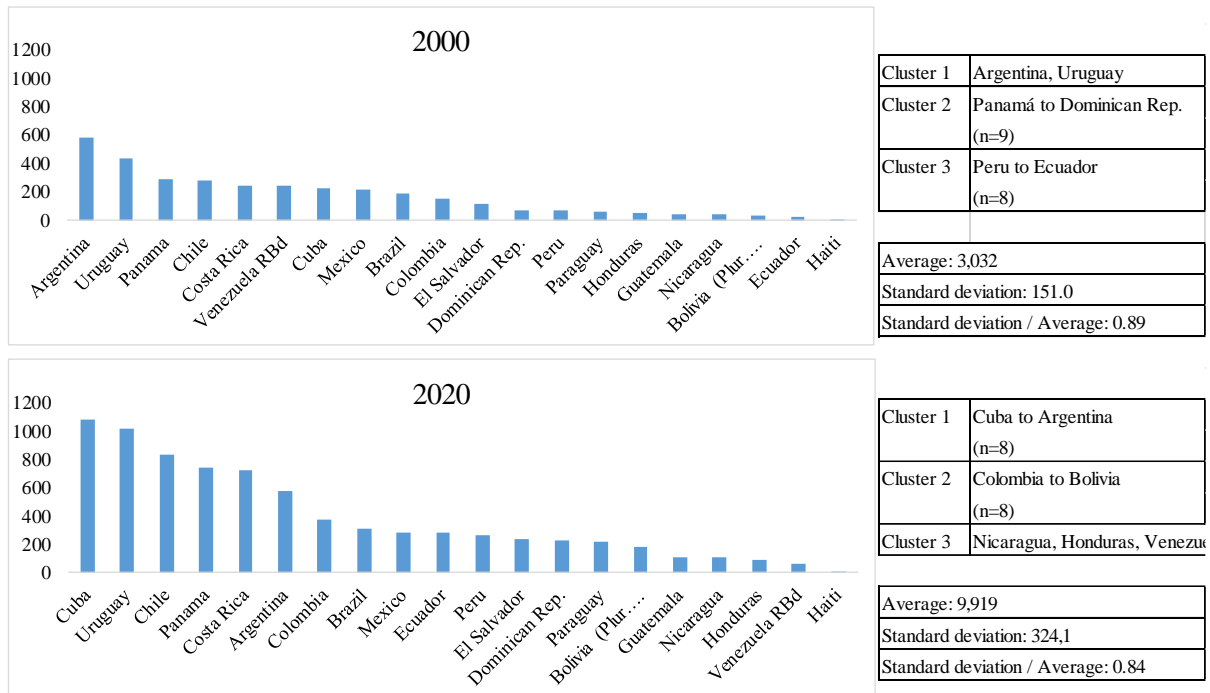
GRAPH 7. Expenditure per capita (US dollars, constant year 2020). Average of LAC (20 countries). 1960-2020. Serie PAHO 1960-1990 and Serie WHO (2023) 2000-2020



Source: PAHO (1964/2023), WHO (2022, 2023).

As a result of the cluster analysis using three categories, the model identified two clusters with a similar number of countries each year (between 8 and 9 countries). In 2000, Argentina and Uruguay were distinguished as two countries with higher spending that were separated from the rest. In 2020, three countries were identified as having higher spending and were separated from the rest of the countries (Graph 8).

GRAPH 8. Expenditure per capita (US dollars, constant year 2020). Ranking of countries based on value (higher to lower value) and classification according to cluster analysis. Year 2000 and 2020. Latin America



Source: PAHO (1964/2023), WHO (2022, 2023).

4. Conclusions

According to the Actor Network Theory, any understanding of a complex reality or organization must start with a description of its components: inanimate and human actors, and networks. There are very few long term descriptions of the most relevant actors in the evolution of health care systems in Latin America since mid 20th century: hospitals (centers of resources and services), hospital beds (the most relevant and basic physical unit required to attend patients in any health care center poor or rich), and sanitary staff (mainly physicians and auxiliary staff).

The reconstruction of historical series from international organizations whose data came from national organizations, since 1960, done for the first time for this article, for all the Latin American region, enables us to draw conclusions on three overarching questions: the



endowment of hospital beds and human endowments; the different evolution in the endowment of nurses and physicians in the various countries; the increase in health care spending

- First, the evolution of endowments in hospital beds has been decreasing, while human endowments, i.e. doctors and nurses, have been increasing. This decline in hospital bed numbers is not unique to Latin America; other countries have witnessed a similar trend, which can be attributed to national policies, patient demand and profile, medical technologies, and care models (OECD 2023; Ewbank, Thompson and McKenna 2017). However, the Latin American region started this process with low endowments, with only Argentina and Costa Rica exceeding 5 beds per 10 thousand inhabitants in 1960, while 12 out of the 20 countries failed to reach 3 beds per 10 thousand inhabitants. This is particularly significant considering the criticism that hospital bed shortages faced during the COVID-19 pandemic in 2020-2022 (Sen-Crowe et al. 2021; Bloom, Foroutanjazi and Chatterjee 2020; Neville 2020). The series of the United States and Latin America converge towards the end of the period. Also, the number of doctors and nurses per 10,000 inhabitants has increased throughout the period, with particularly noteworthy increases between 1984 and 1996, and after 2015.
- Secondly, there are two differences in the behavior of the doctors and nurses series. Firstly, the countries with the highest number of doctors per population are the same ones that have the highest number of hospital beds at any given time, including Cuba, Uruguay, and Argentina. Conversely, the series of nurses is heavily influenced by the high endowment of Cuba, particularly since 1984. Only in the last two decades, there has been a significant increase in the number of nurses in some countries, namely

Argentina, Chile, and Costa Rica. Secondly, while the number of doctors in LAC is approaching the US standard, the number of nurses is diverging.

