**Various studies on policy implications of demographic changes in national and Community policies**

**LOT 5**

# IMPLICATIONS OF DEMOGRAPHIC AGEING IN THE ENLARGED EU

# IN THE DOMAINS OF

# QUALITY OF LIFE, HEALTH PROMOTION AND HEALTH CARE

**Final report**

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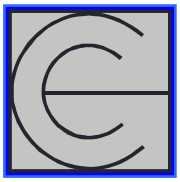

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# GENERAL INTRODUCTION

One of the major successes of the second half of the 20th century was increased longevity, reflecting the improved conditions of health and welfare standards within the European Union. However, extended longevity, coupled with an important decline in fertility, has resulted in a rapid trend towards population ageing, which, over the coming decades, will bring about profound changes for all generations and for most areas of economic and social activity, including social protection, labour market, regional development, migration policies, health care, design and technology, education and culture.

The European Parliament has adopted a proposal to launch in 2004 a "preparatory action1 to encourage account to be taken of demographic change in European and national policies" (budget item 25.04.01/ 04040203). On basis of the budget line "the Commission will submit once a year a public report on demographic trends and their impact on European and national economic policies and other European and national policies. In addition to an appraisal and forecast of developments in society, the report will also contain recommendations for policy adjustments to prevent social change from having a negative impact".

In implementing this preparatory action, the Commission plans to present a Report at the end of 2005 setting out a holistic picture of how the prevailing demographic trends are affecting our societies, and promote a pro-active approach on how to adapt a broad range of policies to current and future population changes.

The present study is intended to contribute at the existing knowledge on demographic changes in the domain of Quality of life, Health promotion and Health care. It aims to identify existing gaps and to assess the main policy options to address the new demographic challenges.

The aim of this study is to analyse the impact and cost-effectiveness of health promotion and other preventive policies to improve the health status and quality of life of the elderly and to avoid the negative socio-economic impact of ageing.

Within this context, the present study aims at analyzing current practices of promoting health among the elderly in order to provide a sound evidence-base for policy-making aimed at improving and maintaining good health of the older population.

WHO defines Health promotion as the process of enabling people to increase control over, and to improve, their health. It adds that in order to reach a state of complete physical mental and social well-being, an individual or group must be able to identify and to carry out aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy lifestyles to well-being[1].

The World Health Organization adopted the term “active ageing” in the late 1990s. It is meant to convey a more inclusive message than “healthy ageing” and to recognize the factors and sectors in addition to health care that affect how individuals and populations age. The term is often used to express the idea of continuing involvement in socially productive activities and meaningful work[2].

The active ageing approach is based on the recognition of the human rights of older people and the United Nations Principles of independence, participation, dignity, care and self-fulfilment. It shifts strategic planning away from a “needs-based” approach (which assumes that older people are passive

[1] Ottawa Charter for Health Promotion (1986).
[2] WHO/NMH/HPS/01.1.

targets) to a "rights- based" approach that recognizes the rights of people to equal opportunity and treatment in all aspects of life as they grow older[3].

Prevention activities include activities to prevent and manage non-communicable disease and injury (primary prevention) and to screen for the early detection of chronic diseases (secondary prevention). More specifically[4]:

- "Primary" prevention includes for example avoidance of tobacco use,
- "Secondary" prevention includes notably screening for the early detection of chronic diseases,
- "Tertiary" prevention includes for example appropriate clinical management of diseases.

The starting point of the study is a review of available statistics and of the international literature in the area of health status of the elderly population, healthcare and health related services and the quality of life of the elderly.

The estimation of the most probable evolutions of different economic, health care and long-term care scenarios provide some light on the expected impact of ageing on future quality of life and health status of the elderly population.

The study concludes with the current views on possibilities for health promotion among elderly and their estimated impact, if implemented effectively. Finally, it provides a selection of current Member States' good practices in promoting health for the elderly.

[3] WHO (2002).
[4] Idem.

# PART A: GENERAL STATISTICAL OVERVIEW

# INTRODUCTION

This part presents a summary of available statistics. It aims at describing the general trends for the EU and its Member States. It may help the reader to visualise and identify the main issues concerning elderly population, health and activity limitations.

The first chapter presents data summarising the main trends concerning the share of elderly people in the EU member states and its economic implications.

The following chapters present data on morbidity and mortality. They focus notably, on the following aspects:

- Life expectancy and healthy life expectancy,
- Morbidity,
- Mortality, and
- Disability and Activity limitations.

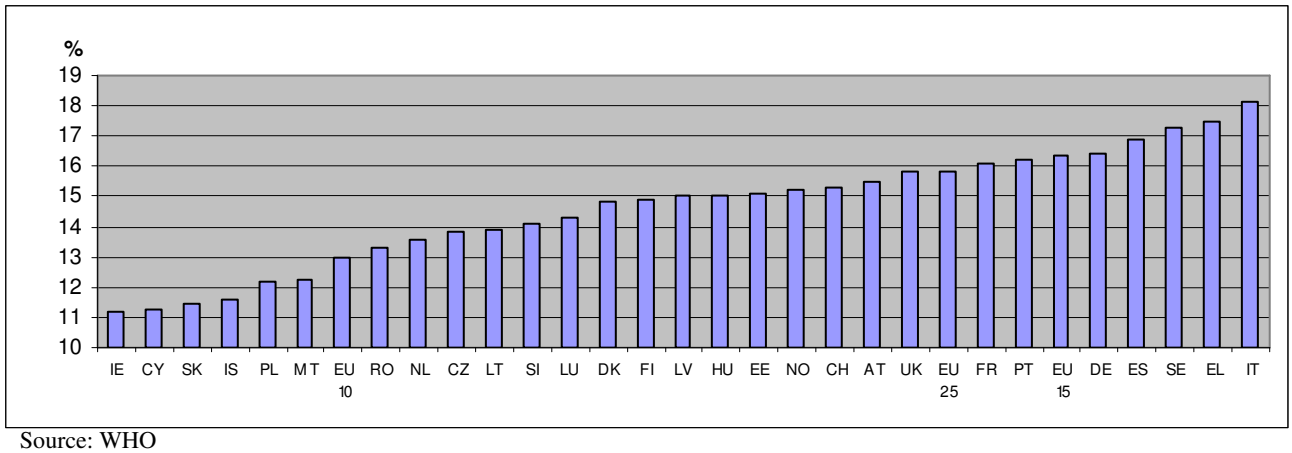
The last chapter presents some tentative data on prevention.

Eurostat and the World Health Organisation (WHO) constitute the main sources. Priority has been given to comparable data. We use mainly data collected through the European Community Household Panel (ECHP) and national data drawn from Health interview surveys. The majority of data analysed here can be downloaded from the respective websites of Eurostat and WHO.

## CHAPTER 1: The ageing of the population

The ageing of the population generates a certain number of imbalances. The more popular relates to the relatively high number of elderly people in the total population. The following table presents the proportion of people aged 65 and over and reveals a big diversity among member states. The proportion of elderly people is relatively low in the majority of the new member states.

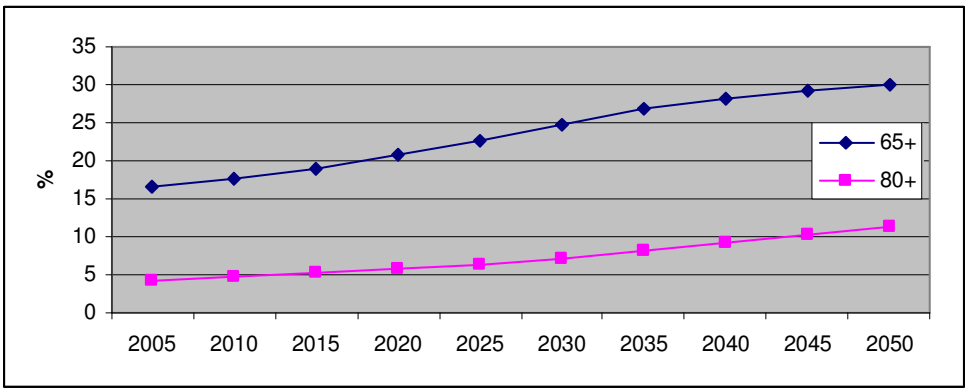
**Figure 1: Proportion of population aged 65+, 2000**




Source: WHO

However, this static view presents only a photograph at a certain time. It has to be completed with the evolution through time. Eurostat projections reveal that the share of elderly people will grow from about 15% in 2000 to about 30% in 2050. The number of elderly people aged 65 and over in the EU 25 will pass from about 77 Mio (2005) to about 135 Mio (2050). The numbers of people aged 80 and over are respectively 19 Mio and 51 Mio.

**Figure 2: The share of people aged 60+ and 80+ in the EU 25**

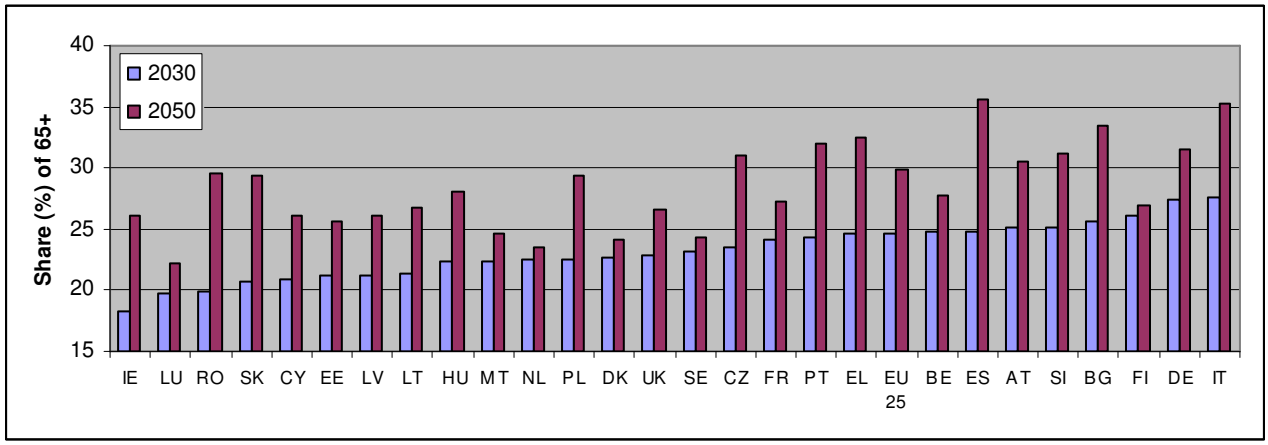



Source: Eurostat

A certain number of countries experience already an ageing population (e.g. Italy, Greece, Spain), while others are expected to face this problem in the coming years. In fact, a certain number of countries with a very low share in 2005, are expected to experience a very fast growth in the coming years e.g. Slovakia and Ireland.

High current rates are found in Germany (28 %) and in Italy (27%). This share is expected to increase further in 2050. The share of elderly people to the total population is expected to be higher than 35% in Spain and Italy.

**Figure 3: Evolution of the share of elderly people by country; Share of 65+ in the total population**




Source: Eurostat

The above rates do not necessarily reflect the capacity of the member states to finance pensions, increased health care, etc. One has to compare the evolution of elderly people in relation to the economically active population. The following graph describes the expected trends. The number of elderly people (65+) is growing rapidly while the number of the economically active population remains almost stable in the long run.

For the projections, we have assumed:

- The population follows the base Eurostat base line scenario, and
- The economically active population will reach in 2050 the highest participation rate currently present in the Member States for each age group. The progression is linear.

The second hypothesis is relatively conservative for some Member States but might be difficult to reach for others. This scenario is very sensitive to the labour participation rate of older workers (55-64 years old).

Despite our assumption of increasing participation rates in the labour markets, the number of elderly people increases steadily while the number of economically active decreases after 2020. After this date, the economic imbalance is increasing. The number of elderly people is coming close to the number of economically active persons.

However, this comparison is incomplete, if we do not take into account technical progress. One has to take into account labour productivity increases. The average Gross Domestic Product (GDP) per worker increased by 2% during the period 1979-1996 for the EU 15 Member States[5]. It is thus realistic to assume that labour productivity will increase at the same rate in the coming years. Given that ageing process is expected to increase the capital-labour ratio this rate seems reasonable. On the contrary, certain consider that an ageing labour force may experience slower innovation and hence lower technical progress.

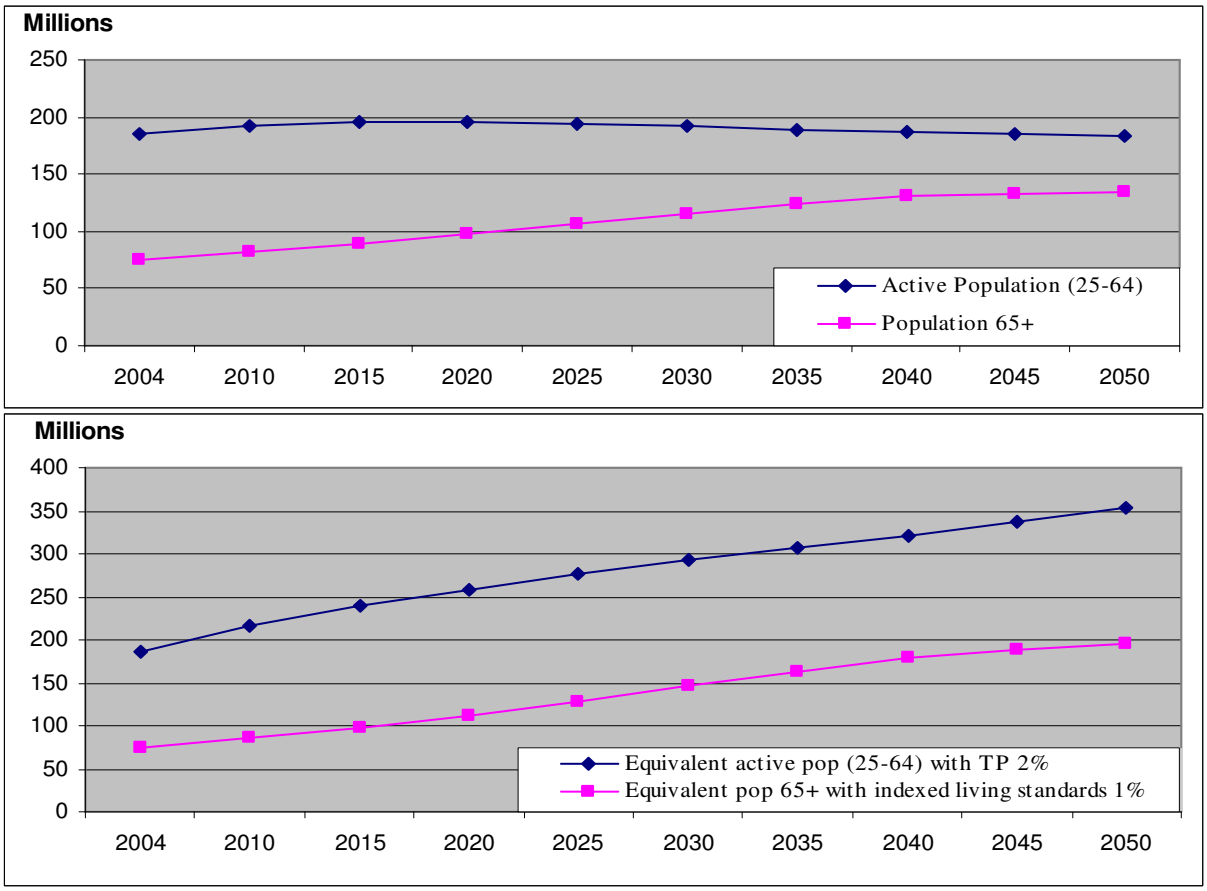
This hypothesis changes sharply the relation between economically active persons and elderly people. Figure 4 indicates that when we take into account labour productivity, the imbalance between active and inactive people is annihilated.

[5] The annual percentage increase in GDP per hour of work in the EU 15 was 2% during 1980-1990 and 1,7% during 1990-2000. This is a compound rate. The average is calculated as a simple average of 13 Member States. Source: OECD Economic Outlook for 1970-2000.

However, these results may hide important national differences. Countries characterized by a rapid ageing of the population and slow technical progress may face serious problems due to the growing share of people aged 65 and over.

An important assumption of the projections reported by different authors is that policy remains unchanged in the coming years. Our figure indicates that a policy of higher labour participation and technical progress can be an adequate "mechanical" answer to the increasing share of elderly people. This is just a "mechanical" and not a social projection. In fact, if we take into account technical progress only from the labour supply side, we assume a growing pauperisation of the elderly people. If we assume that the benefits to old age are indexed to labour productivity increases and hence to the general well being, then the imbalances appear again. The imbalances decrease only if we assume that labour productivity is increasing faster than the rate of indexation of old age benefits and costs.

**Figure 4: Evolution of elderly people and economically active persons, 2004 - 2050**




Note: Equivalent active pop (25-64) with TP 2% means that labour productivity increases on average by 2% per year.
Equivalent pop 65+ with indexed living standards 1% means that old age benefits and costs increase by 1% per year.
Data source: Eurostat (baseline scenario) and own calculations

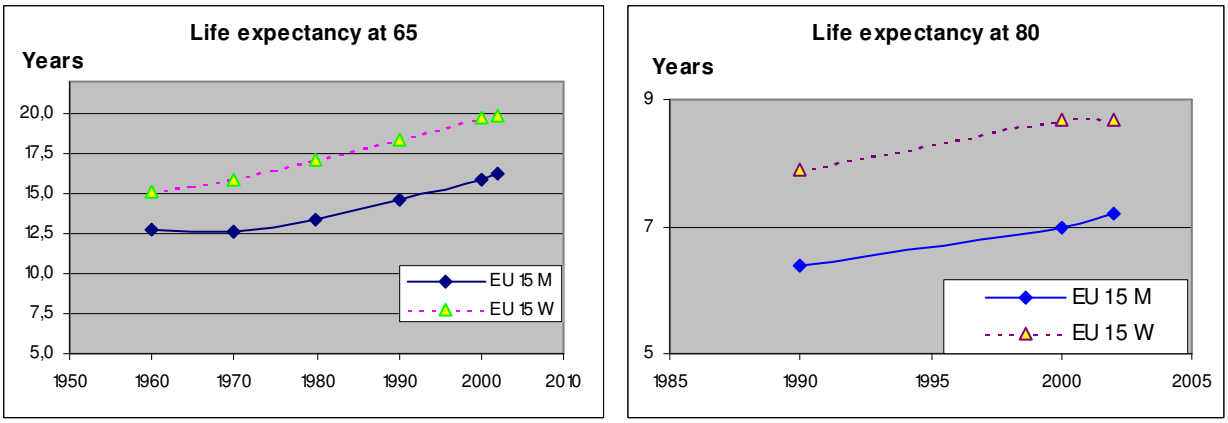
Alternative scenarios assume an increase in the retirement age. This has a strong impact, since it concerns very high numbers in the coming twenty to thirty years. The different ratios are sharply affected and the imbalances are significantly reduced. However, this is not an automatic solution to the different problems. Higher labour supply is not translated automatically into an increase of employment and higher effective production.

The above discussion points out the point that the policy answer might not be a policy based on a unique instrument but might require the combination of several tools and a mix of economic and social considerations.

## CHAPTER 2: Life expectancy and Healthy life expectancy

During the last 40 years both elderly men and women at age 65 gained about 5 years of life expectancy. However, big differences exist between countries and genders.

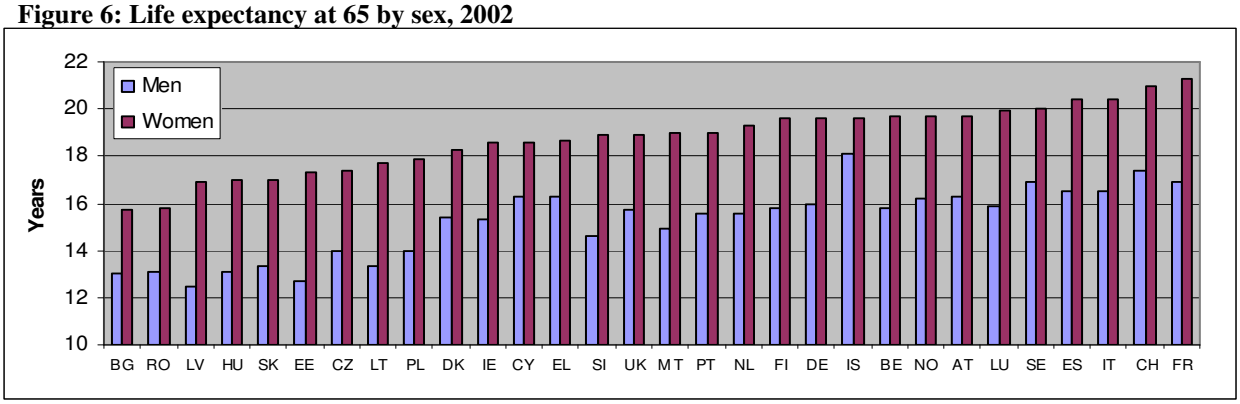
**Figure 5: Life expectancy at 65 and 80**




Data source: Eurostat

Most of the New Member States are characterised by a relatively low life expectancy at 65. Concerning men, in Bulgaria the life expectancy at 65 is only 13 years, while in France, it is almost 17 years. Concerning women, the respective years are about 16 and 21.

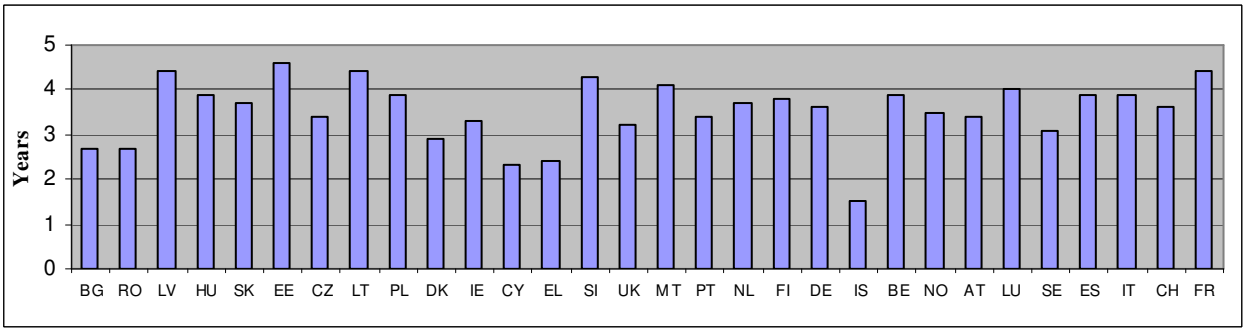
**Figure 6: Life expectancy at 65 by sex, 2002**




Data source: Eurostat

Significant gender differences are present in all Member States. The Baltic states have the highest differences in expected years. The variability across countries is higher for men compared to women.

**Figure 7: Gender differences in life expectancy at 65, gains by women in years; 2002**



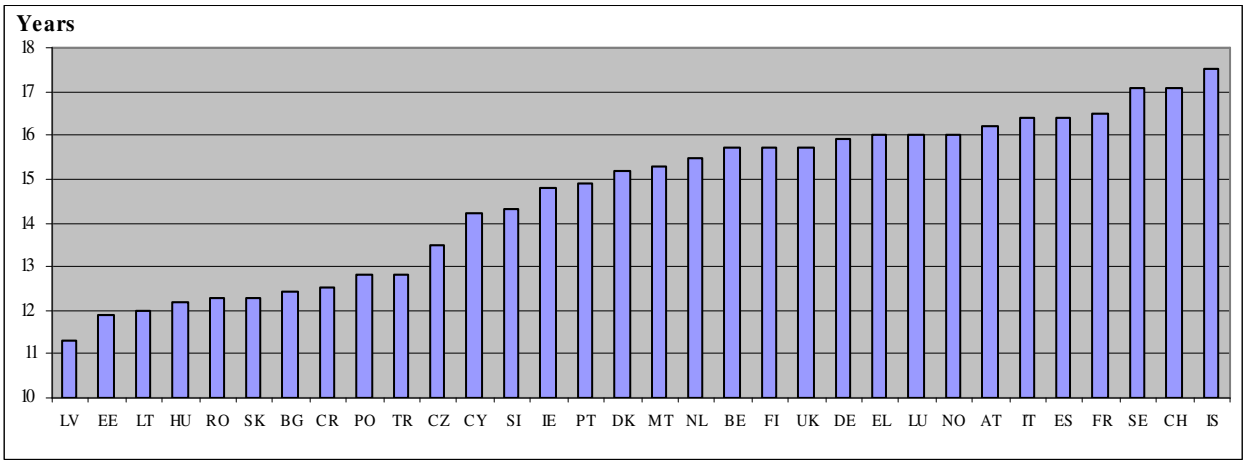

Note: The data refer to 2002 or the closest available year.
Data source: Eurostat

Additional years of life do not always mean years lived in good health. Consequently, we have to give a lower weight to an additional year of life with illness compared to an additional year of life in good health. These weights depend mainly upon the nature of chronic illnesses and the type of disability. One year with a light disability or chronic illness will have a higher weight compared to one year with a severe disability.

The following tables present WHO estimates. The disability-adjusted life expectancy (DALE), also called Healthy life expectancy, is based on age-specific information on the prevalence of non-fatal health outcomes. WHO notes that national DALE estimates are based on the life tables for each Member State, population representative sample surveys assessing physical and cognitive disability and general health status, and detailed information on the epidemiology of major disabling conditions in each country. Healthy life expectancy is thus the equivalent number of years in full health that a person at a specific age can expect to live based on current rates of ill health and mortality.

In Part D, when we treat the socio-economic determinants of health, we note that life expectancy and healthy life expectancy are strongly associated to income per capita and expenditures on health per capita.

**Figure 8: Healthy life expectancy at 60 (males), 2002**




Data source: WHO

Eurostat presents estimations concerning the disability free life expectancy (DFLE), i.e. the number of years one can expect to live without being hampered in daily activities by any physical or mental health problem, illness or disability. In the following figures, we present disability free life expectancy for different European countries and the difference between men and women. The data have to be interpreted with care, as they rely on self-assessments and might be influenced by economic factors.

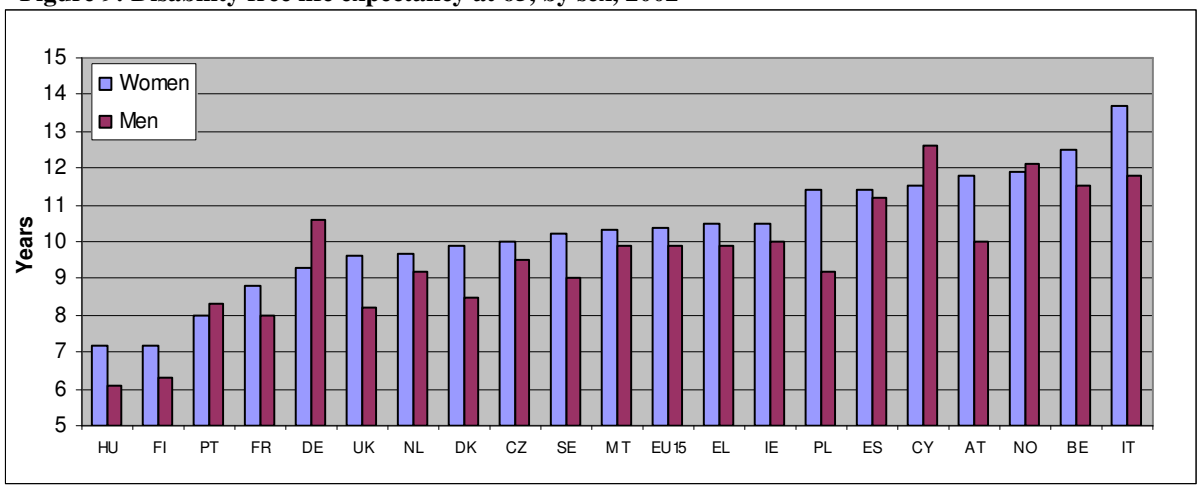
Also, certain critics argue that comparability problems might stem from unmeasured differences in expectations and norms for health or the meaning different populations attach to different concepts (severe disability, moderate limitations, etc.).

We consider that disability and activity limitations are not a one dimension e.g. medical phenomenon but the conjunction of three factors: medical, socio-economic and environmental. Consequently, reported measures reflect national differences on three levels. The question of comparability arises only when we reduce the reported self assessments of activity limitation into a pure medical measure. This aspect will be discussed further in assessing care needs and long-term dependency.

Concerning men, the disability free life expectancy is 6,1 years in Hungary and 11,8 years in Italy. The respective years for women are 7,2 and 13,7 years.

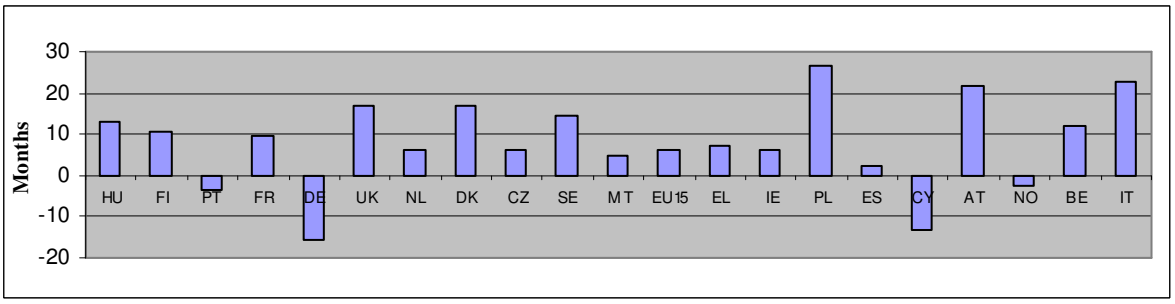
The variability (standard deviation) across countries of disability free life expectancy at 65 is higher compared to life expectancy at 65, both for men and women.

**Figure 9: Disability free life expectancy at 65, by sex, 2002**




Source: Eurostat. Data for CY, HU and NO refer to 2003. The German data are not reliable.

**Figure 10: Gender differences in disability free life expectancy at 65, gains for women in months, 2002**




Source: Eurostat. Data for CY, HU and NO refer to 2003. The German data are not reliable.

The World Health Organisation[6] notes that historic data from Sweden and Australia show that life expectancy at age 60 changed slowly during the first six to seven decades of the twentieth century but since around 1970, it has started to increase substantially.

Herce and al[7] note that life expectancy has been increasing since one hundred years ago. They attribute this both to expansion (people reaching higher extreme ages) and with compression of mortality (more and more people surviving in all ages). They estimate that compression of mortality at adult ages seems to be the dominant process. They consider that in the future life expectancies would not augment as rapidly as in the past. They argue that as the absolute limit of a human life remains unchanged, one should expect less and less margin to be left for further increases. They indicate a record age of about 120 years but note that this is indicative.

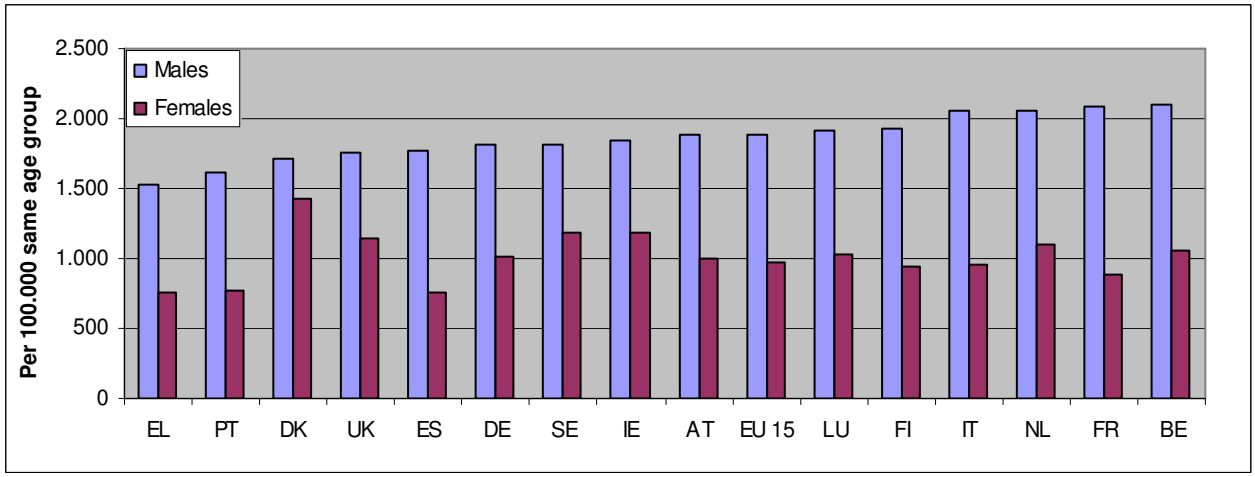
[6] Mathers et al. (2003).
[7] Herce et al. (2003).

## CHAPTER 3: Morbidity

Available statistics published by Eurostat and WHO are limited. Most identified data relate to cancer. Data for other diseases don't distinguish between different age groups and often are not comparable.

The rates vary between countries. For males aged 65-74 years, they range from 1.532 in Greece to 2.097 per 100.000 in Belgium. For women, they range from 753 in Greece to 1.431 per 100.000 in Denmark. The variability (standard deviation) across Members states for women is higher compared to men. In the past the New Member States had a lower incidence of cancer compared to EU 15, but currently the rates seem to converge.

**Figure 11: Cancer morbidity, standardised incidence rates, 65 - 74 years, by sex, 1998, rate per 100.000**

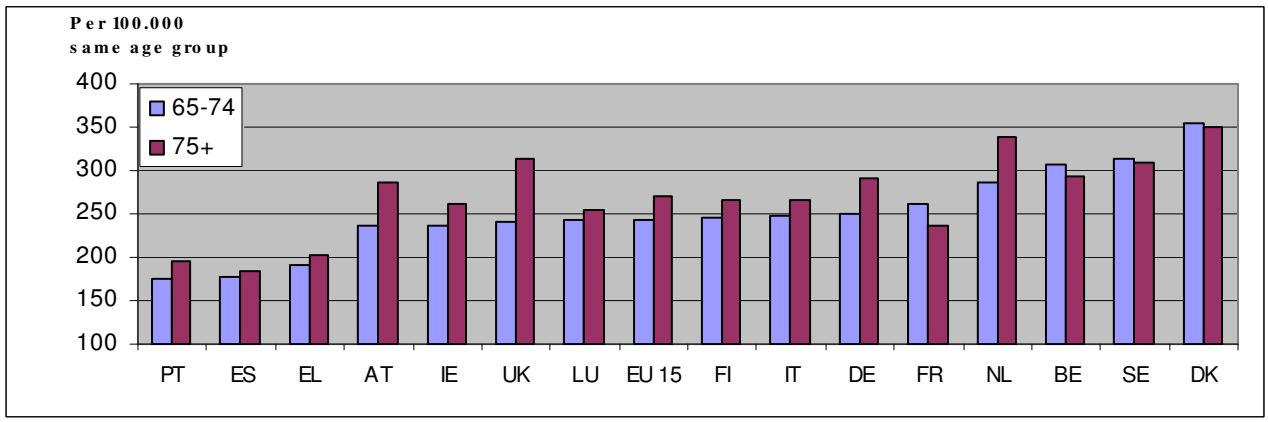



Note: The age-standardized rate represents what the crude rate would have been if the population had the same age distribution as the standard European population.
Source: Eurostat

Among men, trachea/bronchus, prostate, colon/rectum and bladder cancer are the most numerous. Among women the most common are breast, colon/rectum, trachea/bronchus and stomach cancer.

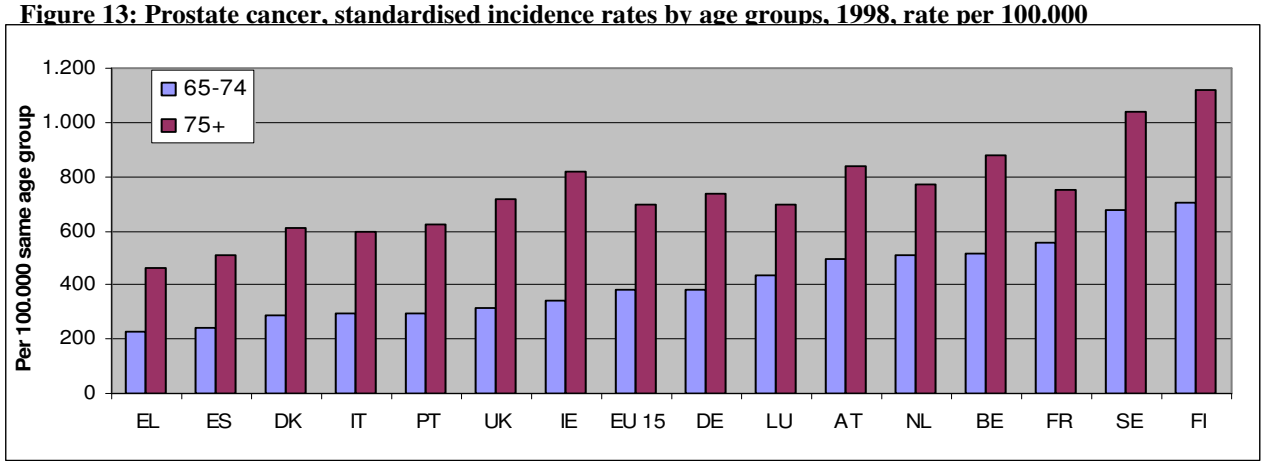
Cancer can occur at any age but the risk of developing cancer increases with age. This increase is slow for breast cancer among women and the variability remains constant across Member states. On the contrary, the cancer of the prostate increases significantly with age. Also, its variability across member states increases too.

**Figure 12: Breast cancer, standardised incidence rates by age groups, women, 1998, rate per 100.000**




Source: Eurostat

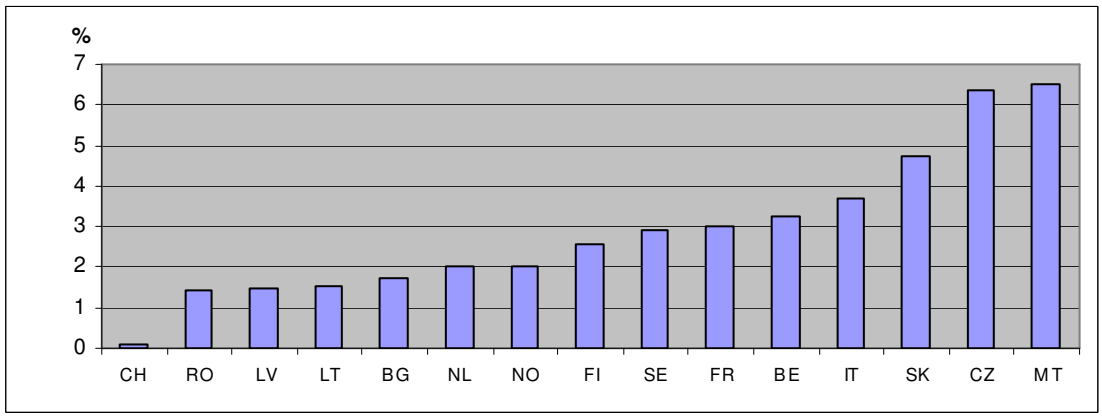
**Figure 13: Prostate cancer, standardised incidence rates by age groups, 1998, rate per 100.000**




Source : Eurostat

Diabetes is a chronic illness that is rising both among the elderly people and among young people. Concerning diabetes mellitus, it is estimated that 5 to 15 % of patients are young people and the remaining middle aged and elderly persons. Concerning diabetes, available data do not distinguish type of diabetes or age group. Data indicate big differences between countries and raise questions on the efficacy of national policies. They raise also questions on lifestyles, as factors like obesity, two little physical exercise and bad diet play a major role.

**Figure 14: Diabetes prevalence (%), total population, 2000**




Source: WHO

It is interesting to note that the cost engendered by diseases vary sharply according to the type of disease. Available data for the Netherlands[8] during 1999 indicate that mental health has generated much more expenses compared to other diseases, followed by cardiovascular diseases (e.g. stroke and coronary health disease), digestive tract, musculoskeletal system, nervous system, and cancers, which raises the issue of the burden of chronic disease and disability. However for the elderly people nursing care is the biggest contributor while the relative use of hospital care is low.

Years lived with a disability (YLD)

Years lived with a disability (YLD) measure the burden of chronic disease and disability. They measure the weight of chronic diseases leading to activity limitations. They are the disability

[8] Polder et al. (2004).

component of the Disability Adjusted Life Years (DALYs)[9]. The data required to estimate YLD are: disability incidence, disability duration, age of onset, and distribution by severity class, all of which must be disaggregated by age and sex. The estimation assigns a disability weight to each state of health.

For elderly people, years lived with a disability is decreasing with age. This is the result of the fact that mortality increases with age.

