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Prevalence of care dependence among older persons in 26 Latin American and Caribbean countries

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Abstract – Rapid population aging will drive a strong increase in the demand for long-term care services in Latin America and the Caribbean. To inform policy making, in this study we present novel estimates of the number of care dependent older persons in 26 countries of the region. For 10 of these countries, estimates are based on existing survey data. For the remaining 16 countries, we use a statistical model to predict the prevalence of care dependence based on the relationship between this condition and age, gender and health status. We also forecast the number of care dependent older persons in the years 2035 and 2050. On average, we find that 14% of the over-65 population is care dependent in 2020, and this average prevalence is predicted to grow to 16% in 2050. Driven mostly by the increase in the size of the older population in the region, the number of care dependent older persons is expected to grow by a factor of three over the same period, from 8 million in 2020 to 23 million in 2050.

JEL classification: H5, I18, J14, J18

Key words: population aging, functional dependence, long-term care, Latin American and the Caribbean.

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1. Introduction

Population aging is increasing the demand for long-term care worldwide, and Latin America and the Caribbean is no exception. Estimating the number of persons requiring these services is a key input for policy planning and implementation. This data is essential, for example, to estimate the cost of a long-term care system and the demand for human resources.

Currently, only ten Latin American and Caribbean countries conduct population-based surveys that allow estimating the number of persons living in a situation of functional dependence. An even smaller number of countries collects this information at regular intervals. Administrative information is equally scarce and reflects the incipient level of development of long-term care systems.

In this study, we estimate the prevalence of care dependence among older persons in the Latin American and Caribbean countries with available survey data, and employ a simple statistical model to predict the prevalence in all other countries of the region. In addition, we forecast the prevalence of older persons' care dependence up to the year 2050, based on the projected changes in the age structure of the older population.

These results update and extend those of Aranco et al. (2018) and Cafagna et al. (2019), providing current evidence and forecasts for 26 Latin American and Caribbean countries. This note considers age 65 as a threshold for older age (as opposite to 60 in previous estimates), which better reflects the new cultural and societal norms about aging in the region and the world. Moreover, these new estimates include new data for Argentina, Brazil, and Colombia, and update that on Mexico and Costa Rica.

On average, we find that 14% of the over-65 population is care dependent in 2020, and this average prevalence is predicted to grow to 16% in 2050. Driven mostly by the increase in the size of the older population in the region, the number of care dependent older persons is expected to grow by a factor of three over the same period, from 8 million in 2020 to 23 million in 2050.

The rest of this study is organized as follows. In section 2, we present current estimates of the percentage and number of older people with functional dependence in the countries with available survey data. In section 3, we present estimates for countries without survey data. Section 4 presents projections to 2035 and 2050. Section 5 concludes discussing the caveats of our analysis and findings.

2. Older persons' care dependence in countries with available survey data

Survey data allow estimating the percentage and number of older persons living in a situation of care dependence in ten Latin American and Caribbean countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Mexico, Paraguay, and Uruguay. It is important to note that, although these countries' surveys include questions on difficulties with basic activities of daily living, comparability is not straightforward. There are differences in the

number and types of activities considered, the formulation of the questions, and the type and the range of possible responses. Table 1 presents an overview of key questions and highlights the differences that challenge cross-country comparability.

First, most surveys inquire about the presence of difficulties in performing basic activities of daily living, except from Argentina and Dominican Republic, where the focus is on the need for help. We treat these two types of questions as equivalent and classify a person as functionally dependent if either she has difficulties or needs help in performing at least one basic activity of daily living. It is important to acknowledge, however, that the two situations may differ: a person can have difficulties in performing an activity while still being able to perform it without help from others. For a discussion of the ideal formulation of this question in surveys or care dependence assessment tools, see Oliveira, Moncada and Terra (2022).

Second, the number of basic activities considered varies from a maximum of seven in Brazil and Colombia, to a minimum of three in Costa Rica. Although difficulties are correlated with one another, it is reasonable to assume that a higher number of activities considered in the survey will lead to a higher probability that a person is classified as care dependent.

Third, possible answers vary from dichotomous (yes/no) to three or more levels of difficulty or need for help. In the latter case, the classification of care dependence requires the selection of a threshold of difficulty or need. The last column of Table 1 reports the range of possible answers included in each country; highlighted in blue font are the ones we use to classify a person as functionally dependent. Our classification of dependence is based on the level of difficulty implicit in the answers, which depends on the wording used in the answers and the number of options available. For example, in Uruguay we classify a person as dependent if she declares having moderate difficulty or always having difficulty in performing basic activities. In Brazil we classify a person as functionally dependent if she has severe difficulty or is not able to do the activity. In both cases, we select the last two options of the range of possible answers, and assume that having a “small difficulty” in Brazil does not indicate a situation of functional dependence.