- Thirdly, it is noteworthy that health spending has significantly increased over the past two decades. However, caution must be exercised as there may be a lack of information on some previous funding sources, and this bias is more pronounced in older series. As Matus-Lopez (2023) has demonstrated, financing schemes in the region have varied over time and are characterized by fragmentation. Only in the last century has there been greater consistency in the data. The analysis for the period of 2000-2020 aligns with other studies that indicate an effort to increase public expenditure in health (Matus-Lopez and Cid 2020). Consequently, at the end of the period, Cuba, Uruguay, Chile, Panama and Costa Rica exceeded \$600 per capita, while Argentina came very close to this threshold. By contrast, no country had reached this level of spending twenty years ago.

An overview of the reconstructed historical series reveals a group of leading countries, including Cuba, Argentina, and Uruguay, that consistently perform well across most indicators and periods. These countries are often accompanied by Costa Rica and Panama. Interestingly, three of these countries are also considered pioneers in the Mesa-Lago classification (2009). Conversely, Venezuela experiences significant setbacks, and most Central American countries show minor progress or stagnation, with the exception of Costa Rica.

This study's data aims to provide to a variety of researchers a valuable new quantitative complement to the qualitative historical analysis of the region's health systems and help test hypotheses about their development. The value of this information lies in its broad temporal

and geographical scope. However, it is important to note the limitations of the study, above all that the sources used in this study may have omissions, particularly in the first years and especially in financing. Therefore, the article calls for further research to collect national historical statistics and describe the financial structure of health systems in the twentieth and twenty-first centuries to strengthen and complement this database.

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ANNEX 1. Original Data.

Hospital beds per 1,000 population by country. Latin America. 1960-2020

Country	1960	1964	1967	1972	1974	1978	1984	1991	1996	2000	2005	2010	2015	2020	Var 64/15
Argentina	6,4	6,0	6,3	5,7	5,4	5,4	5,4	4,4	3,3	4,1	4,1	4,7	5,0	3,2	-3,2
Bolivia (Plur. State of)	1,8	2,1	2,2	2,0	1,8	1,8	1,8	1,3	1,7	0,8	1,1	1,1	1,2	1,4	-0,4
Brazil	3,4	3,4	3,8	3,8	3,8	3,8	3,6	3,5	3,1	2,9	2,6	2,3	2,4	2,4	-1,0
Chile	5,0	4,3	4,4	3,7	3,6	3,6	2,9	3,2	2,7	2,7	2,3	2,1	2,1	2,0	-3,0
Colombia	3,2	2,7	2,4	2,0	2,9	1,7	1,8	1,4	1,5	1,6	1,2	1,5	1,7	1,7	-1,5
Costa Rica	5,1	4,5	3,8	3,9	3,8	3,1	2,9	2,2	1,9	1,6	1,3	1,2	1,1	1,1	-4,0
Cuba	2,3	5,5	4,8	4,2	4,2	4,0	6,1	6,0	5,1	5,0	4,9	5,3	4,0	4,2	1,9
Dominican Rep.	2,7	2,7	2,8	2,8	2,8	2,0	1,2	1,9	1,5	2,0	2,0	1,7	1,5	1,4	-1,3
Ecuador	2,1	1,9	2,4	2,1	2,1	2,0	1,9	1,6	1,6	1,5	1,7	1,6	1,5	1,3	-0,8
El Salvador	2,0	2,3	2,2	2,1	1,8	1,8	1,3	1,6	1,7	0,8	0,7	1,1	1,0	1,1	-0,9
Guatemala	2,8	2,6	2,5	2,4	2,0	1,6	1,6	1,6	1,0	0,5	0,7	0,6	0,6	0,4	-2,4
Haiti	0,7	0,7	0,7	0,7	0,7	0,8	1,0	0,8	0,7	0,8	0,8	0,7	0,7	0,7	0,0
Honduras	2,0	2,0	1,7	1,7	1,7	1,3	0,9	1,1	1,1	1,2	1,0	0,7	0,6	0,7	-1,3
Mexico	1,4	2,2	2,0	1,2	1,2	0,9	0,8	0,8	1,2	1,1	1,0	1,5	1,0	1,0	-0,4
Nicaragua	1,8	2,3	2,3	2,5	2,2	1,6	1,6	1,2	1,6	1,0	0,9	0,9	0,9	0,9	-0,9
Panama	3,8	3,2	3,3	3,2	3,2	3,9	3,6	2,7	2,2	2,1	2,2	2,2	2,1	1,9	-1,9
Paraguay	0,8	2,2	2,0	1,5	1,5	1,5	1,4	1,2	1,3	0,7	1,3	1,3	0,8	1,0	0,2
Peru	2,2	2,5	2,4	2,0	2,0	1,9	1,7	1,5	1,5	1,8	1,2	1,5	1,6	1,6	-0,6
Uruguay	3,9	6,4	6,4	3,0	5,7	5,2	5,0	4,4	4,4	4,4	2,9	2,5	2,5	2,5	-1,4
Venezuela RBd	3,6	3,3	3,2	2,1	2,9	2,7	2,7	2,6	1,5	2,0	0,9	0,9	0,7	1,0	-2,6
United States of America	9,1	9,4	8,3	7,2	7,1	6,2	5,7	4,6	4,0	3,5	3,2	2,9	2,7	2,7	-6,7
N. Obs.	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Average all	2,9	3,1	3,1	2,6	2,8	2,5	2,5	2,3	2,0	1,9	1,7	1,8	1,7	1,6	-1,3
Average full data (N=17)	2,8	3,2	3,1	2,6	2,8	2,5	2,5	2,3	2,1	1,9	1,7	1,7	1,6	1,6	-1,2
Index USA=100	31,3	33,3	37,0	36,5	38,9	40,8	43,2	48,9	51,4	55,4	54,5	61,1	60,8	57,7	
Max	6,4	6,4	6,4	5,7	5,7	5,4	6,1	6,0	5,1	5,0	4,9	5,3	5,0	4,2	1,9
Min	0,7	0,7	0,7	0,7	0,7	0,8	0,8	0,8	0,7	0,5	0,7	0,6	0,6	0,4	-4,0
Range / Average	2,0	1,8	1,9	1,9	1,8	1,8	2,2	2,3	2,2	2,3	2,4	2,7	2,6	2,4	-4,7

Raw data is available in Excel format at <https://zenodo.org/record/7985339>.

