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Characterization of the number, distribution and pertinence of pediatricians in Colombia. 2017

Caracterización de la cantidad, distribución y pertinencia de los pediatras en Colombia. 2017

Mario Hernández-Álvarez[1] **Lorena Mesa-Melgarejo**[2] **Fernando Galván-Villamarín**[3] **Clemencia Mayorga**[4] **Marcela Vega**[3]

[1] Universidad Nacional de Colombia - Bogotá Campus - Faculty of Medicine - Department of Public Health - Bogotá D.C. - Colombia.
[2] Universidad Santo Tomás - Faculty of Economy - Bogotá D.C. - Colombia.
[3] Universidad Nacional de Colombia - Bogotá Campus - Faculty of Medicine - MES (Medicine, Education and Society) Research Group - Bogotá D.C. - Colombia.
[4] Hospital Universitario Clínica San Rafael - Pediatrics Service - Bogotá D.C. - Colombia.
Corresponding author: Mario Hernández-Álvarez. Doctorado Interfacultades en Salud Pública, Universidad Nacional de Colombia. Calle 44 No. 45-67, Camilo Torres Building, block: C2, office: 403. Phone: +57 1 3165000, ext.: 10908. Bogotá D.C. Colombia. E-mail: mehernandeza@unal.edu.co.

Abstract

Introduction: Health human resources estimation and planning in the country require analyzing the relationship between socio-demographic and epidemiological aspects of the population and the supply of health services in different territories.
Objective: To analyze the number, distribution and pertinence of pediatricians in Colombia.
Materials and methods: Cross-sectional study. Data obtained from different sources were aggregated and refined to obtain a single database that allowed conducting an analysis of the number and distribution of pediatricians in Colombia and, this way, make an approximation of the census of Colombian pediatricians.
Results: By 2017, there were 3 398 pediatricians in Colombia. Most pediatricians worked in Bogotá D.C. (35.96%) and in the departments of Antioquia (12.30%) and Valle del Cauca (9.59%). In contrast, in the departments of Vichada and Vaupés, there were no pediatricians and this service was not available.
Conclusion: The distribution of pediatricians in Colombia depends more on the dynamics of healthcare service providers than on the health care needs of children in the different regions of the country. Therefore, the implementation of new policies aiming at achieving a better distribution of the available resources is required to strengthen local authorities and to regulate the provision of pediatric care services throughout the country according to the multiple health needs of each region.
Keywords: Pediatrics; Child Health; Human Resources (MeSH).

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Resumen

Introducción. La estimación y planificación del recurso humano en salud a nivel nacional requiere analizar las relaciones entre la situación sociodemográfica y epidemiológica de las diferentes poblaciones y la oferta de servicios de salud en los territorios que ocupan.
Objetivo. Analizar la cantidad, la distribución y la pertinencia de pediatras en Colombia.
Materiales y métodos. Estudio trasversal. Los datos obtenidos de distintas fuentes fueron agregados y depurados para obtener una base de datos única que permitió analizar la cantidad y distribución de pediatras en el país y, de esta forma, realizar una aproximación del censo de pediatras en Colombia.
Resultados. Para 2017 había 3 398 pediatras en Colombia. Además, la mayoría ejercía en Bogotá D.C. (35.96%) y en los departamentos de Antioquia (12.30%) y Valle del Cauca (9.59%), mientras que en los departamentos de Vichada y Vaupés no se reportó la presencia de estos especialistas o la prestación de sus servicios.
Conclusión. La distribución de pediatras en Colombia responde más a la dinámica de los prestadores de servicios de salud que a las necesidades de la población infantil en los diferentes territorios, por lo que es necesario plantear nuevas políticas que permitan una mejor redistribución de los recursos disponibles y, de esta forma, fortalecer a los entes territoriales y regular la prestación de los servicios pediátricos en todo el país de acuerdo a las múltiples necesidades en salud de las diferentes regiones.
Palabras clave: Pediatría; Salud del niño; Recursos humanos; Políticas, planificación y administración en salud (DeCS).

