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DG-1215-12-17
11 de diciembre del 2017

Doctor
Jorge Fonseca Zamora
Decano Facultad de Medicina
Universidad de Costa Rica

Estimado doctor Fonseca:

Con la presente reciban un cordial saludo de Navidad y mis mejores deseos para el año 2018. Aprovecho para adjuntarle los artículos:

1. Geriatric medicine bridges: Scotland-Costa Rica. Publicado en el mes de diciembre en la revista del Royal College of Phsicians of Edinburgo
2. Is Geriatric Medicine Possible in a Middle-Income Country? The Case of Costa Rica. Publicado en el Journal of the American Geriatrics Society en el mes de agosto.
3. 25 años formando geriatras. Publicado en el Periódico La Nación en el mes de noviembre.

Con el fin de divulgar las mismas, esperando que las encuentren útiles y oportunas y que sean de provecho para sus gestiones cotidianas.

Atentamente,

Dr. Fernando Morales Martínez
Director General

Volume 47: Issue 4: 2017

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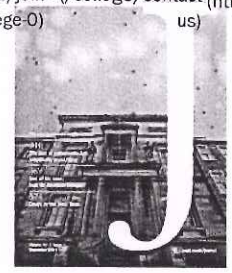

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J R Coll Physicians Edinb 2017; 47: 324–30 | doi: 10.4997/JRCPE.2017.404 PAPER

Geriatric medicine bridges: Scotland–Costa Rica

F Morales-Martínez[1]

Abstract

This paper reviews the specialised geriatrics healthcare services of Costa Rica, with particular emphasis on the achievements made in the field of geriatrics following the author's specialist tertiary education and training period at the Professorial Unit at the City Hospital, Edinburgh, 33 years earlier. The paper charts the development and consolidation of an educational programme of geriatrics in Costa Rica against a background of the changing demographic in this Central American nation and the consequent and compelling need for universal coverage of healthcare services targeted to meet the needs of the burgeoning population of older adults.

Keywords: Costa Rica, education, geriatrics, geriatric medicine, health organisation, research

Declaration of interests: No conflict of interests declared

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Introduction

Costa Rica is located in Central America, bordering Panama to the south, Nicaragua to the north, the Caribbean Sea to the east and the Pacific Ocean to the west. Its land mass is 51,100 km^2,[1] and its total population in 2010 was 4,890,379. The older adult population (60 years and over) is 562,889, representing 9% of the total.[2]

Since the abolition of the country's armed forces in 1948, Costa Rica has devoted the majority of its budget to universal education programmes, universal access to medical services, and social security. The infant mortality rate in 2016 was 8.02,[3] and life expectancy at birth averaged 80 years (82.6 years for women and 77.5 years for men).[4] Per capita income was US$10,400 per annum.[5]

Demographic profile

Costa Rica is characterised by a large and increasing adult population aged over 60 years and a small and a declining youth population (under 16 years). It is projected that in 2030 close to 15% of Costa Rica's population will be older adults and that these numbers will continue to rise. Concurrently, projected estimates of the numbers of young people show a steady decrease, so that from the years 2000 to 2100 their cohort will decline from 31.8% to 16.1% (Figure 1).[6]

Health status of older Costa Ricans

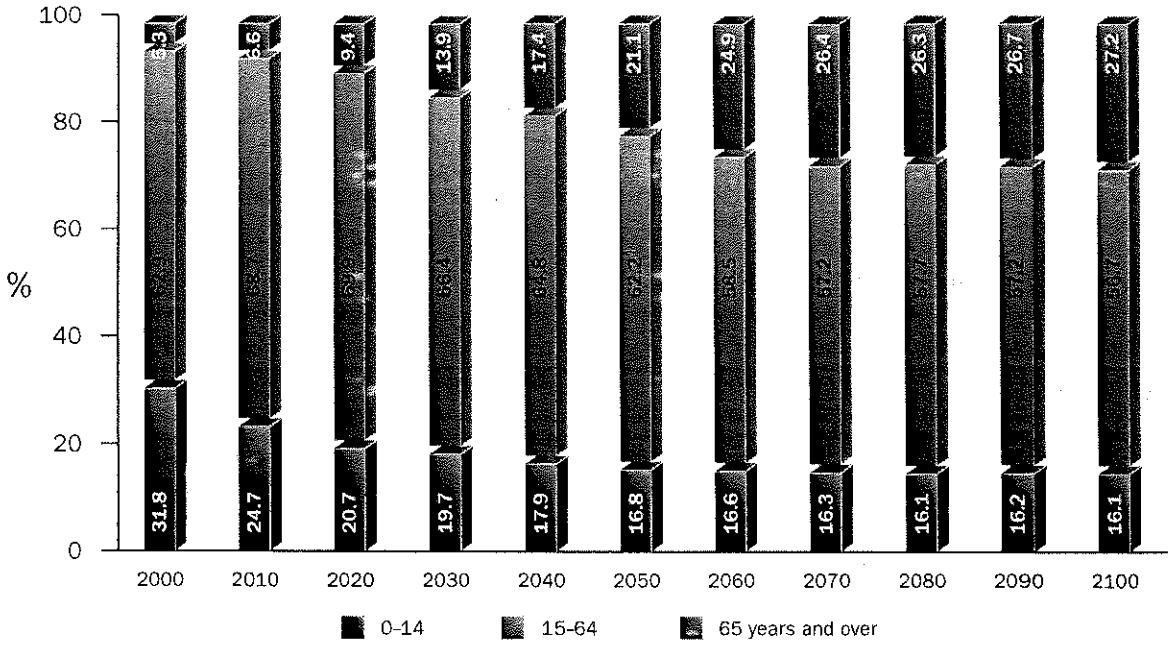
The Costa Rica Longevity Study on Health and Well-being (CRELES) was a major study undertaken from 2004 to 2006 into the health problems and needs of the older adult cohort in Costa Rica. A total of 2,820 people between 60 and 79 years of age participated in this thorough and comprehensive study. The CRELES data were obtained from domiciliary visits. At the beginning of each interview, a version of the Folstein Mini-Mental test modified for Latin America was applied to determine if the interviewed person required another person (known as a proxy) to help them answer the questions.[7] Data indicate that 16% of the people required assistance to answer the questions due to lack of cognitive ability.