**Table 1: Years lived with disabilities (YLDs) by age, Europe, 2002**

| Total | 0-4 | 5-14 | 15-29 | 30-44 | 45-59 | 60-69 | 70-79 | 80+ |
|---|---|---|---|---|---|---|---|---|
| 27.761.029 | 957.085 | 1.248.553 | 6.496.424 | 6.076.870 | 5.431.905 | 3.390.826 | 2.802.673 | 1.356.692 |
| 100 % | 3 | 4 | 23 | 22 | 20 | 12 | 10 | 5 |

Source: WHO, GBD 2002.

Years lived with a disability is a significant indicator of the quality of life, and could guide policy measures towards effective action in specific areas and at targeted populations.

In 2002, the leading cause of years lived with disabilities among elderly people in Europe is mental health (neuropsychiatric conditions), although in a lesser extent compared to the total population. This is due to the fact that mortality is relatively low for this disease and consequently the years lived with a mental health problem is higher compared to diseases associated with a high mortality rate. Other leading causes are sense organ diseases, respiratory diseases, musculoskeletal diseases and cardiovascular diseases.

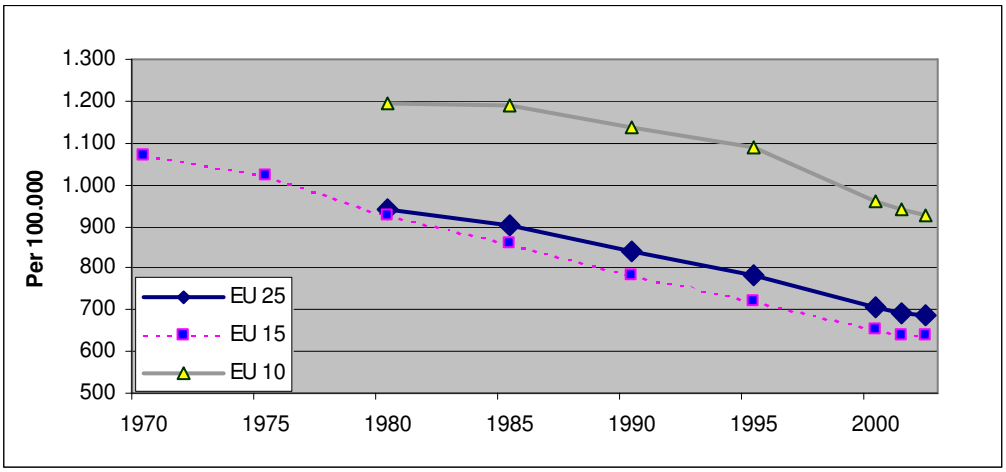
[9] DALY is the sum of years of potential life lost due to premature mortality (YLL) and the years of productive life lost due to disability (YLD).

# CHAPTER 4: Mortality

## 1. Mortality rates

Global mortality rate in Europe has decreased steadily in the last 30 years. However, there is a significant difference between the New Member States (960 per 100.000) and the EU 15 (654 per 100.000). Italy has the lowest standardised mortality rate (591 per 100.000) and Bulgaria the highest (1.146 per 100.000). The 10 new Member States and Bulgaria are at the top of mortality rate.

**Figure 15: Standardised death rates, all ages, rate per 100.000**

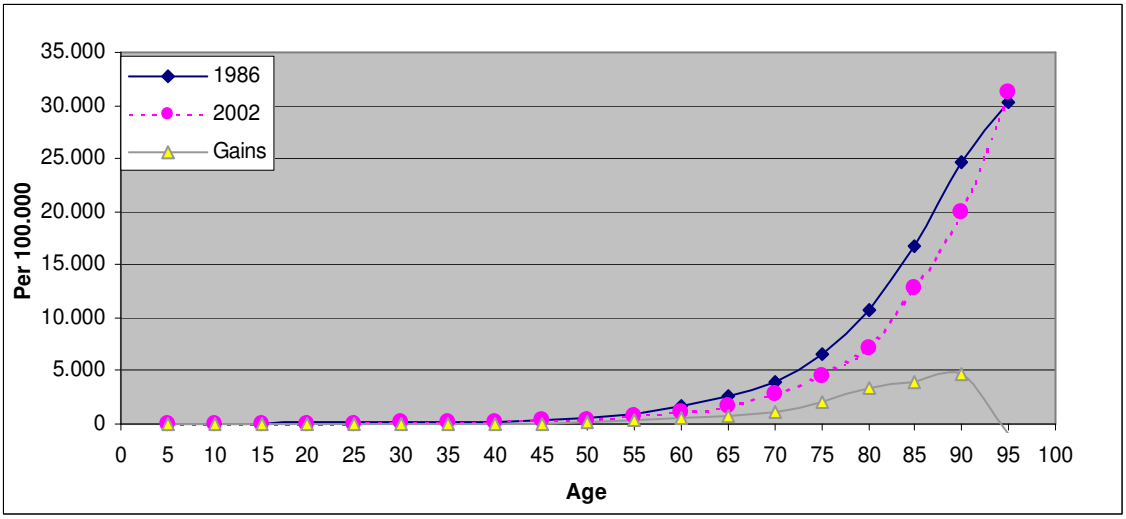



Note: SDR is the age-standardized death rate and represents what the crude rate would have been if the population had the same age distribution as the standard European population.
Source: WHO

The graph presenting mortality by age group indicates that additional life years have been gained mainly in the years 60 to 90. More and more people reach extreme ages. The limit age does not seem to increase significantly. In any case, it ought concern a small number of people.

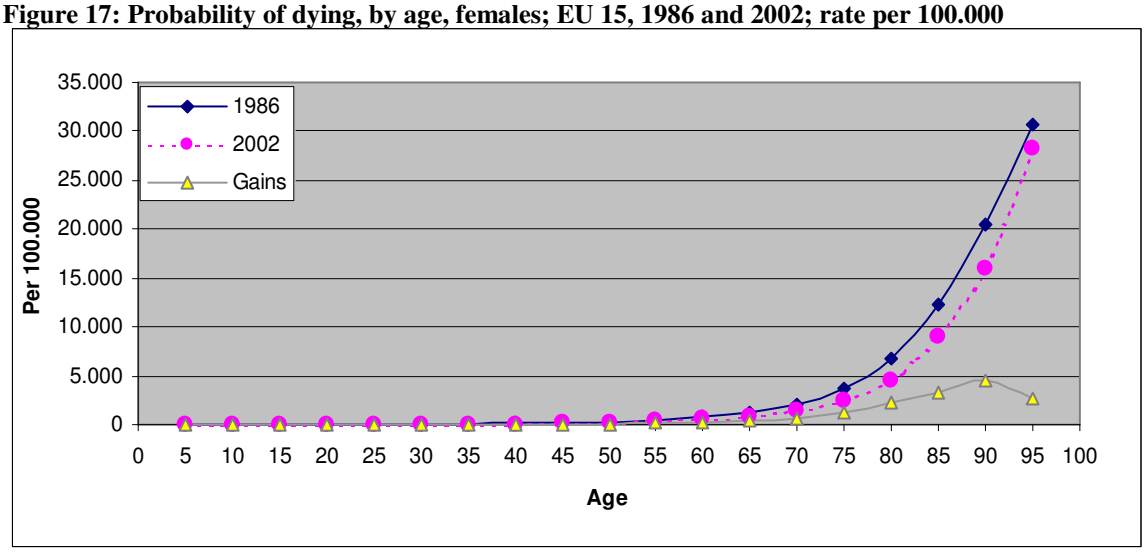
The risk of death rises rapidly with age among adults aged 70 and over. The probability of dying at 95 is similar between 1986 and 2002. The gains in the decrease of death rates seem to stem mainly from the gains in the age group 60 to 90 years old. An increasing number of people reach extreme ages.

**Figure 16: Probability of dying, by age, males; EU15, 1986 and 2002, rate per 100.000**




Source: Eurostat

**Figure 17: Probability of dying, by age, females; EU 15, 1986 and 2002; rate per 100.000**




Source : Eurostat

## 2. Deaths by cause

The following table reveals that the main causes of death for persons aged 65 and over are the diseases of the circulatory system, followed by neoplasm (see classification of diseases in Annexe A).

Cardiovascular diseases count for almost half of deaths. Malignant neoplasm (cancers) count for about 25%.

**Table 2: Causes of death of persons 65 years and over by gender, EU 25, 2002**

| Icd | Females | | Males | |
|---|---|---|---|---|
| | Abs Num | % | Abs Num | % |
| 33 Diseases of the circulatory system (I00-I99) | 879.015 | 48,7 | 620.876 | 42,1 |
| 06 Neoplasms (C00-D48) | 350.148 | 19,4 | 417.438 | 28,3 |
| 37 Diseases of the respiratory system (J00-J99) | 166.156 | 9,2 | 166.933 | 11,3 |
| 42 Diseases of the digestive system (K00-K93) | 71.443 | 4,0 | 56.603 | 3,8 |
| 55 Symptoms, signs, ill-defined causes, etc. (R00-R99) | 69.449 | 3,9 | 38.158 | 2,6 |
| 26 Endocrine, nutritional and metabolic diseases (E00-E90) | 59.603 | 3,3 | 34.179 | 2,3 |
| 58 External causes of injury and poisoning (V01-Y89) | 48.187 | 2,7 | 42.160 | 2,9 |
| 28 Mental and behavioural disorders (F00-F99) | 46.746 | 2,6 | 21.188 | 1,4 |
| 31 Diseases of the nervous system and the sense organs (G00-H95) | 42.463 | 2,4 | 29.968 | 2,0 |
| 48 Diseases of the genitourinary system (N00-N99) | 30.013 | 1,7 | 24.165 | 1,6 |
| 01 Infectious and parasitic diseases (A00-B99) | 16.019 | 0,9 | 12.751 | 0,9 |
| 46 Diseases of the musculoskeletal system, etc. (M00-M99) | 11.781 | 0,7 | 4.457 | 0,3 |
| 25 Diseases of the blood (-forming organs), immunological disorders (D50-D89) | 6.405 | 0,4 | 4.437 | 0,3 |
| Other | 5.857 | 0,3 | 2.592 | 0,2 |
| **Total** | **1.803.285** | **100** | **1.475.905** | **100** |

Source: Eurostat
Note: No data for Malta, Poland & Cyprus

## 3. Years of life lost

The following tables present the number of Years of life lost (YLL)[10] due to premature death. This is the second component of the Disability adjusted life years (DALYs).

Malignant neoplasm (cancers), and cardiovascular diseases are the main factors of the mortality burden.

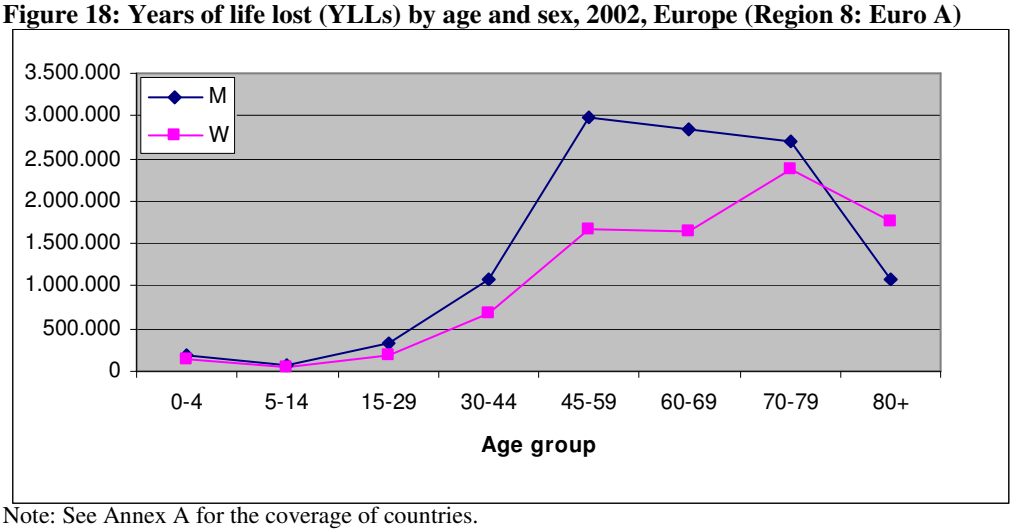
**Table 3: Years of life lost (YLLs) for 60+ by sex and cause, 2002, Europe (Region 8: Euro A)**

| *Cause* | | *M* | | *F* | |
|---|---|---|---|---|---|
| All Causes | | **7.161.221** | **100** | **6.273.526** | **100** |
| G. | Cardiovascular | 2.681.908 | 37 | 2.570.616 | 41 |
| A. | Malignant neoplasms | 2.522.765 | 35 | 1.868.908 | 30 |
| H. | Respiratory | 468.396 | 7 | 316.119 | 5 |
| I. | Digestive | 339.312 | 5 | 291.157 | 5 |
| E. | Neuropsychiatric | 227.650 | 3 | 280.564 | 4 |
| B. | Respiratory infections | 227.008 | 3 | 234.806 | 4 |
| C. | Diabetes mellitus | 151.820 | 2 | 190.752 | 3 |
| A. | Unintentional injuries | 165.566 | 2 | 136.462 | 2 |
| J. | Genitourinary | 96.712 | 1 | 99.345 | 2 |
| A. | Infectious and parasitic diseases | 77.135 | 1 | 78.695 | 1 |
| | Other | 202.948 | 3 | 206.103 | 3 |

Note: See Annex A for the coverage of countries.
Source: WHO, GBD 2002.

The distribution of years of life lost concern mainly the age groups 45 and over. Given the lower life expectancy of men, the number of years lost is higher compared to women.

**Figure 18: Years of life lost (YLLs) by age and sex, 2002, Europe (Region 8: Euro A)**




Note: See Annex A for the coverage of countries.
Source: WHO, GBD 2002.

## 4. Death rates for selected diseases

The previous section has presented a general overview of death rates by cause. The present section will present death rates for specific diseases having an important dimension for elderly people.

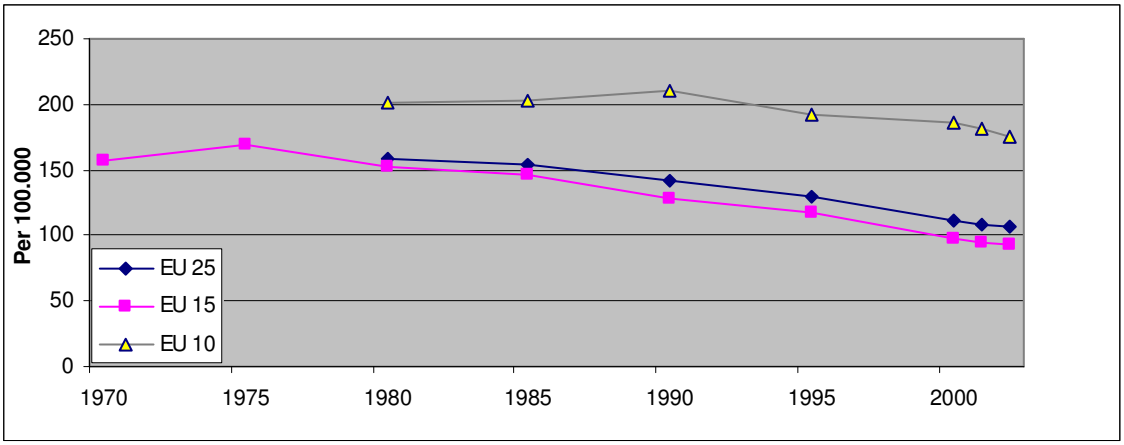
[10] DALY is the sum of years of potential life lost due to premature mortality (YLL) and the years of productive life lost due to disability (YLD).

Mortality rates are declining but the trend indicates that the rate of decline might be slowing down.

The New member States seem particularly affected by cardiovascular related deaths. The standardised death rate[11] from ischaemic heart disease was 93 per 100.000 in the EU 15 but 176 in the New Member States, in 2002. More important, the gap has increased since 1990.

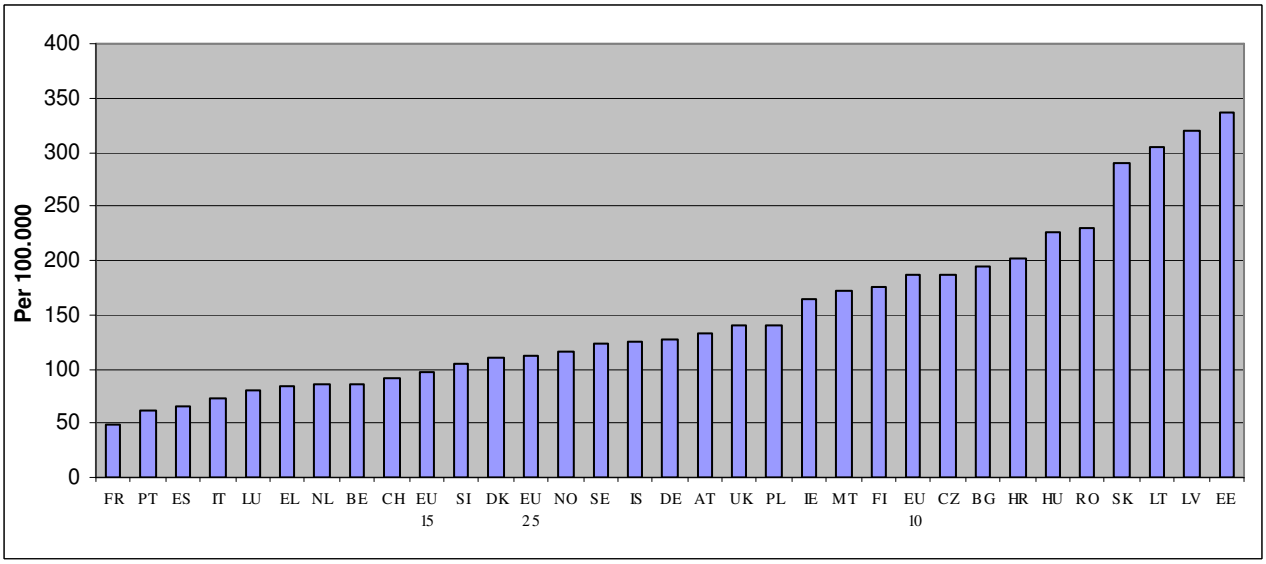
There are big differences across countries. France had the lowest rate (49 per 100.000) and Estonia the highest (336 per 100.000), in 2000. It is interesting to note that the Mediterranean countries keep the lowest places and have significantly lower death rates. This has been attributed to lifestyles and notably to the Mediterranean diet.

**Figure 19: Deaths (SDR) from ischaemic heart disease, all ages, rate per 100.000**




Note: SDR is the age-standardized death rate and represents what the crude rate would have been if the population had the same age distribution as the standard European population.
Data source: WHO

**Figure 20: Deaths (SDR from ischaemic heart disease, by country; 2000, all ages, rate per 100.000**

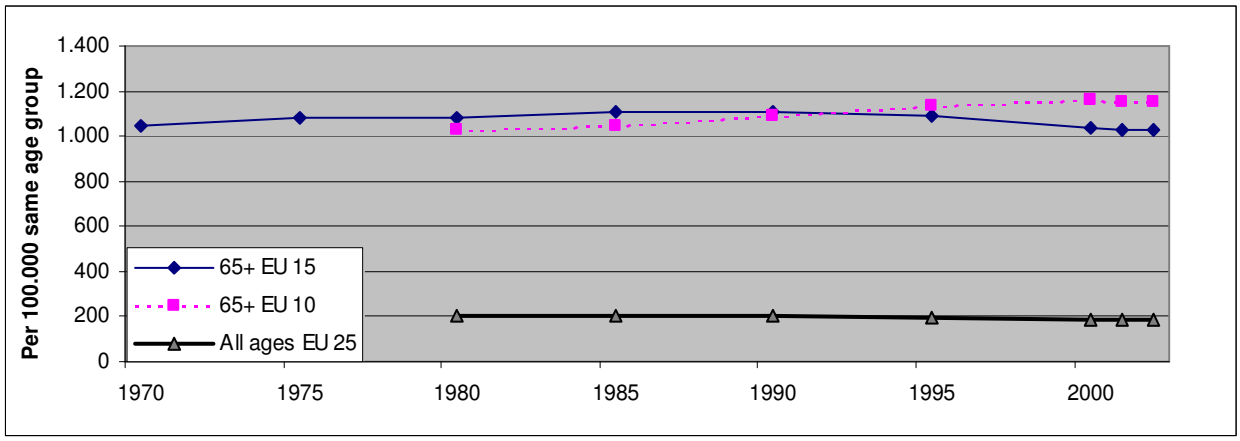



Data source: WHO

[11] SDR is the age-standardized death rate calculated using the direct method, i.e. represents what the crude rate would have been if the population had the same age distribution as the standard European population.

The death rate for all ages from cancer seems quite stable during the last 30 years. The death rate for people 65 and over had even increased for a while to reach in 2000 its value of 1970. Worse, the death rate of people 65 and over has increased significantly since 1990 in the new Member States.

**Figure 21: Deaths (SDR) from malignant neoplasm, all ages and 65+, rate per 100.000**

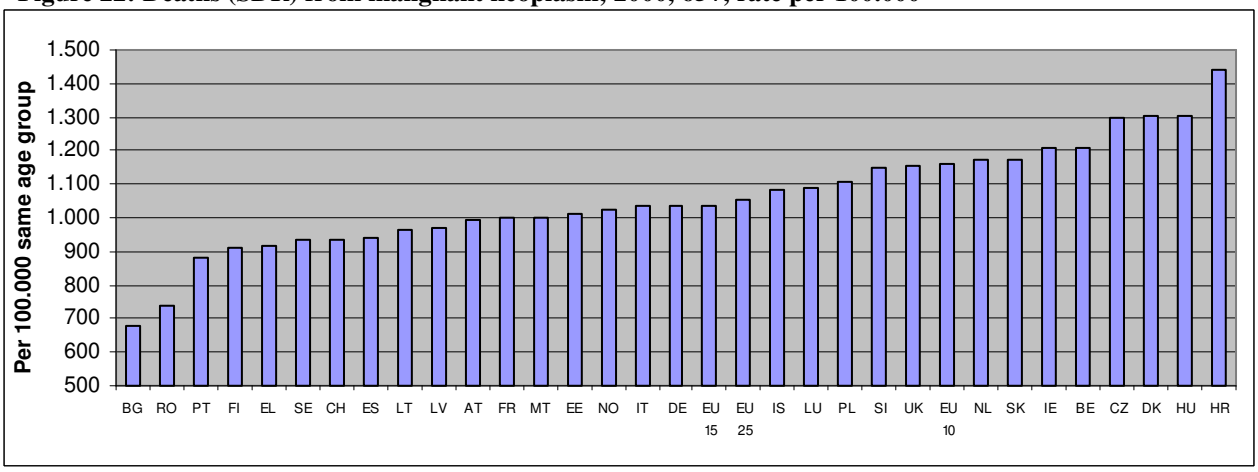



Data source: WHO

Concerning death from cancer there are big differences across countries. However, there is no clear geographical segmentation. The overall mortality is not higher in one part of Europe in comparison to others, as it was the case for cardiovascular diseases.

When focussing on all ages, the variability of deaths rates from cancers across countries is significantly lower (standard deviation: 28; but 160 for 65+) compared to the variability of death rates from ischaemic heart disease (standard deviation: 78). The variability of the total standard death rate for all ages is 184.

**Figure 22: Deaths (SDR) from malignant neoplasm; 2000, 65+, rate per 100.000**

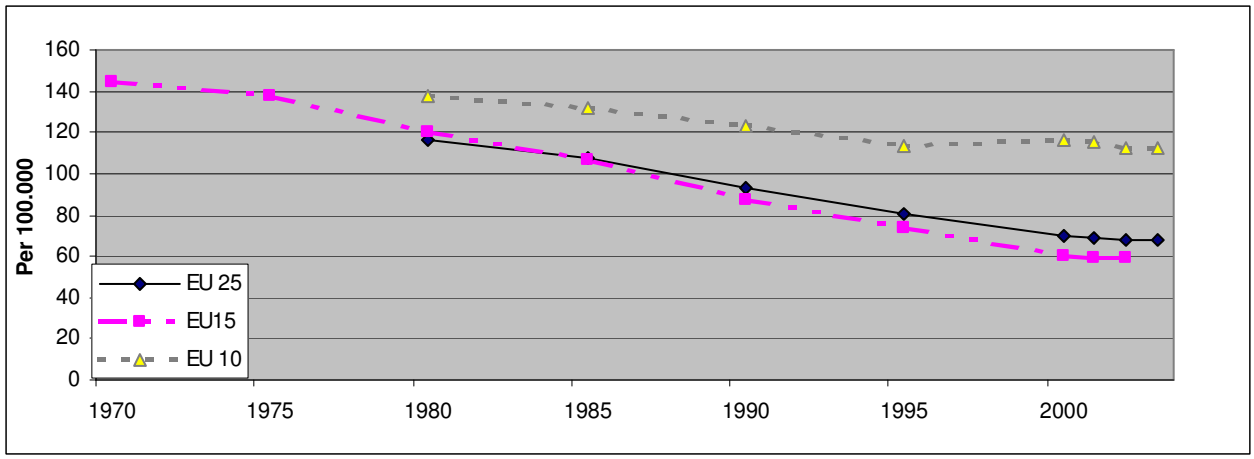



Data source: WHO

Death rates from cerebrovascular diseases have experienced a steady decrease during the last 30 years. However, the decrease has been lower in the new Member States and the gap between EU 15 and EU 10 has increased significantly. The decrease seems to have decelerated during the last years.

Cerebrovascular diseases play also an important role to the health balance as they lead to serious chronic disabilities and care dependencies. They are the first cause of serious disabling illnesses.

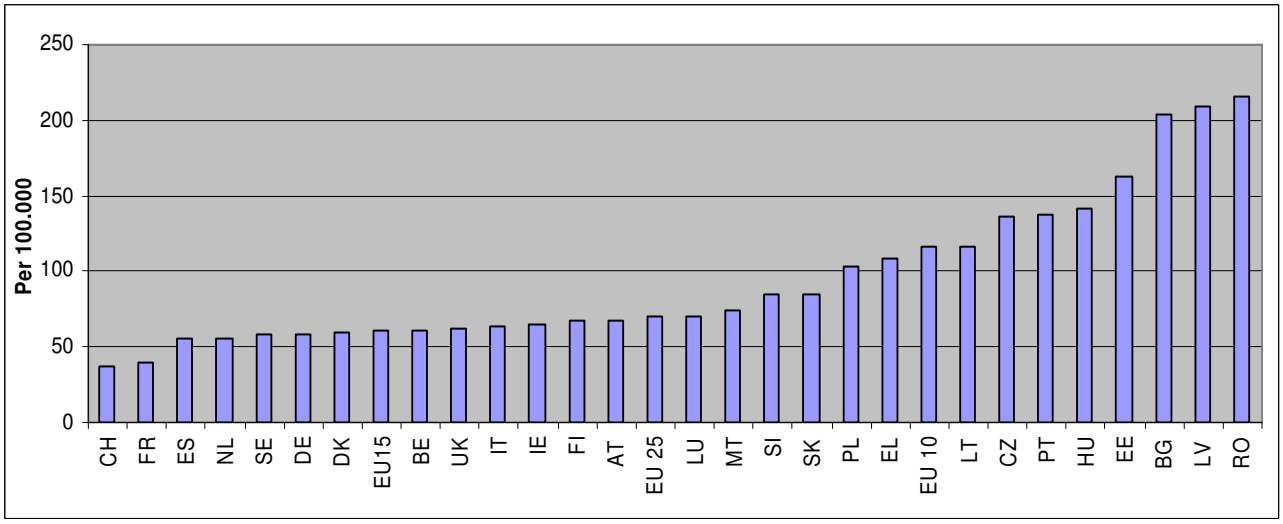
**Figure 23: Deaths (SDR) from cerebrovascular diseases, all ages, rate per 100.000**




Data source: WHO

The variability of death rates across countries from cerebrovascular diseases is high (standard deviation: 50 for all ages) but much lower compared to the total standard death rate.

**Figure 24: Deaths (SDR) from cerebrovascular diseases, by country, all ages, per 100.000**



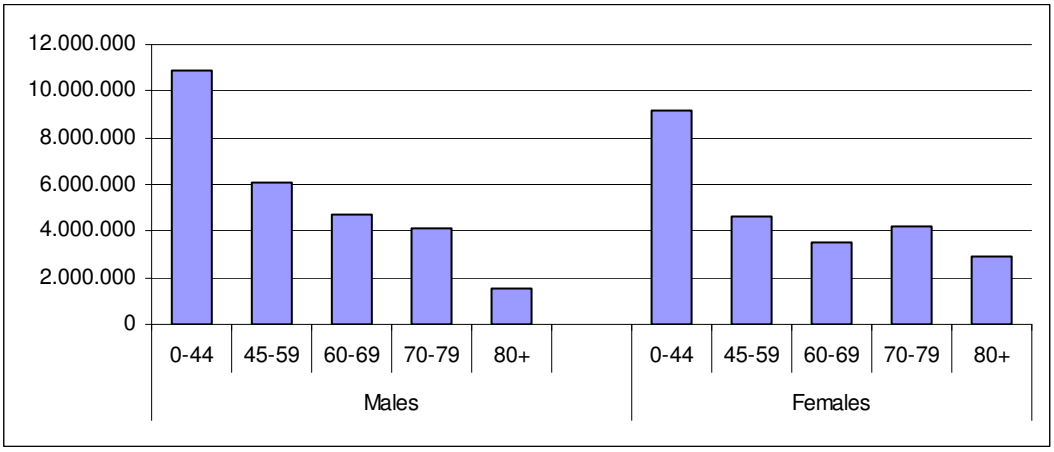

Data source: WHO

## CHAPTER 5: Disability Adjusted Life Years

WHO notes that the Disability Adjusted Life Years (DALY) expresses years of life lost to premature death and years lived with a disability of specified severity and duration. One DALY is thus one lost year of healthy life. In fact, a DALY is the sum of years of potential life lost due to premature mortality (YLL) and the years of productive life lost due to disability (YLD).

As noted earlier, mental health is a major contributor of years lived with a disability (YLD). Consequently, using DALYs as a measure of disease burden allows major causes of disability such as mental health conditions, sense organ diseases (e.g. hearing and visual limitations) to be recognized as major causes of disease burden, despite the fact that mortality from these conditions is generally low.

**Figure 25: DALYs by age groups, Europe A**




Note: See Annex A for the coverage of Europe A
Source: WHO

"Noncommunicable diseases accounted for 75% of the burden of disease expressed in DALYs in 2000."[12] That percentage is expected to reach 80% in 2020.

The following table present the leading causes of burden of disease in Europe, among non-communicable diseases (NCDs). Cardiovascular disease, malignant neoplasms and neuropsychiatric conditions are the three main causes among elderly people aged 60 and over.

**Table 4: DALYs by age and cause, 2002, Region 8: Euro A**

| *Cause* | **All ages** | **60+** | **All ages** | **60+** |
|---|---|---|---|---|
| | Abs number | | % | |
| Noncommunicable diseases | 45.091.278 | 19.742.999 | 100 | 100 |
| Cardiovascular diseases | 8.838.331 | 6.346.999 | 19,6 | 32,1 |
| Malignant neoplasms | 8.548.560 | 4.847.272 | 19,0 | 24,6 |
| Neuropsychiatric conditions | 13.731.640 | 2.771.928 | 30,5 | 14,0 |
| Respiratory diseases | 3.406.475 | 1.313.166 | 7,6 | 6,7 |
| Sense organ diseases | 2.464.864 | 1.103.741 | 5,5 | 5,6 |
| Digestive diseases | 2.413.933 | 978.152 | 5,4 | 5,0 |
| Musculoskeletal diseases | 2.196.536 | 975.747 | 4,9 | 4,9 |
| Diabetes mellitus | 1.105.400 | 613.059 | 2,5 | 3,1 |

Note: See Annex A for definition of Europe A
Source: WHO, GBD 2002.

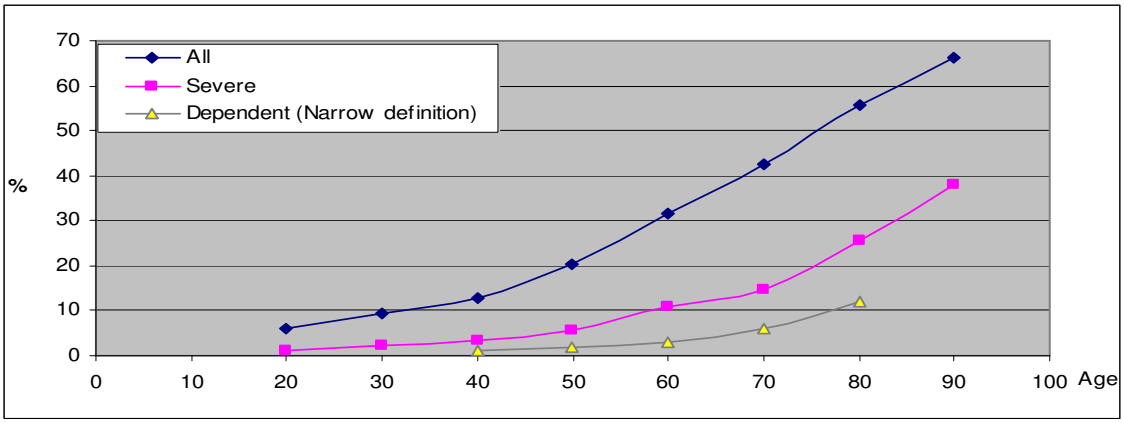
[12] WHO Regional Office for Europe (2002).

## CHAPTER 6: Activity limitations

The European community household panel (ECHP)[13] provided the prevalence of people with activity limitations. However, an activity limitation does not imply necessarily a need for assistance. The definition of persons hampered severely in their daily activities is more close to the concept of dependency but still relatively large. We consider it as a large definition of dependency. In fact, it includes often limitations both for activities of daily living (ADL[14]: washing, eating, etc.) and instrumental activities (IADL: e.g. cooking, shopping, cleaning). Instrumental activities are important for the quality of life but do not require a huge daily burden for carers. On the contrary, dependency on a narrow sense covers basically the need for a third person for the accomplishment of daily activities.

In the following graph, we present the three types of prevalence: disability, severe disability and dependency. Dependency increases significantly and regularly with age.

**Figure 26: Persons hampered in their daily activities, by age, EU, 1999 (% of the same age group)**




Data source: Eurostat - S. Grammenos

**Table 5: Number of elderly dependent people (wide definition), 2005**

| Age group | B | NL | AT | SK | FI | SE | FR | IT | PL |
|---|---|---|---|---|---|---|---|---|---|
| **65+** | 257.990 | 416.980 | 210.169 | 113.174 | 239.113 | 360.201 | 2.627.897 | 1.515.771 | 1.091.516 |
| **80+** | 91.379 | 134.533 | 83.092 | 34.693 | 82.870 | 148.336 | 985.568 | 559.335 | 297.753 |

Source: Eurostat - S. Grammenos

The following table presents the number of elderly dependent people. We have exploited the different waves of the ECHP (1996 to 2000) in order to estimate logistic equations relating severe limitation with age. We have applied the estimated prevalence rates to the number of elderly people in 2005. The narrow definition applies a similar method but exploits national data on dependent people (see also Part D and Annex B).

**Table 6: Number of elderly dependent people, EU25, 2005**

| Age groups | | |
|---|---|---|
| | **Narrow definition** | **Wide definition** |
| 65-69 | 1.018.848 | 3.373.670 |
| 70-74 | 1.170.194 | 3.622.952 |
| 75-79 | 1.272.549 | 3.644.909 |
| 80 + | 2.300.864 | 5.770.989 |
| **Total** | **5.762.455** | **16.412.520** |

Source: Own calculations

[13] The results of SILC have not yet been published.
[14] See the description in the annex

## CHAPTER 7: Statistics on prevention

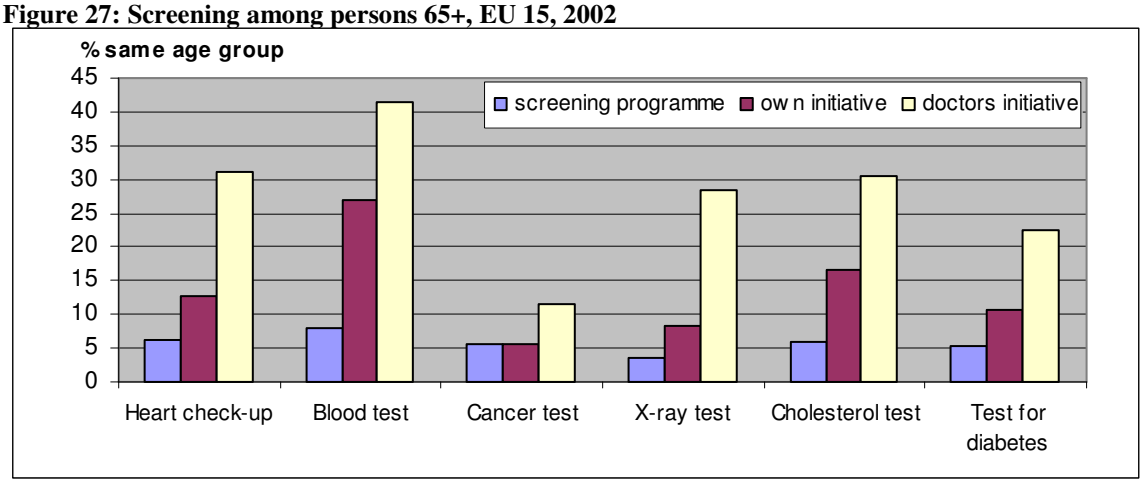
Non-communicable diseases are essentially diseases of later life and many are preventable or can be postponed. The most important non-communicable diseases like cardiovascular diseases, cancer and diabetes are linked to preventable risk factors. Failure to prevent them appropriately might result in important costs and activity limitations. In latter chapters, we will present evidence suggesting that prevention and health promotion even at a later stage of life provides significant benefits in terms of longer life, better health, higher level of activity and improved well being.

Prevention policy may focus on prevention of disease, social circumstances and lifestyles. Health promotion aims at enabling people to take control over and to improve their health, while disease prevention focuses on medical aspects.

Prevention may take the form of "Primary" prevention (for example avoidance of tobacco use), "Secondary" prevention (notably screening for the early detection of chronic diseases), and "Tertiary" prevention (for example appropriate clinical management of diseases).

Available statistics focus on secondary prevention. They reveal big differences among member states. These differences might reveal a lack of relevant policies and hence the need for the elaboration of efficient prevention programmes.

**Figure 27: Screening among persons 65+, EU 15, 2002**




Source: Eurostat

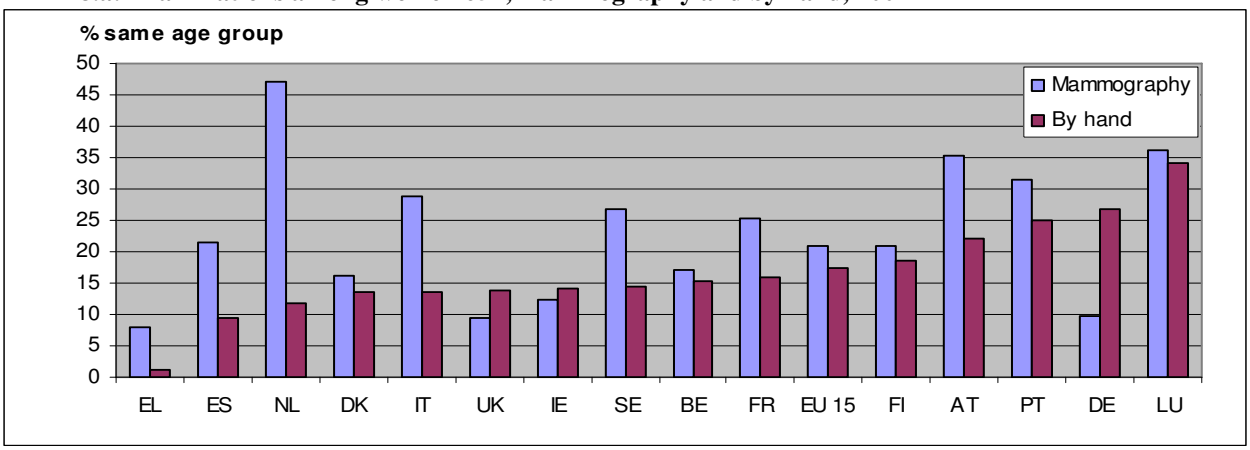
Concerning screening initiated by its own initiative, there is a big difference across countries. Generally, The UK and the Netherlands report the lowest rates, while Luxembourg and Greece the highest. More specifically, in the UK, only 5,9% of elderly people report to have undertaken cholesterol test by their own initiative, while the same rate is 34,7% in Greece. Similarly for blood tests, the rates vary between 13,4 in the Netherlands and 42,3 in Luxembourg (40,3 in Greece).