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Introduction

The World Health Organization (WHO) has acknowledged the shortage of health workforce around the world.[1] In Colombia, several studies on this topic, based on different estimation methodologies, have been carried out, concluding that there is a deficit of physicians, particularly specialists.[2-4] Without a doubt, health workforce is the central axis of health systems, and aspects such as guaranteeing the right to health, improving the resilience of the population, and increasing people' lifespan depend on the availability, accessibility, acceptability and quality of health human resources; as stated by the WHO: "Health systems can only function with health workers; improving health service coverage and realizing the right to the enjoyment of the highest attainable standard of health is dependent on their availability, accessibility, acceptability and quality".[1,p10] However, there is no agreement on what sufficient availability of health workforce means or on the main regulatory aspects regarding the number, distribution, pertinence and quality of healthcare personnel.[2,5]

Human resource estimation and planning is a complex issue for which several approach models have been developed according to the predominant axis of analysis, that is, those centered on supply, on demand, on health needs, or on international standards.[6] In this regard, Fajardo-Dolci *et al*.[7] in a comparative study on the estimation and planning of human resources in health found that the differences between the countries analyzed depended on how their health systems were organized and on their healthcare provision model, but also on the degree of autonomy of their states or provinces, and the decentralization of decision-making processes. Furthermore, the type of educational system and the dynamics of production, whether there was more or less state planning or market autonomy, also had an impact.[5] In Colombia, the growth of the health services market, as well as the increase in the number of training programs aimed at health professionals, is a trend that hinders any planning intention of health human resources by the State, as acknowledged by the Ministry of Health and Social Protection in 2016.[8]

Delays in appointments with specialists and in scheduling surgical procedures, as well as delays in the provision of specialized care have serious health consequences, for example in cancer patients, where time is of essence.[9,10] This situation has led the Colombian government to promote the doubling of the medical specialists in the country through the indiscriminate opening of quotas in residency and medical specialties programs offered by all universities; this, based on perception studies conducted by the managers of health care service provision institutions (IPS, Spanish acronym for Instituciones Prestadoras de Servicios de Salud).[11] In this regard, Law 1797 of 2016[12] established the requirement of conducting detailed studies on the number and appropriate distribution of medical specialists in the country in order to support the development of public policies on this matter, but these studies have not yet been carried out, beyond the calculation of the specialists' offer.[13]

The first study on the number of physicians in Colombia was carried out between 1964 and 1968, but it did not identify how many specialists trained in other countries, especially in USA, had returned to the country.[14] In the last 20 years, several studies on the number of specialists in Colombia have been carried out,[2,3,15-18] but there is still no certainty about their total number, their distribution, and much less about their relationship with the specialized medical care needs of the population across the country. Meanwhile, information from the Single Registry of Health Human Reources (Registro Único de Talento Humano en Salud or RETHUS in Spanish), which was created in 2017, is expected, but this is a slow process.

In order to address the impact of this situation on the health of Colombian children, a population entitled to special protection and prevailing rights, it is essential to establish the correlation between their socio-demographic and epidemiological conditions and the provision of health care services in different settings and regions. Although usual indicators of childhood and adolescence morbidity and mortality in Colombia have improved, several inequities or inequalities that are unjust and preventable remain.[19] Also, most of these inequities can be explained by the lack of timely access to primary and specialized care services.

With this in mind, the objective of the present study was to analyze the number, distribution and pertinence of pediatricians in Colombia in order to obtain enough evidence to start discussing the country's need regarding the training of medical specialists.

Materials and methods

A cross-sectional study was carried out to make an estimation to the census of active pediatricians in Colombia for 2017. To this end, the following sources of information were used to establish the number of these specialists in Colombia in said year: records of authorized pediatric services registered at the Special Registry of Healthcare Providers (REPS, Spanish acronym for Registro Especial de Prestadores de Servicios de Salud) of the Ministry of Health and Social Protection; records of the Sociedad Colombiana de Pediatría (Colombian Pediatrics Society); records of the Colegio Médico Colombiano (Colombian Medical Association); website directories of pediatric subspecialties associations, and prepaid medicine directories. Some of these data were confirmed by making telephone calls to the pediatricians listed in said directories, in particular those who were listed as working in different places. Data collection was performed during 2017.

