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John Yfantopoulos

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John Yfantopoulos[1]

Abstract

The purpose of this article is to investigate the factors contributing to significant improvements in longevity from the pre-historic times to the 21st century. Examining historical data, we witness an improvement in life expectancy from 20 years in prehistoric times to around 85 years in 2023. Several socio-economic and medical factors have contributed to this improvement, including living conditions, sanitation, housing, nutrition, education, disease prevention, medical advancements, environment, and economic growth. Analysing historical trends we can distinguish seven periods. In prehistoric times, primitive sanitary and living conditions, limited access to basic resources, high rates of accidents and infectious diseases resulted in short human longevity, ranging between 20 to 30 years. During ancient times, several historical sources from Egypt, Greece and Rome estimate life expectancy also at 20 to 35 years. Warfare, infectious diseases, malnutrition, and high rates of infant mortality are recorded as the main factors for this short life span. In the Middle Ages (500–1500 AD), the great killers like the Plagues (Black Death) had a significant impact on the reduction of population. Life expectancy fluctuated around 30 to 40 years. The Early Modern Period (1500–1800 AD) is marked by the advent of the agricultural revolution, enhancements in diet, and better sanitary conditions. Despite these advancements, life expectancy remained relatively unchanged, hovering between 30 and 40 years. With the Industrial Revolution (18th–19th centuries), life expectancy increased to 40-50 years. Advancements in the Twentieth Century, including medical care, sanitation, living conditions, nutrition, reforms in health systems for improved access to health services, and technological innovations, significantly increased life expectancy. These developments, predominantly in developed regions, led to life expectancy surpassing 70 years. The 21st Century is characterised by ongoing improvements in life expectancy, which has reached 85 years. However, significant health disparities persist between nations, regions, and socioeconomic groups. In 2022, the disparity in life expectancy among nations was as large as 33.5 years, with figures ranging from 52.5 years in Chad, Nigeria, and Central African Republic to 86 years in Monaco, Hong Kong, and Japan.

Key Words: *Life expectancy, health inequalities, living conditions, medical history*

1. Life expectancy from Prehistoric times to the 21st Century

Introduction

One of the extraordinary achievements of humankind is the remarkable increase in life expectancy and well-being. Life expectancy is an important indicator because it provides valuable information to understand human behaviour, cultural aspects, living conditions and governmental policies towards survival and quality of life at different times and across nations and socioeconomic groups.[1,2] Life expectancy[3] has been used widely over the years as the best metric for assessing the health status of a population or socioeconomic group. It is a more comprehensive and representative measure than infant, child, and overall mortality rates. It provides a succinct overview of the overall probability of death within a population, offering a clearer summary than mortality rates alone. Life expectancy[4] indicators are derived from life tables that record survival and mortality rates within a hypothetical cohort. Life expectancy offers a comparative measure of the average age at death within a population. Various scholars estimate that during ancient times, life expectancy was approximately 30 years across all regions of the pre-modern world. For an extended period, there were only modest increases. The most significant surge

[1]D.Phil., Academic Co-Ordinator MBA National & Kapodistrian University of Athens in Health Management
ORCID /0000-0003-0424-6887

occurred during the Age of Enlightenment and the early 19th century.

In 10,000 BCE, during the first agricultural revolution, the world population was around 4 million. Life expectancy at that time was 25 years. During the Roman Empire, there was very little, if any progress. In the 17th century, according to some estimates by Wrigley and Schofield,[5] life expectancy in some selected European countries like England and the Netherlands reached 37 years. In England, by 1820 and during the industrialisation period, life expectancy fluctuated around 41 years, and in the first decade of the twentieth century climbed to 50 years.[5] In 1960, this figure was 71 and in 2022 after 62 years, a health gain of 10 years was recorded, reaching 81 years. Similar demographic trends in longevity have been recorded in France and other western European countries. Exploring World Bank data sources,[6] we found that the health gain in African countries during the period 1960-2022 was almost double, i.e. 18.4 years, in comparison to the health gain in the European Union, i.e. 11.4 years.

The purpose of this paper is to examine the historical evolution of life expectancy from ancient times to the 21st century, highlighting the trends and the unbridged health inequalities in life expectancy among nations.

2.0. Life expectancy throughout the centuries

2.1 Prehistoric Longevity

Very little is known about life expectancy in prehistoric times. In the Palaeolithic and Neolithic eras, life expectancy at birth fluctuated from 22 to 33 years. In 2006, a group of scientists from Central Michigan University[7] the Brown University[8] and the University of California analysed fossilised skeletons from archaeological excavations in Africa and Europe using carbon-dating techniques. They concluded that longevity about 30,000 years ago was around 30 years. Diamandopoulos et al[9] extensively reviewed medical and archaeological literature pertaining to Down syndrome. Their research focused on a Greek Neolithic clay figurine, presumed to be 7,000 years old. They concluded that Down syndrome is an ancient genetic disorder with characteristics similar to its current manifestation in the Western world.

2.2 Ancient Greek and Roman times

2.2.1 Ancient Greece

Some authors argue that life expectancy in Ancient Greek and Roman times was around 20 to 35 years.[10] However, this estimate has faced criticism for being based on data from graveyards and epitaphs of archons, which are considered "notoriously unrepresentative". Critics also point out that these estimates fail to account for the lifespan of slaves and individuals from lower social classes.

