ROYAL
COLLEGE of
PHYSICIANS of
EDINBURGH

Journal

of the Royal College of Physicians of Edinburgh

307
Thyroid hormone replacement

310
The rise of gabapentin and pregabalin prescribing

369
End of life care: how do we move forward?

374
Death in the New Town

Volume 47 | Issue 4
December 2017

rcpe.ac.uk/journal

Cover image: based on original photograph by Rory Cavanagh

Volume 47 | Issue 4
December 2017

Contents

Editorial

306 From the editor
RM Bracewell

Perspective

307 Thyroid hormone replacement – a counterblast to guidelines
AD Toft

Clinical

310 Gabapentin and pregabalin: do the benefits outweigh the harms?
EE Morrison, EA Sandilands, DJ Webb

314 Resonance and dissonance asymmetry in effective physician–patient relationships
L Dyck

324 Geriatric medicine bridges: Scotland – Costa Rica
F Morales-Martínez

331 The increasing burden of atrial fibrillation in acute medical admissions, an opportunity to optimise stroke prevention
I Induruwa, E Amis, N Hannon, K Khadjooi

336 The new classification of seizures: an overview for the general physician
S Liyanagedera, RP Williams, RM Bracewell

339 Going beyond audit and feedback: towards behaviour-based interventions to change physician laboratory test ordering behaviour
Z Meidani, GA Mousavi, D Kheirkhah, N Benar, MR Maleki, M Sharifi, A Farrokhian

345 A review of photodiagnostic investigations over 26 years: experience of the National Scottish Photobiology Service (1989–2015)
H Naasan, RS Dawe, H Moseley, SH Ibbotson

Cases of the Quarter

351 Leptomeningeal carcinomatosis: easy to miss
A Sekhar, B Corbo, K Das, S Biswas

353 Disseminated tuberculosis – diagnostic challenges of atrial tuberculoma masquerading as atrial myxoma
A Alaga, YX Yew, MK Razul

Clinical Opinion

356 Addressing unmet needs for patients with previous upper gastrointestinal bleed requiring concomitant aspirin and non-steroidal anti-inflammatory drugs
T Jayaraman, MS Wong, N Mustaffa, YY Lee

Image in Medicine

359 Calvarial thickening due to anticonvulsants other than phenytoin
Z Siddiqui, K Singh

Education

360 Latest developments in clinical stroke care
JS Minhas, TG Robinson

364 Bariatric surgery as a treatment for metabolic syndrome
P Cordero, J Li, JA Oben

369 End of life care: how do we move forward?
B Wee

History

375 Death in the New Town: Edinburgh's hidden story of stonemasons' silicosis
K Donaldson, WA Wallace, C Henry, A Seaton

384 James Lind and the disclosure of failure
S Justman

388 Sir Winston Churchill: treatment for pneumonia in 1943 and 1944
JA Vale, JW Scadding

396 Letters to the Editor

399 In memoriam

400 Editorial information

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.

Correspondence to:
F Morales-Martínez
PO Box 1234-2050
San Pedro
San José
Costa Rica

Email:
fernandomm@
costarricense.cr

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

Declaration of interests: No conflict of interests declared

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

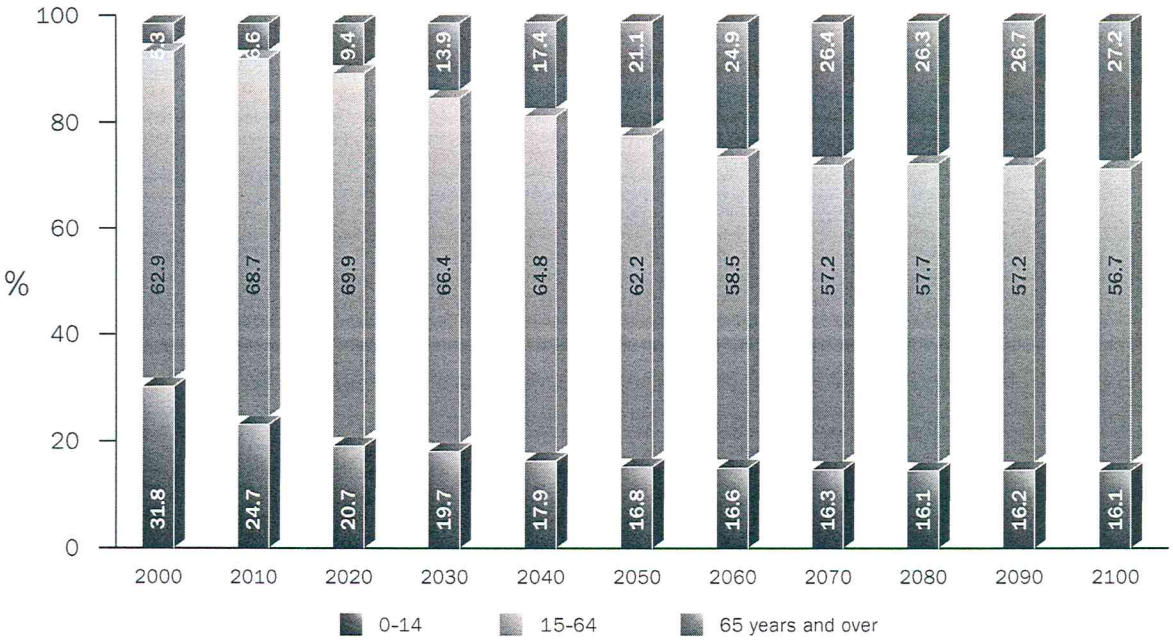
The Costa Rica Longevity Study on Health and Well-being (CRELES) was a major study undertaken from 2004 to 2006 into the health problems and needs of the older adult cohort in Costa Rica. A total of 2,820 people between 60 and 79 years of age participated in this thorough and comprehensive study. The 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