Once collected, data were aggregated and refined to obtain a single Microsoft Excel® database for their analysis in terms of quantity and distribution. Considering that finding homonyms was a possibility, duplicity was controlled by checking ID number, ensuring that even if registered in different municipalities or departments of the country, pediatricians were included only once. In these cases, specialists were allocated to those departments with the largest cities or municipalities with the highest population densities, based on experts' criteria, since medical specialist spend more time providing their medical services in such places. These data were then geocoded by department using the ArcGIS® software, licensed by the Universidad Nacional de Colombia.

To estimate the pediatrician density index by department, a projection of the population younger than 18 years, as reported by the National Administrative Department of Statistics (DANE for its acronym in Spanish) for 2016,[20] was used.

The pertinence of pediatricians was understood as the relationship between the number and distribution of pediatricians and some health indicators considered to be affected by the quality and access opportunity to health care. The basic child health indicators reported by the Comprehensive Social Protection Information System (SISPRO, Spanish acronym for Sistema Integral de Información de la Protección Social) as of 2016 by department (the latest data available in the system at the time the study was conducted) were used to analyze said pertinence. Health indicators with the greatest impact on children were selected in accordance with the methodological guidelines on the Standard System of Basic Health Indicators in Colombia, issued by the Ministry of Health and Social Protection:[21] child mortality rate (children under 5 years of age), mortality rate due to acute respiratory infection (ARI) in children under 5 years of age, and mortality caused by and associated with malnutrition (MNT) in children younger than 5 years. These situations are directly related to both, the access opportunity to health care and the quality of health care, given that most deaths of Colombian children are caused by preventable and treatable complications and diseases.[21]

In addition, a statistical correlation was made between the number of pediatricians and the number of IPSs registered by department in 2017. These data were obtained from the REPS, and all health care service providers and institutions, whether they were state-owned, private or mixed, registered in 2017 were included.

Correlations between the number of pediatricians and mortality indicators were sought, as well as the number of pediatricians and health care provision institutions by department, estimating correlation indicators.

Ethical considerations

According to article 11 of Resolution 8430 of 1993, issued by the Ministry of Health,[22] this is a risk-free research since information was retrieved from secondary databases and no interventions were made on the study population. Sources used for data collection were publicly accessible online. All data were treated as confidential, and only the researchers had access to the consolidated database. Likewise, personal information was not used for a purpose other than obtaining the identification number of pediatricians, since this is public information.

Results

Number and distribution of pediatricians in Colombia

In 2017, based on the information retrieved in the present study, there were 3 398 pediatricians in Colombia. As shown in Table 1, 35.96% were in Bogotá D.C., which makes it the area with the highest number of these specialists in the country, followed by the departments of Antioquia (12.30%) and Valle del Cauca (9.59%), while in the departments of Vichada and Vaupés no presence or service delivery of pediatricians was reported.

Table 1. Number of pediatricians in Colombia by department. 2017.

Department	No. of pediatricians 2017	Density indicator *
Bogotá D.C.	1 222	5.27
Antioquia	418	2.07
Valle del Cauca	326	2.33
Atlántico	221	2.69
Santander	149	2.3
Bolívar	133	1.71
Huila	94	2.19
Norte de Santander	80	1.63
Cesar	69	1.67
Nariño	65	1.04
Magdalena	64	1.23
Boyacá	64	1.46
Cauca	61	1.22
Tolima	54	1.1
Caldas	54	1.77
Sucre	52	1.64
Córdoba	50	0.76
La Guajira	47	1.11
Risaralda	46	1.57
Meta	40	1.16
Quindío	30	1.72
Cundinamarca	22	0.24
Casanare	9	0.65
Caquetá	8	0.4
Arauca	6	0.5
San Andrés, Providencia y Santa Catalina	6	2.47
Chocó	2	0.21
Putumayo	2	0.14
Amazonas	2	0.55
Guaviare	1	0.2
Guainía	1	0.52
Vichada	0	0
Vaupés	0	0
Total	3 398	2.08

* No. of pediatricians per 10 000 people younger than 18 years.
Source: Own elaboration.