In 2008, Endocrinology professor Menelaos Batrinos[11] published a historical note entitled: "The length of life and eugeria in classical Greece". He argued that in the 5th and 4th century, there was a wide life expectancy variation in Greece, ranging from 45 years to more than 100 and a median estimated life expectancy of around 35 years. He opposed the arguments discussed in several classical sources like the Oxford Classical Dictionary,[12] the Papyrus-Larousse Encyclopaedia,[13] the Great Lexicon of the Greek Language by Liddell and Scott[14] and the thesaurus of mythical and historical names,[15] presenting estimates of life expectancy in Classical Greece of around 25 to 28 years. This estimate is also supported by Morris.[16] Several research articles published in the *Journal of the Royal Society of Medicine* highlighted that, on the basis of several records from Athens Agora and Corinth, distinguished philosophers and politicians lived on average 56.2 years with a standard deviation of plus or minus 15.5 years. Prof Batrinos' estimates were based on a cohort of 83 "eminent men of classical Greece" for whom detailed knowledge of the time of birth and death are precisely known. In his analysis, he presents a scatter diagram portraying the age distribution of his sample of 83 men. He distinguishes between two groups of people, presented by black and white dots. Black dots refer to the longevity estimates of 'eminent ancient Greek'. White dots represent a selection of men whose life ended prematurely due to execution, murder, poisoning, disease or suicide and would probably live longer. The cluster of white dots indicates life expectancy of non-eminent Greeks lower than the sample average and the median. Estimated median values were 70 years and the average life expectancy for men was 71.3, with a large standard deviation of 13.4 years. That implies a range in life expectancy from 57.9 to 84.7 years and a health gap of 26.8 years. Batrinos acknowledges the limitation of his study and the unrepresentativeness of his sample. He asserts that the longevity of ancient Greeks is attributed to cultural, environmental, economic and social factors. As we will discuss later, similar views were shared by many historical epidemiologists and Greek Professors of Medicine. The current epidemiological and socioeconomic literature on health determinants support this hypothesis, attributing longevity to diet, physical activity, environmental, economic and educational factors. Batrinos emphasises that: "*good living condi-*

tions and a mild climate at the time of intellectual and artistic excellence, the use of slaves for hard work, an animated social life in which the aged actively participated and, not least of all, the respect that aged people were accorded by the younger, all favoured a longer length of life and eugeria (happy aging) or eulongevity in classical Greece".

This hypothesis is also supported by Hippocrates,[17] who emphasised the importance of lifestyle, physical activity and the economic dimensions of health financing, as discussed in current health economics literature. He favoured the accurate observations of his patients by examining health in relation to patients' living conditions (air, water and places).

2.2.2 Roman Times

Demographic data from Roman times is limited. Several authors[18,19] have utilised computer models to assess survival rates in the Roman Empire, arriving at estimates similar to those for classical Greek times. These models suggest that, if a Roman survived early threats such as infections or battle wounds and reached the age of 20 or 25, they could expect to live an additional 30 years. It is also believed that women likely had a higher life expectancy than men.[20,21]

2.3 Early Middle Ages Europe (5th to 10th century)

Statistics are also scarce. Although average life expectancy was approximately 35 years, individuals who survived the great plagues, accidents, or chronic diseases and reached the age of 40 could expect to live an additional 15 to 20 years, potentially reaching 60 years of age.[22]

2.4 Late Middle Ages

Numerous sources indicate high infant mortality rates during medieval times.[7] Approximately 30 percent of infants died within their first year. Those who survived past their tenth year could expect to live an additional 32 years. Furthermore, individuals who reached the age of 25 had a life expectancy of an additional 23 years. Interestingly, aristocrats who surpassed the age of 25 could anticipate a significantly greater survival advantage, with an additional 43 years, bringing their total expected lifespan to around 67 years.[23]

2.5 From 15th to 18th century

Throughout the 15th to 18th century, infant mortality remained high across Europe. As much as 25% of infants died within their first year of life. Average life expectancy fluctuated between 30 to 40 years. Gradual improvements in sanitation, nutrition and access to clean water and more hygienic environments contributed to substantial increases in life expectancy. Figure 1 presents the estimates of the Scottish researcher T.H. Hollingworth on life expectancy for women at age 15 from Pre-Industrial Times to 1989.

3. Industrial Revolution

The Industrial Revolution spurred economic growth but also led to significant health issues. This period marked a substantial shift from an agricultural

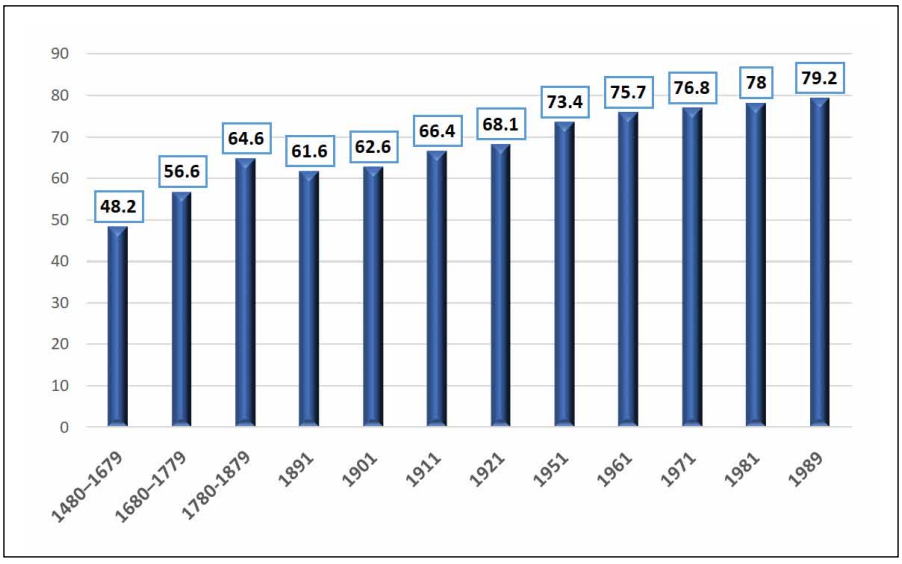

Figure 1. Life expectancy of women at age 15 from 1480 to 1989.

