

The teaching of Geriatrics and Gerontology in Central America, and related sociodemographic issues

Roberth Steven Gutiérrez-Murillo¹, José Alexandro de Araújo Nascimento², Chared Nicol Godoy-Ñustes³, Walfrido Kühl Svoboda⁴, Patricia Krieger Grossi⁵

¹ School of Medicine, Department of Biomedical Gerontology, Pontifical Catholic University of Rio Grande do Sul (PUC-RS/Brazil); roberth.murillo@edu.pucrs.br; ORCID <https://orcid.org/0000-0003-2304-3241>.

² Latin American Institute of Life and Nature Sciences, Department of Collective Health, Federal University of Latin American Integration (UNILA/Brazil); alex_sandroal@hotmail.com; ORCID <https://orcid.org/0000-0002-5568-2278>

³ Latin American Institute of Life and Nature Sciences, Department of Medicine, Federal University of Latin American Integration (UNILA/Brazil); nicolegodoy12@hotmail.com; ORCID <https://orcid.org/0009-0001-9203-2354>

⁴ Latin American Institute of Life and Nature Sciences, Department of Collective Health, Federal University of Latin American Integration (UNILA/Brazil); walfrido.ufpr@gmail.com; ORCID <https://orcid.org/0000-0001-6320-4754>

⁵ School of Medicine, Department of Biomedical Gerontology, Pontifical Catholic University of Rio Grande do Sul (PUC-RS/Brazil); pkgrossi@pucrs.br; ORCID <https://orcid.org/0000-0002-0851-639X>

* Correspondence: roberth.murillo@edu.pucrs.br

Received: 7/1/2024; Accepted: 7/29/2024; Published: 8/19/2024.

Abstract: In several Latin American countries, medical curricula are deficient in the inclusion of compulsory disciplines such as Geriatrics and Gerontology (G&G). In the most favorable circumstances, these subjects are offered as elective courses. To problematize the teaching of G&G in Central American countries and related sociodemographic aspects, this paper offers answers, even if they are considered inexhaustible, to the following questions: What has been the nature of the demographic transition in recent decades? To what extent is graduate training in G&G symmetrical in the region? What is the predominant training profile in the countries? In short, are there sufficient specialized human resources to meet the health demands of older adults? A review of the literature and an analysis of secondary data suggest that the countries can be divided into two groups. The first group of countries demonstrates a notable commitment to ensuring that future generations of professionals are adequately trained to meet the demands of these fields (Costa Rica, El Salvador, Panama, and Guatemala). In contrast, the second group of countries, which includes Belize, Honduras, and Nicaragua, demonstrates a comparatively lesser degree of sensitivity to this issue. It is curious that the rapid growth of the older population in these countries has not resulted in a proportional increase in the responses required by governments to meet the needs of this demographic. Immediate examples of this are the shortage of professional geriatricians and gerontologists, as well as the few postgraduate courses in G&G studies.

Keywords: Medical education; older adults; human resources for healthcare; Central America.

1. Introduction

Contemporary societies have undergone significant changes, as identified by experts in various fields, including demography, applied social sciences, and health sciences (1-3). Due to these developments, there has been a growing imperative for the urgent delineation of strategic actions to address sociodemographic and epidemiological transitions in a scenario of exponential transformation, occurring at an accelerated pace and in conditions that are not uniform across countries. The data from 1990 to 2020 demonstrate a notable increase in the proportion of older adults in the global population. In 1990, this proportion was 6.4%, but by 2020 it had reached 10.4%. Projections indicate that this figure will reach 16% by 2050 (4).

In recent years, the focus of the task has been on the adaptation of new age patterns and modes of social organization, particularly in the context of labor reform in response to the capitalist production model that emerged in the modern world in the 1970s, although this was particularly prevalent in the early 1980s. In the current era, however, the challenges are multifaceted and pervasive, affecting all spheres of society. Consequently, an initial step in comprehending demographic trends necessitates a broader examination than that of the social and health spheres. It is essential to tackle these issues with the same rigor, considering factors such as the environment, anthropology, religion, politics, and particularly the budgetary implications (5). Of these, the latter is of particular importance about the organization of public healthcare systems and the sustainability of social security programs.

These elements were addressed in the World Report on Aging and Health, presented by the World Health Organization (WHO), in 2015. It is understood that the document serves as a roadmap for the development of plans and strategies to be implemented in each nation. It emphasizes the training of qualified human resources, sensitized and perfected to deal with the particularities of the triad aging-older person-old age (6). A comparable phenomenon is observed in the Latin American and Caribbean region, where governments have been unable or unwilling to address the demographic changes caused by the aging of their populations with the necessary determination (7-9). This has resulted in a lack of preparation to deal with the micro- and macro-structural repercussions of this phenomenon (10), acting as contributing factor to the repression of institutional demands, defined as the discrepancy between the demand received and the demand met. Additionally, it is associated with the low rate of qualified human resources available to provide care to users of geriatric-gerontological services and programs in the region (11-12).

The medical field of geriatrics, which is concerned with understanding and addressing the pathological issues of older adults, and the interdisciplinary field of gerontology, which is focused on the biopsychosocial aspects of aging, serve as the primary theoretical and practical foundations for training professionals to address the emerging epidemiological profile observed in recent times (13). In the field of healthcare, these two disciplines frequently collaborate in research, teaching, and care initiatives (14-15). A diverse range of professionals from various academic and professional backgrounds have dedicated their expertise to the field of aging studies, employing an interdisciplinary approach in their research and practice (16-17). As posed by Karasik et al. (18, p. 151):

The ways in which education is approached in the fields continues to evolve. Ageism and its antidotes area persistent theme underlying all aspects of the fields, while shifting demographics and critical workforce development needs remain at the forefront. The path forward requires moving beyond simply documenting current and future professionals' lack of knowledge and/or interest in aging and older adults.

Nevertheless, in the Americas, less than 15% of undergraduate programs in health sciences and less than 10% of graduate programs in key medical specialties for the care of older patients include a focus on aging and health in old age (19, p. 107). Regarding Central American countries, there is a dearth of empirical research; among the limited number of existing studies, those of the biomedical branch appear more frequently, which impedes an integral understanding outside the pathological (20-21). A cursory search of the Scopus database on June 25, 2024, employing the search terms ["geriatrics" or "gerontology" and "Belize" or "Costa Rica" or "El Salvador" or "Guatemala" or "Honduras" or "Nicaragua" or "Panama"] returned only eleven results, indicating a dearth of research in this area. Moreover, a search of titles, abstracts, and keywords, with no restrictions on areas or year of publication, yielded only eleven publications, underscoring the need for further research in this area. The evidence suggests a potential correlation between sociodemographic factors and the limited availability of specialized human resources for the health of older adults, thence inviting further research into this subject.

As will be discussed along this work, the disparity in clinical-scientific output can be attributed to the fact that geriatrics is a more established field with a more robust research profile in the region (22). The change in the approach to human aging in recent years has shown that, despite its best efforts, geriatrics does not address the needs of older adults in isolation, as aging is not a purely biological process. This is where gerontology becomes relevant, not in a competitive context, but as a complement to health care. Both fields of knowledge have different aims, although they share the same units of analysis: the process of human aging, old age as the last vital phase, and the older adult as the central element.

