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## **How to evaluate the capacity of hospital systems in a very long term international comparative perspective? Hospital beds per inhabitant in Catalonia 1900s-2010s**

### *Abstract*

This article proposes that the number of hospital beds available in a territory can be used as a comparative tool to gain a perspective on the very long term evolution of the historical capacity of hospital systems worldwide. The article presents: 1) the issues stemming from a lack of sources and comparative data available internationally before 1960; 2) data for the early 20th century for Barcelona and other cities of the world; 3) data on hospital beds for various countries since the 1960s, with attention to data for Catalonia; 4) data for the number of hospital beds per 1000 inhabitants for the past few decades in Catalonia, and a comparison with other autonomous communities and countries. The sources are the League of Nations, Yearbooks for Barcelona, the National Statistics Institute of Spain (Instituto Nacional de Estadística, INE), IDESCAT, the World Health Organization (WHO) and the OECD. The article provides research data that confirm that the beginning of the modern increase in the number of hospital beds per capita in Catalonia started as the rest of the Western world in the first third of the 20th century. Such growth was maintained throughout the 20th century up until the 1980s. After the 1980s, in Barcelona as in the rest of the world, there was a process of reducing hospital beds per capita. This has therefore created the possibility of hospital services being overwhelmed very quickly in the instance of a widespread health emergency.

**Keywords:** Hospital Beds per Capita; Well Being; Healthcare; Catalonia; Hospitals

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## 1. Introduction

Health expenses have risen very rapidly in the 20th century, most notably in the last 50 years. According to the Organization for European Cooperation and Development (OECD) and the World Health Organization (WHO) health statistics, such expenses amounted to an estimated 1 per cent of global GDP in 1900, 4-6 per cent in 1970, and 10 per cent in 2017. Of the overall health expenditure, according to the same sources, it is very likely that in recent decades at least 50 per cent are hospital related expenses. These very rough figures suggest that the 20th century and the first decades of the 21st century have witnessed the construction of national health systems all over the world in which hospitals have had a central role.

The exact point in time when hospital expenditure began to increase, around a century ago, is not very clear, due to the lack of reliable aggregated data on both national and international levels prior to the creation of the World Health Organization (WHO) post World War II. Some economic historians have been able to produce some estimated figures about social expenditure from national accounts before the 1940s, however in these documents education and health expenditure was quite often combined, which made it difficult to identify what was purely hospital expenditure (Donzé and Fernández Pérez 2019; Espuelas 2013).

The correlation between health expenditure and general improvement in the health of a nation is an extremely complex process, which varies according to specific national and local contexts. In the period between the late 1880s and early 1930s the most commonly accepted factor that contributed to general health improvement worldwide was improved sanitary conditions in the provision of drinking water and sewage disposal, as well as improvements in nutrition. The enormous relevance of water and food quality, however, does not account for the change that

also started to take place in the improvement of hospital infrastructures, and access to hospital services, particularly in the largest cities of the world (Fernández Pérez 2021). The History of Medicine, the History of Science and Technology, and more recently Economic and Business History have provided a wealth of empirical evidence about the process of reform, or brand new construction of very large hospitals in the centre and in the outskirts of big metropolises. Hospital account books, or the history of health insurance, provide excellent data to analyse this parallel process of improvement in hospitals and health insurance in a few areas of the world for some countries like England, Germany, Switzerland, the United States or Japan (Stevens 1989, Fernández Pérez 2021, Donzé 2007, 2017 and 2019; Pons and Vilar 2019). The main issue is that, for most of the world, the data available is not ample enough or of good enough quality to make a balanced evaluation of what happened outside Europe and in the United States before World War II. There is limited, fragmented data, which only becomes less and less available for earlier periods and for developing countries. Despite this lack of information, the number of beds per hospital often appears in documents. On its own it does not indicate in depth what a hospital system looks like, and how it evolves, because it is more often the quality of the staff and the pharmaceutical and clinical resources that are important. However, as this information on equipment and resources does not usually appear continuously over time for the history of hospitals in many countries, an alternative to obtain an approximate idea of the evolution of a hospital system can be constructed with a series of data on beds per hospital, which usually appear in all countries for long historical periods. A hospital bed requires care from qualified personnel, and medicines, and equipment for diagnostic tests so the more hospital beds, the more staff and resources are used for each bed, and in this way they can be

used as an indicator to reflect the evolution of hospital resources over a very long period of time in a given country or region.

Since the late 1880s there are official statistics on the number of hospitals and number of patients attended in hospitals available for many cities and countries in developed and developing economies. From the 1860s, originally only in very few countries such as in England, and gradually in more countries from the 1900s onwards, there is an increasing number of official statistics about the number of hospital beds available at a local, national, and international level, which therefore allows for comparison.

The number of hospital beds available are not, and this is important to highlight, the best indicator to study the evolution of hospital expenditure or general health improvements in the last century. Looking at the number of hospital beds alone does not provide information about what changes, if any, took place inside a hospital in productivity or efficiency, investments made, specialised staff and equipment available, and if there were any changes in the general organisation and management of the hospital. Why, then, can it be useful to spend time and effort to analyse international statistics about the numbers of hospital beds available per capita since the early 1900s? Firstly, as mentioned previously, the number of hospital beds per capita in a given region or country is one of the few indicators that there is evidence available for the period prior to World War II. There is little else to go on as more detailed health expenditure data over the years only really became available after the creation of the WHO. Furthermore, any increase in the number of hospital beds requires a parallel increase in part, or completely, of the other economic factors associated with hospital expenditure: labour, capital and technology. Each new hospital bed in a health centre requires more, or better organised, specialised human resources (doctors, nurses, and other healthcare and administrative staff),

more medicines, more intensive use of existing or new healthcare equipment. Consequently, more, or better organised, labour and technology requires more financial resources (or more efficiently employed). If a given country does not have centralised and well coordinated health care centres, it still may have alternative ways to coordinate different types of health centres. If coordination exists, then efficiency may be achieved, and movements of patients from one centre to another be done thus relieving one centre that can occasionally suffer from a sudden arrival of a huge number of acute patients (as can happen with large scale transport accidents, or fires, that can cause the emergency system of a large hospital to be overwhelmed in a matter of minutes).

However, a sophisticated network of healthcare establishments that are well equipped, organised, and interconnected in a sustained way, has been a historical rarity. What has more often taken place in history, everywhere in the world, is a poor distribution of total numbers of healthcare centres in each territory, and bad or inefficient connection between them, and a trend (with clear exceptions in a few countries like Germany or Japan) towards a concentration of healthcare products and services in only a few large hospitals serving hundreds of thousands of potential patients.

A concentration of hundreds of thousands of potential patients in a few large hospitals might be a relatively efficient option, if: a) the population served is small, b) if there are good financial resources to maintain the high fixed expenditure of large hospitals, and c) if there are no epidemics or pandemics. However, such a concentration may be very inefficient if the population increases beyond available financial resources to pay correspondingly for an increased amount of specialised healthcare staff, medicines, and healthcare equipment.

From a very long term historical perspective, the number of patients a hospital can serve may be relatively estimated if we are able to find out the number of hospital beds per inhabitant and how that number may have increased or decreased over a long period of time, and are able to compare it with this evolution in different territories, in order to evaluate the relative availability of healthcare resources in a dynamic, flexible way. It is for these reasons that identifying good sources from which to study the number of hospital beds available are important, to compare and evaluate if a healthcare system is improving, or declining, the healthcare services supplied to the population when conditions change.

There are many disciplines which have published research about the History of Hospitals, from the History of Medicine, the History of Science and Technology, the Economics of Health, Public Health Administration, History, and Economic and Business History. There are also national and international organisations which have tried to provide reports and data, like the League of Nations in the late 1920s, healthcare Conferences and the Pan American Health organisation between the 1880s and World War II, private philanthropic foundations with Health Units like the Rockefeller Foundation also before the 1920s, and the World Health Organization and regional and national agencies of public health after World War II (Donzé and Fernández Pérez 2019; Fernández Pérez 2021).

There is, however, the issue of finding appropriate sources or methodologies in order to make international comparisons with homogenous indicators and variables throughout the last century. A century ago, there was a huge diversity in the control of key variables which could allow us to see when, where, and how far, the process of growth and the concentration of healthcare services in large hospitals that dominate the landscape of global healthcare today, took place. It is very difficult to know for sure, especially before the 1980s, if the process of

growth of hospitals and hospital services in a given city or country was similar, or distinctly different, to other cities or countries. The fragmentation of data for the thousands of hospitals, cities, and healthcare systems is enormous, and makes it very difficult to establish appropriate analysis through comparison.

In order to start filling this gap, this article aims to provide a starting point for the long term comparative study of hospital beds, using the case study approach for the city of Barcelona in an international context. The goal is to try to establish, even if in a fragmentary way, a long term view about stages of development in the evolution of hospitals (Fernández Pérez 2021). The article first contextualizes the relevance of studying hospital centrism and the indicator of the number of hospital beds, and then presents and analyses the data.

