

WDA Forum



University of St.Gallen

The WDA – HSG Discussion Paper Series *on Demographic Issues*

The Future of Dementia

by Hans Groth and Felix Gutzwiller

No. 2011/6



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This discussion paper series is kindly supported by the Ecoscientia Foundation

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The Future of Dementia:

Dimensions of midterm challenges for developed nations followed by a closer look at Switzerland

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Introduction

The demographically based upcoming "dementia epidemic" will, sooner or later, have an unprecedented impact on the future social and economic development of every country on this planet. This development is already today becoming a challenge for the developed nations, but it will also affect the emerging and developing countries at some point in the foreseeable future. In the first part of this paper, this issue will be considered from a global perspective with a special focus on the developed world. Following, the specific details in Switzerland – a country with one of the highest life expectancies in the world - will be described and discussed. In a third section, the current and potential future strategies for dealing with this challenge will be reviewed.

In the concluding summary, the ethical and humanitarian implications of longevity – an achievement that will certainly shape the public and social policy discussions in the coming decades - will be raised. Finally, there is no doubt that any future solutions must incorporate innovations of earlier disease detection and diagnosis followed by more effective treatment schemes and care plans.

The global perspective: a scenario of population growth by 2050

The world population has seen uninterrupted growth for 300 years. While the total population has increased by over 160% in the last 50 years alone, growth will slow down during the next 50 years to an approximately 50% - 60% rate. Based on this assumption, the world's population will nevertheless grow from 6.1 billion people in the year 2000, to about 9.2 billion by 2050, with the majority of growth located within the less-developed and poor countries¹. These numbers become even more impressive when one considers specific demographics. The number of people over 65 years of age will jump from 600 million to 2 billion, an increase of 330%. The number of people over 80-years-old will leap from 105 million to 400 million, an increase of almost 400%. These expected increases in elderly populations are largely disproportionate compared to other younger population cohorts, and therefore drive the ageing of the global population as a whole. However, this phenomenon is evolving very differently from a regional and time frame perspective, as seen by the variability in size of elderly cohorts in Africa, Asia, Europe, North America, South America, and Japan, illustrated in figures 1 and 2, below.

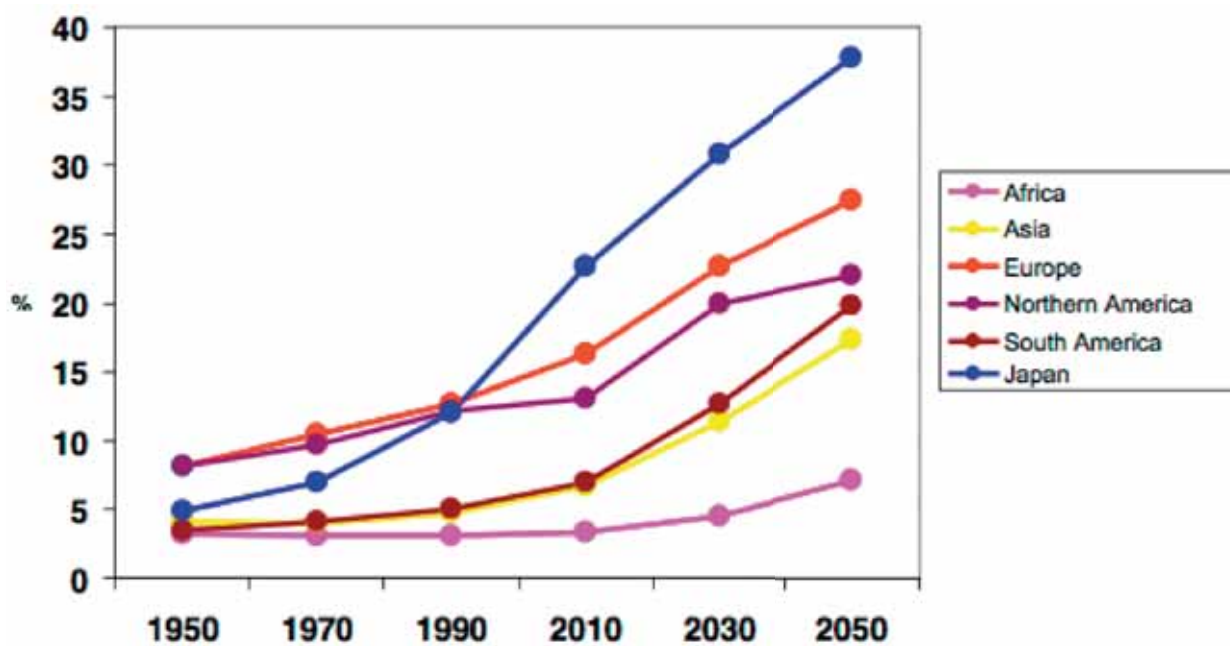


Figure 1: Growth rate for the 65+ age cohort as percent of the whole population
Source: UN populations division (2009), medium variant