to an industrial economy, necessitating the participation of vast numbers of workers in the production process. Working conditions were often unhealthy, contributing to the spread of infectious and chronic diseases, and a general decline in health. Factors such as illiteracy, poor health, unemployment, and limited access to healthcare and other public services exacerbated social inequalities, affecting life expectancy, employment, and mortality rates. Social studies from the 19th and 20th centuries have documented these inequalities, highlighting their impact not only on individuals but also on society as a whole. A critical area of inquiry is the effect of social and economic transformations during the Industrial Revolution on life expectancy.

Researchers from diverse disciplines, including philosophy, political science, economics, and sociology, have attempted to answer this question. Initially relying on simple empirical observations, they advanced to collecting long-term data series to test various demographic and historical hypotheses. They conducted population-based studies and designed questionnaires aimed at "representative" samples from various regions and socioeconomic classes. They used sampling methods and selected data that reflected different socioeconomic strata among individuals, families, and neighbourhoods. They presented their results in tables and charts and performed statistical analysis to interpret social phenomena and formulate proposals for future social planning and social policy practice.

3.1 First Survey attempts

The first social surveys were more descriptive and less analytical in nature. Furthermore, the statistical documentation and recording of social phenomena was limited. The study entitled "The Working Class of the London Poor", by H. Mayhew,[24] presented in 1861, provided important information about the impact of problematic living conditions, unemployment and social deprivation on health of the working class in London. In his monumental thesis, Henry Mayhew (1812-87) argued: 'I shall consider the whole of the metropolitan poor under three separate phases, according as they will work, they can't work, and they won't work'. Thus, the book proceeds from interviews with working-class professionals (dockers, factory workers) to street performers and river scavengers ('mudlarks') and finally to interviews with beggars, prostitutes, and pickpockets.

During the period 1877-1879, a significant study titled "The European Workers" by F. le Play was published, noted for its comparative approach.[25] Pioneers such as Charles Booth and Seebohm Rowntree were among the foremost to examine the impact of socioeconomic conditions on life expectancy.

3.2 Charles Booth[26]

In 17 volumes of the monumental work "The Life and Work of the Londoners", Charles Booth (1840-1916) describes the impact of impoverished living conditions, deprivation and under-employment on the health of Londoners in greater London during the period 1892-1897. Booth argued that "the object of my inquiry is to confine myself to the description of things as they are". Booth's study was a milestone the field of European demographic research. As he argued in his 1902 publication, his main contribution was to describe a wide range of unhealthy and social conditions which were reported by people living in the margins of poverty. Beyond the strict methodology and detailed presentation of the social and economic situation of Londoners, he captured the social needs of his time and enabled the British Government to enact a series of laws for a fairer social and economic policy.

3.3 Seebohm Rowntree[27]

Rowntree's research, conducted with a meticulously designed statistical approach and robust sampling methodology, was one of the most thoroughly documented of its time. Using a specially designed questionnaire, he carried out face-to-face interviews to comprehensively capture the adverse living conditions of numerous households across various neighbourhoods in York, Northern England. His findings were published in 1901 under the title "Poverty: A Study of Town Life", which had a profound impact on both British and European societies. It graphically documented the vast and varied issues related to housing, health, nutrition, education, and employment, while notably highlighting the "provocative inequalities" among different occupational and socioeconomic classes. In the introduction to his book, Rowntree articulated the overarching goal of his research.

"My object in undertaking the investigation detailed in this volume was, if possible, to throw some light upon the conditions which govern the life of the wage earning classes in provincial towns, and especially upon the problems of poverty" (page v).[27]

In his impressive 437-page multidisciplinary analysis, he describes the social and economic conditions of wage earners, the living standards, the methodology in measuring "primary" and "secondary" poverty and the relationship of poverty with health standards. Using death rates to measure physical wellbeing across

socioeconomic classes, he asserts that "the mortality amongst the very poor is more than twice as high as amongst the best paid sections of the working classes" (page 205).[27] He further presents estimates of death rates per annum per 1,000 population: 27.78 for the poorest, 20.71 for the middle classes, 13.49 for the highest classes and 18.5 on average for the whole York area (page 205).[27] He argues that "In considering these figures, it must be remembered that a high death rate implies a low standard of general health and much sickness and suffering which is not registered".

Rowntree's thesis has been one of the most important and pioneering contributions to the multidimensional investigation of health problems in relation to poverty, destitution, housing, working conditions and overall living standards.

3.4 Other Surveys

Similar surveys were later conducted in Germany, France and other Northern and Central European countries, recording and analysing the social, educational and health needs of the population. The church, local government and the state took some sporadic measures to deal with the recorded health problems. They introduced legislation and public health measures to defend the rights to healthy working environments, education and health. Finally, these rights were incorporated into legislative acts. Gradually, social rights were transformed into special laws for the reform of the health system and education and the redistribution of income and opportunities.

