Andrzej Zieliński

AGEING INDIVIDUALS AND AGEING POPULATIONS

Department of Epidemiology, National Institute of Public Health -
National Institute of Hygiene in Warsaw

ABSTRACT

Public health problems associated with ageing, due to its complexity, enters the spheres of interests in many fields: demography, economics, and politics. In many countries challenges related to the increasing number of people at retirement age remain strongly dependent on the actual and projected numbers of people at productive age emerging from the demographic condition of the population.

The article addresses the complexity of the relations between life expectancy, healthy life expectancy and the length of life in disability. Underlined are the social and economic conditions of life in the period of the old age, including the problem of inequalities in health and the role of research in the field of public health for the proper recognition of the problem and rational planning of resource allocation and organizational measures aimed at meeting social expectations associated with ageing.

Keywords*: ageing, replacement of generations, inequalities in health*

INTRODUCTION

The 1st Congress on Healthy Ageing held in Warsaw on 30-31st January 2014 was undoubtedly important for determining the rank of the current public health problems in this area. It raised a number of important problems faced by medical personnel, public health workers, families and authorities in relation to the increase in the number of old people. Formerly, these problems also occurred, but their severity is associated with longer average expectancy of life in our society and what the Congress emphasized less, with decrease in the number of births occurring in Poland in recent years.

Challenges for public health and medicine occurring in connection with the ageing of society are deeply involved in the demographic problems and their sociological and economic implications situated well beyond even the most widely understood scope of public health. They are a cluster of issues which cannot be exhaustively discussed in one article. Therefore, at most, I can attempt to provide some structure ordering issues of health implications of the ageing population.

AGEING POPULATION

"If I were reincarnated I would wish to be returned to earth as a killer virus to lower human population levels." (Prince Philip of Great Britain, leader of World Wildlife Fund)

This rather appalling statement is probably a reflection of concern about the demographic explosion threatening the future generations of animals protected by the WWF. This explosion occurred in the 20th century and continues globally. One can find many instances in which global approach to demography loses consideration for the diversity of demographic problems in many countries on different continents.

Besides the countries in which population growth leads directly to the Malthusian trap, there are countries where decline in fertility related to the changes in the life style is an economic problem even today, and can be a prognostication of the economic disaster in the oncoming decades. The list of these countries include Japan and some members of the European Union including Poland. In most of these countries a marked increase in life expectancy can be observed in recent decades, leading to an increase in the number of people at retirement age, who receive pension (or other benefits),

use medical care and nursing services, and to a very limited extent, participate in the creation of national product. Entering the working age, less numerous birth cohorts will not be able to generate income that could provide the means for decent benefits, medical care and nursing services to the members of society in such a need. The existing structure of education at all levels will continue to shrink, and the competition necessary in academic and creative areas of the economy even today is sometimes replaced by a feverish search for candidates for higher education, and soon may be even for scientific work.

The expected consequence of this situation may be the decrease in quality of learning and as a result the decline of innovation in the science and economy. Countries with particularly attractive labor market fill the gap in the demand for workers by the means of immigration. An example may be a drain of multitudes of Polish computer programmers to some Western European countries. Canada which has great possibilities for development, in order to maintain current levels of production, needs about 1% of the workforce coming from the new immigration. However, in none of the countries, including Poland, there is a possibility of such regulating the immigration to meet the needs of economic growth. In many countries, immigration unmatched culturally and economically has raised demons of ethnic tensions.

Approach to the ageing of the society solely as to the effect of extending average expectancy age of the population is narrowing down the issues only to the increase of the number of people requiring medical care and other forms of social protection. It overlooks the role and capabilities of this part of the population that produces the means forming the necessary material basis of this care, as well as a base from which people who perform the relevant services are recruited. Individual ageing is an important, but not the fundamental problem of population ageing. The most essential aspect is the inadequacy of natural replacement of generations.

Figure 1 shows the age pyramid of Polish population in 2002 compared to a forecast for 2030. In about 15 years, baby boomers of today who actually are about 50 years will turn retirement age. And in 2050, if the existing demographic trends will continue, long-lived individuals with the birth of the baby-boom cohorts will be at the very top of the pyramid, and the majority of people at retirement age will be persons of next baby boom cohorts, which in 2002 had 15 - 25 years. Even more dramatic demographic changes shows the age pyramid of Japan (Fig. 2).