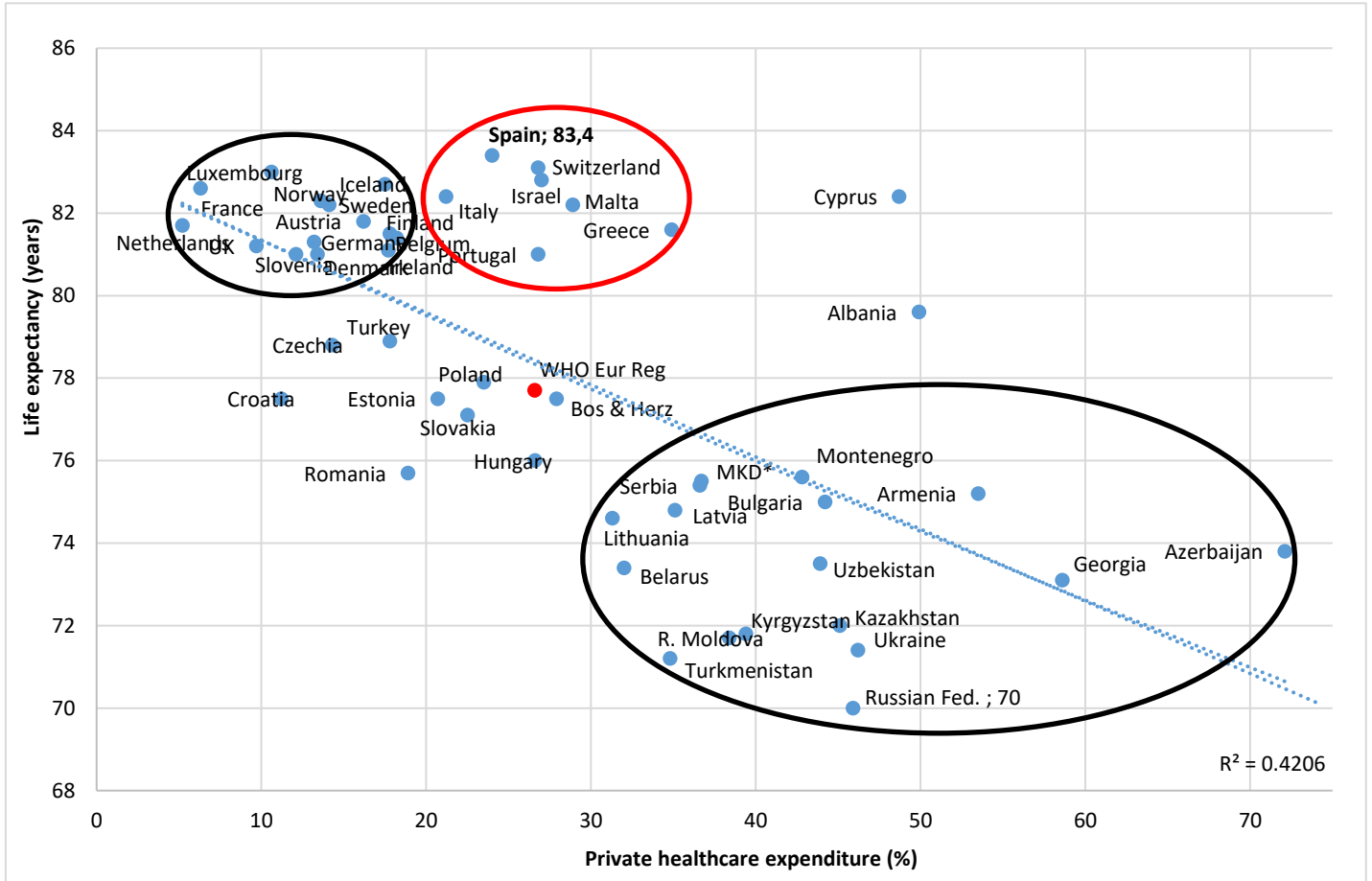
## **2. Well being, economic growth and the relevance of hospital expenditure in the 20th century.**

General well being is an accepted measure of the progress of social and economic development in the world, which takes the increase or decrease in life expectancy as a comparable international indicator (Prados de la Escosura 2003). There is a common popular belief, shared by many policymakers, according to which countries with higher percentages of expenditure on health over GDP should automatically have, and give rise to, a higher level of general well being to the population. The figure below, drawn with official data from national sources gathered by the World Health Organization (WHO), reveal that this common belief often does not correspond to reality. On the right side of the graph, which includes European countries, there are a group of countries with a higher expenditure on health in 2014, that are precisely the group of countries in the sample with a lower life expectancy at birth for both sexes. On the left

side of the graph, there are countries with less private expenditure on health where life expectancy at birth is much better and higher. There are two lessons to be taken from this data. Firstly, that private expenditure on health is not a direct drive towards a higher level of national wellbeing (measured by life expectancy), and therefore public expenditure on health (which dominates in the group of countries on the left hand side) seems to be a better engine for improved life expectancy in the sample. Secondly, there is an intermediate group of countries that include most Southern European countries where there is considerably less expenditure on health over GDP than in Northern European countries where wellbeing levels (again measured by levels of life expectancy at birth) are excellent. Economic investment, public (as in Nordic countries where it is very high) or private (as in Eastern European countries where it is very high) alone, seems to be not enough to understand why Southern European countries perform so well in terms of well being and life expectancy levels.



**FIGURE 1.** Life expectancy at birth (years) both sexes, and private households' out-of-pocket expenditure (World Health Organization/WHO estimates) as % of health expenditure, 2014



Source: WHO 2017. Latest available data on table. With technical assistance of Jaime López Guauque.

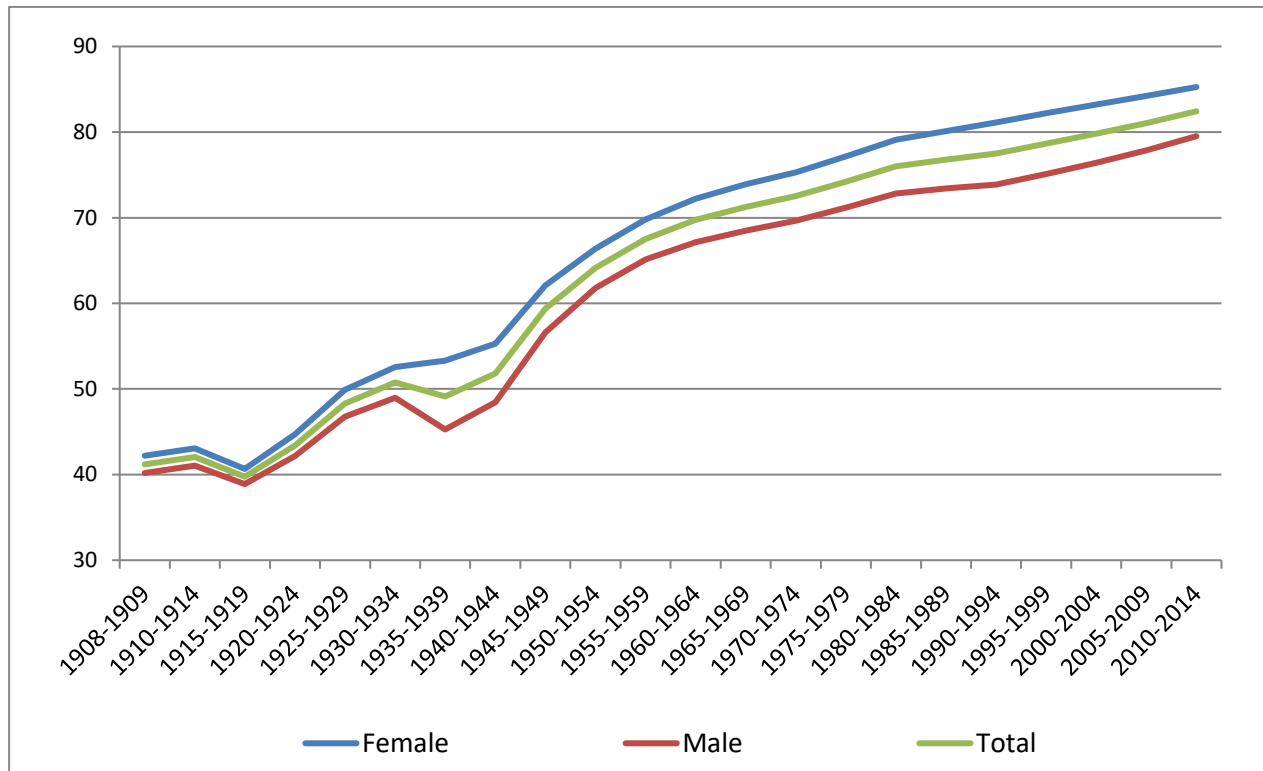
The Organisation for European Cooperation and Development has provided data about healthcare spending since 1960, which presents one of the first long term indicators that show evolution and change. Between 1960 and 2011 the total cumulative average growth rate of total spending, public and private, on healthcare as a percentage of GDP, increased in the countries of the sample of the table below. The country where the total increase was the highest was Spain, where the growth rate is almost double the average cumulative growth rate of Europe, and the United Kingdom, over the last five decades.