Table 1. Comparison of surveys with data on functional dependence

Country	Survey	Year	Sample 65+	# of basic activities considered	Asks if person has difficulties	Asks if person needs help	Possible answers
Argentina	Encuesta Nacional de Calidad de Vida de los Adultos Mayores (ENCAVIAM)	2012	3,291	6		✔	No
							Yes
Brazil	Estudo Longitudinal de Saúde dos Idosos (ELSI)	2018	3,860	7	✔		No
							Small difficulty
							Severe difficulty
							Cannot do it
Chile[a]	Encuesta Longitudinal de Protección Social (ELPS)	2015	2,919	4	✔		No
							Yes
Colombia[b]	Encuesta Nacional de Salud, Bienestar, y Envejecimiento (SABE)	2015	17,134	7			Barthel index range (See note (b) for details on answers classified as care dependence)
Costa Rica[c]	Encuesta Nacional de Discapacidad (ENADIS)	2018	1,899	3	✔		None (level of difficulty = 1)
							Level of difficulty = 2
							Level of difficulty = 3
							Level of difficulty = 4
							Cannot do it
El Salvador	Encuesta Longitudinal de Protección Social (ELPS)	2013	2,370	4	✔		No
							Yes

Mexico[(d)]	Estudio Nacional de Salud y Envejecimiento (ENASEM)*	2018	7,889	6	✔		No
							Yes
							Cannot do it
							Does not do it (due to a health problem)
Paraguay	Encuesta Longitudinal de Protección Social (ELPS)	2015	2,196	4	✔		No
							Yes
Dominican Republic [(e)]	Encuesta Nacional de Hogares de Propósitos Múltiples (ENHOGAR)*	2012	6,448	5		✔	No
							Yes
Uruguay [(f)]	Encuesta Longitudinal de Protección Social (ELPS)	2013	4,863	6	✔	✔	No
							Yes, moderately
							Yes, always

Notes: Blue font indicates the answers that we use to classify care dependence. (a) In Chile, a single question asks if a person has difficulty or needs help. (b) The survey in Colombia uses the Barthel Index to classify the level of difficulty in performing daily activities. For eating, dressing, and using the toilet, three options are presented: *able to do it independently, need help, need someone to do it*. Care dependence corresponds to the second or third answer. For showering and self-grooming, only two options are given: *do it independently*, *need help.* Care dependence corresponds to the latter answer. For getting up from bed, the following options are given can do it independently, needs minimum help, needs great help, cannot do it alone. Care dependence corresponds to the last two answers. Finally, for getting around the house, the following options are included: walks alone, needs some type of help, is in a wheelchair, cannot walk. The last two answers are used to classify a person as functionally dependent. (c) Following Medellin, Jara Malês and Matus-López (2019)'s analysis for Costa Rica, for the activity "getting up from bed", we consider that a person has difficulties if she selects a level of difficulty of 4 or above. (d) In Mexico, questions about difficulties with daily activities are asked only to persons that report difficulties in at least one type of mobility (e.g., walk one block, remain seated, getting up from a chair, climbing stairs, etc.). For the present analysis, it is assumed that persons that do not have any mobility problems are not dependent. (e) In Dominican Republic, questions on difficulties with daily activities are asked only to persons that report physical, sensorial, or cognitive limitations. For the present analysis, it is assumed that persons with no limitations are not care dependent. (f) In Uruguay, respondents are asked about the degree of difficulty; for those that report some level of difficulty, the need of help is assessed. In order to maintain consistency with the rest of the surveys in the analysis, we consider only the first question to assess dependence.

Source: authors' elaboration based on data from *Encuesta Longitudinal de Protección Social* (ELPS) in Chile (2015), El Salvador (2013), Paraguay (2015), and Uruguay (2013), *Estudio Nacional de Salud y Envejecimiento* (ENASEM) in Mexico (2018), *Encuesta Nacional de Discapacidad* (ENADIS) in Costa Rica (2018), *Estudo Longitudinal da Saude dos Idosos* (ELSI) in Brazil (2018), *Encuesta Nacional de Calidad de Vida del Adulto Mayor* (ENCAVIAM) in Argentina (2012), *Encuesta Nacional de Hogares de Propósitos Múltiples* (ENHOGAR) in Dominican Republic (2013), *Encuesta Nacional de Salud, Bienestar, y Envejecimiento* (SABE) in Colombia (2018).

Based on the information and assumptions presented in Table 1, we create a binary variable that classifies older people as functionally dependent if they have difficulties or require assistance with at least one basic activity of daily living. For each country, we calculate the prevalence of care dependence (percentage of persons with difficulty) separately by gender and age, using five-year age intervals (65-69, 70-74, 75-79, 80-84, 85+). This figure is calculated for the year of the latest survey available, which varies by country.