The dramatic situation of this country is deepened by its anti-immigration policies, which are reinforced by the social attitudes. But countries like Japan and Germany can alleviate shortages of workforce with automation and robotics in manufacturing processes. Hope that Poland

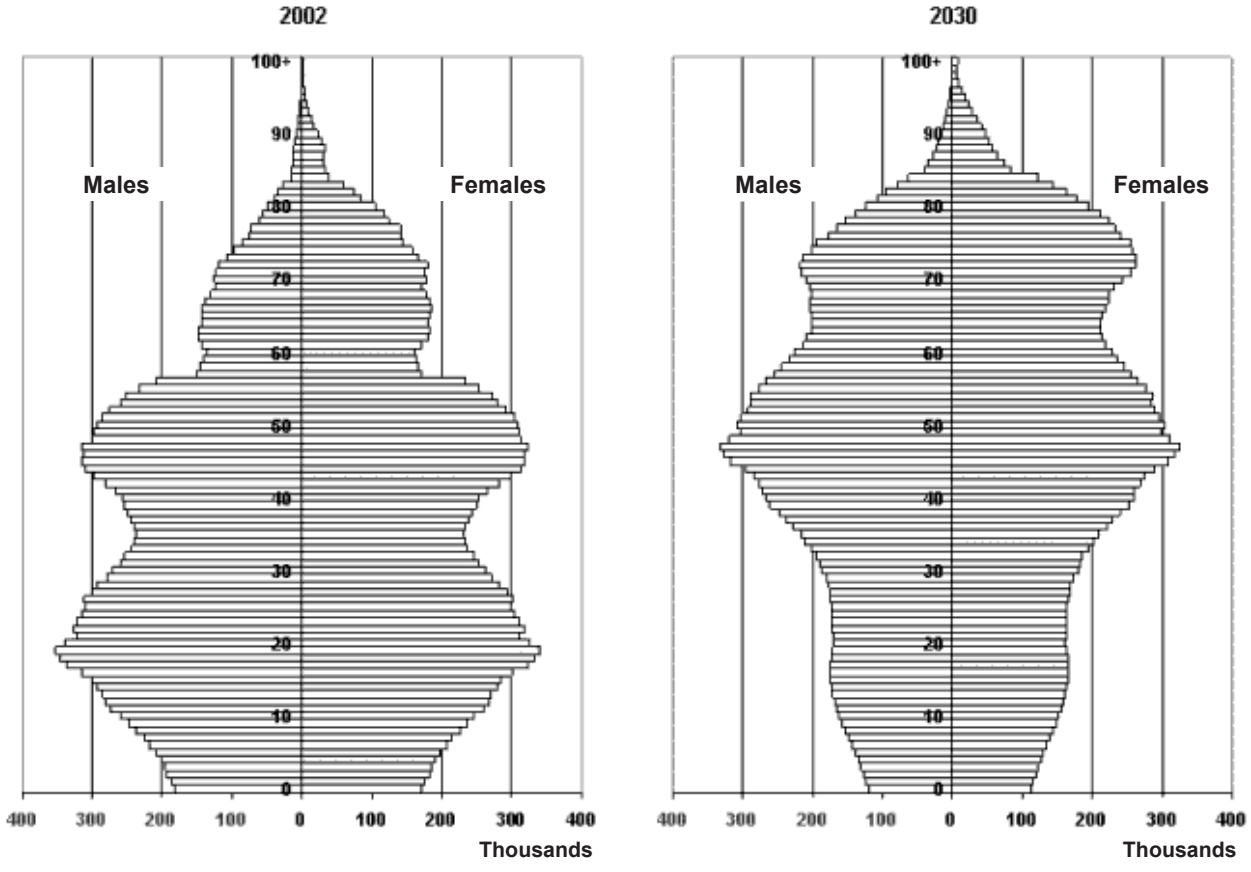

Fig. 1. Age pyramids for Poland: 2002 and projection for 2030. Source: Main Statistical Office, Poland.