The CRELES study encompassed the following:

- Objective measurements of subjects' health status, including physical examinations, laboratory analysis and anthropometric studies
- Active and resting blood pressure measurements
- Height, weight and waist circumference measurements
- Fasting blood samples, followed by medical anamnesis on the following day
- Screening for dementia, muscle strength and power, and capacity for activities of daily living
- A comparison of the biomarkers gained from these objective parameters with the subjects' self-reported health status assessment

[1]Professor, University of Costa Rica; Member of the National Academy of Medicine; General Director, National Geriatrics and Gerontology Hospital, Costa Rica

Figure 1. Ageing in Costa Rica



Based on: Morales-Martínez F. Ageing in Costa Rica. Costa Rica Medical Journal. San José: 57(2), 2015

Some significant findings emerged from this study. These included the following:

- A high proportion of older people (65%) had an average systolic blood pressure above 140 mmHg, and this was a constant across categories of gender, age and residential circumstances
- Approximately 43% of subjects had triglyceride levels above the maximum for good health in their age range
- The metabolic control measured by haemoglobin A1C showed that 11% of the population had values above expectation, and that this was lower in the female older adult cohort
- More than 50% had low levels of HDL cholesterol
- Only 1% of participants were very unsatisfied with life, and 6.4% considered their health as poor
- Their economic situation was assessed as bad by 12.8% of the sample
- Around 16.1% of the studied population had probable depression

The study showed that 24.3% of the older adult population in Costa Rica are underweight, according to the criteria for body mass index of the Pan American Health Organization; more men than women are within the normal weight range; and nearly three times more women than men show risk factors for metabolic complications according to waist circumference measurement. Outside of the Greater Metropolitan Area, the percentages of both underweight and overweight citizens are higher.

The eating habits and nutritional intake of older Costa Rican adults were measured through a short questionnaire validated by the CRELES project. Results showed that 18% of older adults consumed less than 1500 kilocalories per day, most of these people being women and/or those > 80 years of age. Among those studied in the project, 12% consumed more than 3000 kilocalories per day, and 14% ingested 40g of fat daily. These high levels of fat consumption were more common in men and older, but not

Table 1 Self-reported and performance-based measures of physical function. National Geriatrics and Gerontology Hospital, 2016.

Self-reported measures of physical function	
Number of ADL limitations (0–5), mean (SD)	0.3 (0.9)
Number of mobility limitations (0–4), mean (SD)	1.2 (1.3)
Performance-based measures of physical function	
Unable to perform grip strength test	2.8%
Grip strength (kg), mean (SD)	27.3 (9.1)
Unable to perform PEF test	8.9%
PEF (L/min), mean (SD]	314.6 (121.2)
Unable to perform timed walk	8.5%
Walking speed (m/sec), mean (SD)	0.6 (0.2)
Unable to perform chair stands test	11.7%
Chair stand speed (stand/sec), mean (SD)	0.4 (0.1)
Died by the end of follow-up	16.5%

Source: CCSS Hospital Discharge System (ARCA)

extremely old, adults. In general, fewer proteins and more carbohydrates and saturated, monounsaturated and trans-fats than recommended were consumed. This is associated with the ingredients found in low-cost and low-fibre foods, reflecting levels of poverty and eating habits among the cohort studied.

Within the scope of assessment of physical function and capacity to perform the activities of daily living, only a small number of subjects (11%) reported any of the five activities of daily living limitations, indicating probable low rates of serious disability. Other important findings are shown in Table 1.

Mortality rates and causes

Cardiovascular disease is the leading cause of death in the older adult population in Costa Rica, and is higher among males than females. However, the most significant difference in cause of death between males and females occurs from injury rather than illness. Deaths from external causes (such as accidents) constitute the second most common cause of mortality and also show the greatest discrepancy between the genders: the rate of mortality from external causes in men is double that in women. Death by external causes occurs most commonly through accidents that are not vehicle related. This is followed by vehicle accidents, then homicides and, lastly, suicides. The proportion of accidents that are not vehicle related is higher in the female population than in the male (84%/49%). In contrast, men have significantly higher representation than women in the three other causes of traumatic deaths. For example, 10% of traumatic deaths in older men are caused by suicide compared with only 1% in women.[7]

Approximately two-thirds more Costa Rican women than men die as a result of cancer. Respiratory illness claims the life of 19% more men than women, and cardiovascular disease causes the death of 15% more men than women. Significantly fewer older women than men die from complications caused by diabetes, as rates indicate that mortality from diabetes is 43% lower in women.[7]

The causes of death in older adults also vary by region. For example, from 2001–2005 the Central Region had the highest rate of mortality from cardiovascular diseases, cancer and infectious diseases. Mortality from the first of these was also high in the Huetar Atlantica region. Deaths attributed to chronic respiratory diseases and external causes (accidents, homicides and suicides) were more common in the Huetar Atlantica and Chorotega regions than elsewhere in the country. These two regions, along with the Central Pacific Region, also had high mortality rates from diabetes. The Huetar Norte region maintained the overall lowest levels of mortality in older adults, irrespective of the cause of death; while the Brunca Region had the lowest mortality rate from diabetes.[7]

Healthcare service infrastructure

Costa Rica's healthcare sector is categorised as being part of the social arena and was formally established as such on 15 February 1983, after a 4-year infrastructure preparation period. This was then used as the basis for a process of reform and modernisation of the Costa Rican healthcare sector that began in 1994, seeking to adapt the existing models of service delivery to meet the changing healthcare needs of the population.

In 1942 the Costa Rican Institute of Social Security was created as an autonomous institution designed to attend to the healthcare and other needs of the populace. It was financed by contributions from the government, employers and employees, with the aim of enabling all citizens to have access to healthcare and social support services regardless of their age, ethnicity or economic situation.

In November 1989 the Costa Rican National Health System was created, giving authority to the Ministry of Health to coordinate and technically control all services directed towards meeting the population's wellbeing requirements. The Ministry of Health remains responsible for directing and coordinating the various branches of the healthcare sector, as well as ensuring all institutions respond adequately to the health needs of citizens.