Concerning screening following the advice of a doctor, the rate varies between 16,2% in Sweden and 39,2 in France.

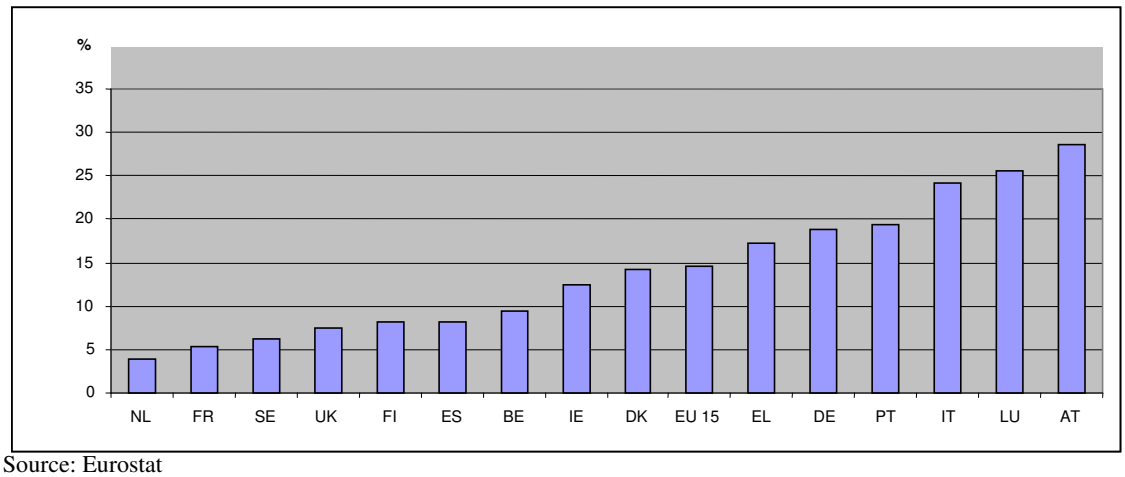
Concerning screening following a public programme, the rate varies between 1% in Portugal and 17,3% in Austria. Germany and Sweden report also high rates.

**Figure 28: Examinations by type in the Member States**

**28.a: Examinations among women 65+, mammography and by hand, 2002**




**28 b: Examinations among women 65+, osteoporosis, 2002**




Source: Eurostat

There is a big variability across countries of examination rates meaning that there is a potential to learn from each other and to define common strategies. Also, as noted above, morbidity incidence varies across countries. Consequently, major health gains might be possible for many countries if preventive public health actions are developed.

## SUMMARY AND CONCLUSIONS

The ageing of the population generates a certain number of imbalances. Eurostat projections reveal that the share of elderly people (65+) will grow from about 15% in 2000 to about 30% in 2050. However, data indicate a big diversity among member states. A certain number of countries experience already an ageing population (e.g. Italy, Greece, Spain), while others are expected to face this problem in the coming years (e.g. Slovakia and Ireland). The share of elderly people to the total population is expected to be higher than 35% in Spain and Italy.

This raises questions on the sustainability of social and economic systems. Increased labour participation and high labour productivity are not a solution by themselves. The first needs to be translated into effective jobs and the second ought to respect the relative position of elderly people. Health and long-term care costs associated with high morbidity and activity limitations for elderly people are another candidate for policy action.

During the last 40 years both elderly men and women at age 65 gained about 5 years of life expectancy. However, big differences exist between countries and genders. Concerning men, in Bulgaria, the life expectancy at 65 is only 13 years, while in France it is almost 17 years. Concerning women, the respective years are about 16 and 21. Most of the New Member States are characterised by a relatively low life expectancy at 65. Additional years of life do not always mean years lived in good health.. The disability-adjusted life expectancy also called Healthy life expectancy, and the Disability Free Life expectancy, is the equivalent number of years in full health that a person at a specific age can expect to live based on current rates of ill health and mortality. Concerning men, the disability free life expectancy is 6,1 years in Hungary and 11,8 years in Italy. The respective years for women are 7,2 and 13,7 years. The variability (standard deviation) across countries of disability free life expectancy at 65 is higher compared to life expectancy at 65, both for men and women

This increase may be attributed both to expansion (people reaching higher extreme ages) and with compression of mortality (more and more people surviving in all ages). In the future life expectancies might not augment as rapidly as in the past.

Concerning morbidity, the rates vary sharply between countries. Concerning cancer in males aged 65-74, they range from 1.532 in Greece to 2.097 per 100.000 in Belgium. For women, they range from 753 in Greece to 1.431 per 100.000 in Denmark. In the past the New Member States had a lower incidence of cancer compared to EU 15, but currently the rates seem to converge. Among men, trachea/bronchus, prostate, colon/rectum and bladder cancer are the most numerous. Among women the most common are breast, colon/rectum, trachea/bronchus and stomach cancer.

Diabetes is a chronic illness that is rising both among the elderly people and among young people. Data indicate big differences between countries and raise questions on the efficacy of national policies. They raise also questions on lifestyles, as factors like obesity, too little physical exercise and bad diet play a major role.

Years lived with a disability measure the burden of chronic disease and disability. They measure the weight of chronic diseases leading to activity limitations. In 2002, the leading cause of years lived with disabilities among elderly people in Europe is mental health. This is due to the fact that mortality is relatively low for this disease and consequently the years lived with a mental health problem is higher compared to diseases associated with a high mortality rate.

Global mortality rate in Europe has decreased steadily in the last 30 years. However, there is a significant difference between the New Member States (960 per 100.000) and the EU 15 (654 per 100.000). Italy has the lowest standardised mortality rate (591 per 100.000) and Bulgaria the highest (1.146 per 100.000). The 10 new Member States and Bulgaria are at the top of mortality rate.

The probability of dying at 95 is similar between 1986 and 2002. The gains in the decrease of death rates seem to stem mainly from the gains in the age group 60 to 90 years old. An increasing number of people reach extreme ages. The main causes of death for persons aged 65 and over are the diseases of the circulatory system, followed by cancers. Cardiovascular diseases account for almost half of deaths. Malignant neoplasm (cancers) counts for about 25%. Mortality rates are declining but the trend indicates that the rate of decline might be slowing down.

The new Member States seem particularly affected by cardiovascular related deaths. The standardised death rate[15] from ischaemic heart disease was 93 per 100.000 in the EU 15 but 176 in the New Member States, in 2002. It is interesting to note that the Mediterranean countries keep the lowest places and have significantly lower death rates. This has been attributed to lifestyles and notably to the Mediterranean diet.

The death rate for all ages from cancer seems quite stable during the last 30 years. But the death rate of people 65 and over has increased significantly since 1990 in the new Member States.

Death rates from cerebrovascular diseases have experienced a steady decrease during the last 30 years. However, the decrease has been lower in the new Member States and the gap between EU 15 and EU 10 has increased significantly. The decrease seems to have decelerated during the last years. Cerebrovascular diseases play also an important role to the health balance as they lead to serious chronic disabilities and care dependencies. They are the first cause of serious disabling illnesses.

WHO uses the Disability Adjusted Life Years (DALY) to express lost years of healthy life (life lost to premature death and years lived with a disability). The leading causes of the burden of disease in Europe among elderly people aged 60 and over, are cardiovascular diseases, malignant neoplasm and neuropsychiatric conditions. This requires monitoring of these diseases in order to better design future programmes.

We consider that severe activity limitation is a good indicator for need for assistance in a large approach of care dependency. In fact, it includes often limitations both for activities of daily living (washing, eating, etc.) and instrumental activities (e.g. cooking, shopping, cleaning). Dependency on a narrow sense covers basically the need for a third person for the accomplishment of daily activities. We estimate at about 16,4 Mio the number of people aged 65 and over with a severe activity limitation in the EU 25, and about 5,8 Mio elderly persons with a need of daily care.

Non-communicable diseases are essentially diseases of later life and many are preventable or can be postponed. The most important non-communicable diseases like cardiovascular diseases, cancer and diabetes are linked to preventable risk factors. Failure to prevent them appropriately might result in important costs and activity limitations.

Prevention may take the form of “Primary” prevention (for example avoidance of tobacco use), “Secondary” prevention (notably screening for the early detection of chronic diseases), and “Tertiary” prevention (for example appropriate clinical management of diseases). Available statistics focus on secondary prevention. They reveal big differences among member states. These differences might reveal a lack of relevant policies and hence the need for the elaboration of efficient prevention programmes.

There is a big variability across countries of prevention practices and examination rates meaning that there is a potential to learn from each other and to define common strategies. Also, as noted above, morbidity incidence varies across countries. Consequently, major health gains might be possible for many countries if health promotion activities and preventive public health actions are developed.

[15] SDR is the age-standardized death rate calculated using the direct method, i.e. represents what the crude rate would have been if the population had the same age distribution as the standard European population.

## PART B: LIFESTYLES AND DISEASE PREVENTION

## INTRODUCTION

In order to improve the quality of life in the European growing aged populations, and to prevent diseases, two possibilities are generally offered: either focus on the population at risk and try to prevent the disease, or act in a long-term perspective and target the entire population by promoting health. The World Health Organisation (WHO) stresses the importance of a life course approach[16]. Adopting healthy lifestyles could effectively reduce the prevalence of a certain number of diseases or postpone others.

The table below compares the advantages and disadvantages of both approaches addressing prevention and health promotion: the population approach versus high risk/clinical approach.

**Table 7: Comparison of high risk and population strategies for diseases prevention and health promotion**

| Approach | Advantages | Disadvantages |
|---|---|---|
| High Risk | - intervention appropriate to individual and socio-economic groups<br>- subject motivation<br>- physician motivation<br>- cost-effective use of resources<br>- benefit/ risk ratio favourable | - difficulties and costs of screening<br>- limited potential for population<br>- behaviourally inappropriate |
| Population | - large potential for population<br>- behaviourally appropriate | - small benefit to individual<br>- poor motivation of subject<br>- poor motivation of physician |

Source: Adapted from Mills et al., "From Stroke Prevention to Health Gain: Final Report", 2002.

This part will present how different lifestyles (nutrition, smoking/alcohol, physical activity) influence health and find out what are the implications for attitudes and healthy ageing. It will also present an overview of screening methods for cancer and cardio-vascular diseases.

[16] WHO (2001).

## CHAPTER 1:Physical activity

Physical activity seems to be a strong predictor of successful ageing. It reduces the number of falls, improves strength, gait and balance, reduces blood pressure and promotes mental health and social activity. It also reduces the risk of contracting non-communicable diseases (cardiovascular disease and type 2 diabetes). The World Health Organisation (WHO) considers that, in order to benefit health, individuals should participate in at least 30 minutes of at least moderate intensity activity per five or more days a week but even intermittent daily activity of moderate intensity benefits health (WHO, 2002)[4].

However, a great proportion of older adults are not sufficiently physically active to maintain good health. They represent the more sedentary segment of the adult population. Some 61,5% of elderly people aged 65 and over do not do any moderate physical activity, compared to some 44% among the 26-44 age group.

**Table 8: Time spent on moderate physical activity in the last 7 days by age, EU15**

| | 26-24 years | 45-64 years | 65+ years |
|---|---|---|---|
| No moderate physical activities | 44,2 | 46,1 | 61,5 |
| 30 minutes or less | 10,2 | 10,0 | 7,6 |
| 31 to 60 minutes | 20,5 | 18,1 | 13,0 |
| 61 to 90 minutes | 4,0 | 4,4 | 4,0 |
| 91 to 120 minutes | 12,5 | 12,4 | 7,8 |
| More than 120 minutes | 3,3 | 4,0 | 2,6 |
| Don't know | 5,1 | 5,0 | 3,6 |

Source: Eurobarometer, "*Physical activity*", European Commission, 2003.

However, big differences exist across Member States. In Belgium, the percentage of the population considered as a risk group due to insufficient physical activity reaches about 28% for males, aged 65-74 years, 43% for females of the same age group, 51% for males above 75 years and nearly 70% for females above 75 years.

In Italy, 49% of men aged 60 and over do not practice any physical activity, 42% do practice some physical activity, 3,4% do practice physical activity in an irregular way, and only 5,3% do practice sport in a continuous way. Among women, 70% do not practice any physical activity, 28% do practice some physical activity, 0,7% do practice sport in an irregular way, and 1,8% do practice physical activity in a continuous way[17].

Participation in social and cultural activities of elderly people is also important for an active ageing. In France, the membership in the associative life concerns 27% of elderly people[18]. Men attend cultural and artistic organisations (13,6%), or sports organisations (12,8%), but also trade unions or political associations (7,8%). Women of the same age concentrate their interests on art, culture (15%) and sport (10%)[19].

WHO reports that empirical evidence suggests that in comparison with sedentary people, physically active people:

- Run 50% less risk of dying from coronary heart disease (CHD) and stroke;
- Are at lower risk of hip fracture (30–50%), hypertension (30%), colorectal cancer (40–50%) and non-insulin-dependent diabetes (20–60%);
- Are 50% less likely to become obese;
- Have a 25–50% lower risk of developing functional limitations in later life; and
- Show a 50% slower decrease of aerobic capacity (which occurs with age), thereby gaining 10–20 years of independent living.

[17] Istituto di Ricerche sulla Popolazione (1999).
[18] Haut Comité de la Santé Publique (1997).
[19] Mouvement chrétien des retraités (1998).

In 2002, WHO estimated the disease burden in disability adjusted life years (DALYs) related to physical inactivity in western industrialised countries. As noted above DALYs measure lost healthy life years due to disease and death. Physical inactivity was estimated to cause 6-7% of all premature deaths and 3-4% of the disease burden[20]. However, these data cover the whole population.

Professional advice to "go from doing nothing to doing something" and physical rehabilitation programs that help older people recover from mobility problems are both recognized as effective and cost-efficient by the World Health Organisation (WHO).

Disabling illnesses refer to the total loss of longevity and quality of life caused by illness in a society. In the Netherlands, the National Institute of Public Health and the Environment (RIVM) has calculated for the total population that the following lifestyles contribute to disabling illnesses[21] (the aggregate of shorter and poorer quality life through illness):

- Smoking 15 %
- Excessive use of alcohol (excluding accidents) 7 %
- Too little physical exercise 5 %
- Too much saturated fat 5 %
- Too few fruit and vegetables 4 %

The Dutch cabinet estimates that at least 20 percent of all disabling illnesses are attributable to unhealthy lifestyles and hence theoretically avoidable. The RIVM has also calculated that between 5 and 9 percent of total expenses for health care are the result of unhealthy lifestyles, obesity and high blood pressure.

A generalisation of physical activity could reduce[22]:

- 15 to 39% the number of coronary diseases,
- 33% cerebral vascular accidents (CVA),
- 12% hypertension cases;
- 12 to 35% diabetes cases;
- 18% of fractures and osteoporosis.

The universal access to effective health services in the Member States is the base of health systems. However, substantial differences concerning health across Member States seem to result much more from different lifestyles than from failures in public health services.

[20] National Food Administration (2005).
[21] Ministry of Health, Welfare and Sport (2004).
[22] Inspection Générale des Affaires Sociales (2003).

## CHAPTER 2:Nutrition

The estimations presented in the previous chapter present nutrition as a significant contributor to years lost due to bad health or death.

WHO considers that the burden of disease attributable to nutrition is greater than is often thought. A better diet (for example, the consumption of more fruit and vegetables) would significantly reduce the risk of chronic disease like cardiovascular disease, cancer, diabetes, obesity, osteoporosis, etc.

Preliminary analysis from the Institute of Public Health in Sweden suggests that poor nutrition accounts for 4,6% of the total disability-adjusted life-years (DALYs) lost in the EU.

In the European Region, about 41% of lost years of healthy life are due to diseases with major nutritional determinants, and about 38% of these lost years are due to diseases in which nutrition plays a role (WHO)[23].

It has been estimated that over 26.000 deaths before the age of 65 years would be prevented annually in the EU if fruit and vegetables intake was levelled up to the highest consumption levels, and about double this number of deaths before the age of 75 years. According to the intake data, the mean consumption in about seven of the Member States is less than 275 g of vegetables and fruit per person per day, corresponding to less than 70% of that recommended by WHO[24]. Yet the majority of countries of the Region do not meet the current WHO recommendations of 400 g per person per day. On the contrary, fat intake is too high (WHO recommends a daily fat intake of less than 30% of total energy) in the majority of European countries.

From an economic point of view, it has to be noted that diet-related diseases can account for some 30% of National Health Service costs. Improvements in nutrition will therefore bring economic benefit by reducing the burden of disease in the population (WHO).

Policies on food supply, pricing and technology, product promotional activities, and public health messages can play a role in the adoption of a better diet[25]. In September 2000, the WHO Regional Committee for Europe endorsed the "First Action Plan for Food and Nutrition Policy, 2000–2005". General food and nutrition plans have been promoted notably by Belgium, France, Finland and Slovenia.

The "National Diet and Nutrition Survey: people aged 65 years and over"[26] conducted in Britain revealed that even if most older people have a good nutrition, some subgroups, in particular those without their own teeth, those living in institutions, older age groups and low socio-economic groups, do need improvement in this domain. It was also concluded that people should not wait until they are 65 years of age to implement good eating habits[27].

According to the American Nutrition Screening Initiative (NSI), for every $1 invested in nutrition programmes, $3,25 is saved in health care costs[28]. A certain number of experts consider that in order to reach the objective of a healthy nutrition, health education might be less important than lowering the price and improving the availability of balanced food.

[23] WHO Regional Office for Europe (2004).
[24] Joffe et al. (2001).
[25] Idem.
[26] Finch et al. (1998).
[27] British Nutrition Foundation, 'Nutrition and older people', 1999.
[28] Meals on Wheels, Nutrition programmes, Programme evaluation and cost-effectiveness http://www.meals.org/meals/nutrition.htm

# CHAPTER 3:Smoking

Smoking seems to be the most important modifiable risk factor both for young and elderly people. It is also, a major preventable cause of premature death.

The Swedish National Institute of Public Health considers that smoking remains the principal cause of death and morbidity in the European Union[29]. It is a major cause of cancer and heart disease and also increases the risk of respiratory disease. Furthermore, several studies indicate that smoking actually increases the risk of Alzheimer[15].

The percentage of present smokers in the female European population aged 65-74 years varies between 1% (Portugal) and 32% (Denmark). For females aged 75-84 this percentage varies between 1% (Portugal) and 26% (Denmark and Austria). Finally, between 1-2 % (Portugal, France, Belgium, Germany) and 27%(Austria) of women over 85 years who currently smoke.

For men aged 65-74 these percentages are 15% for France and 39% for Denmark. For men aged 75-84, the rates vary between 10% (Sweden and France) and 31% (Denmark). For men aged 85 and over the rate varies between 4% (Spain) and 28% (Austria)[30].

These data ought to be interpreted with caution when evaluating policies. Quitting smoking decreases the risk but only very slowly in certain cases. Consequently, current rates are not a good indicator. Past exposures ought to be taken into account. In any case, these data indicate that smoking could be reduced further among elderly males in a certain number of countries.

Among female smokers aged 65 and over, there are on average 25% who smoke more than 20 cigarettes per day. The same rate for men amounts to 35%.

Peto et al.[31] estimated that about half of regular smokers will die because of tobacco and that those who will die prematurely because of tobacco lose on average 22 years of life expectancy. Even those dying as a result of smoking at age 70 or older lose 8 years.

In France, more than 1/3 of deaths due to cancer are attributed to the consumption of tobacco[32].

The following table give us an overview of deaths attributable to smoking.

**Table 9: Mortality due to smoking as a proportion of all deaths, EU25, 2000**

| Cause | **Males** | | **Females** | | **All** | |
|---|---|---|---|---|---|---|
| | Total number of deaths | Attributable to smoking in % | Total number of deaths | Attributable to smoking in % | Total number of deaths | Attributable to smoking in % |
| Lung cancer | 171.000 | 91 | 53.000 | 65 | 224.00 | 85 |
| All cancer | 626.000 | 38 | 493.000 | 9 | 1.119.00 | 25 |
| Cardiovascular | 846.000 | 16 | 1.028.000 | 5 | 1.873.000 | 10 |
| Respiratory | 194.000 | 40 | 178.000 | 19 | 371,000 | 30 |
| All causes | 2.214.000 | 23 | 2.238.000 | 7 | 4.452.000 | 15 |

Source: Peto et al. cited in "*Tobacco or Health in the European Union. Past, present and future. The aspect consortium. Document de synthèse*", European Public Health Alliance, European Commission, 2004.

[29] Berleen (2004).
[30] Eurostat (2003).
[31] Peto et al. (2004).
[32] Inspection Générale des Affaires Sociales (2003).

It is important to note that smoking cessation seems to be highly cost-effective when compared with other types of preventive interventions[33].

Smoking cessation treatments have been shown to be effective for older adults. Contrary to common thinking, it is possible for smokers over the age of 65 to quit smoking. The "4 A's" (Ask, Advice, Assist, and Arrange follow-up) in patients aged 50 and over has been demonstrated to be efficient. So did counselling interventions, physician advice, buddy support programmes, age-tailored self-help materials, telephone counselling, and the nicotine patch. Furthermore, due to particular concerns of this population, as mobility issues, the use of proactive telephone counselling appears particularly promising with older smokers[34].

E. Johnson et al. (2003) study persons aged 40-95 years in private households, in the US. They first estimate the disease risk between smokers and non-smokers. Then they calculate the fraction of diseases attributable to smoking. Finally, they estimate the average difference in medical expenditures for persons with and without disease. They estimate that 53% of the medical expenditures for persons with lung and laryngeal cancer or chronic obstructive pulmonary disease and 13% of medical expenditures for cardiovascular disease, stroke and other smoking-caused cancers are attributable to smoking. The attributed fraction of disease cases is slightly larger for people younger than 65 than for people older than 65 years old. They estimate that 6,6% of medical expenditures for persons 40-94 years of age are attributable to smoking. This is slightly lower compared to other studies.

Finally, a Swedish study provides a summary evaluation of the different factors that contribute to disability adjusted life years (DALYs). It covers all ages. A certain number of contributing factors are relevant to elderly people but others like unemployment are not relevant. Concerning people aged 65 and over, it has to be noted that smoking might contribute relatively less as elderly people generally smoke less compared to younger ages.

**Table 10: Proportion (%) of the burden of disease (DALYs) that can be ascribed to various contributory causes**

| Risk factor | Sweden | EU |
|---|---|---|
| Smoking | 8,0 | 9,0 |
| Alcohol use | 3,5 | 8,4 |
| Vegetable/fruit deficiency in food | 4,0 | 3,5 |
| Overweight | 2,8 | 3,7 |
| Unemployment | 2,4 | 2,9 |
| Work-environment factors | 2,2 | 3,6 |
| Drug use | 1,7 | 2,4 |
| Fat content of food | 1,5 | 1,1 |
| Physical inactivity | 4,4 | 4,4 |
| Relative poverty | 1,2 | 3,1 |

Source: Diderichsen, Dahlgren, Vagerö (National Institute of public health, 1997; in National Food Administration – National Institute of Public Health: "Background material to the Action Plan for Healthy Dietary Habits and Increased Physical Activity"; Sweden, 2005.

It is important to note that smoking and alcohol cause a severe disease burden because several diseases and death events occur at young ages. Consequently, the length of life with disability or life years lost are important.

[33] Haapanen-Niemi (2000).
[34] U.S. Department of Health and Human Services Public Health Service 2000

## CHAPTER 4: Screening for cancer and cardio-vascular diseases

### 1.1 Cancer

Several countries organise nation-wide systematic breast cancer screening campaigns. The Netherlands have a national screening programme for several illnesses, including breast and cervical cancer with the objective of reaching an 80% screening level for breast cancer, and a 75% screening level for cervical cancer.[35] France has set an 80% screening level for both cancers in women aged 50-79 years and 25-69 years respectively. Finland has a nation-wide breast cancer screening programme for women aged 50-59 years and can be extended to women up to 64 years old. Sweden, the UK, Germany and Belgium also have a national organised screening programme. Other countries have opted for an opportunistic or spontaneous cancer screening. The periodicity of the tests ranges from two to three years.

When comparing[36] the percentage of female population ever having had a mammography in France, Denmark, Italy and The Netherlands, few young women (aged 15 to 24) have ever had a breast cancer-screening test, whereas the rates increase with age, but decline in all countries after age 55-64. Denmark has the lowest rates of women ever having had mammography up to age 65-74.

As noted in the introduction, "Primary" prevention includes for example avoidance of tobacco use. "Secondary" prevention includes notably screening for the early detection of chronic diseases and "Tertiary" prevention includes for example appropriate clinical management of diseases. Secondary prevention of cancer appears as the most cost-effective alternative.[37] Tertiary prevention of cancer often entails high economic and social costs of treatments undertaken at a late stage of the disease. The cost of diagnosis, treatment and follow-up at an early stage of the cancer was estimated around € 3.487 in the US, whereas costs related to the treatment of an advanced stage of cancer amounted to some € 10.687, triple the initial costs.[38]

Furthermore, socio-economic status and health status seem to determine to some extent access to screening tests. Both in younger and older age groups, women with unhealthy lifestyles, with poor perception of their own health and with low survival expectation were less likely to be screened. Those with higher education, regular medical check ups, higher economic status and better insurance coverage were more likely to be screened. The degree of insurance coverage is a determinant of access to health care as those with no additional health coverage were less likely to receive influenza vaccination, cholesterol testing, mammography, or Pap tests. Women with a higher educational level are more likely to have ever had a mammography, particularly in Italy and France. But the effect of education is very small in Denmark and even opposite in the Netherlands. Little difference is found between economically active and inactive women.[39] No particular pattern can be found between women having had a mammography test in the past year and their educational level and economic status.[40]

Lorant et al. (2002) have shown that socio-economic status determines utilisation of preventive strategies. The lowest quintile had a lower likelihood to undergo a cholesterol screening compared with the highest quintile. Women age 50-59 were three times more likely to have a mammography while women aged 25-64 were six times more likely to undergo a pap test. For both mammography and pap test, socio-economic status was a discriminating factor for the lower categories where the likelihood of undergoing both screenings decreased gradually with the socio-economic status.

[35] Ministry of Health, Welfare and Sport (2004).
[36] Eurostat (2003).
[37] Ministère de la Communauté française de Belgique (2004).
[38] U.S. Department Of Health and Human Services (1999).
[39] Data refer to Denmark, The Netherlands and Iceland.
[40] Eurostat (2003).

The study also highlighted that inequity in access to prevention strategies was higher in specialised settings than in general practice, which can be partly explained by the fact that prevention screening is implemented in specialised settings (e.g. mammography) and lower socio-economic categories have a lower probability to resort to a specialist. Implementing preventive strategies in a general practice setting would increase the probability of disadvantaged populations to benefit from them[41].

### 1.2 Cardio-vascular diseases

In the Netherlands, the National Institute of Public Health and the Environment (RIVM) estimates that the following factors contribute to disabling illnesses:

- Obesity 6%
- Too high blood pressure 6%
- Too high cholesterol levels 3%, and
- 2 to 5% of all disabling illnesses are due to residential and social environments, including air pollution and indoor environments (at home and in the office).

A follow up of coronary heart disease (CHD) trends over 10 years in 21 countries registered a 27% fall of CHD mortality, 6% of which only were attributable to treatments and 21% to change in risk factors.[42] Consequently, it appears that risk factors play a significant role in reducing cardiovascular diseases.

In the European Union, in countries with a very low child and adult mortality, cardiovascular diseases account for 41,1% of deaths, and they represent 39% of years of life lost due to premature mortality in individuals aged 60 and over[43].

As for cerebrovascular disease, related mortality declined by 55% in men from 1965-69 to 1995-97, and by 57% in women for the same period in the EU15. In contrast, Eastern European countries observed a rise in mortality of both coronary heart disease and cerebrovascular disease until late 1990s. Poland and the Czech Republic managed to reverse the trend starting mid 1990s, mainly due to change of diet in Poland, including more fresh fruit and vegetables, rather than change in smoking habits, drinking or other medical care. In the Czech Republic, the decline has been associated with changes in diet, smoking habits, cholesterol levels, and blood pressure[44].

Death rates from coronary heart disease (CHD) are higher in Northern Europe (United Kingdom, Denmark and Ireland) and lower in Southern Europe. One third of women aged 55-64 with heart disease face activity limitations, and more than half those over 75. Cardiovascular diseases in women are the leading cause of hospital admissions and general practice consultations in the United Kingdom[45]. The gender aspect of cardiovascular diseases in general, and coronary heart disease in particular, is of utmost importance given the increasing proportion of older women in the population and hence, the increase of coronary heart disease incidence among them.

Screening for cardiovascular risk indicators is carried out either as systematic screening or an opportunistic assessment of risk. In The Netherlands, where opportunistic screening is privileged, a study carried out in 1991-1992, measured the value of one cardiovascular health check in addition to the usual normal care, and its effectiveness in detecting new risk factors, unknown to the general practitioner and patient so far. The results indicate that "in 32% of the 805 participants, one risk indicator was observed, in 27% two risk indicators, in 17% three risk indicators, and in 11% four or more risk indicators." [46] As for the unknown risk indicators detected during the cardiovascular health

[41] Lorant, et al. (2002).
[42] Kelly et al. (2004).
[43] Mathers et al. (2003).
[44] The rates mentioned in this paragraph refer to the world age standardised death rates.
[45] European Institute of Women's Health (1997).
[46] Pieter J. van den Berg et al. (1999).

check, they were detected in 25,1% of patients. Furthermore, compared to the initial medical history of the patients filled on the basis of normal health checks, the cardiovascular health check included questions on family history, smoking and obesity. As a result of the inclusion of these risk indicators, 59% of patients had at least one of them that were not mentioned in their initial medical summary.

Conclusions on the causal effect of classic risk factors on cardiovascular diseases have to be drawn down with caution and addressed separately regarding each cardiovascular disease. According to surveys conducted in the frame of the WHO MONICA project during a time frame of 7 to 13 years, it appears that changes in stroke trends are attributable partly to changes in risk factors, and the association is stronger for women.[47]

Hypertension is one of the major risk factors for coronary heart disease and is the most important risk factor for stroke. There is a good knowledge of how to reduce blood pressure effectively which could reduce significantly stroke morbidity and mortality. However, even in countries with well-established programmes for hypertension control, the levels of awareness and effective control are very low[48].

[47] Tolonen et al. (2002).
[48] Giorgianni et al. (2000).

## CHAPTER 5: Obesity

The increasing prevalence of overweight and obesity has become a major public health problem in developed countries, contributing to significant excess disease and mortality. Obesity reduces life expectancy and people who are obese or overweight have a higher risk of disease including cancer, coronary heart disease, diabetes, hypercholesterolaemia, hypertension, gallstones, degenerative joint disease and obstructive sleep apnoea [49].

Several reasons have been put forward to explain the national trends in obesity. According to the British Nutrition Foundation, sedentary lifestyles appear to be the most important factor.

It is worth noting that even modest weight loss is associated with health benefits and it can also reduce the costs associated with treating some of these conditions (NHS, 1997). According to current knowledge, obesity is a reversible condition, and with careful attention to both prevention and treatment it should be possible to tackle this problem in the future[50].

The Body Mass Index (BMI) is a quick and useful way of making an initial assessment and monitoring of weight. An obese person is considered to be a person who's Body Mass Index (BMI) is superior to 30 [51] [52].

The percentage of the European female population that is obese in the 65-74 age bracket varies between 8% (Norway) and 33% (Germany). For women aged between 75 and 84 years, this percentage varies between 7% (Norway) and 34% (Germany). Finally, for women aged 85 and over, this percentage varies between 3% (Ireland) and 24% (UK).

Concerning the male population aged 65-74 years old, the obesity prevalence varies between 5% (Norway) and 24-25% (UK and Belgium). For the 75-84 age group, the rate varies between 5% (Netherlands) and 17% (UK and Germany). Finally, between 1% (France) and 11% (Norway, Portugal and the UK) of males over 85 years are obese.

The above data indicate that big differences exist between countries and that efforts ought to be deployed in order to lower the proportion of obese persons especially in those countries where this percentage is high (e.g. Germany and UK).

Furthermore, epidemiological surveys indicate that the prevalence of obesity is increasing.

Body Mass Index increases with age in both men and women up to the age of 64 years, and then decreases slightly in older age groups. The relationship between BMI and social class varies with gender. For women, BMI tends to be higher in the manual social classes than in the non-manual social classes. For men, the pattern is less clear. Furthermore, an inverse association has been reported between educational attainment and BMI, particularly amongst women[53].

Although it is difficult to compare costs across countries and to extrapolate the results from one country to another, it has been estimated that, in Europe, obesity, overweight and the treatment of obesity-related diseases account for 2–8% of all medical costs[54].

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[49] University of York, 1997; 3(2).
[50] British Nutrition Foundation (1999).
[51] The Body Mass Index can be calculated by dividing the weight in kilos by the square of the height (Weight (kg)/ Height ($m^2$)).
[52] University of York, 1997; 3(2).
[53] Condon (2003).
[54] British Nutrition Foundation, 'Ob-age. Report 1'(2004).

Excess weight is calculated to be responsible for nearly 1/12 of all deaths recorded in the EU through its contribution to cardiovascular disease (CVD) and cancer. Estimates suggest that modest changes in diet and physical activity could prevent up to 60% of cases of diabetes. The risk of diabetes is increased up to 100 fold by obesity, and 80% of the prevalence of diabetes can be attributed to obesity and overweight[55].

Condon (2003) estimated that people who are obese at the age of 40 could expect their life expectancy to be shortened by up to seven years, compared with people of a healthy weight. Women who were obese at the age of 40 lost 7,1 years of life, while men lost 5,8 years, when compared with adults of a similar age and with a healthy weight. Obese people who smoked were even more at risk, with females losing 13,7 years of life altogether and men losing 13,3 years, compared with people of a healthy weight who did not smoke.

In 2002, WHO estimated that overweight and obesity was causing 7% and 8% of the total disease burden among men and women in Europe[56].

As the children of today will be the adults of tomorrow, information concerning children and adolescents may provide us estimations for the coming years. Available results[57] indicate that life expectancy might decrease due to obesity in the coming years. In fact, child obesity caused by high-fat diets and especially by sedentary lifestyles might create a health crisis. Obesity-related illnesses might lead to rising death rates reducing, for the first time in more than a century, the average life expectancy. Children growing up today might then have a shorter life expectancy than their parents.

The Swedish Public Report 2005 notes that over 50% of men and 36% of women in Sweden between the ages of 16 and 74 are overweight or obese. The number of obese adults has doubled since 1980 and the number of overweight people has increased by about 25%. The number of obese people is increasing in all age groups. The Swedish Council of Technology Advancement in Healthcare estimates that around 60% of people living in Sweden could be overweight or obese in 2030 if the prevalence of obesity and overweight increases at the same rate as during the 1990s. This means that direct medical costs for obesity are expected to rise by 120% between 2003 and 2030[58]. The number of obese people is increasing in all age groups. However in terms of DALYs, the contribution of elderly people is relatively lower as their life expectancy is lower compared to younger people.

[55] British Nutrition Foundation (2004).
[56] National Food Administration ( 2005).
[57] Adams, M. (2003).
[58] National Food Administration ( 2005).

## CHAPTER 6: Falls and osteoporosis

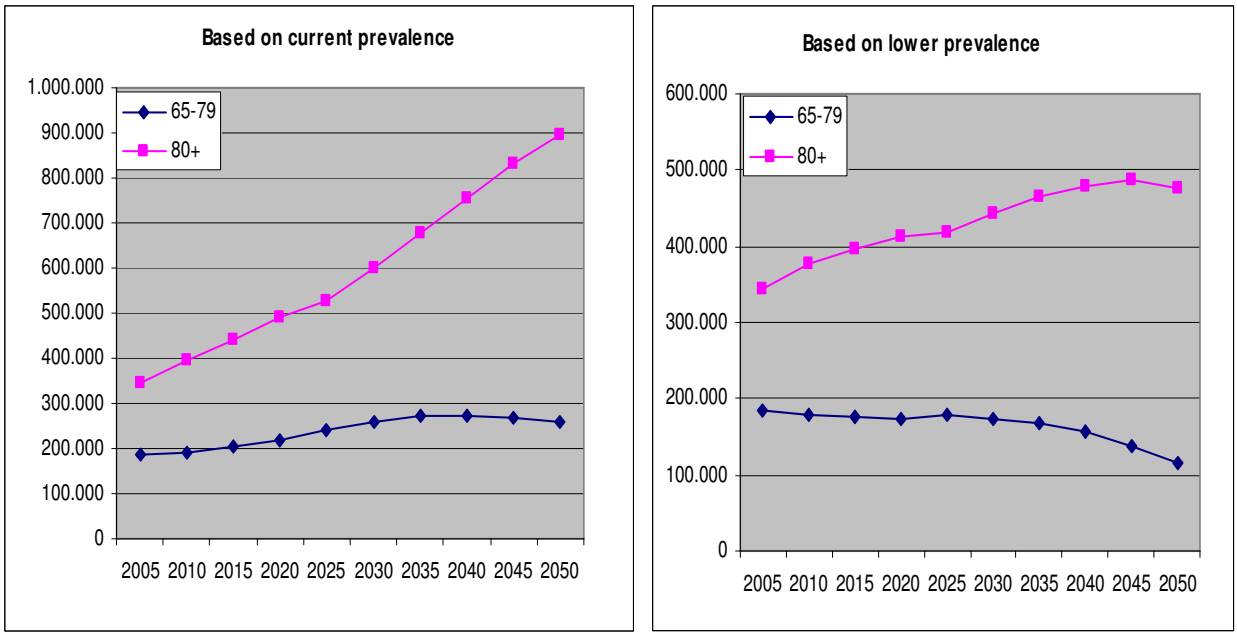
WHO defines osteoporosis as "a progressive systemic skeletal disease characterized by low bone mass and architectural deterioration of bone tissue, with a consequent increase in bone fragility and susceptibility to fracture"[59]. Even the most insignificant falls can result in hazardous consequences like fractures, and by this way, cause a great burden on society[60].

Osteoporosis and the propensity to fall determine to a large extent the occurrence of hip fractures. Prevention of osteoporosis and fractures, particularly among older individuals aged 80 and over, may in turn have an impact on mortality, morbidity and quality of life. Hip fracture is the most serious consequence of osteoporosis and the risk increases considerably with age. Persons aged 80 and over are at highest risk of hip fracture, the incidence being twice as high among women (2.117 per 100.000).

Available statistics are scarce and not comparable across countries. However, we consider that the Dutch hip fracture incidence rates estimated by Laet et Al. (1996) are reliable and an acceptable proxy at EU level. We estimated the number of fractures in the EU25 over the next five decades. The projections were carried out with and without an assumption about the evolution of hip fracture rates. The projections not including an assumption were based on applying the current age specific hip fracture rates to the population projection figures. The projections including an assumption were based on shifting the hip fracture rates towards the lower age category in 2050.

Results show that if the current age specific hip fracture rates were applied to the population projection figures, the number of hip fractures would more than double among older people aged 80 and over, the increase being more significant among men (240% increase between 2005 and 2050). This rise would be the result of demographic ageing alone, especially of the striking rise of the very elderly people. Furthermore, the female/ male ratio has been decreasing in many countries. High rates of increase of hip fracture among men could be attributable to improving life expectancy.

**Figure 29: Projection of the number of hip fractures by age groups, EU 25**




Data source: Eurostat and Laet et Al. (1996)

[59] WHO Regional Office for Europe (March 2004).
[60] WHO (2003).

When assuming a shift of hip fracture rates towards the lower age category in 2050 because of better lifestyle factors and to better education, the projections show a more moderate rise of the number of hip fractures among people aged 80 and over. The number of hip fractures among men is expected to increase by some 75% over the next decades, compared to 29% among women.

Common and repetitive falls are, for people aged 65 and over, the principal cause of injury leading to death or hospitalisation. Falls and fractures are then, especially for the elderly persons, associated with high morbidity, mortality and substantial costs. But the impact of falling has repercussions far beyond physical pain. A serious fall can also lead to short – or long-term curtailment of activity because of concern about further falls and also to physical disability, anxiety, depression, reduced confidence, social isolation and dependence. So, falls and their consequences have a major impact on the health, independence and well being of older people and their families. Falling can, by this way, devastate health and quality of life [61].

The risk of falls increases with age - especially over 80. We cannot find any gender differences in the risk of falling. There is little difference in the number of falls between the sexes. But women tend to experience more severe injuries. Concerning minority ethnic groups, there is no evidence of higher rates of falls among them[62].

In the UK, osteoporosis results in over 200.000 fractures each year, causing severe pain and disability to individual sufferers at an annual cost to the National Health Service (NHS) of €2,4 billion. More than one-third of adult women will sustain one or more osteoporotic fractures in their lifetime. Lifetime risk in men is approximately half that in women[63].

