

# The Field of Gerontology: Views from the Past, Present & Future

By Pinchas Cohen



Author Pinchas Cohen

## Introduction

Russian microbiologist Elie Metchnikoff is believed to have first coined the term “gerontology” – the comprehensive multidisciplinary study of aging and older adults – in 1903.

“Scientists have been neglecting aging, which nonetheless presents a problem of great interest,” he wrote around that time, according to author Luba Vikhanski in *Immunity: How Elie Metchnikoff Changed the Course of Modern Medicine* (Chicago Review Press, 2016). Metchnikoff went on to win the Nobel Prize for his still-relevant discoveries related to the immune system. But his call for a discipline devoted to exploring how we live and age has proved equally, if not more, prescient.

## A Field Necessitated by Global Change

When Metchnikoff was alive in the early 1900s, life expectancy was limited in large part by the fact that many infants and children never made it to adulthood, due to early deaths from infections and parasites, according to “Global Health and Aging”, a 2015 report from the World Health Organization (WHO) and the United States’ National Institute on Aging (NIA). Life expectancy increased with improvements in sanitation and hygiene, the discovery of antibiotics and the start of vaccination programs, according to “Achievements in Public Health, 1900-1999: Control of Infectious Diseases” (Centers for Disease Control, 1999).

“In a century the world changed markedly from having almost no countries with life expectancy more than 50 years to having many countries with a life expectancy of 80 years as life expectancy almost doubled in the long-lived part of the world,” wrote Prof. Eileen Crimmins of the University of Southern California Leonard Davis School of Gerontology (*The Gerontologist*, Vol. 55, Issue 6, December 2015). The “Global Health and Aging” report calls this dramatic increase in life expectancy during the 20th century, “one of society’s greatest achievements”.

Due to declining fertility rates, the report also predicts that adults aged 60 and over will soon outnumber children younger than age five.

A 2017 United Nations report, “World Population Ageing”, projects that the number of people aged 80 or over will increase more than threefold between 2017 and 2050, rising from 137 million to 425 million. The same report states that Japan was the world’s most aged population in 2017, with a third of the population at age 60 or older, and projects that it will remain so through 2050. Another UN report notes that the highest proportion of young people today – nearly nine out of 10 – live in less developed countries, where life is harder due to poverty, instability and a lack of access to education and health care (The State of the World Population, 2014).

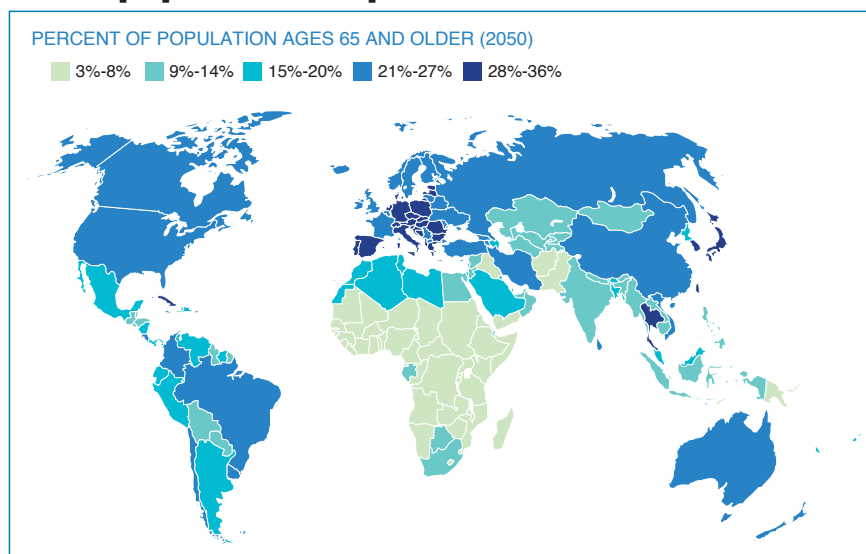
Taken together, these global demographic trends make the field of gerontology more relevant than ever (*Chart 1*).