Child mortality indicators in Colombia

Mortality indicators in the country show that the departments of Guainía, Vichada, Chocó, Vaupés and La Guajira have the highest mortality rates in children under 5 years of age due to ARI or caused by or associated with MNT (Table 2). Regarding mortality rates in this population, SISPRO reported that in 2016 the department of Guainía had the highest rate with 55.98 deaths

per 1 000 live births (LB), followed by Vichada (43.77), Chocó (39.8) and Vaupés (39.77); it should be noted that the national child mortality rate was 15 deaths per 1 000 LB for the same period.

Table 2. Mortality indicators in children under 5 years of age by department. 2016.

Department	Mortality rate in children under 5 years of age (per 1 000 LB)	Mortality rate due to ARI in children under 5 years of age (per 100 000 children under 5 years of age)	Mortality rate in children under 5 years of age associated with MNT (rate per 100 000 children under 5 years of age)
Guainía	55.98	57.02	171.07
Vichada	43.77	29.39	146.9
Chocó	39.8	48.82	44.25
Vaupés	39.77	49.95	66.6
La Guajira	24.14	23.13	63.24
Amazonas	20.42	38.3	9.58
Cesar	18.65	20.8	37.07
Córdoba	17.48	13.67	9.29
Guaviare	16.38	27.5	6.88
Putumayo	15.38	12.58	20.13
Caquetá	15.11	16.51	9.17
Atlántico	14.87	13.95	3.72
San Andrés Providencia y Santa Catalina	14.77	No data	No data
Magdalena	14.61	19.49	14.44
Bolívar	14.29	20.3	8.22
Risaralda	14.28	22.41	9.23
Cauca	14.18	12.69	4.48
Meta	14.18	21.1	11.6
Sucre	14.1	17.73	9.46
Norte de Santander	13.19	8.69	4.74
Cundinamarca	13.15	10.65	0.41
Quindío	13.01	10.87	2.17
Nariño	12.97	8.48	2.42
Tolima	12.61	12.61	5.52
Huila	12.5	6.98	5.24
Boyacá	11.74	8.39	2.8
Caldas	11.71	6.35	2.54
Arauca	11.65	9.01	9.01
Antioquia	11.44	9.34	2.24
Valle del Cauca	11.37	11.79	3.56
Bogotá D.C.	11.22	12.39	0.5
Santander	10.36	9.08	3.03
Casanare	10.01	16.37	NO DATA

ARI: Acute respiratory infection; MNT: Malnutrition; LB: Live birth.
Source: Own elaboration based on data reported by SISPRO.

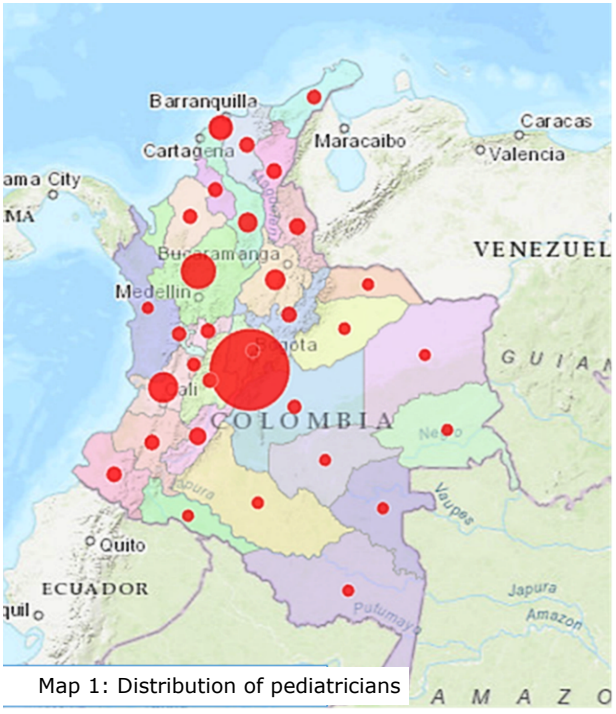
In 2016, the highest mortality rates due to ARI in this population were found in the departments of Guainía (57.02), Vaupés (49.95), Chocó (48.82) and Amazonas (38.3), which were higher than the national average for the same year (31/100 000). Likewise, despite that the national mortality rate due to MNT was 0.78 deaths per 100 000 children under five years of age in 2016,[23] these rates were significantly higher in the departments of Guanía (171.07), Vichada (146.9), Vaupés (66.6), and La Guajira (63.24).