Physicians per 10,000 population by country. Latin America. 1960-2020

Country	1960	1964	1968	1972	1976	1979	1984	1990	1996	2000	2005	2010	2015	2020	Var 64/15
Argentina	13,0	14,9	18,9	20,9	21,7	26,7	27,0	26,8	26,8	32,5	31,9	39,4	39,9	40,6	27,6
Bolivia (Plur. State of)	1,9	2,9	3,6	4,1	4,7	4,7	7,2	4,5	13,0	12,0	3,3	4,4	15,9	9,5	7,6
Brazil	4,0	4,0	4,4	5,2	6,1	8,7	9,3	13,6	12,7	13,7	16,1	18,5	18,8	23,1	19,1
Chile	6,2	5,8	5,5	5,4	4,5	5,2	8,0	11,0	11,0	8,9	9,8	14,3	21,5	28,4	22,2
Colombia	4,3	4,4	4,5	4,6	4,8	5,1	8,4	10,9	11,6	12,5	14,2	16,5	19,7	23,3	19,0
Costa Rica	3,9	4,7	5,4	7,0	6,6	6,6	10,1	12,6	14,1	13,1	20,4	23,1	27,3	33,0	29,1
Cuba	9,7	8,9	8,7	8,5	8,9	14,8	19,1	43,3	53,0	59,3	62,7	68,2	77,7	84,2	74,5
Dominican Rep.	1,5	6,2	5,0	5,2	5,4	5,4	6,2	14,9	21,6	18,5	11,0	15,3	21,2	14,5	13,0
Ecuador	3,4	3,3	3,6	3,4	4,7	4,7	11,5	14,2	17,0	14,5	15,0	21,1	20,7	23,2	19,8
El Salvador	1,8	2,2	2,3	2,5	2,7	2,9	3,4	8,4	10,7	12,4	17,1	18,8	15,7	28,7	26,9
Guatemala	2,1	2,5	2,2	2,3	2,2	1,2	4,7	7,8	9,3	8,8	9,7	9,0	2,8	12,4	10,3
Haiti	0,0	0,7	0,7	0,8	0,9	1,2	1,6	0,8	0,8	2,4		1,4	2,3	2,3	2,3
Honduras	2,1	1,6	2,7	2,9	3,4	3,2	6,6	7,0	8,3	5,6	3,6	3,0	6,0	5,0	2,9
Mexico	5,8	5,2	5,4	6,9	8,0	8,0	16,4	17,0	18,6	16,3	17,7	20,0	23,3	24,3	18,5
Nicaragua	3,5	4,2	5,1	7,0	6,3	3,6	6,9	4,4	8,6	6,2	5,0	7,3	9,3	16,7	13,2
Panama	3,8	5,3	5,1	7,0	7,9	8,5	10,4	16,4	16,7	12,3	13,5	14,1	15,8	16,3	12,5
Paraguay	5,3	6,0	6,2	4,1	4,6	5,7	7,3	6,5	11,0	11,5	11,5	12,8	15,8	10,5	5,2
Peru	4,7	4,7	5,1	5,5	5,6	6,8	9,5	10,6	9,3	11,4	10,0	9,5	13,1	13,7	9,0
Uruguay	11,3	11,4	9,6	10,9	11,0	18,8	19,3	36,8	37,0	37,2	37,2	39,5	39,6	53,2	41,9
Venezuela RBd	7,0	7,8	8,9	10,3	11,5	11,4	14,3	16,2	23,6	19,5	20,0	12,3	17,6	19,2	12,2
United States of America	13,4	15,4	15,3	15,5	16,3	16,7	21,4	24,5	27,9	27,9	26,0	26,0	26,0	25,9	10,6
N. Obs.	20	20	20	20	20	20	20	20	20	20	19	20	20	20	20
Average all	4,8	5,3	5,6	6,2	6,6	7,7	10,4	14,2	16,7	16,4	17,3	18,4	21,2	24,1	19,3
Average full data (N=17)	5,3	5,5	6,0	6,7	7,0	8,3	11,4	15,3	17,8	17,7	18,3	20,3	23,0	27,4	22,1
Index USA=100	35,6	34,6	36,9	40,2	40,3	45,9	48,4	57,9	60,0	58,9	66,7	70,8	81,5	93,1	
Max	13,0	14,9	18,9	20,9	21,7	26,7	27,0	43,3	53,0	59,3	62,7	68,2	77,7	84,2	74,5
Min	0,0	0,7	0,7	0,8	0,9	1,2	1,6	0,8	0,8	2,4	3,3	1,4	2,3	2,3	2,3
Range / Average	2,7	2,7	3,2	3,2	3,2	3,3	2,5	3,0	3,1	3,5	3,4	3,6	3,6	3,4	3,7

Raw data is available in Excel format at <https://zenodo.org/record/7985339>.