Geriatric healthcare services

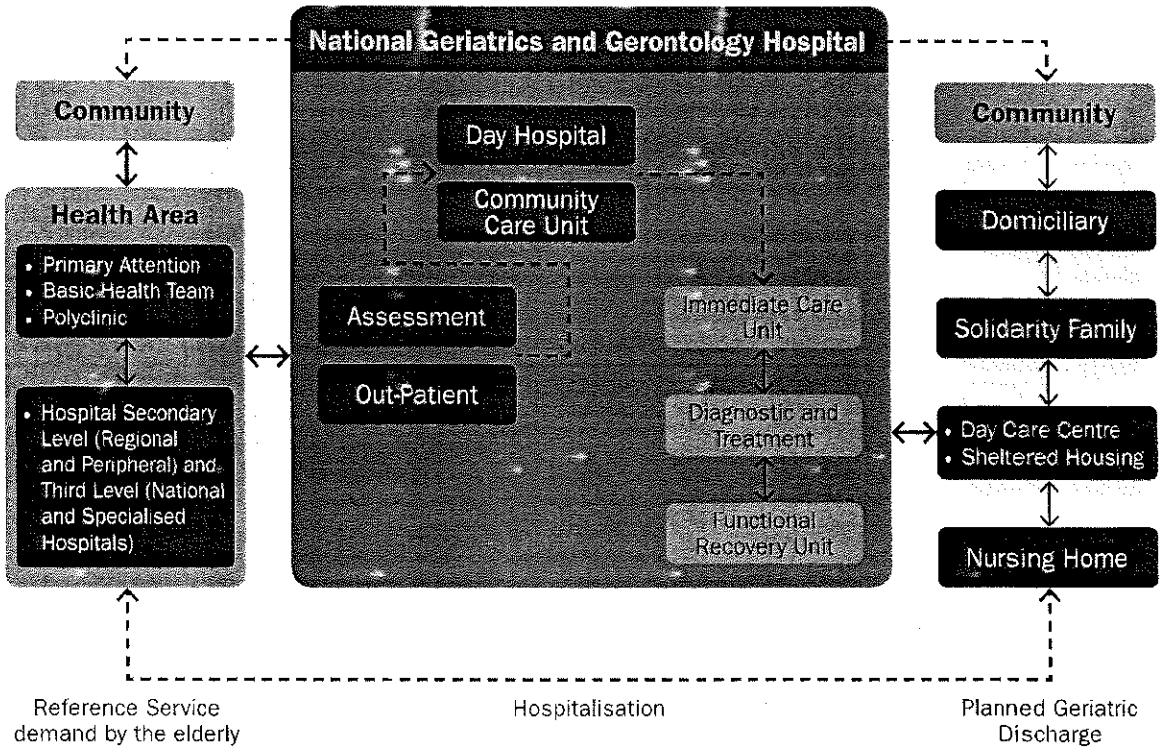
There are three main categories of health service delivery for the older adult population in Costa Rica – primary, secondary and tertiary care – and together they encompass customised programmes and services for this cohort, designed with the key objective of offering older adults optimal care that is inclusive of treatment, cure and rehabilitation, alongside health promotion and other preventive strategies. The primary, secondary and tertiary levels of healthcare service delivery have distinct foci and priorities within the whole healthcare system.

The Costa Rican Institute of Social Security has divided health service delivery into geographical areas so that people can have access to services as close to their home as possible. These services are inter-connected and are structured in such a way as to ensure guaranteed provisions and continuity. This network is sustained by medical referrals and cross-referrals between each different unit and among a range of healthcare disciplines. There are three main networks:

Southern network: 19 health areas (13 from the South Central region and six from the Brunca region), 226 basic integrated healthcare teams comprising a general practitioner, domiciliary nurse and technical aide (known as EBAIS), four peripheral hospitals, one regional hospital, and the San Juan de Dios General Hospital.

Eastern network: 27 health areas (19 from the East Central Region and eight from the Huetar Atlantica region), 229

Figure 2 Progessive care network for the elderly in Costa Rica



EBAIS, two peripheral hospitals, two regional hospitals, and the Calderon Guardia General Hospital.

North-western network: 57 health areas (from the North Central Region, the Chorotega Region, the Central Pacific Region and Huetar Norte Region), 458 EBAIS, seven peripheral hospitals, four regional hospitals, and the Mexico General Hospital.

The network is also sustained by six specialised hospitals: the National Children´s Hospital, the National Women´s Hospital, the National Psychiatric Hospital, the Chacon Paut Hospital (Psychiatric Hospital), the National Rehabilitation Center, and the National Geriatrics and Gerontology Hospital. While it is widely acknowledged that there is a need for improvement in the care of older adults in the country at all levels of healthcare service delivery, some significant steps forward have already been taken. One example is the Norms of Integrated Care of the Older Adult, which were added to the Norms of Integrated Service Delivery to the General Population in 1995. These regulations for older adults are based on a primary healthcare preventive and empowering model and informed by the holistic geriatric care principle of considering the whole person: their physical, mental and psychological status, emotional and spiritual wellbeing, and level of activity and social inter-connectedness.

Since clear evidence shows that hospitalising older adults can pose a significant risk to their health and wellbeing, concerted efforts are being directed towards improving outpatient and community services. To achieve these aims, the nation needs more trained geriatricians so that a range of approaches to healthcare, including home healthcare delivery and consultation with specialists, can be enhanced.

The three general hospitals and the National Geriatrics and Gerontology Hospital offer specialised care for high-risk older adult patients in facilities that include an emergency room, a day care hospital, community care, and a surgical support service. Figure 2 illustrates how the whole healthcare network for older adults functions as one integrated structure in Costa Rica.

The National Geriatrics and Gerontology Hospital

This hospital was originally an anti-tuberculosis facility but has been functioning as a geriatric hospital for the past 41 years. Its main objective is to provide comprehensive and specialised healthcare that is targeted to the needs of the individual older person, through both inpatient and outpatient services. It is the hub of the country's progressive and interdisciplinary healthcare service delivery network for older people. This network is initiated at the community care level through the basic integrated healthcare teams (EBAIS), which are responsible for screening older adults, and for identifying those who need more sophisticated treatment and care than can be provided in the community health centres. Such individuals are referred to the next appropriate level of service delivery according to the complexity of their health problem.

Table 2 Discharges from the National Geriatrics and Gerontology Hospital according to main pathologies registered, 2016

Main causes of discharge	Total	%
Urinary tract infection	225	8.7
All forms of pneumonia	193	7.5
Hypertensive cardiorenal disease	150	5.8
Other physical conditions	145	5.6
Chronic obstructive pulmonary disease	128	5.0
Other cerebral vascular diseases	115	4.5
Benign prostatic hypertrophy	73	2.8
Chronic ischemic cardiopathy	56	2.2
All forms of anaemia	42	1.6
All forms of cerebral vascular disease	37	1.4
Atrial flutter and fibrillation	37	1.4
Diabetes mellitus	38	1.5
Pressure ulcers	35	1.4
Delirium	34	1.3
Clostridium difficile enterocolitis	30	1.2
Others	1235	48
Total	**2573**	**100**

Source: CCSS Hospital Discharge System (ARCA)

Table 3 Teaching programmes at the National Geriatrics and Gerontology Hospital, 1984–2017

Programme	Total
Geriatrics medical graduates (5 years or more), 1991–2017*	123
Family and Community Medicine residency geriatrics rotation of 4 months, 1987–2016	154
Practical courses for physicians (National Geriatrics and Gerontology Week and Congress, 40 hours), 1984–2016	4600
Internship in the Collaborative Center (WHO/PAHO, 1–3 months), 2008–2017	111
Undergraduate medical program students (Physiopathology, Internal Medicine I, Geriatrics), 1994–2017	2076
Interns	500
Residents	48

*1 geriatrician per 4,552 older adults above 60 years of age.
Source: Department of Geriatric Medicine, National Geriatrics and Gerontology Hospital, 2017.

Those who are referred to the National Hospital of Geriatrics and Gerontology are first assessed in the Geriatric Evaluation Unit, Day Care Hospital or the Geriatric Community Care Unit. If they need to be hospitalised, they are admitted to the Diagnostics and Treatment Section (cases for further study), the Intensive Care Unit for acute cases, or the Functional Recovery Service for rehabilitation. Each inpatient undergoes a full geriatric assessment on admission. Before discharge, a planned geriatric care study is undertaken, which includes a home care plan and a community care plan, identifying the health service that will continue the follow-up consultation with medical prescriptions, a nutritional plan, and an interdisciplinary approach to strengthening the support network around the individual.