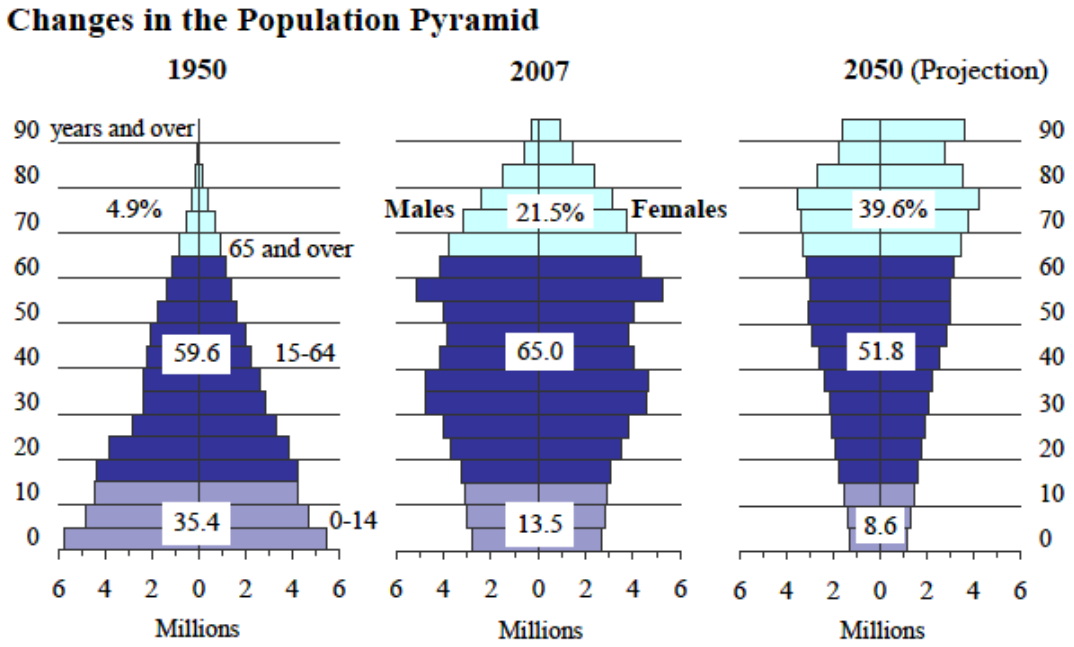

Fig.2. Age pyramids for Japan: 1950, 2007 and projection for 2050. Source: Statistic Bureau, Ministry of Interior Affairs and Communications, Japan

will be able to compete with them in this respect in the oncoming decades is a very optimistic thinking. But even in the most technologically advanced countries huge services sector requires people who can render particular services, and most of them cannot be replaced.

United States, as compared with the EU countries, have an exceptionally favorable demographic trends. High population growth enforced with legal and illegal immigration creates a solid basis of the workforce, and expanded educational system is able to provide high quality staff recruited from domestic and foreign candidates for the economy and science. Figure 3 shows sequential changes in the age pyramid of the U.S. population since 1900 with the forecast for 2050. In the United States as in Poland and other EU countries, there is an increase in the number of people at retirement age but the vertical "walls" of the age pyramid indicates almost complete substitutability of subsequent generations of people at the working age (1).

DOES THE LENGTH OF LIFE CORRELATE WITH THE LENGH OF LIFE IN HEALTH?

Steven A. Schroeder at the prestigious Shattuck Lecture (2) singled out five key domains that affect the