4. Longevity in the 20th Century

During the 20th century, several historical studies, using long-time series, indicate the important contribution of health to economic growth. Fogel (1994)[28] argued that as much as 50% of economic growth gains in the U.K. over the period 1780 to 1980 can be attributed to improvements in health and nutrition. Other researchers, following a similar methodology by collecting data from various industrialised nations over a period of at least one century, concluded that health improvements contributed to economic growth by 30% to 40%. Empirical evidence reveals that economic progress largely contributes to life expectancy improvements. Thomas McKeown (1976)[29] argued that mortality declines during the 19th and 20th centuries could be attributed to the improvements in nutrition and living standards and much less to medical advancements. Thus, there is a twofold interaction between economic growth and health.

Professor Nikolaos Louros[30] had been actively interested in longevity and, in 1971, had already authored a book on Longevity, "Macrozoia" in Greek,[30] (Figure 2) based on Christoph Wilhelm Hufeland's (1762 -1836) work "Makrobiotik oder Die Kunst das menschliche Leben zu verlängern, Stuttgart: A.F. Macklot, 1826". Hufeland proposed, and Louros seemed to agree, that the main factor contributing to longevity is psychological and spiritual development. Utilising this, individuals can enhance their anima vitae. A commentary on this book was published by the Vice President of the Louros Foundation, Prof. Athanasios Diamandopoulos.[31]

4.1 Preston's curve[32,33]

Samuel H. Preston further explored the relationship between life expectancy and economic development in his seminal 1975 article titled "The Changing Relation between Mortality and Level of Economic Development". He investigated the link between life expectancy and real per capita income, utilising statistical data from the 1900s, 1930s, and 1960s. His findings revealed that individuals in wealthier countries tend to have longer life expectancies compared to those in poorer nations (Figure 3). His analysis of health gains in terms of life expectancy demonstrated that increases in income were associated with larger gains in the poorer countries. However, in wealthier countries, further income

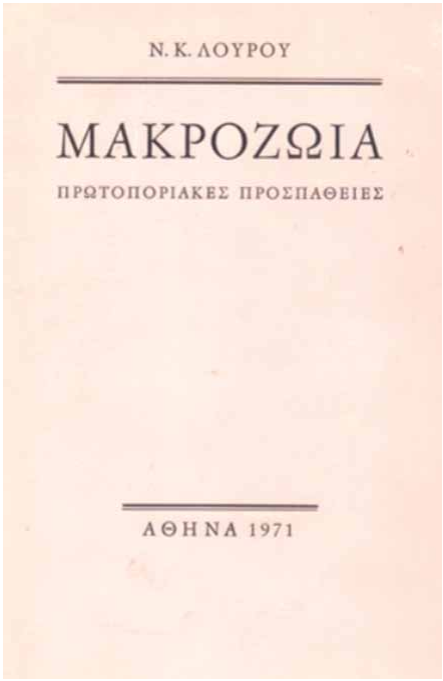

Figure 2. Prof. Nikolaos Louros' book on Macrozoia.
Source: Louros N.K. (1971) Macrozoia, pioneering attempts, Athens, 1971, Rhodi Brothers publ. (in Greek)

increases had no significant impact on life expectancy, illustrating the diminishing returns of income on life expectancy. This relationship is depicted through a concave curve known as the "Preston curve" (Figure 3).

We use more updated data to confirm the concavity (diminishing returns to scale) of Preston Curves. Figure 4 portrays the relationship between life expectancy and Gross Domestic Product (GDP) per capita for the mid 2010s. Our sample includes 185 countries across the globe with various levels of socioeconomic development. Preston's hypothesis is also supported by the findings of our study (Figures 4 and 5).

We further investigated the Preston curve using OECD data for the year 2022. Life expectancy varied in 2022 from 73.2 years in Russia to 84.4 in Japan (Health Gap of 11.2 years). Figure 5 portrays a second order relationship between Life Expectancy and Personal Income per Capita. Two countries are outliers from the general trend. Russia in the left-hand side of figure 5, with the lowest per capita income of 19,546 USD and a life expectancy of 73.2 years, and USA in the right-hand side of figure 5, with the highest income of 51,147 USD, which does not guarantee a high life expectancy i.e. 78.9 years. Life expectancy in the USA is much lower than the OECD and EU-27 averages. Hence economic growth does not necessarily guarantee longevity. Analysing the scatter diagram of figure 5, we distinguish three sets of countries: The first set covers countries with a disposable income of less than 28,000 USD, where economic growth has an important impact on longevity. The second group includes all high-income developed countries, with an income from 28,000 to 45.000 USD, where the Preston curve becomes flat. These countries have reached a high level of economic prosperity with well-developed health care systems and high living conditions. Economic growth has a limited impact on longevity. Finally, the third group includes the USA, where high income levels do not guarantee high life expectancy (Figure 5).

In an attempt to further investigate the Preston Curve hypothesis, the following double logarithmic econometric model is specified:

Log (Life Expectancy) =
a + b Log (National Disposable Income) + u

where:

a, is constant.

b presents income elasticity and indicates the impact of a proportional change of income on life expectancy.

u = the usual stochastic term.

Table 1 presents the results of the above model, utilising data from a comprehensive group of 190 countries. This dataset encompasses high, middle, and less developed countries worldwide, sourced from the World Bank for the year 2022.