Taking account of the ageing of the UK population, it is estimated that there will be a doubling of the number of osteoporotic fractures over the next 50 years if changes are not made in present practice[64].

In Sweden in 1990, it is estimated that injuries (home, road, etc.) have reached about 7 billion Euros, equivalent to over 4% of GNP[65].

[61] Health Education Authority (1999).
[62] British Heart Foundation National Centre.
[63] Health Education Authority (1999).
[64] Health Education Authority (1999).
[65] Jansson (1994).

## CHAPTER 7: Mental health

WHO defines mental disorders as "a set of symptoms or behaviour reflecting a cerebral dysfunction, associated in most cases with distress and interference with personal functions"[66]. Mental problems cause a greater burden of disease (DALYs) than cancer. It also constitutes a substantial and costly public health burden[67].

Several studies have suggested that mental health disorders of people in advanced age are under-diagnosed. According to Kivelä[68], 19-20 % of elderly women and 15-22 % of elderly men in Finland were assessed to have depression or depressive symptoms.

The principal mental disorder affecting older people is Alzheimer's disease. The single largest risk factor for developing Alzheimer's disease is age. Consequently, as life expectancy increases, the number of persons with Alzheimer's disease is expected to increase.

Another important component of mental health is depression. In the UK, one in seven people over the age of 65 years suffers from depression. More severe states of depression are less common, affecting about 3-5% of older people[69]. One in 20 people suffers from dementia, which rises to one in five over the age of 80. Depression in people aged 65 and over is especially under-diagnosed and this might be particularly true of residents in care homes.

Also, it is estimated that in the UK, by 2026 there will be 840.000 people with dementia, rising to 1,2 million by 2050[70].

During the discussion on DALYs, we noted that mental disorders are not an important factor of mortality but a major cause of low quality of life. Furthermore, although the prevalence of mental disorders is weak, it is increasing because of the recent high incidence of such disorders. By 2020 depression is expected to be the second leading cause of disability adjusted life years (DALYs) lost, second only to ischaemic heart disease[71].

In the Netherlands, the estimated number of cases of depression and anxiety disorders in 2000 and 2020 are 15% and 12% respectively. The number of people with dementia is predicted to increase to more than 400.000 by the year 2050[72].

In the coming decades, the WHO expects depression in industrialised countries to develop into a number one public illness. In 2002, mental disorders are the leading cause of years lived with disability among elderly people in Europe and is expected to become the second leading cause of DALYs lost. In several member states, the number of cases of depression and dementia are projected to rise over the next decades as the number of older people is expected to rise too.

It has been claimed that the development of diagnostic and therapeutic skills in mental health problems of elderly people has largely been neglected. Therefore it has been recommended that preventive programmes (e.g., community-based regular screening of the elderly clients) and screening practices in the primary care settings be developed.[73]

[66] WHO Regional Office for Europe (2002).
[67] University of York, 1997, 3(3).
[68] Kivelä (1993).
[69] Baldwin et al. (1997).
[70] Department of Health (2001).
[71] WHO Regional Office for Europe (2002).
[72] Ministry of Health, Welfare and Sport (2004).
[73] STAKES the National Research and Development Centre for Welfare and Health (2000).

## SUMMARY AND CONCLUSIONS

Physical activity seems to be a strong predictor of successful ageing.

Some 61,5% of elderly people aged 65 and over do not do any moderate physical activity, compared to some 44% among the 26-44 age group. In 2002, WHO reported that physical inactivity was estimated to cause 6-7% of all premature deaths and 3-4% of the disease burden. However, these data cover the whole population.

Lack of physical activity, reduces notably the number of falls, reduces blood pressure and promotes mental health and social activity. The World Health Organisation (WHO) considers that, in order to benefit health, individuals should participate in at least 30 minutes of moderate intensity activity per five or more days a week but even intermittent daily activity of moderate intensity benefits health.

WHO reports that empirical evidence suggests that in comparison with sedentary people, physically active people: run 50% less risk of dying from coronary heart disease and stroke; are at lower risk of hip fracture (30–50%), hypertension (30%), and non-insulin-dependent diabetes (20–60%); have a 25–50% lower risk of developing functional limitations in later life; and show a 50% slower decrease of aerobic capacity (which occurs with age), thereby gaining 10–20 years of independent living. A generalisation of physical activity could reduce: 15 to 39% the number of coronary diseases, 33% of cerebral vascular accidents, 12% of hypertension cases; 12 to 35% of diabetes cases; and 18% of fractures and osteoporosis.

WHO considers that the burden of disease attributable to nutrition is greater than is often thought. A better diet would significantly reduce the risk of chronic disease like cardiovascular disease, cancer, diabetes, obesity, osteoporosis, etc

Preliminary analysis from the Institute of Public Health in Sweden suggests that poor nutrition accounts for 4,6% of the total disability-adjusted life-years lost in the EU. The World Health Organisation (WHO) proposes a higher estimate. Furthermore, WHO notes that diet-related diseases can account for some 30% of National Health Service costs. Improvements in nutrition will therefore bring economic benefit by reducing the burden of disease in the population.

The "National Diet and Nutrition Survey: people aged 65 years and over" conducted in Britain revealed that even if most older people have a good nutrition, some subgroups, in particular those without their own teeth, those living in institutions, older age groups and low socio-economic groups, do need improvement in this domain.

According to the American Nutrition Screening Initiative (NSI), for every $1 invested in nutrition programmes, $3,25 is saved in health care costs. A certain number of experts consider that in order to reach the objective of a healthy nutrition, health education might be less important than lowering the price and improving the availability of balanced food.

Smoking seems to be the most important modifiable risk factor both for young and elderly people. It is also, a major preventable cause of premature death. The percentage of present smokers in the European population aged 65-74 years varies between 1% and 39%. These rates decrease with age.

The Swedish National Institute of Public Health considers that smoking remains the principal cause of death and morbidity in the European Union. It is a major cause of cancer and heart disease and also increases the risk of respiratory disease. Furthermore, several studies indicate that smoking actually increases the risk of Alzheimer. Certain studies estimate that about 15% of all deaths are attributable to smoking (23% for men and 7% for women).

It is important to note that smoking cessation seems to be highly cost-effective when compared with other types of preventive intervention. Smoking cessation treatments have been shown to be effective for older adults. Contrary to common thinking, it is possible for smokers over the age of 65 to quit smoking. The "4 A's" (Ask, Advice, Assist, and Arrange follow-up) in patients aged 50 and over has been demonstrated to be efficient.

E. Johnson et al. study persons aged 40-95 years in private households, in the US. They find that 53% of the medical expenditures for persons with lung and laryngeal cancer or chronic obstructive pulmonary disease and 13% of medical expenditures for cardiovascular disease, stroke and other smoking-caused cancers are attributable to smoking. They estimate that 6,6% of medical expenditures for persons 40-94 years of age are attributable to smoking. This is slightly lower compared to other studies.

Several countries organise nation-wide systematic breast cancer screening campaigns. Secondary prevention of cancer appears as the most cost-effective alternative. The cost of diagnosis, treatment and follow-up at an early stage of the cancer was estimated around € 3.487 in the US, whereas costs related to the treatment of an advanced stage of cancer amounted to some € 10.687, triple the initial costs.

Furthermore, socio-economic status and health status seem to determine to some extent access to screening tests. Those with higher education, regular medical check ups, higher economic status and better insurance coverage were more likely to be screened. In certain countries, women with a higher educational level are more likely to have ever had a mammography.

Lorant et al. have shown that socio-economic status determines utilisation of preventive strategies. The lowest quintile had a lower likelihood to undergo a cholesterol screening compared with the highest quintile. The likelihood of undergoing screening decreased gradually with the socio-economic status. Lower socio-economic categories have a lower probability to resort to a specialist. Implementing preventive strategies in a general practice setting would increase the probability of disadvantaged populations to benefit from them.

A follow up of coronary heart disease (CHD) trends over 10 years in 21 countries registered a 27% fall of CHD mortality, 6% of which only were attributable to treatments and 21% to change in risk factors. In contrast, certain Eastern European countries observed a rise in mortality of both coronary heart disease and cerebrovascular disease until late 1990s. According to surveys conducted in the frame of the WHO MONICA project during a time frame of 7 to 13 years, it appears that changes in stroke trends are attributable partly to changes in risk factors, and the association is stronger for women.

The increasing prevalence of overweight and obesity has become a major public health problem in developed countries. Obesity reduces life expectancy and people who are obese or overweight have a higher risk of disease including cancer, coronary heart disease, diabetes and hypertension.

It is worth noting that even modest weight loss is associated with health benefits. According to current knowledge, obesity is a reversible condition, and with careful attention to both prevention and treatment it should be possible to tackle this problem in the future.

The percentage of persons aged 65-74 who are obese varies between 5% and 33% depending on the country and gender. Furthermore, epidemiological surveys indicate that the prevalence of obesity is increasing.

Although it is difficult to compare costs across countries and to extrapolate the results from one country to another, it has been estimated that, in Europe, obesity, overweight and the treatment of obesity-related diseases account for 2–8% of all medical costs. Estimates suggest that modest changes in diet and physical activity could prevent up to 60% of cases of diabetes. In 2002, WHO estimated

that overweight and obesity was causing 7% and 8% of the total disease burden among men and women in Europe.

D. Condon estimated that people who are obese at the age of 40 can expect their life expectancy to be shortened by up to seven years, compared with people of a healthy weight. Women who were obese at the age of 40 lost 7,1 years of life, while men lost 5,8 years, when compared with adults of a similar age and with a healthy weight.

Available results indicate that life expectancy might decrease due to obesity in the coming years. In fact, child obesity caused by high-fat diets and especially by sedentary lifestyles might create a health crisis. Obesity-related illnesses might lead to rising death rates reducing, for the first time in more than a century, the average life expectancy.

The Swedish Council of Technology Advancement in Healthcare estimates that around 60% of people living in Sweden could be overweight or obese in 2030 if the prevalence of obesity and overweight increases at the same rate as during the 1990s. This means that direct medical costs for obesity are expected to rise by 120% between 2003 and 2030. The number of obese people is increasing in all age groups. However in terms of DALYs, the contribution of elderly people is relatively lower as their life expectancy is lower compared to younger people.

Osteoporosis and the propensity to fall determine to a large extent the occurrence of hip fractures. Prevention of osteoporosis and fractures, particularly among older individuals aged 80 and over, may in turn have an impact on mortality, morbidity and quality of life.

If the current age specific hip fracture rates were applied to the population projection figures, the absolute number of hip fractures would more than double among older people aged 80 and over. However, this might overestimate the problem if technical progress decreases the prevalence.

Mental problems cause a greater burden of disease (DALYs) than cancer. They also constitute a substantial and costly public health burden. Several studies have suggested that mental health disorders of people in advanced age are under-diagnosed. The principal mental disorder affecting older people is Alzheimer's disease. The single largest risk factor for developing Alzheimer's disease is age.

Another important component of mental health is depression. In the UK, one in seven people over the age of 65 years suffers from depression. Depression in people aged 65 and over is especially under-diagnosed and this might be particularly true of residents in care homes.

Although the prevalence of mental disorders is weak, it is increasing because of the recent high incidence of such disorders. By 2020 depression is expected to be the second leading cause of disability adjusted life years (DALYs) lost, second only to ischaemic heart disease.

In the Netherlands, the National Institute of Public Health and the Environment (RIVM) has calculated for the total population that the following lifestyles contribute to disabling illnesses: Smoking 15 %, excessive use of alcohol (excluding accidents) 7%; too little physical exercise 5 %; too much saturated fat 5 %, and too few fruit and vegetables 4 %. The Dutch cabinet estimates that at least 20 percent of all disabling illnesses are attributable to unhealthy lifestyles and hence theoretically avoidable. The RIVM has also calculated that between 5 and 9 percent of total expenses for health care are the result of unhealthy lifestyles, obesity and high blood pressure.

Research by the Swedish National Institute of public health has estimated the proportion of the burden of disease (DALYs) that can be ascribed to various contributory causes (risk factors). They attribute: 9% to smoking, 8% to alcohol use, 3,5% to vegetable/fruit deficiency in food, 3,7% to overweight, 2,4% to drug use, 1,1% to fat content of food, 4,4% to physical inactivity, and 3,1% to relative poverty.

# PART C: SOCIO-ECONOMIC DETERMINANTS OF HEALHY AGEING

## INTRODUCTION

We have noted earlier that poverty seems to be a significant factor in screening policies and lifestyles. Poverty and ill health might form a vicious circle. Poor health may lead to low income and low income may deteriorate further poor health. Or alternatively low income may lead to poor health, which in turn decreases further personal income.

This chapter will analyse these relations and will aim to identify the cause of causality and the different factors, which intervene in the well-known association between income and health. Income is just one socio-economic factor; other factors are wealth, education, inequality and relative position, living and working conditions, etc.

We will not limit ourselves to pure economic indicators. For this reason, we will try to identify how "immaterial" personal capital affects health. This chapter will end with a discussion of social capital and its impact on chronic illness and care dependency.

## CHAPTER 1: Income and wealth

Several studies have established a strong association between socio-economic status (income, education, occupation, etc.) and health. However, there is a big debate on whether this association can be interpreted as causality. Causality might run in different directions:

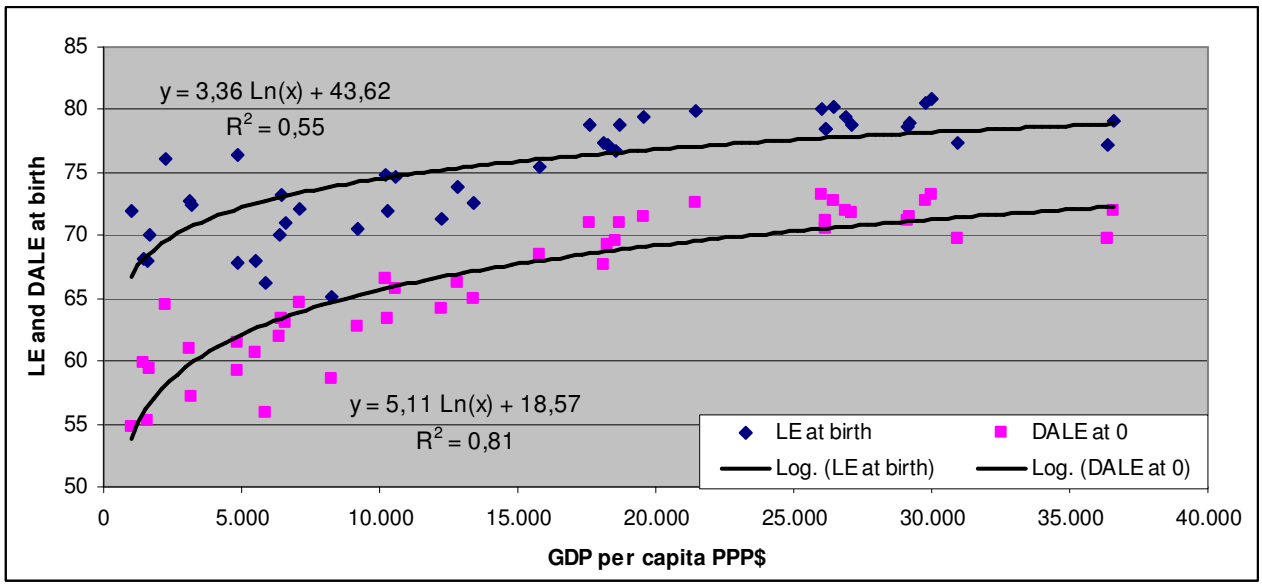
- Socio-economic factors determine health. In fact, higher income means better access to health, better nutrition, better environment (location of residence), etc. As income, education and occupation are collinear it is difficult to distinguish the influence of each factor.
- Health determines income and wealth. Following this argument, good health means high productivity and hence high income.
- Third variables or hidden common factors, for example genetic factors, may cause both socio-economic status and health.

The existence of a link between socio-economic factors and health implies that a redistribution of income reduces the strength of the association between health and income and might increase the overall health of the population.

The following graphs present the strong association between life expectancy and income. The relation is very strong for low-income countries but tends to fade out as income increases. The effect of income is decreasing at higher income levels. At low GDP per capita, the increase of income might measure not only income effects but also improvements in sanitation, in medical technologies, etc. The decreasing influence of income indicates that gains solely through this channel are limited. Shift of the whole curve upward, for all income levels, could be achieved through change in third factors (for example medical innovations).

The relation between gross domestic product per capita and life expectancy at birth is significant. However, this might underestimate the real impact of income. In fact, income might not affect only years of life but also the quality of life e.g. morbidity, disability, etc. Consequently, it is preferable to take a measure, which covers both the number of years and the quality of years. From this perspective, the disability-adjusted life expectancy is a better indicator, as it measures the number of years without activity limitations. The next figure indicates in fact, a much stronger relation between disability adjusted life expectancy and income per head.

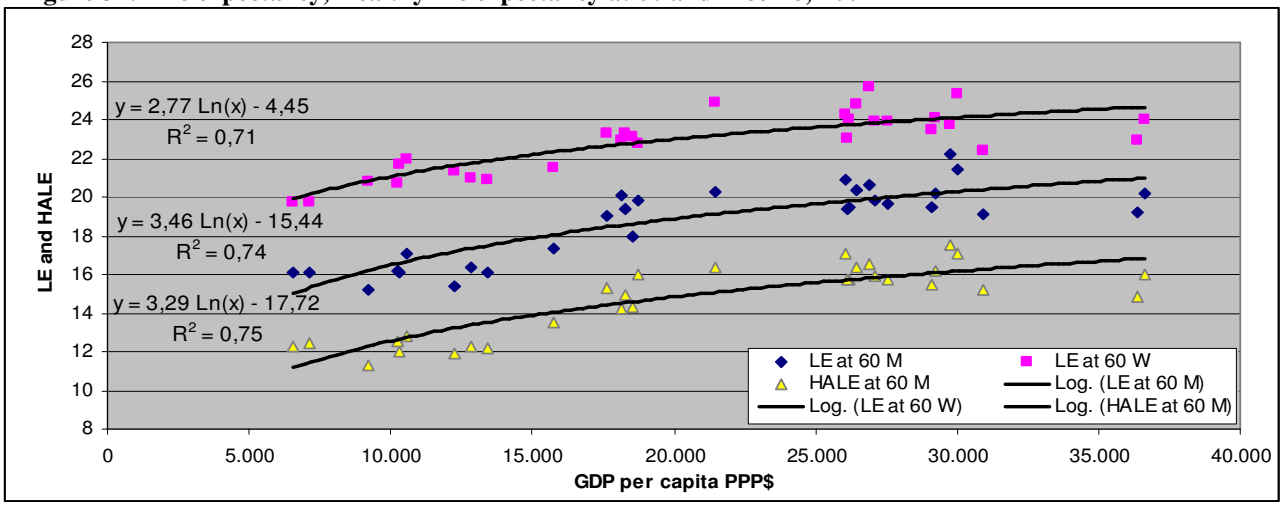
**Figure 30: Life expectancy (LE) and Disability adjusted life expectancy (DALE) at birth, and GDP; 2002**




Note: The data covers European countries according to WHO definition (excl. Luxembourg) (see Annex A).
Data source: WHO. Data are for 2002 and in a limited number of cases for 2001. Number of countries: 44.

Certain critics argue that the relation between life expectancy and income is inexistent among elderly people. They argue that the pension systems and the health care systems wave out any impact from income on health and life expectancy. In the next figure, we focus on elderly people. We retain life expectancy at 60 years and we distinguish between men and women. For comparison we present healthy life expectancy at 60 years. Furthermore, in order to cover countries with similar systems, we exclude the ex-soviet republics. The next figure indicates that the relation between life expectancy and income is very strong, across countries. The relation for men is slightly stronger.

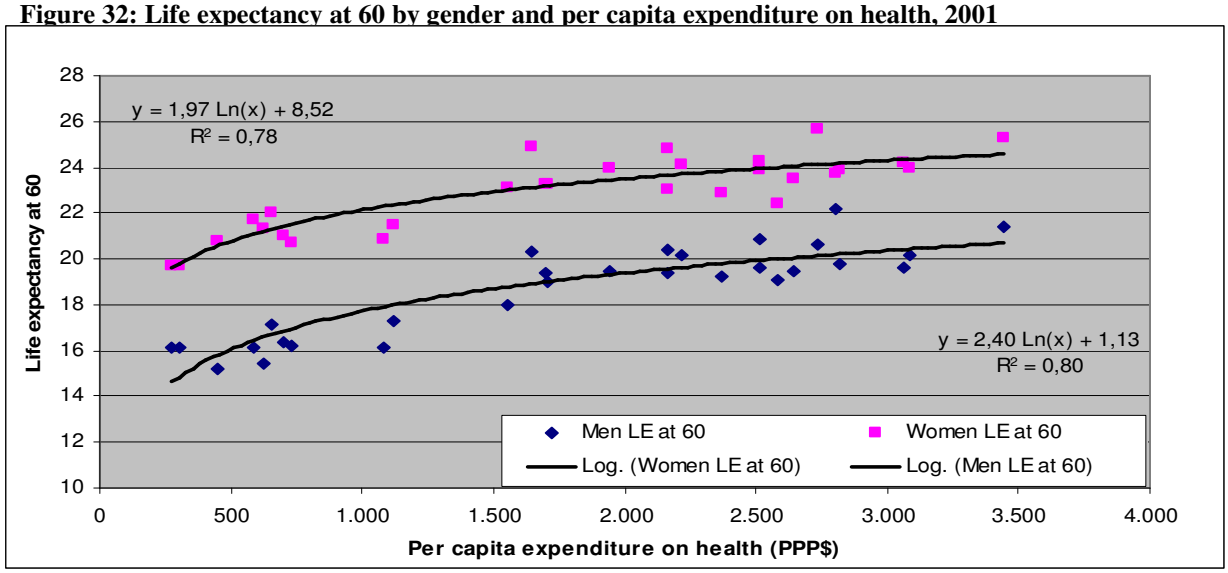
**Figure 31: Life expectancy, Healthy life expectancy at 60 and Income; 2002**




Note: The data covers European countries (excl. Luxembourg). If we include the ex-Soviet Republics, $R^2$ is close to 0,80.
Data source: Eurostat (Life expectancy) and WHO (GDP and Healthy life expectancy). Number of countries: 30.

In order to refine our relations, we use below the level of health expenditures. In fact, the level of income plays a role but also money spent for health care. The following graph presents the relation between expenditures on health per capita and life expectancy for men and women. The shape of the curve is similar to the previous graph. The evolution of the curve indicates a maximum life expectancy at 60 of 25 years for women. However, an upward shift of the curve may increase it further.

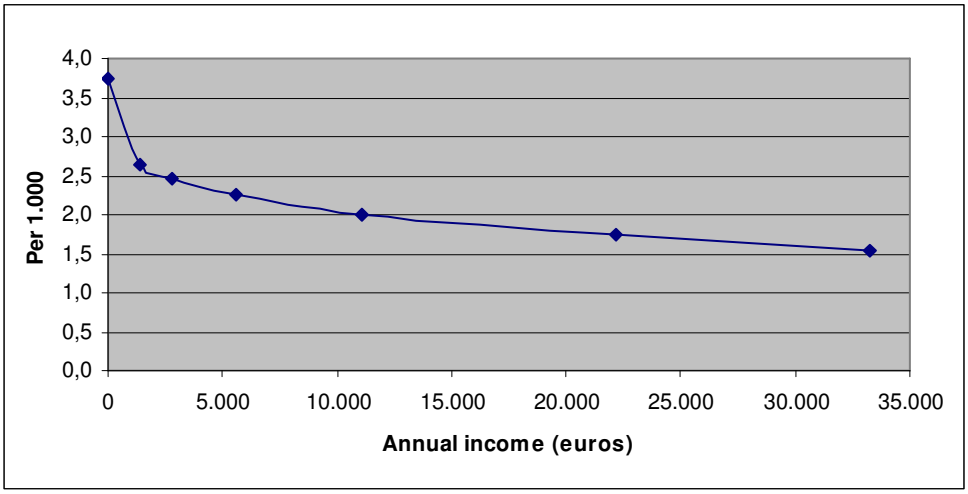
**Figure 32: Life expectancy at 60 by gender and per capita expenditure on health, 2001**




Note: The data covers 29 European countries.
Data source: Eurostat (Life expectancy) and WHO (Expenditures)

U. Gerdtham and M. Johannesson (2004) study the Swedish adult population and find that mortality decreases significantly as individual income increases whereas for the relative income hypothesis and the income-inequality hypothesis they cannot reject the null hypothesis of no effect on mortality. Concerning people aged 65 and over, they note that their main source of income consists of pension payments, which are stable over time. This reduces slightly the strength of income but the impact is still significant.

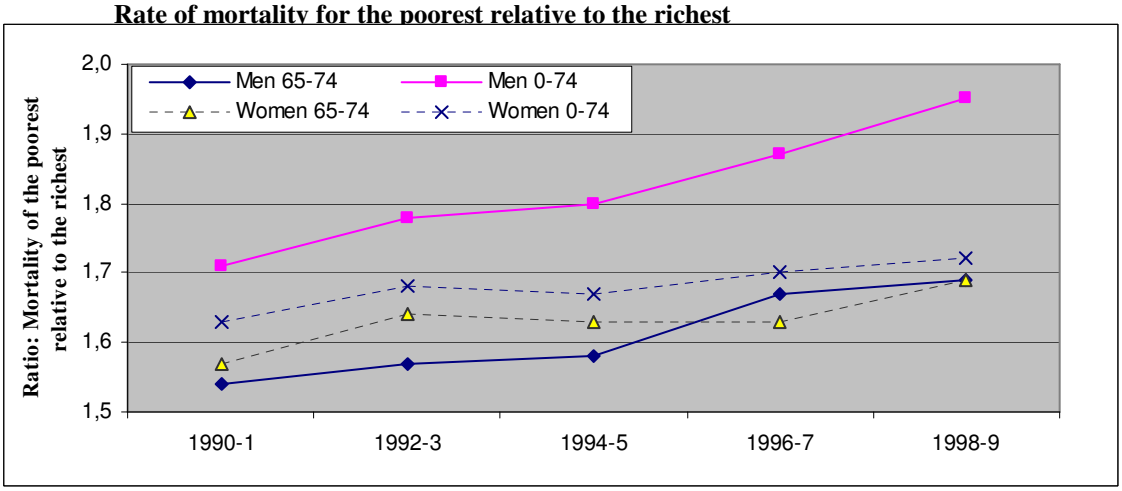
**Figure 33: One-year mortality risk in Sweden; per 1.000**




Source: U. Gerdtham and M. Johannesson (2004)

UK data provide similar conclusions. Mortality decreases significantly as individual income increases but this relation is weaker among elderly people. In the following graph we present the ratio of mortality for the poorest relative to the richest. Poor persons aged 65 to 74 have a mortality rate which is about 70% higher compared to the rate of the richest group. The gap is similar among men and women for this age group. Furthermore, the graph indicates that despite the general improvement of income levels in the UK, health inequality has increased.

**Figure 34: Relative indices of inequality by age group and sex in the UK**
**Rate of mortality for the poorest relative to the richest**




Source of data: Smith et al., 2002.

Results in the UK provide similar results. The death rate and the socio-economic class is linked. The death rate of persons aged 35-64 from ischaemic heart disease is much lower in high income social classes than in lower ones[74].

[74] Hilary Graham and Michael P Kelly (2004).

**Table 11: Death rates from ischaemic heart disease by social class, UK 1997-9,**
Men and women aged 35-64; Age-standardised rates per 100.000 persons

| | Males | Females |
|---|---|---|
| I and II | 90 | 22 |
| IV and V | 167 | 50 |

Source: H. Graham and M. P Kelly (2004).
Note: Class I: Top social class; V: Bottom social class. The classification is occupation-based.

The following table presents the relation between health and income, for people aged 50-65, in the Netherlands. The income level of those declaring being in good health is much higher compared to those declaring in bad or very bad health.

**Table 12: Health and Income in the Netherlands, persons aged 50-65; 1994-97**; amounts in euros.

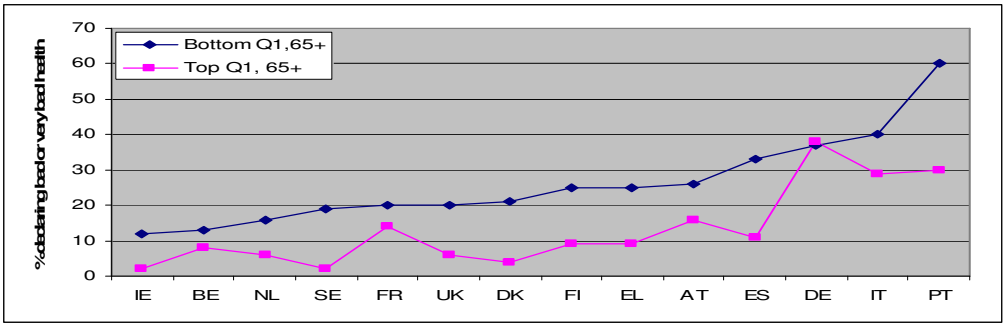
| | Very good | Good | Fair | Bad | Very bad |
|---|---|---|---|---|---|
| Mean income level of those declaring | 29.500 | 28.100 | 23.600 | 19.800 | 17.100 |
| Median income level of those declaring | 27.200 | 26.200 | 20.900 | 18.100 | 17.500 |

Note: Socio-economic panel (SEP), private households. The CentER Savings Survey provides similar results.
Source: M. Hurd and A. Kapteyn (2003)

In Belgium, income-related inequality in ill health among people aged less than 65 is present, but reduces significantly as soon as one restricts the analysis to people aged 65 and over. T. Van Ourti (2003)[75] argues that the difference in inequality between persons younger than 65 and persons 65 and over is linked with differences in mortality and morbidity across income groups. In fact, the characteristics of his sample indicate that individuals with low-to-middle incomes are more likely to leave the panel than individuals with higher incomes. On the other hand, mortality is concentrated among the lower incomes. Consequently, sample attrition might explain part of the lower socio-economic inequality in ill health among the elderly. In summary, the differential mortality across income groups and the ensuing sample attrition introduces a bias which smoothes socio-economic differences among the elderly people. In a simple way, we can say that inequality among elderly people is low because the most disadvantaged have died.

Subjective measures are based on self assessments. Elderly people (65+) with a low income declare more often in all Member States (except Germany) a bad or very bad health status. The percentage of poor declaring bad or very bad health is higher compared to higher income levels. About 25% of elderly persons (65+) declare a bad or very bad health compared to 13% of the highest income classes. Furthermore, the variability among poor across countries is slightly higher compared to higher socio-economic classes.

**Figure 35: Persons aged 65+ in bad health; Self declared by income quintile, 2001**

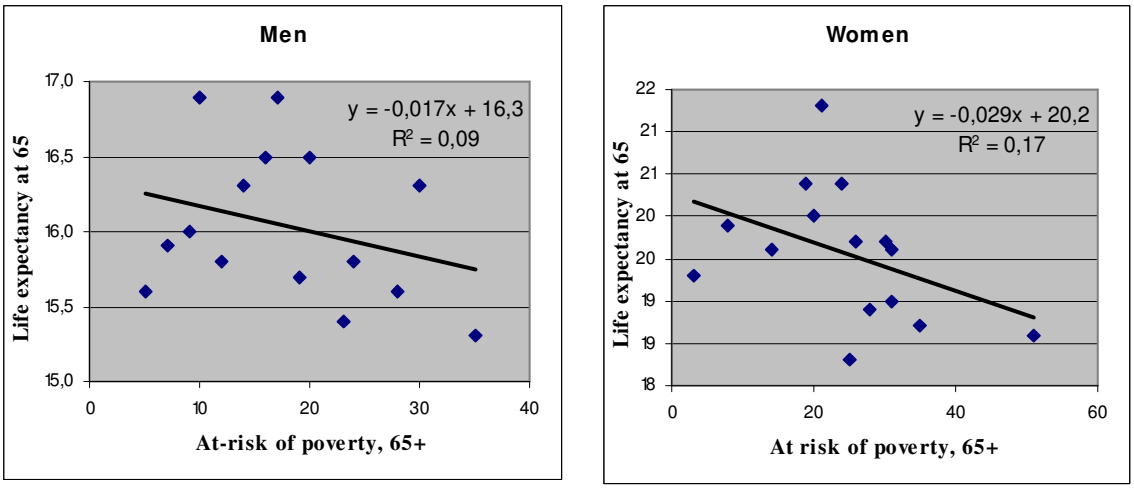



Note: Q1 refers to quintile.
Source: European Commission, Report on social inclusion 2004.

[75] Tom Van Ourti (2003).

The relation between life expectancy at 65 and the risk of poverty is generally weak. Countries with a high risk of poverty do not seem to have a significantly lower life expectancy. However, the results are very sensitive to the definition of life expectancy and risk of poverty.

**Figure 36: Life expectancy at 65 and risk of poverty**




Data source: Eurostat and European Commission Social Report 2004

Several Swedish studies[76] confirm the link between socio-economic status and health status for elderly persons. Within the age group 65 – 84, the people running highest risk of ill health are single, foreign-born and lowest income-group. Conversely best profile for good health is: married, born in Sweden and highest income group. Furthermore, there is a higher percentage of people with severe ill health within the lower income groups aged 65-69 than in the higher income group aged 80-84, which shows that socio-economic status is a more important factor than age for risk of ill health. A study in the Stockholm region shows that areas with high representation of people within the lowest earning groups (defined as the 20% of the population with the lowest income) have a significantly lower life expectancy (difference of 5.7 years for men and 5.2 years for women) compared to highest income group.

UK data indicate that higher social classes have a higher life expectancy compared to low income classes and that life expectancy gains at birth, have been relatively higher for high income classes.

**Table 13: Life expectancy at birth, women, 1999, UK** (England and Wales)

| | 1972 | 1999 | % Increase |
|---|---|---|---|
| Social class I | 79 | 83 | 6 |
| Social Class V | 74 | 77 | 5 |

Note: Data are rounded. Class I: Top social class; V: Bottom social class. The classification is occupation-based.
Data source: Smith et al., 2002.

Critics argue that the reported association between income and health does not imply causality. The third factor hypothesis has been advocated notably by P. Adams et al. (2003)[77]. They study elderly non-institutionalised Americans aged 70 and older and find that there is no direct causal link from socio-economic status to mortality and health, once initial health conditions are controlled. The strong association found in the data between socio-economic status (notably income and wealth) with mortality and morbidity risk might be attributed to third common variables. They conclude that there is no evidence that socio-economic status-linked therapies and prevention for acute diseases induce mortality differentials. A possible socio-economic causal link might exist only for mental conditions and chronic illnesses.

[76] Hälsoutveckling och hälsofrämjande insatser på äldre dar - en kunskapssammanställning, Stiftelsen äldrecentrum 2004.
[77] P. Adams et al., (2003).

J. Adda et al. (2003) note that the Granger causality test used by P. Adams et al. can be seen as a test between direct and none or indirect causality of socioeconomic status. For example, the results indicate no association of socioeconomic status with stroke, once a number of health conditions are controlled. By controlling for such prior health conditions, the direct association between socio-economic status and stroke may weaken. In fact, if socioeconomic status affect high pressure and obesity which in turn affects stroke, the causality tests will give little evidence for a direct causal effect of socioeconomic factors on stroke although socioeconomic factors have determined risk factors on stroke earlier in life. J. Adda et al. conclude that the hypothesis of direct causal links from low income to the incidence of certain diseases may not be useful. The pathways from socioeconomic status to mortality and morbidity may be through the effects of socioeconomic status on risk factors.

J. Adda et al. (2003) study UK and Swedish data. The UK data covers British civil servants aged 35 and 55. Concerning UK females, they find no causal socio-economic link for incidence of heart problems, diabetes, hypertension and BMI (obesity). No causality may be rejected for self-rated health, smoking and mental well being. For men, they find hypertension and mental well being in the first group, and in the second: heart problems, diabetes, obesity, self rated health and smoking. The Swedish results covering persons aged 28-84 are similar.

In both countries, UK and Sweden, access to medical care is free and universal and one could not expect a significant causal relation between socio-economic status and health. However, income may affect health not only through access to health care but also through nutrition, environmental risks, etc. Furthermore, some argue that it is relative and not absolute income, which is important.

An important question is what is the relation between socio-economic factors (income, occupation, education) and lifestyles? Often the overall improvement in health (for example following a reduction of smoking) does not eliminate social differences between subgroups. Tackling health inequalities here requires the improvement of the health of disadvantaged groups compared to higher income classes. In this case, policy aims to reach only a specific group. This is the case of a policy aiming to reduce health inequalities.

An important issue for elderly people is the decision to enter an institution. There is some evidence in the UK and the US that moving into an institution is more likely for older people with low income or in income support[78]. This might be due to the fact that people on low incomes are more likely to develop disabilities and to enter institutions latter in life. But disability is not the only factor as provision of informal care might also be another important factor.

[78] For a review of the literature and the UK results see: Anne Scott et al.: "Going Into Residential Care: evidence from the BHPS 1991-1998", SAGE Discussion Paper no. 5.

## CHAPTER 2:Occupational status

Occupation plays an important role, separate from income, often associated with working conditions. Physical effort, psychological stress, accidents and toxic agents might have an important impact on health. During time they accumulate and their effects might appear after retirement age.

The cumulative effects might increase till retirement age, and one could expect a decrease after retirement but not a complete disappearance.

Concerning all ages, on the basis of data from Denmark and Norway, the Northern Council estimated the work-related proportion of widespread common illnesses. For example, it is roughly 33% for musculo-skeletal disorders, which are widespread in all EU states, 20% for cardiovascular diseases, and 45% for skin diseases. The resulting volume of costs becomes at least partially clear when the national expenditure on health services is examined.

M. Beatson and M. Coleman estimate the economic cost of accidents at work and work-related ill health at between 1.4% (UK) and 8.3% (Sweden) of the GNP[79]. According to the European Agency for Safety and Health at Work, the costs of work-related illness range from 2,6% to 3,8% of GNP.

E. Cambois et al. study the experiences of French adult men in three major occupational classes: managers, manual workers, and an intermediary occupational group. They use life table models and show that managers have longer life expectancy and disability-free life expectancy (DFLE), and a shorter life expectancy with disability than manual workers. They argue that concurrent increase in life expectancy and DFLE during the period maintained the occupational disparities in health, although the years lived with disability declined for all groups, as for the entire French population[80].

**Table 14: France: Life expectancy by occupational group, 1980 and 1991**

| | **Managers** | | | **Intermediary** | | | **Manual workers** | | | **Total male population** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1991 | 80-91 | 1980 | 1991 | 80-91 | 1980 | 1991 | 80-91 | 1980 | 1991 | 80-91 |
| Life expectancy at age | | | | | | | | | | | | |
| **35 years** | 41,3 | 43,5 | *+2,2* | 39,6 | 41,8 | *+2,2* | 35,9 | 38,1 | *+2,3* | 37,9 | 40,2 | *+2,3* |
| **60 years** | 19,1 | 21,1 | *+2,0* | 18,4 | 20,4 | *+2,0* | 15,8 | 18,0 | *+2,2* | 17,3 | 19,2 | *+1,9* |

Source: E. Cambois et al. (2001).

**Table 15: France: Disability-free life expectancy by occupational group, 1980 and 1991**

| | **Managers** | | | **Intermediary** | | | **Manual workers** | | | **Total male population** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1991 | 80-91 | 1980 | 1991 | 80-91 | 1980 | 1991 | 80-91 | 1980 | 1991 | 80-91 |
| Disability-free life expectancy at age | | | | | | | | | | | | |
| **60 years** | 14,3 | 17,0 | *+2,7* | 12,8 | 14,9 | *+2,1* | 10,5 | 12,8 | *+2,3* | 12,0 | 14,3 | *+2,3* |
| Life expectancy with disability at age | | | | | | | | | | | | |
| **60 years** | 4,8 | 4,1 | *-0,7* | 5,6 | 5,5 | *-0,1* | 5,3 | 5,2 | *-0,1* | 5,3 | 4,9 | *-0,4* |

Source: E. Cambois et al. (2001).

[79] Bjurström LM. The economic aspect of working conditions change policy and practice. In: Mossink J, Lichter F, eds. Costs and benefits of occupational safety and health. Proceedings of the European conference on costs and benefits of occupational safety and health/The Hague. Amsterdam, The Netherlands; 1997;147-152.
Beatson M, Coleman M. International comparisons of the economic costs of work accidents and work related ill health. In: Mossink J, Lichter F, eds. Costs and benefits of occupational safety and health. Proceedings of the European conference on costs and benefits of occupational safety and health/The Hague. Amsterdam, The Netherlands; 1997.

[80] Emmanuelle Cambois, Jean-Marie Robine and Mark D. Hayward (2001).

The Finish data below indicate that not only occupational inequalities persist but also that life gains are higher for non-manual compared to manual workers.