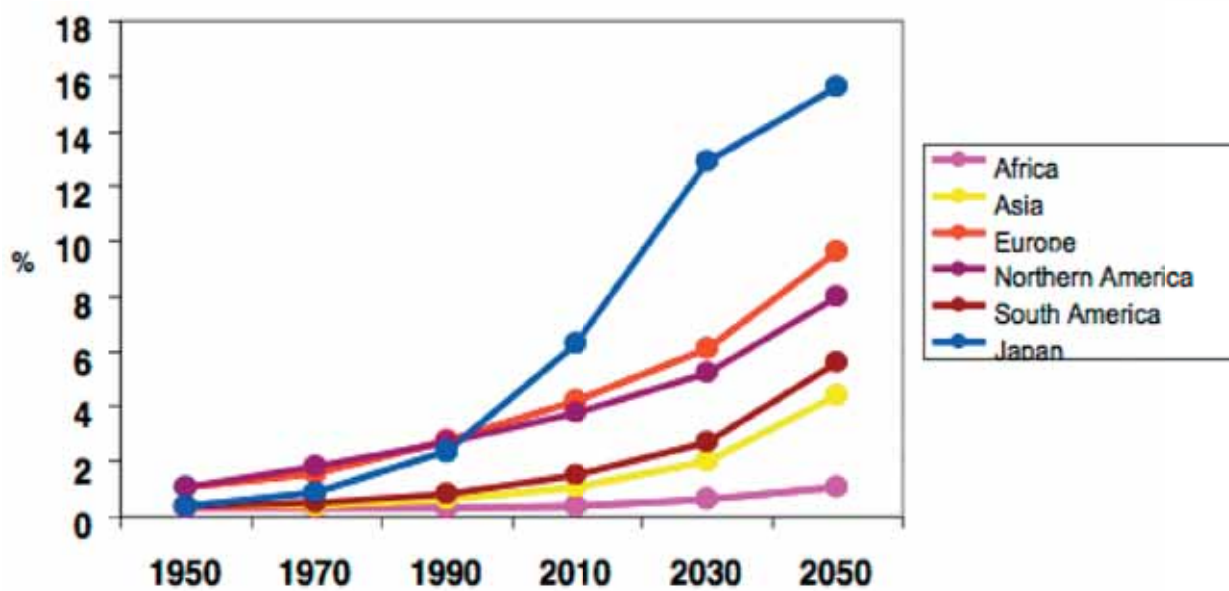


Figure 2: Growth rate for the 85+ age cohort as percent of the whole population
Source: UN populations division (2009), medium variant

It is very obvious that such far reaching transitions of societies will result in growing cohorts of senior citizens everywhere. The phenomenon of ageing will automatically result in increasing pressures on social structures, particularly in the fields of pension entitlements, healthcare, and nursing care. However, due to the increasingly observed phenomenon of "compression of morbidity" the full extent and scope of this claim cannot ultimately be given today.

Since the end of the 18th century, improvements in living conditions (general hygiene measures, clean water supply, higher-quality nutrition, accident prevention at work and at home, etc.) and the establishment of healthcare systems with access for nearly everybody, have continually contributed to increases in life expectancy all over the globe. Currently, industrialized nations with highly developed healthcare systems are experiencing further increases in life expectancy. This is mainly a result from further improvements in modern medical care, for example, for non-communicable chronic diseases (NCDs) and many types of cancer. Similarly, the effects of stricter laws for protection against both passive and active smoking should not be underestimated. Experts therefore believe that longevity in the next 20-30 years will continue to increase. Take, for example Japan, the country currently experiencing the most advanced ageing. In the period 2005-2010, according to the UN Population Division's database, the life expectancy at birth for women was 86.2 years and for men, 79.0 years. The forecasts for 2050 are 91.0 years for women and 86.2 years for men¹. On the contrary, it is important to consider the effects of lifestyle diseases such as obesity, as they will, undeniably, have an opposite influence on life expectancy.

These incredible achievements also represent unprecedented new challenges for ageing societies, especially resulting from the following three mutually dependent demographic phenomena:

- declining birth rates
- a decrease in working age populations i.e. the economically productive cohorts
- a shrinking of a nation's total population - but with some delay

In Germany, for example, the birth rate of 2.5 children per woman in 1965 (a birth rate of 2.1 per woman is generally regarded in developed countries as a maintenance number for a population) dropped to 1.4 births by the end of the 1970s, and has not risen since. Similar developments are seen, although in varying degrees, in virtually all developed countries². The most impressive declines in birth rates can be found in Hong Kong, South Korea, Singapore, and Japan, where birth rates are currently 1.02 (Hong Kong), 1.22 (South Korea), and 1.27 (Japan and Singapore)¹. As indicated above, the working age populations recently started to shrink in these nations, while their elderly populations continue to experience double digit growth. With regard to social security systems, these changing equilibriums will create at least medium, if not severe, constraints and imbalances. Those people, who contribute their productivity and thus produce socioeconomic capital for their society, are diminishing, while those with above average consumption demands, especially related to healthcare and nursing services, are growing.

These emerging imbalances are further intensified due to the fact that most chronic diseases increase in incidence with age. Included in this context is dementia - the most important and resources-intensive disease in old age. This disease affects a person's lifestyle quality in an unprecedented way, i.e. it progressively reduces the mental and physical mobility of each individual concerned.