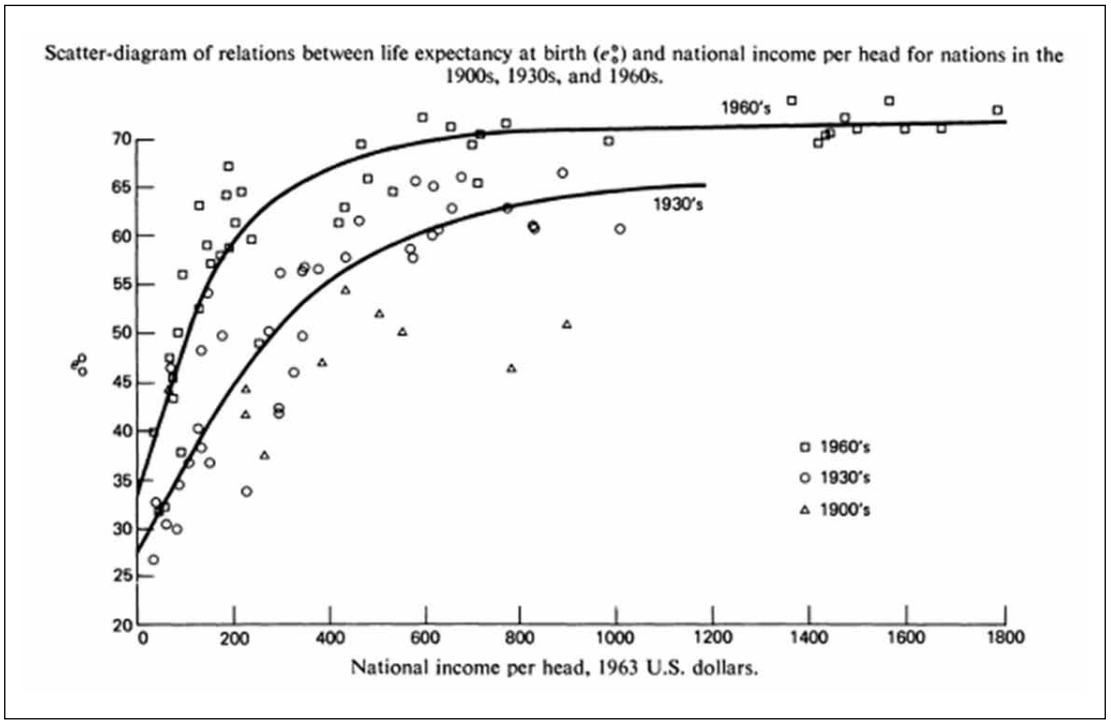

Figure 3. Preston Curve for 1990s 1930s and 1960s.

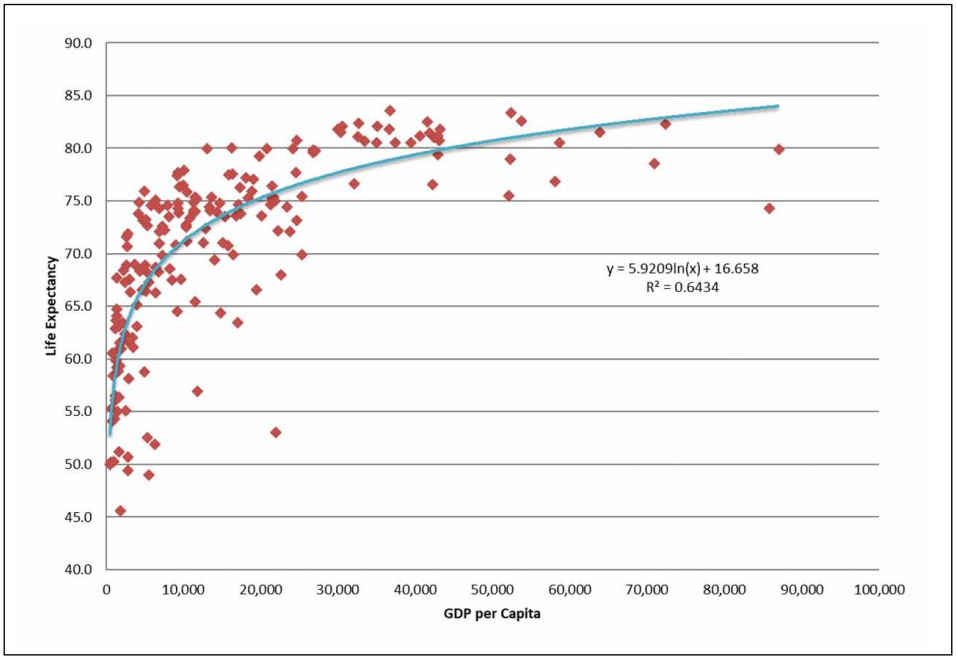

Figure 4. Relation between life expectancy and GDP per capita in 185 countries in the mid-2010s.

The value of the coefficient of determination R^2 shows that the specified model can explain around 70% of the evolution of life expectancy in OECD countries. The estimated parameters a and b are statistically significant at a high statistical level ($p< 0.000$). The results indicate that a 10 percent increase in National Disposable Income would improve life expectancy by 0.08 percent. It should be noted that this estimate