**Table 16: Life expectancy at 35 in Finland**

| | **Men** | | **Women** | |
|---|---|---|---|---|
| | Manual | Non-manual | Manual | Non-manual |
| 1971-1975 | 33,53 | 36,58 | 41,79 | 43,35 |
| 1991-1995 | 37,30 | 41.68 | 44,80 | 46,99 |
| | *3,77* | *5,10* | *3,01* | *3,64* |

Source: P. Martikainen et Al. (2001)

In Finland, despite significant improvements in life expectancy, the differences between socio-economic groups are large both in mortality and in morbidity[81]. The socio-economic differences in mortality have not decreased, but even increased in some respects during the last decades. The average life expectancy of a male upper-level white-collar worker of 35 is 5-6 years longer than that of a male blue-collar worker.

Concerning the risk of developing diabetes, Connoly et al. (2000) conducted a study in the UK. They find an association between socio-economic status and the prevalence of type-2 diabetes in individuals in their middle years of life. In men, the prevalence in the least deprived quintile was 13,4 per 1.000 and 17,22 in the most deprived quintile. In women, the prevalence was 10,84 and 15,48 respectively.[82] Diabetes is a serious and costly disease, which is becoming increasingly common in disadvantaged minorities. Diabetes related deaths are higher among blue collars (1.8 per 100.000) than among white collars (0.6 per 100.000).[83]

Occupational status has also a significant impact on activity limitations. The following table presents data persons aged 55 and over in France.

**Table 17 : Persons 55+ in private households and in institutions**, France, 2004.
Prevalence of severe activity limitations and functional restrictions for personal care (standardised rates).

| | **Men** | | **Women** | |
|---|---|---|---|---|
| | Severe activity limitations for at least 1 personal care activity | Functional limitations | Severe activity limitations | Functional limitations |
| Cadres | 5 | 33 | 7 | 44 |
| Agriculteurs | 8 | 52 | 16 | 59 |
| Indépendants | 9 | 43 | 10 | 45 |
| Employés | 9 | 54 | 1 | 61 |
| Ouvriers | 13 | 51 | 13 | 62 |
| Inactifs | 44 | 94 | 16 | 58 |
| | | | | |
| **Total** | **9** | **44** | **12** | **54** |

Source: Cambois, E., Robine, J.M. (2004).
Note : 13% of blue collar workers declare a severe activity limitations for at least 1 personal care activity

The UK Department of Health notes that, in the early 1970s death rates among men of working age were almost twice as high for unskilled groups as they were for professional groups. By the early 1990s, death rates were almost three times higher among unskilled groups. Consequently, the government's aim is to reduce health inequalities by tackling the wider determinants of health inequalities, such as poverty, poor educational outcomes, poor housing, etc.

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81 Lahelma E, Koskinen S (2002) Suomalaisten suuret sosioekonomiset terveyserot – haaste terveys- ja yhteiskuntapolitiikalle. In: Kangas I et al (2002) Kohti terveyden tasa-arvoa. Edita, Helsinki

82 V. Connoly et al. (2000).

83 Data refer to France: white collars refers to "cadres supérieurs, professions liberals", blue collars refer to "ouvriers, employés".

Kunst et al. (1998) provide an interesting estimation of mortality rates in different European countries. They use the mortality rate ratio comparing manual classes to non-manual classes for men aged 45-59. They find that the manual to non-manual mortality ratio is little different across countries (except in France). This finding is true for males aged 45-59 years, and 60-64 years. The following table indicates that the mortality rate ratio varies between 1,33 and 1,44 (except France and Finland). Among males aged 60-64 years, most rates lie between 1,21 and 1,33. Contrary to previous studies, they adjust for the exclusion of economically inactive males and this makes a significant difference compared to other cross-national studies. The authors conclude "there is no evidence that mortality differences are smaller in countries with more egalitarian socio-economic and other policies".
Previous comments have to be taken with caution. In fact, occupational inequalities for specific causes of death did vary across countries in a larger extend than all cause inequality in mortality. The northern countries tended to have higher inequalities in cardiovascular mortality, while Mediterranean countries tended to have higher inequalities in cancer mortality. The analysis of the contribution of specific causes of death to the difference between manual and non-manual classes indicates that a large part of the mortality difference in southern countries is due to cancers. Ischaemic heart diseases are a major contributor of inequality in northern countries.

A. Kunst et al. (1998) consider that alcohol consumption plays an important role in explaining the high class differences in France and at a lesser extent in Finland. In Southern European countries death rates from ischaemic heart disease were similar across social classes. They consider that traditional diet and moderate alcohol consumption have protected lower socioeconomic groups.

**Table 18: Mortality rate ratio and Contribution (percentage) of specific causes of death; Men aged 45-59. Period: 1980-90.**

| Mortality rate ratio comparing manual classes to non-manual classes for major groups of causes of death | | | | | Contribution (%) of specific causes of death to the difference between manual and non-manual classes in total mortality[1] | | | |
|---|---|---|---|---|---|---|---|---|
| **Country** | **All causes** | **Neo-plasms** | **Cardio-vascular diseases** | **All other diseases** | **Lung cancer** | **Other cancers** | **Ischaemic heart disease** | **Cerebro-vascular disease** |
| FI | 1,53 | 1,39 | 1,48 | 1,60 | 12.8 | 4.2 | 31.8 | 6.5 |
| SW | 1,41 | 1,18 | 1,36 | 1,83 | 5.9 | 6.0 | 30.1 | 3.5 |
| NO | 1,34 | 1,25 | 1,34 | 1,51 | 11.7 | 9.3 | 34.7 | 2.9 |
| DM | 1,33 | 1,21 | 1,28 | 1,62 | 14.0 | 5.8 | 22.0 | 3.2 |
| UK | 1,44 | 1,21 | 1,52 | 1,74 | 13.1 | 3.3 | 41.7 | 8.1 |
| IE | 1,38 | 1,39 | 1,27 | 1,66 | 18.7 | 8.3 | 25.4 | 7.4 |
| FR | 1,71 | 1,71 | 1,35 | 2,09 | 8.6 | 29.2 | 2.7 | 3.9 |
| CH | 1,35 | 1,44 | 1,08 | 1,75 | 22.8 | 19.1 | –0.3 | 4.2 |
| IT | 1,35 | 1,43 | 1,17 | 1,60 | [2] | 44.3 | [3] | [3] |
| ES | 1,37 | 1,33 | 1,19 | 1,52 | 8.9 | 20.8 | –0.1 | 4.0 |
| PT | 1,36 | 1,12 | 1,03 | 1,65 | 1.3 | 8.9 | –11.3 | 13.0 |

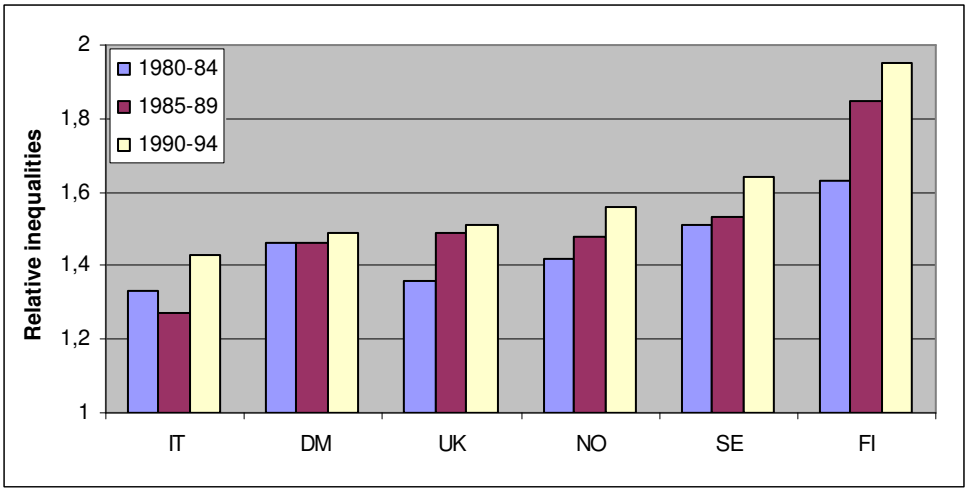
Note: [1]The different contributions add to 100% but here we report only the main contributors. [2] Combined with other diseases. [3] Combined with other cardiovascular diseases. ‡ Combined with other cancers.
UK covers England and Wales. The data include people in institutions (except Italy).
Source: A. Kunst et al. (1998).

Furthermore, inequalities increased in all countries between the 1970s and 1990s (see Figure 36). T. Blakely argues[84] that any beneficial effect of egalitarian policies on health affects both high and low socio-economic groups evenly. This even benefit might reduce the overall national mortality rate, reduce the *absolute difference* in mortality between high and low occupational classes, but not reduce the *relative difference* in mortality between social classes. Recent health policies do not seem to advantage lower social classes more than higher socio-economic groups. However, one might argue that from a public health policy perspective, it is absolute differences that are the most important.

84 Tony Blakely (2001).

Relative inequalities have increased more in Northern countries compared to Italy. However, data for Italy are partial.

**Figure 37: Mortality rate ratios for manual compared to non-manual classes in the 1970s and 1980s. Men 30-59 years**




Note: UK covers England and Wales, and Italy covers Turin.
Data source: A. Kunst et al. (2004).

## CHAPTER 3: Educational level

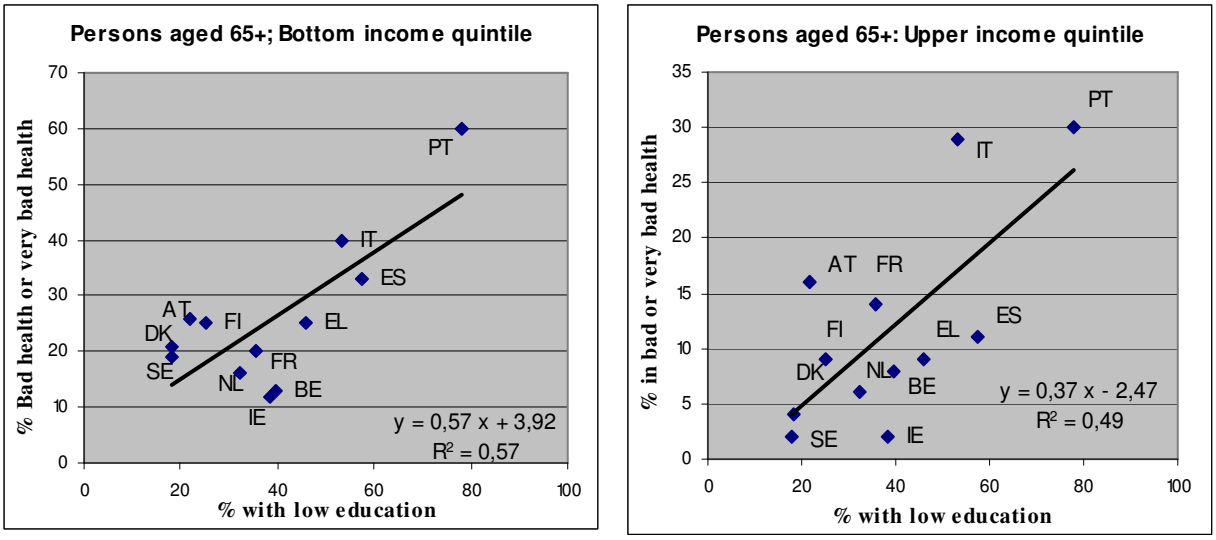
The correlation between income and education is well established. However, the impact of the educational level is difficult to identify, as it is difficult to separate it from income effects. In fact, low education might mean previous unskilled jobs with low salaries and bad working conditions. Some researchers have argued that the educational level is a factor by itself affecting health. In fact, low education is often associated with risky lifestyles.

One could expect that the rise in educational level might relieve future health care burden. In fact, there is an increasing consensus to consider that, in the coming years, health and health care utilisation might decrease as the educational level is expected to increase.

The impact of the educational level on health status seems insignificant, when we compare cross-national data. Countries with a higher educational level do not seem to experience a higher health status. However, this analysis is done at a highly aggregated level. In fact, when we distinguish income groups, the impact of education becomes significant, notably for the low-income groups.

The following graphs indicate a significant impact of educational level on self perceived health of low-income groups. If we focus on the lower income group of elderly people in the EU countries, a high proportion with a low education imply a high proportion of persons declaring themselves in bad or very bad health[85]. If we take the upper class, we find a similar shape but the strength of the impact seems less important (the slope is smaller). Poor education seems to have a larger effect on health among the poor than among the rich.

**Figure 38: Health self assessments and relative income**




Note: Self defined status refers to 2001. Education data refers to the total population 65+ for 2002 or 2003. We have excluded German data (outlier), as they are not reliable. In fact, they show a strong variability across the different survey waves, which is inconsistent with national surveys.
Source: European Commission, Report social inclusion 2004.

Several surveys report a significant impact of education to self-declared health condition. The following table presents the number of elderly persons declaring a bad or very bad health by educational level in the EU (15). There is a clear association between bad health and low education.

[85] However, the proxy used for the percentage of people with low education refers to the total population and not to the low income quintile.

**Table 19: Persons declaring a bad or very bad health by educational level, EU 15, 2001.**

| | Females | | | Males | | |
|---|---|---|---|---|---|---|
| **Age group** | Pre-primary, primary and lower secondary education | Upper secondary education | Tertiary education | Pre-primary, primary and lower secondary education | Upper secondary education | Tertiary education |
| 65-74 | 24 | 21 | 15 | 21 | 15 | 11 |
| 75-84 | 35 | 38 | 5 | 32 | 25 | 25 |

Source: Eurostat.

Also, the following table indicates a strong impact of education on mortality. For each age group, the table presents the mortality ratio between the bottom and the top of the educational hierarchy. It presents the Relative inequalities in mortality between the bottom and the top of the educational hierarchy. The educational levels are: High: 16 years of education, Mid: 10 to 12 years of education, and Low: 5 to 8 years of education. The Nordic studies cover the entire national population. The Italian study is restricted to the city of Turin and its surroundings.[86]

The relative inequality indicates that less educated persons (i.e. an hypothetical man at the bottom of the educational hierarchy) has a higher mortality than the most educated people (at the top of the hierarchy). This applies to elderly people too. However, this inequality is lower compared to younger groups. The evolution through time indicates that, in most cases, the relative inequality has increased indicating a relative deterioration for low educated groups.

**Table 20: Relative inequalities in mortality; Ratio between the bottom and the top of the educational hierarchy**

| **Country** | **Age group** | **Men** | | **Women** | |
|---|---|---|---|---|---|
| | | **1980-1984** | **1990-1994** | **1980-1984** | **1990-1994** |
| | | | | | |
| Finland | 30-44 | 2,87 | 3,36 | 2,13 | 3,29 |
| | 45-59 | 2,16 | 2,22 | 1,63 | 1,92 |
| | 60-74 | 1,72 | 1,80 | 1,67 | 1,61 |
| | | | | | |
| Norway | 30-44 | 3,16 | 3,85 | 1,46 | 2,45 |
| | 45-59 | 1,87 | 2,48 | 1,63 | 2,01 |
| | 60-74 | 1,43 | 1,70 | 1,49 | 1,78 |
| | | | | | |
| Denmark | 30-44 | 1,98 | 2,86 | 1,50 | 2,04 |
| | 45-59 | 1,47 | 1,75 | 1,49 | 1,61 |
| | | | | | |
| Italy (Turin) | 30-44 | 1,92 | 3,02 | 1,05 | 1,62 |
| | 45-59 | 1,44 | 2,03 | 1,12 | 1,24 |
| | 60-74 | 1,35 | 1,43 | 1,45 | 1,36 |

Source:A.E. Kunst (2001).

Note: The 1,35 for men 60-74 years in Italy implies a 35% mortality difference between the top and the bottom of the educational hierarchy.

Several studies have found that mortality and morbidity differences by educational level have increased or remain unchanged[87], during the last years (e.g. Finland and Netherlands).

Furthermore, A. E. Kunst et al. (2001) argue that in Finland, an increase in educational level by one year is associated, with on overage, a 4,4 percent decrease in the mortality rate. Relative inequalities in mortality have increased in all countries studied and for both sexes. Also, the pace of increase appears to vary according to country, with the largest increases in Denmark among men and in Norway among women.

[86] Source: Kunst et al. (2001)

[87] I.M.A. Joung et al. 2000.

Silventoinen et al. (2005) studied a sample of 864 men and 1045 women aged 45-64 without history of coronary heart disease (CHD). The metabolic syndrome was less prevalent in subjects with university education compared with basic level education. Adjusting for health behavioural factors had only a slight effect on the educational gradient. An educational gradient in CHD incidence was clear, and adjustment for the metabolic syndrome attenuated this gradient only slightly. In conclusion, educational differences in the metabolic syndrome and CHD incidence were clear in this Finnish sample.

C.J.M. Schrijvers et al. (1999) examined how much of the association of education with mortality was explained by health-related behaviours versus wealth factors. They used the Longitudinal Study on Socio-economic Differences in the Netherlands covering a sample of people aged 15-74 years old. The behavioural factors included alcohol, smoking, BMI and physical activity. The wealth factor included financial problems, employment status, and a proxy for income. Using regressions to control for the different factors, they estimated that over 50% of the education-mortality association was explained in total by wealth factors.

The Dutch Ministry of Health, Welfare and Sport notes that men with primary education live five years shorter than men with higher vocational or university education. For women, this difference is two-and-a-half years. It concludes that socio-economic health differences have apparently not diminished during the last ten years and that there are major differences in lifestyles among various population groups. It notes that poor health, illness and premature death are more prevalent in some population groups than in others. Particularly people with limited education and low incomes are less healthy, including many immigrants.

Similar results have been found in Belgium. The level of education has a strong positive impact on life expectancy and on life expectancy without disability.

**Belgium 21: Life expectancy at 65 and 80 years old, 1997**

| | **Life expectancy** | | | | **Life expectancy without disability** | | | |
|---|---|---|---|---|---|---|---|---|
| | Males | | Females | | Males | | Females | |
| | **65** | **80** | **65** | **80** | **65** | **80** | **65** | **80** |
| **Level of education** | | | | | | | | |
| No diploma | 14,1 | 6,2 | 18,6 | 8,2 | 3,9 | 0,2 | 5,5 | 2,6 |
| Primary | 14,4 | 6,3 | 19,0 | 8,4 | 6,3 | 1,8 | 6,6 | 1,0 |
| Sec Lower professional | 15,1 | 6,6 | 20,3 | 9,2 | 6,8 | 5,3 | 9,9 | 1,3 |
| Sec Lower technical | 15,1 | 6,7 | 20,5 | 9,5 | 10,7 | 4,8 | 10,1 | 1,3 |
| Sec Lower general | 15,4 | 6,8 | 20,3 | 9,2 | 5,9 | 2,2 | 9,2 | 2,4 |
| Sec Higher professional | 15,8 | 7,3 | 20,5 | 9,4 | 5,0 | 0,3 | 7,0 | 1,7 |
| Sec Higher technical | 15,4 | 6,5 | 20,7 | 9,5 | 11,2 | 6,5 | 9,6 | 3,7 |
| Sec Higher general | 15,7 | 6,9 | 20,6 | 9,4 | 11,1 | 1,9 | 12,4 | 3,8 |
| Higher short duration | 17,0 | 7,6 | 20,8 | 9,4 | 12,2 | 3,7 | 8,2 | 3,6 |
| Higher long duration | 17,0 | 7,7 | 21,2 | 9,5 | 8,1 | 0,8 | 18,4 | 9,4 |
| | | | | | | | | |
| Standard deviation | 1,0 | 0,5 | 0,8 | 0,5 | 3,0 | 2,2 | 3,7 | 2,5 |

Source : Bossuyt N., Van Oyen H. (2002)

A national case study[88]

In The Netherlands, "men with primary education live five years shorter than men with higher vocational or university education. For women, this difference is two-and-a-half years. People with limited education (primary school) live shorter, less healthy lives. Men and women with little schooling live ten and eight-and-a-half years less, respectively, without health impediments. These differences in health – also called socio-economic health differences – have apparently not diminished during the last ten years".

"There are major differences in lifestyles among various population groups. People with limited education live less healthier lives than those with higher education. Certain aspects of immigrants' lifestyles are unhealthy; and other aspects are healthy. Besides differences in lifestyles, psychological factors and material or structural environmental factors, such as low income and unfavourable working conditions, also contribute to differences in health. This shows that a combined approach, in which individual responsibility plays a central role, will produce the best results".

Using the disabling illnesses (expressed in DALYs) criterion, the Ministry defined the following illnesses (categories) as priorities:

- Cardio vascular diseases: coronary cardiovascular diseases, heart failure and stroke
- Cancer: lung cancer, breast cancer, colitis and rectal cancer
- Asthma and chronic pulmonary diseases
- Diabetes mellitus
- Psychological disturbances: depression, anxiety disturbances and alcohol addiction
- Motor system disorders: neck or back, arthritis, rheumatoid arthritis

The Dutch Ministry notes that these six illnesses (categories) occur systematically more often (up to three times as often) among people with limited education, compared to those with higher education. This difference also continues with people older than 55. Treatment of these illnesses therefore has a simultaneous effect on reducing health inequalities.

The percentage of smokers among people with limited education is higher than among those with higher or university education. Since people with higher education smoke less, this difference has only increased since the mid-1990s.

The Dutch Ministry notes that overweight problems and obesity occur in certain population groups much more frequently. Obesity among women with limited education is five times higher than by those with higher education. The figure is three times higher for men with little schooling. The number of overweight people in this group is also high. A recent study shows that 90 percent of Turkish women in Amsterdam are overweight. The percentage of immigrants that are overweight or obese corresponds to current American percentages, where the situation is even worse than in the Netherlands**.**

The Dutch Ministry notes that people with limited education run twice the risk of diabetes than those with higher education. There is also above average occurrence of diabetes among certain population groups, such as Hindustanis and Moroccans. According to various epidemiological studies, the number of undetected incidences of type-2 diabetes is between 100.000 and 400.000.

[88] Extracts from: *Living longer in good health – also a question of a healthy lifestyle*, Netherlands Health – Care Prevention Policy; International Publications Series Health, Welfare and Sport no 19. Ministry of Health, Welfare and Sport; The Hague, July 2004.

# CHAPTER 4: Inequality

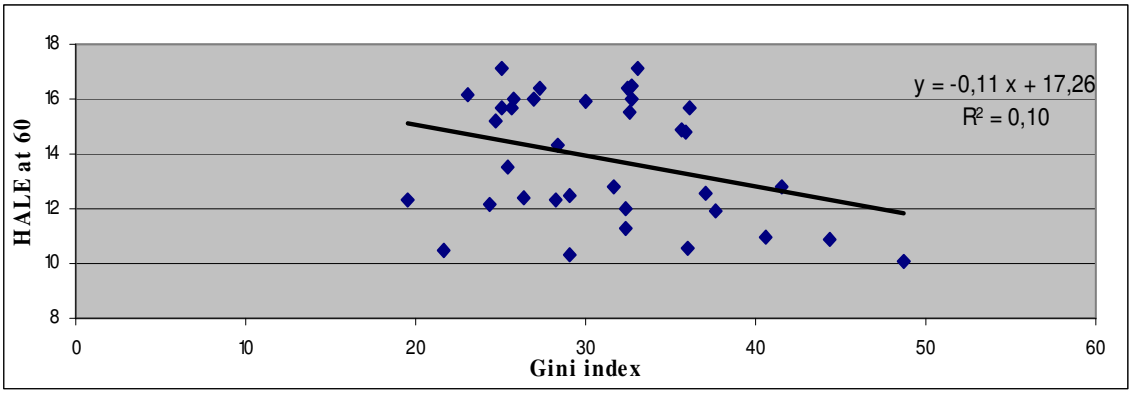
Despite the development of social security coverage and health care protection systems in several EU countries, significant health differences remain across different income groups. Furthermore, in certain countries the gap between social groups has been increased. Consequently, several experts thought that it is not absolute income, which is important but the relative position of the individual in the society. From this perspective, those at the bottom of the income distribution will have worse health than persons in the top income scale regardless of the level of average income.

A certain number of researchers argue that there is a direct link from inequality per se to ill health and life expectancy. They argue that relative disadvantage provokes stress and bad health. However, this relation has been questioned[89]. The opponents argue that reported statistical relations reflect only the classical channel between income or poverty and health. In fact, inequality indexes might act as proxies for income. Low-income countries experience often, higher inequalities and provide poor health care services.

The proponents of the inequality and relative income argument state that, a doubling of everyone's income would, for example, have no effect on health inequality. We have noted above that health related income, occupational and educational inequalities persist and are increasing in several countries.

Life expectancy and inequality are significantly correlated[90]. However, when we focuss on elderly people, the results are marginally significant The following graph presents healthy life expectancy at 60 and income inequality. Furthermore, if we take only EU 15 countries the results are weaker. One might argue, that the retained measure of inequality is not relevant for elderly people, since it refers to the total population and does not cover all revenues from wealth.

**Figure 39: Healthy life expectancy at 60 and Income inequality (Gini index), 2002**[1]




[1] : Data refers to 2002 or latest available year. The Gini index refers to all ages.
Data source: WHO.

[89] A. Deaton (2003)
[90] The regression gives: Life expectancy at birth = 76,78 – 0,31 · (Gini index); R²=0,18. Std deviations: 3,66 and 0,12.

## CHAPTER 5:Social capital

Several surveys have noted that people living alone report a higher prevalence of activity limitations (e.g. Eurostat: Labour Force Survey - Ad hoc Module on Disability). Contacts with the family and friends play also a significant role in the admission into an institution. Some evidence in the UK and US indicates that, older people divorced, separated, without children and/or siblings face a higher probability of institutionalisation[91].

Social support and informal relations with the family and society seem to be important for successful ageing. Several studies recommend to maintain contacts with the family and friends, to accept being helped by family carers, to preserve or to create new contacts after the retirement, for example within clubs, to participate in activities organised by the town halls or any other association (Assureurs Prevention Santé)[92].

There is a growing literature arguing that resources available to individuals through the family and networks constitute a "capital" which enhances well being. This form of immaterial capital seems to play also an important role on health status or health capital.

In the following, we will use time spent caring as a proxy for this immaterial social capital. Available data on time spent caring are scarce and their statistical reliability is weak. The Eurobarometer and the ECHP/SILC are the main resources. However, the Eurobarometer covers a small number of interviewees while the ECHP (Eurostat) accompanies its data with several cautions. The indicator which has some statistical reliability and can be used as a proxy for social capital is the number of people aged 50-64 caring. In fact, a significant number of persons caring adults are in the age bracket 50 to 64 (30 to 40%). For small samples, the results for the other groups are not reliable, unless we include all forms of caring (children and adults).

The first graph indicates that countries with a high percentage of people providing care experience a relatively lower prevalence of severe activity limitations among persons aged 65 and over. However, the percentage of people caring does not take into account the intensity of caring. In order to take into account the hours spent caring, we have created an index taking into account the percentage of people caring and the average hours spent caring. As the intensity of caring is better suited to care dependency, we combine the index with severe activity limitations. The second figure presents the results for elderly people with severe limitations aged 65 or over. Again the prevalence of severe activity limitation is significantly and inversely related to the capacity of caring in a country. Countries with a high capacity of caring like Ireland, Italy and Spain experience a relatively lower prevalence of severe disability among elderly people. The results are similar ($R^2$ ranges between 0,3 to 0,4) if we retain alternative indicators such as women aged 50 to 64 spending time caring adults or all persons spending time caring.

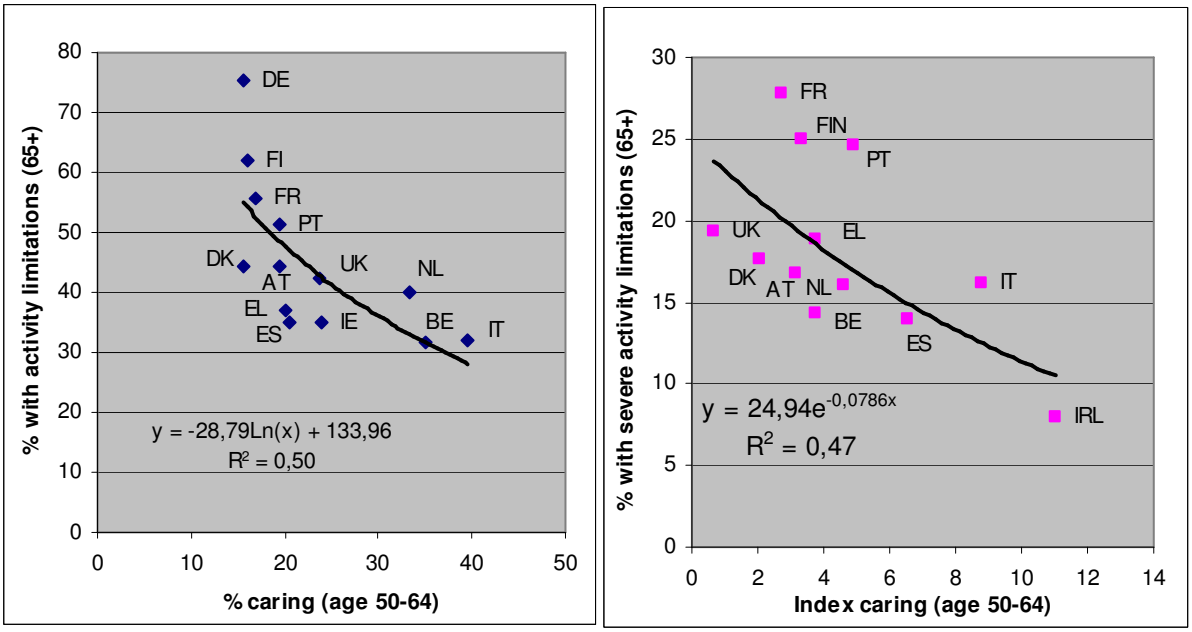
These data support the argument that social capital plays a significant role on the prevalence of activity limitations and hence on care dependency. Also, it indicates that social capital might have a bigger impact on moderate activity limitations than on care dependency.

A major policy goal for the coming years is the increase of labour participation. This policy ought to be accompanied with the development of relevant services for the elderly dependent people. These services could replace intensive caring but favour simultaneously light regular informal caring. The latter could limit any negative effects of changes in social capital. This point will be discussed further in the chapter treating informal care.

[91] For a review of the literature and the UK results see: Anne Scott et al.: "Going Into Residential Care: evidence from the BHPS 1991-1998", SAGE Discussion Paper no. 5.

[92] Assureurs Prevention Santé (2004)

**Figure 40: Prevalence of activity limitations (persons 65+) and caring (persons 50-64)**




Note: 1) Percent caring (age 50-64) refers to persons aged 50-64 spending time caring children, adults or both. The total is a weighted average (Men:2/5 and Women:3/5). Data source: Eurostat, 1998/99. The data for Germany are not reliable.
2) Index caring (age 50-64) is the product of the prevalence of caring (absolute value) and the average hours spent caring. Data source: Eurostat, 1998/99.

Policies aiming to increase social capital may not intervene in personal relations. However, national policies may exert an influence through its policy of accommodation specifically designed for elderly people. Group living apartments for elderly people might favour contacts and the provision of mutual informal help among elderly people. The provision of formal care could be organised in a better way and integration of small units into the community ought to avoid segregation and stigmatisation.

## SUMMARY AND CONCLUSIONS

Several studies have established a strong association between socio-economic status (income, education, occupation, etc.) and health. However, there is a big debate on whether this association can be interpreted as causality.

Available cross-national data reveal a strong association between life expectancy and income. The relation is very strong for low-income countries but tends to flatten down as income increases. However, income might not affect only years of life but also the quality of life e.g. morbidity, disability, etc. Consequently, it is preferable to take a measure, which covers both the number of years and the quality of life. When we use disability-adjusted life expectancy and income per head, the relation is much stronger.

Certain critics argue that the relation between life expectancy and income is inexistent among elderly people. They argue that the pension systems and the health care systems wave out any impact from income on health and life expectancy. Analysis of cross-national data indicates that the relation between life expectancy at 65 and income or health expenditures is very strong.

Several national studies on adult and elderly population find that mortality decreases significantly as personal income increases. Concerning people aged 65 and over, the relation is slightly weaker compared to the general population but the impact is still significant (e.g. Sweden, UK, Netherlands). The death rate of elderly persons is generally 50% to 100% higher in low-income groups compared to high-income classes.

National and European surveys find that elderly people (65+) with a low income declare more often a bad or very bad health status. About 25% of elderly persons (65+) declare a bad or very bad health compared to 13% of the highest income classes.

In Sweden, within the age group 65 – 84, the people running highest risk of ill health are single, foreign-born and in the lowest income-group. Another study in Sweden shows that areas with high representation of people within the lowest earning groups have a significantly lower life expectancy (difference of 5.7 years for men and 5.2 years for women) compared to highest income group.

Critics argue that the reported association between income and health does not imply causality. They admit a possible socio-economic causal link only for mental conditions and chronic illnesses. The causality test used by critics tests direct causality of socio-economic status and disease, by controlling for other health conditions and lifestyles. This method may weaken the relation. In fact, if socio-economic status affects lifestyles or other factors (e.g. obesity), which in turn affect diseases, the causality tests will give little evidence for a direct causal effect of socio-economic factors on diseases although socio-economic factors have determined risk factors on diseases earlier in life.

In several countries, access to medical care is free and universal and one could not expect a significant causal relation between socio-economic status and health. However, income may affect health not only through access to health care but also through nutrition, lifestyles, environmental risks, etc.

Occupation seems to play an important role, separate from income, often associated with working conditions. Physical effort, psychological stress, accidents and toxic agents might have an important impact on health. During time they accumulate and their effects might appear after retirement age. The cumulative effects might increase till retirement age, and one could expect a decrease after retirement but not a complete disappearance.

The Northern Council estimated the work-related proportion of widespread common illnesses for all ages. They find that, it is roughly 33% for musculo-skeletal disorders, which are widespread in all EU states, 20% for cardiovascular diseases, and 45% for skin diseases. Other evaluations report that the

economic cost of accidents at work and work-related ill health are between 1.4% (UK) and 8.3% (Sweden) of the GNP. Finally, according to the European Agency for Safety and Health at Work, the costs of work-related illness range from 2,6% to 3,8% of GNP.

In several countries, surveys confirm that life expectancy is lower for elderly people who were blue collars. In France, managers at 60, have a life expectancy of 21,1 years and disability-free life expectancy of 14,3 years. For manual workers, the rates are respectively 18,0 and 12,8. Concurrent increase in life expectancy and DFLE during the period maintained the occupational disparities in health, although the years lived with disability declined for all groups, as for the entire French population. Occupational status has also a significant impact on activity limitations. In France, about 6% of cadres face severe limitations while this rate is 13% among manual workers.

Similarly, the Finish data indicate that not only occupational inequalities persist but also that life gains are higher for non-manual compared to manual adult workers. In Finland, despite significant improvements in life expectancy, the differences between socioeconomic groups are large both in mortality and in morbidity. The average life expectancy of a male upper-level white-collar worker of 35 is 5-6 years longer than that of a male blue-collar worker.

Concerning the risk of developing diabetes, a study in the UK finds an association between socio-economic status and the prevalence of type-2 diabetes in individuals in their middle years of life. In men, the prevalence in the least deprived quintile was 13,4 per 1.000 and 17,22 in the most deprived quintile. In women, the prevalence was 10,84 and 15,48 respectively. Diabetes related deaths are higher among blue collars (1.8 per 100.000) than among white collars (0.6 per 100.000).

The UK Department of Health notes that, in the early 1970s death rates among men of working age were almost twice as high for unskilled groups as they were for professional groups. By the early 1990s, death rates were almost three times higher among unskilled groups.

The manual to non-manual mortality ratio is little different across countries (except in France). This finding is true for males aged 45-59 years, and 60-64 years. Among males aged 60-64 years, most rates lie between 1,21 and 1,33. This means that the death rate is 21% to 33% higher in manual classes. In Southern European countries death rates from ischaemic heart disease were similar across social classes. Traditional diet and moderate alcohol consumption might have protected lower socioeconomic groups.

Furthermore, inequalities increased in several countries between the 1970s and 1990s. Policies on health affect both high and low socio-economic groups but do not reduce the relative difference in mortality between social classes.

The correlation between income and education is well established. However, the impact of the educational level is difficult to identify, as it is difficult to separate it from income effects. Some researchers have argued that the educational level is a factor by itself affecting health. In fact, low education is often associated with risky lifestyles.

National and European surveys indicate a significant impact of educational level on self-perceived health of low-income groups. The prevalence in bad or very bad health among elderly people is higher among low-income groups compared to higher ones. Also, poor education seems to have a larger impact on health among the poor than among the rich.

Available studies (notably for Denmark, Italy, Norway and Finland) indicate a strong impact of education on mortality. The relative inequality indicates that less educated elderly persons have a higher mortality than more educated people. However, the inequality among elderly people is lower compared to younger groups. The evolution through time indicates that, in most cases, the relative inequality has increased indicating a relative deterioration for low educated groups.

The level of education has a strong positive impact on life expectancy and on life expectancy without disability (e.g. Belgium). Males at 65 with a primary school diploma have a life expectancy of 14,1 years, while persons with higher education have 17 years. For women, the rates are 19 and 21 years respectively. Similar differences appear when we retain life expectancy without disability. The Dutch Ministry of Health, Welfare and Sport notes that men with primary education live five years shorter than men with higher vocational or university education. For women, this difference is two-and-a-half years. It concludes that socio-economic health differences have apparently not diminished during the last ten years.

In the Netherlands, the six most disabling illnesses occur systematically more often (up to three times as often) among people with limited education, compared to those with higher education. This difference also continues with people older than 55.

Estimates indicate that over 50% of the education-mortality association is explained by wealth factors and the remaining by lifestyles and other factors.

Despite the development of social security coverage and health care protection systems in several EU countries, significant health differences remain across different income groups. Furthermore, in certain countries the gap between social groups has increased. Consequently, several experts are thinking that it is not absolute income, which is important but the relative position of the individual in the society. They argue that relative disadvantage provokes stress and bad health.

Life expectancy and inequality are significantly correlated. However, the relation between healthy life expectancy at 60 and income inequality is only marginally significant.

Social support and informal relations with the family and society seem to be important for successful ageing. Several surveys have noted that people living alone report a higher prevalence of activity limitations. There is a growing literature arguing that resources available to individuals through the family and networks constitute a "social capital" which enhances well being. This form of immaterial capital seems to play also an important role on health status or health capital.

Available data indicate that countries with a high percentage of people providing care experience a relatively lower prevalence of severe activity limitations among persons aged 65 and over. Countries with a high capacity of caring like Ireland, Italy and Spain experience a relatively lower prevalence of severe disability among elderly people. These data support the argument that social capital plays a significant role on the prevalence of activity limitations and hence on care dependency. Also, it indicates that social capital might have a bigger impact on moderate activity limitations than on care dependency.

A major policy goal for the coming years is the increase of labour participation. This policy ought to be accompanied with the development of relevant services for elderly dependent people.

The previous analysis reveals that socio-economic factors play an important role in life expectancy, morbidity and mortality of older persons. Also, the general improvement in these criteria must not hide the fact that even in countries with developed social protection systems, relative inequality is present among elderly people and is even increasing.

# PART D: LONG TERM CARE

# INTRODUCTION

The ageing of the population raises the issue of the sustainability of the long-term care system and is expected to increase the pressure on public spending. Long-term care is different from a traditional health care intervention and aims at providing assistance in activities of daily living to people not able to complete them due to a disability, chronic illness or frailty. Services may be provided in a person's home, in the community, or in residential facilities (e.g., nursing home).

As ageing and long term care expenditure appear to be closely related, chapter one first looks into the prevalence of care dependency by age.

In terms of care provision for dependent elderly people, carers may play a greater or lesser role according to the institutional setting of countries. The nature of substitutability or complementarity between formal and informal help is important. Chapter two provides an overview of the type of care provided in several countries and some of the characteristics of carers.

Furthermore, forecasting the future volume of long term care on public spending depends on the assumptions evolving around the long-term trends of activity limitations. A simple correlation between demographic ageing and care dependency may be too simplistic and alarming. Health status is influenced by several other socio-economic and medical factors. Chapter three will take a closer look at the impact of socio-economic factors on forecasting activity limitations, elaborating a series of assumptions around replacement rates, labour force participation and social capital.

Chapter four shows the number of dependent people and the number of potential carers over the next decades, demonstrating a widening gap between the two, especially for the very old dependent people aged 80 years and over. A more detailed analysis and projection of the nature of dependency experienced by older people are given in chapter five.

Chapter six is an attempt to analyse the implications of the increasing number of dependent older people on the carers themselves, notably in terms of their participation in the labour market.

Finally, as part of the debate on the burden long-term care is expected to exert on public spending, we have presented projections of long-term care expenditures based on dependency and informal care assumptions in an attempt to identify the most viable scenario in the long run. A presentation by country of long term care provision schemes allow us to compare the Beveridgian and the Bismarckian models of social support, and to analyse their sustainability on the long run.

