

Integrating intrinsic capacity into Latin American medical education: a comprehensive framework for future physicians

Nevíd Rafael Meza^a , Mara Durán Borbolla^a , Daniel Camilo Hernández^b , Carlos Cano-Gutierrez^b , Miguel Germán Borda^{a,c,d} 

^aCentro de Investigación en Ciencias de la Salud, Facultad de Ciencias de la Salud, Universidad Anáhuac México – Huixquilucan, Estado de México, Mexico.

^bSemillero de Neurociencia y Envejecimiento, Aging Institute, Pontificia Universidad Javeriana – Bogotá, Colombia.

^cDepartment of Neurology, Clínica Universidad de Navarra – Pamplona, Spain.

^dCentre for Age-Related Medicine (SESAM), Stavanger University Hospital – Stavanger, Norway.

Correspondence data

Daniel Camilo Hernández – Semillero de Neurociencia y Envejecimiento, Aging Institute, Pontificia Universidad Javeriana. Cra. 7 #40 – 62, Bogotá, Colombia. Email: danieruht@gmail.com

Received on: Mar 4, 2025

Editor decisions on: Apr 14, 2025; May 19, 2025; Jun 11, 2025

Accepted on: Jun 26, 2025

Handling editor: Roberto Lourenço

How to cite this article: Meza NR, Borbolla MD, Hernández DC, Cano-Gutierrez C, Borda MG. Integrating intrinsic capacity into Latin American medical education: A comprehensive framework for future physicians. *Geriatr Gerontol Aging*. 2025;19:e0000307. https://doi.org/10.53886/gga.e0000307_EN

Copyright: © 2025 Meza et al. This open-access article is distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



Abstract

This study advocates the integration of the World Health Organization's intrinsic capacity (IC) framework — encompassing physical, mental, and psychological well-being — into Latin American medical education to address the challenges associated with population aging. This region faces rapid demographic aging amid health inequities, fragmented systems, and social determinants such as poverty and limited access to health care services. Traditional medical training, focused on reactive disease management, often neglects preventive, person-centered approaches that are critical for healthy aging. Embedding IC into medical curricula equips practitioners to assess older adults' mobility, cognition, vitality, and psychological health, allowing personalized interventions. This shift prioritizes early risk detection, autonomy preservation, and interdisciplinary collaboration across health care and social services. Effective implementation requires systemic reforms, including updated curricula, the training of educators, and partnerships between universities, governments, and non-governmental organizations. In resource-limited settings, IC-aligned care could reduce hospitalizations, promote aging in place, and alleviate strained systems. By addressing biological and socioenvironmental factors, this approach fosters more equitable models aligned with Latin America's demographic realities. Integrating IC into medical education strengthens the connection between clinical practice and the complex needs of older adults, improving their quality of life and strengthening the health system.

Keywords: healthy aging; education, medical; Latin America; preventive medicine; patient-centered care; curriculum.

INTRODUCTION

By 2050, population aging will significantly reshape Latin America's demographic pyramid, leading to a higher prevalence of chronic diseases and associated disabilities.¹ Older adults often face multiple comorbidities that affect their quality of life and functional independence, making traditional organ-specific approaches insufficient. The Comprehensive Geriatric Assessment (CGA) and the concept of frailty have emerged as alternatives to answer to this challenge. However, the expansion of these approaches has been limited by insufficient access to specialized geriatric care.² In response, the World Health Organization (WHO) introduced the concept of intrinsic capacity (IC) as a person-centered, function-focused framework that shifts the emphasis from disease management to the maintenance and optimization of an individual's physical and mental capacities throughout the aging process.³

Over the past four decades, geriatric medicine has progressively moved away from disease-centered paradigms toward person-centered, functional approaches, exemplified by tools such as the CGA and the concept of frailty.⁴ In this context, the WHO's IC model represents an evolution of these principles. While IC offers a standardized structure for monitoring key functional domains, it ultimately serves as part of a broader architectural design – one aimed at preserving the capacity and autonomy of aging individuals.⁵

To support the implementation of IC in real-world settings, the WHO developed the Integrated Care for Older People (ICOPE) strategy. ICOPE is a clinical and public health approach that translates the concept of IC into concrete actions by guiding health care workers through the early identification, assessment, and management of declines in physical and mental capacity.