With a view to problematize the teaching of Geriatrics and Gerontology in Central American countries and the related socio-demographic aspects, this text presents answers to the following questions: What has been the nature of the demographic transition in recent decades? To what extent is graduate training in geriatrics and gerontology balanced across the region? What are the predominant training profiles in the countries? Ultimately, are there sufficient specialized human resources to meet the health demands of older adults? The hypothesis of this study is that countries which have experienced a more accelerated aging process have implemented tangible responses to the challenge, including an increased supply of professionals with specialized knowledge in the field.

2. Methods

The methodological approach utilized is a mixed methods approach (23). This study examines the congruencies and incongruencies in geriatric and gerontological higher education because of a review of the specialized literature and, in a complementary manner, analyzes the sociodemographic aspects related to population aging in these countries quantitatively. It is important to note, however, that the work employed a two-phase sequential explanatory design in which the qualitative approach was predominant, thus affording less weight to the quantitative approach to the data. The phases established a correlation between the exponential growth in the proportion of the population aged 65 and over and the availability of trained professionals to meet the demand for care.

In the specialized bibliographic review phase, a virtual consultation was conducted of the following scientific databases: Google Scholar, Taylor & Francis Online (journals specializing in geriatrics and/or gerontology only), and Scientific Electronic Library Online (SciELO). The following search terms were used: "geriatrics teaching," "gerontology teaching," "geriatrics," and "gerontology." The terms were utilized for each Central American country, without temporal exclusion. The papers were selected based on the following criteria: they should have addressed the teaching of geriatrics and gerontology at the graduate level; they should have been written in Portuguese, English, or Spanish; and they should have been accessible without restrictions. The authors read all the articles that met the inclusion criteria in their entirety and then selected, by consensus, the most appropriate materials for discussion based on the results found.

The identification of public and private higher education institutions for each Central American country was conducted with the assistance of the *Universidades* website, which compiles all undergraduate and graduate programs in the region. Each country was selected for inclusion in the study, and an individual search was conducted for each country, with the following results: A thorough search of Belize revealed no institutions meeting the criteria (n= 0). In the case of the remaining countries, institutions were identified in Costa Rica (n= 88), Guatemala (n= 16), El Salvador (n= 40), Honduras (n= 22), Nicaragua (n= 44), and Panama (n= 42). Following, a selection was made to determine which institutions offer graduate programs in geriatrics and gerontology. The presentation of results considered the name of the program and the institution offering it, the teaching modality (academic or professional), the duration (in years and months), and the

description of the vocational orientation and the professional outlet foreseen by the graduate program.

The quantitative data included in this study are analyzed using the descriptive statistical technique, which employs measures of dispersion and absolute and relative frequencies. The results are presented in comparative tables and figures, with differentiation of percentage weights. The demographic data were extracted from the World Bank, with the dependent indicators selected as "total population and population aged 65 and over," and the independent indicators selected as each Central American country. The countries included in the study were Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama (4). The extracted data were imported into a Microsoft Excel database, version 16.82, compatible with the macOS Sonoma operating system, version 14.5. The same software was used for all statistical analyses.

To ascertain the residual discrepancy in population growth, the formula $DRC = [(t_2/t_1) \times 100]$ was employed, wherein t_1 corresponds to the initial period (1990) and t_2 to the final period (2020) under examination (24). The calculation provides an approximation between periods, highlighting the gross percentage of population growth. However, due to the relative annual variations, the formula does not allow for continuous stratifications by age. To facilitate the presentation of the data, the residual difference was plotted based on the pattern (linear or oval) and trend (increasing or decreasing) during the predefined period (1990-2020). In the interest of focusing the present study on its specific objectives, the population stability criteria recommended in the residual analysis were not employed (25). The reason for this exclusion is that the available data are not stratifiable by quartiles for sensitive variables such as sex, age, mortality, birth rate, and fertility. The calculation of seasonality is contingent upon the availability of continuous, stratifiable data for all periods and variables.

In terms of ethical considerations, this research did not necessitate the clearance of a research ethics committee, given that it involved the utilization of secondary data, which is freely accessible on the Internet.









3. Results and Discussion

3.1. Sociodemographic Contextual Aspects

Prior to formulating any hypotheses, it is imperative to acknowledge that the paucity of interest in geriatric and gerontological training cannot be attributed exclusively to the dearth of graduate programs. Furthermore, it is an overlooked consequence of structural changes in societies. This debate is particularly pertinent in the context of Central American countries, which, like other countries in Latin America and the Caribbean, have undergone significant demographic shifts, albeit to a more pronounced degree than their neighbors due to the unique social challenges they face (26). To substantiate this argument, it is essential to examine the following supporting points.

In comparison to the southern and northern regions of the Americas, Central America is a relatively modest geographical area. The region is comprised of seven countries, most of which are Spanish speaking. It should be noted, however, that Belize has English as its official language, although it is also spoken in the Caribbean part of Central America. The region's population is estimated at approximately 50 million, with Belize (approximately 395,000 inhabitants) and Guatemala (approximately 17 million inhabitants) having the smallest and largest populations, respectively. Apart from Honduras (10.1 million), the remaining countries have populations that do not exceed seven million inhabitants (table 1).

Table 1. Gross population (both sexes) in the countries analyzed 1990-2020.

Location	Gross population	Time trend	D_{RC} [t_2 / t_1] x 100	Pattern	Graphics
Belize	394,921	Increasing	[394,924/182,589] = 116.3%	Linear	
Costa Rica	5,123,105	Increasing	[5,123,105/3,158,253] = 62.2%	Linear	
El Salvador	6,292,731	Increasing	[6,292,731/5,367,179] = 17.2%	Oval	
Guatemala	16,858,333	Increasing	[16,858,333/9,050,115] = 8.3%	Linear	
Honduras	10,121,763	Increasing	[10,121,763/5,053,234] = 100.3%	Linear	
Nicaragua	6,755,895	Increasing	[6,755,895/4,227,820] = 59.8%	Linear	
Panama	4,294,396	Increasing	[4,294,396/2,449,968] = 75.3%	Linear	
Central America	49,841,144	Increasing	[49,841,144/29,489,158] = 69.1%	Linear	

D_{RC} : Residual difference in population growth between periods. **Source:** Own elaboration (2024) based on the World Bank (4), accessed on 06/25/2024.

Several indicators, including fertility rate, maternal and infant mortality, birth rate, geometric population growth, intergenerational dependency, and the aging index, demonstrate a positive or negative correlation contingent on the country of residence. Costa Rica and Panama exhibit superior human development outcomes relative to what might be anticipated for their regional context. As illustrated in Figure 2, these countries demonstrate a persistent growth trajectory in the population of older adults between 1990 and 2020, with a cumulative expansion of over 50%, followed by El Salvador. On the other hand, Guatemala, Nicaragua, Belize, and Honduras have exhibited a relatively stable growth pattern in recent decades (lagged between 1995 and 2005), with cumulative increases of less than 20%.