**TABLE 1.** Evolution in healthcare spending in a sample of OECD countries, 1960–2011 (cumulative average growth rate of total spending public and private on healthcare as a percentage of GDP at market prices)

	1960-2011	1970-2011	1980-2011	1990-2011	2000-2011
USA	2.47	2.25	2.21	1.71	2.36
UK	1.74	1.81	1.68	2.33	2.72
France	2.21	1.88	1.64	1.55	1.27
Europe	1.91	1.65	1.08	1.45	1.51
Japan	2.31	1.92	1.32	2.43	2.15
Spain	3.64	2.41	1.83	1.72	2.35
Germany*	–	1.56	0.96	1.48	0.76
Sweden*	–	0.82	0.21	0.70	1.35
Italy	–	–	–	0.85	1.39

Source: Compiled by the author, with assistance of Jaime López Guauque, from EFPIA 2014 (OECD 2013)

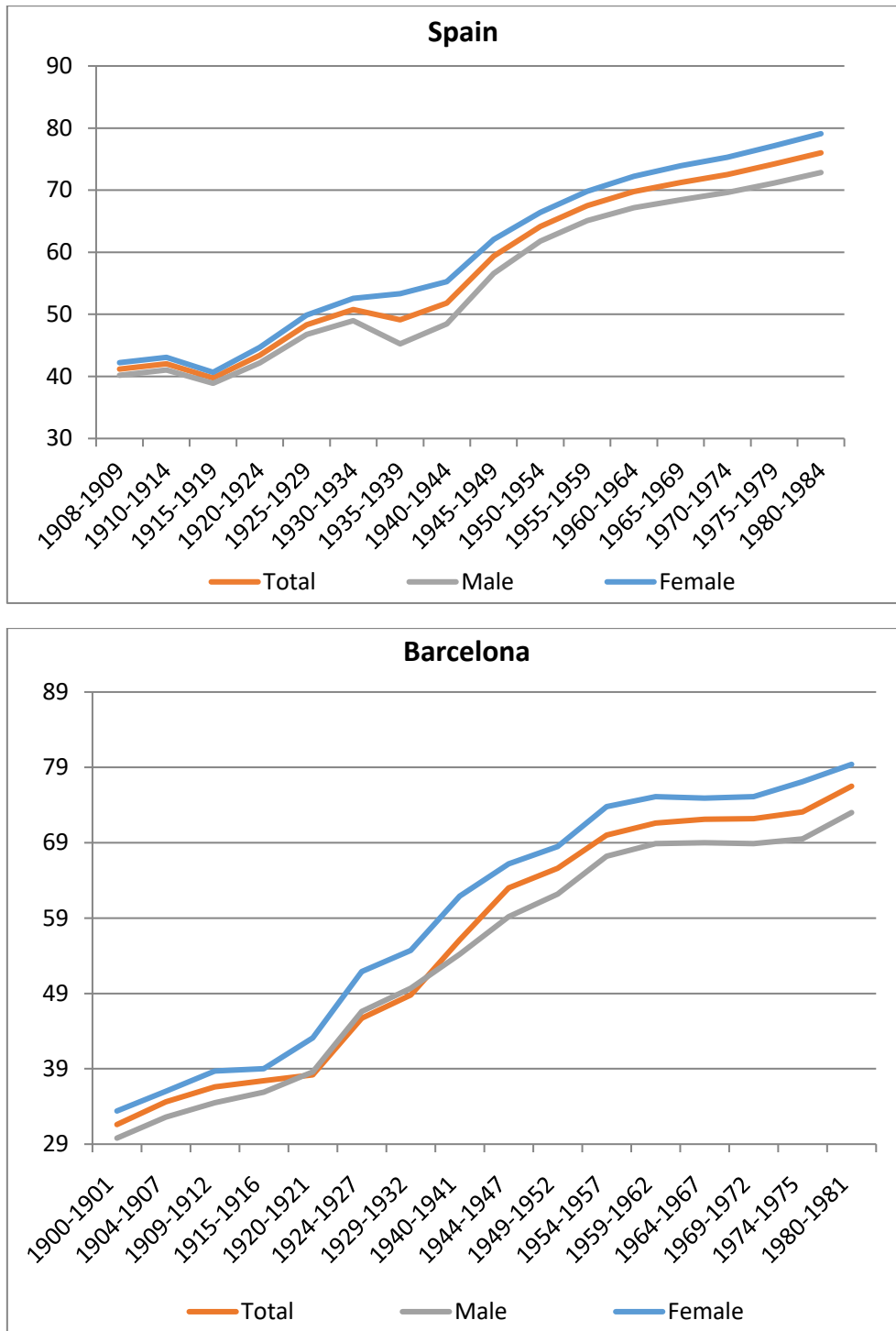
The figure below shows that there seems to be a direct connection between the increase in healthcare expenses since 1960, and the increase in life expectancy at birth. However, the graph below clearly displays something else extremely important: the largest increase in life expectancy took place before 1960, during the first half of the 20th century. And taking into account the fall in life expectancy during the Civil War (1936-1939), the graph shows that the process of improvement in wellbeing, measured by the improvement in life expectancy at birth, started in the 1920s, and continued steadily, with the exception of the Civil War, until the first decade of the 21st century. The 1920s were a crucial decade of improvement in wellbeing (life expectancy) in Spain.

**FIGURE 2.** Life expectancy at birth in Spain, 1908–2014

Source: Instituto Nacional de Estadística, INE.

The figures below show how the 1920s were, also, the crucial decade of improvement and radical take-off in life expectancy in the city of Barcelona

**FIGURE 3.** Life expectancy in Spain and the city of Barcelona, 1900/1908–1984



Source: See Table 2.

**TABLE 2.** Growth rates in life expectancy in Spain, and in Barcelona, 1908-1984

Year	Spain			Year	Barcelona		
	Total	Male	Female		Total	Male	Female
1908-1909	41.19	40.19	42.21	1900-1901	31.6	29.8	33.4
1910-1914	42.04	41.05	43.07	1904-1907	34.6	32.6	36.0
1915-1919	39.75	38.89	40.66	1909-1912	36.6	34.5	38.7
1920-1924	43.41	42.17	44.69	1915-1916	37.4	35.9	39.0
1925-1929	48.31	46.77	49.89	1920-1921	38.2	38.6	43.1
1930-1934	50.75	48.98	52.56	1924-1927	45.7	46.6	51.9
1935-1939	49.11	45.26	53.31	1929-1932	48.8	49.7	54.7
1940-1944	51.8	48.46	55.28	1940-1941	56.1	54.2	61.9
1945-1949	59.36	56.59	62.09	1944-1947	63.0	59.2	66.2
1950-1954	64.16	61.8	66.4	1949-1952	65.6	62.2	68.5
1955-1959	67.52	65.11	69.81	1954-1957	70.0	67.2	73.8
1960-1964	69.75	67.15	72.24	1959-1962	71.6	68.9	75.1
1965-1969	71.25	68.47	73.92	1964-1967	72.1	69.0	74.9
1970-1974	72.53	69.65	75.3	1969-1972	72.2	68.9	75.1
1975-1979	74.21	71.16	77.15	1974-1975	73.1	69.5	77.1
1980-1984	76.01	72.84	79.09	1980-1981	76.5	73.0	79.4

Source: Spain: *Human Mortality Database* 2016. Barcelona: Ajuntament de Barcelona, Departament d'estadística 2016. With technical assistance of Jaime López Guauque.

### 3. Hospital Beds per Capita Since the 1880s

#### 3.1. The relevance of Hospital Beds as an international indicator of the evolution of well being

What happened in the 1920s? Qualitatively speaking historians have analysed the close links between improvement in life expectancy at birth with prior improvements in diet and in the sanitary conditions in the provision of drinking water used by the urban population. However, which long term comparable quantitative indicators are available to detect major patterns of change besides the demographic ones in this process? Are there any indicators for improvement in healthcare systems in the world, however small, that could be analysed and used for comparison since the 1880s and first third of the 20th century until recent times? This article

argues that there is one that, despite limitations in availability of data, in comparability, and in its implications due to the diversity of contextual factors, exists in most countries of the world in the last century or more: the number of hospital beds in a given region or country, in relation to the number of inhabitants. Since medieval and early modern times large hospitals and city hall councils, in most of the world, kept regular records of the number of hospitals that received public subsidies, and often (though not consistently up until the 19th century) of the number of hospital beds available in those hospitals.

