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### Essay

## Aging population: A challenge for public health<sup>☆</sup>

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#### ABSTRACT

At present, 8% of the world population is over 65 years of age, and this percentage is expected to increase to 20% in 20 years, with many of these people being older than 80. For example, it is estimated that in Italy there will be more than one million people over 90 in the year 2024 and, in China, it is estimated that 330 million people will be older than 65 and 100 million will be older than 80 in 2050. The growth of the elderly population is considered a global phenomenon, and Díez Nicolás even refers to “aging of the elderly population” which means that not only will there be more elderly people, but also that there will be a substantial increase in the number of elderly of an older age.

The demographic determinants of the aging population are lower fertility rates during the past decades owing to multiple causes, reduction in mortality due to longer life expectancy, and migration, though to a lesser degree.

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#### Envejecimiento de la población: un reto para la salud pública

#### RESUMEN

En la actualidad, el 8% de la población mundial tiene más de 65 años, y se espera que en 20 años este porcentaje aumente al 20%; muchas de estas personas incluso serán mayores de 80 años. Por ejemplo, en Italia se proyecta más de un millón de personas sobre la edad de 90 años para el año 2024 y en China en el 2050 se proyecta 330 millones de personas mayores de 65 años y 100 millones mayores de 80 años. El incremento en la población adulta mayor se ha considerado un fenómeno global, e incluso Díez Nicolás menciona el «envejecimiento de la población mayor», es decir, no solo serán más ancianos, sino que aumentarán sustancialmente el número de adultos mayores con una edad más avanzada.

Los determinantes demográficos del envejecimiento poblacional son la disminución de la fecundidad durante las últimas décadas de causa multifactorial, la disminución de la mortalidad con un aumento en la expectativa de vida y, con un menor aporte, está la emigración.

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## Aging and medicine

Increasingly, partly as a result of advancements in the treatment of chronic diseases, surgery or interventional procedures for conditions that were managed with palliation in the past or whose causes were not understood, and also as a result of new medications, people are living longer.

Aging of the population is a challenge for medicine because of the growing number of elderly patients and their many implications: comorbidities, better defined in this group as multi-morbidities,<sup>1</sup> many of them very costly, as is the case of cardiovascular diseases, cancer, chronic renal disease and diabetes, and their respective complications due to the time when chronic diseases are diagnosed. Moreover, elderly patients have limited physiological reserve and many of them are frail and deconditioned, especially when they are in their eighties. This results in higher pharmaceutical costs for the control of diseases that cannot be cured, and also creates a risk of worsening of adverse effects and a faster course to disability and dependence.

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## Anesthesiology and the elderly patient

At present, it is not rare to find people in their nineties scheduled for surgical procedures who would have been vehemently rejected in the past and would rarely have been proposed for an intervention based due to age as an exclusion criterion. But now, given the understanding of the elderly physiology, the development of better monitoring, special and intensive care units, and adequate multi-disciplinary perioperative preparation, these patients are accepted for those procedures, as long as pre-operative optimization is achieved, their functional status is acceptable, and the surgical option actually offers better quality of life. Of course, this does not mean that their perioperative risk is low, or that individual variability should not be considered.

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## Physiology of the elderly patient and its impact on anesthesia

Some of the anesthetic implications in the elderly patient include sensitivity to certain drugs, which requires careful titration or lowering of the dose; lower minimal alveolar concentration<sup>4-6</sup>; and the need to reduce the dose of local anesthetic by 40% in cases of spinal anesthesia.<sup>4,6</sup>

In the elderly, the kidney is more prone to acute renal injury and progression of chronic renal failure.<sup>7</sup> Another area that has received attention recently is post-operative cognitive dysfunction in elderly patients,<sup>8</sup> although its cause is not yet clear. However, the approach to the study of this effect is no longer focused on the type of surgery and anesthesia, but rather on patient susceptibility.<sup>8,9</sup> Another event is delirium, more frequently associated with major surgery; it is a mortality marker and it has been shown that it is not prevented by the use of haloperidol, although the use of this agent may reduce the severity and duration.<sup>2</sup> Elderly individuals are also at a higher risk of developing atelectasis and hypoxemia.<sup>2,5,10</sup> Elderly patients have diminished cardiac

reserve, which manifests as hypotension after the induction of general anesthesia,<sup>2,10</sup> a higher incidence of arrhythmias, and endothelial dysfunction with increased afterload.<sup>2</sup> Elderly patients require preload in order to maintain cardiac output, but because of diastolic dysfunction, there is a higher risk of pulmonary edema with a rapid increase of filling pressures.<sup>2,5,10</sup> These are but a few of the many changes that occur in the elderly.