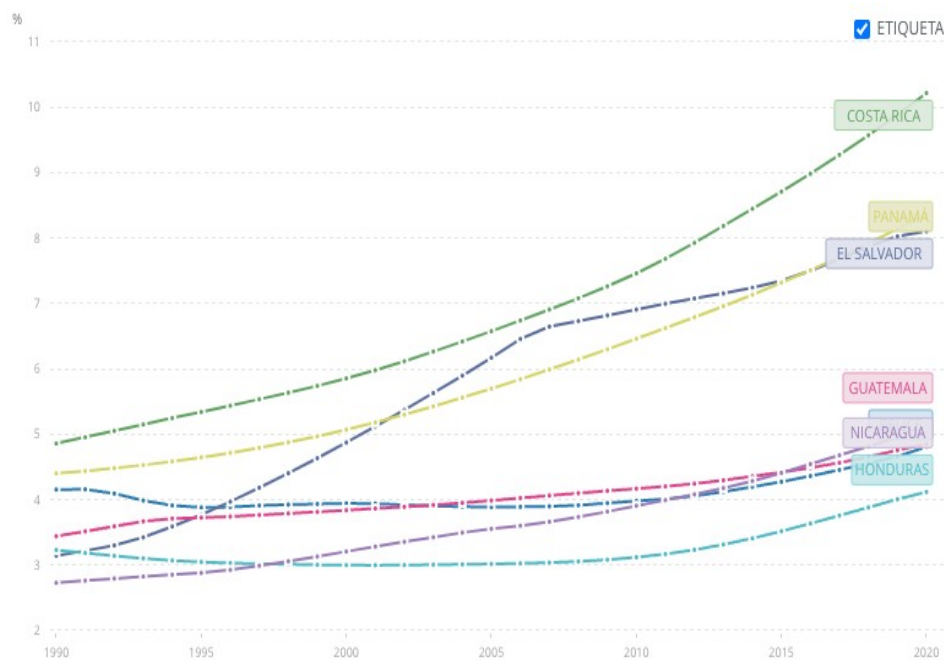


Figure 1. Older adults as a percentage of total population, Central America, 1990-2020. **Source:** Own elaboration (2024) based on the World Bank (4), accessed on 06/25/2024.

The figures can also be interpreted in a disaggregated approach. For instance, Central American women have a life expectancy at birth of 81 years, with a positive difference of three years compared to men. Most of these people are illiterate, married, or widowed, and their average monthly income is up to the national minimum wage (27). This demographic profile is composed of the birth wave calculated between 1950 and 1960, so there will be significant fluctuations in these waves, especially from 2000 onwards. This is partly since women in the region have been able to access social rights that have allowed them to improve their living conditions in a perspective of egalitarian human development.

Another fundamental factor influencing demographic changes in the region is migration, predominantly in the countries of the Northern Arc (El Salvador, Honduras, and Guatemala). The movement of people from rural to urban areas has had a significant impact on the distribution and segmentation of territories, particularly about the demographic dependency ratio. This ratio, which represents the residual percentage between individuals aged 0-14 years and 65 years or older, is a key indicator of a society's productive capacity and economic activity profile (28). The phenomenon of overpopulation in urban areas, particularly in large metropolises, can give rise to a few challenging social conditions for older adults. These include increased rates of violence and consequent early mortality, extreme poverty, unemployment, and water and atmospheric degradation of the environment (29). The locality of residence is relevant, as residents in poorer areas tend to spend a greater proportion of their short lives in a state of poor health (30). In this context, the demographic composition itself becomes dynamic and complex, presenting a multitude of interrelated conditions.

Regarding the ethnic-racial dimension, it is estimated that Central America is inhabited by approximately 63 indigenous communities and 30 Afro-descendant groups (31). In general, these anthropological data fail to account for the diversity of existing age structures, which in turn translates into a lack of population policies adapted to address the specific characteristics of each group, due to their ethnicity and worldview. The comprehensive approach of public health systems is undermined by the reinforcement of a biomedical model of geriatric care that privileges drug

dependence, psychic overload, and hospitalization, to the detriment of complementary and counter-hegemonic alternative practices.

One of the most significant challenges confronting these countries is the suboptimal quality of medical records and the low rate of compulsory notification. This is because health information systems in Central America remain in a state of obsolescence, despite the implementation of significant changes in recent decades (32). A practical and fresh example is the lack of completeness and timeliness in the notification of confirmed or suspected cases of the novel coronavirus disease 2019 seen during the COVID-19 pandemic, as well as the limited response capacity of management and health care systems. This fragility in health surveillance strategies, particularly in epidemiological surveillance, can be replicated for the set of chronic and communicable conditions that have the greatest impact on the health of Central American older adults.

The discrepancy in the chronological criteria used to legally define the onset of old age is the underlying cause of the five-year difference in the age at which Costa Rican older adults must work (65 years *vs.* 60 years) to access geriatric and gerontological services and programs, such as retirement and socioeconomic assistance provided by the government, compared to their Central American counterparts (33). Similarly, the age differential gives rise to variations that should be weighted in national and regional reports on population aging, particularly in the context of analyses of accessibility and utilization of public services (especially health and social assistance).

The diversity of aging is apparent even within the same population cohort. As individuals age, their socio-health needs vary considerably. Individuals aged 60-69 years are more active, autonomous/independent, and have social ties still in place (34). Compared to older adults aged 70 and above, there is a perceived more pronounced functional decline, characterized by a sedentary lifestyle and the loss of basic vital and instrumental functions of daily living. Additionally, there is an increase in cognitive dependence, with factors such as depression and dementia becoming more prevalent. Furthermore, there is a high overall pathological burden, particularly in the presence of more than three limiting morbidities and the daily use of multiple drugs (34). Overall, the points illustrate that old age is the most complex phase of human life. This necessitates a multifaceted approach that must also consider human diversity, which encompasses issues such as sexual orientation and gender identity, age, race/ethnicity, and other individual characteristics that bring additional complexities in addressing their needs.

3.2. Teaching Gerontology in Central America

A review of master's degree programs in gerontology at higher education institutions revealed the existence of such programs only in Costa Rica, Guatemala, and El Salvador. A detailed description of the identified programs is provided in Table 2. By and large, it is perceived that the training market requires the payment of fees to access this type of professional qualification, except for Costa Rica, where training is also offered free of charge. In the three countries under observation, on-site courses are available that enable prospective gerontologists to align their interests with either a research path or professional opportunities in the labor market.

Notwithstanding the absence of a graduate program in Honduras, the Master's in Demography and Development, offered by the National Autonomous University of Honduras since 1988, is worthy of mention. The objective of the program is to cultivate in students the capacity for critical reflection, analysis, and research on demographic processes, their socioeconomic determinants, and their implications in the lived experiences of the population. In Nicaragua, the National Autonomous University offers a specialization in gerontology, encompassing specific practices and studies on aging. As evidenced by the data, Central American universities are enhancing higher education to equip health and social professionals with the skills to address the challenges posed by an aging population. However, the finding that less than half of the countries ($n= 3$; 42.8%) offer a graduate option indicates a notable deficit in training opportunities within the

region. The dearth of interest in these subjects is readily apparent in the undergraduate training curriculum. In numerous Latin American countries, medical curricula lack mandatory disciplines such as geriatrics and gerontology; in the most favorable scenario, these subjects are offered as elective courses (19). Similarly, the results indicate that many of these countries are facing considerable challenges in fulfilling their obligations as set forth in the Political Declaration and the Madrid International Plan of Action on Ageing, which was signed by governments in 2002 (35):

Art. 8. We commit ourselves to the task of effectively integrating ageing into socio-economic strategies, policies, and actions, bearing in mind that specific policies will vary according to the conditions of each country.

