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Geographical distribution of centenarians in Colombia: An analysis of three databases

Distribución geográfica de los centenarios en Colombia: un análisis de tres bases de datos

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[| Abstract |](#)

Introduction: Individuals aged one hundred years or more are of interest for the study of the aging process, which has been scarcely addressed in Colombia.

Objective: To estimate the number and geographical distribution of centenarians in Colombia.

Materials and methods: Three sources of information were reviewed: the 2005 Census, the death certificates issued from 2010 to 2013, and the Individual Registries of Health Services Provision (RIPS in Spanish) of 2014.

Results: The census recorded data of 3 165 centenarians (1 972 women, 62.3%), finding the highest rates in La Guajira (2.23 x 10 000), Chocó (1.90) and Sucre (1.61). In the four-year period analyzed, 3 611 people died, with the highest proportions (for every 1 000 deaths) found in Chocó (10.4), La Guajira (9.4) and Sucre (6.5). RIPS identified 3 390 centenarians, with a higher frequency in Sucre (2.17 x 10000), Chocó (1.29) and Córdoba (1.11).

Conclusions: Although the results are consistent with the number and geographical distribution of centenarians, some errors may be found in the date of birth stated in the records, which is the basis for estimating age in the three sources. Other factors potentially involved in the results may be physical activity, family and community support, low stress and healthy diet in these regions.

Keywords: Age Distribution; Aged 80 and over; Demography; Gender Ratio (MeSH).

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[| Resumen |](#)

Introducción. Las personas mayores de 100 años han sido poco estudiadas en Colombia, si bien son importantes para entender el envejecimiento.

Objetivo. Estimar el número y distribución geográfica de los centenarios en Colombia.

Materiales y métodos. Se revisaron tres fuentes de información: el Censo de 2005, los certificados de defunción de 2010 a 2013 y los Registros Individuales de Prestaciones de Servicios de Salud (RIPS) de 2014.

Resultados. En el censo, se identificaron 3 165 centenarios (1 972 mujeres, correspondientes al 62.3%) con las tasas más elevadas en La Guajira (2.23 x 10 000), Chocó (1.90) y Sucre (1.61). En el cuatrienio analizado fallecieron 3 611 y se hallaron sus mayores proporciones (por cada 1 000 fallecidos) en Chocó (10.4), La Guajira (9.4) y Sucre (6.5). Los RIPS identificaron 3 390 centenarios, cuyas tasas más altas se ubicaron en Sucre (2.17 x 10 000), Chocó (1.29) y Córdoba (1.11).

Conclusiones. Aunque los resultados de la investigación fueron consistentes en el número y la distribución geográfica de los individuos centenarios, pudo haber errores de registro de la fecha de nacimiento, que es la base para estimar la edad en las tres fuentes. Otra explicación de estos resultados podría involucrar la actividad física, el apoyo familiar y comunitario, el bajo nivel de estrés y la dieta saludable en estas regiones.

Palabras clave: Anciano de 80 o más años; Demografía; Distribución por edad; Razón de masculinidad (DeCS).

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Introduction

Centenarians are individuals aged 100 years or older. This is a group of interest to geriatricians, demographers and epidemiologists concerned with the aging process (1-3). In Colombia, research on this age group is scarce, and its geographical distribution as well as other sociodemographic and clinical characteristics have not been analyzed. The only published Colombian study characterized 29 centenarian patients who consulted the emergency department of a university hospital in Bogotá during an eight-year period (4).

Current registration methods, particularly RIPS (which are completed every time a user of any of the health systems in Colombia has access to a health service), could help determining the number of centenarians in the country, their distribution by gender, the places where they live, and the types of diseases they suffer.

This paper describes the information collected from RIPS, together with the data obtained in the last national census of 2005 and the ages recorded in the death certificates that the National Administrative Department of Statistics (DANE in Spanish) records and summarizes every year.

Materials and methods

A descriptive study to review the information on centennial population was conducted in three different databases. First, data obtained from the 2005 census, referring to the population aged 100 or older and their characterization by gender and departmental distribution, were examined on the DANE webpage. Based on this census population, a rate was estimated for every 10 000 inhabitants per department that year.

Second, based on the DANE webpage as well, the data of centenarians who died between 2010 and 2013 were collected. At first, including data for 2014 was considered, but it was finally discarded since it had not been consolidated by the time this research was conducted. Subsequently, the number of deceased centenarians was correlated to the total number of deaths in the same departments during that period. This result was expressed in number of centenarians for every 1 000 deceased.