Nurses per 10,000 population by country. Latin America. 1960-2020

País	1960	1964	1968	1972	1976	1979	1984	1990	1996	2000	2005	2010	2015	2020	Var 64/15
Argentina	5,2	10,4	5,7	6,1	5,9	7,2	4,7	5,4	7,7	5,9	2,2	3,80	25,82	37,20	32,0
Bolivia (Plur. State of)	0,7	1,1	1,3	1,6	1,6	1,7	1,9	2,5	6,9	1,6	3,2	2,40	3,92	5,70	5,0
Brazil	0,6	0,8	1	0,9	0,8	1,9	2,0	3,7	4,1	4,5	5,4	7,10	21,18	19,24	18,6
Chile	2,1	2	2,5	2,3	2,6	3,2	2,8	4,2	4,7	2,4	4,3	15,30	20,66	35,32	33,2
Colombia	0,7	0,7	1	1,2	1,4	1,1	3,5	4,6	4,8	5,7	6,1	9,20	10,80	13,91	13,2
Costa Rica	4,5	4,3	5,7	4,6	5,6	5,5	5,2	9,5	10,9	11,7	15,3	19,10	26,58	35,21	30,7
Cuba	4,5	5,1	5,4	5,5	10,1	14,3	26,5	68,0	67,8	74,9	83,6	91,70	79,40	75,20	70,7
Dominican Rep.	1,4	0,4	0,5	0,7	0,7	0,9	0,9	1,8	3,0	3,0	3,9	3,30	3,48	3,93	2,5
Ecuador	0,5	0,7	0,9	1	1,7	2,6	3,1	5,0	7,0	4,6	5,8	7,90	11,74	12,42	11,9
El Salvador	1,3	2,4	2,4	2,6	2,9	3,8	3,4	4,9	3,5	6,3	8,1	17,20	7,82	8,08	6,8
Guatemala	1,6	1,1	1,4	1,4	1,4	1,1	3,0	3,2	2,7	3,2	3,6	5,00	0,24	1,17	-0,4
Haiti		0,7	0,9	0,8	1,1	1,5	1,9	1,0	1,1	1,1			3,50		
Honduras	0,5	0,8	1,3	1,1	1,3	1,5	2,6	2,5	2,6	3,2		4,00	1,23	1,13	0,6
Mexico	1,3	2	2	2,1	4,6	5,4	4,6	9,2	8,7	11,6	13,8	25,40	16,36	16,90	15,6
Nicaragua	1,8	2,1	2,3	2,4	2,4	3,7	4,3	5,6	9,2	3,3	1,4	11,80	7,31	7,70	5,9
Panama	4,6	6,5	7,3	7	6,9	11	10,4	10,5	14,4	10,8	11,5	12,80	14,02	16,28	11,7
Paraguay	0,5	0,7	1,3	1,2	1,7	1,7	2,2	3,0	2,4	1,2	2,8	14,90	14,60	11,70	11,2
Peru		3,1	3,1	3,5	4,6	4,6	7,8	8,7	11,5	6,7	9,0	10,90	8,52	10,54	10,5
Uruguay	1,5	1,8	2,7	3,4	3,4	3,4	5,0	5,5	7,0	9,1	8,7	15,30	18,90	13,47	12,0
Venezuela RBd	3,2	4,3	5,7	7,3	7,4	6,9	5,3	7,4	6,4	7,9		8,0	8,0	12,14	8,9
United States of America	28,0	29,6	33,1	36,3	44,9	50,1	83,0	87,8	97,2	97,2	78,5	85,0	111,4	96,6	81,8
N. Obs.	18	20	20	20	20	20	20	20	20	20	17	19	20	19	19
Average all	2,0	2,6	2,7	2,8	3,4	4,2	5,1	8,3	9,3	5,7	11,1	15,0	15,2	17,7	15,8
Average with full data (N=16)	2,1	2,7	2,7	2,7	3,4	4,4	5,3	9,2	10,5	5,7	11,8	16,9	17,2	20,6	18,6
Desv/Avrg	0,80	0,99	0,76	0,76	0,77	0,85	1,09	1,72	1,52	0,76	1,72	1,30	1,12	0,99	
Index USA=100	7,2	8,6	8,2	7,8	7,6	8,3	6,1	9,5	9,6	5,9	14,1	17,7	13,6	18,4	
Max	5,2	10,4	7,3	7,3	10,1	14,3	26,5	68,0	67,8	19,1	83,6	91,7	79,4	75,2	70,7
Min	0,5	0,4	0,5	0,7	0,7	0,9	0,9	1,0	1,1	1,1	1,4	2,4	0,2	1,1	-0,4
Range / Average	2,3	3,9	2,5	2,3	2,8	3,2	5,1	8,1	7,2	3,1	7,4	6,0	5,2	4,2	4,5

Raw data is available in Excel format at <https://zenodo.org/record/7985339>



Health Expenditure by country. US Dollars, constant 2021. Latin America. 1960-2020

País	1960	1972	1980	1990	2000	2010	2020	Var 20/60
Argentina		56,32	34,13	649,52	581,61	687,88	574,77	
Bolivia (Plur. State of)	8,90	12,93	32,81	75,12	38,83	73,53	180,93	19,3
Brazil	14,42	7,38	71,65	248,10	194,93	478,77	314,17	20,8
Chile	62,05	122,74	81,22	299,53	286,76	611,49	832,71	12,4
Colombia	18,94	17,92	25,01	158,34	154,87	402,46	375,23	18,8
Costa Rica	64,27	23,47	87,46	300,11	246,56	569,06	722,40	10,2
Cuba	57,76				228,53	657,80	1.079,75	17,7
Dominican Rep.	34,05	53,93	76,30	62,41	70,42	170,44	232,81	5,8
Ecuador		5,27	38,06	151,40	21,85	156,54	282,28	
El Salvador		24,47	38,69	101,70	119,96	178,81	234,59	
Guatemala		22,20	67,39	57,59	44,91	70,82	107,41	
Haiti	8,44	4,33	8,10	16,95	9,92	11,96	9,59	0,1
Honduras	15,26	18,98	46,31	84,75	51,88	91,73	92,80	5,1
Mexico	21,94	14,65	24,47	165,27	219,33	322,20	284,89	12,0
Nicaragua	23,39	60,59	118,74	51,82	39,41	72,17	104,93	3,5
Panama	74,40	92,61	100,35	332,27	294,76	470,14	740,22	8,9
Paraguay	5,60	33,90	19,07	94,77	60,57	119,51	220,41	38,4
Peru	30,14	68,47	32,87	79,55	66,75	149,07	267,45	7,9
Uruguay	277,81	88,50	77,05	304,54	434,44	737,41	1.014,61	2,7
Venezuela RBd	152,48	238,15	96,90	424,35	243,24	422,10	62,59	-0,6
United States of America	228,64	827,27	3.080,69	5.322,16	3.032,86	4.539,03	9.919,44	42,4
N. Obs.	16	19	19	19	20	20	20	16
Average all	54,4	50,9	56,7	192,5	170,5	322,7	386,7	11,4
Average with full data (N=16)	54,4	57,2	59,9	179,9	165,1	335,0	408,5	13,5
Index USA=100	23,8	6,2	1,8	3,6	5,6	7,1	3,9	
Max	277,8	238,2	118,7	649,5	581,6	737,4	1079,7	38,4
Min	5,6	4,3	8,1	17,0	9,9	12,0	9,6	-0,6
Range / Average	5,0	4,6	2,0	3,3	3,4	2,2	2,8	3,4