Art. 13. We emphasize the primary responsibility of governments to promote, provide and facilitate access to basic social services, considering the specific needs of older persons. To this end, we must cooperate with local authorities, civil society, including non-governmental organizations, the private sector, volunteers and voluntary organizations, older persons themselves and associations of and for older persons, as well as with families and communities.

Art. 17. The implementation of the action plan will require the cooperation and participation of many actors: professional organizations, enterprises, workers and workers' organizations, cooperatives, research institutions, universities and other educational and religious institutions, and the media.

In Guatemala, graduate programs in gerontology are not distinguished from those in geriatrics, as the existing options maintain a combined degree profile. This can have both beneficial and detrimental effects. Such an approach is beneficial in that it has the potential to facilitate a more entrenched understanding of the interrelationships between aging, old age, and older adults. However, this convergence could prove detrimental to the theoretical and conceptual development of gerontology, potentially favoring the advancement of geriatric knowledge, which is more entrenched in higher medical education systems. In their work, Moro, Betancourt, and Pérez (36) put forth the notion of employing the term "gerontogeriatrics" in medical education. This term, they argue, represents a conceptual fusion between the two fields, reflecting the biopsychosocial condition of the older adult and the importance of the psychological, social, and economic spheres in their functioning.

In any case, today's gerontology is confronted with a multitude of challenges. About the theoretical-ideological challenge, it is evident that gerontological knowledge is not immune to the radical changes that are occurring in society; ergo, it must remain on the periphery of the developments that have been imposed in the clinical, social, and technological fields (37). The ideological aspect is significant in that the population's perception of aging and old age has a direct impact on the conceptualization of what an older person is and, consequently, on the resolution of their health problems. In contrast to geriatric knowledge, which is primarily quantifiable (e.g., chance of a clinical event occurring: recovery *vs.* death), the social spectrum constitutes a fundamental aspect of gerontology. Consequently, this field must engage in an active and ongoing dialogue with all sectors of human development throughout the lifespan.

In examining academic achievements in the field of geriatrics and gerontology in Costa Rica, Morales-Martínez (22, 39) posits that enhancements in the quality of care provided to Costa Rican older adults are directly correlated with the pivotal involvement of medical schools, the national health system, and the National Hospital of Geriatrics and Gerontology, which serves as the primary institution for training and practical preparation of future specialists. Since 2008, this hospital has been designated by the Pan-American Health Organization (PAHO) and the WHO as a Collaborating Center for Education in Geriatrics and Gerontology in Latin America, thus illustrating the excellence of the training opportunities available there. What is more, the country's commitment to advancing scientific knowledge is exemplified by its ownership of the sole academic journal in the region (40). The journal *Anales en Gerontología*, edited and managed by the Gerontology Graduate Program of the University of Costa Rica (UCR), makes meaningful

contributions to the development of gerontological knowledge in Central America and Latin America, by encouraging reflection on policies, programs, and projects related to older adults or the aging process and old age. This achievement is linked to the fact that the UCR has one of the oldest graduate programs in Latin America, with almost three decades of expertise training gerontologists (41-42).

It is deemed advantageous for those countries that have not yet established master's degree programs— Belize, Honduras, Nicaragua, and Panama— to consider joining specialized associations, which could facilitate the creation of initial strategies. Likewise, professionals from various disciplines interested in these topics may wish to consider joining regional associations, which can facilitate the acquisition of both practical updates and theoretical knowledge. Examples of such associations include the Latin American Association of Community Gerontology (ALGEC), the Latin American Network of Gerontology (RLG), and the Latin American Association of Palliative Care, the Latin American Population Association (ALAP), the Inter-University Network on Healthy Aging in Latin America and the Caribbean (RIES-LAC), the Latin American and Caribbean Committee of the International Association of Geriatrics and Gerontology (COMLAT-IAGG), and the Latin American Academy of Medicine of Older Adults (ALMA) are among the organizations that could be consulted.

Particular attention should be directed to ALMA, which has played a pivotal role in the advancement of geriatric science in Latin America (43). ALMA “was established by a group of university geriatricians from Latin America and Spain with the support of the PAHO and the Merck Institute of Aging and Health, and with the technical support of the European Academy of Medicine of Aging (EAMA), which was inaugurated in Madrid during the World Assembly on Aging in April 2002” (44, p. 429).

3.3. Teaching Geriatrics in Central America

There remain discrepancies in the availability of medical and other professionals to meet the care demands of older users. These discrepancies indicate that an older adult is less or more likely to receive qualified geriatric care compared to their counterparts, depending on the country of residence (Table 3). These countries are currently experiencing moderate to rapid ageing, leading to a growing need for geriatric expertise. In addition to facilitating health recovery, geriatricians are responsible for the prevention of common diseases of old age. The lack of human resources results in ineffective management of geriatric syndromes, with a significant impact on primary care staff and a high cost to public expenditure on third level hospitals.

As Table 4 shows, there is a shouting shortage of geriatricians in the region. Costa Rica stands out with 33 geriatricians per 100,000 older adults, followed by Panama with seven specialists. The rest of the countries do not have at least five geriatricians per 100,000 older patients. It is likely that these statistics are due to the limited number of medical specialization programs (internships/residencies) in this field, which tend to be concentrated in the medical schools of the country's main public universities. This has a direct impact on the number of geriatricians trained each year, with Panama and Costa Rica being the countries with the largest cohorts.

Table 2. Mapping of Graduate Programs in Gerontology offered by Central American universities.

Country	Program	Institution	Modality and Duration	Vocational Guidance and Carrier Development
Costa Rica	*Master's Degree in Gerontology.	University of Costa Rica, UCR.	Academic and Professional. Two years.	The Academic Master's degree covers the social, psychological, and biological aspects of aging, thus training highly qualified researchers to carry out research and teaching functions in multidisciplinary environments. The Professional Master's Degree aims to train professionals to work in multidisciplinary contexts that require attention to older adults, focusing on guaranteeing fundamental rights and access to programs and services at the individual, family, institutional, community and population levels.
	** Master's Degree in Multidisciplinary Psychosocial Gerontology.	Catholic University of Costa Rica, UCAT.	Academic and Professional. One year and four months.	
	**Master's Degree in Gerontology with Emphasis in Project Management.	Santa Paula University, USP.	Professional. One year and four months.	
El Salvador	**Master's Degree in Clinical and Social Gerontology.	University of El Salvador, UES.	Academic. Two years and six months.	The program's objective is to facilitate a more profound understanding of the evolving issues within this field, with a particular focus on the following areas: comprehensive geriatric care, the ethical challenges inherent to the gerontological population, the genetic aspects of aging, the architectural design of specialized spaces for older adults, rehabilitation, and the management of gerontological care institutions.
	**Master's Degree in Geriatrics and Gerontology.	Euroinova El Salvador.	Professional. One year and six months.	The objective of the program is to provide training for health professionals in the comprehensive care of older adults, with an emphasis on the management of high levels of moral and business values. Furthermore, it seeks to enhance the knowledge of health professionals in the prevention, diagnosis, treatment, and rehabilitation of diseases affecting older adults. The program also aims to encourage the utilization of preventative measures that facilitate active aging among the adult population.
	**Master's Degree in Geriatrics and Gerontology.	Galileo University	Academic and Professional. Two years (24 months).	The training provides healthcare professionals with the requisite knowledge and skills to address the healthcare needs of older patients effectively and comprehensively in the areas of geriatrics and gerontology. Moreover, the master's degree allows professionals to apply and refine the competencies acquired in a national and international