To calculate the number of care dependent older persons in 2020, we apply gender and age specific prevalence calculated in the year of the survey to the number of persons in each group in 2020. The implicit assumption is that the prevalence in each group has not changed between the year of the latest survey and 2020. The formula is as follows:

$$(1)\quad dep65_{c,2020} = \sum_{g=m,f}\left(prev6569_{c,g} * pop6569_{c,g,2020} + prev7074_{c,g} * pop7074_{c,g,2020} + prev7579_{c,g} * pop7579_{c,g,2020} + prev8084_{c,g} * pop8084_{c,g,2020} + prev85_{c,g} * pop85_{c,g,2020}\right)$$

Where $dep65_{c,2020}$ is the number of care dependent persons aged 65 and over in country *c* in the year 2020; $prev6569_{c,g,s}$ is the prevalence of care dependence in country *c*, for the population of gender g (where *g* is equal to *m* for males, and *f* for females) aged 65-69 in the latest survey; $pop6569_{c,g,2020}$ is the size of the population with gender *g* in country *c* in year 2020; and so on for different age groups.

The prevalence of older persons' care dependence in 2020 is calculated by dividing the number of care dependent older persons in 2020 ($dep65_{c,2020}$) by the total number of older persons in the same year as reported by the United Nations Populations Prospects, 2019 revision ($pop65_{c,2020}$). Gender specific prevalence can be calculated by applying the same formula to men and women only, separately. The formula for the care dependence prevalence among people over 65 in country *c* is as follows:

$$(2)\quad prev65_{c,2020} = \frac{dep65_{c,2020}}{pop65_{c,2020}}$$

Table 2 reports the prevalence of care dependence in the over-65 population in the year of the latest available survey and in 2020. In general, the prevalence in 2020 is higher than in the year of the latest survey, reflecting that the age composition of the older population is shifting over time, with a progressively higher share of older groups characterized by higher prevalence of dependence. In a few cases, however, the results show a decrease in the rate of care dependence over time. This is due to differences between the surveys and the United Nations' estimates in the age structure of the older population. It is also interesting to observe that the prevalence of functional dependence varies greatly across countries, going from as low as 5% in El Salvador in 2013 to as high as 25% in Mexico in 2018. Differences in survey design and cultural idiosyncrasies in the way people rate their own functional dependence could be contributing to these large disparities. For a thorough discussion of these factors, see Aranco et al. (2018).

Table 2. Prevalence of care dependence in the over-65 population, for countries with available survey data

Country	year of latest survey	2020
Argentina	7.3% (2012)	7.8%
Brazil	10.3% (2018)	10.5%
Chile	12.2% (2015)	12.1%
Colombia	14.3% (2015)	13.6%
Costa Rica	16.6% (2018)	16.4%
Dominican Republic	11.5% (2012)	11.1%
Mexico	25.5% (2018)	25.2%
Paraguay	6.0% (2015)	5.9%
El Salvador	5.3% (2013)	5.3%
Uruguay	9.0% (2013)	9.5%

Notes and sources: see Table 1.

3. Current estimation of the number of people with functional dependence for countries with no household surveys

For countries with no survey data, we estimate the rate of care dependence based on the relationship with age, gender and chronic health conditions in countries with existing survey data (in general, those included in the previous section). Evidence shows that the probability of being functionally dependent increases with age, that women are more prone to be functionally dependent than men within each age group, and that the presence of chronic conditions is positively correlated with the probability of being functionally dependent (Aranco et al. 2018). Applying these correlations observed at the individual level to the characteristics of the population in a country, the prevalence of care dependence can be seen as a function of the following variables: age composition of the older population; percentage of women in the older population; prevalence of chronic conditions in the older population. We apply a two-steps methodology, as detailed below.

Step 1: Estimation of the individual-level probability of being functional dependent in countries with survey data

We extract a random sample from each country survey analyzed in the previous section (excluding Argentina and the Dominican Republic) and create a pooled data set.[2] To avoid larger surveys to drive the results of the estimation, the size of these random samples is equal to the number of observations in the country with the smallest sample (i.e., Costa Rica). Table A.1 in Annex presents descriptive statistics by country and for the pooled data.

[2] In Argentina, the survey lacks information on chronic diseases. In the Dominican Republic, information on chronic diseases is available only for individuals with physical, sensorial, or cognitive limitations, so it is not possible to use it in the estimation.