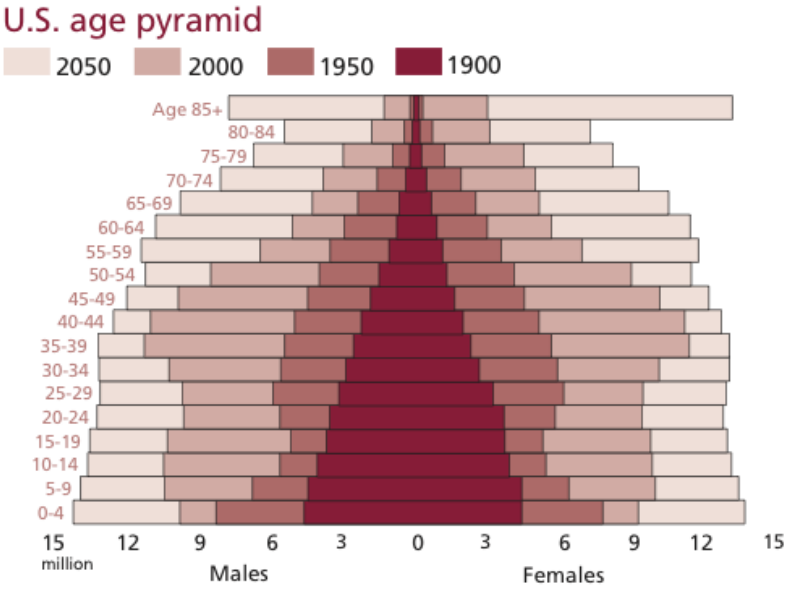

Fig.3. Age pyramids for USA: 1900, 1950, 2000, and projection for 2050. Source: http://chartporn.org/2010/03/08/us-age-pyramid/

life expectancy of individuals, thus defining a field in which to search for opportunities to prolong life time, including the period of active, disease and disability-free life *(compression of morbidity)*. He based his classification on the analysis of the causes of death in the United States done by *Mc Ginis* and *Foege* (3).

According to *Schroeder*, the impact of the effects of behavior: lifestyle, diet, drugs etc. represents 40% of the causes of premature deaths, and the same percentage can decide on our longevity. Genetic predisposition, social circumstances and environmental exposure account for 30%, 15% and 5%, respectively. The role of medical treatment is limited to 10%. *Mc Ginis* and *Foege* and *Schroeder* were aware of the limited generalizability of the research based on the population of the United States in respect to other countries, as well as the simplifications resulting from the mutual interaction of factors within the above-mentioned domains.

For example, the economic situation is a strong modifier of diet and lifestyle as well as educational and social environment. The fact, that none of these modifiers, however, strongly influence health behaviors, do not determine them and besides the exceptionally extreme situations leaves a wide field for their modification, and therefore to health-promotion activities. The above-mentioned authors show that restorative medicine has relatively small share in extending the average life expectancy. Although it is worth noting that since the publication of their report, the life expectancy of people treated due to many diseases, especially cancer and heart diseases increased markedly.

Out of five domains ordering factors affecting the length of life of the people, only one: genetic predisposition remains essentially beyond the individual and social control. Although there was a time, hopefully permanently past, when promoters of eugenics tried to "improve mankind" also on this way. Other domains undergo modifications and already observed effect of these modifications is the increase of the average duration of life. It is also a challenge for public health to develop healthy habits, not only to prolong the life, but also increase the period of active, healthy life. Not in all individual cases, but on the scale of the population, it appears that there is a fairly obvious link between life expectancy and the healthy life expectancy, giving a chance for longer professional activity and other activities in life.

Comparison of successive cohorts of births in the U.S. population suggests that younger generations living longer also have a longer working life (4). **It should be noted that the extension of this two periods does not necessarily shorten the difference between them, which is the period of life in disability requiring dependence on other people**. Large differences exist between the various populations, genders and people of different social status with respect to life expectancy, active life expectancy and life expectancy in disability (5.6). In Poland, we have a painful shortage of such studies.

COSTS OF AGEING DEPENDS ON HEALTH

Ageing does not begin at the time of retirement. It occurs sometimes as early as in the fifth decade of life. Deterioration of health is reflected in the growth of expenditures on medical care. In the USA, the average annual cost of medical care between 40 and 65 years of age increases four times, and during the next 20 years, remains relatively stable. The costs of ill health of employees go far beyond direct spending on health services. With the deterioration of health condition, there is a decrease in labor productivity, only partially dependent on absence through sickness. There is also a serious problem of discrimination of people over 50 years of age on labor market (7).

At the age over 80 years, costs of accommodation and care in nursing institutions are rising quickly. For people older than 90 years of age, the costs equate to the cost of hospital care (8,9,10). Big and growing financial burden of nursing care for very old people raises legitimate concerns and the search for cheaper solutions, one of which is organized care at the home of the elderly (11). Return to the large-scale social welfare shared with families of these people, although it would be desirable, it is not feasible on a large scale due to the loosening of family ties, focusing on egoistic aims and weakening of caring attitudes in younger generations.