From a gerontological perspective, the core elements of IC are not new concepts. The World Health Organization's key contribution is organizing these well-established ideas into a unified and scalable framework, using standardized language and practical tools that can be applied to policies, health care services, and medical education. In this way, the IC model builds upon and strengthens the foundational principles of gerontology, rather than replacing them.^{2,4} The ICOPE strategy provides governments and health systems with a practical, methodical framework for implementing what the field of aging has long endorsed at both the clinical and academic level.

IC is defined as the combination of an individual's physical, mental, and psychological capacities.³ It serves as a strong indicator of adverse health outcomes in older adults; a decline is associated with disability, falls, hospitalizations,

and frailty.^{3,6} Furthermore, IC has proven to be an independent predictor of mortality in specific conditions; for example, higher IC scores are associated with a significantly increased risk of respiratory disease mortality.⁷

Undergraduate education in geriatric medicine is essential for equipping future physicians with the knowledge, skills, and expertise required to care for older adults with complex needs. However, the integration of geriatric education into medical curriculums has thus far been very limited.⁸ By incorporating the concept of IC into medical education, particularly in Latin America, future physicians can be better prepared to address the health needs of rapidly growing aging populations.

This manuscript advocates the integration of the WHO's IC framework into undergraduate medical education in Latin America. It addresses the region's rapid demographic aging and the limitations of traditional, disease-centered training. By outlining key educational and systemic shifts, it proposes the integration of IC, particularly within primary care settings and through the ICOPE strategy, as a practical model for teaching healthy aging and strengthening the care of older adults.

Particularities of aging in Latin America

Aging in Latin America is influenced by sociodemographic, ethnic, and cultural factors that challenge universal models of healthy aging.⁹ Factors such as the social determinants of health, mental health, and cardiometabolic risks have a greater influence on healthy aging than age and sex.¹⁰

Population-based studies, such as The Health, Well-Being, and Aging (SABE) study and The Mexican Health and Aging Study (MHAS), have consistently demonstrated the critical influence of socioeconomic factors on health outcomes in older adults.⁹ For example, individuals with lower educational attainment are at increased risk of comorbidities, functional dependency, and mortality.¹¹ Recent findings further suggest that, among Mexican older adults, lower levels of IC are associated with limited education, poorer self-rated health, a greater burden of chronic diseases, more frequent physician visits, and increased difficulty with activities of daily living.¹²

Implementation in medical education

Current medical education primarily focuses on diagnosing and treating diseases, which, while essential, often results in fragmented care that fails to account for the broader context of a patient's life, function, and overall well-being. For example, an older adult with diabetes, cognitive impairment, and mobility limitations may be seen separately by an

endocrinologist for blood sugar management, a neurologist for cognitive decline, and a physical therapist for mobility issues, with limited coordination between specialists. This fragmentation can lead to conflicting treatment plans, polypharmacy, and unaddressed functional or social needs, ultimately compromising patient outcomes.¹³

IC allows future health care providers to view older patients as individuals with unique needs rather than merely as collections of diseases or symptoms, promoting the development of therapeutic strategies tailored to specific limitations.¹¹

By 2050, the global population aged 65 and older is expected to reach 1.5 billion, with older adults accounting for more than 40% of health care utilization.¹ This demographic also experiences hospital readmission rates nearly 50% higher than those of younger adults, primarily due to chronic illness and functional impairment, leading to high health care costs.³ To contextualize the role of IC in medical education, it is helpful to compare it with the concept of frailty, which has been a cornerstone of geriatric care. Since the concept of frailty originated, it has been widely validated, adopted, and integrated by geriatricians. However, its usefulness has extended beyond geriatrics, being incorporated into other specialties such as cardiology, oncology, orthopedics, endocrinology, and surgery, where it is recognized as a valuable tool for guiding clinical decision-making in aging populations with multiple comorbidities.⁴ Still, its operationalization in medical education and application in primary care is difficult, often due to its complexity, variability in definition, and tools to identify it. In contrast, the IC approach focuses on capacities, making it more naturally aligned with generalist training and preventive care models that aim to promote function before dysfunction sets in.