We then use the pooled data set to estimate the individual-level probability of being functionally dependent as a function of age, gender, and presence of chronic conditions. To account for the fact that the probability of being care dependent grows steeper with age in the case of women than in the case of men, we include the interactions of gender and age among the explanatory variables. We estimate the following equation:

(3) $DEP_i = \beta_0 + \beta_1 * F6569_i + \beta_2 * M7074_i + \beta_3 * F7074_i + \beta_4 * M7579_i + \beta_5 * F7579_i + \beta_6 * M8084_i + \beta_7 * F8084_i + \beta_8 * M85_i + \beta_9 * F85_i + \beta_{10} * DIAB_i + \beta_{11} * CANCER_i + \beta_{12} * ART_i + \beta_{13} * RESP_i + \beta_{14} * HEART_i + \varepsilon_i$

Where:

- DEP_i is a dummy variable which equals 1 if the individual is functionally dependent and 0 otherwise.
- $F7074_i$ is a dummy variable equal to 1 if the individual is female and aged 70-74; $M7074_i$ is a dummy variable equal to 1 if the individual is male and aged 70-74; similar variables are included for the remaining age groups, with $M6569_i$ as the omitted category.
- *DIAB, CANCER, ART, RESP* and *HEART* are dummy variables equal to 1 if the individual has diabetes, cancer, arthritis (or other musculoskeletal condition), respiratory disease, and heart disease, respectively.
- β_j are the model coefficients, with $j \in [0, 14]$.
- ε is the error term with the usual distributional characteristics.

We obtain the estimated $\widehat{\beta_j}$ coefficients through Ordinary Least Square estimation (OLS). The results of the estimation are presented in Table 3.

Table 3. Individual-level probability of care dependence

Independent variable	OLS coefficient
Male, age 65-69	omitted
Female, age 65-69	-0.0018386
Male, age 70-74	0.0095351
Female, age 70-74	0.0228351**
Male, age 75-79	0.0367817***
Female, age 75-79	0.0535159***
Male, age 80-84	0.087552***
Female, age 80-84	0.1405115***
Male, age 85+	0.1894248***
Female, age 85+	0.2884067***
Has diabetes	0.0808448***
Has cancer	0.0147391
Has respiratory condition	0.1062838***
Has arthritis	0.0695981***
Has cardiac condition	0.0426975***
_cons	0.0258524***
Number of observations	15,079
R-squared	0.0899
Adj. R-squared	0.0891

Notes: Robust standard errors applied for statistical inference.
Significance levels: * p < 0.1; ** p < 0.05; *** p < 0.01.
Source: authors' calculations.

Step 2: Estimation of the prevalence of care dependence in countries with no survey data

The estimated coefficients obtained from equation [3] are used to predict the prevalence of functional dependence in countries without survey data. This implies two assumptions. The first is that the correlation between care dependence, age, gender and health observed at the individual level also holds at country level. The second is that the correlation between care dependence, age, gender and health is the same for all countries with no survey data and equals the average of the countries with survey data (as the latter is used to predict the former). We use the following formula:

(4) $$\widehat{prev65_{c,2020}} = \widehat{\beta_0} + \widehat{\beta_1} * f6569_{c,2020} + \widehat{\beta_2} * m7074_{c,2020} + \widehat{\beta_3} * f7074_{c,2020} + \widehat{\beta_4} * m7579_{c,2020} + \widehat{\beta_5} * f7579_{c,2020} + \widehat{\beta_6} * m8084_{c,2020} + \widehat{\beta_7} * f8084_{c,2020} + \widehat{\beta_8} * m85_{c,2020} + \widehat{\beta_9} * f85_{c,2020} + \widehat{\beta_{10}} * diab_{c,2019} + \widehat{\beta_{11}} * cancer_{c,2019} + \widehat{\beta_{12}} * art_{c,2019} + \widehat{\beta_{13}} * resp_{c,2019} + \widehat{\beta_{14}} * heart_{c,2019}$$

Where:

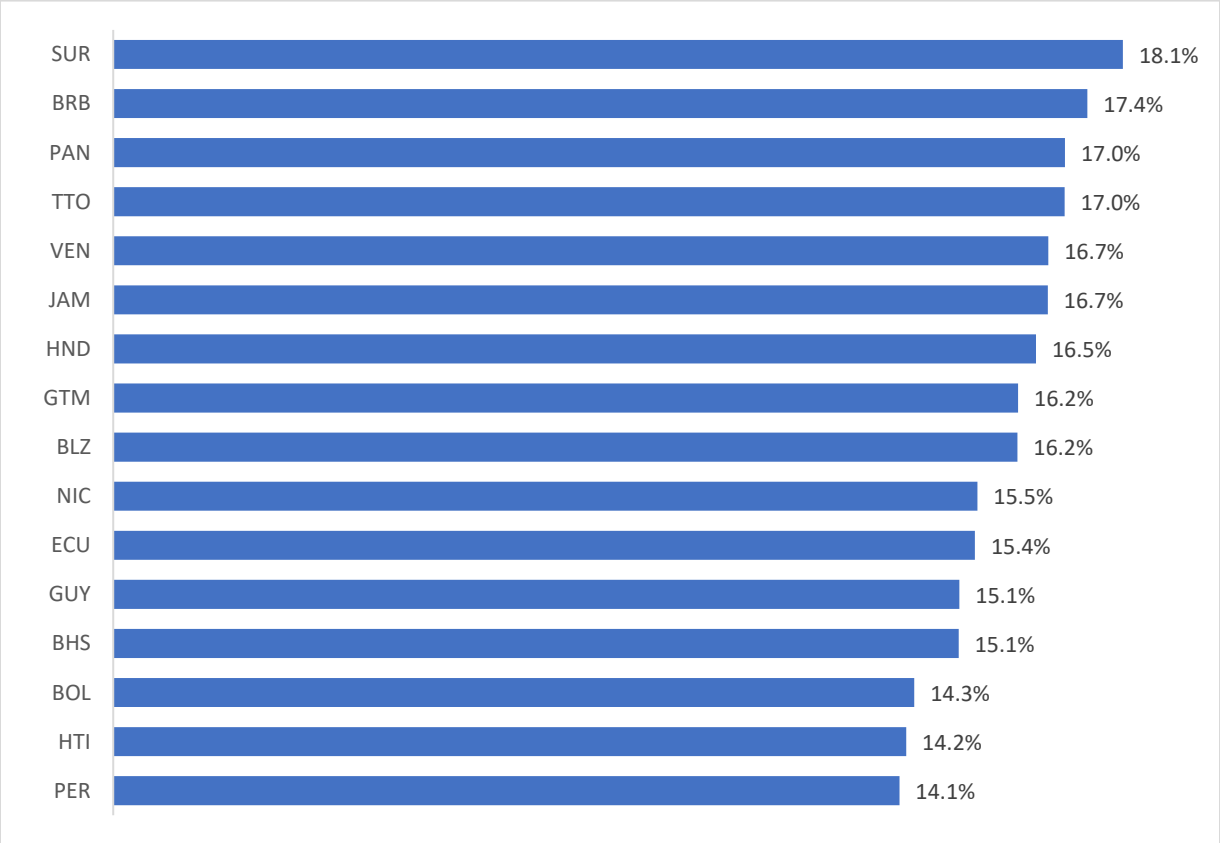
- $\widehat{prev65_{c,2020}}$ is the predicted prevalence of care dependence for the population aged 65 and over in country *c* in the year 2020;
- $\widehat{\beta_j}$ are the estimated OLS coefficients from equation [3], with *j* = [0, 14].
- $f7074_{c,2020}$ is the percentage of females aged 70-74 in the population aged 65 or more in country *c*; similarly, $m7074_{c,2020}$ is the percentage males aged 70-74 in the population aged 65 or more in country *c*; and so on for different age groups, with males aged 65-69 as the omitted category. Data for year 2020 is from the United Nations Population Prospect, 2019 revision.
- *diab, cancer, art, resp* and *heart* are the prevalence of diabetes, cancer, arthritis (or other musculoskeletal condition), respiratory disease, and heart disease, respectively, among the over-65 population in country *c*. Data comes from the Global Burden of Disease Study of the Institute of Health Metrics and Evaluation, 2019 (latest year available).

The number of care dependent older persons in 2020 is calculated by multiplying the estimated prevalence ($\widehat{prev65_{c,2020}}$) by the population in the same year ($pop65_{c,2020}$), as shown below:

(5) $\widehat{dep65_{c,2020}} = pop65_{c,2020} * \widehat{prev65_{c,2020}}$

Figure 1 presents our estimates of the prevalence of care dependence, while the number of care dependent older persons is presented in Table 4. Table A2 presents the population and health data used for the estimation.

Figure 1. Prevalence of functional dependence in the over-65 population in countries with no survey data, in 2020.



Source: authors' calculations.

4. Forecasted rates of care dependence (2035, 2050)

Population aging is expected to increase the number of functionally dependent older persons because of two reasons. First, over the next 30 years the number of persons over 65 in Latin American and Caribbean countries is predicted to grow substantially (UN Population Data 2019). Second, older persons life expectancy is predicted to grow, leading to an increase in the percentage of older persons aged over 80 (UN Population Data 2019). This is the age with the highest prevalence of care dependence.

We project the number of functionally dependent older people using two different methods for countries with and without survey data. For the ten countries with survey data, we multiply specific gender-age care dependence prevalence in 2020 by the size of the population in years 2035 and 2050. The formula is as follows:

(6) $$dep65_{c,t} = \sum_{g=m,f}\left(prev6569_{c,g} * pop6569_{c,g,t} + prev7074_{c,g} * pop7074_{c,g,t} + prev7579_{c,g} * pop7579_{c,g,t} + prev8084_{c,g} * pop8084_{c,g,t} + prev85_{c,g} * pop85_{c,g,t}\right)$$

Where $prev$ are the same prevalence rates used in equation [1], and *t*=2035, 2050. This equation is the parallel of equation [1] for year 2020. The implicit assumptions are that the prevalence of care dependence within each age-gender group is constant over time.