Senile dementia is a special group of diseases, which are a big burden on families and society, most commonly caused by Alzheimer's disease. It is a disease

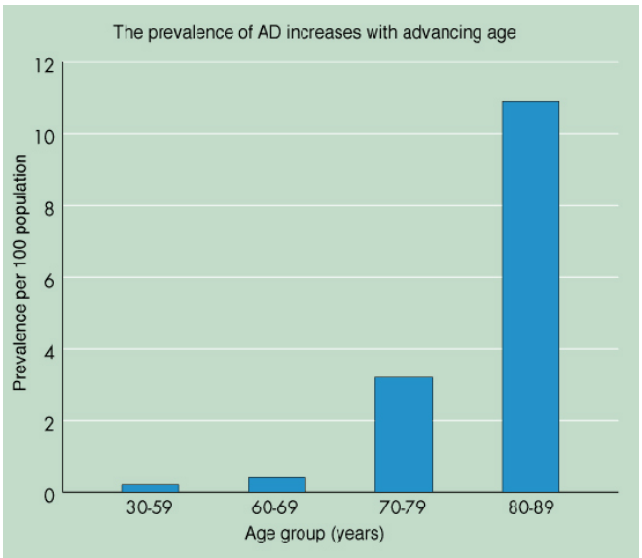

Fig.4. Changes in prevalence of Alzheimer diasease with age. Source: ABPI Resources for Schools website

that consumes enormous resources of sick people, their families and their insurers. Among many risk factors of this disease, a definite relations with age should be placed as first (Fig. 4). A constant increase in the incidence of the disease observed in all age groups almost all over the world is also a serious problem ongoing since many years.

INEQUALITY IN HEALTH

The problem of inequality in health affects people at all ages, but in the old age it is particularly serious. It involves not only the differences in access to medical care, but also those referring to the prevalence of diseases. Many diseases, including Alzheimer's disease are more common in people representing less privileged social groups. Indicators of economic inequality in Polish society, such as the *Gini index*, are not high, but it is worth remembering that they are in a country with relatively low *GNP per capita* and it is higher than in countries with much bigger income: Sweden, the Netherlands, Germany, France and the Czech Republic (OECD data for 2014). Having considered inequalities in health, it is important to consider the level of wealth of the society on which these inequalities overlap. In poor societies, with the same ratio of income as in affluent societies, much larger part of the population may live in the sphere of poverty which does not allow the freedom of diet choice and deprive people of possibilities for extra spending on health care.

For inequalities in health, one does not need to look for socially marginalized groups. The basic inequality is the difference in average life expectancy of blue and white collar workers, as well as the distribution of the incidence of various diseases in both social groups. According to the Austrian Institute for Economic Research - WIFO, in 2008, in Austria, much wealthier then Poland, the proportion of white-collar workers reaching age 70 was 84.4%, while for those working manually 75.7%. Planning for social and health services, without careful examination of the actual health situation of different groups of the society, deprives social policy makers of necessary tools for assessing the rationality of their decisions.

Equally important is the problem of "short blanket". General scarcity of resources causes the reorganization of activities not to go significantly beyond the sham movements. Among the 34 OECD countries in 2014, Poland was ranked as 5th and 4th in terms of mortality due to heart disease and cancer, respectively (12). On the other hand, our expenditures per capita on health care and the number of physicians per 1,000 inhabitants put us on the 31st and 30th place, respectively. Young people, in most cases, are waiting for the problems to face, but the elderly are already affected and sometimes very painfully.

The ageing of the population in the present era is of one of the greatest challenges for our country. If all possibilities for support are not mobilized to achieve replacement of generations, the effort to provide medical care and decent living conditions for people at retirement age will be ineffective due to the lack of funds. To do this, we need a strong consensual population policy which is not understood as a conflict of ideologies and personal interests, but as a concern for the common welfare, for the dissemination of knowledge about the actual demographic situation, with pro-social attitude of people and careful, daily activities with the prospect for decades, not only for the oncoming years.

Measures to improve the health situation of people at retirement age should be addressed not only to those who have already reached that age. Old age is the period of harvest in a good and bad sense of this word. The health of people at elder age consists of their medical history, cigarettes smoked in youth and adulthood, diet and obesity in different age periods, working with harmful factors, environmental factors outside the workplace, but also interpersonal relations at work and home, and with social groups of friends and acquaintances, and how their lifestyle looked like.