In addition, patients may be referred to allied clinics staffed by teams with expertise in their area who offer treatment, support and advice for particular conditions, which include memory loss; urinary incontinence; pressure ulcers; sleep disorders; elder abuse (mistreatment, negligence and abandonment); bereavement; pain; obesity and nutritional support.

Table 2 shows the most common causes of hospitalisation among older adults in Costa Rica, as reflected in discharge statistics. It should also be noted that these are accompanied by a complex interaction of personal and social circumstances, including the affordability of medical attention, the matrix of morbidity and mortality, and the likelihood of loss of functionality and independence during and after the inpatient stay. These multiple levels of association must be considered in all healthcare strategies for this cohort in order to overcome some of the major therapeutic difficulties that occur in the treatment of older people, such as nosocomial infections.

The Costa Rican Social Security Institute

The Costa Rican Social Security Institute (CCSS) has its own 140-bed specialised hospital. The CCSS reported in 2006 that 5.7% of the discharges were from the Ophthalmology Service and the rest from Geriatrics. In 2016, 56% of patients discharged from the CCSS hospital were > 80 years old and 55% of these were women; 15.2% died in hospital.[8]

The average inpatient stay in the Geriatrics section in 2006 was 20.55 days. The 10 most frequent diagnoses at the time of discharge that related to 37.5% of patients were non-specified bronchitis (7.8%), non-specified urinary tract disorders (6%), non-specified pneumonia (6%), acute cerebral vascular disease non-specified as bleeding or ischaemic (4.3%), non-specified chronic ischaemic heart disease (2.6%), immobilisation syndrome (2.1%), diarrhoea and gastroenteritis (1.9%), atherosclerotic heart disease (1.9%), acute cerebral vascular insufficiency (1.9%), and pressure ulcers (1.9%).

Surgical procedures accounted for 17.2% of older adults, of whom 94% were treated as outpatients. Those who required hospitalisation post-surgery had on average a 3-day stay in

hospital. The conditions requiring surgery were non-specified cataracts (81.3%), pterygium (2.5%) and a range of other diagnoses (< 10%). Procedures included emulsifications and cataracts removal (78.7%), percutaneous endoscopic gastrostomies (3.7%), and extracapsular removal of the eye crystalline (2.3%).[9]

Geriatrics education

Upon the author's return from Edinburgh to Costa Rica, one imperative was to help develop the field of geriatrics in the country and in the region as a whole, since at that time specialist education was sorely lacking. A number of initiatives have been established in the three decades since that time, as reflected in Table 3.

In 1984 a biannual geriatrics course was introduced as part of the continuing medical education programme. This was the forerunner of the annual National Geriatrics and Gerontology Week and Congress, which began in 1987 with an initial enrolment of 10 professionals and has seen a steady increase in general practitioners and other participants. Over the years more than 100 distinguished geriatric specialists from Europe, North America and Latin America have been invited to participate in the course, including professors from the University of Edinburgh. Held in April each year and offering 40 tuition hours in total, it has educated more than 4,600 medical professionals at an average of 200 per year.

The National Geriatrics and Gerontology Hospital Dr Raul Blanco Cervantes is a national reference centre for the care of older Costa Ricans, and collaborates with the University of Costa Rica in the training of medical specialists in geriatrics. However, this important educational initiative met with resistance for many years, so it was only in 2015 that a course in geriatrics was introduced as a compulsory unit for medical students in their final year of undergraduate studies. More than 100 students have successfully graduated to date.

The course has actively benefited the University of Costa Rica at the regional level, earning accreditation for the medical school on the grounds of the combined theory and practice curriculum set within the context of a specialist geriatric hospital, which few other medical schools in the region have been able to replicate. In fact, this medical school within a specialist hospital is unique in Latin America, offering new installations in the outpatient services designed to meet the multiple needs of older adults. In addition, since 1985 the hospital's medical school has been offering an 11-week internship, consisting of both theoretical and practical components relevant to the field of geriatrics. On average, 15 doctors undertake this internship each time it is offered.

In 1987, a 4-month course of geriatrics was introduced within the specialty of Community and Family Medicine, and since that time all medical residents in that programme have completed a rotation at the National Geriatrics and Gerontology Hospital.

Once the University of Costa Rica had approved a residency programme in geriatrics in 1991, student admissions commenced in January of the following year. Ground was slowly but steadily gained within the postgraduate study programme at the university; and now 123 postgraduate specialists in geriatrics have completed the 5-year degree. The 5-year programme comprises two years of internal medicine and three years of geriatrics, together with a final-year original research project approved by the university.

Recruitment for this programme begins with an exam and those who pass undergo a strict selection process, consisting of a written and oral exam and an interview. To date there have always been more candidates than spaces available. Each year 10 students are admitted and in 2016 there were 52 candidates.

This level of enthusiasm is heartening, and holds promise for the future of the field. Recruiting young medical doctors interested in geriatrics will enable Costa Rica to gradually and progressively provide every hospital in the country with at least one geriatrician. This also enables a new vision for universal and integrated care of all older citizens in the country.

In 2008, the National Geriatrics and Gerontology Hospital was designated by the World Health Organization and the Pan American Health Organization as a collaborative centre with a focus on research and education in geriatrics and gerontology. Through a fellowship of more than 110 professionals from 13 countries (Belize, Chile, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama and Peru), close collaboration has made possible the development of comprehensive programmes of effective and high quality healthcare for older people. In recognition of this endeavour, the World Health Organization designated the hospital as a collaborative centre of excellence for three consecutive periods: 2008–2012, 2012–2016 and 2016–2020.[10]

The hospital co-founded the Latin American Society of Medicine of the Older Person (ALMA, in Spanish), comprising Latin American universities that share the objective to formulate, train and inspire the teaching of this discipline in the region through a progressive and practical unified methodology. For an individual doctor to become a member of ALMA, they must undertake three approved courses annually. Members of the academy become disseminators of knowledge, contributing to improvements in the quality of healthcare services for all Latin American older adults.

Research

Despite funding constraints, the National Geriatrics and Gerontology Hospital has already been able to participate in valuable research into the ageing population of Costa Rica and neighbouring regions, through empirical and longitudinal research studies in collaboration with the University of Costa Rica and CRELES. The CRELES study identified the important

fact that Costa Rica has a geographical area, the Nicoya Peninsula, which is home to some of the world's most long-lived individuals, reaching 100 years of age and above. Research studies have commenced into the clinical reasons for this phenomenon.