Ageing in developed nations

As the trend of rising life expectancy continues unabated, most babies born today in Europe, the USA, Japan, and many other Western countries, will see their 100th birthday (currently one in eight boys and one in four girls reaches the age of 100). In contrast to the world population as a whole, the populations of many developed countries have started to stagnate or even shrink, as birthrates have fallen significantly below the replacement rate of 2.1 for quite some time. For Europe, there are estimates that by 2050 the population will decline by 5-10% despite some amount of immigration, and in Japan the forecasted population decline is as high as 30%.

Within the developed world, the U.S. appears to have taken on a special demographic role. For decades, continuing high birth rates in the vicinity of the replacement level have held steady. Inbound-migration has, and will continue to have a significant influence in the future as well. Therefore, in the U.S., the number of working age people will, at least until 2030, remain constant¹.

If looking at the scale of diversity among demographic trends in developed nations, the U.S. is clearly considered the exception to the trend of shrinking working-age populations in developed societies. Germany falls in the middle of the scale with continuing low birth rates without evidence of any turnaround so far. With the most extreme demographic circumstances, Japan is the country with the world's highest life expectancies today (when considering both men and women), and for 2050, Japan is also the only country projected to see an average life expectancy of over 9 decades¹.

In table 1 below, a comparison of the life expectancies for the European countries, China, India, Japan and the USA are presented. The highest life expectancies in Europe are found in France, Italy, Spain, Sweden and Switzerland. Eastern European countries have up to a 10 year shorter life expectancies. The resulting situation will likely be that by 2030, the proportion of the population over 80 years in France, Spain, Britain and Germany will be 6-8%. In Japan, the percentage of the population over 80 years will equal 12% of the total population in 2030, compared to only 4% in 2010.

This progressive ageing could not be better illustrated than by the number of centenarians. For example, in Germany the number of people age 105 in 2006 was estimated to be 334, while in 1989 there were only 54³.

	2000		2050	
	Men	Women	Men	Women
Albania	72.6	79.0	78.7	84.3
Belgium	75.1	81.2	82.1	88.0
Bulgaria	68.7	75.6	76.5	82.5
Denmark	75.0	79.6	80.7	85.2
Germany	75.8	81.4	81.8	87.0
Estonia	65.6	76.9	76.0	83.6
Finnland	74.8	81.6	81.5	87.5
France	75.8	83.1	83.1	88.9
Greece	75.9	80.4	81.8	86.6
Great Britain	76.1	80.7	81.9	86.4
Ireland	75.3	80.3	82.1	86.9
Iceland	79.3	82.7	84.5	87.7
Italy	77.2	83.1	82.5	88.4
Croatia	71.4	78.4	78.8	84.5
Latvia	65.3	76.2	75.3	82.7
Lithuania	66.3	77.5	74.5	82.9
Luxemburg	75.1	81.3	82.4	86.8
The Netherlands	76.3	81.0	82.4	86.1
Norway	76.8	81.8	83.2	87.3
Austria	75.8	81.6	82.8	87.2
Poland	70.4	78.8	77.4	84.3
Portugal	74.1	80.8	80.2	86.2
Romania	67.8	75.1	76.2	82.2
Russia	58.5	71.8	70.5	79.0
Sweden	77.8	82.3	83.5	87.0
Switzerland	78.0	83.3	84.4	88.5
Serbia	70.9	75.6	77.2	81.7
Slovakia	69.8	77.8	77.1	83.5
Slovenia	72.6	80.3	80.0	86.7
Spain	76.4	83.1	83.1	88.0
Czech Republic	72.1	78.7	79.1	84.9
Ukraine	62.1	73.4	71.3	78.8
Hungary	68.3	76.6	76.3	82.8
Japan	78.3	85.7	83.5	91.0
China	70.5	73.7	77.4	81.3
India	60.9	63.3	71.4	75.4
USA	75.8	80.6	80.8	85.8
Europe	69.6	78.0	78.5	84.5

Table 1: Life expectancy at birth in 2000 and 2050. For comparison purposes, Japan, China, India, the USA and Europe as an aggregate are presented in bold at the bottom of the list.

Source: UN population division, medium variant

Because of these developments, it can be foreseen that the dependency ratios, i.e. the number of retired people in proportion to the working population, will increase by 50% or more between 2030 and 2050 in many European countries and Japan¹. These demographic developments will have an unknown extent of influence on economic productivity, prosperity, social security systems, taxation systems and consumer behavior. The fact that we cannot draw upon any historical experience, makes the management of these challenges all the more demanding.

Changing morbidity patterns in ageing societies - dementia as an illness with exponentially growing importance

The fact that many diseases are more common in old age is nothing new. Despite the obvious, this finding seems to have not found a comprehensive role in the discussion of progressively ageing societies. Based on the forecasted demographic changes and resulting shifts in the prevalence of age-related diseases, the 'Institute for Health Systems Research, Kiel' has estimated the following impressive morbidity rate increases for Germany by 2050⁴:

Acute Pneumonia	+198%
Macular Degeneration	+169%
Dementia	+144%
Hip Fracture	+125 %
Heart Attack	+109%
Stroke	+ 94%
Colon Cancer	+ 67%
Lung Cancer	+ 66%
COPD	+ 47%
Diabetes mellitus	+ 45%

Overall, these numbers look more than impressive. Nevertheless, it must be pointed out, that any progress through prevention and medical innovation is not considered in these estimates. Even though it is only the third fastest growing disease, from an epidemiologic perspective, dementia has the most significant public health impact. The reason is simple and compelling: dementia is associated with significant, long-lasting restrictions on the quality of life, and of the diseases listed above, dementia has thus far made some of the weakest advancements in treatment options. There are also far reaching implications for families and social security systems, particularly when considering the financing of care and nursing.