IC and frailty have complementary roles in the care of aging populations. Frailty emphasizes vulnerability and disease burden with a reactive approach to managing risks such as disability and hospitalization, while IC focuses on maintaining overall function. Integrated into general health care settings, IC supports early detection and proactive interventions, as seen in WHO's ICOPE, shifting the focus from specialized geriatric care toward a more accessible approach within primary care.⁵

Beyond its conceptual value, IC should be actively integrated into the routine practice of primary care, where most older adults initially present with health concerns. Family medicine and community-based settings are particularly well-suited for IC assessment, given their continuity of care and holistic approach. Training medical students in these settings, through clinical rotations, interdisciplinary case discussions, and community engagement, can promote early

identification of IC decline, support the development of person-centered care plans, and enhance collaboration among physicians, nurses, and social workers.^{8,14}

Moreover, the ICOPE strategy has demonstrated that IC assessments are feasible and acceptable in primary care settings, requiring minimal resources and producing actionable insights that align with population health goals.¹⁴ Embedding IC tools into primary care workflows allows a shift from reactive disease management toward preventive, function-focused care that supports aging in place. This is particularly important in Latin America, where access to specialized geriatric services remains limited and primary care serves as the backbone of the health system.^{5,8}

Incorporating IC training into primary care education is a critical step toward aligning medical curricula with regional demographic realities, equipping students with the skills needed to deliver effective, equitable care for older adults across diverse and economic contexts.

Development of the preventive approach

The IC approach prioritizes maintaining and enhancing older adults' capacities. The WHO ICOPE framework plays a crucial role as a preventive strategy by facilitating the early identification of declines in IC.¹⁴ Implementing IC as a preventive strategy at the community level can promote the goal of boosting independence and healthy aging.⁶

Longitudinal assessment of intrinsic capacity

Monitoring IC over time is essential for identifying risk factors, predicting outcomes, and guiding interventions that support healthy aging. Longitudinal studies suggest that while IC remains relatively stable, it is influenced by multiple demographic, health, and socioeconomic factors, emphasizing the need for routine assessment to inform preventive and personalized care strategies.

Several tools have been developed to operate the assessment of IC. ICOPE has demonstrated feasibility in both clinical and community settings, requiring minimal equipment and training.¹⁴ Scoring systems derived from IC domain assessments have shown predictive value for adverse outcomes such as frailty, functional decline, and mortality.^{5,6,14} Longitudinal studies confirm their stability and utility in tracking health trajectories, particularly in resource-limited settings where routine geriatric assessments may not be feasible.¹⁵

The current stage of intrinsic capacity operationalization

Although the use of IC is still new, it represents a big change toward focusing more on prevention and helping older adults stay independent. Variable accuracy in the initial ICOPE,

particularly sensitivity and specificity, is a major concern. Scoping reviews reported sensitivity rates ranging from 26.4 to 100% and specificity rates ranging from 17.1 to 94.3%, depending on the population and domain.¹⁶ Furthermore, across the five IC domains, validation studies such as the INSPIRE-T cohort demonstrate varying sensitivity (42–69%) but strong specificity (> 70%).¹⁷ Additionally, self-screening instruments show deficits in certain domains, such as sensory and cognitive function.¹⁷

Moreover, the translation of screening results into management plans and their integration into routine clinical workflows remain uneven. The potential of IC-based risk classification is demonstrated by pilot projects in China and France, but these are still isolated initiatives, highlighting the need for larger implementation studies.¹⁸ Thus, while promising, the operational maturity of IC requires cautious application and further validation, especially for its widespread use in medical curricula.

A Chinese study involving older adults found that the structure of IC remains stable and can therefore be consistently measured over time. However, declines in IC were associated with increasing age, female gender, rural residence, low body mass index, and hypertension. Conversely, improvements in IC were linked to higher educational attainment and moderate alcohol consumption.¹⁵ Similarly, the 10/66 study identified specific patterns of IC deterioration, with declines in locomotion, cognition, vitality, sensory function, and psychological well-being. A significant proportion of participants experienced deterioration in one or more of these domains, which was associated with increased risks of frailty, disability, and mortality.⁶ Research in Mexico further demonstrated that individuals with better IC trajectories reported higher quality of life and lower disability levels, reinforcing the importance of maintaining IC through targeted interventions.¹¹ Additionally, sociodemographic disparities play a role in IC trajectories. For example, higher educational attainment and wealth are linked to better IC preservation, whereas women and indigenous populations tend to experience greater declines.¹¹

Perspectives on implementation

The integration of IC into medical education presents a promising opportunity to reshape how future physicians approach aging. Latin America, with its rapidly aging population and persistent health inequities, is particularly well positioned to benefit from IC as both a conceptual framework and a practical tool. Unlike frailty, which is often limited to a geriatric specialist, IC aligns with physician competencies

and can be taught effectively in primary care settings where most older adults seek care.