Pertinence of pediatricians in Colombia

In Colombia, according to the child mortality indicators for 2016, the departments with the highest mortality rates in children younger than 5 years (general mortality, mortality due to ARI, and deaths associated with MNT) were Guainía, Vichada, Chocó, Vaupés and La Guajira; coincidentally these are the departments in which the lowest number of pediatricians was found (Figure 1). An inverse correlation is observed when geocoded data on the distribution of pediatricians are compared with data on mortality rates in children under five years. In this sense, mortality by ARI and mortality associated with MNT health indicators are concentrated in the departments of Guainía, Vichada, Chocó, Vaupés, and La Guajira, areas where the number of pediatricians present in their territories is the lowest, as the map in Figure 1 shows. However, the statistical correlation between the health indicators considered in the present study and the number of pediatricians in these departments was close to 20% and, thus, was not significant (Table 3).

Although mortality is caused by multiple causes and is related to living conditions that are very unfavorable for the development of children, these indicators do show a failure by those responsible for providing health care to Colombian children to understand and make interventions to prevent health problems associated with mortality such as ARI and MNT.

Regarding the distribution of IPSs in the country in 2017, the number of pediatricians is correlated to the number of these institutions in all departments reported in the REPS (Table 4). With respect to the number of outpatient pediatric services, based on the REPS, their concentration per department is similar to the number of pediatricians, thus confirming that these specialists are distributed according to the number of IPSs located in each department (Figure 2).



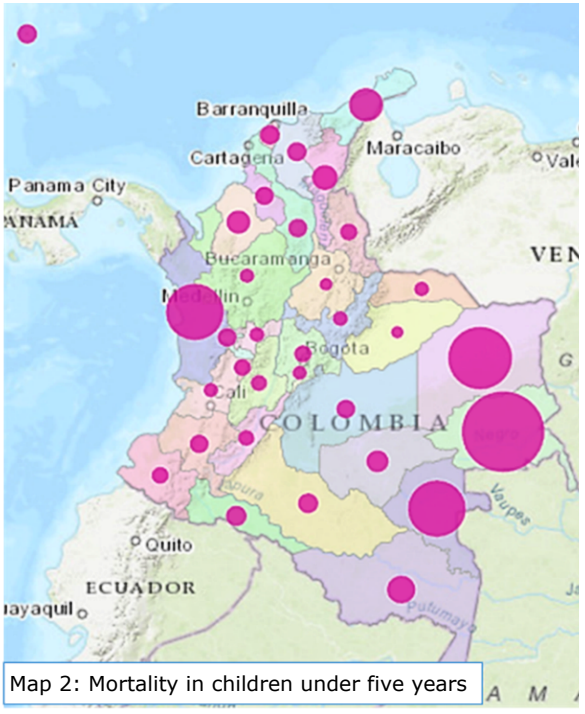


Figure 1. Distribution of pediatricians in 2017, and infant mortality rates by department in 2016, Colombia. Source: Own elaboration.

Table 3. Correlation coefficients between health indicators considered in the present study and the number of pediatricians in Colombia in 2017 (Pearson correlation coefficient).