The term "healthy ageing" can only apply to those who survived to old age in good health. The program of healthy ageing should be focused on the increase of the fraction of such people. But this goal will not be achieved if we will not think about healthy ageing and act on its behalf in time of healthy youth. But we should remember that sick old age has the same right for assistance, care and respect. I dare not to dream about it, but sometimes I would like to see that old people have a right to seat in the commuter train, while young educated from the big cities sprawled on the seats are going to their schools.

THERE IS NO HEALTH WITHOUT RESEARCH IN THE FIELD OF PUBLIC HEALTH

It is a title of a recent, important book, edited by *D. Cianciara*. It points to another key issue, which, in consideration for the health issues of an ageing society cannot be overlooked. In public health, as in any other fields **in order to act effectively one needs to know exactly**. Deficiency of the results of well-planned research leads to inefficient and ineffective actions, which lead to the loss of funds without obtaining the expected results. Often, even the definition of what has to be an expected effect requires knowledge based on earlier discernment of possibilities, that is, obtained in previous studies.

Unfortunately, this consciousness does not easily reach the people who decide on the health policy of our state. We are not only dealing with limited funds for research. Among the priorities of medical science are primarily laboratory studies, especially molecular, which in itself is not a bad thing, except that the well-established methods of molecular indicators make sense only if they are properly anchored in the population as exposure or effect and tested in relation with other variables in properly conducted epidemiological studies. It should also be emphasized that the accuracy of administrative decisions relating to public health must be based on applied research in the field of public health, providing knowledge about the prevalence of hazards in a population which is of interest, detecting the risk factors of the hazards and in the case of preventive measures assessing their effectiveness (13).

REFERENCES

1. Lisa Wade, The graying of America. HTTP://THESOCIETYPAGES.ORG/SOCIMAGES/2010/03/08/THE-GRAYING-OF-AMERICA/
2. Steven A. Schroeder. We Can Do Better — Improving the Health of the American People. N Engl J Med 2007; 357:1221-1228 (SHATTUCK LECTURE)
3. Mc Ginnis M, Foege WH. Actual Causes of Death in the United States. JAMA 1993; 270 (10):227-12.
4. Kenneth G. Manton, XiLiang Gu, and Gene R. Lowrimore. Cohort Changes in Active Life Expectancy in the U.S. Elderly Population: Experience From the 1982–2004 National Long-Term Care Survey Journal of Gerontology 2008; 63B, (5): S269–S281.
5. Jitapunkul S, Krungkraipetch N, Kamolratanakul P, Dhanamun B. Dependence and active life expectancy of the elderly population living in the central region of Thailand 2001;84(3):349-56.
6. Kaneda T, Zimmer Z, Tang Z. Differentials in Life Expectancy and Active Life Expectancy Among Older Adults in Beijing. Population Council. Policy Reaserch Division. http://www.popcouncil.org/uploads/pdfs/wp/189.pdf
7. Tishman FM, Van Looy S, Bruyère SM. Employer Strategies for Responding to an Aging Workforce. Report of NTAR Leadership Center (2012).
8. Alemayehu B, Warner KE. The Lifetime Distribution of Health Care Costs. Health Serv Res 2004; 39(3): 627–42.
9. Spillman B C, Lubitz J. "The Effect of Longevity on Spending for Acute and Long-term Care." New England J Med 2000;342(19):1409–15
10. Scitovsky A A. "Medical Care in the Last Twelve Months of Life: The Relation between Age, Functional Status, and Medical Care Expenditures." Milbank Quarterly. 1988;66(4):640–60.
11. Marek KD, Stetzer F, Adams SJ, Popejoy LL, Rantz M. Aging in place versus nursing home care: comparison of costs to Medicare and Medicaid. Res Gerontol Nurs 2012 Apr; 5(2):123-9.
12. Wojtyniak B, Goryński P, Moskalewicz B, red. Sytuacja zdrowotna ludności Polski i jej uwarunkowania. Warszawa: NIZP-PZH, 2012.
13. Cianciara D. Nie ma zdrowia bez badań w dziedzinie zdrowia publicznego. Warszawa: NIZP-PZH, 2014.

Received: 30.04.2014
Accepted for publication: 17.07.2014

Address for correspondence:
Andrzej Zieliński
Department of Epidemiology
National Institute of Public Health –NIH
Chocimska 24, 00-791 Warsaw,Poland
e-mail: azieliński@pzh.gov.pl