Hospitals were, in early modern Europe, and in many Central and South American countries during colonial times, very modest establishments or houses where basic services to poor sick people could be supplied with the aid of charitable donations from religious groups and public authorities or institutions (Fernández Pérez 2021). Since the mid 19th century, in close connection with the beginning of massive migrations to cities from the countryside, and between countries and continents, cities grew and the pressure on those small hospitals increased. For safety reasons, mainly, but also because of the increase in the number of graduates in Medicine and Pharmacy in the Western world, and radical innovations in microbiology and medical equipment and products, many cities increased the number and the size of their hospital services (Fernández Pérez 2021).

In industry or trade an increase in the number of employees, financial assets or sales of a business are traditional indicators used by economic and business historians in order to analyse historical increases in size of a given business organisation. However, hospital archives in Madrid, Barcelona, Bilbao, New York, London, Berlin and Paris, reveal that when hospitals increased their services in the 19th century up until the 1930s there were no significant changes in financial resources for these hospitals, or employment levels: public authorities either

expanded existing hospitals or built brand new hospital buildings. Until after the 1930s, the only indicator that has had a very marked increase since the 1880s with the expanded or new large hospitals in the world, was the number of hospital beds.

Online research on the history of hospitals in colonial Latin America, early modern Europe, preindustrial East Asian countries, or Africa, has revealed that before the 19th century the vast majority of hospitals had less than 200 beds each, and the poorer the area the closer to a figure of less than 100 beds per hospital, as was the case in South America even in the early 1920s (Martin and Mayo 1922). Only in Eastern Europe, particularly in Russia, or in some large Arab cities such as Cairo, foreign observers revealed that there were hospitals with more than 1,000 beds per hospital in the early 1930s (Fernández Pérez 2021).

Between the 1880s and the 1930s, when life expectancy radically increased in the world, and in Spain or Barcelona more particularly as seen in the figures and tables above, there was a parallel process of an increase in large hospitals (that can be compared across countries with the consequent increase in hospital beds) that took place and has been relatively unexplored by economic historians, despite the fact that this increase in hospital beds ran in parallel with a marked improvement of general wellbeing (in terms of life expectancy) during those decades. After the 1980s, in many countries as demonstrated later in the article, there was a consistent reduction in the number of hospitals in the world, and in the number of hospital beds. In 1861 in England and Wales, there were 65,000 hospital beds in 904 hospitals; 263,103 hospital beds in 1938; 455,138 in 1959; 363,395 in 1980; and 255,094 in 1990, with a continuous decline up until 2018-2019, where there were only 140,960 overall.<sup>1</sup>

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<sup>1</sup> Data for 2018-2019 from The Kings Fund 2020. For previous years in England and Wales, Armstrong 1998.

### 3.2. Hospital Beds, 1880s-1930s: Barcelona in an international context

Relatively reliable statistics about healthcare establishments, public and private, at a local and national level, increased in Western countries after the 1860s and particularly in the 1880s. These statistics detail the number of healthcare centres in each country and the number of patients attended in such centres. Statistics such as these for the 1880s and the first decade of the 20th century did not often provide data about hospital beds with which researchers could easily figure out the number of hospital beds per inhabitant, but they did publish data about the number of inpatients and outpatients per hospital, a variable that hospital historians have used to see the growth in size and scope of modern hospitals in many OECD countries (Fernández Pérez 2017; Donzé and Fernández Pérez 2019; Fernández Pérez 2021).

In Spain the *Reseña geográfica y estadística de España* published very little data at a provincial level in 1888, and since 1913 the *Anuario estadístico de España* provided aggregated data for the various types of healthcare establishments (profit and not for profit, public and private). At the municipal level, statistic yearbooks published data for individual healthcare establishments that received municipal subsidies and support, usually very large hospitals and specialised healthcare centres like maternity hospitals and hospitals for poor children. These sources provide data for large healthcare establishments at the provincial, municipal, and national level.

In Barcelona there is data available in the *Anuario estadístico de la Ciudad de Barcelona* for the years 1902-1920 (which is also available after 1987 under the same name but with exclusively online records), and in the *Estadística municipal* for the years 1927 to 1986, with changes in the quantity and quality of data provided. Both sources have been made available through digitalisation of their content, which is downloadable with open access through the



website of the Barcelona City Hall. Governments at the national and municipal level provided such data for many countries in Western Europe, Latin America, and Asia (Ayuntamiento de Barcelona website; Fernández Pérez 2021).

What do these sources indicate about the evolution of the number of patients and hospital beds available in the largest healthcare establishments that were supported by public subsidies (either totally or in part)? In Barcelona in 1902, the largest public and private hospitals that received some financial support from the local city hall gave assistance to around 60,000 inpatients, which represented around 10% of the total population of the city that year. The figure went up to 20% in the year 1920 as shown below, which can be seen as a sign of the increased demand for health services from large hospitals in the city. In 1920 one out of five people in the city of Barcelona used hospital services. This was a revolution, when compared to the 19<sup>th</sup> century and earlier. This demonstrates that the hospital was at the centre of healthcare assistance, in a very early period.

The municipal source provides data for the following hospitals in 1902: the Hospital de Nois Pobres (for poor children) with 45,255 inpatients (a figure that could be a error in the source that still needs further confirmation), the Hospital de la Santa Cruz with 7,050 inpatients, the Hospital Militar with 4,836; various *Casas de Socorro* with 5,452; the Hospital Nuestra Señora del Sagrado Corazón de Jesús 644, the Higiene Especial del Gobierno Civil 169, and the Hospital Homeópata del Niño Dios, 75. A new hospital was added in 1906, the Hospital Clínico de la Facultad de Medicina de Barcelona, where there were 3,132 inpatients in 1919; 4,799 in 1915; and 5,545 in 1920. The Hospital de la Santa Cruz maintained an average of 6,000 inpatients every year in the first decades of the 20th century, as did the aggregated number of *Casas de Socorro* of the city; the Hospital Militar had an average of 4,000 inpatients annually;

and the Sagrado Corazón de Jesús an average of 640 inpatients per year, according to the *Anuario estadístico de la ciudad de Barcelona*. According to the same source, at least half of the inpatients attended in Santa Creu and Clínic Hospitals came from the neighboring provinces of Aragón and the Valencian region.<sup>2</sup>

The number of large establishments for health assistance with partial or total public financial support remained rather stable in the 1910s and 1920s in Barcelona. However, the number of patients went up, as well as the percentage that these patients represented of the total population of the city. The number of patients went from 10% of the total population of Barcelona in 1902 to 20% in the year 1920, most likely as a result of the effect of the 1918-1919 pandemic of Spanish flu, as shown in the table below with data from the *Anuario estadístico de España*. The percentage of the population of the city who attended the healthcare centres shown in the source went down to 11% a decade later in 1930, which suggests that, with the exception of the years of pandemic of the 1918-1919, the average percentage of patients attended in hospitals in the city with public subsidies, was around 10% of the total number of city inhabitants.

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<sup>2</sup> The name of hospitals changed throughout their history, before the 1930s in their own documents the name appears in some years in Catalan but mostly in Spanish. After the 1930s, mostly in Spanish. After the 1980s, mostly in Catalan. The text respects the name as it was used in the documents in every period of their history

**TABLE 3.** Patients in Health Care Centers of the City of Barcelona in the first third of the 20th century (number of patients)

	1920	1930
Hospitals (5 hospitals)	12,864	18,981
Asilos/Hospicios	4,794	4,941
Casas Expósitos	1,757	1,574
Casas Maternidad Prov.	505	565
Casas Socorro (4 top) (“consulta general”)	126,302	93,316
Total patients, Barcelona centers of the source (A)	146,222	119,377
Total population BCN City (B)	710,335	1,005,565
% A/B	20.6%	11.8%
% Patients in Hospitals/Patients in all Centers of the source in BCN city	8.8%	15%

Source: Own elaboration with data from Ministerio de Instrucción Pública y Bellas Artes, Dirección General de Estadística 1922, Ministerio de Trabajo, Comercio e Industria, Dirección General de Estadística 1922, Presidencia del Consejo de Ministros, Dirección General del Instituto Geográfico, Catastral y de Estadística 1932a and 1932b.

The table above indicates a second interesting fact that happened in the first decades of the 20<sup>th</sup> century: the increase in the percentage of total patients who used a hospital for health care assistance as an option, from the various health care establishments of the city: 8% in 1920, and double up to 15% in 1930, a sign of the relative decline of traditional establishments like Casas de Socorro in the provision of assistance. This was a process that was most likely a result of new regulations of the Mancomunitat de Catalunya, an administrative institution which was created that had partial responsibility for public health in Catalonia, and whose policy included reducing the number of primary health care centres like the *Casas de Socorro* in the city and reinforcing a select few larger clinics and hospitals to help improve the administrative capacity of supervision of health care centres in the city (Sabaté 2015). A similar process of concentration and reform of health care centres took place not just in Barcelona but in most of the largest cities of the Spanish provinces in these years, as observed in the table below:

**TABLE 4.** Concentration of sick people/patients in hospitals in the largest cities/provincial capitals of Spain in the first third of the 20th century

City/Provincial Capital	1920	1930
Madrid	22,982	25,405
Barcelona	12,864	18,981
Seville	8,508	10,631
Bilbao	8,251	8,708
Valencia	5,171	6,618
Córdoba	4,220	5,505
Zaragoza	3,393	5,470
Pamplona	3,022	2,004
Valladolid	2,450	2,331
Burgos	466	446
<b>Spain</b>	<b>132,272</b>	<b>166,813</b>

Source: Own elaboration with data from Ministerio de Instrucción Pública y Bellas Artes, Dirección General de Estadística 1922, Ministerio de Trabajo, Comercio e Industria, Dirección General de Estadística 1922, Presidencia del Consejo de Ministros, Dirección General del Instituto Geográfico, Catastral y de Estadística 1932a and 1932b.