Guatemala				context. Physicians will be able to diagnose and treat functional and mental health problems affecting their aged patients. Moreover, they will be able to engage in interdisciplinary collaboration to address the needs of families and society in relation to the care and well-being of older adults.
	**Master's Degree in Geriatrics and Gerontology.	Euroinova Guatemala.	Professional. One year and six months.	The objective of the program is to provide training for health professionals in the comprehensive care of older adults, with an emphasis on the management of high levels of moral and business values. Furthermore, it seeks to enhance the knowledge of health professionals in the prevention, diagnosis, treatment, and rehabilitation of diseases affecting older adults. The program also aims to encourage the utilization of preventative measures that facilitate active aging among the adult population.
	**Master's Degree in Geriatrics and Gerontology.	San Pablo University of Guatemala, USPG.	Professional. One year and six months.	The graduate professional will be able to develop the requisite skills and abilities to manage the patient, including diagnosis, treatment planning, follow-up, and evaluation. They will be capable of functioning effectively within a team setting, utilizing appropriate diagnostic and treatment modalities. Moreover, they will cultivate comprehensive decision-making abilities, which will empower them to address the medical necessities of patients in a comprehensive manner. It is expected that the graduated professional demonstrates an understanding of the appropriate treatment of older adults across the disciplines of gerontology.

*: Public education, free of charge. **: Private education, with applicable fees. **Source:** Own elaboration (2024).

Table 3. Sociodemographic variables that impact the supply of geriatric care in Central America.

Location	Health Expenditure (2020)				Human Resources for Healthcare (%)			
	% GDP	% in health	% of pocket	\$ per capita	Physicians ^a	Nurses and midwives ^b	Surgical specialists ^c	Surgical procedures (n/100.000)
Belize	6.9	71.8	21.9	436.2	1.1	2.3	10.5	1,964
Costa Rica	7.9	71.8	20.3	1,737.4	3.2	3.4	25.5	3,746
El Salvador	9.9	59.2	32.9	855.1	2.9	1.9	--	--
Guatemala	6.5	38.3	56.3	556.1	0.4	1.3	3.4	1,505
Honduras	9.0	38.0	50.0	479.2	0.3	0.7	13.7	--
Nicaragua	8.6	61.8	32.3	471.2	0.7	1.5	15.5	4,860
Panamá	9.7	60.7	32.5	2,600.2	1.6	3.2	26.2	--
Central America	8.36	57.37	35.17	1,019.3	1.46	2.0	15.8	3,018.75

a: per 1,000 inhabitants (2014-19); b: per 100,000 inhabitants (2013-18); c: per 100,000 inhabitants (2010-18); \$: US dollar exchange for 2019. **Source:** Own elaboration (2024) based on the World Bank (4), accessed on 06/25/2024.

Table 4. Overview of geriatrics training in Central America.

Location	Number of specialty programs	Geriatricians trained each year	Geriatricians per 100,000 over 65 years of age
Belize	NMSG	NMSG	NA
Costa Rica	1	10	33
El Salvador	1	2	1,8
Guatemala	NMSG	NMSG	< 1
Honduras	NA	NA	NA
Nicaragua	NMSG	2	3
Panamá	2	24	7
Central America	4	48	46

NMSG: Does not offer medical specialty in Geriatrics in the national territory; NA: Not available data. **Source:** Borrowed from Robledo, Cano-Gutiérrez, and García (45, p. 3).

The dearth of specialists in geriatrics appears to be a phenomenon that has been affecting the Latin American region. In Chile, the Ministry of Health deemed it prudent to augment the monthly remuneration for physicians opting to pursue specialization in this domain via Exempt Resolution No. 67 of January 26, 2021 (46). Despite representing an additional public expenditure in the health budget, the strategy is designed to address the shortage of these professionals. In Mexico, the inaugural cohort of geriatricians graduated in 1993, following an eight-year training period that was deemed excessive. Consequently, in 2020, the modification of the Unified Plan of Medical Specialties of the National Autonomous University of Mexico established that the training of a geriatric physician should last four years, with the objective of addressing the shortage of specialists (47). Similarly, Cortes et al. (48) observed a notable shortage of geriatricians in Colombia, which has a tangible impact on the care of older patients in hospitals. The availability of these professionals is not expected in any department; on the contrary, there is a national average shortage of more than 70%. As voiced by Rentsch, Vitale, and Zietlow (49):

To effect meaningful change, physician leaders trained and versed in geriatric principles are desperately needed. With the underrepresentation of geriatricians, health systems will have to draw on all physicians to care for older adults. While Family Medicine and Internal Medicine physicians provide the bulk of care for older adults, the training requirements for geriatric education are insufficient to meet the needs of a rapidly aging population.

In addition to fostering the training of new cohorts of geriatricians, it is imperative to strategically position them in locations where their expertise is most required, particularly considering the tenets of comprehensive, universal, and equitable care that should underpin clinical practice. As a matter of fact, let us not forget that the unequal distribution of health professionals and adequate infrastructure between rural and urban settings has contributed to an increase in inequity in access to health services and a differential in life expectancy at birth, according to local of residency. Thereof, that people are living longer has immediate implications for the geriatric clinic, as there is a pressing need to promote greater autonomy and independence among older persons to reduce the years of life lost due to disabling diseases.

This new understanding of the health of older adults and the introduction of complementary approaches have resulted in the reform of obsolete modes of care, particularly those that prioritize the biomedical vision. In this context, the ability to withstand, promote, and adapt to changes in the external environment is of paramount importance. Concurrently, this scenario necessitates the advent of a novel geriatrician profile based on an innovative training methodology that is markedly distinct from the conventional model of medical education. In this new era of super-technification and artificial intelligence, medical science must prioritize paradigm shifts (17, 50-51), including educational innovations such as the use of simulation (52-54), the incorporation of student and patient perspectives (55-57), the enhancement of professionals outside of geriatrics (58), and the integration of practice between disciplines through interprofessional learning (59-61).

In 2005, a group of geriatricians from Colombia, Costa Rica, Spain, Chile, the United States of America, Mexico, and Cuba convened with the technical support of PAHO to develop a proposal for the minimum content of undergraduate programs in Geriatric Medicine in Latin America (44). These specialists posit that prospective candidates for the geriatric field must evince the professional competencies of "learning to learn, integrating and expanding knowledge, communicating, thinking critically and reasoning, relating to the health care team and society, and taking responsibility for themselves, their learning and their social role" (p. 431). Moreover, they must demonstrate proficiency in conducting a comprehensive clinical history (anamnesis), which entails a biopsychosocial examination of the typical challenges commonly encountered by older adult patients. To accomplish this objective, it is essential to possess the following competencies (44, p. 432):

- To evaluate the physical, mental, social, and functional aspects of the health of elderly patients.
- To develop a plan of care based on the identified problems, considering life expectancy, baseline functional status, prognosis, and quality of future life as key decision points, and utilizing the available medical and paramedical resources in the hospital and community to achieve this goal.
- To distinguish between the normal aging process and its pathological manifestations.
- To demonstrate knowledge of the principles and practices of chronic ambulatory care for patients with irremediable diseases and the care of dying patients.
- Illustrate understanding of the organization and support services available for the care of older adult patients in the hospital and in the community.
- To explain the purposes and roles of the various members of the multidisciplinary team involved in the care of the patient.
- To display proficiency in communicating with the older patient.
- To exhibit an optimistic attitude during the care of the older adult.