Raw data is available in Excel format at <https://zenodo.org/record/7985339>

ANNEX 2. Methodological Notes*Sources by series*

1. The rate of Hospital Beds was extracted from PAHO (1962, p.82) for 1960, PAHO (1998, p. 281) for 1964 to 1996 (1972 not included), PAHO (1972, p. 225) for 1972, PAHO (2002b, column 49) for 2002, PAHO (2007, column 49) for 2005, PAHO (2013, column 41) for 2010, PAHO (2022) for 2015 and 2020. The missing information was extracted from PAHO (2002a, p. 375) for Honduras in 1996, PAHO (2008, column 41) for Panama and Peru in 2005, PAHO (2022) for Haiti in 2010.

2. The rate of Physician was extracted from PAHO (1962, p. 66) for 1960, PAHO (1966, p. 125) for 1964, PAHO (1970, p. 178) for 1968, PAHO (1974, p. 230) for 1972, PAHO (1978, p. 326) for 1976, PAHO (1982, p. 365) for 1979, PAHO (1986, p. 170) for 1984, PAHO (1994, p. 453) for 1990, PAHO (1998, p. 301) for 1996, WHO (2022) since 2000 to 2020, and PAHO (2023) for Haiti in 2015. The missing information was extracted from PAHO Vol II. (1990, p. 228) for Mexico (own calculation) in 1986, PAHO (2002b, column 46) for Nicaragua in 2000, PAHO (2007, column 46) for Brazil, Guatemala, and Peru in 2005, PAHO (2012, p. 72) for Venezuela in 2010, PAHO (2016, column 74) for Dominican Rep. and Paraguay in 2015 (circa 2014),

3. The rate of Nursing Personnel was extracted from PAHO (1962, p. 98) for 1960, PAHO (1966, p. 129) for 1964, PAHO (1970, p. 178) for 1968, PAHO (1974, p. 230) for 1972, PAHO (1978, p. 326) for 1976, PAHO (1982, p. 365) for 1979, PAHO (1986, p. 175) for 1984, PAHO (1994, p. 453) for 1990,

PAHO (2002b, column 47) for 2000 with WHO (2022) for Cuba and Costa Rica, PAHO (2007, column 46) for 2005, PAHO (2013, column 39) for 2010, WHO (2022) since 2015 to 2020 with

PAHO (2010, column 39) for Argentina and Venezuela for 2010, PAHO (2016, column 75) for Colombia, Haiti, Venezuela, Uruguay, Paraguay, and United States of America for 2015 and PAHO (2023) for Argentina and Bolivia for 2020.

4. Government spending on health, per capita was extracted from PAHO (1962, p. 69) for 1960, PAHO (1974) for 1970, PAHO (1986, p. 210) for 1980, PAHO (1994, p. 401) for 1990, and WHO (2023) for 2000, 2010 and 2020. Series are not directly comparable. For 1960 it refers to Expenditure on Health (“Gastos para salud”), for 1970 it refers to Total government expenditures and expenditures devoted to health (“Gastos totales del gobierno y gastos dedicados a salud”), and for 1980 it refers to Central government expenditure (“Gasto del Gobierno Central”) and excludes Social Security data, for 1990 it refers to National Health Expenditure (“Gasto Nacional en salud”). The PAHO source explain that the items included differ considerably owing to the nature of the programs and services provided. Since 2000 public health expenditure refers to Government schemes and Compulsory health insurance. Government Health care financing schemes are determined by law or by the government of each country. A separate budget is set for the programme, and a government unit has an overall responsibility for it. Compulsory health insurance involves a financing arrangement to ensure access to health care for specific population groups through mandatory participation and eligibility based on the payment of health insurance contributions by or on behalf of the individuals concerned.

Country, year of the data (in parenthesis) and annotations

Argentina: (1968) Nurses for 1969, (1970) Expenditure of the Ministry of Health for 1969, (1972) Beds for 1971, (1976) Physician, Nurses, for 1973, (1996) Physician for 1992, Nursing



Auxiliaries for 1994, (2000) Physician for 2001, (2005) Beds for 2000, Physician for 2004, (2010) Physician for 2013, Nurses for 2008, (2015) Nurses for 2016.

Bolivia: (1960) Physician only government, Expenditure Public health and social insurance “Previsión Social”, (1968) Nurses for 1969, (1970) Expenditure for 1972, (1972) Beds for 1970, (1976) Physician and Nurses, for 1974, (1979) Physician and Nurses, for 1974, (1996) Physician for 1997, (2000) Beds for 2001, Physician for 2001, (2005) Beds for 2006, Physician for 2007.

Brazil: (1960) Physician for 1959, hospitals and Health Services only, (1960) Graduated Midwives included in Nurses, (1964) Nurses for 1963, (1968) Nurses for 1966, (1970) Expenditure for 1972, (1972) Beds for 1971, Physician for 1969, Nurses for 1970, (institutional and public health services only), (1976) Nurses in government only, Physician and Nurses for 1972, (1979) Physician and Nurses, for 1980, (2000) Beds and Physician for 1999, (2005) Beds for 2002, (2010) Physician for 2011, (2020) Nurses for 2019.

Chile: (1964) Nurses for 1963, (1970) Expenditure for 1972, (1972) Beds for 1970, Physician and Nurses for 1973, (1996) Physician for 1994, (2000) Physician for 2002.

Colombia: (1960) Midwives not available., (1964) Nurses for 1965, (1968) Nurses for 1967, (1970) Expenditure for 1972, (1976) Physician and Nurses for 1972, (1979) Physician and Nurses for 1977, (1996) Physician for 1997, (2000) Beds for 2001, (2005) Beds for 2004, (2015) Nurses for 2014, (2020) Nurses for 2019.