For the remaining 16 countries with no survey data, we apply the following formulas, which build on equations 4 and 5 for year 2020:

(7) $\widehat{prev65}_{c,t} = \left(\widehat{\beta_0} + \widehat{\beta_1} * f6569_{c,t} + \widehat{\beta_2} * m7074_{c,t} + \widehat{\beta_3} * f7074_{c,t} + \widehat{\beta_4} * m7579_{c,t} + \widehat{\beta_5} * f7579_{c,t} + \widehat{\beta_6} * m8084_{c,t} + \widehat{\beta_7} * f8084_{c,t} + \widehat{\beta_8} * m85_{c,t} + \widehat{\beta_9} * f85_{c,t} + \widehat{\beta_{10}} * diab_{c,2019} + \widehat{\beta_{11}} * cancer_{c,2019} + \widehat{\beta_{12}} * art_{c,2019} + \widehat{\beta_{13}} * resp_{c,2019} + \widehat{\beta_{14}} * heart_{c,2019}\right)$

(8) $\widehat{dep65}_{c,t} = pop65+_{c,t} * \widehat{prev65}_{c,t}$

Where t=2035, 2050. Both the size of the population and its age-gender composition changes with time; data come from the *medium variant* projections of the United Nations Population Prospect estimations for 2035 and 2050. The prevalence of chronic health conditions is assumed to remain constant; data comes from the Global Burden of Disease Study of the Institute of Health Metrics and Evaluation, 2019 (latest year available). The $\widehat{\beta_j}$ are the ones estimated from equation [3]. The implicit assumptions are that: (i) the correlation between care dependence, age, gender and health is constant over time; (ii) the prevalence of chronic health conditions does not change over time.

Table 4 presents the prevalence of care dependence and the number of care dependent older persons for 26 Latin American and Caribbean countries, as well as the unweighted regional average, in 2020, 2035 and 2050. On average, the prevalence is expected to increase over time, from 14% in 2020 to 15% in 2035 and 16% in 2050. This reflects the changes in the age structure of the older population; in particular, the increasing importance of the population over 80.

The number of care dependent individuals is forecasted to grow even more rapidly, driven by the growing size of the over-65 population: it is predicted to reach 23 million individuals by 2050, a near threefold increase compared to current figures. The intensity of the growth is projected to be smaller in countries that are well advanced in their demographic transition, such as Uruguay and Barbados. In contrast, the greatest increases are expected in those countries that are still relatively young, and where population aging is most rapid, such as Belize or Honduras.

Table 4. Estimates of functional dependence in the over-65 population, 2020, 2035, 2050

Country	Prevalence			Number of persons (thousands)			Change in the number of care dependent persons
	2020	2035	2050	2020	2035	2050	2020-2050
ARG*	7.8%	8.3%	8.5%	398.81	563.67	806.60	102.3%
BRA*	10.5%	11.2%	12.4%	2,131.50	3,994.22	6,434.34	201.9%
CHL*	12.1%	12.8%	15.2%	282.59	493.82	770.64	172.7%
COL*	13.6%	14.5%	16.9%	625.31	1,198.33	1,981.69	216.9%
CRI*	16.4%	17.0%	18.7%	85.45	165.17	255.57	199.1%
DOM*	11.1%	11.4%	12.6%	90.27	161.26	259.29	187.2%
MEX*	25.2%	25.4%	27.5%	2,471.38	4,386.30	7,276.87	194.4%
PRY*	5.9%	6.4%	6.4%	28.64	49.01	74.50	160.1%
SLV*	5.3%	5.6%	6.1%	29.73	45.95	69.13	132.5%
URY*	9.5%	9.5%	9.8%	50.04	61.54	77.28	54.4%
BHS	15.1%	15.0%	16.8%	4.61	9.05	13.77	198.9%
BLZ	16.2%	15.6%	16.8%	3.22	6.51	12.24	280.2%
BOL	14.3%	15.1%	15.1%	125.16	201.21	303.94	142.8%
BRB	17.4%	17.7%	19.8%	8.36	12.31	15.20	81.8%
ECU	15.4%	15.9%	17.0%	206.33	382.91	641.85	211.1%
GTM	16.2%	16.5%	16.5%	146.13	257.02	485.88	232.5%
GUY	15.1%	15.4%	17.2%	8.33	15.29	20.98	151.9%
HND	16.5%	16.4%	16.9%	81.27	156.00	299.81	268.9%
HTI	14.2%	14.1%	14.0%	83.65	129.97	210.50	151.6%
JAM	16.7%	16.1%	17.4%	44.91	67.73	94.87	111.2%
NIC	15.5%	15.5%	16.2%	58.11	110.36	206.40	255.2%
PAN	17.0%	17.4%	18.6%	62.69	116.86	193.57	208.8%
PER	14.1%	14.7%	15.6%	404.41	719.22	1,193.37	195.1%
SUR	18.1%	17.5%	19.0%	7.56	12.85	18.59	146.0%
TTO	17.0%	17.8%	18.6%	27.41	43.36	57.51	109.8%
VEN	16.7%	17.0%	18.0%	379.00	676.62	1,023.72	170.1%
LAC**	**14.3%**	**14.6%**	**15.7%**	**7,844.85**	**14,036.54**	**22,798.10**	**190.6%**