Experiences from other regions offer valuable insights. In parts of Europe and Asia, national efforts have incorporated IC-based assessments into primary care and medical education using the WHO's ICOPE model. These initiatives have reported improvements in functional monitoring, prevention of disability, and interdisciplinary collaboration. While these contexts differ socioeconomically from Latin America, they demonstrate the scalability and adaptability of IC-based education across health care systems.

The region's challenge extends beyond curricular reform. It demands a cultural shift toward valuing functional autonomy and community-centered aging. Introducing IC early in medical education through experimental learning in community health settings, interprofessional case discussions, and ICOPE-aligned assessments can foster empathy, preventive mindsets, and systems thinking. For instance, training students to recognize IC declines could prevent fragmented care and polypharmacy, addressing root causes rather than isolated diseases.

Ultimately, implementing IC in education and primary care must be grounded in local realities. Efforts should involve academic institutions, health ministries, and local governments working collaboratively to ensure sustainability, equity, and contextual relevance. The authors believe that IC offers a timely and transformative approach to preparing health professionals for an aging society, and its inclusion in Latin American curriculum deserves attention.

CONCLUSION

IC is a key concept for promoting healthy aging, providing a goal-oriented tool to enhance individuals' physical, mental, and psychological capacities. In the context of Latin America, where social determinants of health and socioeconomic inequalities significantly impact the health of the aging population, and the access to specialized geriatric care is limited, IC emerges as a valuable tool to guide primary medical care.

Implementing the instruction of IC in medical training programs is essential to prepare future physicians to face the challenges of a rapidly aging population.

Further research and the development of educational strategies are necessary to effectively integrate IC into medical training, ensuring that future health professionals are prepared to tackle the challenges of aging and social inequalities in the region.

DECLARATIONS

Conflict of interest

The authors declare no conflicts of interest.

Funding

The study funding was provided by a grant from the Norwegian Health Association

Authors' contributions

Neví Rafael Meza: conceptualization, writing – original draft, writing – review & editing. Mara Durán Borbolla: conceptualization, writing – original draft, writing – review & editing. Daniel Camilo Hernández Triana: project administration, writing – review & editing. Carlos Cano-Gutierrez: investigation, writing – review & editing. Miguel Germán Borda: conceptualization, funding acquisition, supervision, writing – review & editing.

Ethical approval and informed consent

Not applicable.

Data availability statement

The data is available within the article

Reporting standards guidelines

This manuscript has been prepared following the SQUIRE 2.0 guidelines for quality improvements in health care