## Longevity, Healthspan & Lifespan

While the number of centenarians is going up, maximal life expectancy looks unlikely to change, according to a study led by Jan Vijg (*Nature*, 2016). While individuals will be less likely to die at 60,

CHART 1

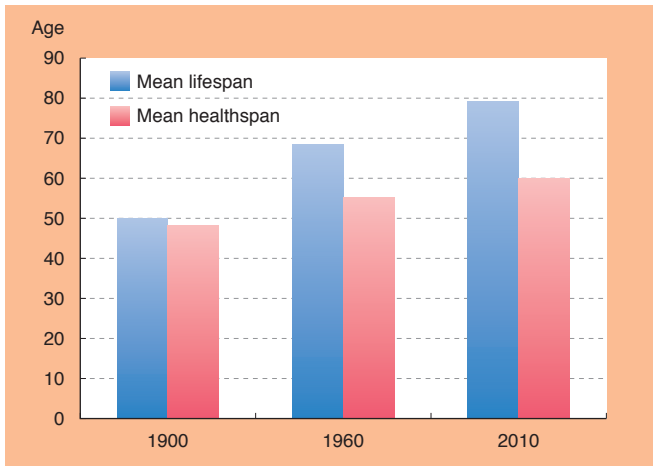
### World population map



Source: Population Reference Bureau, “2018 World Population Data Sheet”

CHART 2

### Estimate of lifespan, healthspan & disability span



Source: Compiled by the author, 2019

70 or 80 and more likely to reach centenarian status, the maximum lifespan seems to have a natural limit, with the record set by France’s Jeanne Calment of 122 years having never been surpassed, according to the study.

Although we have made incredible advances in increasing lifespan, these have not been matched in healthspan extension. This leads to what we call the disability span, which is getting longer and longer. The field of gerontology must now focus on extending healthspans, the portion of our lives that we spend in good health rather than in disability (Chart 2).

Heart disease is now the leading cause of death around the world and dementia is considered one of the major causes of disability and dependency among older people, according to the WHO. Deaths from heart disease in the United States decreased 9% between 2000

and 2017, while deaths from Alzheimer’s disease increased by 145%, according to the Alzheimer’s Association (Facts and Figures, 2019), which also notes that by the year 2050, 13.8 million people in the US alone are projected to have Alzheimer’s, barring the development of new treatments or prevention methods.

Among the most important interventions to work toward are those against Alzheimer’s and related dementias. Understanding, preventing and conquering these devastating illnesses is crucial, as is the development of new policies in health care, housing and more to address the challenges of an older population facing dementia risks. Providing tools and resources for support for their caregivers is needed as well.

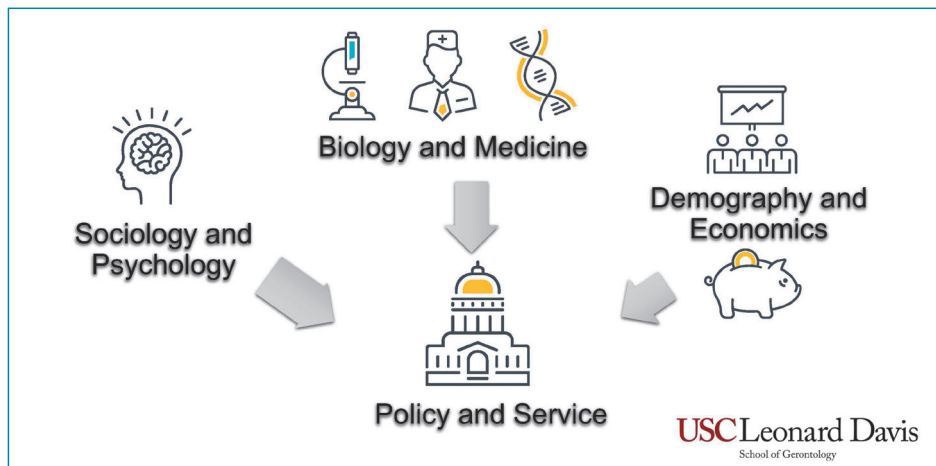
### Formal Support for Aging Research & Education

Prior to the 1965 passage of the Older Americans Act in the US, there was very little established instruction on gerontology in colleges and universities, according to a national survey by David Peterson (Association for Gerontology in Higher Education, 1987), which notes that between 1966 and 1984 the Administration on Aging awarded nearly \$95 million in grant funding to institutions of higher education and educational consortia to support gerontology career preparation programs.