To understand the resource impact of dementia, consider the following examples of prevalence figures. In Germany, dementia affects 5% of 65-69 year olds; by the age of 90, dementia prevalence jumps to 50%. In absolute terms, this frequency amounted to 1 million sufferers in 2007, and will double to 2 million by 2030⁴. Impressive figures are also published for the U.S. and Japan. In the U.S., the absolute prevalence of Alzheimer's will jump from approximately 5 million patients in 2010, to 8.5 million by 2030, i.e. an increase from 1.6% to 2.3% of the total population. In Japan, the numbers rise from the current 2 million to 4 million by 2040, a rise from 1.6% to 3.6% of Japan's entire population^{5, 6}.

Socioeconomic consequences

As mentioned above, the impact of dementia on socioeconomic parameters is extraordinary and unprecedented. No other disease causes such a massive and progressive loss on quality of life, personal independence, mobility, and mental performance.

Although cost estimates are only one aspect of the great ethical and humanitarian implications, they are a good starting point to develop a full picture. For example, take the direct and indirect costs of dementia in the U.S. In 2005 approximately 5 million dementia patients accumulated nearly \$150 billion in direct and indirect costs. All too often forgotten cost aspects - amounting to approximately additional \$94 billion - include reduced or eliminated income of family members who provide care at home. Overall, spending requirements for dementia are nearly \$250 billion, a figure roughly equal to 2/3 of the current national budget of the Federal Republic of Germany in 2009⁷.

Level of care control group	# of studies	Severity of dementia		
		light	middle	heavy
at home	11	7'100-24'600	13'400-31'700	19'800-68'000
mixed care: home & care facility	15	4'000-35'300	14'200-34'900	21'200-56'100
full time care facility	2	23'900-42'300	32'200-45'700	37'800-49'000

Table 2: Nursing care costs per patient per year for varying degrees of dementia and different levels of nursing (in 2006 US dollars)

Source: Quentin, W., et al. (2009)

Any cost estimates per patient (as shown in table 2) are of course highly dependent on the severity of dementia and the type of care required⁸. Based on 2006 U.S. figures, the annual costs varied from a minimum of \$7,100 for mild dementia and home care, to \$49,000 in cases of severe dementia and home care. Latest disease stages with full nursing home care easily run up to annual costs of \$79,000 per year.

It already becomes clear at this point, that dementia will shape future social developments, particularly also in ethical terms. The ongoing epidemic spread in ageing societies will inevitably lead to shortages in nursing capacities. Issues related to allegations of neglect or lack of care will become unavoidable and painful agenda topics in future public discussions. Unfortunately, to date, a serious consideration of these topics is missing. This passive approach to handling these challenges is best illustrated when reviewing the United Nations' Millennium Development Goals⁹. Neither demographic change, ageing, nor the upcoming dementia epidemic are mentioned, or even implied, within any sentence.

This brief overview shows that any nation with currently growing cohorts of elderly citizens will already in the midterm future face challenges, especially with respect to equal access to nursing, healthcare and how to finance it. Without a fundamental rethinking and reforms in areas such as retirement ages, pension plans, organization of the 3rd period of life etc., "longevity" might in the future be critically scrutinized as a desirable goal of the 21st century. Worse yet, for advanced ageing societies, reaching such an "old age" could no longer be seen as a goal worth attaining. The scenario of a "regulated lifetime" is one no one wants to think about, but one we may be forced to lead a public discussion on.

Demographic forecasts for Switzerland till 2060

The following figures for Switzerland's demographic evolution till 2060 - unless stated otherwise - are taken from the medium scenario prospects of the 2010 demographic update of the Swiss Federal Statistical Office (BfS)¹⁰.

Switzerland has always been a densely populated country: its population was 5.4 million in 1960 and grew on average about one percent to the current population size of about 7.8 million. Of these, approximately 6 million are Swiss natives, and 2 million non-Swiss citizens. According to the BfS forecast (medium scenario) population growth will level off at 9 million – or one additional million - by 2060 (figure 3). The forecasted slowdown in population growth is mainly explained by the fact that the average number of deaths exceeds the number of births. For example, in 1964 the birth rate was 2.7 children per woman. In 2003 it had dropped to a historic low of 1.4 and is currently at about 1.5 children per woman. Life expectancy at birth in 1960 was for women 74.1 years, and for men, 68.7 years. In 2008 the corresponding figure was 84.4 years for females and 79.7 years for men - so for both sexes a full decade longer.