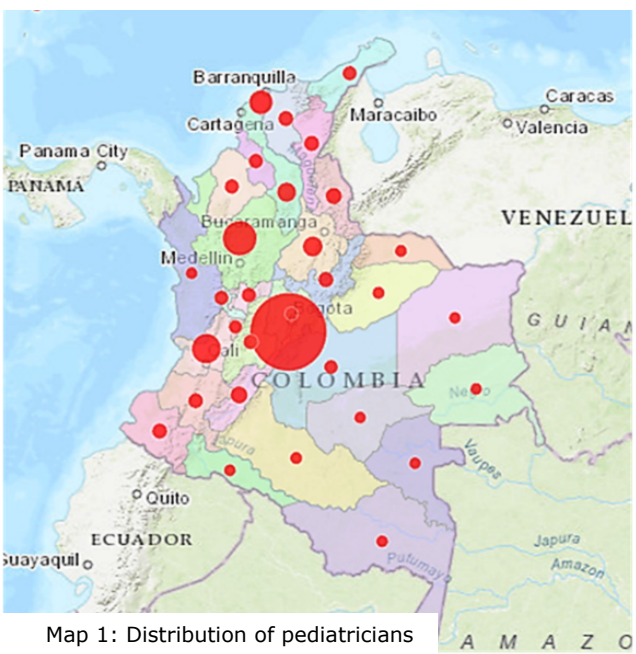
No. of pediatricians	Mortality in children under five years	Mortality due to ARI	Mortality associated with MNT	Health care Service Institutions
3 398	-0.238	-0.239	-0.216	0.893

Source: Own elaboration.

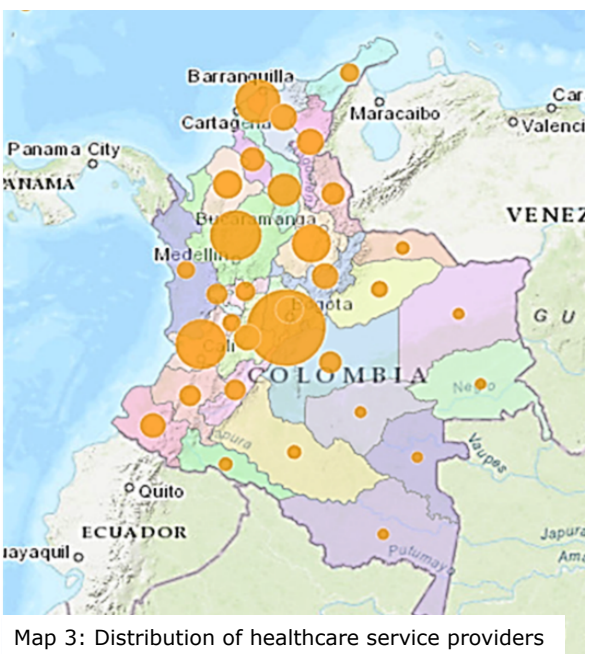
Table 4. Number of health care institutions per department in Colombia. 2017.

Department	Number of IPS
Amazonas	4
Antioquia	921
Arauca	59
Atlántico	782
Bogotá D.C.	1 548
Bolívar	513
Boyacá	345
Caldas	196
Caquetá	64
Casanare	120
Cauca	231
Cesar	358
Chocó	150
Cordoba	407
Cundinamarca	349
Guainía	5
Guaviare	13
Huila	224
La Guajira	173
Magdalena	358
Meta	250
Nariño	319
Norte de Santander	267
Putumayo	63
Quindío	150
Risaralda	219
San Andrés Providencia y Santa Catalina	15
Santander	633
Sucre	304
Tolima	346
Valle del Cauca	922
Vaupés	2
Vichada	11

IPS: Health care service provision institution
Source: Own elaboration based on the data reported by the REPS. Data includes private, state-owned, and mixed IPSs.



Map 1: Distribution of pediatricians



Map 3: Distribution of healthcare service providers

Figure 2. Distribution of pediatricians and healthcare institutions by department in Colombia. 2017.
Source: Own elaboration.

Discussion

The findings of the present study allowed analyzing the number and distribution of pediatricians in Colombia and their correlation with some key child health indicators, as a way of approaching to the training needs of these medical specialists in the country (pertinence). According to the information retrieved, by 2017, there were 3 398 pediatricians, a figure that exceeds by 316 (10.2%) the one reported in 2015 by Restrepo and Ortiz,[2] who found a total of 23 000 medical specialists in Colombia, of which, 3 082 (13.4%) were pediatricians.