The proliferation of educational offerings led to the creation of the Association of Gerontology in Higher Education in 1974. Now known as the Academy for Gerontology in Higher Education (AGHE), the group works to foster the commitment of higher education to the field of aging and currently counts more than 130 member institutions in the US, Canada and elsewhere. Today the science of gerontology can span fields including biology, medicine, sociology, psychology, demography, economics, policy and service (Chart 3).

CHART 3

### The science of gerontology



Source: Compiled by the author, 2019

## History of the USC Leonard Davis School of Gerontology

Compared to today, both the world and the aging field were markedly different when what is now the USC Leonard Davis School of Gerontology began as a university research center in 1964. Nations were not yet directly wrestling with the issues of rapidly aging populations on their current scale. The first retirement communities had only recently been created, and opportunities to research aging and retirement issues had just started to appear.

USC recognized these unique opportunities and created the center in 1964, with USC sociologist James Peterson serving as interim director. The following year, National Institute of Mental Health Aging Program Director James E. Birren was tapped to become the gerontology center's first permanent director.

The current Ethel Percy Andrus Gerontology Center facility on the USC University Park Campus – named for the American Association of Retired Persons (AARP) co-founder – was dedicated in 1973 and funded by more than 400,000 AARP members. It would provide a comprehensive research and education venue for the center and subsequently the school, which was founded in 1975 with Birren serving as its first dean. A generous endowment gift from Leonard Davis, AARP co-founder and Colonial Penn Group founder, named the school in 1976.

In the early 1970s, recruits such as Caleb “Tuck” Finch, now a USC professor and the ARCO/Kieschnick professor of Gerontology and Biological Sciences at the Leonard Davis School, would eventually become some of the school's first faculty members. Finch and his contemporaries would also develop the school into a research powerhouse through both incredible scientific achievements and trailblazing grantsmanship. This reputation for both high-quality scholarship and research support has aided in the steady recruitment of the field's top faculty throughout the 1980s, 1990s and beyond. Renowned research centers helmed by Leonard Davis School faculty continue to investigate Alzheimer's disease, the biology of longevity, biodemography, age-friendly housing for older adults, long-term care and more.

### Innovation in Gerontology Education

In the fall of 1975, an inaugural class of 55 students attended the first-of-its-kind institution. Among the course offerings was a brand-new Master of Science in Gerontology program; the innovative curriculum would heavily influence the way in which later gerontology programs throughout the nation were created and structured.

In 1989, the nation's first Ph.D. in Gerontology program was inaugurated at USC. Since then, the program has produced many of today's top leaders in the aging field, and in 2014 the Davis School added the first Ph.D. in the Biology of Aging to its doctoral offerings.

Today, all Leonard Davis School masters programs – including the

Master of Science in Nutrition, Healthspan and Longevity program, a coordinated dietetics program and the first such program to specifically highlight aging – as well as the Certificate in Gerontology program are available both on-campus and online. Professor and Dean Emeritus Edward Schneider says the unique push for online gerontology programs was a response to the needs of prospective students with heavy professional or family responsibilities, including those caring for children or older family members.

“I was concerned that there were students across the country who wanted to come to USC but couldn't physically come here,” Schneider said in a 2015 article commemorating the school's 40th anniversary. “The online program was developed to make the excellent education we provide here on campus accessible to people around the nation and the world.”

### Current Research Efforts

The USC Leonard Davis School's faculty includes top academics in the field such as world-renowned demographer and USC Prof. Eileen Crimmins; Valter Longo, director of the USC Longevity Institute, and one of *TIME* magazine's 50 Most Influential People in Health Care of 2018; free radical biology pioneer Kelvin Davies, leading elder-abuse expert Kate Wilber, as well as rising stars in biology, economics, sociology, policy and other crucial areas.

There has been a substantial growth in both research grants obtained by faculty and student enrollment in all programs, representing the two major missions of the school. More than 100 researchers conduct state-of-the-art scientific investigations, and more than 500 students further the exploration and implementation of that knowledge.

Recent findings have advanced our understanding of the role air pollution plays in the development of Alzheimer's disease, the importance of sleep and nutrition in optimal aging, how emotion and stress affect memory as we age, the impact of social determinants of health across the life course, the potential of previously unknown mitochondria-derived peptides as possible treatment targets for several age-related diseases, differences in disease risks between men and women, and more.

In the coming years, new focuses on purpose, genomics, and technology's roles in aging, as well as global aging outreach and study, will provide a wealth of new research questions and educational opportunities for USC gerontology researchers, educators, and students.