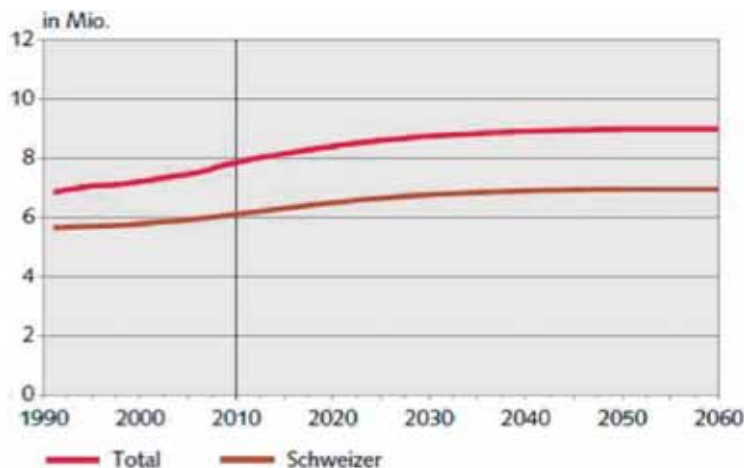


Figure 3: Population scenario for Switzerland 1990-2060

Source: Swiss Federal Statistics Office (BfS)

This ongoing increase in life expectancy at birth is mainly due to the reduced mortality of elderly citizens and no longer due reductions in maternal and child mortality. In 1960 the remaining life expectancy for women at the 65 years was 15.1 years. By 2008 it rose to 22.0 years. For men of the same age, the corresponding figures were 12.9 years in 1960 and 18.7 years in 2008.

These life expectancy figures must also be taken in the context of never before seen changes to the age cohorts of Switzerland's population. The proportion of people over 65 years in 1960 was 10.3% and in 2008 rose already up to 16.6%. Conversely, the proportion of people under 20 years of age sank from 31.8% to 21.2%. The proportion of people of working age (20-64 years) in the total population in 2008 was 62.2%, and 57.9% in 1960.

The relative and absolute age structure of the Swiss population in the period from 2010 to 2060 is expected to see further significant change. The proportion of persons aged 65 years and above will increase from 17.1% to 28.3%. In absolute numbers this is an increase from 1.343 million to 2.543 million; this amounts to a percentage increase of +89%, almost a doubling. The proportion of people of working age (20-64 years) in the total population is expected to decrease from 62.1% to 53.3%. Although the number of people under 20 years increases between 2010 and 2060 from 1.635 million to 1.652 million, their share of the total population is declining, however, from 20.8% to 18.4%.

Given these anticipated changes, without appropriate and comprehensive mitigation strategies, Switzerland's economic performance and prosperity will most definitely be affected in a constraining way.

There are different explanations discussed for these demographic developments. Several studies show that high education levels¹¹ and professions without physical stress¹² are associated with higher life expectancy and lower desired fertility. In Switzerland, the proportion of persons in the tertiary sector with a high level of

education, is continuously increasing. Their share of the total population continues to rise, further supported by an ongoing in-migration of mostly very well-qualified persons and by a marked increase in the proportion of people achieving a university degree or higher vocational education.

In addition, progress in medical care, particularly new treatment options for chronic diseases, ultimately make a high life expectancy a reality. Preventative measures (vaccinations, preventive examinations and treatments, improved health literacy, less risky life-styles, etc.) also reduce the risk of a premature death. Furthermore, a growing proportion of the population is voluntarily pursuing a healthier lifestyle (more healthy diet, restriction of alcohol consumption, renunciation of the use of harmful substances such as tobacco and narcotics, etc.). This, of course, does not go without a positive impact on life expectancy.

The shape of the age pyramid of Switzerland is noticeably changing (figure 4): its peak, as a sign of longevity is becoming wider and longer, while the base remains thin due to low fertility rates. The age dependency ratio, i.e. the ratio between persons aged 65 years and older compared to the 20 to 65 year old cohort, will increase from 27.5% in 2010 to 53.1% in 2060. The latter value is twice as high as the corresponding figure in 2008. The consequence is that in the year 2060, two workers will have the “burden” of paying social security etc. for one older person, while in 2008 this “burden” was shared among four working persons.