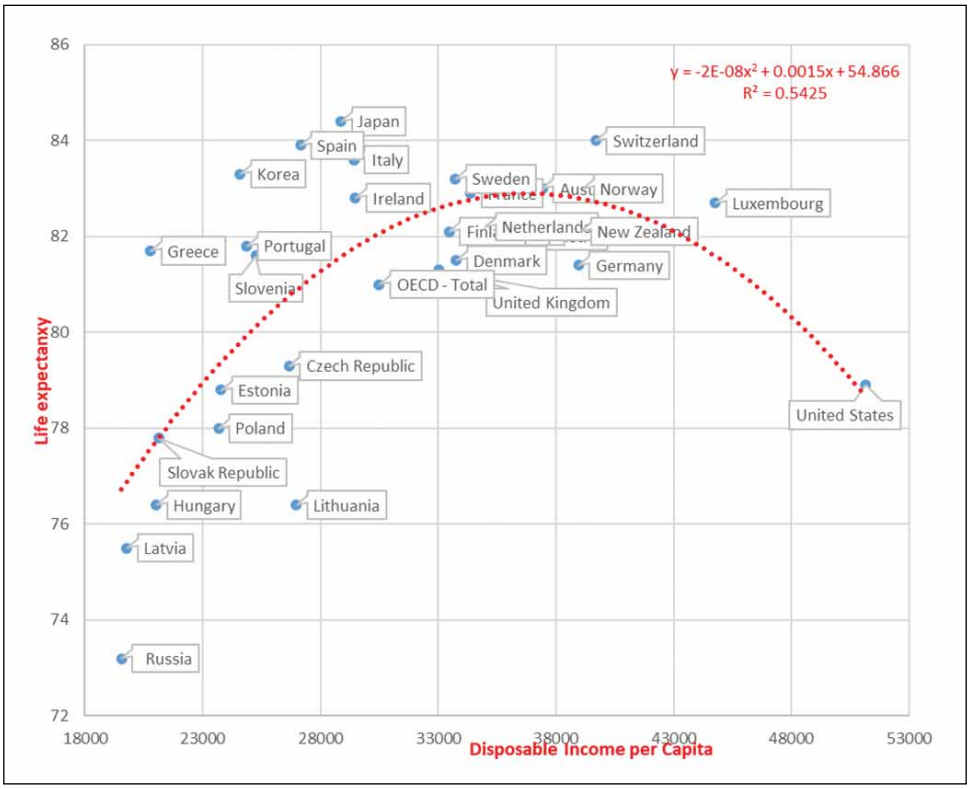

Figure 5. The Preston Curve in 2022.

Table 1. Regression Results for the impact of national disposable income on longevity in 190 Countries.

Dependent Variable: Log of Life Expectancy				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	3.525	0.036	98.41	0.000
Log of Nat. Dis. Income	0.079	0.004	20.680	0.000
R-squared	0.695	Adjusted R-squared		0.693

refers to the overall sample of 190 countries. In less developed countries, income elasticity would assume higher values, indicating a greater impact of economy on longevity.

4.2 Life expectancy Inequalities in the 1900s to the 2020s

Since 1900, the global average life expectancy has more than doubled, reaching approximately 70 years. However, despite this significant increase, vast inequalities persist among nations. In 1980, life expectancy varied greatly across the globe, from a high of 76.68 years in Iceland to a low of 39.25 years in Timor, representing a health gap of 37.43 years (Figure 6). By 2021, the life expectancy in the wealthiest countries had increased further, with Switzerland at 85,5 years. Conversely, the lowest life expectancies were recorded in Chad at 52.5 years and in Central African countries at 54 years. Although the health gap had narrowed slightly, significant disparities persisted, with a gap of 32 years still evident (Figure 7). Further investigations into health inequalities have also examined quality of life,[34-35] revealing substantial disparities in health among nations and socioeconomic groups, similar to those observed in life expectancy.[36]

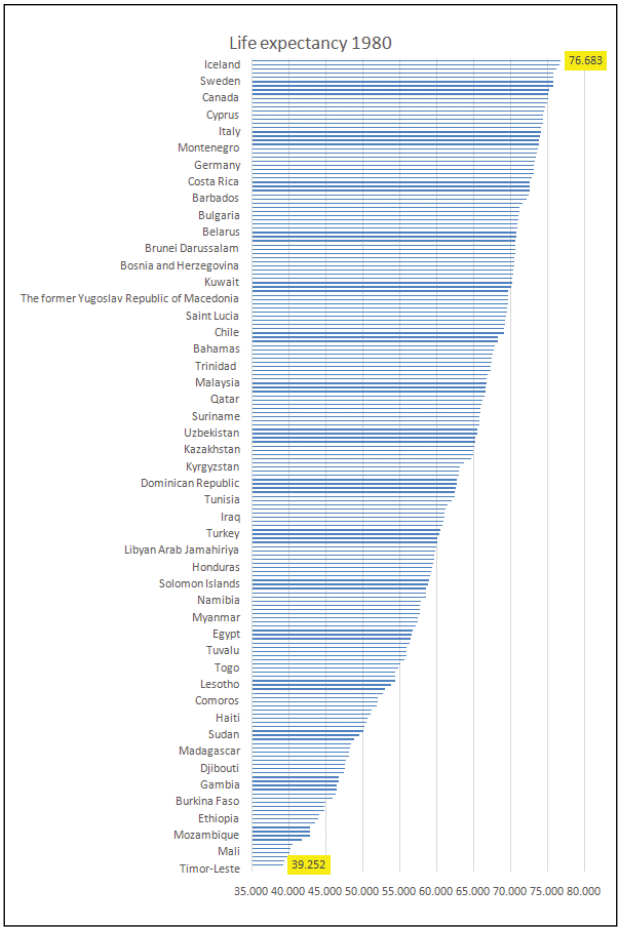

Figure 6. Life expectancy in 1980.