Costa Rica: (1960) Nursing government only, midwives included in Nurses, (1964) Nurses for 1965, (1968) Nurses for 1969, (1970) Expenditure for 1969, (1972) Physician and Nurses for 1973, (1976) Physician and Nurses for 1975, (1979) Physician and Nurses, for 1975, (1996)

Physician for 1997, (2000) Beds for 1999, Nurses personnel not further defined, (2005) Beds and Physician for 2006.

Cuba: (1960) Beds do not include those administered by universities, municipalities, and other autonomous institutions, (1964) Nurses for 1965, (1972) Physician for 1968, Nurses for 1970, (1976) Physician and Nurses for 1974, (1979) Physician and Nurses for 1978, (1996) Physician for 1997, (2000) Beds for 2001, Nurses personnel not further defined.

Dominican Rep.: (1960) Beds, government hospitals only, Physician and Nurses government only, (1964) Nurses for 1965, (1968) Nurses for 1967, (1976) Physician and Nurses for 1973, (1979) Physician and Nurses for 1973, (1996) Physician for 1997, (2000) Beds for 1999, (2005) Physician for 2008, (2010) Physician for 2011, (2015) Physician circa 2014, (2020) Nurses for 2019.

Ecuador: (1960) Physician for 1958, (1964) Nurses for 1965, (1968) Nurses for 1969, (1970) Expenditure for 1972, (1972) Beds for 1971, Physician and Nurses for 1970, (1976) Physician and Nurses, for 1973, (1979) Physician and Nurses for 1973, (1996) Physician for 1997, (2005) Beds and Physician for 2003, (2020) Physician for 2019, Nurses for 2018.

El Salvador: (1960) Beds government hospitals only. It does not include 500 beds of social security, military, and private hospitals. Nursing Ministry of Health only, (1964) Nurses for 1965, (1972) Beds for 1971, (1996) Physician for 1997, (1970) Expenditure for 1971, (2000) Physician for 1999, (2010) Physician for 2008, (2000) Beds for 2001, (2020) Nurses for 2018.

United States of America: (1960) Expenditure for 1958-59, (1964) Nurses for 1962, (1968) Nurses for 1967, (1970) Expenditure for 1971-72, (1972) Physician and Nurses for 1971, (1976) Physician and Nurses for 1975, (2015) Nurses professionally active for 2014.

Guatemala: (1960) Physician 1958, (1964) Nurses for 1965, (1968) Nurses for 1969, (1970) Expenditure for 1972, (1972) Beds, Physician and Nurses for 1971, (1976) Physician and Nurses for 1971, (1979) Physician and Nurses, for 1976, (1996) Physician for 1997, (2005) Physician from PAHO 2008, (2000) Beds for 2001, Physician for 1999, Nurses data was modified from original 18.4 to average inter-years (2010) Beds Public Sector and Physician for 2009.

Haiti: (1960) Beds of “other hospitals” not included. Physician for 1957, (government only), (1960) Expenditure for 1959, (1964) Nurses for 1963. Nurses, government only, (1968) Nurses for 1967, (1970) Expenditure for 1972, (1996) Physician for 1992, (2000) Beds for 1998, (2005) Beds for 2000, (2010) Beds for 2013, Physician for 2011, (2015) Beds for 2013, Nurses for 2014, (2020) Beds for 2018, Beds original data 7,0 was modified by 0.7.

Honduras: (1960) Beds, does not include tuberculosis and leprosy hospitals, Physician 1957, (1964) Nurses for 1965, (1972) Nurses for 1973, (1996) Physician for 1997, (2000) Beds for 2001, (2005) Beds for 2002, (2010) Beds Public Sector, (2020) Nurses for 2018.

México: (1960) Expenditure Public health and social insurance “Previsión Social”, (1964) Nurses for 1965, (1968) Nurses for 1967, (1970) Expenditure estimation, (1972) Beds for 1971, Physician and Nurses for 1970, (1976) Physician and Nurses for 1974, (1979) Physician and Nurses for 1974, (1984) Physician for 1986, (1996) Physician for 1990, (2005) Beds for 2004, (2020) Nurses for 2019.

Nicaragua: (1960) Beds without one mental hospital, Expenditure for 1960-61, (1964) Nurses for 1965, (1968) Nurses for 1969, (1976) Physician and Nurses for 1975, (1996) Physician for 1997, (2000) Beds for 2001, (2010) Beds Public Sector.

Panama: (1964) Nurses for 1965, (1968) Nurses for 1969, (1970) Expenditure for 1972, (1976) Physician and Nurses without Zona del Canal, (1979) Physician and Nurses for 1978, (1996) Physician for 1995, (2000) Physician for 1999, (2010) Beds Public Sector, (2020) Nurses for 2019.

Paraguay: (1960) Beds, government hospitals only, Physician 1958, (1964) Nurses for 1965, (1996) Physician for 1997, (2000) Physician for 2002, (2005) Beds for 2006, Physician for 2002, (2010) Physician for 2012, (2015) Physician, circa 2014, (2020) Nurses for 2018.