Regarding the pediatrician density index, in countries such as USA a density rate of 70.8 certified general pediatricians per 100 000 children under 18 years has been reported,[24] while in countries like Mexico, the rate is 49 per 100 000.[25] In the present study, a 20.8 pediatricians per 100 000 Colombian children under 18 years of age rate was found, which is significantly smaller. Comparing other data is difficult since the age ranges used to classify a population group as pediatric vary depending on the country or countries in which studies are conducted, as well as on their authors.[26]

There is a clear concentration of pediatricians in large cities, a phenomenon that also occurs with other health professionals in Colombia,[2,3,4] where a density of 102 professionals per 10 000 inhabitants has been described in urban areas, compared to 40.8 and 28.1 in rural and scattered rural areas, respectively.[27] Some studies have associated this behavior with the lack of work incentives for practicing medicine in remote or poorly urbanized areas, or the living conditions these professionals have to face while staying in such areas.[2,3,18] However, it is essential to consider the dynamics among insurers, intermediaries and flexible forms of work within health systems such as the Colombian health system, which is based on per capita payment, vertical or commercial integration between health insurers and health care institutions, and the correlation between profitability and concentration of population as factors regulating the supply of health care services and, therefore, the distribution of health professionals.

This is clearly observed in the results of the present study, which leads to consider that the concentration of pediatricians in large cities is more related to the dynamics of health care service provision institutions than to the actual health care needs of pediatric population. In this regard, Birch *et al.*[28] state that health systems based on people's ability to pay impose requirements different from those found in systems based on the needs of the population; this could partially explain the correlation between the number of pediatricians and IPSs found here, although further studies are needed to go deeper into this correlation.

Furthermore, Bonet-Morón *et al.*[29] explain that, in Colombia, people living in the departments of Amazonas, Guainía, Guaviare, Vaupés and Vichada have access to less than 50% of the health care services available in the country. Also, Guzmán-Finol[30] found that in only 45% of all 32 departments of Colombia there are public IPSs (primary and secondary care institutions), some of which have infrastructure deficits and debts, that, in average, offer 18 health care services, out of 234 that should be available. Therefore, it is possible to assume that there are fewer pediatricians in places where there are fewer IPSs, even though they are urgently needed.

Child mortality rates described here did not correlate with the distribution, nor the number of pediatricians, which differs from the findings by Anand & Bärnighausen,[31] who reported that the amount and quality of health human resources were associated with child health outcomes. Although in the present study correlations between child mortality rates and the number and distribution of pediatricians in Colombia were not statistically significant, these rates show a failure in the care provided to children under the age of 5 to understand and intervene in a timely manner preventable health problems associated with their mortality, including ARI and MNT. This situation can be addressed by strengthening the provision of primary health care services with the creation of interdisciplinary teams made up of family and community health specialists, and not necessarily with specialized medical personnel.

Regarding the limitations of the study, it is worth noting that it was not possible to access the validation database of degrees awarded abroad of the Colombian Ministry of Education, thus it was not possible to confirm whether the degrees of pediatricians that were awarded overseas had been validated in Colombia. Also, the possibility of any pediatrician dying during the time the study was conducted was not considered, which could have altered the number of pediatricians that were identified.

Conclusion

Results obtained here allow concluding that the discussion about health human resources planning must be centered on the provision of health care/health needs correlation model, rather than on the number of specialists/ population density ratio correlation model, since in health care provision models such as the Colombian health system, where the per capita payment unit/ health benefits plan correlation is the financing axis, profitability for the financial intermediaries of the Colombian health system, that is, Health Promoting Entities (ESP, Spanish acronym for Empresas Promotoras de Salud), is found in areas with the largest population densities. On the contrary, in territories where rural areas are predominant, and therefore greater health gaps exist, the timely and efficient provision of quality care is not guaranteed due to the absence of market incentives, and, therefore, said provision is not in the interest of the administrators of the two health care schemes (contributory and subsidized) currently in force in Colombia, as acknowledged by the Ministry of Health and Social Protection.

Therefore, the implementation of new policies aiming at achieving a better distribution of the available resources is required to strengthen local authorities and to regulate the provision of pediatric care services throughout the country according to the multiple health needs of each region.

Finally, it is necessary to think of a way of territorialization that allows recovering the control over the public administration of available resources through a new regional public institutionality that strengthens territorial governments and regulates the provision of health care

services according to the multiple health needs of each region, as has been proposed on several occasions.

Conflicts of interest

None stated by the authors.

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