Note: The numbers are sick people that were inpatients the first day of the year plus inpatients registered during the year. The table shows that Barcelona was the city that experienced the fastest rate of growth. The figures do not include patients from hospitals which did not supply data to the source, only information from hospitals that responded to requests to provide data. In Madrid 16 hospitals responded to the source, in most other provincial capitals it was only between 1 to 3 hospitals that responded and supplied data. The total number for Spain has been elaborated by the author taking into account the inpatients of the hospitals that supplied data to the source from all provincial capitals included in the source.

Most of the population did not use hospitals, or healthcare establishments, despite this process of growth of hospitals in the first third of the 20<sup>th</sup> century. More often it was doctors who received visits from patients at their home practice or that were called directly to the patients' homes. An indicator of the increase in healthcare assistance in these years, therefore, is to see not just the number of healthcare centres and patients in them, but also the number of new doctors in a city. The table below shows that, in the city of Barcelona, the number of registered doctors in the Colegio de Médicos of Barcelona increased to six times the original number in a time span of three decades: from 383 in 1895 to 2,000 registered doctors in 1928. In only 10 years, between 1895 and 1907, the number of doctors increased almost threefold, from 383 to

928 *médicos colegiados*. In comparison with the number of *médicos colegiados* registered in Spain in the same period of time, the numbers are fairly similar, thus indicating that the case of the city of Barcelona is a good example of a national trend that took place across the country in that period.

**TABLE 5.** Doctors, Hospitals and Social Health Expenditure 1895-1928 in Spain

Year	Registered doctors of Barcelona (COMB)	Registered doctors of Spain <sup>1</sup> (OECD)	Number of new Hospitals built in Spain	Social Health spending (in current million pesetas)
1895	383	2,908	229	18,70
1907	928	7,046		18,92
1928	2,000	15,186	317	78,54

Source: Own elaboration with data from: for 1920s Ministerio de Sanidad y Seguridad Social/Instituto Nacional de Salud Madrid 1977). The health social expenditure data was taken from Espuelas 2015. Registered doctors from the Official Medical Association of Barcelona COMB (Col·legi Oficial Metges de Barcelona), OECD, and the INE.

Note: The total number of doctors licensed in Spain for the years 1895, 1907, 1928, corresponds to a proxy which was calculated using the series for the city of Barcelona and its trend. It was found that for the years for which data are available for Spanish and Barcelona-based members, there is a very similar trend over time, and taking this into account, this trend has been used to estimate the Spanish total (for the years for which there was no data for Spain) from the number of Barcelona-based universities .

In Spain, the number of healthcare establishments doubled in the period: 1529 in 1915, from 755 in 1844, with some 66,000 beds at the beginning of the century and some 7,769 responsible municipal doctors (Fernández Pérez 2018). The new hospitals built in Spain increased in number, though relatively slowly compared to other countries: from 229 in 1895, 317 in 1928, to 563 in 1945. In the United States this number went from 178 establishments (public and above all private) with 50,000 beds in 1873 to 4,359 establishments with more than 420,000 beds in 1909. The proliferation of hospitals and clinics for commercial purposes in the cities ran in parallel with an increase in employees in the health sector. By the first third of the 20th century, Germany and Japan had already both had outstandingly dense networks of health centres and healthcare staff per inhabitant in their territories. This trend has continued up until

present times, as according to the WHO these countries are still among the top countries with the highest numbers of hospital beds per inhabitant in the world.

So how did Barcelona's hospitals and hospital beds available per inhabitant compare with those of other territories of the world in this period? Health authorities started to elaborate statistics that could be used as a comparative measure between countries in the first decades of the 20<sup>th</sup> century. In Soviet Russia, a hierarchically organised system of healthcare that linked factories, homes, primary assistance healthcare centres (local GPs), general hospitals, and specialised hospitals, was established in the late 1920s for the admiration of North American and British health authorities who visited Russian hospitals to learn about modern efficient methods of healthcare organisation (Newsholme and Kingsbury 1934). Reports from these Western authorities led to the publication of some figures about the hospital system in Soviet Russia in the late 1920s and early 1930s: in 1927-1928 there were 154,685 hospital beds in total in the seven Soviet Union Republics in existence in the years the report was made; 207,502 in 1931; and 244,375 in 1932. These figures are not far off those mentioned previously for the number of hospital beds available in England per inhabitant for 1938. Moreover, medical doctors increased in those years in Soviet Russia from 1,289 doctors in 1927-1928 to 3,846 in 1932 (Newsholme and Kingsbury 1934 244-246, and Fernández Pérez 2021). These numbers were, nevertheless, far lower than in Spain, where there were about five times that amount of doctors than in Soviet Russia. Clearly, in Russia the speed in the increase in hospital beds was faster than the increase in specialised healthcare staff, whereas in other countries like Spain with regions like Catalonia with an old tradition of medical education since at least the 18<sup>th</sup> century, the speed in the increase in the number of doctors was more relevant than a sudden increase in the number of hospital beds available. Indeed, the transformation of big and magnificent palaces

of the Russian aristocracy into healthcare establishments in Soviet Russia was directly responsible for the sudden increase in the capacity to multiply hospital beds right after their Civil War in the early 1920s (Newsholme and Kingsbury 1934 Fernández Pérez 2021).

The League of Nations published statistics about hospital beds per 1,000 inhabitants in different countries in 1929: 3.6 in France, 5.0 in Germany, 2.97 in the United States, 9.6 in Mexico, 3.8 in Panama. For Spain some scholars have indicated that in 1940 right after the Civil War, there would have been around 4.0 beds per 1,000 inhabitants (Fernández Pérez 2021).

In Japan from around the 1880s onwards there was a very different process compared to Western countries, or Soviet Russia, with a decline of public hospitals, and a fast increase in the number of small private clinics where most healthcare beds and doctors concentrated assistance in a fragmented, dispersed way to patients. In 1883, there were 632 hospitals in Japan, of which about 43.2% were private hospitals and around half public hospitals. The wave of privatisation by the Japanese Government in the 1880s led to a decline in public hospitals, and a relative increase in the number of private hospitals and clinics. Private hospitals represented 95% of all hospitals in 1926, many of them small; the total number of hospital beds multiplied by three from 36,856 in 1913 to 101,883 in 1940, and most of them were concentrated in cities, owned and managed by doctors (Donzé, 2017, and 2019). These figures were around half the total number of hospital beds in the late 1930s in Soviet Russia, or in England.

On a local level, Barcelona provides a good example of the process of increase of hospital beds and patients in continental Western Europe in this period sustained totally or in part with public funds. The number of hospital beds of the private Hospital de la Santa Creu and Sant Pau of

Barcelona was similar to the number of hospital beds of other large hospitals in Spain: the public Hospital General de Madrid had 1,200 in 1929, and Hospital de la Santa Creu of Barcelona 1,256 in 1901 and 1,000 in 1930. These figures were possibly exceptional in comparison to the rest of country, as they were almost double the number of beds compared with other large hospitals in Spain such as the public Hospital Civil of Bilbao (with 600 hospital beds in 1908), and the Hospital Clínico of Barcelona (with 400) in the first decades before the Civil War.<sup>3</sup> If we compare these figures with other large hospitals in large cities of the world, like Hong Kong, the number of hospital beds per hospital was similar to the medium sized hospitals of Spain, close to the the number in the Hospital Civil of Bilbao or the Hospital Clinic of Barcelona, with around 480 hospital beds in Tung Wah Hospital and in the Queen Mary Hospital of Hong Kong in 1938 (Fernández Pérez 2021; Chang-Yeung 2018, 239).<sup>4</sup> In South America, only maybe the Hospital San Vicente Paul and Hospital Barrios Laco of Santiago de Chile (with between 900 to 1,000 beds respectively) the US Army controlled Ancon Hospital in Panama (800 beds in 1921) and Dos de Mayo Hospital in Lima in Peru (700 hospital beds in 1921) could be compared to Hospital de la Santa Cruz y San Pablo and Hospital General de Madrid. Most large hospitals in the capital cities and large cities in South America in the 1920s had far fewer hospital beds far from hospital beds of Santa Cruz y San Pablo or Hospital General de Madrid: in Sao Paulo there were around 400, and a similar number again in Buenos Aires. Most hospitals in Lima had below 200 beds, whereas in Bolivia and Ecuador the figures were

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<sup>3</sup> Figures for Madrid and Barcelona in Fernández Pérez and Sabaté 2019 and Archivo Histórico Hospital Sant Pau i Santa Creu; for Bilbao Pedro Pérez Castroviejo 2002; all of them analyzed in Fernández Pérez 2021. For Clínic Antonio Morales Pérez 1908. About the Clínic also Corbella 2006.