Other educational initiatives

Eight books in the field of geriatrics have been published in Costa Rica to date, one of which is a Primary Health Care Guide produced in affiliation with World Health Organization/Pan American Health Organization. This Guide comprises nine modules and 30 sets of instruction guidelines on topics relevant to the first level of primary healthcare delivery. It is also a training manual for nurses, nutritionists, social workers, psychologists, physical therapists, occupational and language therapists. In August of 2017, the second edition of the *Treaty on Geriatrics and Gerontology* was published. Containing 78 chapters, this edition is keenly awaited for its clear, comprehensive and updated information.

Another key initiative for the older adult population is the 'Gold School'. This educational tool offers older adults and their family members an opportunity to understand different pathologies and other useful information relevant to the ageing process. It is generated and delivered by geriatricians and other professionals in the field. To date, approximately 30,000 older people in Costa Rica have participated in this educational model by means of telemedicine and lectures.

Conclusion

In a variety of ways Costa Rica has been preparing to care for its rapidly increasing older adult population, aiming to provide an organised, comprehensive, dynamic, flexible, humane and cost-effective healthcare system. To this end, concerted efforts need to be made by geriatricians in Costa Rica to promote and improve the education and training of future specialists. Further research must be undertaken in order to better understand the ageing process of Costa Ricans and their as-yet unmet needs. There is a special place in this work for important exchanges of knowledge and shared research between Costa Rica and the University of Edinburgh, so that internships and other academic interactions can benefit both communities.

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Is Geriatric Medicine Possible in a Middle-Income Country? The Case of Costa Rica

Fernando Morales-Martínez, MD

This article outlines the current and future-projected demographic data, organization, networks for the care of older people, and perspectives in Costa Rica in relation to the challenges resulting from exponential growth of the older adult population, most notably those aged 80 and older. It includes consideration of the Norms of Integrated Care of the Older Adult of Costa Rica's national social security system and contributions from other public and private institutions. It also makes note of commentaries on the need for ever-increasing efforts to manage the care of Costa Rica's burgeoning older adult population. J Am Geriatr Soc 2017.

Key words: Costa Rica; geriatrics; gerontology; geriatric medicine; geriatric education

Costa Rica is located in Central America. With a total population in 2011 of 4,890,372, of whom 371,562 (7.6%) were aged 65 and older, the nation is experiencing a rapid surge in its older adult population. This poses unique challenges to the limited financial resources of this middle-income-economy country, making it essential to use the available resources effectively. Total healthcare expenditures in Costa Rica in 2014 were US$4.74 billion (9.3% of gross domestic product).[1] The country has a universal coverage health system. It is in the process of developing its geriatric medical system along with targeted community services for older adults.

The Demographic Shift and Its Effect on the Country

Various factors have influenced the marked demographic change in Costa Rican society:

- Decline in the birth rate from approximately 48 live births per 1,000 in 1960 to 15 per 1,000 in 2014[2]
- Decline in the fertility rate from 7.35 in 1960 to 1.8 in 2014
- Increase in life expectancy from 61 in 1960 to 79.7 in 2014
- Increase in life expectancy to a further 23 years at age 60 and a further 8 years at age 80[3]

The combination of increasing numbers of older adults and declining numbers of children younger than 15 is expected to continue. The population aged 65 and older will experience a steep increase as a percentage of the total population, from the present 7.6% to close to 15% by 2035,[4] with projections of a continuing upward trend. Concurrently, the percentage of individuals younger than 25 has fallen from 50% in 1994 to 28% at present, and this decline is expected to continue.[4]

A notable effect of this demographic shift is seen in the changing dependency ratio, which in a period of demographic aging, reduces the economic pressure of the inactive population on citizens of working age. In Costa Rica today, the dependency ratio is less than 67.7%, offering the potential for development of the national infrastructure. The demographic bonus which refers to the relationship between the active economic population and the retired population, in Costa Rica is projected to peak in 2020 and thereafter begin to fall until it disappears in approximately 2050. The current ratio of more economically active to inactive citizens must be taken into account when planning and investing in infrastructure, such as developing and strengthening programs to ensure the full inclusion of older adults in the healthcare system.

An Overview of the Older Adult Population of Costa Rica

Life expectancy is 79.6 at birth, healthy life expectancy (free of disease) is 69, and life expectancy at 65 is 19.5 years (2007)[5]

Self-Perception of Health Status As Average or Poor

Approximately 50% of older people in Costa Rica consider that they have good health, which accords with the

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Table 1. Frequency of Chronic Disease in Costa Rican and Mexican-American Older Adults and Citizens of Seven Latin American Cities

Location	Arthritis	Hypertension	Diabetes Mellitus	Cancer	Pulmonary Disease
Costa Rica	15.9	50.5	20.7	6.6	16.7
Buenos Aires, Argentina	52.5	49	12.5	4.9	8.5
Bridgetown, Barbados	47.1	47.9	22.2	3.5	4.2
Sao Paulo, Brazil	32.2	53.8	17.7	3.7	12.6
Santiago, Chile	29.5	52.3	13.3	4.5	12.7
La Habana, Cuba	56	44.1	15.2	3.5	12.6
Mexico D.F. Mexico	23.8	43.1	21.9	2	9.7
Mexican-American, United States	39.9	—	27.8	5.6	2.5
Montevideo, Uruguay	48.3	44.9	13	6	9.2

Source: Costa Rican University and National Council of the Elder Person. First Report of the current situation of the older adult in Costa Rica. San José, Costa Rica Costa Rica: National Press, 2008.

average self-perceived assessment of Latin Americans. In Costa Rica, Mexico, and Argentina, the self-perception of the remaining 50% of the population is that their health is average or poor (Table 1).[5]

Prevalence of Chronic Disease

According to the Pan American Health Organization, the most-prevalent disease in Costa Rica is hypertension.[6] The prevalences of other important chronic diseases are compared with those in several Latin American populations in Table 1.[7]

Approximately 34% of Costa Rican older adults are considered at risk of malnutrition according to the Mini Nutritional Assessment, compared with 15% in Canada and 20% in the United States in similar studies.[8] Body mass index measurements indicate a prevalence of obesity in older people in Costa Rica of 26%. The prevalence is higher in women (33%) than in men (19%).[9] A study of the home circumstances of older Costa Ricans published in 2015 reported that 13% live alone, 70% live with one to three other people, and 17% live in a household of four or more people.[10] The same study indicated poverty levels of 23% in homes where older adults live, compared with the national average of 19%. One-quarter of these people live in extreme poverty, defined as an inability to afford the necessities of life.[10] Studies in the early 1980s and 1997 reflected the same results—the two predominant concerns that older Costa Ricans identified were loneliness and poverty.[7]