## CHAPTER 1:Elderly dependent people

If we interpret care dependency in a strict sense, it means that we have to include mainly self-care and basic transfer activities (washing, dressing, transfer (getting in/out of bed/chair), going to the toilet, continence and eating). This means that a person who needs help to accomplish at least one of these activities may be considered as dependent. This strict interpretation leads to the Katz index.

The Katz index (ADL) has six items: washing (bathing), dressing, transfer (to or from a bed or chair), going to the toilet, continence and eating. The index covers tasks, which people need to be able to perform to survive without help. They were initially used for clinical purposes and may be sufficient in certain institutional settings. They are considered too restrictive for a person living in the community.

In order to take into account these critics, the Lawton and Brody index (IADL) includes 8 Instrumental Activities of Daily Living: using the telephone, shopping, food preparation, housekeeping, laundry, travel, responsibility for own medicine and ability to handle finances. These activities are considered to be necessary for living a more or less normal life without help. Communication, general tasks and demands, and social life are considered important by most but pose a methodological problem of measurement.

Social security definitions in the Member States take into account IADL activities, considering that they are essential for an independent living[93]. However, the nature of these activities as well as conditions imposed upon them (minimum number or hours needed) differs greatly across countries and inside a country between different services.

The frequency of care activity is an important element. Narrow indicators of care dependency use the term "assistance on a daily basis'. In this case, care dependency is close to the Katz index. Wider definitions cover the items of the Katz index with a weight of "1"and instrumental activities with a weight between "0" and "1", depending on their frequency.

Statistics on disability and activity limitations constitute an important source of statistics on care dependent persons. The European Community Household Panel (ECHP) presents the number of persons who are hampered in their daily activities by chronic physical or mental health problems, illness or disability.

The different waves of the ECHP provide estimates for severe limitations, which are generally stable, except for Denmark and the United Kingdom, while the German data are not compatible with the national surveys. However, not all persons with a severe limitation might be considered as dependent. A severe limitation might indicate that some persons are doing a daily activity with some problems but do not necessarily need help. This might affect the quality of life but in a strict sense does not necessarily imply a regular and permanent help. For example diabetes or hearts problems might restrict severely daily activities but do not always imply constant help. This however, might engender a need for occasional help. Consequently, the number of persons with severe limitations might be used as an upper limit for the number of dependent people[94].

It is widely accepted that the prevalence of activity limitations follows a logistic function where the exogenous variable is age. The general form is:

$Pi = 1 / (1 + EXP\{-(\alpha + \beta * age)\}$; where Pi=Prevalence rate for a specific age, and EXP=exponential.

[93] S. Grammenos-Eurostat (2003).

[94] The "Indicators on childcare and elderly care – coverage and targets set in 2002 NAPs" indicate that Indicator EO c10 concerns: "dependent elderly men and women (unable to look after themselves on a daily basis) over 75: Breakdown by: living in specialized institutions; who have help (other than the family) at home; and looked after by the family".

And

Ln(Pi/(1-Pi)) = α + β* age; where 'Ln' is the logarithm, and Pi/(1-Pi) is the odds ratio.

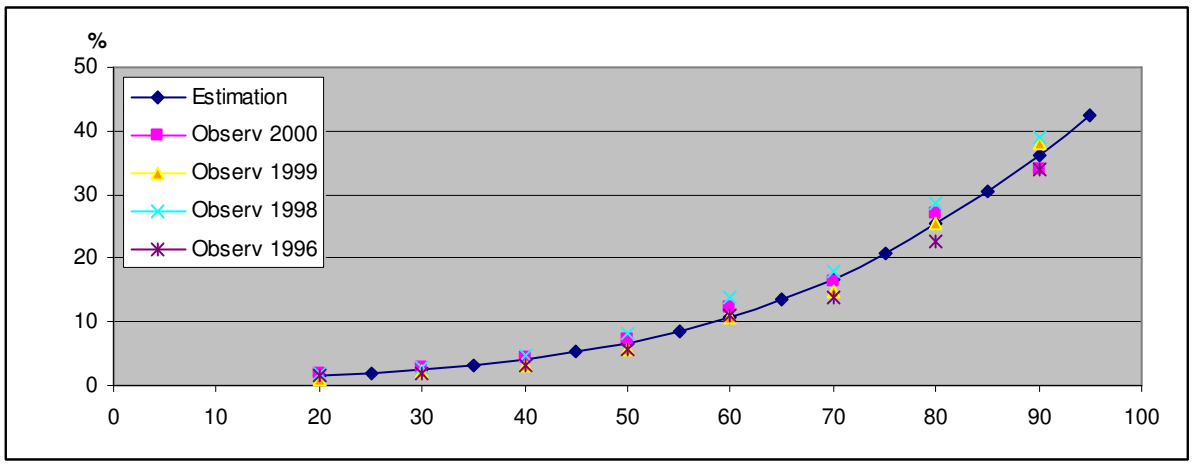
In Annex B, we present the estimations of total disability and severe disability prevalence using the ECHP data (Eurostat). We have used ordinary least squares (OLS) on pooled national data for the years 1996, 1998, 1999 and 2000. We have used dummy variables for the different years. Estimations without dummy variables provide very close results.

The following figure presents the fitted and the observed values for the EU. As noted above, not all people severely hampered in their daily activities may be considered as dependent persons, but we consider that severe disability is a good proxy for care dependency defined in a wide way. In fact, national surveys covering assistance for activities of daily living and instrumental activities provide results, which are close to severe disability[95].

The results of the estimation for the aggregated data on EU 15 for 2000, 1999, 1998 and 1996 are presented in the following figure. The results of the regression are:

Ln(Pi/(1-Pi)) = -5,241 + 0,052 x age; $R^2 = 0,98$ Prevalence rate (Pi) is expressed as a %.
(0,081) (0,001) Std errors in parenthesis. Data: ECHP-Eurostat.

**Figure 41: Care dependency (ADL and/or IADL); Prevalence of severe activity limitations in the EU**




Note: ADL: Activities of daily living; IADL: Instrumental activities of daily living.
Data source: ECHP (Eurostat)

By simplifying, we can say that 'β' measures the rate of progression of care dependency, defined in a large way, by age, while 'α' determines the position of the curve.

The coefficients 'α' and 'β' are determined by socio-economic and medical factors. Previous chapters have shown that health, disability and care dependency are influenced notably by income, health care expenditures and social capital.

This method enables us to calculate the prevalence rates for the two definitions of care dependency. We then apply the estimated prevalence rates to the baseline scenario for the population established by Eurostat. The projections for 2030 and 2050 are presented in the following table. The number of elderly dependents persons is expected to almost double between 2005 and 2050. The highest increase will take place between 2005 and 2030. Projected values for the age group 20 to 64 for 2030 are expected to increase slightly and then decease.

[95] S. Grammenos – Eurostat (2003).

**Table 22: Number of care dependent people, EU 25. Prevalence rates as for 2005.**

| | Narrow definition (ADL) | | | | | Wide definition (ADL and/or IADL) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **2005** | **2030** | **2050** | Change 2030-05 | Change 2050-30 | **2005** | **2030** | **2050** | Change 2030-05 | Change 2030-50 |
| | Absolute number | | | % | | Absolute number | | | % | |
| 25-64 | 3.467.901 | 3.723.208 | 3.236.462 | 7,4 | -13,1 | 14.872.111 | 15.564.058 | 13.560.954 | 4,7 | -12,9 |
| 65+ | 5.762.455 | 9.071.748 | 11.382.074 | 57,4 | 25,5 | 16.412.520 | 25.532.107 | 31.350.277 | 55,6 | 22,8 |
| **Total** | **9.230.356** | **12.794.956** | **14.618.535** | **38,6** | **14,3** | **31.284.631** | **41.096.164** | **44.911.231** | **31,4** | **9,3** |
| | **2005 = 100** | | | | | | | | | |
| 25-64 | 100 | 107 | 93 | - | - | 100 | 105 | 91 | - | - |
| 65+ | 100 | 157 | 198 | - | - | 100 | 156 | 191 | - | - |
| Total | 100 | 139 | 158 | - | - | 100 | 131 | 144 | - | - |

Dependent adults aged 25 to 64 years, with a need of assistance for the activities of daily living are estimated at about 3.467.901 persons. They represent about 1,4% of this age group. As noted in Part A, the number of care dependent persons with a need of assistance for ADL, aged 65 and over, is 5.762.455 persons (7,5% of the same age group).

Following the wide definition of care dependency based on a need for activities of daily living and/or instrumental activities, dependent persons aged 25-64 are about 14.254.000. They represent 5,7% of the same age group. This method gives an estimate of about 16.412.520 for the number of dependent elderly people, (21,4% of the same age group).

However, this method might overestimate the number of dependent persons. In fact, if we apply the current prevalent rates to the population in 2030 and 2050, we assume implicitly that the additional years of life are not disability free. Or a realistic hypothesis might be that expected life gains are partly in good health and partly with activity limitations. The following table takes into account this correction. For simplicity, in the following projections, we assume that in 2050 the prevalence of dependency will shift downwards implying that the current prevalence for the 65-69 age group will apply, in 2050, to the 70-74 age group, and similarly for the other age groups. Furthermore, we assume that the shift from 2005 to 2050 will be smooth and will accelerate slightly as time passes.

**Table 23: Number of care dependent people, EU 25. Lower disability scenario.**

| | Narrow definition (ADL) | | | | | Wide definition (ADL and/or IADL) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **2005** | **2030** | **2050** | Change 2030-05 | Change 2050-30 | **2005** | **2030** | **2050** | Change 2030-05 | Change 2050-30 |
| | Absolute number | | | % | | Absolute number | | | % | |
| 25-64 | 3.467.706 | 3.187.553 | 2.398.707 | -8,1 | -24,7 | 14.872.111 | 13.839.951 | 10.853.629 | -6,9 | -21,6 |
| 65+ | 5.762.455 | 7.836.499 | 8.607.444 | 36,0 | 9,8 | 16.412.520 | 22.914.690 | 25.647.023 | 39,6 | 11,9 |
| Total | **9.230.161** | **11.024.051** | **11.006.151** | **19,4** | **-0,2** | **31.284.631** | **36.754.641** | **36.500.651** | **17,5** | **-0,7** |
| | **2005 = 100** | | | | | | | | | |
| 25-64 | 100 | 92 | 69 | - | - | 100 | 93 | 73 | - | - |
| 65+ | 100 | 136 | 149 | - | - | 100 | 140 | 156 | - | - |
| Total | 100 | 119 | 119 | - | - | 100 | 117 | 117 | - | - |

This table reveals an important change in the composition of care dependent people. At 2005, dependent elderly people represent 62% (52% for the wide definition), while in 2050, they will represent 78% (70% for the wide definition) of all dependent people. The big increase of elderly dependent people is expected to be dampened by the decrease of young dependent adults.

However, this method might overestimate the decrease of dependency among adults aged 20-64. This point will be developed further below.

**Table 24: Number of care dependent people aged 65 and over, EU 25**

| Age groups | Narrow definition (ADL) | | | Wide definition (ADL and/or IADL) | | |
|---|---|---|---|---|---|---|
| | **2005** | **2030** | **2050** | **2005** | **2030** | **2050** |
| 65-69 | 1.018.848 | 1.227.526 | 972.334 | 3.373.670 | 4.212.272 | 3.462.318 |
| 70-74 | 1.170.194 | 1.426.485 | 1.262.237 | 3.622.952 | 4.564.997 | 4.179.592 |
| 75-79 | 1.272.549 | 1.587.218 | 1.611.732 | 3.644.909 | 4.724.471 | 4.989.964 |
| 80 + | 2.300.864 | 3.595.268 | 4.761.141 | 5.770.989 | 9.412.950 | 13.015.149 |
| **Total** | **5.762.455** | **7.836.499** | **8.607.444** | **16.412.520** | **22.914.690** | **25.647.023** |

The number of dependent people with ADL needs is expected to increase by 90% between 2005 and 2050, while the number of dependent people with ADL and/or IADL by 60%. This difference is due to the high weight of very old among people needing assistance for ADL activities. The share of very old is increasing more rapidly.

Below, we will refine further our estimations.

## CHAPTER 2: Carers of dependent people

Care may be provided by professionals or by informal sources. The informal sector includes mainly the family, relatives, friends and neighbours. A question concerns the frontier between help considered to be convenience assistance and help considered to be dependency care. The frequency and the time spent by the carer might be relevant criteria.

Also, a family carer may receive different types of support (for example: social security contributions of the carer are paid by public authorities, if the amount of assistance is over 14 hours per week, in Germany; the carer receives an allowance if he/she lodges a dependent person in Spain; an allowance or a set of services is provided to the carer, in Sweden and the United Kingdom). These elements will be taken into account, when we will present the different scenarios.

Another important aspect is that many persons may receive help from different sources. In fact, many persons cumulate informal help with formal home services. An important discussion concerns the substitutability or complementarity between formal and informal help. Analysis of different surveys provides mixed results. In certain cases formal and informal seem to be substitutes and in other cases they seem to be complementary. Furthermore, a Swedish study finds that increased inputs from families match the decline of public services, that is, a 'reverse' substitution of old-age care has recently been taking place in Sweden[96]. The shrinking of services in the latter years has been out-weighted by an increase in family care.

Available quantitative studies on substitution or complementarity between informal and formal care is limited and sometimes contradictory. In France, formal and informal care vary too much from one dependent person to another to be able to determine the extent to which these two types of care are substitutable[97]. However, the probability of receiving formal care increases with the level of education, isolation and low hourly costs. The role of education is ambiguous since it might play the role of a proxy for income and wealth. The link of formal help with its price implies that subsidized services might increase the volume of formal help.

In Sweden, family and public services are not total substitutes even in response of to cutbacks[98]. In the US, some evidence shows that an increase of formal help by 25% resulted in a decline by 3% only of informal care. These results were obtained among those who have already been benefiting from informal care and do not indicate future trends and preferences of individuals[99].

**Table 25: Type of care**

| | **France** | | **Germany** | **Sweden** | | |
|---|---|---|---|---|---|---|
| | Persons aged 65 and over Type of care received | | Home care recipients | Source of care received by persons 75+ in need of help. | | |
| **Type of care** | Extreme dependency | Moderate dependency | | All | Live alone | Co-resident |
| Informal care alone | 53 | 54 | 73 | **66** | 47 | 88 |
| Formal and informal care | 30 | 29 | 15 | 16 | 24 | 7 |
| Formal care alone | 16 | 17 | 12 | 18 | 28 | 5 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |

FR: 1996;. DE: Care giving within home care; statutory long-term care insurance funds, 2002. SE: Formal help refers to Home help services; 2000. Data cover only private households.
Source: S. Grammenos – Eurostat (2003) and E. Schulz (2003)

[96] L. Johansson et al. (2003) and G. Sundström et al. (2002)
[97] P. Breuil-Genier (1999)
[98] L. Johansson et al. (2003)
[99] Leontaridi, R., Bell, D. (2001).

National statistics indicate that in the majority of cases, informal help concern instrumental activities like shopping and household tasks. Also, the share of formal home care increases with the disability level.

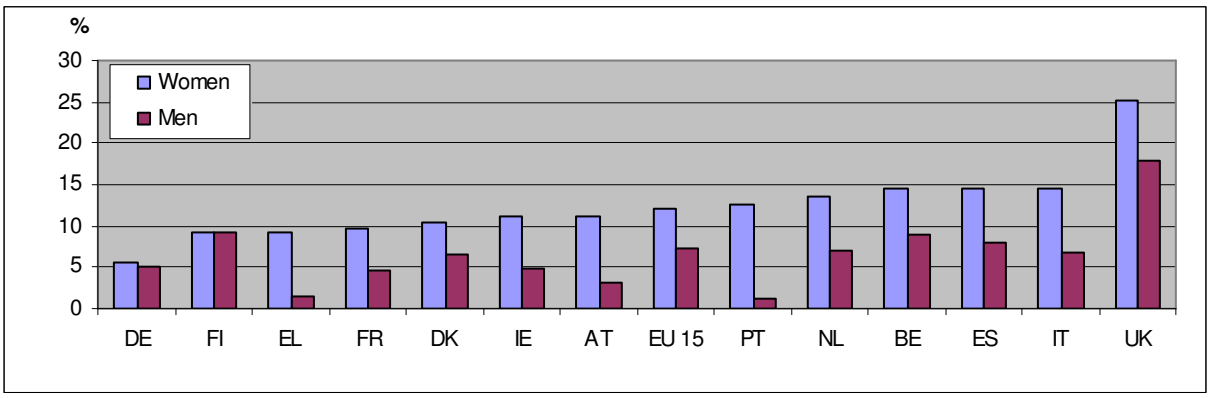
According to the complementary assumption public services support informal structures and are mutually reinforcing. Improved public services for the elderly might imply more informal care. The two types of care are complementary rather than substitutes. Complementarity might arise in situations where the formal sector provides personal care services and leaves to the family the provision of instrumental activities (shopping, etc.). However, this does not hold for isolated persons and isolation is a major determinant of formal care. In any case, the lack of total substitution between formal and informal care implies that if we want to turn informal care into employment, we must keep in mind that a person receiving for example 38 hours per week of informal help will not "create" a full time caring job. The family will continue to provide part of the required help.

Existing national surveys indicate that about 60 to 70% of all carers are aged 45 to 75 years old in France, Germany, Netherlands, Austria and the UK[100]. This is an important characteristic for the estimations presented below and the policy recommendations. Austrian data focussing only on carers for persons aged 60 and over give a similar distribution. About 38% of carers for elderly people are aged between 30 to 64 years and 30% are aged 65 and over.

Concerning gender distribution, available national surveys indicate that the big majority of carers are women. Men constitute a small share. The share of women varies between 60% and 80%. If we focus only on people caring elderly persons, the share of women varies between 67% (Ireland) and 80% (Austria). According to the relationship, in most countries about 30% of all carers for elderly people is the daughter of the dependent elderly person. The share of spouse/partner varies greatly among countries. It ranges generally from 20% (UK) to 60% (Germany) of all persons caring for elderly people. In all cases, the daughter and the partner/spouse constitute the big majority of persons caring elderly people.

Data on caring elderly people are collected by a certain number of countries, but they are not comparable. Also, according to Eurostat, data collected by the ECHP concerning carers are unreliable for several countries, notably for men. Consequently, in order to reduce any potential bias by the use of ECHP estimations, we present below mainly data concerning carers aged 50-64. The ratio women/men in the following table is higher compared to the rates presented in the previous paragraph as it focuses on carers aged 50 to 64 years.

**Figure 42: Persons (Men and Women) aged 50-64 spending time caring adults, 1998**



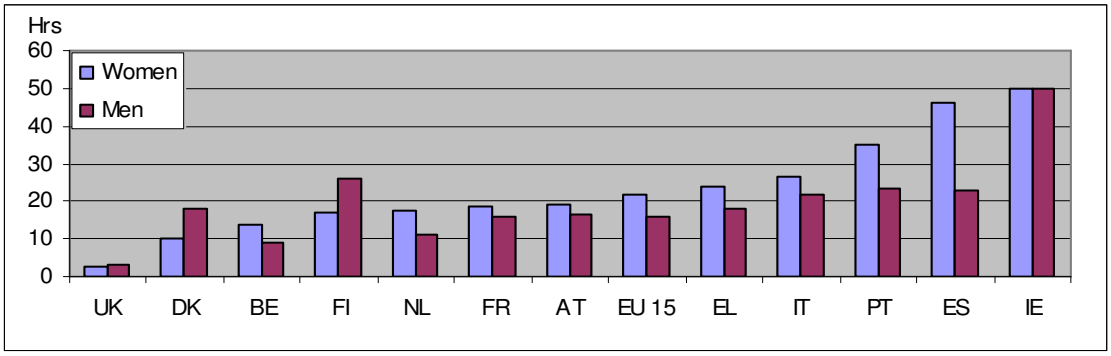

Note: Eurostat notes that several data have to be treated with caution. Data for men are not reliable, notably DE and UK.
Source: Eurostat, ECHP 1998

[100] S. Grammenos – Eurostat (2003)

About 12 of women aged 50 to 64 spent time caring. The following figure indicates that on average they spend about 20 hours per week. This is an unrealistic estimate in comparison to national surveys. In fact, national surveys indicate that about 60 to 65% of carers aged 50-64 spends less than 20 hours per week. The ECHP data implies that the majority of carers spend more than 20 hours per week, which is in contradiction with national surveys.

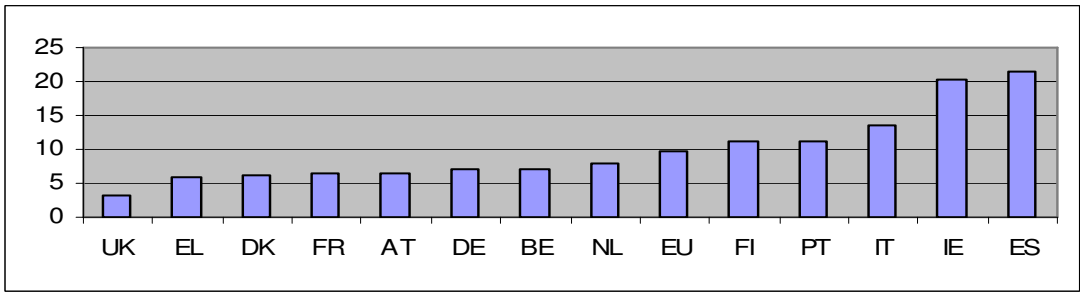
The data are coherent only if we consider that they focus on people caring more than a certain amount of hours per week, for example, 5 hours per week. In fact, this group is about 30% of all carers. In this case, the data might indicate that about 6,5% to 7% of persons in the age group 50-64 spend more than 20 hours per week caring.

**Figure 43: Average hours spent (Men and Women) looking after someone other than a child**




Note: Eurostat notes that several data have to be treated with caution.
Source: Eurostat, ECHP 1998

**Figure 44: Standardized index for persons ((Men and Women) aged 50-64 caring adults; 1998**




Note on index: We put average hours for EU 15 equal to 1. We multiply this index with the % of persons caring.
Source: Eurostat ECHP 1998, and own estimations

The number of hours spent caring has important impacts on labour participation. Also, the number of hours demanded by dependent elderly people is important for the quality of their life. Available econometric analysis suggests that the impact of informal care on the labour supply of men and women is similar and that a commitment of less than 10 hours has no significant statistical impact on labour supply. However, higher levels exert a negative impact on employment of carers compared to non-carers[101].

We have retained two levels for further study:

- More than 20 hours per week: This threshold helps us to eliminate help considered to be convenience assistance and retain only help considered to be dependency care;
- More than 35 hours: This amount helps us to identify intense caring, which has important effects on the carer and the autonomy of the dependent person. The estimation of higher volumes of care is difficult due to statistical bias. In fact, it concerns small numbers in existing surveys.

[101] F. Carmichael and S. Charles (2003).

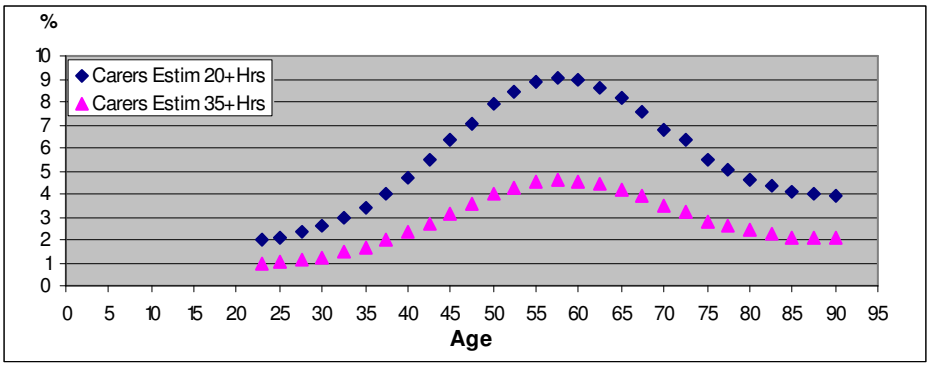
The absence of care provision at home might also be an important element in the decision to enter an institution. We consider that the amount of 35 hours per week might be an important ceiling both for the carer and the elderly person.

In order to assess the number of carers providing care to dependent people we have exploited available research[102], the SHARE (Survey of Health, Ageing and Retirement in Europe)[103]; and national surveys[104].

We present below, the percentage of people providing care to adult dependent persons.

For comparison, the survey "carers 2000" in the UK reports the prevalence of care-giving for the elderly, chronic sick and disabled, in 2000. About 4% of persons aged 16 and over provided care for at least 20 hours a week. Our own estimation for persons aged 25 and over in the EU is 5,8%. As one could expect, the average prevalence of caring in the EU is higher. In fact, the previous figure indicate that the prevalence of caring is low in the UK compared to countries like Spain, Italy or Ireland. The same British data indicate that the prevalence of caring is almost the double among married and cohabiting persons compared to widowed, divorced or separated. All surveys report a significantly higher prevalence for women compared to men. Women seem to care for partners or parents more often than men.

**Figure 45: Persons providing care (20+ Hrs and 35+ Hrs per week) as a % of the same age group**




Note: "Carers Estim 20+": Estimation of persons (% same age group) who provided care for more than 20 hours a week.
"Carers Estim 35+": Estimation of persons (% same age group who provided care for more than 35 hours a week.

[102] See S. Grammenos, Eurostat, 2003

[103] SHARE (Survey of Health, Ageing and Retirement in Europe: Edited by A. Börsch-Supan et al.; Mannheim Research Institute for the Economics of Aging (MEA), Mannheim 2005.

[104] 1) Family Ressources Survey: Great Britain 2000-01; Edited by N. Butt et al., Department for Work and Pensions: national statistics. 2) "2001 Census Topic Report – Carers": Cardiff Research Centre, The County council of the city and county of Cardiff; 2004. 3) "Carers 2000": J. Maher and H. Green; The Stationery Office: national statistics; 4) "Women and Men on Farms in Ireland", B. Murphy, Ireland, 2004

It is interesting to note that a high number of carers are in the age group of 55-64, where labour participation is low. Furthermore, people caring for 35 hours per week or more may be considered as the main providers of help. This is not sure for persons caring for less than 35 hours per week. In the latter case, the amount of formal help might be the main source of care. This is important for the carer, as this might mean that his help has an occasional supportive role and thus a greater flexibility in organising it.

**Table 26: EU 25 Number of carers, 2005**

| | Carers providing +20 hrs/week | | | Carers providing + 35 hrs/week | | | Carers providing +20 hrs/week | Carers providing + 35 hrs/week |
|---|---|---|---|---|---|---|---|---|
| | 2005 | | | | | | 2030 | |
| Age groups | Number | % | % same age group | Number | % | % same age group | Number | Number |
| 25-29 | 717.329 | 3,8 | 2,31 | 344.690 | 3,6 | 1,11 | 594.019 | 285.438 |
| 30-34 | 984.387 | 5,2 | 2,96 | 478.891 | 5,0 | 1,44 | 782.894 | 380.868 |
| 35-39 | 1.401.595 | 7,4 | 3,98 | 690.233 | 7,2 | 1,96 | 1.137.597 | 560.224 |
| 40-44 | 1.908.442 | 10,0 | 5,45 | 948.969 | 9,9 | 2,71 | 1.631.702 | 811.360 |
| 45-49 | 2.312.726 | 12,1 | 7,08 | 1.159.630 | 12,1 | 3,55 | 2.194.923 | 1.100.562 |
| 50-54 | 2.585.326 | 13,6 | 8,46 | 1.304.887 | 13,6 | 4,27 | 2.655.493 | 1.340.302 |
| 55-59 | 2.540.949 | 13,3 | 9,02 | 1.290.194 | 13,4 | 4,58 | 2.933.826 | 1.489.681 |
| 60-64 | 2.067.946 | 10,9 | 8,64 | 1.055.514 | 11,0 | 4,41 | 2.874.389 | 1.467.136 |
| 65-69 | 1.702.579 | 8,9 | 7,57 | 872.656 | 9,1 | 3,88 | 2.391.517 | 1.225.771 |
| 70-74 | 1.226.379 | 6,4 | 6,33 | 631.595 | 6,6 | 3,26 | 1.736.101 | 894.106 |
| 75-79 | 798.711 | 4,2 | 5,04 | 413.618 | 4,3 | 2,61 | 1.155.267 | 598.263 |
| 80+ | 803.514 | 4,2 | 4,27 | 417.055 | 4,3 | 2,22 | 1.446.980 | 751.039 |
| **Total** | **19.049.883** | **100,0** | **5,84** | **9.607.931** | **100,0** | **2,94** | **21.534.708** | **10.904.748** |

Source: Own calculations using Eurostat population forecasts (baseline scenario)

If we apply the current rates to the Eurostat baseline scenario for the population, there is a small increase of the number of carers (+13%) but a significant change in the age composition. The age of carers increase significantly. Furthermore, the total number of carers increases by only 13%.

## CHAPTER 3:The impact of socio-economic factors on activity limitations

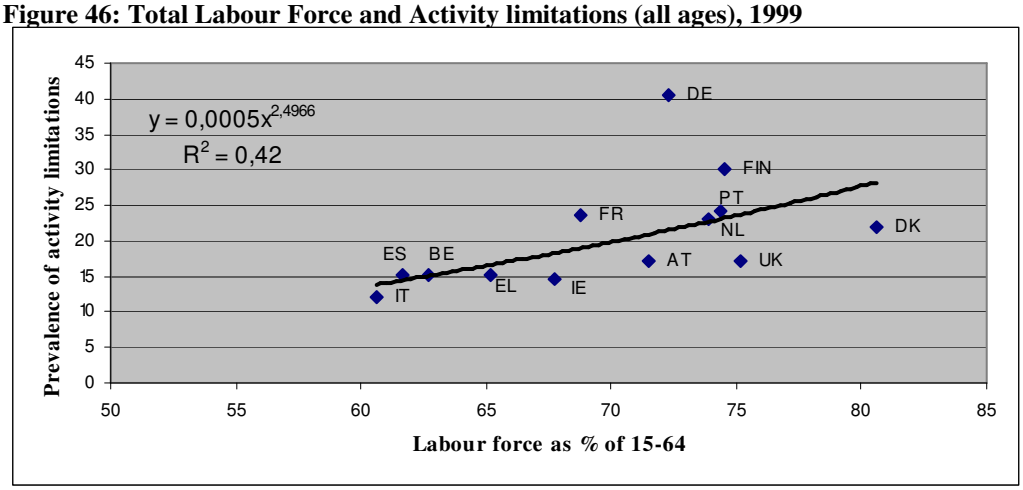
There are several studies indicating that the gains in life expectancy are years in good health or years without activity limitations[105] but some researchers contest this result. For example, the Swedish National health report 2005, notes that most studies on long-term tendencies show that the mobility of the elderly and their capacity to carry out basic daily functions have increased, but at the same time studies also show that the proportion of elderly with illnesses have also increased. In fact, the self-declared ill-health among the elderly Swedish dropped in the 1980s, but increased again in the 1990s. This is interpreted as a sign that people with serious and chronic conditions survive longer[106]. It is important to note that self-assessments are strongly influenced by economic factors.

Other researchers[107] argue that, for the majority of countries for which time series are available, an increasing life expectancy parallels an increase in life expectancy without severe disability, keeping more or less constant the number of years lived with severe disability. However, Cambois et al. note that when various levels of disability severity are combined, trends are more variable from one country to another. Taken together, these studies suggest that additional years of life expectancy are accompanied by moderate disability but not by severe disability.

The previous comments are strongly based on a medical approach of disability and activity limitations. Consequently, it is interesting to see what are the social influences on disability and care dependency of elderly people. In the following, we will depart from the medical approach and try to identify the factors, which affect the level and progression of activity limitations. This will enable us to simulate the impact of certain variables on the level of activity limitations in the coming years.

In Chapter 1 on "Dependent elderly people", we noted that the prevalence of dependency follows a logistic function, where the coefficients 'α' and 'β' are determined by socio-economic and medical factors. Previous chapters have shown that health status is influenced notably by income and health care expenditures. Also, it is widely accepted that replacement rates (level of social and welfare benefits relative to wages) affect the prevalence of disability. In the following, we have included also labour force participation as a proxy for labour market conditions on health. Finally, as we noted above, social capital might exert an influence on activity limitations.

**Figure 46: Total Labour Force and Activity limitations (all ages), 1999**




Note: The data concerning Germany manifest a big variability and are not comparable to other countries.
Data source: ECHP/Eurostat and OECD

[105] O. Bontout et al., 2002 ; E. Cambois et al., 2001; Aromaa A, Koskinen S (Eds) (2004); Martelin T, Sainio P, Koskinen S (2004) Ikääntyvän väestön toimintakyvyn kehitys. (The Development of the Functional Capacity or the Aging Population.) In: Ikääntyminen voimavarana. Tulevaisuusselonteon liiteraportti. Valtioneuvoston kanslian julkaisusarja 33/2004, p. 117-130

[106] National health report (2005)

[107] Emmanuelle Cambois, Jean-Marie Robine and Mark D. Hayward (2001).

At a first step, we estimated 'α' and 'β' for the 13 countries by ordinary least squares. In a second stage, we regressed the estimated 'α' and 'β' on the socio-economic variables which seem to have an influence on the level and progression of activity limitations.

Due to data limitations we have used 1999 data. Eurostat notes that most data concerning the percentage of people spending time caring adults are not reliable. Consequently, we have chosen two proxies for social capital according to their reliability. The first covers all people aged 20-49 spending time caring (both for adults or children) and the second includes women aged 50-64 spending time caring adults. The first may be considered as a global proxy, taking into account attitudes of young generations. The second focuses on adult care and has the advantage to take into account the percentage of people spending time caring and the number of hours spent. This is important, since in certain countries the number of people declaring spending time caring adults is high, but when they specify the number of hours per week, the latter is very low. The following table presents the results of the estimations.

**Table27: Regression results; Dependent variable: estimated 'α' and 'β'**
**Care dependency (Large definition: Prevalence of severe activity limitations)[108]**

| | | Dependent variable: '**α**' | | | | | Dependent variable: '**β**' | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Exogenous variable | $SC^1$ | SB | RR | Constant | $R^2$ | $SC^2$ | SB | RR | Constant | $R^2$ |
| 1 | | -0,033* | 0,055 | 1,650 | -11,843 | 0,70 | 0,00001* | -0,0007 | -0,018 | 0,139 | 0,67 |
| | Std. error | (0,021) | (0,023) | (0,477) | (2,244) | | (0,00001) | (0,0003) | (0,007) | (0,029) | |
| | | | | | | | | | | | |
| 2 | | - | 0,033* | 1,802 | -13,561 | 0,62 | - | -0,0008 | -0,016 | 0,131 | 0,63 |
| | | | (0,020) | (0,504) | (2,135) | | | (0,0003) | (0,007) | (0,028) | |
| | | | | | | | | | | | |
| | Exogenous variable | $SC^1$ | SB | LF | Constant | $R^2$ | $SC^2$ | SB | LF | Constant | $R^2$ |
| 3 | | -0,056 | 0,081 | 4,218 | -22,163 | 0,66 | -0,00002 | -0,0007 | -0,058 | 0,312 | 0,68 |
| | Std. error | (0,022) | (0,025) | (1,402) | (5,934) | | (0,00001) | (0,0003) | (0,021) | (0,090) | |

Notes: **SB**:GDP per capita in 1000 PPP x sickness benefits as % of GDP (Eurostat and OECD data); **RR**: Replacement rate in percentage, married couple, in Ln (OECD data); **SC**: Social capital (ECHP-Eurostat); $SC^1$: Percent of people aged 20-49 spending time caring children and/or adults. $SC^2$: Average hours spent for caring adults multiplied by the percentage of women aged 50-64 caring adults. **LF**: Total Labour Force as a percentage of population from 15 to 64 years; 1999, in Ln (OECD data); All data refer to 1999 except social capital which refers to 1998. Regressions run on 13 countries (EU 15 except Luxembourg and Sweden). SB is not correlated with RR or LF. SB is correlated with $SC^1$ (0,58) and $SC^2$ (0,37). LF is correlated with $SC^2$ (-0,55) but not with $SC^1$ (0,03). LF is correlated with RR. (0,64).
* : Not significant at 0,05.

It is interesting to note a certain number of properties, which are important for the definition of policy variables during the projections.

The per capita sickness benefits (SB), the replacement rate (RR) and total labour force (LF) are generally significant. Social capital is very sensitive to the definition used.

Higher per capita sickness benefits have two conflicting effects:

- Through 'α', they increase the prevalence of activity limitations. High per capita sickness expenditures might reflect a relatively bad general health status of the population. This implies also higher care;
- Through 'β', they reduce the rate of progression of care dependency and thus decrease the prevalence of care dependency. This might reflect better health care and prevention.

[108] The results for total disability are:

$\alpha$ = -17,063 + 0,038·SB + 2,945·RR $R^2$=0,68.
(0,026) (0,686) (2,927)

$\beta$= 0,174 + -0,0010·SB + -0,026·RR $R^2$=0,76.
(0,030) (0,0003) (0,007)

The total effect is ambiguous and depends upon age. Generally, it is positive for elderly people even though relatively small.

A decrease of replacement rates generates two conflicting effects:

- Through 'α', it decreases the prevalence rate and might reflect the well-known discouragement effect. Lower replacement rates push people to work more.
- Through 'β', it increases the prevalence of dependency. This might reflect a health effect. In fact, high replacement rates make possible access to costly treatments and in certain cases longer health care treatments.

The second effect seems to be stronger compared to the first. The relation between replacement rates and activity limitations appears to be positive for all age groups.

An increase of labour participation has conflicting effects:

- Through 'β', it decreases the prevalence.
- Through 'α', it increases the prevalence of activity limitations. This might reflect working conditions and the strains of labour market. National data indicate that high labour activity countries face high prevalence of total activity limitations[109].

The total effect is ambiguous and depends upon age. Generally, it decreases the prevalence of elderly people. The curve rotates clockwise. Finally, lower care increases the prevalence of dependency for all age groups.

In order to generate the forecasts of care dependency for EU, we use the previous estimations. Furthermore, we make the following assumptions:

- GDP per capita increases by an average annual growth rate of 2%;
- Labour force participation increases from 70% (simple EU average) to 74%.
- Replacement rates are expected to decrease due to the pressure of ageing on public finances. They pass from 68% (simple EU average) to 65%.
- Sickness benefits as a percentage of GDP reduce slightly, in accordance with historical data. They pass from 0,55% to 0,53% of GDP.
- Social capital measured as total time spent caring by people aged 20-49 is increasing, in accordance with historical data on care and income. This is consistent with the assumption that light caring is complementary to public services. It increases by 10% of its original value.
- Social capital measured as time spent caring by women 50-64 is decreasing. It reflects the assumption that heavy caring is a substitute to public long-term care. Also, it is consistent with the assumption of higher labour force participation. We assume a reduction of about 5%.

The results are presented in the following table and figure. It is interesting to note that the gains are relatively high for the very old. The gains are not proportional at all ages. The widely used assumption that the prevalence of activity limitations will shift downwards for all ages is not supported by our method. Other researchers find similar results, e.g. that the disability status of the very old (85+) is falling more rapidly than that of the youngest elderly (65-85)[110].

Furthermore, a higher activity rate, which is a policy goal, and/or a decrease of replacement rates, due to strains of ageing on public finance, might exert a negative effect on the health of persons active in the labour market.

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[109] The regression on 13 Member states gives: Ln(y) = 0,0005 + 2,5 Ln(x); $R^2$=0,41. y= Labour force as a % of population 15 to 64 years and x= Prevalence of total activity limitations. The prevalence of severe activity limitations is less sensitive to the activity rate.

[110] D. M. Cutler and E. Meara, 1999, The concentration of medical spending : An Update, NBER Working Paper 7279.