Note: countries with available data from household surveys are marked with *; ** LAC average is unweighted. Source: author's elaboration based on survey data and results from equations [1], [2] and [6] in Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Paraguay, El Salvador, Mexico, and Uruguay (see Table 1 for details), results of calculations from equations [4], [5], [7], and [8] in Bahamas, Belize, Bolivia, Barbados, Ecuador, Guatemala, Guyana, Honduras, Haiti, Jamaica, Nicaragua, Panama, Peru, Suriname, Trinidad and Tobago and Venezuela.

Conclusions, limitations and caveats

To the best of our knowledge, this study presents the first estimations (for 2020) and forecasts (to 2035 and 2050) of the number of care dependent older persons in 26 Latin American and Caribbean countries. The estimations present an update and improvement from previous estimations in Aranco et al. (2018), by including new countries with survey data and updating others. The estimation for countries with no household data was also improved with respect to

Aranco et al. (2018), as they now consider the specific links between care dependence and the demographic and epidemiological characteristics of countries. The results, however, come with caveats that are worth discussing.

First, the assumption that the prevalence of care dependence within each age group does not change over time (implicit in our forecasts for countries with survey data) must be taken with caution. Panel data from Mexico's Health and Aging Study shows that the prevalence of functional dependence among older persons has increased remarkably between 2001 and 2018, even after controlling for age. For example, the share of individuals over 80 years old with difficulties with at least one activity of daily living has increased by 17 percentage points, from 30% in 2001 to 47% in 2018. Assuming a constant prevalence within each age group may be underestimating the number of care dependent individuals. This is, therefore, a conservative assumption that could be relaxed in future estimations.

Second, the assumption that the prevalence of chronic conditions is constant over time (implicit in the forecasts for countries without survey data) may also be a strong one. Data from Mexico points to an increase in the prevalence of certain chronic conditions among the older population – which may be partly explaining the growth in the prevalence of care dependence. For example, data from the Health and Aging Study shows that the percentage of people aged 60 to 69 with diabetes diagnosis increased from 16% in 2001 to 26% in 2018; a similar increase is observed for people aged 70 to 79. Part of this increase might be due to better diagnosis and management of the condition, that allows people to survive up to older ages with the disease. Our assumption of constant prevalence of chronic conditions may lead to an underestimation of the number of care dependent individuals.

Third, our methodology assumes that the correlation between functional dependence, age, gender and health observed in some countries (with survey data) holds also for other countries (without survey data) and over time. This correlation may be a function of country features such as the quality and coverage of the healthcare system. The direction of this bias is hard to predict.

Finally, it should be kept in mind that although care dependence rates are higher among the older population, there is still a significative proportion of younger people that are care dependent. According to data reported in Cafagna et al. (2019), for example, almost half of care dependent people in Mexico is aged 50 to 69, and in Chile, 40% is between 15 and 69 years old.

Notwithstanding the abovementioned limitations, the figures provided in this paper show that population aging will create a strong growth in the demand for long-term care services. Almost 15 million more people will demand these services by 2050, compared to 2020. In 2020, of the approximately eight million people with the need for care in the region, about 90% received it from a family member (from 76% in Uruguay to 98% in Mexico), most of the time from an unpaid woman (Oliveira, Aranco and Stampini 2021).[3] This has important gender implications. Evidence from Chile, Colombia, Costa Rica, and Mexico shows the negative impact of providing care on women's labor market participation (Stampini et al. 2020).

The coverage of public long-term care services is low, reaching 20% in Argentina and Costa Rica, 11% in Uruguay, and 7% in Chile, for example (Aranco et al. 2022). In Mexico 25% of older

[3] Based on calculations from Argentina, Brazil, Costa Rica, Mexico, and Uruguay.

persons with severe dependency do not receive any kind of support (González-González et al. 2019). Looking forward, the traditional supply of care will further diminish as households are becoming smaller and women are increasingly participating in the labor market. Countries will need to develop care alternatives not only to meet the projected increased demand but also to promote a shift in the structure of care, relieving the burden posed on female family caregivers. As the care sector has been shown to encourage the creation of millions of jobs, this challenge can be transformed into an economic opportunity (Villalobos, Oliveira and Stampini 2022).