A study comparing a group of older Costa Ricans with a similar group of older Taiwanese adults revealed that only a small proportion reported limitations in any of the five activities of daily living (ADLs) (11% in Costa Rica, 7% in Taiwan), suggesting low rates of severe disability, but performance-based tests captured subtle variations in physical capability. For example, even in those who reported no ADL or mobility limitations, there was a wide ragne in performance ability, such as grip strength ranges from 5 to 58 kg in Costa Rica and 4 to 68 kg in Taiwan.[11] A comparative study showed that the annual probability of disability onset doubles from age 65 to 85 in men and women in the United States, Costa Rica, and Mexico, whereas it is 1.5 times as great in Puerto Rican men and women. Total life expectancy at the age of 65 is approximately 20 years for women and 18.5 years for men in each of the four countries, but Costa Rican women aged 65 to 75 can expect to live approximately 1.5 disability-free years fewer than their counterparts in the United States. There are no substantial differences between the four populations for men, although Costa Rican men can expect to live approximately 1 year longer than men aged 65 in the United States.[12]

Studies of the incidence of dementia and depression in older Costa Rican adults show severe cognitive impairment in 18% of older people.[7] Depression was found in 18.1% of Costa Rican older adults, with women statistically significantly more likely to be depressed than men, similar to results of other international reports. Identified risk factors were lower socioeconomic status and lower literacy level. Spirituality was documented as a protective factor against depression. No relationship was found between age or comorbidity and depression.[13]

Geriatrization of the National Health Service

The public health system in Costa Rica has strong coverage nationwide. It is divided into 1,000 health sectors, each of which basic health teams consisting of a general practitioner, assistant nurse, and technical assistant in primary care who deliver health care at the local level serve. They can refer to specialists at clinics and peripheral hospitals in 100 health areas, who in turn can refer to larger regional and national hospitals for highly specialized care. This integrated health system has been able to deliver highly effective maternal and childhood care, for example, which has resulted in basic health indicators comparable with those of developed nations (infant mortality of 7.8 per 1,000 live births).[14] This explains in part the rapidly aging population. The Index of Complexity and Performance indicates that the care given to hospitalized older adults tends to be far more complex and to require longer in-hospital management than for other age groups.[5] Thus it is imperative that the social security system address the ageing process effectively.[15]

Table 2. Outline of the Health Service Delivery System for Older Costa Rican Adults

Level of Care	Components	Notes
Primary	Basic integrated healthcare service teams consisting of a general practitioner, auxiliary nurse, and technical assistant serve clinics in towns and outlying areas, approximately 4,000 citizens each	Sectors dedicated to health care—including primary health care—instituted in the country in the 1970s are being developed
Secondary	Hospitalization: required for such cases as treatment of an acute illness that has the potential of functional loss, treatment of reversible delirium and dementia (e.g., vitamin B12 deficiency), intoxication by prescribed medications (e.g., unintentional overdose or challenging side effects), treatment and care after disabling incident or disease (e.g., fracture, immobilization syndrome, cerebrovascular disease)	Evidence shows that hospitalizing older adults can pose a risk for the individual, so strong efforts are directed toward improving outpatient and community services while recognizing the need for efficient hospitalized care in cases such as those described here
Tertiary	Three large general hospitals offering specialized care in the emergency department, community care at a day hospital, and surgical and medical support services (e.g., orthopedics, oncology, urology), including the National Geriatrics and Gerontology Hospital	These services are currently being developed to supplement facilities within hospitals that already offer specialized care in geriatrics, rehabilitation, and psychiatry

Costa Rican Social Security System, 2017.

USE OF HOSPITAL SERVICES

The results of the demographic shift are already beginning to effect the national healthcare system. In 2002, hospital admissions of children younger than 15 accounted for 20% of the total, decreasing to 17% by 2012. Conversely, hospital admissions of older adults (≥65) accounted for 12% of the total in 2002, rising to 15% by 2012. Inpatient treatment and care has grown 10% in the same decade, and this growth is estimated to have increased the cost to the health system by nearly 250%.[4]

According to records from 2010 and population projections provided by the Central American Population Center and the National Statistics and Census Institute, by 2020, it is expected that Costa Rican hospitals will provide treatment and care in approximately 2.2 million consultations for older adults, a figure that will rise to 5.9 million in 2050. Emergency services for the same cohort is estimated at 740,000 in 2020 and 2 million in 2050.[16]

Hospital discharge figures for older adults are similar to those of emergency departments and outpatient facilities. By 2020, it is estimated that approximately 70,000 older adults in Costa Rica will be discharged from hospitals, rising to 190,000 in 2050. This growth is projected to be sustained until 2070, with a slight decline at the beginning of the 2080 decade.[4]

Geriatric Health Services for Older Adults

There are several tiers of health service delivery for older adults in Costa Rica. Together, they provide customized strategies and programs for this cohort, designed in a considered manner with the objective of offering older adults optimal care that encompasses treatment, prevention, health promotion, rehabilitation, and cure. There are three main levels of care: primary, secondary, and tertiary (Table 2), each with specific activities and developmental objectives.

A process of reform and modernization of the Costa Rican health sector began in 1994, seeking to adapt the existing models of service delivery to meet the changing needs of the population.[17] The Norms of Integrated Service Delivery to the General Population were revised in 1995 to include Norms of Integrated Care of the Older Adult for the first time. These regulations are based on the holistic geriatric care principle of considering not only physical illness, but also associated psychological health, activity, and social well-being, using a primary preventive approach. This integrated, holistic approach permits detection of relevant factors to decrease or avoid deterioration in the quality of life of older adults,[18] but many of the regional and peripheral hospitals involved in the delivery of care to sick older adults do not have their own specialist geriatricians, which creates a gap in targeted healthcare delivery. As discussed in the ensuing section on education and training in the field of geriatrics, Costa Rica has an urgent need for more specialists in the field of geriatrics and gerontology to enable a future in which all hospitals and health services employ at least one consultant geriatrician with formal training.

National Geriatrics and Gerontology Hospital

The National Geriatrics and Gerontology Hospital is part of the tertiary level of care. Originally an antituberculosis facility, it has been functioning as a geriatric hospital for the past 40 years, with outpatient and inpatient services. Services for outpatients consist of an external consultation unit, emergency department, day hospital, and community geriatric care unit. Inpatient care is delivered through an acute care unit, a rehabilitation unit, and a diagnostics and treatment unit. The last of these three units records approximately 2,400 discharges per year.[19]

Once treatment has achieved its goal, discharge planning is performed under the auspices of the Geriatric Discharge Consultation Service. The individual and family members are connected to appropriate home care supports, including community support and medical follow-up. If home care is not possible, geriatric follow-up continues through outpatient consultation at the day hospital. Alternatively, the individual may be transferred to the

Community Geriatric Care Unit temporarily until their existing health problem has resolved. The main objectives of the Community Geriatric Care Unit are to organize and coordinate geriatric assistance and social services at the primary level of care, which includes delivery of care through associations, clubs, day centers, and nursing homes for older adults,[20,21] and to provide direct health care at home for high-risk cases discharged from the National Geriatrics and Gerontology Hospital.

Teams employed by the Community Geriatric Care Unit consist of a multidisciplinary group of professionals who visit older adults at home or in nursing homes in the metropolitan area. The hospital has 140 inpatient beds and currently provides domiciliary care to approximately 700 outpatients annually.