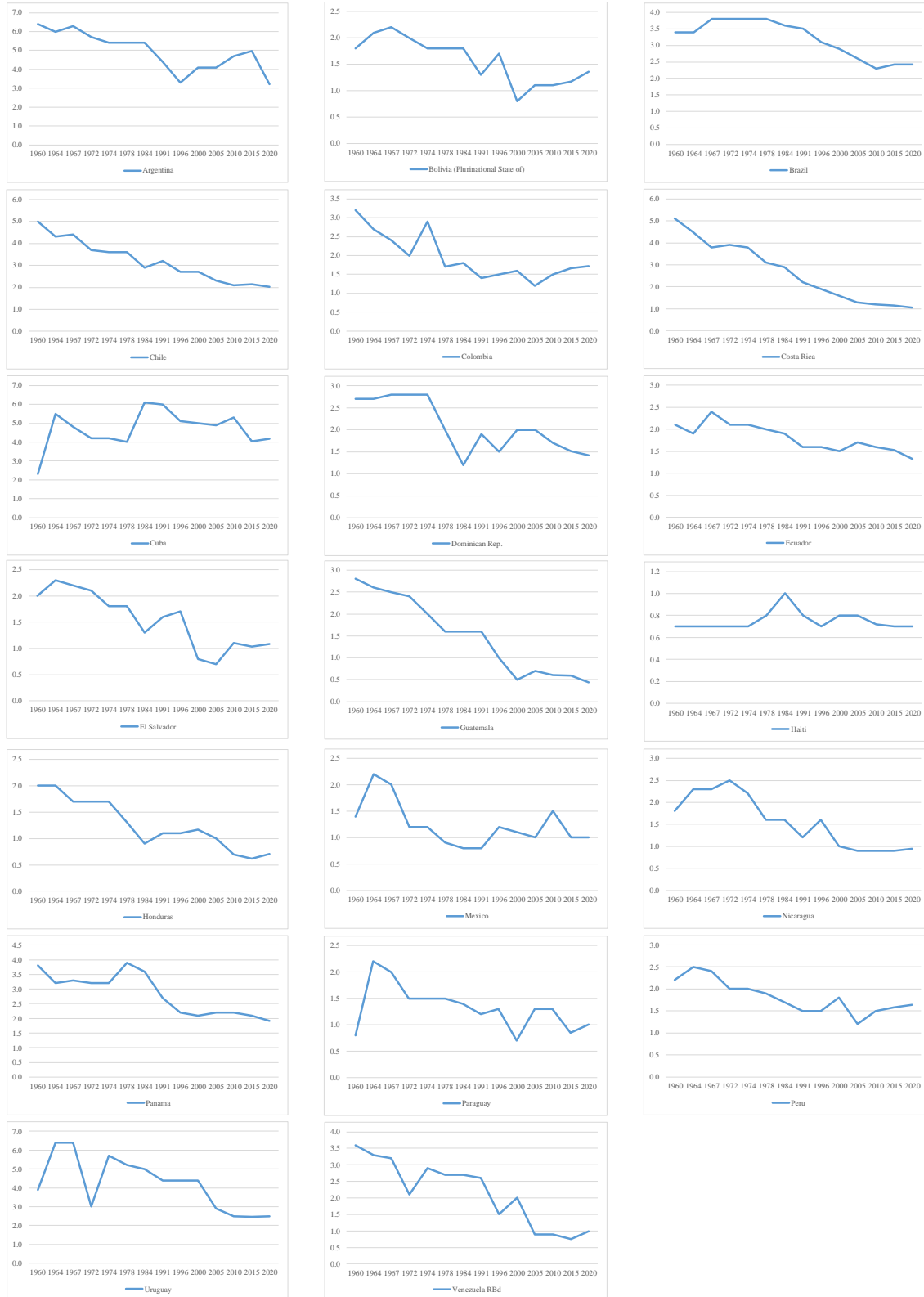
Peru: (1960) Graduate nurses not separately specified. Expenditure Public health and social insurance “Previsión Social”, (1964) Nurses for 1965, (1968) Nurses for 1969, (1976) Physician and Nurses for 1972, (1996) Physician for 1997, (2000) Beds for 1996, Physician for 1999, (2005) Beds public sector only, (2010) Physician for 2009, (2020) Nurses for 2018.

Uruguay: (1960) Beds, government hospitals only, Physician for 1958, (1968) Nurses for 1967, (1972) Beds, Physician and Nurses for 1971, (1976) Physician and Nurses for 1972, (2000) Beds for 1996, Physician for 2002, (2005) Beds, public sector for 2006, Physician for 2002, (2010) Physician for 2008, (2015) Nurses for 2014, (2020) Nurses for 2019.

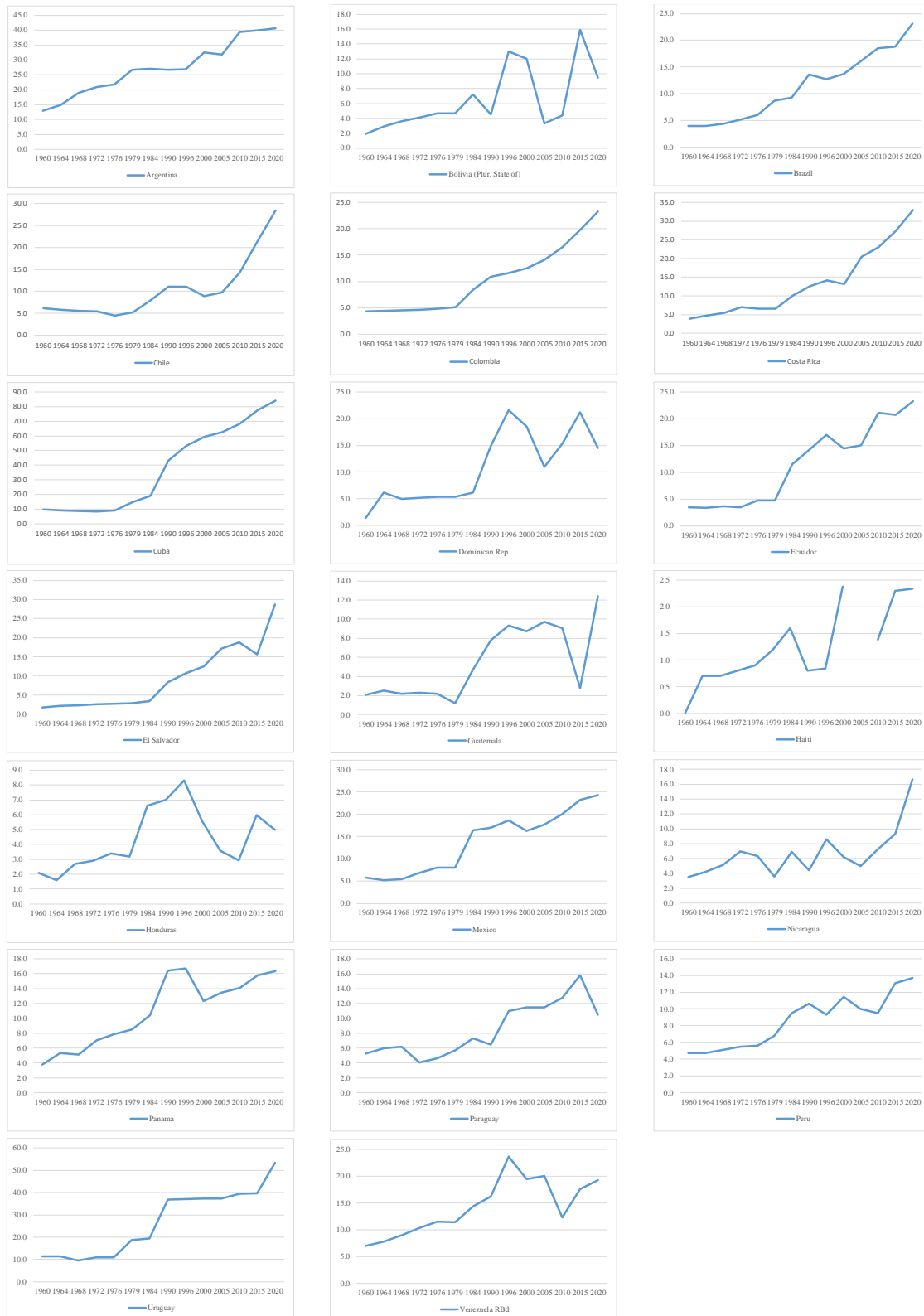
Venezuela Bol. Rep.: (1960) Expenditure for 1960-61, (1964) Nurses for 1963, (1968) Nurses for 1969, (1972) Nurses public sector only, (1979) Physician and Nurses for 1977, (1996) Physician for 1997, (2000) Beds for 1999, Physician for 2001, (2005) Beds, public sector only for 2003, (2010) Beds public sector only, Nurses for 2008, (2015) Nurses public sector only for 2014, (2020) Nurses for 2018.