REFERENCES

- Clark P, Caló M, Torres-Naranjo JF, Cisneros-Dreinhofer F, Silveira-Torre LH, Tapia-Hernández M, et al. Osteoporosis and fragility fractures in Mexico: a call to action. *Arch Med Res*. 2024;55(7):103062. <https://doi.org/10.1016/j.arcmed.2024.103062>
- Schippinger W. Comprehensive geriatric assessment. *Wien Med Wochenschr*. 2022;172(5-6):122-5. <https://doi.org/10.1007/s10354-021-00905-y>
- Maheshwari S, Dai C, Giri S, Harmon C, Tucker A, Fowler ME, et al. Intrinsic capacity and survival among older adults with gastrointestinal malignancies: the cancer and aging resilience evaluation registry. *Cancer*. 2024;130(20):3530-9. <https://doi.org/10.1002/cncr.35427>
- Turner G, Clegg A; British Geriatrics Society; Age UK; Royal College of General Practitioners. Best practice guidelines for the management of frailty: a British Geriatrics Society, Age UK and Royal College of General Practitioners report. *Age Ageing*. 2014;43(6):744-7. <https://doi.org/10.1093/ageing/afu138>
- Tay L, Tay EL, Mah SM, Latib A, Koh C, Ng YS. Association of intrinsic capacity with frailty, physical fitness and adverse health outcomes in community-dwelling older adults. *J Frailty Aging*. 2023;12(1):7-15. <https://doi.org/10.14283/jfa.2022.28>
- Prince MJ, Acosta D, Guerra M, Huang Y, Jacob KS, Jimenez-Velazquez IZ, et al. Intrinsic capacity and its associations with incident dependence and mortality in 10/66 Dementia Research Group studies in Latin America, India, and China: a population-based cohort study. *PLoS Med*. 2021;18(9):e1003097. <https://doi.org/10.1371/journal.pmed.1003097>
- Ramírez-Vélez R, Iriarte-Fernandez M, Santafé G, Malanda A, Beard JR, García-Hermoso A, et al. Association of intrinsic capacity with respiratory disease mortality. *Respir Med*. 2023;212:107243. <https://doi.org/10.1016/j.rmed.2023.107243>
- Mercado-Asís LB, Domingo-Maglinao MLP. Geriatric medicine in the medical curriculum: a MUST in the globally aging world. *St Tomas J Med*. 2022;6(2):944-51. <https://doi.org/10.35460/2546-1621.2022-0061>
- Wong R, Michaels-Obregon A, Palloni A. Cohort profile: the Mexican Health and Aging Study (MHAS). *Int J Epidemiol*. 2017;46(2):e2. <https://doi.org/10.1093/ije/dyu263>
- Zhao Y, Jiang Y, Tang P, Wang X, Guo Y, Tang L. Adverse health effects of declined intrinsic capacity in middle-aged and older adults: a systematic review and meta-analysis. *Age Ageing*. 2024;53(7):afae162. <https://doi.org/10.1093/ageing/afae162>
- Salinas-Rodríguez A, Fernández-Niño JA, Rivera-Almaraz A, Manrique-Espinoza B. Intrinsic capacity trajectories and socioeconomic inequalities in health: the contributions of wealth, education, gender, and ethnicity. *Int J Equity Health*. 2024;23(1):48. <https://doi.org/10.1186/s12939-024-02136-0>
- Gutiérrez-Robledo LM, García-Chanes RE, Pérez-Zepeda MU. Screening intrinsic capacity and its epidemiological characterization: a secondary analysis of the Mexican Health and Aging Study. *Rev Panam Salud Pública*. 2021;45:e121. <https://doi.org/10.26633/RPSP.2021.121>
- Trullàs JC, Blay C, Sarri E, Pujol R. Effectiveness of problem-based learning methodology in undergraduate medical education: a scoping review. *BMC Med Educ*. 2022;22(1):104. <https://doi.org/10.1186/s12909-022-03154-8>
- Leung AYM, Su JJ, Lee ESH, Fung JTS, Molassiotis A. Intrinsic capacity of older people in the community using WHO Integrated Care for Older People (ICOPE) framework: a cross-sectional study. *BMC Geriatr*. 2022;22(1):304. <https://doi.org/10.1186/s12877-022-02980-1>
- Yang F, Su Q, Ran Q, Hu Y. Longitudinal change of intrinsic capacity and associated factors in older Chinese adults: China Health and Retirement Longitudinal Study. *J Nutr Health Aging*. 2024;28(5):100214. <https://doi.org/10.1016/j.jnha.2024.100214>
- Oliveira VP, Ferriolli E, Lourenço RA, González-Bautista E, Barreto PS, Mello RGB. The sensitivity and specificity of the WHO's ICOPE screening tool, and the prevalence of loss of intrinsic capacity in older adults: a scoping review. *Maturitas*. 2023;177:107818. <https://doi.org/10.1016/j.maturitas.2023.107818>
- Giudici KV, Barreto PS, Guyonnet S, Beard JR, Takeda C, Cantet C, et al. Predictive capacity of the integrated care for older people screening tool for intrinsic capacity impairments: results from the INSPIRE-T cohort. *J Gerontol A Biol Sci Med Sci*. 2024;79(7):glae112. <https://doi.org/10.1093/gerona/glac112>
- Gonzalez-Bautista E, Beard JR. The challenge of measuring intrinsic capacity. *J Nutr Health Aging*. 2023;27(10):806-7. <https://doi.org/10.1007/s12603-023-2012-z>