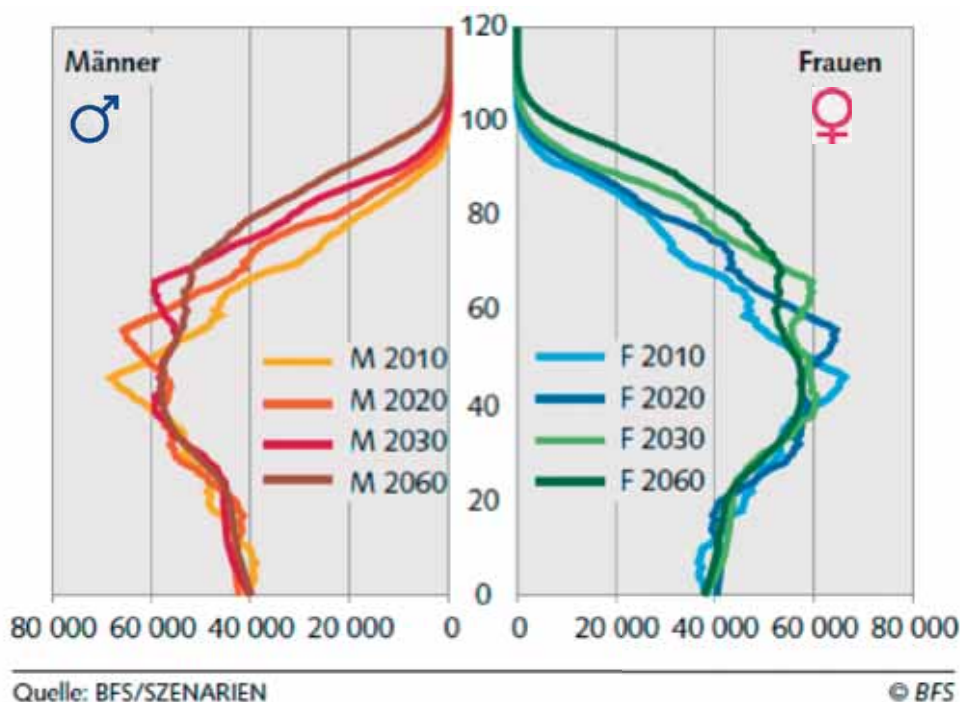


Figure 4: Switzerland's age pyramid for 2010, 2020, 2030 and 2060
Source: Swiss Federal Statistics Office (BfS)

It must be expressly emphasized at this point, that the above figures are based on the so-called medium BfS scenario. Another scenario, with higher population growth, forecasts a total population by 2060 at almost 11 million inhabitants, while the low growth scenario, in contrast, predicts a shrinkage to 7 million inhabitants. Additional sub-scenarios relate to different assumptions as to ageing and inevitably come to different conclusions.

As these figures vary dramatically in many ways, and also include sociopolitical explosives, two important remarks must be added. They relate to (a) the methodology of demographic scenarios and (b) the ultimate driving forces of the potential population evolution in Switzerland.

- a) On the methodology of demography: demography is a statistical method that works with defined assumptions about time defined horizons in the future. The longer the period, the lower the reliability. It is also important to know that these assumptions are regularly updated over the forecast period. To take relevance from these constraining factors, demographers usually work with several scenarios and update them at regular intervals on potential changes in migration patterns, fertility rates, and latest life expectancies. Demography is nonetheless an accepted method to make the development of a designated population not only transparent, but also to enable a public discourse.
- b) Regarding the Switzerland-specific factors of population development: the deciding factors for the future population development in Switzerland are migration and the development of the birth rate. Undoubtedly, Switzerland will in the future, be able to utilize migration as an instrument of its demographic management but to what extent remains uncertain. In addition to sensitivities among the country's native citizens, the sustainability of the unlimited availability of foreign skilled workers should come into question. The numbers of potentially eligible people in neighboring countries already show today that especially in-migration of high-skilled young workers from the EU – might no longer be unlimited. Migration is in this respect far too difficult to fully assess, as it does not offer any solutions to the ageing problem, but only postpones the consequences. Regarding the birth rate, the following question arises: Will this low level of fertility which has existed for more than 30 years in Switzerland, stay the same forever? Or is there hope for change due to changing values and aspirations of today's young generation?

The dementia prevalence in Switzerland

Considering the described expected changes within the Swiss population, it is very likely that there will be far-reaching changes to the usage of social infrastructure, particularly health care. As shown above, in ageing societies, dementia is the disease which will have the greatest impact on these systems. The relevant epidemiological data will now be discussed in more depth.

The three most common causes of death are cardiovascular diseases (37%), cancer (26%) and, for the first time since 2007, dementia¹³. The prevalence of dementia is 3% in the group of 65 to 69 year olds and rises to 36% in the group of the 85 to 93 year olds¹⁴. This is a prevalence increase of twelve times!

The absolute number of dementia patients has since 1997 almost doubled¹³, driven by the achievement of ageing or longevity. It should be noted, however, that the more frequent diagnoses are also a result of better and well-validated diagnostic methods. For similar reasons, the death rate due to dementia is steadily rising (figure 5).

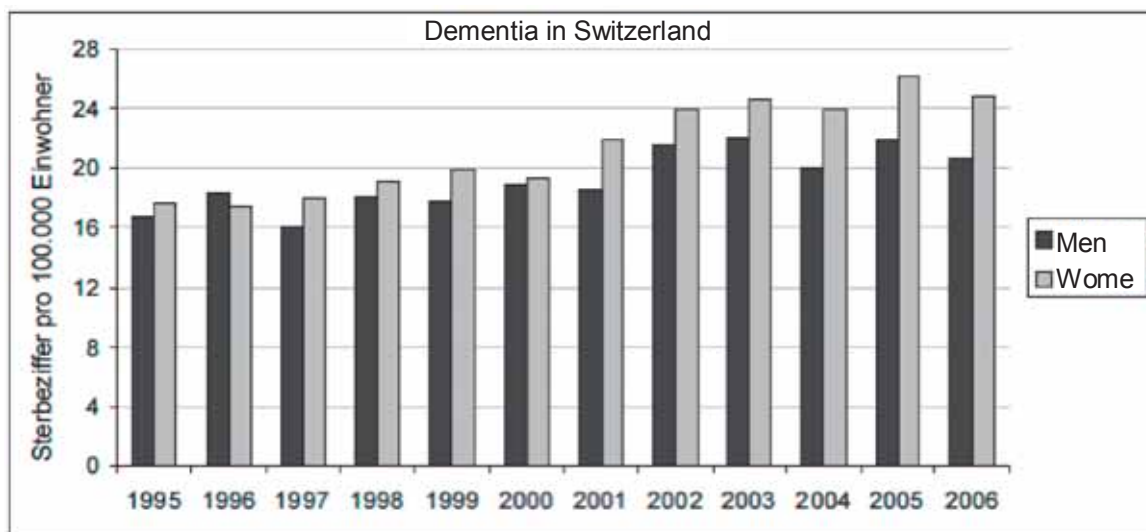


Figure 5: Mortality from dementia in Switzerland 1995-2006

Source: Swiss Federal Statistics Office (BFS)