<sup>4</sup>Chang-Yeung from Hong Kong Administrative Reports, medical annual reports.



in general very low compared to their South American neighbours (Martin and Mayo 1922, 233-265; Fernández Pérez 2021).

### 3.3. The expansion of hospital beds in the world, 1940s-1970s

Wars of the late 1930s and early 1940s in the world increased the demand for healthcare assistance, but depleted financial resources available to provide care: specialised healthcare staff went to war, abandoning hospitals, and many died, were exiled, or became imprisoned; the immediate demands that war put on countries prioritised investments in weapons and not in medicines; innovation had to substitute for the scarcity or high price of medicines and hospital equipment. Established and often mobile healthcare assistance had to be provided far from large cities near the battle front, and large hospitals piled up the sick and wounded patients who were cared for by voluntary medical staff, many of them medical students still in their final years of study, as revealed by famous Catalan surgeon Moisés Broggi, and the two Grifols brothers who learnt about blood banks in the battlefield of Spain during the Civil War and with their father (further explained in the article in this special issue by Fernández and Sans) who created Laboratorios Grifols S.A. in 1940 (Hervás 2004; Fernández Pérez 2017; Fernández Pérez 2019). In the late 1940s and in the 1950s and 1960s, public welfare and public investment in healthcare accelerated the previous path that was moving towards an increase in large hospitals in big cities where patients, and resources, were concentrated. These hospitals were centralised in order to achieve economies of scale in the acquisition and concentration of specialised staff and equipment. Health insurance companies also expanded the access the public had to health services (Vilar and Pons 2016). OECD countries regulated the coexistence of public and private institutions and organisations in the construction of welfare systems, and ISI policies in emerging economies started vast programs in cooperation with international organisations to

reduce mortality rates and increase life expectancy with a variety of healthcare establishments in rural and urban centres of developing countries.

The table below puts together available information about hospital beds per 1,000 inhabitants for a sample of countries in a few benchmark years between 1929 and 1980. The starting year shows how countries with strong state intervention and investment in healthcare in the late 19th century and first decades of the 20th century, like Germany, had the highest amounts of hospital beds per inhabitant in 1929. The figures for Germany were very high compared to available figures for other developed countries in that year, like France, and compared to most emerging economies of America until the late 1970s. According to the source, in 1980, the number of hospital beds per capita in most of Latin America was lower than in Germany in 1929, with the exception of Argentina and Uruguay. Secondly, the table shows how from 1929 until 1960, or 1970 depending on the country, most of the countries in the sample increased their numbers of hospital beds substantially. The peak in most of them was in 1970, as by 1980 many countries reduced or maintained numbers of hospital beds per 1,000 inhabitants.

**TABLE 6.** Hospital Beds per 1.000 inhabitants in the world, 1929-1980

	1929	1960	1970	1980
<b>Europe</b>				
France	3.6			
Germany	5.0			
Italy		8.9	10.5	9.6
Spain	4.0*		4.6	5.3
<b>America</b>				
Argentina	6.4	5.7	5.4	
Bolivia		1.8	2.0	1.8
Brazi		3.4	3.8	3.8
Canada		10.6	9.8	8.9
Colombia		3.2	2	1.7
Costa Rica		5.1	3.9	3.5
Cuba		2.3	4.2	4.0
Chile		5.0	3.7	3.6
Ecuador		2.1	2.1	2.1

	1929	1960	1970	1980
El Salvador		2.2	2.1	1.8
Guatemala		2.8	2.4	2.0
Haití		0.7	0.7	0.8
Honduras		2.0	1.7	1.3
Mexico	9.6	1.4	1.2	1.2
Nicaragua		1.8	2.5	2.2
Panama		3.8	3.2	3.9
Paraguay		0.8	1.5	1.5
Peru		2.2	2.0	2.0
Dominican Republic		2.7	2.8	2.8
Uruguay		3.9	5.7	5.7
USA	3.0	9.2	7.9	6.0
Venezuela		3.6	3.0	3.4

Source: League of Nations 1932, OECD.stat. 2017.; WHO 2020; PAHO Various years. Data downloaded with technical assistance by J. Lopez Guauque (data for 1970 published in 1972 report; PAHO data for 1980 corresponds to 1978)

\*the figure for Spain in 1929 in fact is data corresponding to 1940.

In Spain there are studies on the statistical sources for research on the history of the hospital system in Spain in the 20th century (Carreras and Tafunell 2005), and research projects which have produced recent publications with new descriptions about the regulation, the policies, and the diversity of stakeholders in the business of private and public health Insurance, that slowly contributed to a modern construction of a public hospital system in Spain after the Civil War (Vilar and Pons 2016 and 2019). According to these studies, there are published censuses of healthcare establishments in Spain in 1949, 1957, and 1964, published in the *Anuario Estadístico de España* edited by the Instituto Nacional de Estadística. Since 1971, the INE has been publishing the “Estadística de establecimientos sanitarios en régimen de internado” (EESRI), annually, and since 1997 the series of “Indicadores Hospitalarios” (Carreras and Tafunell 2005, 110-111). In the early 1980s the creation of the Autonomous Communities in Spain led to a transfer of healthcare policies and supervision to the new regional governments. Between the 1940s and the early 1980s the state increased its share of investment and regulation of healthcare establishments in Spain, but in some regions like Catalonia, private healthcare

establishments that existed before the Civil War remained very much dominant, as the other articles by Barceló, Vilar and Pons and Bohigas indicate in this special issue.

The approval of the *Seguro Obligatorio de Enfermedad* in 1942 was an ambitious attempt to override private control of healthcare establishments and regulations in Spain. However, it was poor in resources and early results were not promising: 353 healthcare establishments under public control existed in 1944, and despite a lot of propaganda in 1953 only 9 new large healthcare residences had been built (26 more were in construction that year). The number of hospital beds designated for the 9 new large healthcare residences in service were: 812 beds in the Barcelona Francisco Franco healthcare residence, 702 in the Bilbao residence, and all the others had between 60 and 450 beds each, most of them having around half the number compared to the Barcelona and Bilbao residences (Vilar and Pons 2016). Far from the 1,200 hospital beds that the Hospital General de Madrid and Hospital Sant Pau of Barcelona had had in 1930, before the Civil War, Sant Pau was financed mostly with private donations.

In 1963 the private sector was still very significant in Spain: there were 538 public civil hospitals, 1,040 private civil hospitals, and 55 public military hospitals. Public civil hospitals had in total 47,548 beds, and private civil hospitals 52,063 beds (Vilar and Pons 2016 36). This means that the average number of hospital beds in 1963 per public civil hospital was around 100, and in private civil hospitals around 50 beds per hospital, on average. The reality was that there were less than 10 top public hospitals with more than 500 beds per establishment, in the most important cities of the country (Madrid, Barcelona, Bilbao, Seville, Valencia), whereas the rest of new hospitals in the provincial capitals and other cities of the country were had very low numbers of hospital beds.

The hospitals in the territory, in the 1950s and 1960s, were dominated by many small hospitals with below 50 beds on average. There was, subsequently, an increase in the concentration of patients in a few large hospitals in the region, "large" being defined as a hospital with 500 beds or more. "Large", by international comparison, was rather small in Spain at the time. The largest hospitals in the world had on average 1,000 beds per hospital. Spain had in 1968 an index of hospital beds per 1,000 inhabitants of 4.34, a huge difference when compared to Sweden and Ireland (with 14.28); East Germany, Northern Ireland and Luxembourg (which all had average of around 12.5); Austria, France, Iceland, West Germany, Finland and Italy (11.10); Russia (9.3); Denmark and Norway (9.09); England and Wales and Belgium (8.3); Poland, Hungary, the Netherlands (7.69), Portugal (5.8); Greece (5.5) (OECD 2017 and 2019; WHO 2020; Vilar and Pons 2016, 37-38; Fernández Pérez 2021).

In the city of Barcelona in 1963, the number of hospital beds of the 4 largest hospitals were: 932 in Hospital Sant Pau and Santa Creu; 904 in Clínic Hospital; 758 in Residencia Francisco Franco; and 612 in Quinta de Salud La Alianza. (Vilar and Pons 2016, 37). These numbers were similar to the number of hospital beds of large hospitals in Sao Paulo, Buenos Aires, Santiago de Chile, but also in London, Paris, Berlin, or New York City and Tokyo (Fernández Pérez 2021). The city, as was the case in other Western European cities like Milan, Paris, Berlin, London, had healthcare beds concentrated in a few large hospitals, some publicly owned and some privately owned, and in many very small clinics (mostly privately owned) where a variety of specialised chronic and acute health assistance was provided (Comelles et al. 2017, and Barceló et al. in this special issue). This process was possible with the increased number of private and public health insurance systems distributed across the developed world, between

the 1940s and the late 1970s, as echoed by the process of hospital and healthcare system development in Barcelona, as shown in the other articles published in this special issue.