ANNEX 3. Graphical analysis

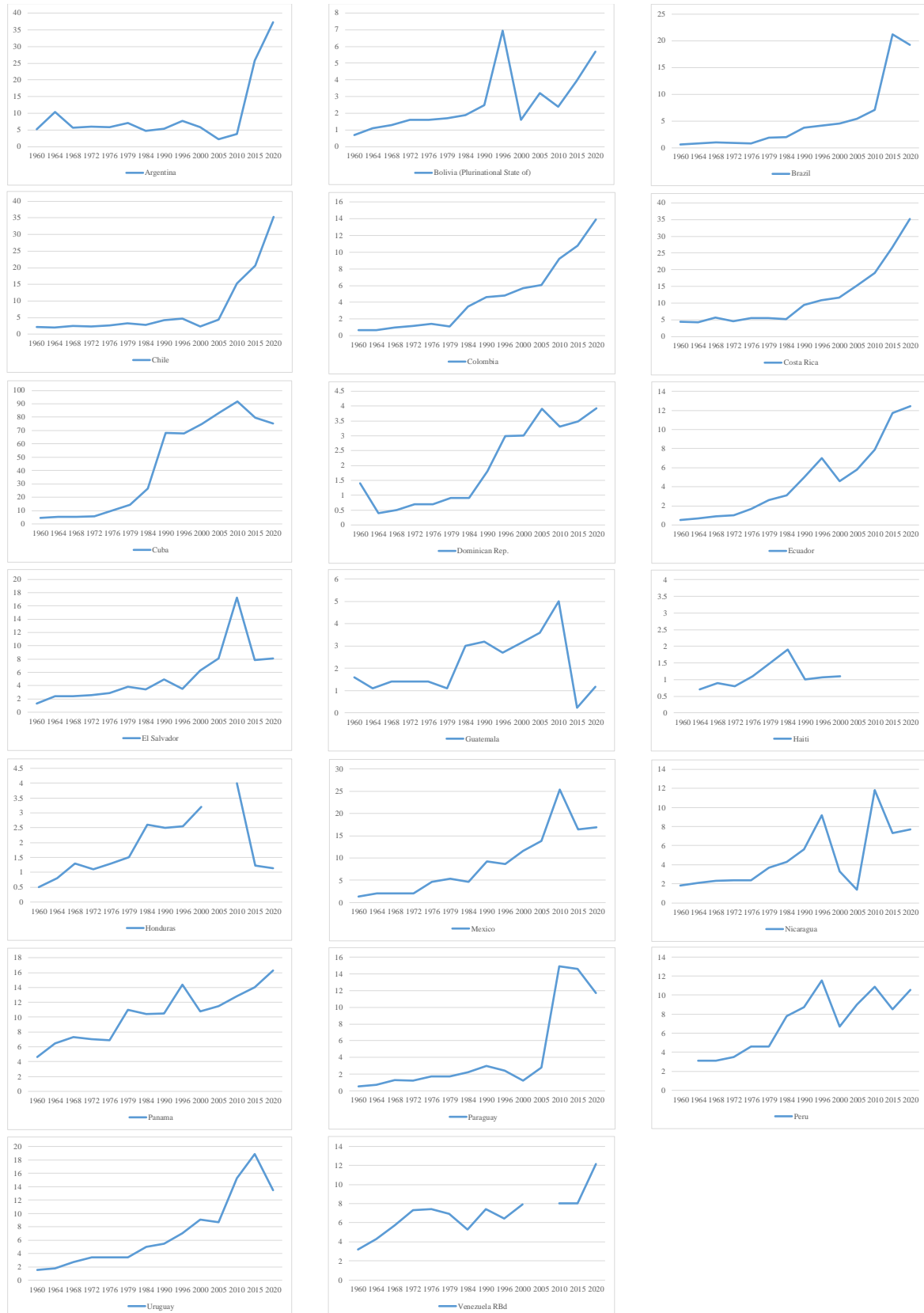
Hospital beds per 1,000 population by country. Latin America. 1960-2020



Physicians per 10,000 population by country. Latin America. 1960-2020



Nurses per 10,000 population by country. Latin America. 1960-2020



Health expenditure by country. US Dollars, constant 2021. Latin America. 1960-2020