In the EU-27 today, there exist about 5.3 to 5.8 million dementia patients, corresponding to 1.14% to 1.27% of its population. According to the European Commission, the absolute number of 60 year olds and older who suffer from dementia will increase from to about ten million by 2040. The greatest prevalence of dementia are found in Italy and Sweden, where about 1.5% of the population suffer from this disease. Germany and France share similar prevalence figures to that of Switzerland, also in the range of 1.2% to 1.3% of the population¹⁵.

In 2007 there were 67,000 dementia patients over the age of 80 in Switzerland (less than 1% of the total population). That number will triple by 2050 to almost 161,000 patients. The collective number of people with dementia will then represent 2.3% of the population. This is a consequence of the growth of this population cohort from 344,000 in 2008 to 874,000 in 2050 (under the conservative assumption of a constant population size of 7 million inhabitants¹⁵).

Socioeconomic consequences for Switzerland

According to estimates by the Swiss Health Observatory, long-term care costs, as a result of the increasing number of over 80 year olds and their morbidity rate, could more than double by 2030¹⁶.

The specific costs of care in Switzerland, dating back to the diagnosis of dementia, will increase from CHF 1.6 billion in 2008, even up to CHF 7 billion in 2050. If different scenarios of the severity of dementia and the nursing care intensity are considered, a much more differentiated picture arises¹⁵. Then the total costs of dementia treatment in Switzerland range from 1.02 to 4.64 billion CHF in 2008, and will grow to the range of 2.58 to 11.76 billion CHF in 2050¹⁷. These figures are based on single case costs of 16,000-73,000 CHF per patient per year and different levels of disease severity.

In 2004, Switzerland allocated 15% of all neurological disease expenditures to the field of dementia, falling in the median range of spending compared to other European countries. However, the average absolute treatment costs of €19,000 per case were the highest in Europe¹⁸.

In a recent study by Ecoplan¹⁹, total costs for the year 2007 for dementia care were determined to be 6.3 billion CHF, including direct and indirect costs, but intangible costs (loss of quality of life) not considered. From this figure, 3.5 billion CHF, or 56% of costs, came at the expense of the mandatory healthcare system, representing 6.3% of the total health expenditure of 55 billion CHF. These mandatory covered costs are broken down as follows: 2.9% in hospital, 47.1% in nursing homes and 4.8% to home care; home medical care, diagnostics, and costs for medicines each accounted for only 0.4%; memory clinics / interdisciplinary diagnosis only 0.1%; 44% of the calculated total cost, or 2.8 billion CHF, has been allocated as indirect or unpaid costs. This support or service is currently provided by family members, friends of those affected or volunteers. In the absence of further willingness or availability, these indirect costs will in the future be borne by the health system.

From the perspective of an individual dementia case, costs for nursing home care are annually 69,000 CHF. The cost for care at home are 55,000 CHF and includes at least 47,000 CHF resulting from indirect costs, i.e. through voluntary and unpaid work.

When considering the severity of the disease, costs for care can vary greatly. For care at home, the fee is 26,000 CHF in mild cases of the disease and rises to 68,000 CHF for moderate cases. Severe dementia cases may cost up to 120,000 CHF per year. Out of these figures, the direct costs only range from about 3,000 CHF for mild cases to 13,000 CHF for moderate and severe cases. The largest share is thus, in all degrees of severity, clearly a result of indirect and non-reimbursed costs.

The sensitivity analysis of the study shows a considerable range of total annual costs from 5.44 to 7.27 billion CHF. This broad range is explained by different assumptions for prevalence, length of stay in hospitals, prevalence of dementia in nursing homes,

intensity of care required through home care, doctor expenses, and the assumptions of about the amount of care provided in the indirect segment which by far continues to be the biggest resource "black box".

From these figures, and considering the foreseeable demographic developments, it can be easily deduced that this aging-related chronic disease will become a major financial and resource burden to those affected and their families. Next to these cost burdens is also the challenge to ensure that the required nursing staff continues to be available. In the year 2006 around 330,000 people were working in both public and private healthcare institutions, or about 8% of Switzerland's total employment. In a study carried out by the Careum foundation²⁰, 200,000 people were employed in the largest facilities of care (hospitals, nursing homes, home care); 60% of these workers were in hospitals, 30% in nursing homes and 10% employed in home care. Of these employees, by 2020 about 20% will have reached their retirement age, and by 2030 this figure jumps to 47%. In nursing homes the staff is even older than the study average, and therefore in this area retirement figures are closer to 30% and 60% for the years 2020 and 2030, respectively. Based on this study, it is estimated that by 2030, 120,000-190,000 new nurses need to be recruited and trained to compensate for age-related withdrawals from the system (2/3) and the increased demand resulting from the increase of dementia cases (1/3).