**Table28: Prevalence of care dependency in the EU by age (Wide definition: ADL ansd/or IADL activitirs), in 2000 and 2030**

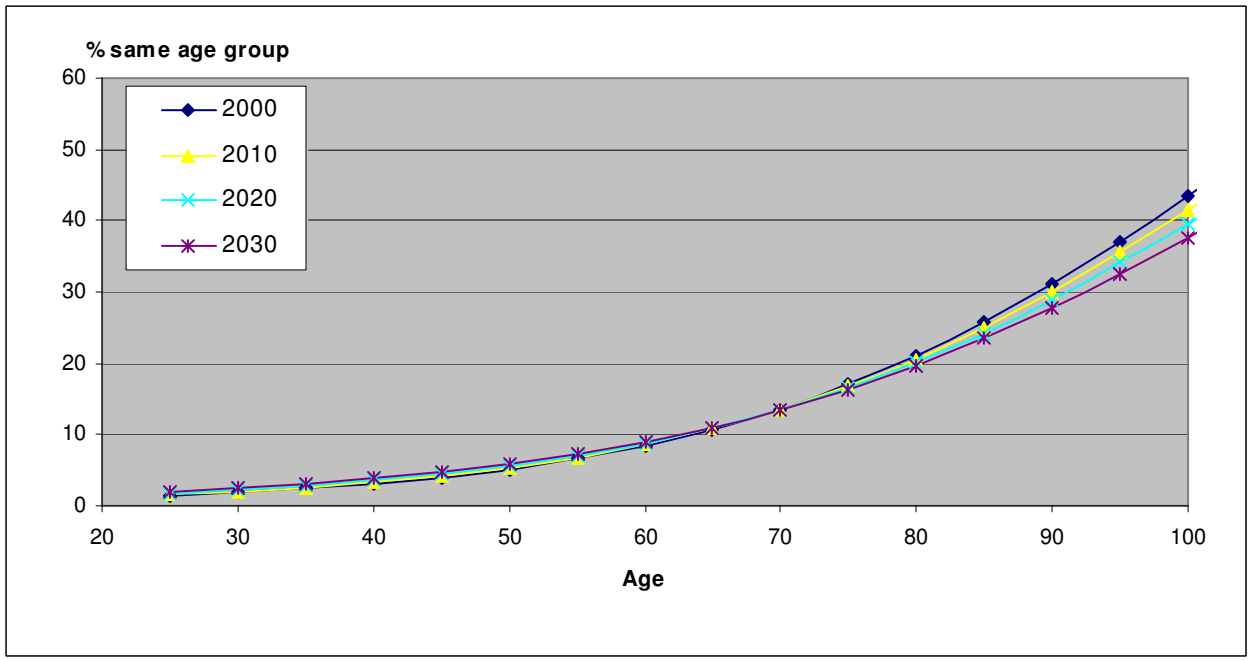
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| | | Method 3 | Method 1 | (Age t) – (age t-1) | (1)-(2) | (5)/(4) | (1)-(3) | (7)/(4) |
| Age | **2000** | **2030** | **2030** | 2000 | 2000-30 | Ratio en % | 2000-30 | Ratio en % |
| **65** | 10,7 | 11,0 | 9,3 | | | | | |
| **70** | 13,6 | 13,4 | 11,6 | 2,9 | 0,2 | 7 | 2,0 | 69 |
| **75** | 17,0 | 16,3 | 14,3 | 3,4 | 0,7 | 21 | 2,7 | 79 |
| **80** | 21,0 | 19,6 | 17,6 | 4,0 | 1,4 | 35 | 3,4 | 85 |
| **85** | 25,8 | 23,4 | 21,4 | 4,8 | 2,4 | 50 | 4,4 | 92 |
| **90** | 31,2 | 27,7 | 25,8 | 5,4 | 3,5 | 65 | 5,4 | 100 |
| **95** | 37,1 | 32,5 | 30,7 | 5,9 | 4,6 | 78 | 6,4 | 108 |

Note: The prevalence for 2000 is calculated using simple average values for the 13 countries-observations. Consequently, the prevalences are slightly different for those reported in Chapter 1, which are estimated directly on the raw survey data for EU 15. For comparison, the observed and directly estimated (age as dependent variable) prevalence for age 65 is 12% instead of 10,7 reported in this table.

Concerning the national evolutions, Belgium, France and Italy are close to the EU average. The UK is expected to experience a lower decrease of the prevalence of activity limitations while Netherlands a faster decrease.

If we apply the above methodology, to the Eurostat baseline scenario, the results indicate that in 2030 the number of elderly dependent persons (wide definition) might be between 22.483.000 persons (method 3) and 24.910.000 persons (method 1). The simple medical approach presented in Chapter 1 gave us about 22.914.690 persons.

**Figure 47: Prevalence of care dependency in the EU (wide definition), in 2010, 2020 and 2030**

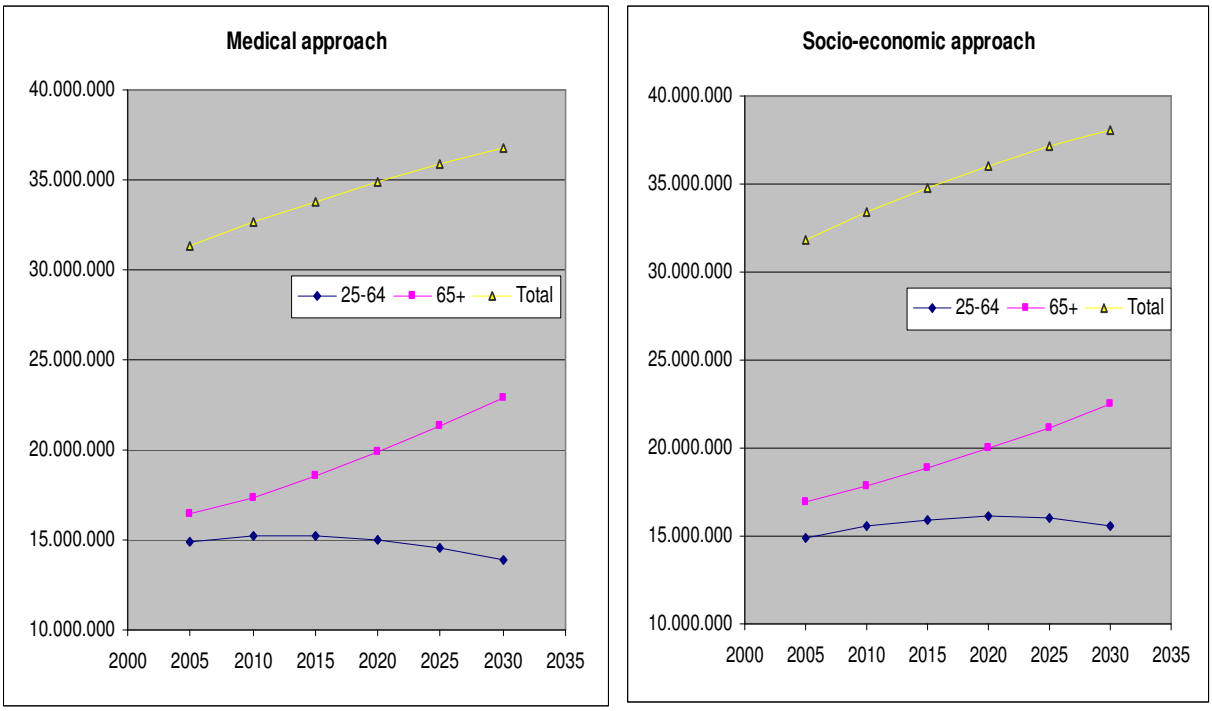



Note: Based on method 3 (see Table with regression results). The method using Replacement rates (Method 1) gives slightly lower prevalence rates for the very old.

By resuming, we can say that the projections indicate a reduction of activity limitations in the coming years for elderly people but provide uncertain results for younger groups. Our projections indicate that lower replacement rates and tight labour markets may have an adverse effect on health and activity limitations of younger generations.

The following graphs indicate the differences between the medical and the socio-economic approach. The number of elderly dependent people is approximately the same, but the socio-economic approach provides higher numbers for the number of dependent persons in the 25-64 age group.

**Figure 48: Number of care dependent people (Wide definition: ADL and/or IADL) by age group**




Note: We have used the Eurostat baseline scenario for the population projections

## CHAPTER 4: Projections concerning the number of carers

The previous chapter concluded that the number of persons with a care dependency will increase in the coming years. For simplicity, in the following projections, we assume that in 2050 the prevalence of dependency will be shifted downwards implying that the current prevalence rate in the 65-69 age group will apply to the 70-74 age group in 2050, and symmetrically for the other age groups. Furthermore, we assume that the shift from 2005 to 2050 will be smooth and will accelerate slightly as time passes.

Concerning the prevalence of caring, we assume the same rates as those estimated for 2005.As for the population, we adopt the baseline Eurostat scenario. The results indicate that the number of carers increases slightly till 2030 and decreases latter, while the number of dependent elderly people is increasing steadily, notably those aged 80 and over. The number of carers is increasing in the coming years because the majority of carers are aged 40 to 70 years.

The following graphs present the evolution of care dependent people according to two different definitions. The narrow definition refers to ADL and the wide to IADL activities. The number of carers covers all people providing care to adult or elderly dependent people for more than 20 and 35 hours per week. The graphs reveal big differences across countries.

People with a moderate care dependency might require only an occasional assistance. Consequently, we have associated the number of people providing care for more than 20 hours per week with the large definition of dependency. People needing care on ADL activities (narrow definition of care dependency) are compared to the number of people caring for more than 35 hours per week.

The comparison between carers and dependent people ought to be done with caution, as the number of dependent people, in the 25-64 age group, is expected to decrease. The increase of elderly dependent people is compensated partly by a decrease of younger dependent people. Also, our projections for 80+ are very sensitive to small changes. It is important to note that national and EU estimations of the prevalence of activity limitations present a high variability for the extreme age groups. Also, the Eurostat baseline scenario does not disaggregate the 80+ age group.

The age profile of carers is expected to change. The average age is expected to be higher in the coming years, as spouses or partners of elderly people are expected to be more numerous among persons providing care. The organisation of future services ought to take into account of the limited mobility of these persons, of their limited capacity to provide intensive informal care, etc. Otherwise, we risk deteriorating the mental and physical health of elderly carers and thus increasing further the need for assistance.

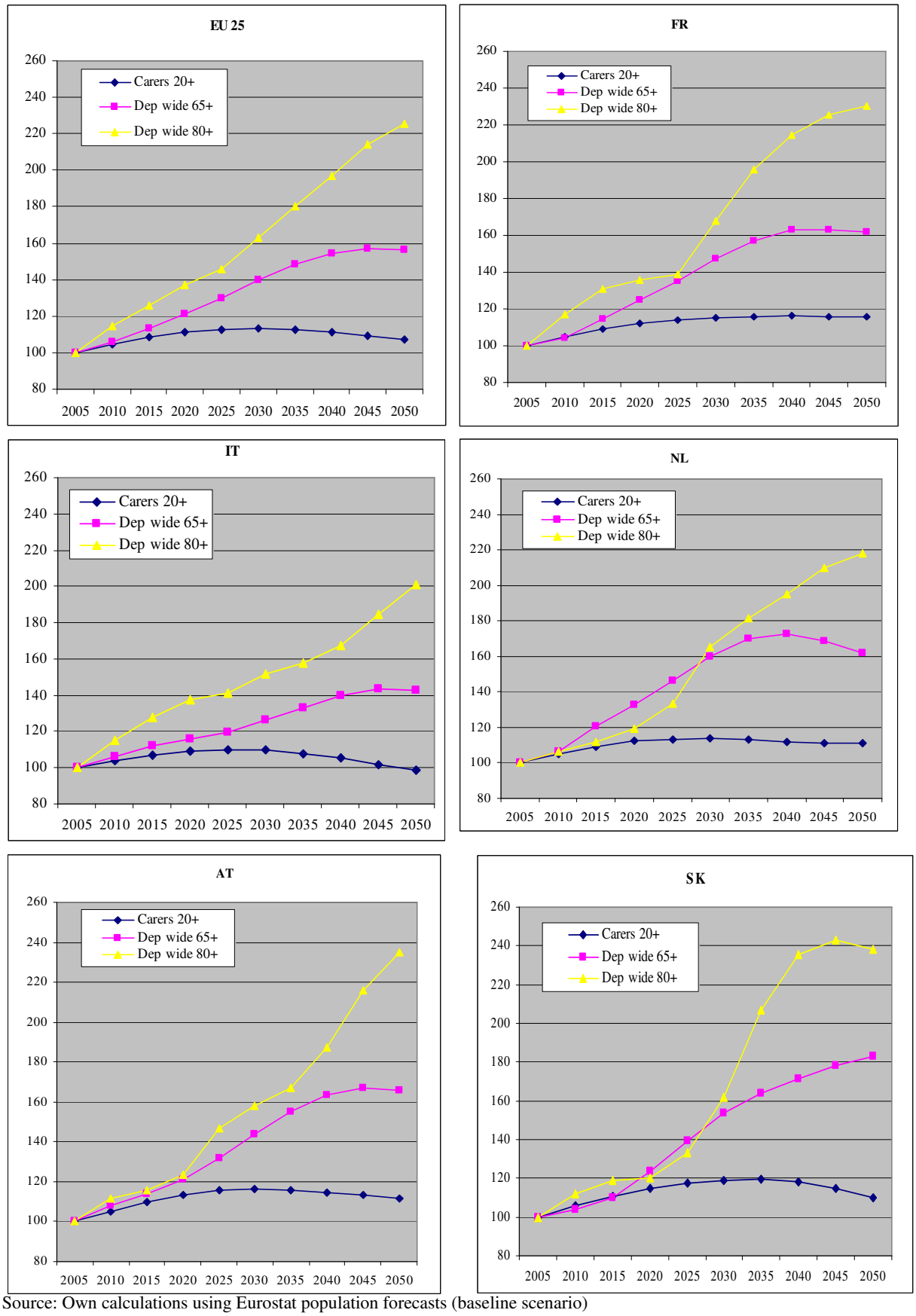
Current services have notably two aims: to meet the demands of elderly dependent people and to eradicate any obstacle for labour participation of carers. In the future, we have to take into account the needs of elderly carers who are different from those in the middle-aged groups.

These developments require an adaptation of care policies in order to find the right balance between self-care, informal care and formal care. The development of formal care ought to:

- Reinforce the capacity of older people to look after themselves,
- Enable economically active persons to combine work and informal care, and to
- Alleviate the burden of elderly carers.

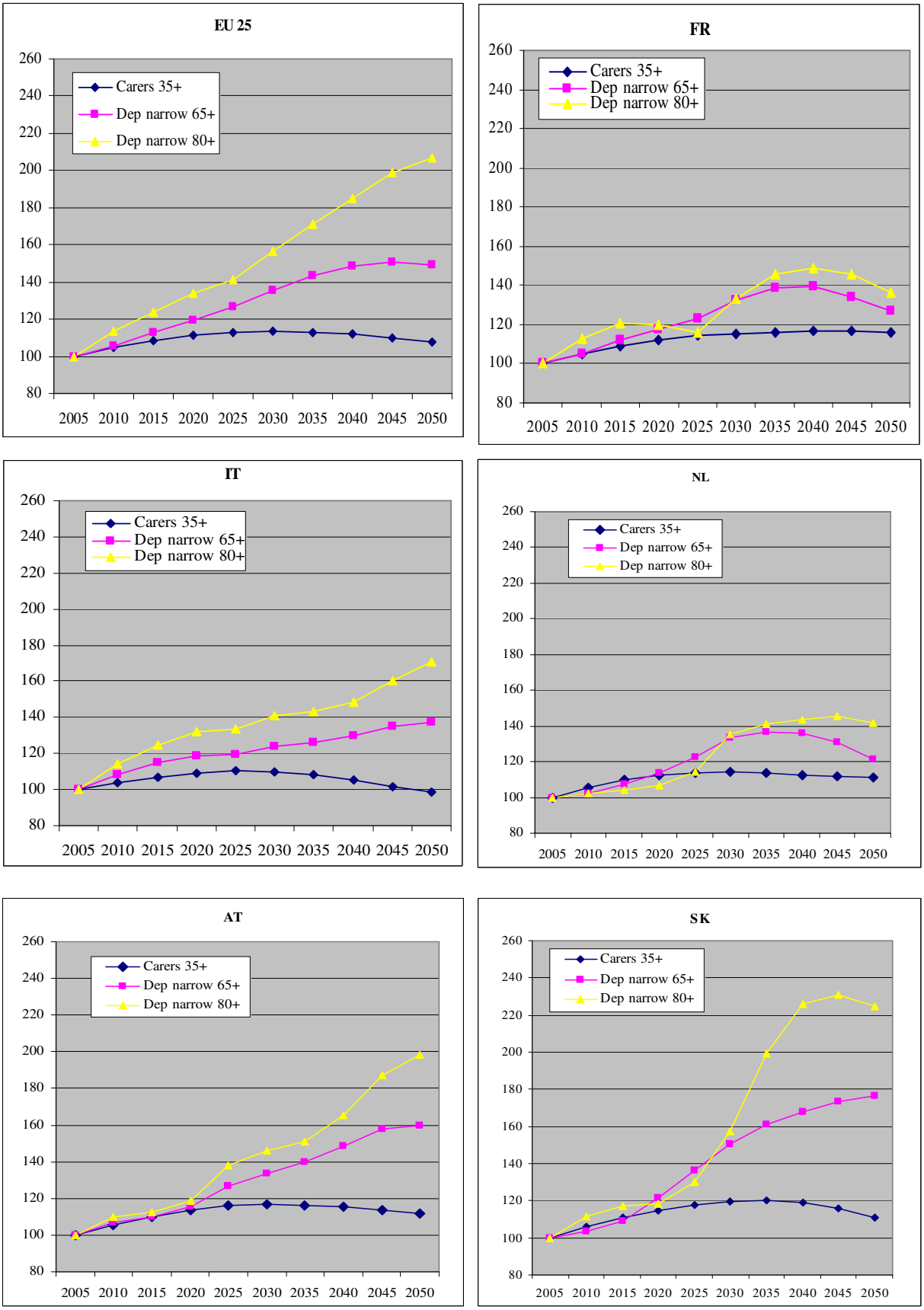
Social workers, visiting nurses, day centres, rehabilitation services, and proximity services ought to favour elderly people to stay at home.

**Figure 49: Carers providing care +20 hours per week and number of dependents (wide definition)**




Source: Own calculations using Eurostat population forecasts (baseline scenario)

**Figure 50: Carers providing care +35 hours per week and number of dependents (narrow definition)**




Source: Own calculations using Eurostat population forecasts (baseline scenario)

## CHAPTER 5: Projections concerning the nature of care

The previous chapters have indicated a significant increase of dependent people in the coming years. This chapter will explore the nature of care. Dependency here means that a person needs the assistance of a third person in order to do a certain number of activities of daily living (washing oneself, dressing oneself, etc.) and/or instrumental activities (shopping, social relations, etc.).

We focus on the main activities of daily living and a certain number of activities, which are important for healthy ageing and social participation. Concerning the dependence by nature of need, we have used the values for 2005 from Eurostat[111]. We have taken a simple average of available national rates and used it as an approximation for the EU 25, except for social relations where we had only data for Austria and Germany. "Social life" refers mainly to mobility but other factors play also an important role. Severe mobility refers to changing body positions (sitting down, standing up, getting into/ out of a car).

We estimated a logistic function for each activity limitation and assumed a leftward shift of the prevalence curve. Consequently, in 2050 the prevalence of dependency for people aged 70-75 will be the current prevalence for the age group 65-69. Generally, the prevalence is very low for people younger than 60 years and increases sharply latter. This explains why the reduction between 2005 and 2050 is relatively high in certain cases.

**Table 29: Dependency rates by type of activity; percent of people of the same age group requiring assistance**

| | Severe mobility | Washing oneself | Dressing oneself | Preparing meals | Climbing stairs | Housework | Shopping | Social relations |
|---|---|---|---|---|---|---|---|---|
| **65-74** | | | | | | | | |
| 2005 | 3,0 | 3,5 | 3,2 | 4,3 | 9,9 | 9,8 | 10,9 | 6,8 |
| 2030 | 2,3 | 2,5 | 2,3 | 3,1 | 7,6 | 6,5 | 8,1 | 5,0 |
| 2050 | 1,7 | 1,7 | 1,60 | 2,2 | 5,8 | 5,8 | 5,8 | 4,2 |
| **75+** | | | | | | | | |
| 2005 | 9,3 | 13,9 | 12,0 | 15,7 | 25,8 | 27,5 | 32,6 | 23,5 |
| 2030 | 7,5 | 10,8 | 9,4 | 12,3 | 21,5 | 22,3 | 26,7 | 18,9 |
| 2050 | 5,3 | 8,0 | 7,1 | 9,4 | 18,0 | 17,9 | 21,7 | 15,1 |

It is important to note that the first four activities (severe mobility, washing, dressing and preparing meals) require an important amount of assistance, "climbing stairs" might be partly solved by architectural adaptations of public and private infrastructures, while the last three are occasional activities (housework, shopping, social relations).

When measuring the number of dependent elderly people for the coming years, one has to take into account two factors pushing towards different directions:

- The medical technology tends to decrease the rate and thus the number of dependent people;
- The increasing number of elderly people tends to increase the number of dependent people.

The following projections use the dependency rates noted in the table and the baseline scenario for the population of Eurostat. The figures below reveal that the number of dependent elderly people aged 65-69 will increase till 2030 and will decrease latter. On the contrary the number of dependent people aged 80 and over is expected to increase till 2040.

[111] S. Grammenos – Eurostat (2003).

The following figures indicate that the number of very old is increasing faster to than the number of people aged 65 and over.

**Figure 51: Number of dependent people (needing the assistance of a third person) by nature of dependency, EU 25; 65-74, 2005-2050**

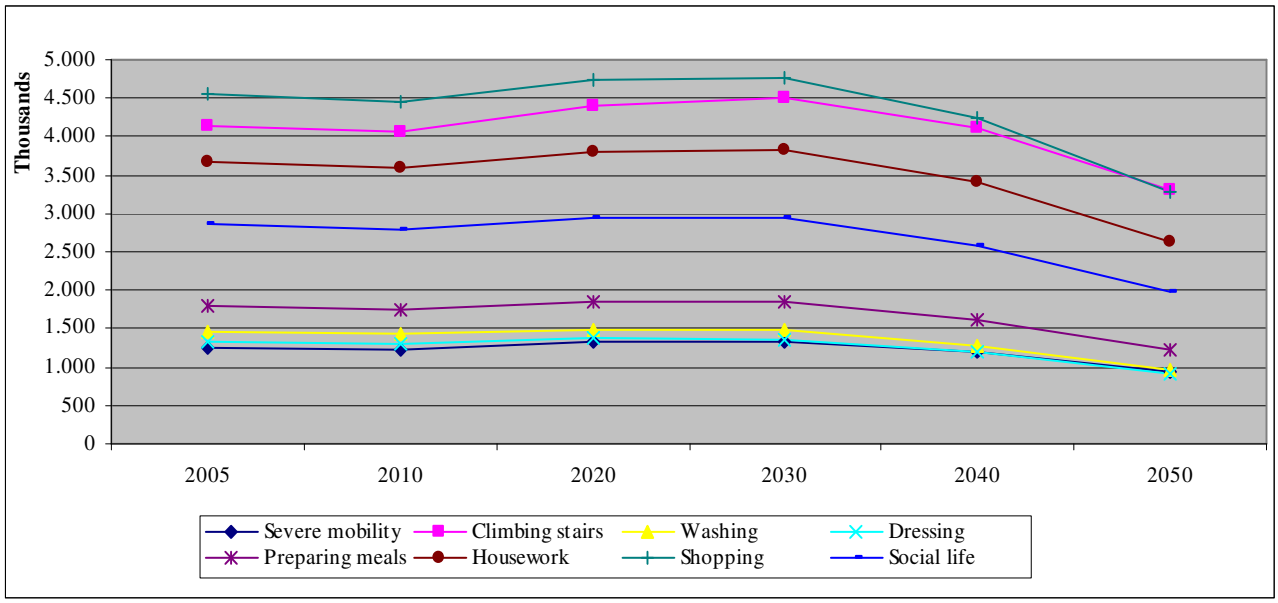
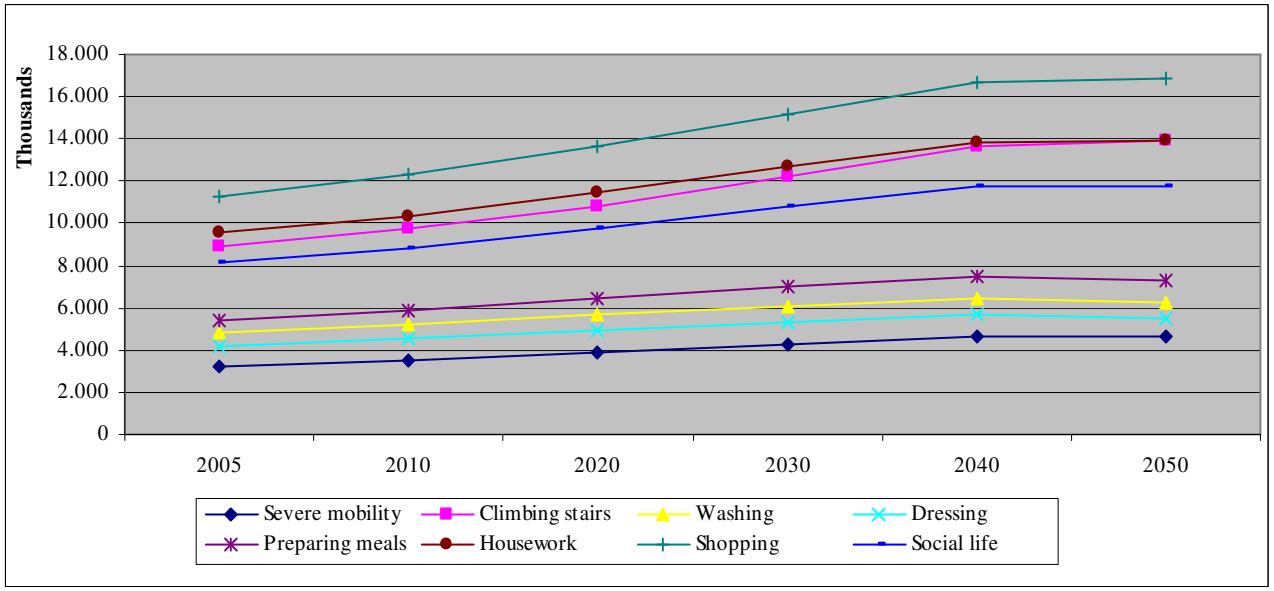



**Figure 52: Number of dependent people (needing the assistance of a third person) by nature of dependency, EU25; 75+, 2005-2050**



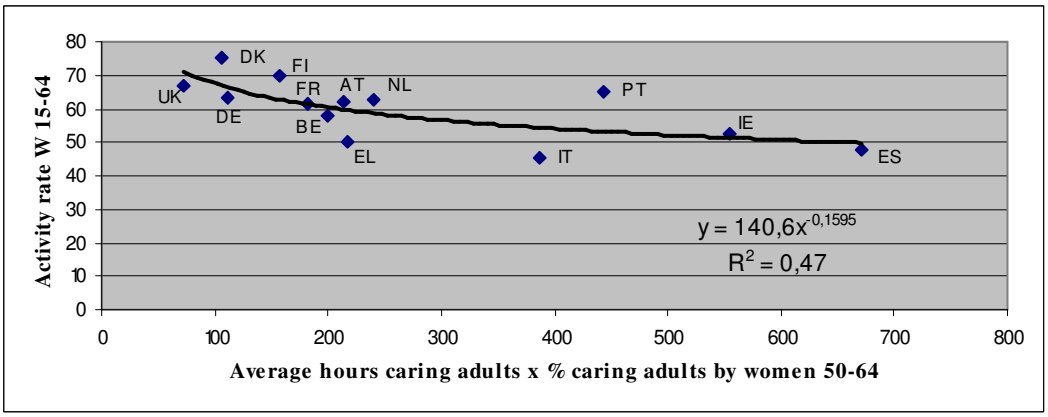
# CHAPTER 6: Implications for carers

Guideline 18 in the Employment guidelines on gender equality concerns "Reconciling work and family life". The main objective of this guideline is to adopt family-friendly policies in order for women and men to be able to reconcile their work and family life. The reconciliation of work and family life is facilitated by the availability of care services for children and frail elderly people. The Conclusions of the Lisbon summit of 23-24 March 2000 confirmed the need of making it easier to reconcile working life and family life.

Current policies aim to increase labour participation of people aged 55 to 64, as their participation is very low. Also, certain countries focus on women, notably in countries where their participation is low.

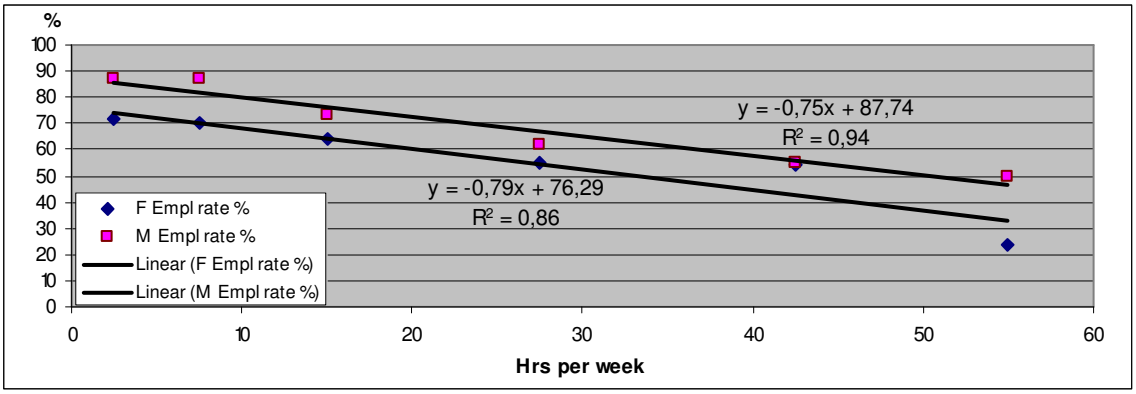
It is thus interesting to analyse the impact of increased care needs for the elderly and labour participation. Available data indicate that caring might have a negative impact on labour participation. The following figures indicate a clear negative relation between labour force participation and intensity of care. More committed carers are less likely to participate in the formal labour market than otherwise similar non-carers These results reveal that the expected increase of care needs might counteract current efforts to increase labour participation, unless such policies are accompanied with the development of care services for the elderly.

**Figure 53: Intensity of care and labour participation; Women, 1998.**




Note: The activity rate covers all women.
Data source: Eurostat/ECHP & OECD

**Table 54: Hrs/week spent caring and employment rate of carers by gender (UK)**




Data source: GHS 1990

As noted earlier, public and market provided care is not a perfect substitute for informal care. Informal carers seem to keep assistance on instrumental activities (shopping, housework, etc.) and leave assistance needed on a daily basis (washing oneself, dressing oneself, etc.) to public services.

The previous figure indicates the presence of intensive informal care by women aged 50-64, in Member states like Italy, Spain and Portugal. On the other hand, the following table indicates a high reservoir of inactive labour force in these same countries. Consequently, these countries might have a big potential for increased labour participation with the relevant care development policy.

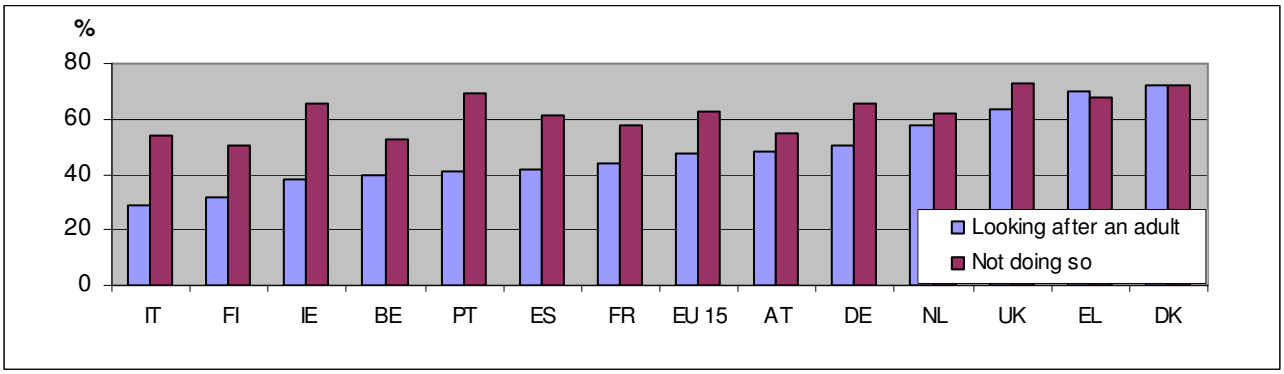
**Table 30: Inactive population not seeking employment because of familiar or personal responsibilities, 2002**

| Persons 40-64; % of total population same age group | SE | FI | DK | UK | EU | PT | ES | IT |
|---|---|---|---|---|---|---|---|---|
| Total | 1,1 | 1,2 | 1,9 | 5,0 | 6,0 | 7,8 | 9,1 | 16,0 |
| Females | 1,7 | 2,1 | 3,5 | 8,9 | 11,4 | 15,0 | 17,8 | 31,1 |

Note: EU is the simple average of the 7 member states
Source: LFS-Eurostat

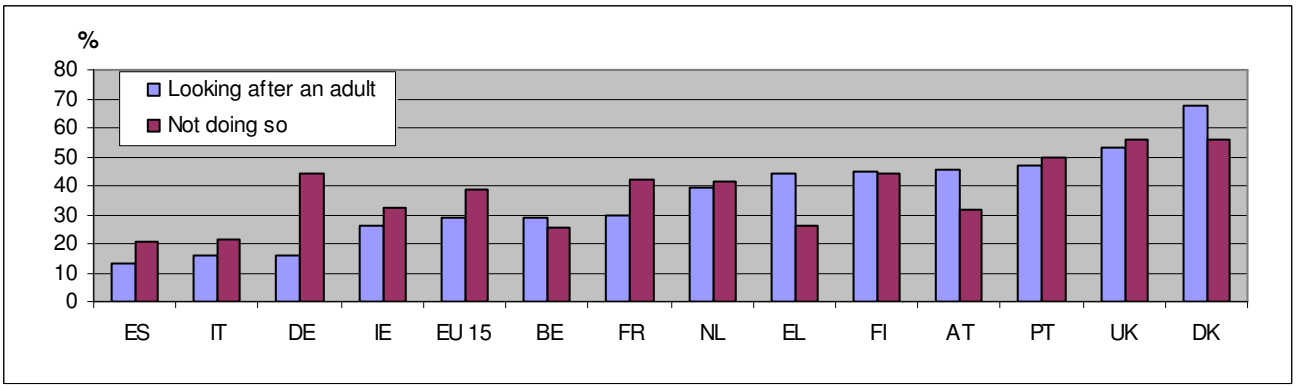
Furthermore, the following figures indicate also a negative impact of care on the employment of carers. This effect seems to be stronger among men compared to women. However, this might be a statistical artefact, as many women might be out of the labour market as a consequence of caring. Different studies have found that working aged female informal carers were earning less per hour than would have been expected given their human capital[112].

**Figure 55: Employment of men aged 50-64 looking after an adult and not doing so, 1998**




Note: DK, BE, FR, IRL, DE: Data on carers are not reliable. 'Adult' means: other than a child.
Source: Eurostat, ECHP 1998

**Figure 56: Employment of women aged 50-64 looking after an adult and not doing so, 1998**



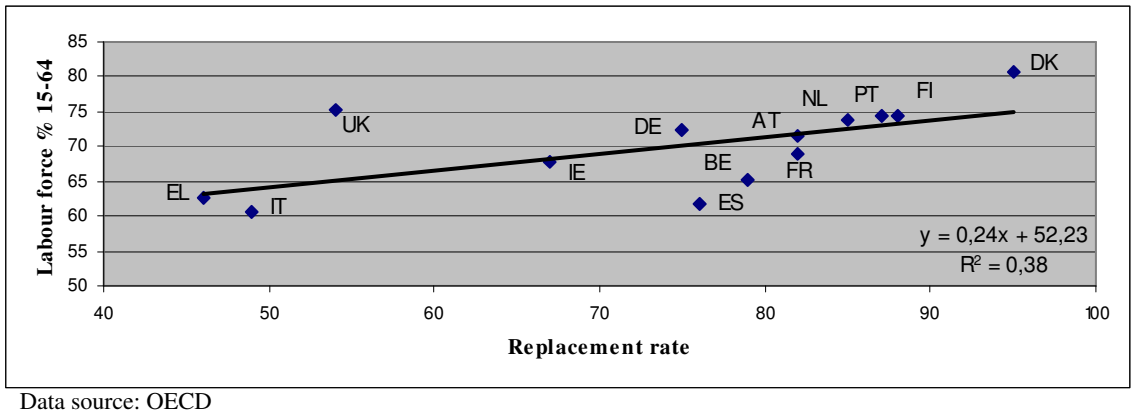

Note: DK, IRL, AT: Data for carers are not reliable. 'Adult' means: other than a child.
Source: Eurostat, ECHP 1998

[112] F. Carmichael and S. Charles (2003).

A factor, which might push more carers to enter the labour market, is the expected relative increase of wages in the coming years. In fact, the ageing process is expected to increase wages through a relative shortage of labour force and an increased capital-labour ratio. This means that the foregone earnings of informal care is increasing. However, this does not imply automatically the absence of any informal care. An important share of the adjustment to higher wages might be fewer hours spent for caring.

Certain argue that another factor, which might push economically inactive people from informal care to the labour market, is the expected stabilisation or decrease of replacement rates. The argument is that the ageing of the population is expected to put pressure on public budgets and thus decrease replacement rates. This hypothesis seems very weak. In fact, labour force participation and the level of replacement rate is positively correlated. High labour participation seems to favour high replacement rates. This simply means that high activity rates increase the capacity to fund the social welfare.

**Figure 57: Labour force participation and replacement rates**




Data source: OECD

The previous discussion indicates that there is a conflict between the forces generated by ageing (lower labour participation of intensive carers) and market factors (higher labour participation due to higher wages). This might push wages of personal services providers to increase. However, it is unlikely that domestic labour reservoir of economically inactive people is sufficient to meet the increased care demands by the elderly.

Previous data have indicated a higher increase of dependent people, notably elderly people, and a smaller increases in the number of carers. Furthermore, elderly carers will support an increasing share of assistance. This might have an adverse impact on their own health and increase further the gap between needs and potential carers. Consequently, an increasing gap might appear between demand and supply of care in the coming years. A policy of higher labour participation ought to increase further this gap. Also, long-term care services are high labour intensive and productivity improvements are relatively low in this sector. Given that these services require often low-skilled jobs with no career prospects, labour immigration seems a potential solution.

The decrease of the provision of informal care may be contradictory with the expressed preferences of elderly people for long term care services. According to the Eurobarometer[113] elderly people asked about who they would turn to if they needed extra help or assistance, more than half of the respondents expressed a first preference for partner and children. The rate was higher in Mediterranean countries, where more than 70% (reaching 83,3% in Spain and 83,1% in Greece) would turn to partner and children. Whether older people are satisfied or not with the informal care they are receiving, they are not willing to replace informal care by home care. In the Netherlands, some 40% of elderly people satisfied with the informal help they receive, would be less than 10% to be satisfied with replacing it with home care.[114]

[113] Eurobarometer 37.2; April-May 1992.
[114] Job van Exel et al. (2003).

## CHAPTER 7:Macroeconomic implications

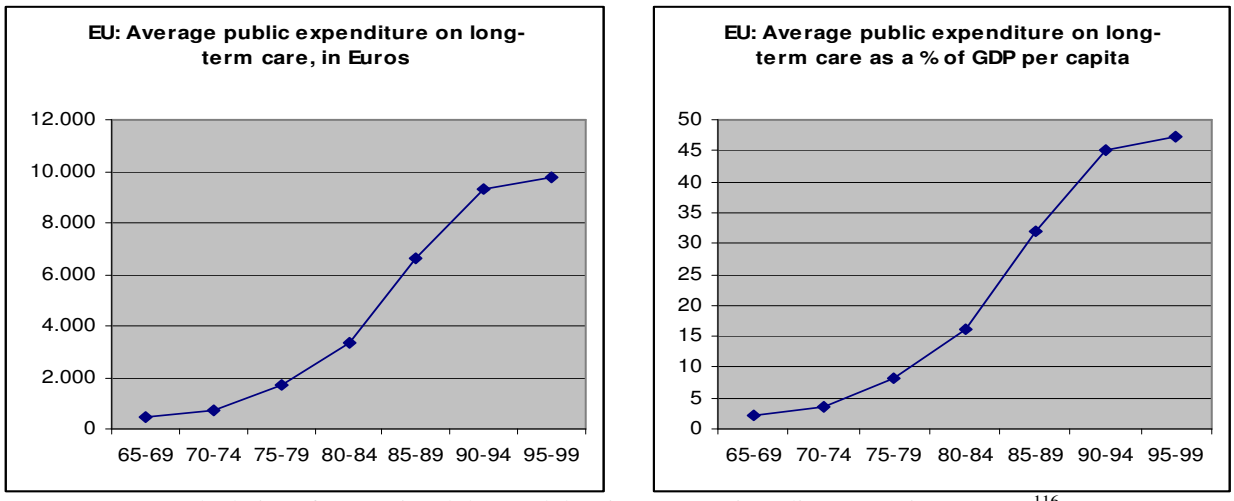
The measurement of costs related to long term care poses several problems. First it includes services which might be part of the health care system in certain countries (e.g. toileting). Second, certain services are part of social support schemes (e.g. cleaning the house) and are included in social policy. These problems make it difficult to use available national statistics. Consequently, the national data ought to be considered with caution.