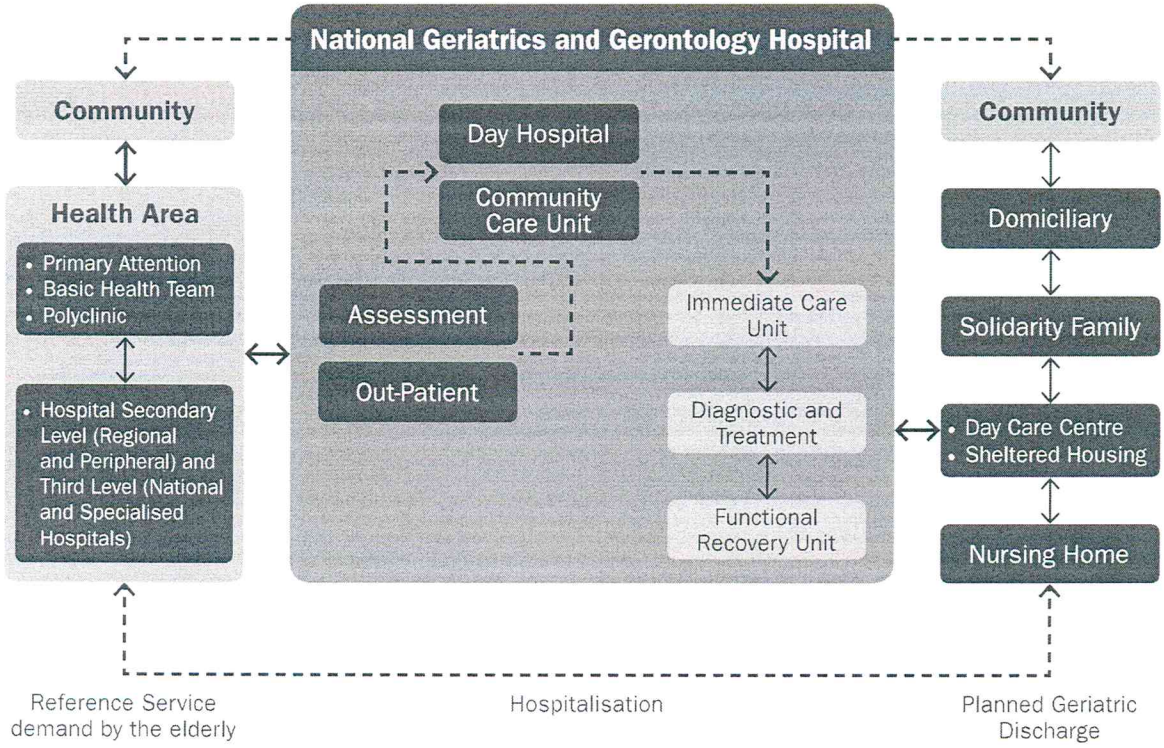
There are three main categories of health service delivery for the older adult population in Costa Rica – primary, secondary and tertiary care – and together they encompass customised programmes and services for this cohort, designed with the key objective of offering older adults optimal care that is 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.

Acknowledgments

With thanks to Dr Milena Bolaños Sánchez, Consultant Geriatrician, and Dr Manrique Sandí Arias, Occupational Medicine Specialist (both based at the National Geriatrics and Gerontology Hospital), for review of this article; and Mrs Sonia Zeledón-Mora, support secretary of the Department of Clinical Geriatrics, National Geriatrics and Gerontology Hospital. Mrs Vyvyan Mishra provided editorial services.

References

1 Morales-Martínez F Ageing in Costa Rica. *Costa Rica Medical Journal* 2015; 57: 74–9.
2 Morales-Martínez F. Levels of Geriatric Care. In: Morales-Martínez F, editor. *Geriatric Medicine and Gerontology Practical Topics* (Costa Rica) EUNED; 2001. II: 1–7.
3 National Institute of Statistics and Census. Infant mortality and recent evolution. I Semester 2016 I San José; 1(22): 3.
4 National Institute of Statistics and Census. *Estimates and projections of the population by sex and age 1950–2050*. CCP INEC; http://www.inec.go.cr/poblacion/temas-especiales-de-poblacion (accessed 3/4/17).
5 World Bank. *Costa Rica Demographics 2015*. http://www.worldbank.org/country/costarica (accessed 3/4/17).
6 Fernández X, Robles A. Health Status. In: *Report of the status of the elderly in Costa Rica*. National Council of the Older Person (CONAPAM), University of Costa Rica. 2008; 6: 103–121.
7 University of Costa Rica. *Longevity, ageing and health study of Costa Rica (CRELES)*. 2005; http://ccp.ucr.ac.cr/creles/index.html (accessed 3/4/17).
8 Costa Rican Institute of Social Security. Medical Management, Direction of Health Services Projections. Area of analysis and projection of health services (March 2017). Inventory and analysis of health areas, sectors, EBAIS, area headquarters and periodic health outposts in Costa Rica as of 31 December 2016.
9 National Geriatrics and Gerontology Hospital. *Registry of Hospital Discharges*. Costa Rica Institute of Social Security. Department of Medical Records, 2017; San José.
10 World Health Organization. *List of Worldwide Collaborative Centres, 2017*. http://www.who.int/collaboratingcentres/es/ (accessed 3/4/17).