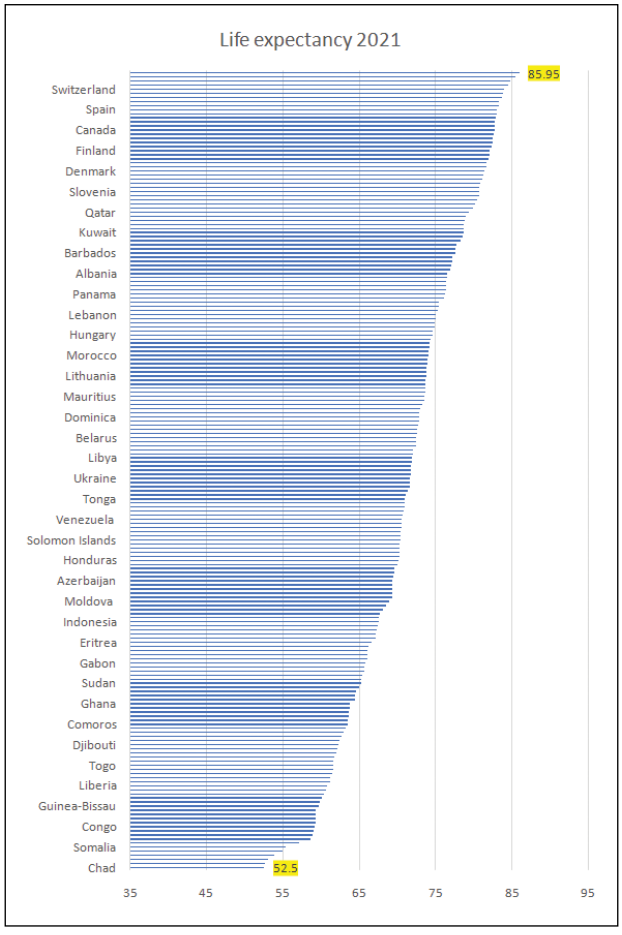

Figure 7. Life expectancy in 2021.

4.3 Gender and Interregional Inequalities in Life expectancy 2021

Figure 8 highlights gender differences in life expectancy across the European Regions based on Eurostat data for 2021. The highest life expectancy for women was recorded in 6 regions of Spain: Comunidad de Madrid (88.2 years), Comunidad Foral de Navarra (87.6 years), Castilla y León (87.5 years), Cantabria (87.1 years), Galicia and País Vasco (both 87.0 years). In France the regions of Rhône-Alpes and in Italy the Provincia Autonoma di Trento, both reported 86.7 years.

The highest life expectancy at birth for men was recorded in Finland (Aland region 82.8 years) followed by two Spanish regions: Comunidad de Madrid (82.2 years) and Comunidad Foral de Navarra (81.9) and two Swedish regions, Stockholm (82.1 years) and Småland med öarna (81.9 years). Despite the public health aspirations of the European Commission to bridge regional disparities in health status across the EU-27, Member States' regional health inequalities remain unbridged (Figure 8).

5. UN Projections

The United Nations publication on the "World Population prospects 2022" presents the current UN global population estimates, as well as the population trends from 1950 to 2022 covering 235 countries across the globe.[37-38] The latest population estimates are based on 1690 national censuses and 2,700 nationally representative sample surveys. Analysing these data sources, the UN estimated that the global population reached 8 billion on 15 November 2022. Recent projections indicate that the population is expected to grow to 8.5 billion by 2030, 9.7 billion by 2050, and 10.4 billion by 2100. Population growth may be attributed to declining trends in mortality, improvements in sanitation, housing and living conditions as well as economic and social growth. All these factors have contributed to a substantial increase in global life expectancy, from 64.2 years in 1990 to 72.8 years in 2022. The COVID-19 pandemic had an important impact on life expectancy, reducing it to 71.0 years in 2021. Despite this reduction, further gains in longevity are expected for the next decades, reaching 77.1 years in 2050. Despite this increase, there are noticeable differences in life expectancy among countries, with a lag of 7.4 years in the least developed countries behind the global average.

6. Conclusions

An analysis of global average life expectancy estimates over the last 30 years indicates two crucial facts: 1) a noticeable increase in longevity and 2) substantial inequalities among countries and regions. In 1990, global life expectancy was 64.2 years and in 2019 it reached 72.6 years, marking a health gain of 8.4 years. According to United Nations population forecasts, global life expectancy is projected to reach 77.1 years by 2050, representing a health gain of 4.5 years from 2019 to 2050.

Despite global improvements in longevity, health inequalities among the richer and the poorer countries persist. Life expectancy in the least developed countries

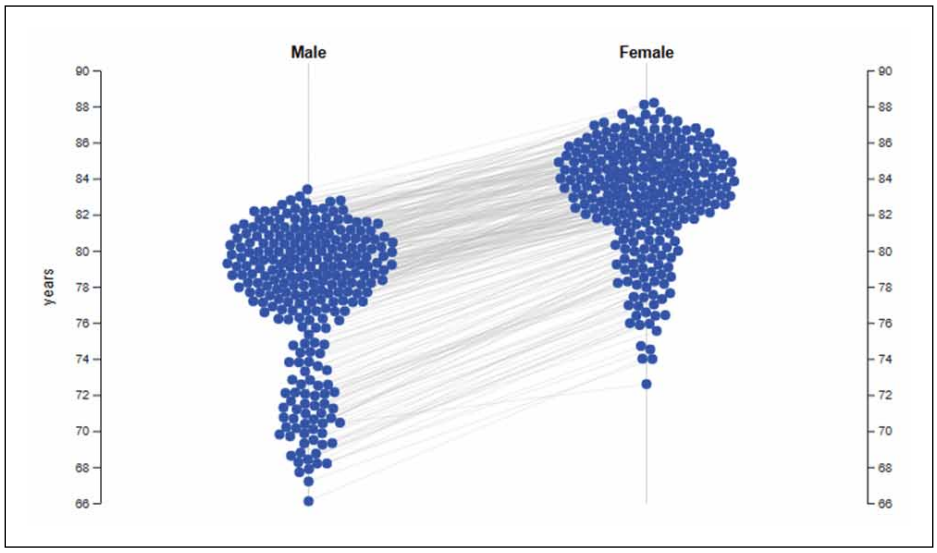

Figure 8. Gender difference in Life expectancy across the EU-27 Regions 2021.
Source Eurostat Regional Statistics 2021.

lags 7 years behind the global average.[39-40] This lag is attributed to high infant, child and maternal mortality, violence, conflict, and the impact of epidemics such as HIV and Covid-19.[41,42]

The UN and the WHO have developed several policies to combat health inequalities and to ensure a better lifestyle for the less privileged and lower socioeconomic classes.