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Annex

Table A1. Weighted average of the variables used for the estimation of equation 3

Variable	Argentina	Brazil	Chile	Colombia	Costa Rica	El Salvador	Dominican Republic[(a)]	Mexico	Paraguay	Uruguay	Total
Male, age 65-69	13%	16%	16%	13%	16%	12%	15%	15%	18%	13%	14%
Female, age 65-69	19%	21%	17%	19%	18%	20%	18%	20%	17%	16%	19%
Male, age 70-74	13%	10%	11%	11%	11%	10%	12%	12%	13%	10%	12%
Female, age 70-74	14%	14%	14%	15%	14%	14%	13%	14%	14%	14%	14%
Male, age 75-79	7%	8%	9%	8%	9%	8%	9%	8%	7%	7%	8%
Female, age 75-79	11%	12%	9%	11%	9%	13%	9%	10%	9%	12%	10%
Male, age 80-84	6%	4%	5%	5%	7%	6%	6%	5%	6%	5%	5%
Female, age 80-84	9%	8%	7%	8%	7%	8%	7%	6%	6%	10%	7%
Male, age 85+	2%	3%	4%	4%	4%	3%	5%	5%	5%	4%	4%
Female, age 85+	6%	5%	8%	6%	6%	6%	7%	6%	6%	9%	6%
Has diabetes	n.a	19%	25%	17%	28%	15%	20%	25%	4%	15%	23%
Has cancer	n.a	8%	4%	5%	7%	2%	2%	3%	0%	3%	3%
Has respiratory condition	n.a	9%	9%	11%	12%	6%	7%	7%	1%	7%	7%
Has arthritis	n.a	55%	27%	28%	49%	24%	53%	16%	6%	29%	20%
Has cardiac condition	n.a	16%	15%	15%	17%	12%	17%	10%	3%	18%	11%
Number of obs.	3,291	3,860	2,919	17,134	1,899	2,370	6,448	7,889	2,196	4,863	52,869

Source: see Table 1

Note: (a) Data on chronic conditions only available for individuals with physical, sensorial, or cognitive limitations.

Table A2. Mean of the variables used for estimations according to equation 4

Variable	Bahamas	Belize	Bolivia	Barbados	Ecuador	Guatemala	Guyana	Honduras
Age X Gender (% in 65+ population)								
Male, age 65-69	18%	19%	15%	14%	17%	16%	17%	17%
Female, age 65-69	21%	18%	17%	17%	19%	20%	21%	20%
Male, age 70-74	12%	13%	12%	11%	12%	11%	13%	11%
Female, age 70-74	15%	12%	14%	13%	13%	14%	14%	13%
Male, age 75-79	8%	8%	9%	7%	8%	8%	6%	8%
Female, age 75-79	11%	8%	10%	10%	10%	10%	8%	9%
Male, age 80-84	4%	6%	5%	5%	5%	5%	6%	5%
Female, age 80-84	6%	6%	7%	7%	6%	7%	7%	6%
Male, age 85+	2%	5%	4%	6%	4%	4%	3%	4%
Female, age 85+	4%	5%	7%	8%	6%	5%	5%	6%
Chronic conditions (prevalence in 65+ population)								
Diabetes	33%	29%	21%	34%	29%	39%	39%	35%
Cancer	19%	17%	15%	20%	19%	15%	14%	15%
Respiratory condition	7%	11%	10%	9%	9%	8%	7%	13%
Arthritis	50%	51%	43%	48%	53%	53%	41%	52%
Cardiac condition	36%	40%	17%	36%	23%	27%	32%	28%

Table A2. Mean of the variables used for estimations according to equation 4 (cont.)

Variable	Haiti	Jamaica	Nicaragua	Panama	Peru	Suriname	Trinidad and Tobago	Venezuela
Age X Gender (% in 65+ population)								
Male, age 65-69	18%	16%	17%	16%	17%	17%	18%	18%
Female, age 65-69	21%	17%	22%	17%	18%	20%	20%	20%
Male, age 70-74	11%	13%	10%	12%	12%	12%	13%	12%
Female, age 70-74	14%	13%	13%	13%	13%	15%	15%	15%
Male, age 75-79	8%	9%	8%	8%	8%	7%	8%	7%
Female, age 75-79	10%	9%	10%	10%	10%	11%	10%	10%
Male, age 80-84	4%	6%	5%	5%	6%	4%	4%	4%
Female, age 80-84	6%	6%	7%	7%	6%	7%	6%	6%
Male, age 85+	2%	5%	3%	5%	3%	3%	2%	3%
Female, age 85+	4%	5%	6%	7%	5%	5%	4%	5%
Chronic conditions (prevalence in 65+ population)								
Diabetes	32%	38%	31%	35%	18%	50%	50%	36%
Cancer	13%	18%	15%	17%	18%	18%	18%	19%
Respiratory condition	11%	11%	11%	12%	9%	10%	7%	14%
Arthritis	37%	47%	48%	53%	50%	56%	52%	56%
Cardiac condition	28%	38%	26%	29%	21%	45%	42%	32%

Source: United Nations World Population Prospects, 2019 Revision; Institute for Health Metrics and Evaluation, Global Burden of Disease Study 2019.