How to tackle the dementia epidemic?

The socioeconomic consequences of demographic ageing and the associated increase in age-related diseases, particularly dementia, have been elaborated in the previous chapters. Apart from new approaches in resource allocation, new strategies are needed which focus on the morbidity course, which should, naturally, be targeted at preemptive and preventative measures. Unfortunately, the currently available treatment schemes focus on the symptoms of dementia, but do not treat the root cause. All currently available therapy principles have the following features in common:

- a limited efficacy to delay mental dementia deficits
- the postponement of the symptoms or the progression of the disease is currently possible by no more than one year
- a real remedy to stop the "dementia epidemic" has not yet been discovered

Understandably, high expectations are raised in this very active research area (for an overview see source 21). Without discrediting the enormous ongoing research efforts, it must, however, be pointed out that none of the new approaches in development have thus far come close to broad clinical applicability. From today's perspective, it is not yet possible to affect the primary neurodegenerative process, i.e. the neuron destruction. But this should not obscure the fact that a prevention of the dementia processes is very possible. This disease is not principally different from other diseases which are

preventable and also typically affect the elderly, such as arterial hypertension, diabetes mellitus, arthritis and many cancers²².

Within the complex pathophysiology of dementia exists a vascular element which is increasingly regarded as important, or in other words, not irrelevant to the disease progression. This component causes a secondary neurodegeneration. Most apparently, this is the case in patients suffering from multiple cerebral infarctions, which is quite commonly associated with dementia²³. Today the overlap of neurodegenerative primary and secondary elements of vascular dementia is no longer contested²⁴. Alzheimer's disease has been demonstrated as the primary cause of 60-80% of all cases of dementia, but in 20-70% of cases, a vascular etiology is also a contributing factor. An overlap of both etiologies is therefore possibly present in up to 50% of cases²⁵. Consequently, the importance of vascular risk factors, in particular the effects of successful interventions on the course of dementia were investigated. A recent meta-analysis published in 2010 concludes:

“strict blood pressure control including during sleep periods may have a neuroprotective effect on the brain and thereby prevent the incidence of dementia”²⁶

The great opportunities presented by this increasingly corroborating evidence is the fact that vascular prevention can be made immediately available. Additional promise exists in this preventive treatment approach, because it is - despite contrary convincing data - available in the everyday medical care, but it is unfortunately heavily "under used". This is exemplified by the DETECT study of 55,000 patients treated in GP offices in Germany, where it was found that only 20% of patients over 60 years of age with the diagnosis of hypertension, were treated according to the hypertension guidelines²⁷.

A treatment gap also exists for other prevention approaches, for example, in the field of dyslipidemia, diabetes mellitus type II, obesity, or smoking. For whatever reasons it seems particularly difficult to implement lifestyle changes, even though these regimens clearly contribute very effectively to improve cardiovascular end points, as shown by the INTERHEART study²⁸.

Summary

In the coming two decades the foreseeable demographic evolution with continued ageing, low birth rates, and a declining population of working age cohorts will result in challenges for the socioeconomic structures in nearly all developed countries. In the case of Switzerland the magnitude of this challenge is best summarized by the 2010 BfS scenario: the number of working persons who have to subsidize or even finance social security and mandatory healthcare plans for older citizens will be cut from 4 in 2008 down to 2 in 2060.

These looming demographic ageing and care problems are further aggravated by the additional increase of non-communicable chronic diseases (NCDs) are by nature more prevalent in elderly cohorts. Among them, dementia creates the most prominent humanitarian and economic challenges. Worse yet, all currently available therapies are limited in their impact, and fail to provide a lasting remedy today. Hope lies in new treatment methods, but there are currently no prospects of new treatments close to broad clinical applicability.

Therefore, as a first step, all existing possibilities of prevention should be exhausted. Great untapped opportunities lie in vascular prevention, which is increasingly recognized as a partial or interrelated cause of dementia. The significant under usage of such preventive approaches in today's medical treatment realities must immediately be overcome.

If these opportunities, including the intensive research efforts to discover novel mechanisms of action, are not maximized, the developed nations will already in the next two decades face socioeconomic challenges of unprecedented magnitude. Because of its already high life expectancy, Switzerland will in no way be excluded from this development.

A possible social reaction to this development could be that the ideal of longevity may come to be increasingly questioned. The ethical implications would be dramatic and may shake the very foundations of our humanitarian principles.

Developing a successful strategy to meet the challenges of ageing and the relating dementia epidemic must therefore be one of the most important human goals of this millennium. Any such solutions can only be achieved by innovations at numerous levels.

Addendum: This manuscript has been prepared before March 11, 2011 when an unprecedented earthquake followed by a tsunami flooding and a nuclear power plant catastrophe hit Japan and most likely influenced its future development. Since Japan has been used as a "demographic reference" in this paper, it cannot be excluded that some of the fertility and ageing forecasts for Japan might take a different course than described in this paper.

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