### 3.4. The decline in hospital beds, 1980s-2020.

#### 3.4.1. *A process of reduction in the number of hospital beds per capita since the 1980s*

In 1976 there were 14 “Medical Cities” in Spain (*Ciudades Sanitarias* being the original Spanish name), including 49 healthcare establishments, 88 healthcare residences, and a total of 41,582 beds. An average of 303 beds per healthcare centre, attended by 47,251 doctors of the national health service or Seguridad Social (81.6 per cent of the total number of medical doctors in the country). In 1981, there were 1,054 hospital establishments public and private with 193,895 beds (61% private establishments and 32% private hospital beds), an average of 193 beds per healthcare centre (Conde 2001, 251-256).

Measured by the average bed per healthcare establishment, the Transition to Democracy period in Spain between 1976 and 1981 were years of cuts which led to reductions in services, in line with the years of economic crisis caused by the new regime. Between 1972 and 1995, the number of healthcare establishments in Spain decreased from 1,287 in 1972 to 799 in 1997. The number of hospital beds from 177,385 in 1972 to 166,276 in 1997.

The number of hospital beds per 1,000 inhabitants declined in a sustained downward trend: 5,3 beds per hospital on average in 1972; 5,13 in 1981; 4,56 in 1985; 4,26 in 1990; 3,94 in 1997 (Conde 2001, 262-265). Some experts believe that in this period, one of the most important effects this period had led to the closure (“cierre o desafectación”) of many healthcare establishments where elderly patients received care —a trend that led to the decentralisation and privatisation of this service and to the reduction of transparency and homogeneity in

regulations about the type of healthcare services that elderly people subsequently received in the new private residences that would substitute the public ones that disappeared in these years (Conde 2001, 261-265)—. On the positive side, the financial resources used to provide universal access to public healthcare allowed that, by 1991, the percentage of Spanish population with healthcare coverage was 98%. It was not a sustainable process in the long run, though. Every citizen had access to all kinds of services in the public healthcare sector almost for free, with an increase of 42.6% of healthcare personnel hired in the public hospitals between 1972 and 1995. This enormous wave of patients to be sustained in public centres revealed the two major flaws in the system: the fact that the system was not financially sustainable and that there was an insufficient number of hospital beds to account for the rise in patients. This was already a visible issue in the 1970s and only worsened throughout the 1980s and 1990s. The various crises that have impacted the Spanish economy since the 1980s also affected the financial sustainability of universal health access. From the 1980s onwards there was less public funding available to have licenced medical personnel in nursing homes for elderly people. Over the years, guidelines for acceptable minimal medical support in nursing homes were watered down, a fact that became tragically apparent during the Covid 19 pandemic of 2020.

It was in these years of sharp reduction in the number of beds per healthcare establishment, and reduction of healthcare establishments for elderly people under that were public control, that the Spanish government initiated the transfer of INSALUD competences to the Autonomous Community of Catalonia, in 1981. In 1983 the Institut Català de la Salut was created, and in 1990 the new law of healthcare organisation of Catalonia (*Llei d'ordenació sanitària de Catalunya*) started new regulations, well described in the article by Lluís Bohigas in this same special issue.

In Catalonia during the majority of this period, 50% of the total number of healthcare establishments were not owned by the public system but by private institutions and organisations (Conde 2001,260-265). The table below, with official data taken from the Catalan Institute of Statistics website, shows how 30% of the total number of hospitals in Spain disappeared between 1981 and 1997, whereas in Catalonia the numbers remained relatively stable. The number of beds per hospital remained relatively stable during this period but in terms of hospital beds per 1,000 inhabitants, the table shows that in fact the big cut in beds per inhabitant that Spain suffered between 1981 and 1995 was not as dramatic in the case of Catalonia that, throughout the same period of economic crisis in the health sector, remained on average better endowed than Spain in terms of beds per person.

**TABLE 7.** Hospitals, Beds per Hospital, and Hospital Beds per 1,000 inhabitants in average in Spain, and Catalonia, 1981-1997

	Hospitals Spain	Hospitals Catalonia	Hosp Beds per 1,000 Spain	Hosp Beds per 1,000 Catalonia
1981	1,054	193	5,1	5,2
1985	913	175	4,5	4,8
1990	820	177	4,2	5,0
1995	782	176	3,9	4,9
1997	799	180	4,1	5,2

Source: own elaboration with data from IDESCAT website (population at 1st of January).

In the first decade of the 21st century, Catalonia, despite economic and political difficulties and issues with healthcare policy, as described in the other articles of this special issue, maintained a fairly stable number of hospital beds per inhabitant. The case of the Barcelonès area<sup>5</sup> is particularly outstanding in this regard. It has always remained above the Catalan average the number of beds available per person, and well above the Spanish average of beds

<sup>5</sup> Barcelonès area is a *comarca* —an administrative division of the Generalitat de Catalunya like a county— whose capital is Barcelona and also groups the municipalities of Badalona, L'Hospitalet de Llobregat, Sant Adrià de Besòs and Santa Coloma de Gramenet, which have a total of 2,278,437 inhabitants (data of 2019).



per person between 2000 and 2018, as shown in the table below elaborated by the author of this article, also with IDESCAT data:

**TABLE 8.** Hospital Beds per 1,000 inhabitants in Spain, Catalonia, and the Barcelonès area, 2000-2018

	Hosp. Beds per 1,000 inhabitants in Spain (public hospitals)	Hosp. Beds per 1,000 inhabitants in Catalonia	Hosp. Beds per 1,000 inhabitants in Barcelonès
2000	2,7	5,1	6,4
2005	2,6	4,8	6,2
2010	2,7	4,7	6,2
2015	2,6	4,8	6,5
2018	2,6	4,7	6,2

Source: Own elaboration with data retrieved from IDESCAT website. Hospital beds per 1000 inhabitants.

How did Catalonia and Barcelona compare with other territories outside Spain in these years?

The table below shows hospital beds per 1,000 inhabitants for a sample of countries. Firstly, Spain compares closely with the evolution of the United States and Italy, a group of countries where there have been very significant cuts in hospital beds per 1,000 inhabitants since the late 1980s. Catalonia's evolution since the 1980s would resemble rather the numbers and patterns of evolution of Cuba and Argentina, and the Barcelonès area would seem to be close to patterns shown in hospital beds per 1,000 people in France.

**TABLE 9.** Hospital Beds per 1,000 inhabitants in the world, 1980-2017

	1980	1990	2000	2013	2017
<b>Europe</b>					
France			7.9	6.4	5.9
Germany			9.1	8.2	8.2
Italy	9.6	7.2	4.7	3.4	3.1
Spain	5.3	4.2	3.6	2.9	2.9
United Kingdom			4.1	2.7	2.5
<b>Asia and Oceania</b>					
Japan			14.6	13.4	13.0
China					4.2
India					0.6
Russian Federation					8.1
Australia					3.7

	1980	1990	2000	2013	2017
<b>America</b>					
Argentina	5.4				5.0
Bolivia	1.8				1.1
Brazil	3.8				2.2
Canada	8.9				2.7
Colombia	1.7				1.5
Costa Rica	3.5				1.2
Cuba	4.0				5.2
Chile	3.6				2.2
Ecuador	2.1				1.5
El Salvador	1.8				
Guatemala	2.0				0.6
Haiti	0.8				0.7
Honduras	1.3				0.7
Mexico	1.2				0.5
Nicaragua	2.2				0.9
Panama					2.3
Paraguay	1.5				1.3
Peru	2				1.6
Dominican Republic	2.8				1.6
Uruguay	5.7				2.8
USA	6.0	4.9	3.5	2.9	2.8
Venezuela	3.4				0.8

Source: 1960 to 2000 OECD.Stat. For 2013 WHO 2020 (Japan for 2013 in fact is data for 2012). For 2017 OECD 2019 (data in 2017 for US in fact is year 2016). For 1960 to 1980 years information for American countries retrieved from PAHO various years (data downloaded with technical assistance by J. Lopez Guauque (data for 1970 published in 1972 report; PAHO data for 1980 corresponds to 1978).

### 3.4.2. *The situation in 2018, right before the Covid pandemic: hospital beds below the level in 1929 in Barcelona, Spain, and the rest of the world*

With respect to the countries in the table above and in Table 11 below, and the numbers of hospital beds per 1,000 inhabitants with the numbers for each Autonomous Community of Spain in 2018, it is apparent that the numbers for the different autonomous communities of Spain are currently very close to the number of beds per capita in Italy, the United States, and the United Kingdom, Canada, and Latin American countries like Chile and Uruguay. That is to say, most Spanish Autonomous Communities are in worse condition in terms of healthcare

infrastructure, as revealed by the proxy of hospital beds per person, than neighbouring territories such as Germany, France, Japan, and emerging economies like Russia or Cuba.