These competencies are employed by geriatricians in their routine clinical practice, thereby facilitating the development of a novel form of care that is more aligned with the current needs of aging patients in challenging contexts. It is important to acknowledge that these competencies are not fixed. The ever-changing nature of societies necessitates a continual rethinking of the fundamental principles of medical practice. This is not a novel phenomenon in the field of

medicine, particularly in the context of geriatrics, which is grappling with significant shifts in the age and epidemiological profile of contemporary societies.

This study is subject to certain limitations in terms of the scope of the proposed analysis. Although a comparative analysis of the contents of each graduate program was not planned, an investigation into the units of study could contribute to a more comprehensive understanding of the quality and profile of the training of geriatricians and gerontologists in the Central American region. Also, the dearth of data regarding the availability of geriatricians precluded a comprehensive evaluation of the regional deficit in this medical specialty. This finding is of relevance for public health systems and integrated healthcare networks for older adults, as the identification of human resource deficiencies could assist health managers in the development of more efficacious strategies to enhance the capacity of services and programs provided to the older population.

Ultimately, this study contributes to the existing body of knowledge and enhances the existing literature on the training of qualified professionals to provide comprehensive care for older adults in Central America. It is our intention to address the gaps identified by incorporating a comparative regional perspective, recognizing that the debate is not closed. It is from the multitude of knowledge gaps identified in this work that further research should be conducted, as they point to few options for graduate training, in the face of demographic phenomena that directly inform the urgency of increasing the workforce specialized in the topic of population aging. Further studies could also be based on an investigation of the search for training in geriatrics and gerontology, with a view to elucidating the reasons that motivate and discourage future professionals to specialize in these areas, especially recognizing that the supply of training does not immediately meet the expected demand in these countries.

4. Final Remarks

- The results allowed for the rejection of the initial hypothesis. Interestingly, the countries with the most significant residual difference in population growth (Belize and Honduras) are precisely those that lack graduate training in areas focused on the aging of their populations. In these countries, the exponential increase in the number of older adults has not been accompanied by the establishment of human resources training strategies. This may result in a reversal of the expected active and healthy approach to aging and old age, as well as an augmented burden on General and Community Medicine.
- The demographic phenomenon of increased longevity should not be viewed as an unmitigated positive. While it is a testament to the advancements in public health, it is also accompanied by a growing prevalence of age-related conditions and inequities that impede individuals from reaching their full potential. It is therefore imperative that professionals receive the highest level of training in the treatment of the most prevalent pathologies affecting this demographic, and that they raise awareness about the adoption of healthier lifestyles. The set of clinical conditions manifested by geriatric patients allows us to gain insight into the epidemiology of old age regarding behavioral and pathological trends, however, we must also acknowledge that each clinical condition is shaped by a complex interplay of social determinants, which frequently contribute to inferior living standards and diminished purchasing power in cases with a less favorable prognosis.
- About the teaching of geriatrics and gerontology, Central American countries can be classified into two distinct groups. The initial group of countries evinces a noteworthy inclination towards guaranteeing that prospective cohorts of professionals are adequately trained to meet the demands of the geriatric population (Costa Rica, El Salvador, Panama, and Guatemala). In contrast, the second group, which includes Belize, Honduras, and Nicaragua, shows less sensitivity to this issue.

Supplementary Material: None.

Funding: This study was partially funded by the Coordination for the Improvement of Higher Education Personnel [Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – CAPES, Brazil], with funding code 001.

Acknowledgments: Gutiérrez-Murillo RS is grateful for the full scholarship awarded under the Doctoral Program of Academic Excellence (Grade 7), in partnership between PUC-RS and CAPES (2022-2026). Grossi PK is a Research Productivity Fellow of the National Council for Scientific and Technological Development – CNPq, Level 1B.

Declaration of Conflict of Interest: The authors declare that they have no conflicts of interest. The funders had no role in the design of the study; in the collection, analysis, or interpretation of data; in the writing of the manuscript; and in the decision to publish the results.

Authors' Contributions: Gutiérrez-Murillo RS led all stages of preparation of this article, including study conception, curation, data collection and analysis, initial drafting, revising, and editing the manuscript. Nascimento JAA, Godoy-Ñustes CN, Svoboda WK, and Grossi PK participated in the collection and analysis of the data, and in the decision to publish the results.

References

1. Palloni A, McEniry M. Aging and health status of elderly in Latin America and the Caribbean: preliminary findings. *Journal of Cross-cultural Gerontology*, 2007, 22(1), 263-285. <https://doi.org/10.1007/s10823-006-9001-7>
2. Santamaria-Garcia H, Sainz-Ballesteros A, Hernandez H, Moguilner S, Maito M, Ochoa-Rosales C, Ibanez A. Factors associated with healthy aging in Latin American populations. *Nature Medicine* 2023, 29(9), 2248-2258. <https://doi.org/10.1038/s41591-023-02495-1>
3. Arai H, Ouchi Y, Yokode M, Ito H, Uematsu H, Eto F, Oshima S, Ota K, Saito Y, Sasaki H, Tsubota K. Toward the realization of a better aged society: messages from gerontology and geriatrics. *Geriatrics & Gerontology International*, 2012, 12(1), 16-22. <https://doi.org/10.1111/j.1447-0594.2011.00776.x>
4. World Bank [Banco Mundial]. World development indicators: Health systems. <https://wdi.worldbank.org/table/2.12>
5. Minoldo MST, Peláez E. Retos del envejecimiento para la protección social de la vejez. *Reflexiones desde Latinoamérica*. Pap. Pobl, 2017, 93, 9-58. <https://doi.org/10.22185/24487147.2017.93.021>
6. Organización Mundial de la Salud, OMS. Informe Mundial sobre Envejecimiento y Salud 2015. El envejecimiento y la salud. <https://www.who.int/es/publications/i/item/9789241565042>
7. Brenes-Camacho G. "The pace of convergence of population aging in Latin America: opportunities and challenges." Org. Cavenaghi S. In. *Demographic transformations and inequalities in Latin America: Historical trends and recent patterns*. Latin American Population Association: Rio de Janeiro, Brazil. 2009. <http://biblioteca.ccp.ucr.ac.cr/handle/123456789/1146>
8. Rofman R, Apella I. Cuando tengamos sesenta y cuatro: Oportunidades y desafíos para la política pública en un contexto de envejecimiento poblacional en América Latina y el Caribe. Banco Internacional de Reconstrucción y Fomento/Banco Mundial; 2021. <https://openknowledge.worldbank.org/server/api/core/bitstreams/66668042-1af4-507a-ae3c-5353b678ceb6/content>
9. Huenchuan S. Cambio demográfico y brechas de protección social en el Caribe hispanohablante, Centroamérica y México. CEPAL, LC/MEX/TS.2023/15. <https://hdl.handle.net/11362/49004>
10. Carvalho CRA, Malfitano APS, Lopes RE. Vulnerabilidade social e envelhecimento na América Latina. Uma revisão bibliográfica a partir das publicações da Comissão Econômica para a América Latina e o Caribe (CEPAL). *Revista Kairós-Gerontologia*, 2019, 22(1): 185-207. <https://doi.org/10.23925/2176-901X.2019v22i1p185-207>
11. López JH, Reyes-Ortiz CA. Geriatric education in undergraduate and graduate levels in Latin America. *Gerontology & Geriatrics Education*, 2015, 36(1), 3-13. <https://doi.org/10.1080/02701960.2014.911662>
12. Parodi JF. Investigación de la implementación en geriatría: una oportunidad para construir un envejecimiento saludable. *Horiz Med*, 2023, 23(4), e2580. <https://doi.org/10.24265/horizmed.2023.v23n4.00>
13. Michel JP, Cha HB. Filling the geriatric education gap around the world. *Journal of the American Medical Directors Association*, 2015, 16(12), 1010-1013. <https://doi.org/10.1016/j.jamda.2015.08.020>