Other Significant Challenges Affecting Older Costa Rican Adults

Palliative Care

Terminally ill older adults are supported at home through palliative care programs. In cases of exceptional need, they may be admitted to a general, regional, or peripheral hospital or to the National Geriatrics and Gerontology Hospital. A significant challenge remains: the stigma of terminal illness in many families, leading to rejection of the terminally ill person. There is an urgent need to overcome this barrier, because help is widely available through well-organized support and assistance programs for older adults and their family members delivered by palliative care units around the country.

Elder Abuse

In 1996, the National Geriatrics and Gerontology Hospital established the Committee for Integrated Study of Assaulted and Abandoned Older Adults to manage and study cases of abuse of older adults. The committee has protocols that allow intervention in detected cases of abuse and refers to the health services of the National Geriatrics and Gerontology Hospital. Given that this social pathology is on the increase,[7] the service urgently requires wider application throughout the nation. In 2008, the committee presided over 680 cases of abuse of elderly adults. The most common causes were abandonment (27.4%), neglect (26.8%), and psychological abuse (22.9%).

Development of a Community Support Network

As noted earlier, Costa Rica is making important strides in the care of older adults. Much good work has been done in the past 3 decades through community, day care, and club programs; nursing homes; and sheltered housing. Education for older adults and their caregivers and family members has improved over time through self-care and caregiver courses offered in hospitals and clinics and education at home of caregivers and families receiving home care.[22]

Costa Rica has developed care networks for high-risk older adults in 50 communities, benefiting more than 10,000 older citizens with severe comorbidity and significant degrees of physical and cognitive dependence and extreme poverty.[22]

More investment must be made in such networks to reach all communities in the country; this can be achieved through collaboration of healthcare institutions, community services, and public and nonprofit organizations. The distribution of community services in Costa Rica is shown in Figure 1.

Long-Term Care

The most recent data available for nursing homes and day care centers, from December 2015, record 1,813 men and 1,566 women living in 92 nursing homes across the country and 69 day care centers serving 573 men and 1,209 women. Community-based nonprofit organizations run most of these institutions with public funding support that predominantly comes from the Junta de Protección Social (Social Protection Board) and private donors. A few are privately run and paid for directly by the beneficiaries. According to these figures, the institutionalized older adult population in the country is slightly less than 1%, but owing to social dynamics that fall outside the scope of this discussion, this percentage is set to rise as families gradually become less willing or able to care for their dependent older relatives. Other factors include the increasingly complex healthcare needs of institutionalized older people and the fact that the majority are unable to pay for the service themselves. This situation is already imposing heavy financial demands on the national budget, which the country is unlikely to be able to meet in the near future.

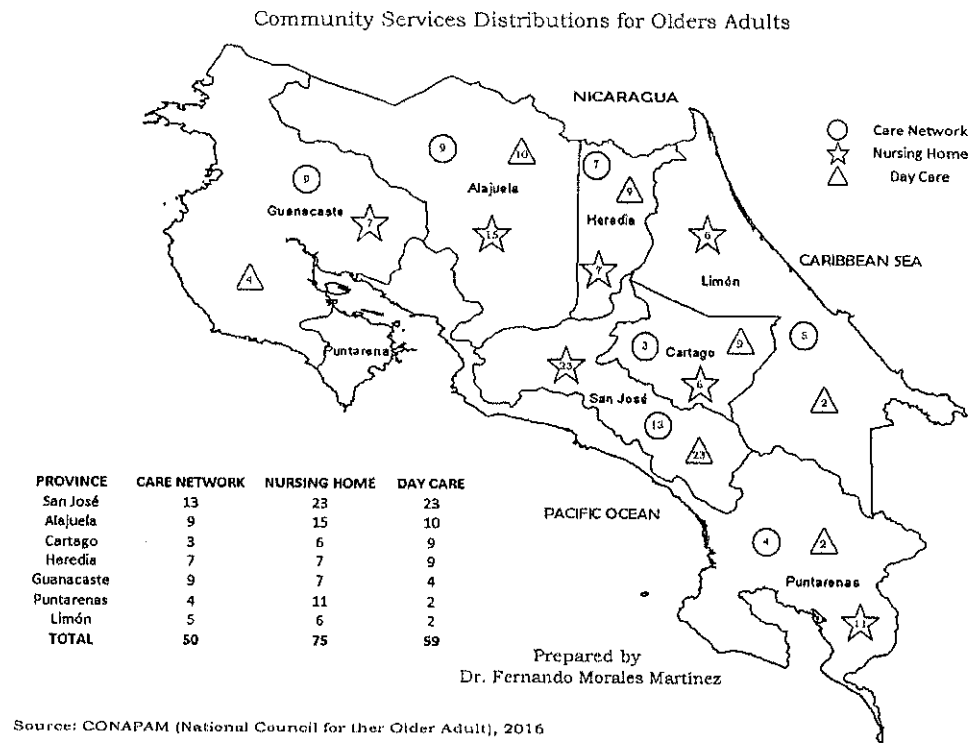
Geriatrics Education and Training

The postgraduate residency program in the medical specialty of Geriatrics and Gerontology at the University of Costa Rica and at the Center of Strategic Development and Information in Health and Social Security (CENDEISSS) was introduced in 1991. This evolved from a collaboration that commenced in 1988 between these institutions and the Family and Community Medicine Program, as well as on-going medical education programs supported by CENDEISSS since 1984.[23–25]

Geriatric medicine training at the undergraduate level, although improving, is still largely neglected in Costa Rican medical schools. The University of Costa Rica did not make a course in geriatrics compulsory until 2014, and only two of the seven medical schools in private universities have a compulsory course in geriatrics. Correcting this deficiency is a pressing need.

In 2008, the National Geriatrics and Gerontology Hospital was designated a Collaborative Center of the World Health Organization in the Latin American region in recognition of its focus on research and training in the field. Since then, health professionals from Chile, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Peru, and Dominican Republic have visited the hospital to take up internships and to gain experience in a holistic model of effective health care and education for older adults at all levels of service delivery.

Since 1991, 123 geriatric medicine and gerontology specialists have graduated from the 5-year postgraduate Geriatrics Program, and 45 are currently enrolled in the



PROVINCE	CARE NETWORK	NURSING HOME	DAY CARE
San José	13	23	23
Alajuela	9	15	10
Cartago	3	6	9
Heredia	7	7	9
Guanacaste	9	7	4
Puntarenas	4	11	2
Limón	5	6	2
TOTAL	50	75	59

Figure 1. Community service distribution for older adults.

program. One hundred fifty-four family and community medicine residents have undertaken a 4-month geriatric medicine rotation since 1987, and under the auspices of the National Geriatrics and Gerontology Hospital, 4,400 physicians have participated in practical courses in geriatrics, 110 Latin American physicians held internshisp in the World Health Organization/Pan American Health Organization Collaborative Center, and 1,959 undergraduate medical program students have undertaken courses in physiopathology, internal medicine, and geriatric medicine.