The third analysis was based on RIPS. These records were created in 2000 by the Ministry of Health to evaluate and monitor the Colombian health system and to support public health decisions. Although doubts about the quality of information are always mentioned, RIPS have been used in different fields of research, including a study of the economic impact of aging Colombian population (5). Information regarding the site of the query, gender and age could be considered reliable to some extent; even though RIPS records have missing and inconsistent data, with these records, it is possible to locate centenarians and determine their most common diagnoses.

Results

Census 2005

According to the 2005 national census, there were 50 077 people over 80 (213 734 men and 287 343 women) in Colombia, which is equivalent to 1.17% of the population. Out of this group of seniors, 3 165 were 100 years or older, 1 193 men and 1 972 women (62.3%). Given that the national population was 41 468 384 (20 336 117 men and 21 132 267 women) at the time, the national centenarian rate for 2005 was 0.76 per 10 000 Colombians (0.59 for men and 0.93 for women).

As Table 1 demonstrates, the rate of centenarians per 10 000 inhabitants presented a minimum value in Meta (0.32), Arauca (0.33), Quindío (0.35), and Casanare (0.36), while the highest values were recorded in La Guajira (2.23), Chocó (1.9), Sucre (1.61), and Córdoba (1.33). In the census, people were classified into ethnic groups. Thus, among those self-defined as indigenous, there were 73 255 over 60 years of age, of whom 467 (0.64%) were over 100. In the Afro-descendants group, 227 598 were over 60 and 1 425 were over 100 (0.63%). Furthermore, other groups had 3 190 262 people over 60 years, and 2 409 of them were over 100 years of age (0.08%).

Table 1. Geographical distribution of centenarians according to the 2005 census and rate per 10 000 inhabitants of each department.

	Total	Males	Females	Rate x 10 000
Amazon region	20	11	9	1.19
Antioquia	410	155	255	0.73
Arauca	5	1	4	0.33
Atlántico	177	49	128	0.84
Bogotá D.C.	314	164	150	0.46
Bolívar	161	50	111	0.88
Boyacá	77	35	42	0.64
Caldas	51	17	34	0.57
Caquetá	30	18	12	0.89
Casanare	10	3	7	0.36
Cauca	106	40	66	0.90
Cesar	54	18	36	0.61
Chocó	74	16	58	1.90
Córdoba	194	60	134	1.33
Cundinamarca	111	38	73	0.50
Guajira	146	48	98	2.23
Huila	55	31	24	0.55
Magdalena	115	59	56	1.01
Meta	23	10	13	0.32
Nariño	127	49	78	0.85
Norte de Santander	77	24	53	0.64
Putumayo	25	11	14	1.05
Quindío	18	7	11	0.35
Risaralda	59	22	37	0.69
San Andrés	6	1	5	1.01
Santander	140	47	93	0.73
Sucre	123	41	82	1.61
Tolima	99	44	55	0.75
Valle	358	124	234	0.88
Total	3 165	1 193	1 972	0.76

Source: Own elaboration based on (6).

Death Certificates 2010-2013

During this four-year period, 799 174 death certificates were issued in Colombia (200 524 in 2010, 195 823 in 2011, 199 756 in 2012 and 203 071 in 2013). 3 611 of them were for centenarians (832 in 2010, 857 in 2011, 897 in 2012 and 1 025 in 2013), of which 66.2% were equivalent to 2 390 women. The rate of centenarians per 1 000 deaths in that period was 4.52 (4.15 in 2010, 4.38 in 2011, 4.49 in 2012 and 5.05 in 2013).

Table 2 shows the total number of deaths and the respective proportion of centenarians per 1 000 deaths, per department. The highest values were observed in Chocó (10.4 per 1 000), La Guajira (9.4), Sucre (6.5) and Bolívar (6.2). The lowest rates were found in the Amazon region (which includes the Amazonas, Guainía, Guaviare, Vaupés and Vichada departments) with 2.3, and Meta with 2.6.

Table 2. Total deaths per department in the 2010-2013 period, and proportion of centenarians per thousand deaths.