14. Chavarriaga-Gómez AL. Gerontagogía, una disciplina en constante evolución. *Scientia Spiritus*, 2023, 49, 53-55. https://repository.javeriana.edu.co/bitstream/handle/10554/66138/vol09_suppl01_2023xx.indd.pdf?sequence=1
15. Lourenço RA, Wachholz PA. Succession, development, and sustainability: advances in Geriatrics, Gerontology and Aging journal. *Geriatr., Gerontol. Aging*, 2023, 17, 1-2. <https://doi.org/10.53886/gga.e0230020>
16. Gonçalves LHT. O campo da gerontologia e seus desafios. *Saúde.com*, 2007, 3(1), 12-19. <https://periodicos2.uesb.br/index.php/rsc/article/view/87>
17. Masud T, Ogliari G, Lunt E, Blundell A, Gordon AL, Roller-Wirnsberger R, Vassallo M, Mari D, Kotsani M, Singler K, Romero-Ortuno R. A scoping review of the changing landscape of geriatric medicine in undergraduate medical education: curricula, topics and teaching methods. *European Geriatric Medicine*, 2022, 13(3), 513-28. <https://doi.org/10.1007/s41999-021-00595-0>
18. Karasik RJ, Andreoletti C, Baker H, Caprio T, Ogletree AM. The Path Forward: Refining Gerontology and Geriatrics Education. *Gerontology & Geriatrics Education*, 2023, 44(2), 151-153. <https://doi.org/10.1080/02701960.2023.2192395>
19. Comisión Económica para América Latina y el Caribe (CEPAL), Envejecimiento en América Latina y el Caribe: inclusión y derechos de las personas mayores (LC/CRE.5/3), Santiago, 2022. <https://hdl.handle.net/11362/48567>
20. Ham-Chande R, Nava-Bolaños I. Convergence toward demographic aging in Latin America and the Caribbean. *Annual Review of Sociology*, 2019, 45, 607-623. <https://doi.org/10.1146/annurev-soc-073018-022532>
21. Gietel-Basten S, Saucedo SEG, Scherbov S. Prospective measures of aging for Central and South America. *PLoS ONE*, 2020, 15(7), e0236280. <https://doi.org/10.1371/journal.pone.0236280>
22. Morales-Martínez F. Is geriatric medicine possible in a middle-income country? The case of Costa Rica. *Journal of the American Geriatrics Society*, 2017, 65(8), 1870-1875. <https://doi.org/10.1111/jgs.14919>
23. McKim CA. The value of mixed methods research: A mixed methods study. *Journal of Mixed Methods Research*, 2017, 11(2), 202-222. <https://doi.org/10.1177/1558689815607096>
24. Karkach AS. Trajectories and models of individual growth. *Demographic Research*, 2006, 15(12), 348-388. <https://www.demographic-research.org/articles/volume/15/12>
25. Swanson DA. Models for Estimating Intrinsic r and the Mean Age of a Population at Stability: Evaluations at the National and Sub-national Level. *Canadian Studies in Population*, 2024, 51(2), 1-20. <https://doi.org/10.1007/s42650-024-00080-6>
26. Huenchuan S. Envejecimiento, personas mayores y agenda 2030 para el Desarrollo Sostenible. Perspectiva regional y de derechos humanos. CEPAL, LC/PUB.2018/24-P. <https://hdl.handle.net/11362/44369>
27. Huenchuan S. Indicadores sobre envejecimiento y personas mayores en Centroamérica, México y el Caribe hispano. CEPAL, LC/MEX/TS.2021/20. <https://hdl.handle.net/11362/47641>
28. González GC. La migración centroamericana en su tránsito por México hacia los Estados Unidos. *Alegatos*, 2018 27(83), 169-194. <https://corteidh.or.cr/tablas/r32330.pdf>
29. Casillas RR. Migración internacional y cambio climático: conexiones y desconexiones entre México y Centroamérica. *URVIO, Revista Latinoamericana de Estudios de Seguridad*, 2020, 36, 73-92. <https://doi.org/10.17141/urvio.26.2020.4038>
30. Tayib S. Reflections on inequalities: the pandemic, cost-of-living crisis, and vaccines. *Perspectives in Public Health*, 2024, 114(4), 133-136. <https://doi.org/10.1177/17579139241249318>
31. Flores K. El rescate identitario de los pueblos indígenas y afrodescendientes en Centroamérica como herramienta de integración después de 200 años de independencia. *Revista de Fomento Social*, 2022, 302, 73-86. <http://hdl.handle.net/20.500.12412/3602>
32. Delgado BMG, Silva AP, Rodríguez JMD. Mapa conceptual en salud y propiedad intelectual en Centroamérica y la República Dominicana. *Rev Panam Salud Pub*, 2019, 43, e4. <https://doi.org/10.26633/RPSP.2019.4>