Challenges

Although significant advances have been achieved with demonstrably positive results, several challenges remain, notably, increasing numbers of retired older adults who depend on the social security system, the effect on the public budget of the rising costs of retirement and health care, how to promote and support preventive healthcare programs for older adults effectively to enhance awareness of self-care, and how to motivate and increase volunteering throughout the country.

CONCLUSION

Costa Rica's health system was established 75 years ago. In the past 40 years, through the national Geriatrics and Gerontology Hospital, there has been a growing necessity to prepare for the future needs of a rapidly growing older population. As a nation, it is working on improvements in infrastructure, training of human resources, logistics, policies, and planning to develop a health system capable of delivering targeted services to older adults.

It is essential that community-based health promotion, prevention, and rehabilitation gain a higher profile in a system traditionally based on the treatment of disease and injury. It is also necessary for the community to become more involved in the care of older adults—such as through volunteering—as a way to achieve financial sustainability in a country with limited resources.

Despite stringent of financial and infrastructure type the progress made to date allows for optimism about Costa Rica's ability to meet these challenges in the future.

Recommendations

It is recommended that the following be considered as priorities.

- Universalization of integrated care services for older adults based on a proven model of interdisciplinary team work in geriatrics and gerontology. This would require improvement in interdisciplinary human resources.
- Development of retirement programs to promote better health maintenance, care services and support programs for older adults.
- Development of a network of advanced information technology (geronto-technology) programs to enhance the country's care of older adults.
- Construction of a new geriatric and gerontology specialty hospital—or expansion of the existing one—with a visionary plan for multidisciplinary, nationwide networks of health care for older adults.
- A new and vigorous political commitment to interinstitutional cohesion and sustainability of care networks for

older adults throughout the nation as part of an active response to epidemiological and demographic changes.
- More investment in research in the field of geriatrics and gerontology.

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25 años formando geriatras

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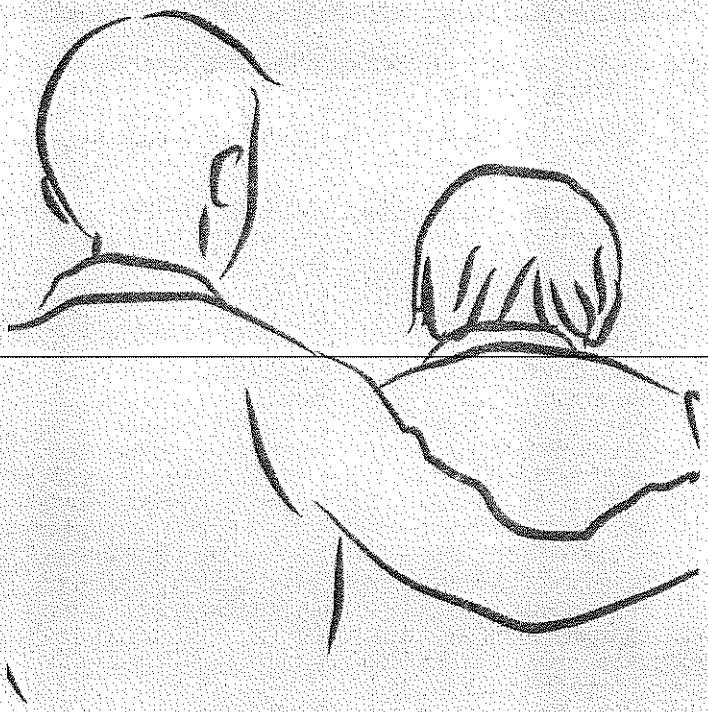

Hace unos días fui invitado por la Asociación de Médicos Geriatras y Gerontólogos de Costa Rica a hacer una presentación oral por los 25 años del programa de especialización de Geriatría y Gerontología de la Universidad de Costa Rica, cuya sede de cátedra está en el Hospital Nacional de Geriatría y Gerontología.

El programa de estudios, que se inició el 2 de enero de 1992, fue una combinación de los mejores programas de Europa y Norteamérica de aquel tiempo, adaptado a la realidad costarricense. Desde entonces, hemos llevado a cabo un análisis y una actualización, en promedio cada dos años, para obtener el grado de excelencia académica que todos anhelamos para esta especialidad de cinco años de duración.

En estos primeros 25 años, hemos superado todo tipo de retos que, para una especialidad tan novedosa como esta, siempre suceden, por el gran desconocimiento y por las debilidades humanas que no faltan y nunca van a faltar.

De los mejores. A pesar de todos los obstáculos, este posgrado se perfila como uno de los mejores en Latinoamérica, reconocido por la Academia Latinoamericana de Medicina del Adulto Mayor (ALMA), una liga de las mejores universidades de la región, y por la Organización Mundial de la Salud.

> El país cuenta con un programa de estudios de geriatría de los mejores en Latinoamérica

Estamos en el proceso de acreditación ante el Sistema Nacional de Acreditación de la Educación Superior (Sinaes) y perfilándola como la primera en su especialidad, lo que significa una revisión rigurosa de todo el programa de estudios, metodología y actualización. Esperamos concluir pronto el proceso de dos años para asegurarnos de que sea de excelencia académica probada, que es lo que siempre hemos querido.

Este esfuerzo ha sido una labor de equipo y han participado distinguidos geriatras y gerontólogos, quienes de manera desinteresada han puesto sus conocimientos, experiencia y material didáctico para hacer realidad un sueño académico compartido por todos: darles a nuestros adultos mayores la mejor atención integral posible en todo el territorio nacional.

El programa de posgrado ha graduado en este período 123 especialistas en geriatría y gerontología que laboran en diferentes áreas del país. Hay otros 60 médicos cursando la especialidad y cada año se gradúan, en promedio, nueve nuevos especialistas.

Con la incorporación de estos médicos especialistas a los diferentes centros de salud, esperamos que se note gradualmente una mejora en la calidad de la atención a las personas adultas mayores.

Agradecemos a las personas generosas y visionarias de la Universidad de Costa Rica y de la Caja Costarricense de Seguro Social por el apoyo a esta novedosa e importantísima especialidad, sobre todo, a la luz de los explosivos cambios demográficos y epidemiológicos que estamos viviendo y viviremos de una manera más notoria en el futuro cercano.

Preparación. Costa Rica debe preparar su sistema de salud, y lo está haciendo, poco a poco con pasos firmes y bien dirigidos.

Tenemos la convicción de que nuestro país alcanzará el primer lugar en toda la región latinoamericana en la provisión de servicios integrales de atención para las personas adultas mayores muy pronto.

Para ello, debemos seguir apoyando todos los esfuerzos académicos y de investigación que tanto necesitamos y necesitaremos a través del Hospital Nacional de Geriatría y Gerontología. ■