### Selected Centers & Institutes at the Leonard Davis School of Gerontology

- The Ney Center for Healthspan Science: dedicated to research on longevity and healthy aging and established in 2018 with a \$20 million gift from Mei-Lee Ney. The center is a hub of multidisciplinary exploration into the biological, demographic,

and psychosocial aspects of aging.

- The Longevity Institute: led by Prof. Valter Longo, conducts translational research on aging and age-related diseases through a focus on diet and exercise, bioengineering, pharmacology and regeneration. The institute recently held the first International Conference on Fasting, Dietary Restriction, Longevity and Disease, during which top researchers from Harvard, MIT, the Salk Institute, the National Institutes of Aging and other institutions gathered for a two-day conference exploring topics in this growing field of study.
- The Senior Living Institute: brings together today's leaders in the field of senior housing to establish best practices in this emerging trillion dollar industry. The two-day Senior Living Executive Course (SLEC) from the USC Leonard Davis School of Gerontology, in partnership with the USC Marshall School of Business, draws professionals from across the US and abroad for education on a range of key issues.
- The Center on Biodemography and Population Health: led by Eileen Crimmins, provides a synergistic research environment for the integration and translation of research on aging cohorts. Crimmins is also co-investigator of the Health and Retirement Study (HRS), a longitudinal panel study that has surveyed a representative sample of approximately 20,000 people in the US since 1990. Described as the largest academic behavioral and social science project ever undertaken in the US, HRS has been called an invaluable publicly available dataset for investigating work, aging, and retirement and informing public policy on these issues (Gwenith G. Fisher, *Work, Aging and Retirement*, Vol. 4, Issue 1, 2018).
- The Family Caregiver Resource Center: helps families and communities master the challenges of caring for older adults. Center Director Donna Benton, along with Prof. Kate Wilber, lead and support a California caregiving task force, which is helping advance specific legislative proposals around addressing limitations in paid family leave laws, improving caregiver training, and increasing access to affordable services.
- Fall Prevention Center: ensures the independence, safety, and well-being of older persons through fall prevention leadership and education. A new survey of adults shows that three out of four adults age 50 and older want to stay in their homes and communities as they age – yet many don't see that happening for them (Home and Community Preferences: A National Survey of Adults Age 18-Plus, AARP, 2018). Led by Prof. Jon Pynoos, the work of the center includes a focus on home modifications programs designed to allow older adults to remain in their homes for as long as possible.
- USC Center on Elder Mistreatment: housed at the Keck School of Medicine at USC, and run together with the USC Leonard Davis School, strives to be the world's academic leader in understanding and addressing elder mistreatment. The center is currently working with the National Institute of Justice and

Photo: John Skalicky



*The USC Leonard Davis School of Gerontology conducts research, advocacy and education to improve the aging process for people everywhere.*

Kaiser Permanente to develop an evidence-based elder abuse prevention program.

Additional areas of emphasis include palliative and end-of-life care, improving service delivery systems, technology and aging, and livable communities. School faculty work with community leaders at all levels, including local, state, national and international.

### Meeting the Needs of a Changing Society

The population of Americans 65 years of age and over is projected to nearly double from 2015 to 2055, according to US census data. As a result, the demand for qualified leaders in aging services and gerontology-related occupations is likely to increase as the first wave of baby boomers reaches the age of 70. To help meet that need, the USC Leonard Davis School continues to develop new educational programs. The school recently unveiled a Master of Arts in Medical Gerontology program and plans to launch another master's program focused on senior living hospitality.

The school has also partnered with other organizations across the world to create tailored gerontology programming for professionals who serve older adults. One such program with Bank of America Merrill Lynch educates financial planners on the specific needs and goals of older people. A partnership with The Hartford insurance company provides a home modification certification program for contracting professionals. Another course is presented in partnership with the Yamano Beauty College in Tokyo and is preparing beauticians-to-be to meet the needs of Japan's older adults.

Some USC Leonard Davis School students also get hands-on experience through a pioneering collaboration with Kingsley Manor, a Los Angeles-area retirement community. Since 1984, at least 60 USC Leonard Davis masters students have called Kingsley Manor home, earning room and board in exchange for two days of service each

week. A few similar residential programs have recently begun in places such as Ohio, Spain and the Netherlands, but Kingsley Manor's is believed to be the only one specifically for gerontology students and is designed to help train future leaders in the field.