33. Gutiérrez-Murillo RS. Health and social rights of older adults in Continental Central América: a comparative historical and legal analysis. *J Aging Sci*, 2021, 9(9), 1-10. <https://www.walshmedicalmedia.com/open-access/health-and-social-rights-of-older-adults-in-continental-central-america-a-comparative-historical-and-legal-analysis-88358.html>
34. Murillo RS, Svoboda WK, Gamarra CJ, de Souza ÉF. Entre lo que se dice y lo que se calla: visitando el concepto de empatía en la atención integral a la salud del adulto mayor. *Rev Esp Edu Med*, 2021, 29;2(1), 74-91. <https://doi.org/10.6018/edumed.464911>
35. Organización de las Naciones Unidas, ONU. Declaración Política y Plan de Acción Internacional de Madrid sobre el Envejecimiento. Segunda Asamblea Mundial sobre el Envejecimiento Madrid, España, 8 a 12 de abril de 2002. <https://social.un.org/ageing-working-group/documents/mipaa-sp.pdf>
36. Moro JCB, Betancourt LAA, Pérez SMP. Metodología para la formación gerontogeriátrica en estudiantes de la carrera de medicina en la atención primaria de salud. *Didáctica y Educación*, 2023, 14(2), 111-139. <https://revistas.ult.edu.cu/index.php/didascalía/issue/view/77>
37. Stoeckel KJ, Eysers I, Fitzgerald KG. Gerontological education: a pathway towards advancing the rights of older people. *Gerontology & Geriatrics Education*, 2023, (13), 1-2. <https://doi.org/10.1080/02701960.2023.2231361>
38. Fitzgerald KG, Stoeckel KJ. Evolving Global Gerontology Career Paths: An Uncharted Adventure. *Gerontology & Geriatrics Education*, 2020, 41(4), 396-7. <https://doi.org/10.1080/02701960.2020.1773456>
39. Morales-Martínez F. Logros académicos en Geriátrica y Gerontología en Costa Rica. *Acta Médica Costarricense*, 2020, 62(3), 140-144. <https://www.scielo.sa.cr/pdf/amc/v62n3/0001-6002-amc-62-03-140.pdf>
40. Granados MH. Presentación. *Anales en Gerontología*, 2017, 9(11), 158-176. <https://www.revistaclinicahsjd.ucr.ac.cr/index.php/gerontologia/article/view/32250>
41. Granados MH, Elizondo AM. Posgrado en Gerontología: XXV Años de su quehacer en Costa Rica. *Anales en Gerontología*, 2019, 11(11), 158-176. <https://www.revistaclinicahsjd.ucr.ac.cr/index.php/gerontologia/article/view/40375>
42. Flores DA, Martínez FM. La formación de Geriátrica y Gerontología en posgrado: un modelo evaluativo innovador, Costa Rica. *Anales en Gerontología*, 2023, 15, 40-87. <https://www.revistaclinicahsjd.ucr.ac.cr/index.php/gerontologia/article/view/57946>
43. Cano-Gutiérrez C, Gutiérrez-Robledo LM, Lourenço R, Marín PP, Martínez FM, Parodi J, Mañas LR, Gil CH. La vejez y la nueva CIE-11: posición de la Academia Latinoamericana de Medicina del Adulto Mayor. *Revista Panamericana de Salud Pública*, 2021, 45, 1-4. <https://doi.org/10.26633/RPSP.2021.112>
44. Cano C, Gutiérrez LM, Marín PP, Morales Martínez F, Peláez M, Rodríguez Mañas L, Vega E, Zúñiga C. Propuesta de contenidos mínimos para los programas docentes de pregrado en Medicina Geriátrica en América Latina. *Revista Panamericana de Salud Pública*, 2005, 17, 429-437. <https://perfilesycapacidades.javeriana.edu.co/en/publications/propuesta-de-contenidos-minimos-para-los-programas-docentes-de-pr>
45. Robledo LM, Cano-Gutiérrez C, Garcia EV. Healthcare for older people in Central and South America. *Age and Ageing*, 2022, 51(5), afac017. <https://doi.org/10.1093/ageing/afac017>
46. Chile. Ministerio de Salud. Resolución 67 Exenta Incrementa Monto Mensual de la Beca de Médicos Becarios de Programas de Formación en Especialidades de Medicina de Urgencia, Medicina Intensiva, Medicina Familiar, Geriátrica, Oncología Médica y Radioterapia Oncológica 2021-2025. <https://www.bcn.cl/leychile/navegar/imprimir?idNorma=1155737&idVersion=2021-02-09>
47. Gutiérrez-Barreto SE, Durán Pérez VD, Avila Avila A, Sosa Tinoco E, Pacheco Pacheco J, Gutiérrez Robledo LM. Propuesta de Actividades Profesionales Confiables para la especialidad de Geriátrica. *Investigación en Educación Médica*, 2021, 10(40), 70-8. <https://doi.org/10.22201/fm.20075057e.2021.40.21362>
48. Cortes WA, Tovar CA. Human talent in geriatrics in Colombia and its relevance for the management of COVID-19. *The Lancet Healthy Longevity*, 2021, 2(3), 123-4. [https://doi.org/10.1016/S2666-7568\(21\)00005-2](https://doi.org/10.1016/S2666-7568(21)00005-2)

49. Rentsch S, Vitale CA, Zietlow K. Prioritizing geriatrics in medical education improves care for all. *Medical Education Online*, 2022, 27(1), 2105549. <https://doi.org/10.1080/10872981.2022.2105549>
50. Parodi JF. Perspectivas de la Geriátría y la Gerontología en América Latina y el Caribe (ALC). *Scientia Spiritus*, 2023, 49, 49-52. https://repository.javeriana.edu.co/bitstream/handle/10554/66138/vol09_suppl01_2023xx.indd.pdf?sequence=1
51. Kiyak YS, Emekli E. A Prompt for Generating Script Concordance Test Using ChatGPT, Claude, and Llama Large Language Model Chatbots. *Rev Esp Edu Med*, 2024, 5(3), 1-8. <https://revistas.um.es/edumed/article/view/612381>
52. Bautista HA, Perafán D, Torres C, López JH. Presentación de GeriatriApp: una app para la evaluación geriátrica integral en español. *Atención Primaria*, 2020, 52(6), 436-438. <https://doi.org/10.1016/j.aprim.2019.07.011>
53. Wang J, Liang Y, Cao S, Cai P, Fan Y. Application of artificial intelligence in Geriatric Care: Bibliometric analysis. *Journal of Medical Internet Research*, 2023, 23(25), e46014. <https://www.jmir.org/2023/1/e46014>
54. Abadir P, Chellappa R. Artificial Intelligence in Geriatrics: Riding the Inevitable Tide of Promise, Challenges, and Considerations. *The Journals of Gerontology, Series A: Biological Sciences and Medical Sciences*, 2024, 79(2), glad279. <https://doi.org/10.1093/gerona/glad279>
55. Karasik RJ. Learning From Internships in Gerontology and Geriatrics: Assessment and Program Evaluation. *Gerontology & Geriatrics Education*, 2009, 30(4), 300-316. <https://doi.org/10.1080/02701960903347675>
56. Giguere AM, Lebel P, Morin M, Proust F, Rodríguez C, Carnovale V, Champagne L, Légaré F, Carmichael PH, Martineau B, Karazivan P. What do clinical supervisors require to teach residents in Family Medicine: How to care for seniors? *Canadian Journal on Aging*, 2018, 37(1), 32-49. <https://doi.org/10.1017/S0714980817000460>
57. Meneses EL, Sánchez-Serrano JLS, Martínez AJ, Galán JG. Percepción de los estudiantes posgrado en gerontología sobre el envejecimiento. *Revista de Humanidades*, 2019, 36, 155-180. <https://investiga.upo.es/documentos/5eb2894229995203e2410a59?lang=en>
58. Rivera V, Yukawa M, Aronson L, Widera E. Teaching geriatric fellows how to teach: a needs assessment targeting geriatrics fellowship program directors. *Journal of the American Geriatrics Society*, 2014, 62(12), 2377-82. <https://doi.org/10.1111/jgs.13187>
59. Alexandraki I, Rosasco RE, Mooradian AD. An evaluation of faculty development programs for clinician-educators: a scoping review. *Academic Medicine*, 2021, 96(4), 599-606. <https://pubmed.ncbi.nlm.nih.gov/33116061/>
60. Palmer RM. Not enough geriatricians or not where they are needed? *Journal of the American Geriatrics Society*, 2023, 71(9), 2701-3. <https://doi.org/10.1111/jgs.18535>
61. Teodorczuk A, Abdool PS, Yap CX, Fisher JM. New horizons in undergraduate geriatric medicine education. *Age and Ageing*, 2024, 53(5), afae050. <https://doi.org/10.1093/ageing/afae050>



© 2024 University of Murcia. Submitted for open access publication under the terms and conditions of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 Spain license (CC BY-NC-ND) (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).