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## Geriatric subspecialties

In the literature of the various medical specialties, there are special issues discussing the topic of the aging population, no longer only in the area of internal medicine and geriatrics, the two specialty areas mainly in charge of managing these patients. Different geriatric subspecialties have been proposed in anesthesiology, oncology, and orthopedics, among others, because of the higher future demand on the health system from elderly patients. Moreover, it is expected that more elderly patients will be included in medical research,<sup>1</sup> given that they are a population of interest because of their growing numbers and the fact that they suffer chronic and degenerative diseases that are widely studied from the genetic, medical and pharmacological points of view, in particular circulatory and neurological diseases.

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## Aging and demographics

With the current drop in fertility being one of the main causes of an aging population, there will be a smaller economically active population to provide for the elderly who are economically dependent. This, together with the crisis of the pension system, means that there will not only be a larger number of retired adults, but they will also receive pensions for a longer period of time.<sup>3</sup> In many countries this has sparked a heated debate about the age of retirement.

This is how changes in societal numbers and structure affect demographic functioning, promoting changes in global health policy and in the healthcare model, which is now focused on geriatric patients and their vulnerabilities. Such a model is designed to not affect the independence of the elderly patients and to avoid abuses, many times by close relatives, since vulnerability increases with physical, emotional or economic dependence.

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## The elderly and public health

In healthcare, primary care of patients with chronic diseases must be emphasized, followed by the multidisciplinary approach to the elderly patient, education for the prevention of abuse against the elderly, its diagnosis and reporting. Priority must also be given to the creation of mental health centers for the elderly, and to the establishment of top-quality, cost-effective acute care models for patients at home and in the hospital.<sup>11</sup> This will require the involvement of scientific societies and training of staff in geriatrics, starting with undergraduate students with a longer exposure to the study of this

discipline, and the promotion of geriatric subspecialties.<sup>11</sup> All this requires the participation of the political and economic sectors<sup>11</sup> that must be made to understand the importance of looking for adequate care solutions for the elderly, with their positive implications for the health and quality of life for people in this age group.

In June 2005, during the XVIII World Congress on Gerontology in Rio de Janeiro, the project on *Friendly cities: a guideline* by the WHO was presented. With the participation in the research of 33 cities of all the continents, the project defined a *friendly city for the elderly* as the one that 'encourages active aging through the optimization of opportunities for health, participation and safety in order to improve the quality of life of people as they age' and proposed, among several things, the creation of a clean and pleasant environment, the importance of green areas and of level, non-slippery surfaces, priority for pedestrians, emphasis on safety, construction of friendly buildings with adequate stairways, ramps, elevators and signaling, and urban transportation with special rates and preferential seating for the elderly.<sup>12</sup> Implementation of these guidelines requires the participation of the public and private sectors, because they are considered part of the health policy; moreover, the elderly population comprises more vulnerable groups such as old people living in rural areas, indigenous populations and women, who must also be the focus of care. Consequently, policies must provide for monitoring of the quality of life of the elderly, using indicators that show the progress achieved in their implementation in the different regions.<sup>12</sup>

The goal is to prevent complications and help the elderly retain their independence for activities of daily living, in particular self-care, and to help them function; otherwise care for the elderly would require more spending and/or time from the economically active population. The goal is to reach old age in the best possible health, delaying the onset of disability, with a focus on quality, dignity and wellness, rather than on number of years.

Aging should not be considered a problem of unmanageable size, because it should be the result of achievements in better mother and child care, and conditions that help enhance life expectancy from birth.

All of the above points to the fact that our approach to aging must be holistic, with policies directed to the comprehensive care of this population. This approach should change the paradigm that the elderly are disabled and incapable of contributing to cultural and society, and should focus on

creating a self-sustainable society that can guarantee a life of quality for its elderly people.

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