One alumnus of the program, Shaun Rushforth, has gone on to become Kingsley Manor's current executive director and credits his experience living there with helping him better meet the residents' needs. "I don't know what it is like to be an 84-year-old man," he said. "But I do know what it is like to live in a retirement community."

### Alumni in the Field

Whether they start businesses, shape policy, practice medicine, develop technologies, or lead research, gerontologists serve older adults in a myriad of ways. Our students have gone on to a wide variety of careers, from top positions in major universities around the world, to traditional leadership roles in community-based services, senior living, health professions, government and advocacy organizations as well as innovative roles in financial planning, technology and real estate.

Notable alumni include Katy Fike, a former investment banking analyst who earned her doctorate at the USC Leonard Davis School. In 2015, Fast Company named her one of the most creative people in business for her roles as a founder of the senior-focused venture fund Generator Ventures and the aging innovation network, Aging 2.0. Laura Trejo, a master of gerontology graduate, leads the Department of Aging for the City of Los Angeles. At the national level, Dr. Dawn Alley directs the population and health group for the Centers for Medicare and Medicaid Services. Rick Matros graduated from our first masters class and is now the chairman and chief executive officer of Sabra Health Care REIT, one of the largest owners of senior housing facilities in the country. Laura Corrales-Diaz Pomatto, the first graduate of our Biology of Aging Ph.D. program, is a post-doctoral fellow at the National Institutes of Health. Recent gerontology Ph.D. graduate Morgan Levine is now a professor at Yale. Her research on epigenetic biomarkers of aging shows that our biological age and chronological age can be different and that we can even be aging faster or slower in one domain versus another.

### Looking to the Future

With its multidisciplinary faculty and research strengths, the USC Leonard Davis School of Gerontology is well positioned to conduct cutting-edge research in several facets of geroscience – understanding the genetic, molecular, epigenetic and cellular mechanisms that make older age a risk factor for many chronic conditions and diseases. The school is particularly prepared for the new age of big data; a new Bioinformatics Research Core within the school will enable researchers to weave together genomic and biomarker data from large cohorts to gain new insights into the

biodemography of populations, risk factors for age-related diseases and other health and well-being outcomes.

The field of longevity and healthy aging is becoming a central theme in conversations in government, industry, foundations, and academia. Our school is poised to be a centerpiece in the process of moving this agenda forward around the world, including:

- advancing research into aging-related diseases, including Alzheimer's, diabetes, and cancer; and addressing fundamental aging processes, to develop new treatments and strategies for prevention, including looking at how lifestyle changes, from specific exercises to specialized diets, can promote healthy aging;
- leveraging the growing interest to identify and strengthen civic partnerships to help meet the diverse societal needs of an aging population;
- providing solutions related to housing, hospitality and health-education, as well personnel-training for the soon-to-be trillion-dollar senior living industry.

### Conclusion

More than 40 years ago, the founders of the USC Leonard Davis School of Gerontology recognized the importance of an interdisciplinary school focused on studying the biological, sociological, psychological and policy aspects of aging. Because of that vision, the school is now the preeminent leader in an increasingly vital field, as people are living longer than ever throughout most of the world.

Older adults are spurring a reimagining of how later life is lived, from work opportunities, home design and community development to technological innovations, scientific breakthroughs and lifestyle changes. The USC Leonard Davis School of Gerontology is poised to continue these successes by advancing individual, community and societal solutions for living longer, healthier and more rewarding lives.

Metchnikoff was correct in stating that the study of aging should not be neglected. Gerontologists are now in high demand by corporations who recognize the market potential of the aging population, by government agencies that recognize programs and policies that must be put in place to ensure the welfare of the very oldest and frail among us, and by forward-thinking organizations around the globe. Gerontologists are changing the world, improving the quality of life for each of us today and for the generations to follow.

**JS**

Pinchas Cohen, MD, is the dean of the University of Southern California Leonard Davis School of Gerontology, holder of the William and Sylvia Kugel Dean's Chair in Gerontology and a professor of medicine and biological sciences. He is an expert in the study of mitochondrial peptides and their possible therapeutic benefits for diabetes, Alzheimer's, and other diseases related to aging.