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ΠΕΡΙΛΗΨΗ

Το προσδόκιμο επιβίωσης από την Προϊστορική εποχή μέχρι τον 21ον αιώνα.

Γιάννης Υφαντόπουλος

Ο σκοπός του άρθρου αυτού είναι η διερεύνηση των παραγόντων που συμβάλλουν στην βελτίωση της μακροζωίας για την χρονική περίοδο από τους προϊστορικούς χρόνους έως τον 21ο αιώνα. Εξετάζοντας ιστορικές πηγές και δεδομένα, παρατηρούμε μια σημαντική βελτίωση στο προσδόκιμο ζωής από 20 χρόνια κατά την διάρκεια των προϊστορικών χρόνων στα 85 χρόνια το 2023. Οι κοινωνικοοικονομικοί και υγειονομικοί παράγοντες που έχουν συμβάλει στη βελτίωση αυτή αποδίδονται: στις συνθήκες διαβίωσης, υγιεινή διατροφή, στέγαση, εκπαίδευση, πρόληψη, ιατρική τεχνολογία, περιβάλλον και οικονομική ανάπτυξη. Αναλύοντας τις ιστορικές τάσεις μπορούμε να διακρίνουμε επτά ενδεικτικές περιόδους. Την προϊστορική εποχή, όπου οι πρωτόγονες συνθήκες υγιεινής και διαβίωσης, η περιορισμένη πρόσβαση σε βασικούς υγειονομικούς και οικονομικούς πόρους, τα υψηλά ποσοστά ατυχημάτων και μολυσματικών ασθενειών είχαν ως αποτέλεσμα το προσδόκιμο επιβίωσης να κυμαίνεται μεταξύ 20 και 30 ετών. Κατά την αρχαιότητα, πολλές ιστορικές πηγές από την Αίγυπτο, την Ελλάδα και τη Ρώμη εκτιμούν την μακροζωία να κυμαίνεται από 20 έως 35 χρόνια. Οι πόλεμοι, οι μολυσματικές ασθένειες, ο υποσιτισμός και τα υψηλά ποσοστά βρεφικής θνησιμότητας καταγράφονται ως οι κύριοι παράγοντες για τη σύντομη διάρκεια ζωής. Τον Μεσαίωνα (500–1500 μ.Χ.) οι μεγάλοι δολοφόνοι όπως οι Πανούκλες (Μαύρος Θάνατος) και άλλες μολυσματικές ασθένειες είχαν σημαντικό αντίκτυπο στη μείωση του πληθυσμού. Το προσδόκιμο ζωής κυμάνθηκε γύρω στα 30 με 40 χρόνια. Η Πρώιμη Σύγχρονη Περίοδος (1500–1800 μ.Χ.) χαρακτηρίζεται με την εγκαθίδρυση της αγροτικής επανάστασης, η οποία πάρα τη βελτίωση στη διατροφή και τις συνθήκες υγιεινής δεν επηρέασαν σημαντικά το προσδόκιμο ζωής που παραμένει στα 30 έως 40 χρόνια. Η Βιομηχανική Επανάσταση (18ος–19ος αιώνας) αύξησε το προσδόκιμο ζωής στα 40-50 χρόνια. Η πρόοδος του 20ου αιώνα στην ιατρική περίθαλψη, την υγιεινή, τις συνθήκες διαβίωσης, τη διατροφή, τις μεταρρυθμίσεις στα συστήματα υγείας, η καλύτερη πρόσβαση στις υπηρεσίες υγείας, και η συμβολή της ιατρική τεχνολογίας στην διάγνωση και θεραπεία, διπλασίασαν το προσδόκιμο ζωής ξεπερνώντας τα 70 χρόνια, κυρίως στις ανεπτυγμένες χώρες. Ο 21ος αιώνας χαρακτηρίζεται από συνεχή βελτίωση του προσδόκιμου ζωής που φθάνει τα 85 χρόνια, αλλά ταυτόχρονα καταγράφονται σημαντικές ανισότητες στην υγεία μεταξύ των κρατών, γεωγραφικών περιοχών και των κοινωνικοοικονομικών ομάδων. Το Χάσμα Επιβίωσης μεταξύ των εθνών έφτασε τα 33,5 χρόνια το 2022. Η μικρότερη τιμή στο προσδόκιμο επιβίωσης καταγράφηκε στο Τσαντ, τη Νιγηρία και την Κεντρική Αφρική (52,5 χρόνια) και η υψηλότερη στο Μονακό, το Χονγκ Κονγκ και την Ιαπωνία. (86 χρόνια)

Λέξεις Κλειδιά: *Προσδόκιμο ζωής, ανισότητες υγείας, συνθήκες διαβίωσης, ιστορία της ιατρικής*

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Corresponding author:
John Yfantopoulos, Emeritus Professor of Health Economics, Academic Co-Ordinator MBA National and Kapodistrian University of Athens
6 Themistokleous Street, 106 78 Athens, Greece
e-mail: yfantopoulos@gmail.com, tel: +30 6977219203