Department	Deceased		Rate x 1 000
	Total	Centenarians	
Amazon region	2 592	6	2.31
Antioquia	117 625	604	5.13
Arauca	3 514	18	5.12
Atlántico	38 532	195	5.06
Bogotá D.C.	132 362	429	3.24
Bolívar	24 606	153	6.22
Boyacá	23 624	141	5.97
Caldas	21 871	95	4.34
Caquetá	6 373	32	5.02
Casanare	4 109	23	5.60
Cauca	17 376	96	5.52
Cesar	13 712	68	4.96
Chocó	3 851	40	10.39
Córdoba	23 347	126	5.40
Cundinamarca	35 931	119	3.31
Guajira	6 088	57	9.36
Huila	19 988	96	4.80
Magdalena	17 652	103	5.84
Meta	17 340	45	2.60
Nariño	25 609	108	4.22
Norte de Santander	25 418	125	4.92
Putumayo	2 973	13	4.37
Quindío	13 561	61	4.50
Risaralda	21 850	82	3.75
San Andrés	831	4	4.81
Santander	39 071	208	5.32
Sucre	10 856	70	6.45
Tolima	29 287	130	4.44
Valle	99 225	364	3.67
Total	799 174	3 611	4.52

Source: Own elaboration based on (7).

RIPS 2014

According to RIPS, 3 390 people aged between 100 and 109 years were attended in Colombia, of which 2 154 (63.5%) were women. Based on these records, the number of individuals is reduced every additional year, so that there are 1 270 people aged 100, 818 aged 101, 578 aged 102, and so on until having only 67 aged 109 (Figure 1).

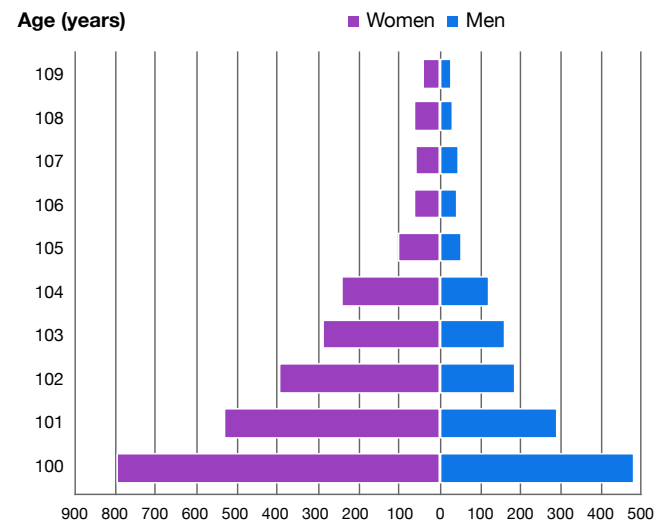


Figure 1. Centenarian population pyramid in Colombia according to RIPS 2014. Source: Own elaboration based on the data obtained in the study.

If the official population projections issued by DANE, which are based on the 2005 census, are taken as the denominator, there were about 47 661 787 inhabitants that year in Colombia, which means that for every 10 000 Colombians, there would be 0.71 centenarians. Most of these patients were attended in Bogotá (528), Antioquia (433), Valle del Cauca (410), Bolívar (222) and Santander (219). After adjusting the departmental population, however, the departments with the highest rates were Sucre with 183 (2.17 per 10 000), Chocó with 64 (1.29 per 10 000), Córdoba with 187 (1.11 per 10 000) and Bolívar and Santander (both with 1.07 per 10 000) (Table 3).

In the entire Caribbean Region, the centenarian population was 1 039, which is a somewhat higher proportion (1.01 per 10 000) than in the rest of the country, where the centenarian rate decreases (0.63 per 10 000) if the Caribbean Region is excluded. On the other hand, the departments with the lowest rates of centenarians were Guaviare with 2 (0.2 per 10 000 inhabitants), Vichada with 1 (0.14 per 10 000) and Casanare with 3 (0.09 per 10 000). The map shows the rates of centenarians by department (Figure 2).

Finally, Table 4 presents the list of the 40 Colombian municipalities with rates higher than 2.5 centenarians per 10 000 inhabitants. These include six municipalities of Chocó, six of Bolívar, four of Boyacá and four of Cauca. The capital city with the highest proportion of centenarians was Sincelejo, but Bucaramanga and Montería also appeared on the top of the list.

Discussion

The results of this study showed, through three different sources of information, a similar pattern of the number and distribution of centenarians in Colombia. In terms of numbers, the 2005 census identified 3 165 centenarians, while the 2014 RIPS found 3 390 (corresponding to an annual growth rate of 0.8%).

Table 3. Number of centenarians registered in RIPS 2014. Population according to DANE estimates and centenarian rate per 10 000 inhabitants, having DANE projections for that year as denominator.