Of course hospital beds per person, alone, are not an indicator that can serve to evaluate the complexities of health care systems, as there are issues surrounding technology available, specialised healthcare staff, and special financing and regulations that are crucial for a real understanding of this sector. However, using hospital beds and hospital beds per person as a very long term variable measure to observe the evolution throughout a century of different health care systems, the figures provided in this article can contribute to identifying patterns, stages of growth and decline, and which countries and territories seem to do better and when than others. As hospital beds have a limit in the number of patients and healthcare staff attending them, any improvement in hospital assistance may be revealed, potentially, by increases in the numbers of hospital beds per person in a given territory.

The current situation in Spain, as revealed by the latest available data for 2018, shows an unequal distribution of hospital infrastructures by regions or autonomous communities: Andalusia has one third of all hospitals in Catalonia, and around half the hospital beds per 1,000 inhabitants Catalonia has. The comparisons between Catalonia and Madrid are also striking, showing clearly the effect of cuts made in the public hospital system in Madrid that have taken place over the last decades in parallel with an increase in the privatisation of their hospital infrastructure and services. The public system in Catalonia has double the number of hospital beds per 1,000 inhabitants than Madrid, and almost 5 times more public hospitals than Madrid. Almost one third of all public hospitals in Spain are in Catalonia.

**TABLE 10.** Hospitals and Hospital Beds per 1,000 inhabitants of the Spanish National Health Service/SNS, by Autonomous Community, 2018

	Hospitals	Hospital Beds per 1,000 inhabitants
	468	2,4
Andalucía	50	1,7
Aragón	20	3,2
Principado de Asturias	12	2,9
Illes Balears	11	1,9
Canarias	15	2,1
Cantabria	5	2,4
Castilla y León	16	2,7
Castilla-La Mancha	20	2,2
Cataluña	158	3,5
Comunitat Valenciana	39	2,0
Extremadura	12	3,1
Galicia	19	2,8
Comunidad de Madrid	37	1,9
Región de Murcia	15	2,3
Comunidad Foral de Navarra	6	2,3
País Vasco-Euskadi	25	2,6
La Rioja	6	3,0
Ceuta y Melilla	2	2,0

Source: Ministerio de Sanidad del Gobierno de España 2018.

### Final Remarks

From the table above one could easily conclude that the Catalanian public hospital system seems to be stronger than that of other Spanish Autonomous Communities. However, this must be examined on a closer level, in terms of each individual hospital or healthcare centre. This article aims to demonstrate that a very long term comparative approach is far more helpful to understand general trends than a static analysis taken over a short period. Catalonia may have more hospital beds per 1,000 inhabitants than other regions in the country, which is a good indicator of the capacity to resist possible big shocks to the system, such as the devastating Covid 19 pandemic. This article has indicated how in fact Catalonia, since the Transition to Democracy, has consistently been reducing the number of hospitals and hospital beds per inhabitant, and that today there is a huge inequality between the excellent ratio of hospital beds

per inhabitant in the Barcelonès area (around 6 per person) and the extremely poor ratio of hospital beds per inhabitant in the rural *comarcas* (areas or small counties) of Catalonia (around 4). The inequality is clear, between autonomous communities, and between very dense and large urban metropolises and the rest of the territory. The inequality has also increased, if we compare territories of the world like Germany, or Japan, or communist countries of Eastern Europe, in which there are far better ratios of hospital beds per inhabitant than in Spain, Catalonia, or Barcelona.

**TABLE 11.** Hospitals and Hospital beds in a sample of countries, 1930-2018

Year	Country	Hospital Beds per 1,000 inhabitants
1929/1930	Union of Soviet Socialist Republics USSR (1931)	2.9
	Mexico	9.6
	Germany	5.0
	France	3.6
	Spain (1940)	4.0
	Panama	3.8
	USA	2.97
1960	United Kingdom	10.6
	Germany	10.5
	USA	9.1
	Japan	9
	Italy	8.8
	Argentina	6.3
	Cuba	4.3
1970	Japan	12.5
	Germany	11.3
	Italy	10.6
	United Kingdom	9.6
	USA	7.88
	Argentina	5.5
	Spain	4.6
	Cuba	4.6
Mexico	1.2	
1990	Japan (1993)	15
	Germany	10.3
	Italy	7.9

Year	Country	Hospital Beds per 1,000 inhabitants
	United Kingdom	5.9
	Cuba	5.4
	USA	4.86
	Mexico	2.0
	Argentina	4.5
	Spain	4.2
2017	Japan (2012)	13.4
	Germany	8.3
	Cuba	5.2
	Spain	2.9
	United Kingdom (2013)	2.8
	USA	2.77
	Italy	3.1

Source: For 1929/1930 League of Nations 1932, Newsholme and Kingsbury 1934:244-246 for Russia. 1970, 1990 and 2017: OECD Statistics 2020; WHO Statistics 2020; and World Bank. 2020.

The inequality is incredibly clear, if the pattern of evolution of hospital beds is analysed in the largest hospitals of Catalonia and Barcelona in the last century: in Santa Creu and Sant Pau today there are half the number of hospital beds in service that these hospitals had in 1929; the Clínic Hospital has also reduced hospital beds from the average number of 1,000 that the hospital had in the late 1930s to the estimated 800 beds today in the first half of the 21st century.

Hospital beds alone, as this article insists, cannot be the sole factor to be analysed when trying to make sense of what has happened in the history of hospital infrastructures and services in a territory. There are financial, regulatory issues, problems with technology, specialised staff, professionalisation, management and organisation, and agency problems between owners and managers and community interests. There are many factors that intervene historically in the good service of a hospital to their community. However, among these there are not many stable indicators that allow for a clear study of the very long term dynamic evolution of the hospital system and that allow for comparison over centuries. The number of hospital beds available,

and this number when compared to the number of inhabitants in the territory per capita, is one of such indicators that researchers can elaborate, and use, for comparing territories, and for comparisons of different hospital systems over long periods of time.

Comparisons over a century or more help to elaborate conclusions that go beyond short-term political criticisms. Comparisons over a very long term period of time helps make structural trends visible. This article shows that there are structural long term trends that have to do with structural options taken by a society over generations.

During the first third of the 20<sup>th</sup> century, many large cities of the world improved and strengthened the network of hospitals and hospital beds, with a significant pattern of increase before World War II, that is visible as we have seen in Barcelona. This improvement coincided with a general improvement in well being in Western territories of the world, as revealed by a sustained trend of mortality reduction and a trend towards an increase in life expectancy. New modern hospitals may have played a relatively neglected role in this process that still needs to be fully researched.

Between the 1940s and the 1970s public and private initiatives expanded the endowment of hospital infrastructure in large cities. In many developed countries these three decades witnessed the peak in the number of hospital beds per inhabitant, though in many emerging countries there was a relative stagnation in the number of hospital beds per inhabitant (despite the increase in the total number of hospitals) because of the impressive demographic growth of those years and the insufficient public funding to create stable hospital systems to attend the new masses of patients in need of healthcare.

After the 1980s, emerging economies maintained their stagnation or declined their health infrastructure measured by hospital beds per inhabitant, as in the developed world, a sign of the path of sustained contraction in the investment per capita in health infrastructures and medical staff per inhabitant particularly from public administrations, in a context of a strong economic crisis. This included Catalonia, and Barcelona (Barceló and Comelles 2016 and 2017). Between the 1980s and the early 21st century, there was a clear reduction in hospital beds per inhabitant, except in Germany, Japan, and countries with strong systems inherited from past Communist times in the health sector. Catalonia and Barcelona, as most of the world, saw a reduction in the number of hospital beds per inhabitant, though less than the reduction that took place in other Spanish Autonomous Communities. Today, the largest hospitals in Barcelona have, relatively speaking, good ratios of hospital beds per inhabitant compared to neighbouring European regions in France, or the Netherlands, or the United Kingdom. However, Catalonia and Barcelona in particular have clearly lost their agility and ability to react quickly in the context of the recent Covid 19 pandemic. Hospital beds, despite the limitations in fully revealing details of health care infrastructure and staff, are as we defend in this article a useful proxy to evaluate very long term trends. Health care assistance, despite all the innovation and all the technologies, are very labour intensive, there are limits in the number of patients that a bed or a medical staff can attend. An increase in the number of patients usually requires an increase in number of beds and medical staff especially in acute intensive care.

Therefore, the trends shown by the evolution of hospital beds per inhabitant in a territory, this article defends, reveal despite all the limitations how between the 1920s and the 1970s there has been a clear increase, followed by a sustained contraction in hospital beds per inhabitant after the 1980s. International comparisons in the long term, also, do show how some territories



have sustained with effort better endowments of hospital beds than others, a sign of the long term interest of their societies and governments in well being, not shown in most territories of the world.

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