Department	Centenarians	Population	Rate x 10 000
Amazon region	2	75 388	0.27
Antioquia	433	6 378 132	0.68
Arauca	7	259 447	0.27
Atlántico	192	2 432 003	0.79
Bogotá D.C.	528	7 776 845	0.68
Bolívar	222	2 073 004	1.07
Boyacá	116	1 274 615	0.91
Caldas	51	986 042	0.52
Caquetá	15	471 541	0.32
Casanare	3	350 239	0.09
Cauca	130	1 366 984	0.95
Cesar	75	1 016 533	0.74
Chocó	64	495 151	1.29
Córdoba	187	1 683 782	1.11
Cundinamarca	100	2 639 059	0.38
Guainía	1	40 839	0.24
Guajira	61	930 143	0.66
Guaviare	2	109 490	0.18
Huila	61	1 140 539	0.53
Magdalena	92	1 247 514	0.74
Meta	32	943 072	0.34
Nariño	96	1 722 945	0.56
Norte de Santander	72	1 344 038	0.54
Putumayo	12	341 034	0.35
Quindío	33	562 114	0.59
Risaralda	67	946 632	0.71
San Andrés	5	75 801	0.66
Santander	219	2 051 022	1.07
Sucre	183	843 202	2.17
Tolima	92	1 404 262	0.66
Valle del Cauca	410	4 566 876	0.90
Vichada	1	70 260	0.14
TOTAL	3 390	47 661 787	0.72

Source: Own elaboration based on the data obtained in the study.

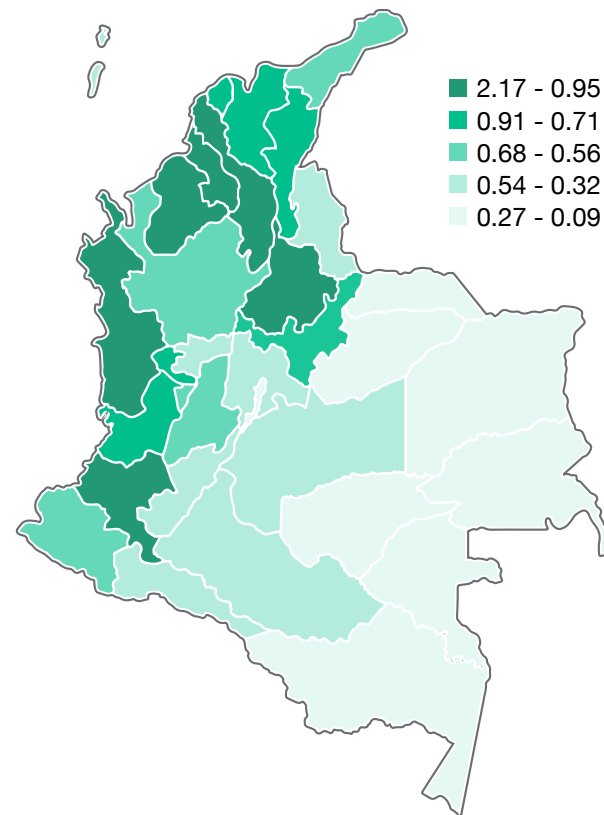


Figure 2. Rate of centenarians per 10 000 inhabitants in Colombia, according to RIPS 2014.

Source: Own elaboration based on data obtained in the study.

Furthermore, considering that 3 611 people aged 100 years or more died between 2010 and 2013, and estimating the death rate of Japanese centenarians aged between 100 and 104 years at 30% per year (35% for men and 27% for women) (8), it could be estimated that the average centenarian population for that period in Colombia was 3 009 people.

However, a common bias could be inherent in these records because of the process of obtaining the citizenship card and the date registered as birth date, which was the basis for age determination in the three databases. These official national citizen identification date back to 1952 (9), when current centenarians were around 30 years. It is possible that the age of birth, especially in the rural areas of Colombia, was imprecise, as was the case of the Ecuadorian population from Vilcabamba (10).

Moreover, there are methods to validate the age of people, as tested in Japanese (8), Chinese (11) and Caucasian (12) populations. These include interviews with relatives to confirm the birth dates, the age at marriage, and the birth date of children and grandchildren (13).

Even with these limitations, it is interesting to note the presence of a significant number of elderly people in some of the poorest areas of the country, such as Chocó and some departments of the Caribbean region. Certain characteristics of these inhabitants may be equated to those described in the so-called blue zones, which are sites of relatively large long-lived populations (14), such as Okinawa in Japan, Sardinia in Italy, Ikaria in Greece, Loma Linda in California, and the Nicoya peninsula in Costa Rica. Some of the characteristics described in these areas include a traditional lifestyle, intense physical activity even in seniors, reduced levels of stress, high family and community support, and consumption of locally produced foods (15,16).

Table 4. Colombian municipalities with the highest rate of centenarians according to RIPS 2014 (only those with three people older than 100 years or more were included). The population corresponds to the municipal projections of DANE for that year.

	Municipality	Centenarians	Population	Rate x 10 000
1	Iza, Boyacá	3	2 325	12.90
2	Soatá, Boyacá	9	7 446	12.09
3	Bajo Baudó, Chocó	16	17 290	9.25
4	Guateque, Boyacá	8	9 677	8.27
5	Pedraza, Magdalena	5	8 052	6.21
6	Colón, Putumayo	3	5 475	5.48
7	Tadó, Chocó	10	18 836	5.31
8	Caloto, Cauca	9	17 607	5.11
9	Sincedejo, Sucre	135	271 375	4.97
10	Condoto, Chocó	7	14 490	4.83
11	Vijes, Valle del Cauca	5	10 886	4.59
12	Mercaderes, Cauca	8	18 018	4.44
13	Arroyohondo, Bolívar	4	9 782	4.09
14	Arjona, Bolívar	29	71 180	4.07
15	Granada, Meta	4	9 855	4.06
16	Istmina, Chocó	9	25 183	3.57
17	Puerres, Nariño	3	8 449	3.55
18	San Juan del Cesar, La Guajira	12	36 851	3.26
19	Unión Panamericana, Chocó	3	9 447	3.18
20	Palmira, Valle del Cauca	96	302 727	3.17
21	Plato, Magdalena	18	56 894	3.16
22	Gómez Plata, Antioquia	4	12 662	3.16
23	Carmen de Bolívar, Bolívar	23	74 297	3.10
24	Tangua, Nariño	3	9 758	3.07
25	Miraflores, Boyacá	3	9 765	3.07
26	Linares, Nariño	3	10 225	2.93
27	Sampué, Sucre	11	37 787	2.91
28	El Carmen de Atrato, Chocó	4	13 819	2.89
29	Sasaima, Cundinamarca	3	10 632	2.82
30	Espinal, Tolima	21	76 291	2.75
31	Bucaramanga, Santander	143	527 451	2.71
32	Cicuco, Bolívar	3	11 110	2.70
33	Timbío, Cauca	9	33 467	2.69
34	Montería, Córdoba	116	434 950	2.67
35	Zambrano, Bolívar	3	11 525	2.60
36	Puerto Triunfo, Antioquia	5	19 656	2.54
37	Corinto, Cauca	8	31 485	2.54
38	Belén de Umbria, Risaralda	7	27 725	2.52
39	Galeras, Sucre	5	19 866	2.52
40	María la Baja, Bolívar	12	47 749	2.51

Source: Own elaboration based on the data obtained in the study.

On the other hand, Colombia has no global indicators of healthy living by departments. Alcohol consumption represented by sales of alcohol in annual liters per capita has a national average of 4.15, which somewhat decreases in the departments of interest. Thus, in La Guajira, the average was 1.64, in Chocó 2.01, in Córdoba 3.20, and in Sucre 3.28 (17). However, these values do not consider the impact of contraband.

Regarding cigarette consumption, according to statistics from the Ministry of Health, in 2007, 3 of these 4 departments may have had a prevalence of tobacco consumption below the national average (12.8%), except for Chocó, which registered 15.9%. The other departments showed a prevalence of 7.8 in La Guajira, 10.5 in Córdoba and 11.9 in Sucre (18).

The 2005 census data allowed estimating life expectancy at birth in Colombia for the five-year period 2000-2005, with an average value for men and women equivalent to 72.8 years. This represented an increase of 2.5 years in relation to the previous 15 years. Some departments with high rates of centenarians, despite having a life expectancy at birth below the national average, showed higher increases when comparing the five-year period 1985-1990 to 2000-2005. Chocó was first with 5.4 years (going from 60.1 to 65.5), followed by Córdoba with 4.8 (from 65.8 to 70.6), and Sucre with 4.7 (from 67.0 to 71.7) (19).

By performing secondary analyzes of official databases (two from DANE and one from the Ministry of Health), this study intended to draw interest on the centenarian population in Colombia, and to continue with this the study, through other strategies, to know if there are regions in the country where longevity tends to concentrate.

Conflict of interest

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