In Italy, the Fondazione del Monte di Bologna e Ravenna launched the Elderly Project in 2000. The programme provides home care for elderly dependent people living in those two provinces and aims at following the general incentive to help older people remain in their homes while assisting carers in their caring duties. Between 2000 and 2002, 549 families have benefited from the services offered by the foundation. The average spending on care per month per person amounted to €1.245,14, 76% of which were covered by the foundation for an average of 7 hours of assistance per day (147,31 hours per month). The rest of the amount (€301,48) was financed by the family as part of the involvement effort of families in the payment of care for their elderly members.

The Economic Policy Committee carried out projections of public expenditures on long-term care. They were carried out taking into account demographic changes using the central demographic variant (Eurostat baseline scenario) and two basic cost assumptions.

The first cost assumption states that expenditures on long term care per head grow at the same rate as GDP per capita with no change in the age structure, even if the size of the population changed. The second assumption considers expenditures per head to grow at the same rate as GDP per worker, hence at the same rate as the productivity in the whole economy. This entails that "under the GDP per capita assumption, higher labour participation does not help in cushioning the budgetary consequences of ageing on long term care expenditure, whereas under the GDP per worker cost assumption it does".[115]

**Figure 58: Public expenditure on long-term care**




Source: Own calculations from national data and data in "Economic Policy Committee, 2001"[116].
Note: Health care average cover: DE, FR, IT, NL, UK. It does not include public expenditure on long-term care. It does not include the private contribution (about 20 to 30% of total expenditure). Long-term care average covers: BE, IT, AT, NL, FIN, SE.

[115] Economic Policy Committee (2001).
[116] Economic Policy Committee (2001).

In 2000, public expenditure on long term care reached around 1,3% of GDP in the EU. Countries with stronger tradition of formal care have higher initial public expenditure on long term care (Denmark, Finland, Sweden and the Netherlands) and registered a more significant increase of projected public expenditure over the fifty years period, reaching a 2,2% increase in the Netherlands. The lowest increase was registered in Italy (0,4%). This reveals an average 70% increase in public expenditures on long term care in 50 years in the EU.

A breakdown by age groups of these increases in expenditures reveals the largest part of expenditures would be on the 80+ age group, especially in the group of countries with a tradition of formal care.

Costs are overall higher under the GDP per worker assumption as employment growth over the projected period is expected to be lower than population growth.

**Table 31: Public expenditure on long term care, 2000-2050.**

| | **Public expenditure as a share of GDP in 2000** | **Increase in expenditure in per cent of GDP between 2000 and 2050** | | **Public expenditure as a share of GDP in 2050** | **Breakdown of increase between 2000 and 2050 by age groups** | |
|---|---|---|---|---|---|---|
| | | **Per capita** | **Per worker** | | **65-79** | **80+** |
| BE | 0,8 | 0,8 | 0,8 | 1,6 | 0,1 | 0,6 |
| DK | 3,0 | 2,1 | 2,5 | 5,1 | 0,4 | 1,7 |
| F | 0,7 | 0,5 | 0,6 | 1,2 | | |
| IRL[1] | 0,7 | NA | 0,2 | | | |
| I | 0,6 | 0,4 | 0,4 | 1,0 | 0,1 | 0,3 |
| NL | 2,5 | 2,2 | 2,5 | 4,7 | 0,3 | 2,0 |
| A | 0,7 | 1,0 | 1,1 | 1,7 | | |
| FIN | 1,6 | 1,7 | 2,1 | 3,3 | 0,2 | 1,5 |
| SE | 2,8 | 2,0 | 2,1 | 4,8 | 0,3 | 1,8 |
| UK[2] | 1,7 | 0,8 | 1,0 | 2,5 | 0,4 | 0,5 |
| **EU** (weighted | 1,3 | 0,9 | 1,0 | 2,2 | 0,3 | 1,2 |

NA: data is not available.
(1): data for Ireland is expressed as per cent of GNP.
(2): the age breakdown for the UK is as follows: 0-64, 65-84, and 85+.
Weights are calculated according to the number of countries with available results.
Source: Adapted from "Budgetary challenges posed by ageing populations", Economic Policy Committee, 2001.

The results of these projections are sensitive to alternative demographic and cost assumptions. A higher life expectancy in 2050 is likely to put additional strain on long-term care expenditures. Higher cost growth may increase expenditures by 0,5 to 2,9% compared to a range of increase between 0,4 and 2,2 under the baseline scenario.[117]

A more detailed study is available for four countries, Germany, Spain, Italy, and the United Kingdom, for which central base case assumptions were formulated to make the projections for 2000-2050 as comparable as possible. The central base case assumptions are[118]:

1. Numbers of older people and their characteristics: 1) Older population by age and gender changes in line with Eurostat 1999-based population projections. 2) Prevalence rates of dependency by age and gender remain unchanged. 3) The proportion of older people by age and gender living in each household type remains constant.
2. Demand for services: The proportion of older people receiving informal care, formal community care services and residential and nursing home care remains constant for each sub-group by age, gender and dependency.

[117] Detailed presentation of sensitivity of results to demographic and cost assumptions can be found in Economic Policy Committee, "Budgetary challenges posed by ageing populations", 2001.
[118] A. Comas-Herrera1 et Al. (2003).

3. Supply of services: 1) The supply of formal care will adjust to match demand; 2) Demand will be no more constrained by supply in the future than in the base year.
4. Expenditure and economic context: The unit costs of care rise in line with the EPC's assumption for the growth in productivity in each country, while GDP also rises in line with the EPC's assumptions.

**Table 32: Projected increase numbers of dependent older people, service recipients and expenditure**

| | DE | ES | IT | UK |
|---|---|---|---|---|
| Numbers with dependency (1) | 121 | 102 | 107 | 87 |
| Recipients of informal care only | 119 | 100 | 109 | 72 |
| Recipients of home based care | 119 | 99 | 119 | 92 |
| Recipients of institutional care | 127 | 120 | 81 | 111 |
| Total expenditure as % of GDP | 168 | 149 | 138 | 112 |
| Total expenditure as % of GDP in 2000 | 1,24 | 0,65 | 0,99 | 1,36 |
| Total expenditure as % of GDP in 2050 | 3,32 | 1,62 | 2,36 | 2,89 |

(1): The definition of dependency varies across countries[119].
Source: A. Comas-Herrera1 et Al. (2003).

The central base assumption on the demand for services states that the proportion of older people receiving informal care, formal community care services and residential and nursing home care will remain constant for each sub-group by age, gender and dependency.

The projections in the number of users of three types of services show an increase of numbers of dependent older people receiving only informal care or home-based care at the same rate as the number of dependent older people, with the exception of the United Kingdom. In the latter case, the type of household is taken into account. Consequently, the proportion of older people living alone is expected to rise leading to a decrease in the receipt of informal care. As the number of older dependent people living alone increases faster than the overall number of dependent people, the rate of utilization of formal care is also expected to increase. This would be the case for Italy and the United Kingdom, where recipients of home-based care increases faster than the number of dependent people. The use of institutional care is expected to rise slightly faster than numbers of dependents in all countries except Italy. The latter trend can be due to the existence of non-means tested cash benefits used to purchase private home-based care.

Under the alternative assumptions about dependency trends, long-term care expenditures vary considerably.

Long term care expenditures are sensitive to trends in disability. If we assume that one year rise in life expectancy at birth delays dependency by one year too, the share of long term care expenditures as % of GDP falls compared to the central base case assumption, more significantly in Germany and Italy. The projected gains in life expectancy at birth during fifty years are higher for these two countries.

[119] Germany: being assessed as needing help during 90 minutes a day with two or more activities of daily living for at least six months. Spain: people who report needing help to perform at least one instrumental activity of daily living or at least one activity of daily living. Italy: people who report being not able to perform at least one activity of daily living. United Kingdom: having difficulties with at least one instrumental activity of daily living or at least one activity of daily living.

**Table 33: Projected long term care expenditures in 2050 under different scenarios for dependency trends, and availability of informal and formal care.**

| | DE | ES | IT | UK |
|---|---|---|---|---|
| Total expenditure as % of GDP in 2050 | 3,32 | 1,62 | 2,36 | 2,89 |
| | | | | **Expenditures as % of GDP in 2050** |
| ***Dependency assumptions*** | | | | |
| **1 year rise in life expectancy delays dependency by 1 year** | 1,58 | 1,06 | 1,26 | 1,98 |
| 1 year rise in life expectancy delays dependency by 0,5 years | 2,11 | 1,23 | 1,53 | 2,36 |
| ***Informal care assumptions*** | | | | |
| 0,5% decrease in numbers receiving informal care, with increased home-based care | 2,81 | 1,52 | 2,07 | 2,82 |
| 0,5% decrease in numbers receiving informal care, with increased institutionalisation | 3,07 | 2,18 | 2,55 | 2,99 |
| 1% decrease in numbers receiving informal care, with increased home-based care and institutionalisation | 3,24 | 2,2 | 2,6 | 3,03 |

Source: A. Comas-Herrera1 et Al. (2003).

The impact of informal care decline on expenditures will also vary according to the type of care provided as a substitute (see table ). If they were to be replaced by institutionalization, the impact on long-term care expenditure would be greater, than if they were replaced by home-based care, particularly in Spain registering a 0,66 point difference between the two scenarios.

Furthermore, the authors investigate the projected shares of public and private expenditures on long term care. They center on the United Kingdom.

Under the central base case scenario[120] and with the current funding system, there would be a decrease of public expenditure from 68% in 2000 to 66% in 2051. This slight decrease could be explained by the rise of older people's higher economic status (owing their own homes) that would require them to draw on their own wealth to pay for formal care (mainly institutional care). The current funding system in the United Kingdom charges for residential and nursing home care according to income and assets (including housing wealth).

If free personal care were introduced, it would have a marked effect on the division of long term care costs between public and private expenditures now and in the coming decades. It would increase public expenditure by some 18% compared to the current funding system, whereas, private expenditure would represent 20% of total long term care expenditures compared to 32% under the current funding system, some 38% decrease. An increase of institutional care would increase both public and private expenditures as older people would be required to contribute to their hotel costs.

In line with concerns about the distribution of long term care expenditures between publicly and privately funded ones, arises the question of the relationship between income, disability, and utilization of services. Evidence show that "there are discernable income/ poverty effects" on demand for long term care services. Elderly people with higher economic status make greater use of privately funded domiciliary services, whereas elderly people with lower income levels are not using publicly funded community based care to their full potential.[121] Therefore, future policies aiming at increasing private contributions to long-term care expenditures may increase inequalities regarding access to services.

[120] The central base case scenario uses official population projections, current age and gender specific dependency rates, and assumes a rise of unit costs of care in line with recent trends in input pay and prices: 1% for social care, 1,5% for health care and 0% or 2% for home care fees.

[121] The Royal Commission on Long term Care (1999).

## CHAPTER 8: Financing long term care: Sustainability and equity issues

Autonomy and long term care in old age has been the focus of several initiatives in the Member States. Several allowances granted to people with activity limitations aim to compensate for the extra costs incurred to live independently[122].

In the Nordic countries and the United Kingdom, these schemes are managed by local authorities and are often accompanied by the provision of services. For example special transport services and meals are provided either directly by the municipality or indirectly through a private company. In Germany, Austria, Luxembourg and Belgium (Flanders), old age dependency is considered a risk that has to be insured against. Finally, in Greece, Spain, Italy and Portugal long-term care is part of social assistance. Recent policies favour living at home rather than in institutions.

This raises the question of who is going to provide long-term care and assistance, and whether services provided or paid by public authorities are sufficient to meet the growing demand. The European Community Panel (1994) reveals that the proportion of people aged 80 plus who live with their children or a relative is:
- more than 35% in Greece, Portugal and Spain;
- between 2% and 5% in the Nordic countries and the Netherlands; and
- at an intermediary level in France, Germany and Belgium.

Policies to take people with activity limitations out of closed institutions, whenever possible, and to promote living at home are followed in all European countries. Most of them cover elderly people too. Countries who favoured in the past institutionalization are currently reversing their policies. For example, Sweden follows its policy of de-institutionalisation and moving people into residential housing or into homes of their own.

There are two main approaches concerning the financing of long term care, even if generally countries apply a mix of them.

The "Beveridgian model" is based on a "universal rights" approach. It is funded by taxes and the benefits are not based on contributions. The system is often means-tested. The dependency is taken in charge by the state through "proximity services" or the grant of allowances. The "Bismarckian model" model is a system based on the insurance principle and the contributions are calculated on wages. This model recognises long-term care as a new "risk".

In the following, we present and discuss the "Bismarckian model" in Germany, Luxembourg and Belgium (Flanders). We add the Austrian and Dutch schemes as they present a certain number of interesting innovations.

### Germany

Germany introduced in 1995 a mandatory social insurance scheme for long term care[123].

Definition of dependency

Level 1: considerable need of care, requiring help at least once a day with personal hygiene, eating, or with a minimum of two activities from one or more types of activity, and several times a week help with household chores. Level 2: severe need of care, requiring help at least three times a day with personal hygiene, eating or getting around, and Several times per week with household chores. Level

[122] This part draws on S. Grammenos – Dublin (2003).
[123] This part draws on: "Long–Term Care Insurance", Federal Ministry of Health.

3: extreme need of care, requiring round-the-clock help every day with personal hygiene, eating or getting around, and help several times a week with household chores.

There are about 2,02 million care dependent persons (2000). There are 10.800 care services and 1,03 million informal carers care for 1,44 million dependent persons. 573.000 dependent persons receive care in 8.900 nursing homes. 22% of the beneficiaries of the long-term care insurance are below retirement age.

Kind of help provided

Care facilities include home-care and full-time and part-time institutional services that are certified within the framework of the law on long-term care insurance. People can choose between cash benefits, in kind benefits or a combination of both. The cash provided is much lower than complementary payments made to professional care providers. The monthly amount for domiciliary care varies from 205 to 665 Euros depending on the degree of activity limitation. Non-cash benefits for institutional care may amount up to a maximum of 1.432 Euros[124]. There are certain conditions, notably the insured person must bear at least 25% of the nursing home charges.

Beneficiaries of home help have the choice between cash or in kind benefits. Even if the in kind benefit are about twice as high as the cash benefits, three-quarter of the beneficiaries opt for the in cash benefits. The beneficiary pays any difference between the grant and the cost of the service. This won't be the case if the benefits were reimbursement of the expenditure.

Funding

Statutory long-term care insurance is financed through contributions that are scaled according to the income[125]. There is a contribution ceiling. The rate of contribution is of 1,7 per cent of gross salary. Employers deduct contributions directly from the wages and transfer them to a health insurance fund. There is equal contribution of employer and employee. Both pay a rate of 0,85% (half of 1,7%).

" The long term care insurance has a yearly turnover of about 16 billion euro, witch works out at less than 1% of the GDP" 1.7% of gross wages. The insured person must bear at least 25 per cent of the nursing home charges but benefits are not dependent on the income of the individual.

Discussion

The definition of long term care in Germany is somewhat narrower compared to others countries. However, the program continues to maintain broad popular and political support[126].

"The LTC insurance has relieved the pressure on the health insurance system significantly. Firstly, special funds designed for particularly needy – amounting to - 1.8 billion ??? (£ 1.2 billion) – were transferred to the LTC insurance. Secondly, due to the expansion of institutional care, the number of hospital beds could be reduced, and so another - 1.4 billion (£ 0.9 billion) were saved. Despite these positive changes, the LTC insurance did not lessen the income support dependency among elderly to the degree that was originally intended. This goes in particular for clients of institutional care, where the number of income support recipients has not even halved since the introduction of the LTC insurance. In 1997, 185 000 clients in institutional care – about 40 % of that group – received income support. The reason for this high share is that clients in nursing homes are charged extensive fees for food and accommodation. On the other hand, the need for income support among those who stay at home is significantly lower."[127]

[124] Bundesministerium für Gesundheit 2002 JEL Classification, april 2004.
[125] However, the population who has a wage under the ceiling of the social security is taken in charge by the public insurance for medical and long term care.
[126] M. Gibson et al. (2003).
[127] Karlson et al. (2004)

**Luxembourg**

The law adopted by Luxemburg in 1998 makes the long-term care insurance the fifth risk covered by the social-security.

Definition of dependency [128]

Old people with dependence in the area of corporal hygiene, nutrition or mobility irreversible or lasting for at least six month can take advantages of the long-term care insurance. The dependence must have a medical cause. Insurance intervenes when regular, important and equivalent to three and an half hours of help a week is recognized. It covers fees linked to irreversible dependence or installed for six month.

Kind of help provided

Four kind of benefit are provided :

- benefit in kind adapted to the place of living ( at home or in rest home)
- cash benefit ( for a maximum corresponding at seven hours of help and care by week)
- particular allowances for particular needs ( furniture, care product, …)
- contributions for the informal carers

Funding

There are two main sources of funding: 1) Compulsory contribution (1%) on all sources of income (including wealth), and 2) the National Budget.

Discussion

One year after its implementation, the long-term care insurance has to handle with an unexpected rush. The government funds the deficit if needed.

**Belgium (Flanders)**

In Flanders, the dependency insurance was introduced in 2002. It is a mix combining a mandatory personal contribution and funding by public resources.

Kind of help provided

People who have been recognised as dependent get a predetermined amount of nominative "cheques-services". This "cheque" pays the care and services related to the dependency. The benefits were sharply reduced in 2003, to 90 euro per month for home care and 125 euro for care in nursing home.

Funding

The sources are: 1) Compulsory contribution of every person residing in Flanders aged 25 or more (generally 25 € per year). The system is not compulsory in the Region of Brussels. 2) Money from the "Vlaams Zorgfonds"; and 3) Donation form the « Flemish community »

Discussion

The unexpected success of the Vlaamse Zorgverzekering led to a reduction of benefits and a rise of contributions. There is an undergoing discussion to introduce the scheme at national level.

[128] M. Borsenberger et A. Kerger

**Austria**

« Since 1993, long-term care cash benefits have been available to Austrians of any age with disabilities regardless of income or assets. Austria is unique in providing a "full cash" strategy, i.e. providing an allowance that may be used to purchase formal home care services, pay informal caregivers, or for any purpose. There is no "in-kind" benefits"[129]. Any person requiring more than 11 hours of care per month for a permanent disability due to a physical, mental or psychological disability or sensory disability is eligible for the benefit. It is important to note the inclusion of psychological

Funding

The Austrian Long-term Care allowance is financed from the general budget.

Kind of help provided

The care allowance is scaled in seven brackets depending on the degree of care that is required. The system provides only for cash benefits. It goes from 145 euro for over 5 hours of care par month to 1531 for aver 180 hours. These benefits may be used for in-home, institutional care, or any other purpose. As already said, Austria is the only one to do so.

Discussion

The Federal ministry of finance forecasts an increase of the cost of long term care in Austria from 0.7 % (rate 2005) to 1.5% of the GDP (rate 2050).[130]

**Netherlands**

A relatively new instrument in the care of the disabled is the so-called client-linked budget in the Netherlands. This incorporates the principles of demand-driven care, freedom of choice, custom-made care and the promotion of autonomy. This subsidy scheme came into effect on 1 January 1996. It enables people with a physical or mental disability, who have a referral for care, to apply for such a budget. With it they can buy the required care and supervision themselves, or have others buy it on their behalf. This means that they can choose who provides care and when. This offers them more freedom and flexibility in arranging their daily lives. These budgets constitute a demand driven supplement to existing schemes for the provision of care, which are usually supply-driven.

Domestic assistance, care or nursing can be obtained through the home care organisation. In the client-linked budget, the dependent person gets cash so that he can choose who will come to help him.

M.M.Y. de Klerk report that at the end of 2001[131] more than 26,000 people were in receipt of a client-linked budget for care and nursing. They note that the proportion of people with such a budget is small (3% of people with disabilities) compared to the proportion receiving home care services (17%); this is particularly the case among those with severe disabilities and the very elderly. In March 2001 there were around 30,000 people on the waiting list for home care services. Sweden and Italy have also used similar budget schemes but at a lower scale.

[129] M. Gibson (*2003).*
[130] Economic Policy. Long term challenges. Federal Ministry of finance. http://english.bmf.gv.at Calculation based on the demography forecasts of Statistik Austria 2001.
[131] M.M.Y. de Klerk (2002).

## SUMMARY AND CONCLUSIONS

Dependency implies a need for assistance. Narrow indicators of care dependency are related to the need of assistance for the activities of daily living (ADL). Wider definitions cover ADL and instrumental activities.

The different waves of the ECHP provide estimates for severe activity limitations. We consider that severe activity limitations are a good proxy for care dependency defined in a wide way, including activities of daily living and/or instrumental activities of daily living. In fact, national surveys covering the need for assistance for activities of daily living and/or instrumental activities provide results, which are close to severe activity limitations.

It is widely accepted that the prevalence of activity limitations follows a logistic function where the exogenous variable is age. The level and the rate of progression of care dependency are important dimensions. These factors are determined by socio-economic and medical factors. The socio-economic factors are notably income, health care expenditures and social capital. This method gives an estimate of the number of persons needing assistance for ADL activities, aged 65 and over, at 5.762.455 persons (7,5% of the same age group), in 2005. Elderly people with a need for activities of daily living and/or instrumental activities, amounts to 16.412.520 persons (21,4% of the same age group).

If we apply the current prevalence rates to the Eurostat baseline scenario for the population, the number of dependent elderly persons is expected to almost double between 2005 and 2050. The highest increase will take place between 2005 and 2030. However, this method might overestimate the number of dependent persons. A realistic hypothesis might be that expected life gains are partly in good health and partly with activity limitations. This method gives 7.836.499 persons (2030) and 8.607.444 (2050) dependent on ADL. Persons needing assistance for ADL or IADL are expected to be 22.914.690 (2030) and 25.647.023 (2050). The number of dependent people on ADL activities is expected to increase by 49% between 2005 and 2050, while the number of dependent people with ADL and/or IADL by 56%. However, the big increase of elderly dependent people is expected to be dampened by the decrease of young dependent adults.

The data reveal an important change in the composition of care dependent people. At 2005, dependent elderly people represent 52% to 62%, while in 2050, they will represent 70% to 78% of all dependent people.

Care may be provided by professionals or by informal sources. The informal sector includes mainly the family, relatives, friends and neighbours. An important discussion concerns the substitutability or complementarity between formal and informal help. Analysis of different surveys provides mixed results.

A certain number of conclusions are supported by different studies. The probability of receiving formal care increases with the level of education, isolation and low cost. The role of education is ambiguous since it might play the role of a proxy for income and wealth. Family and public services are not total substitutes even in response to cutbacks. Some evidence shows that an increase of formal help does not lead to a total crowding out of informal care. National statistics indicate that in the majority of cases, informal help concern instrumental activities like shopping and household tasks. Also, the share of formal home care increases with the level of dependency.

The lack of a perfect substitution between formal and informal care implies that if we want to turn informal care into employment, we must keep in mind that a person receiving for example 38 hours per week of informal help will not “create” a full time caring job. The family will continue to provide part of the required help.

Existing national surveys indicate that about 60 to 70% of all carers are aged 45 to 75 years old. Concerning gender distribution, available national surveys indicate that the big majority of carers are women. The share of women varies between 60% and 80%. In all cases, the daughter and the partner/spouse constitute the big majority of persons caring for elderly people.

The number of hours spent caring has important impacts on labour participation. Available econometric analysis suggests that high levels of caring exert a negative impact on employment of carers compared to non-carers.

In order to assess the number of persons providing care to dependent people, we have exploited available research and national surveys. About 5,8% of persons aged 25 and over in the EU spend more than 20 hours per week caring. The prevalence of caring increases at 9% at the age of 50.

It is interesting to note that a high number of carers are in the age group of 55-64, where labour participation is low. One major policy issue in the coming years will be labour participation and caring activities for elderly people, notably labour participation of women.

The dominant approach of disability and activity limitations is strongly based on a medical approach. We have departed from the medical approach and tried to identify the factors, which affect the level and progression of activity limitations. We find that GDP, sickness benefits, replacement rates and social capital have a significant impact on the level and progression of activity limitations.

In order to generate the forecasts of care dependency (ADL and/or IADL) for the EU in 2030, we assumed realistic values for GDP per capita, labour force participation, replacement rates, sickness benefits as a percentage of GDP, and social capital. The results indicate that the expected gains are not proportional at all ages. The gains are relatively high for the very old. The widely used assumption that the prevalence of activity limitations will shift downwards for all ages is not supported by our method. However, the projected numbers for the elderly are close to the medical approach.

If we apply the above methodology to the Eurostat baseline scenario, the results indicate that in 2030 the number of elderly dependent persons (wide definition: ADL and/or IADL) might be between 22.483.000 persons and 24.910.000 persons. The simple medical approach gave us about 22.929.927 persons. However the socio-economic approach provides different forecasts for younger groups. Our projections indicate that lower replacement rates and tight labour markets might have an adverse effect on health and activity limitations of younger generations.

Current policies aim to increase labour participation of people aged 55 to 64, as their participation is very low. Also, certain countries focus on women, notably in countries where their participation is low. Our results reveal that the expected increase of care needs might counteract current efforts to increase labour participation, unless such policies are accompanied with the development of care services for elderly people.

As noted earlier, public and market provided care is not a perfect substitute for informal care. Informal carers seem to provide assistance on instrumental activities and leave assistance needed on ADL to public services. Available data indicates the presence of intensive informal care by women aged 50-64, in Member states like Italy, Spain and Portugal. The analysis indicates a high reservoir of inactive labour force in these same countries. Consequently, these countries might have a big potential for increased labour participation with the relevant care development policy.

The data indicate a higher increase of dependent people compared to the increase of the number of carers. Furthermore, elderly carers will support an increasing share of assistance. This might have an adverse impact on their own health and increase further the gap between needs and potential suppliers of assistance. Consequently, an increasing gap might appear between demand and supply of care in the coming years. A policy of higher labour participation ought to increase further this gap. Also, potential jobs in this sector are not attractive as these services require often low-skilled jobs with no career

prospects. These developments require an adaptation of care policies in order to find the right balance between self-care, informal care and formal care. The development of formal care ought notably to reinforce the capacity of older people to look after themselves, enable economically active persons to combine work and informal care, and to alleviate the burden of elderly carers.

Furthermore, elderly people may counteract forces aiming to decrease the provision of informal care. Whether older people are satisfied or not with the informal care they are receiving, they are not willing to replace informal care by home care.

The measurement of costs related to long-term care poses several problems. However, there is a consensus that expenditures on long term care increase at an exponential rate after the age 75 years.

The Economic Policy Committee carried out projections of public expenditures on long-term care. In 2000, public expenditure on long-term care reached around 1,3% of GDP in the EU. Public expenditure on long term care will reach 2,2% of GDP in 2050, in the EU. The results of these projections are sensitive to alternative demographic and cost assumptions. A higher life expectancy in 2050 is likely to put additional strain on long-term care expenditures. Higher cost growth may also increase expenditures further.

The London School of Economics presents a more detailed study for four countries, Germany, Spain, Italy, and the United Kingdom, for 2050. Total expenditure as percent of GDP is expected to increase by 3,3 percentage points in Germany, 1,26 in Spain, 2,36 in Italy and 2,89 in the UK. If we assume that one year rise in life expectancy at birth delays dependency by one year too, the share of long term care expenditures as % of GDP falls compared to the central base case assumption, more significantly in Germany and Italy. The impact of informal care decline on expenditures will also vary according to the type of care provided as a substitute. If they were to be replaced by institutionalization, the impact on long-term care expenditure would be greater, than if they were replaced by home-based care, particularly in Spain registering a 0,66 point difference between the two scenarios.

Elderly people with higher economic status make greater use of privately funded domiciliary services, whereas elderly people with lower income levels are not using publicly funded community based care to their full potential. Therefore, future policies aiming at increasing private contributions to long-term care expenditures may increase inequalities regarding access to services.

Several Member States have tackled the financing of autonomy and long-term care in old age. The "Beveridgian model" is based on a "universal rights" approach. The dependency is taken in charge by the state through "proximity services" or the grant of allowances. The "Bismarckian model" model is a system based on the insurance principle and the contributions are calculated on wages. This model recognises long-term care as a new "risk". It has received a wide success in the countries, which introduced such schemes.

In the "Bismarckian model", long-term care insurance is becoming a pillar of the social insurance. However, in order to achieve long-term sustainability, it applies a narrow definition of beneficiaries and fixes a maximum amount of benefits. The system favours long-term sustainability as it fosters "savings" to meet future needs and is more transparent compared to a "Beveridgian" type support.

Questions arise however concerning equity and redistributive effects in the Bismarckian model. High-income classes pay more in absolute amounts but live longer and hence benefit more from the system. On the other hand, very low-income people contribute less but live less and report higher activity limitations. Globally, it is difficult to say if the system redistributes in favour of the poorest or in favour of the richest.

A mix of systems seems desirable, notably encourage private long-term insurance schemes (through tax incentives) and complement them with public long-term schemes. Also, support private-Public partnerships for long-term care.

# PART E: HEALTH CARE

# INTRODUCTION

In light of the ageing population, there is great concern as to the impact of increasing elderly people on health care expenditure. Health care consumption by older people represents a significant share of the total health care consumption. This section aims at providing an overview and analysis of the determinants of health expenditure and to what extent is ageing going to increase public spending on health care.

In order to identify the major determinants of health care expenditure, chapter one looks into the relation between ageing and health care expenditure but also into other drivers of health care costs such as technological progress, attitudes and medical practices on rising health care costs.

Forecasting health care expenditure as a share of GDP over the next decades one ought to take into account demographic and non-demographic factors. Chapter two exposes several projections of future health care expenditure.

Furthermore, in chapter three, we will review the impact of health expenditures at the end of life and the cost of death by age group. Finally, we will analyse the cost of selected policy scenarios and prevention policies.

## CHAPTER 1: Determinants of health care expenditures

Health expenditures for elderly people amount to about 30 to 43 per cent of health care spending. Furthermore, total health expenditure is increasing and it is interesting to see what is the contribution respectively of ageing and other factors in this increase.

**Table 34:Total health expenditures and health expenditures for the elderly (65 and over), 1998**

| | DE | FR | CZ | ES | FI | SE | UK | CH | USA |
|---|---|---|---|---|---|---|---|---|---|
| % of GDP spent on health, 1998 | 10,5 | 9,6 | 7,2 | 7,1 | 6,9 | 8,4 | 6,7 | 10,3 | 13,6 |
| Estimated % of GDP spent on health for the elderly | 3,5 | 3,4 | 2,2 | 2,8 | 2,8 | 3,2 | 2,8 | 4,4 | 4,8 |

Source: *Healthy Ageing and Biotechnology.* OECD (2002).

In most countries, the rise of health care expenditures has been more rapid compared to GDP; for example in France[132] and the Netherlands[133]. This has led to a significant increase of the ratio of health care expenditures to GDP, which is used as an indicator for the long-term sustainability of the financing of the health care system. One explanation might be that the income elasticity of health care expenditures is higher than 1. This means that health care is a "superior good" and its share in GDP is expected to increase with income.

Another factor which has been advanced, as an important contributor to this increase of health expenditures is technology. The argument is that technical progress, attitudes and medical practices have pushed medical costs upwards for every age group.

In France[134], total health and long-term care expenditure increased by about 50% between 1992 and 2000 for persons aged 60 and 70 years. B. Dormont and H. Huber argue that a drift of the total (acute and long-term care) health expenditures has taken place in several EU countries. This drift is larger for older people. The authors argue that medical practices explain a major share of this drift.

Several studies report an increasing average cost for survivors and decedents. In Belgium[135], the average cost of health care for decedents in 1997 was 8.096 euros but it had increased to 9.745 euros, in 2002. For survivors the amounts were respectively 895 and 1.002 euros. In Switzerland[136], we observe a similar steady increase of health care costs both for decedents and survivors. In 1983, the average health care expenditure for the last year of life amounted to 4.898 euros compared to 460 euros for survivors. In 1992, the average figures were respectively 8.242 and 1.538. In the Netherlands, the per capita expenditure on health care has increased more than 20 times between 1960 and 1999, and the share of health expenditures to GDP has doubled.

A. Okunade and V. N. R. Murthy argue that technological change is a major escalator of health care expenditure. They cite the Newhouse hypothesis according to which, technological progress might account for about 75% of the increase in health care expenditure. Furthermore, they find a significant and stable long-run relationship among per capita real health care expenditure, per capita real income and broad-based R&D expenditures for the US.

Another argument is that current practices favour "heroic, high-tech treatments at the end of life". This has been contested by Scitovsky[137] who argues that the data do not support the often-voiced hypothesis that the rise in medical care costs is due largely to the disproportionate use of high-technology medical care by persons who die. He adds that although the intensity of care, as indicated by hospital expenditures, declines with age, any savings on hospital costs of very old decedents are offset by nursing-home costs.

[132] C. Bac and G. Cornilleau (2002)
[133] OECD Health data
[134] B. Dormont and H. Hubert (2004).
[135] H. Avelosse et al. (2005).
[136] P. Zweifel et al. (1999).
[137] Scitovsky AA (1994).

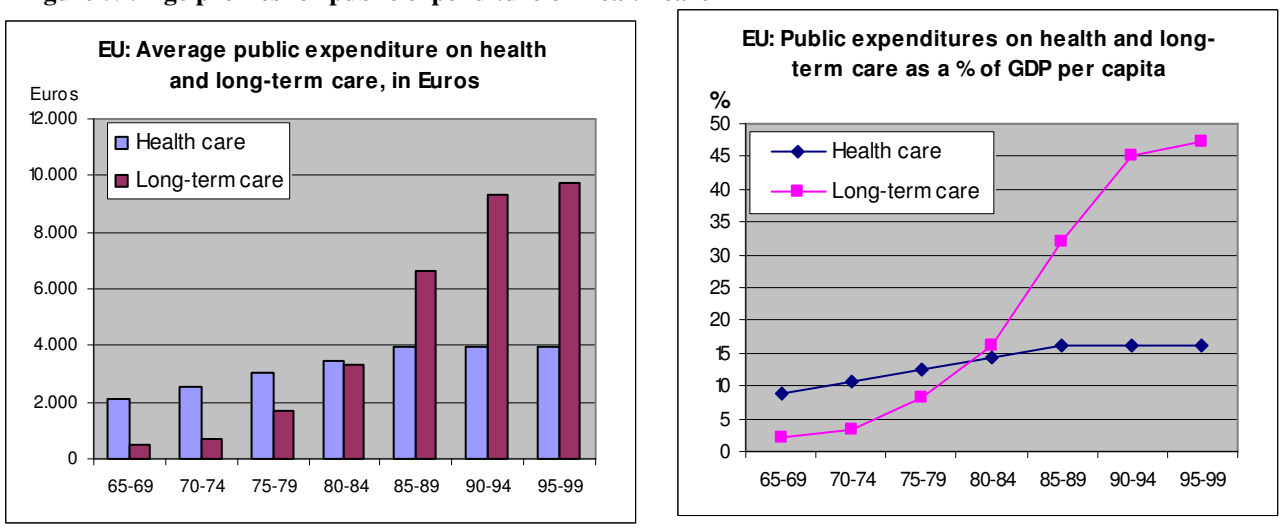
The age profile of health and long-term care expenditures is another candidate for the increase of health care expenditures. The following graphs present a simple EU average for health care and long-term care. The graphs presenting health care averages cover: DE, FR, IT, NL, UK. This expenditure does not include public expenditure on long-term care. Also, it does not include the private contribution (about 20 to 30% of total expenditure). Long-term care average was calculated taking into account: BE, IT, AT, NL, FIN, SE.

For comparison, the total cost per capita (all diagnoses, including long-tern care) for persons aged 85+ in the Netherlands, in 1999, amounted to about 19.000 Euros. It was about 16.000 for males and 20.000 Euros for females. The Dutch National Institute of Public Health and the Environment (RIVM)[138] estimates that the total health care costs (acute and long-term) increases exponentially with age for both men and women to about € 30.000 per head at the age of 95, in 1999. The profile of costs by age category shows a large maximum for the group of women between 70 and 90 years of age. The RIVM notes that this pattern is similar in many countries and shows the importance of ageing on total national health expenditure. These amounts are different from those presented in the graphs. The inclusion of the private participation in total costs may explain part of the difference. However, it is important to note that the inclusion of costly administrations may increase significantly the costs.

R Busse et al.[139] study the use of acute hospital care in Germany. They find that lifelong hospital utilisation for persons who die at 50 or later is directly proportional to the number of years lived. Their data contradict results from cross sectional studies that suggest an exponential rise in health care costs as longevity increases. The estimation presented in the next figure indicates that care health increases smoothly with age but long term care increases at an exponential rate.

Public expenditure on long term care broken down by age shows a considerable increase at the age of 75 and over for both men and women. The highest peak of average expenditure is for the age of 95 in Denmark, where expenditures are around 90% of GDP per capita. Furthermore, available data reveals higher per capita expenditure on long term care for women.

**Figure 59: Age profiles for public expenditure on health care**




Source: Own calculations from national data and data in "Economic Policy Committee (2001).

C. Bac and G. Cornilleau have distributed the increase on health expenditures between the increase of the population and the impact of ageing (change in the structure of the population). The results of this simplified model are presented below. At first sight, ageing dominates in three out of seven countries.

[138] Van der Wilk EA, Achterberg PW (2004)
[139] R Busse, C Krauth and F W Schwartz (2002)

**Table 35: The impact of demography and ageing on health expenditures: 1990-1997**

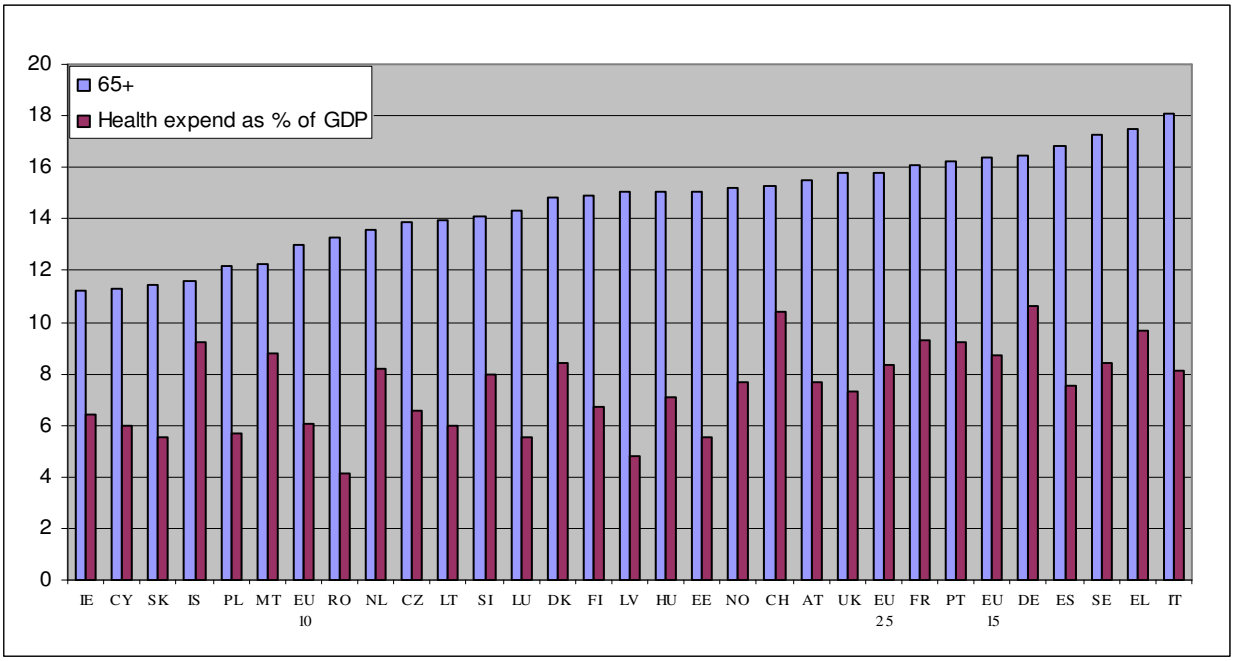
Growth average annual rate

| | DE | ES | USA | FR | IT | NL | UK |
|---|---|---|---|---|---|---|---|
| Total population | 0,52 | 0,17 | 1,02 | 0,46 | 0,19 | 0,63 | 0,36 |
| Impact of ageing | 0,32 | 0,83 | 0,33 | 0,53 | 0,91 | 0,41 | 0,19 |
| Total | **0,84** | **1,00** | **1,35** | **0,99** | **1,10** | **1,05** | **0,54** |

Source: C. Bac and G. Cornilleau ( 2002).

The following chart presents health expenditures as a percentage of GDP and the share of people aged 65 and over. There is some link, but it does not appear to be very strong between the two variables.

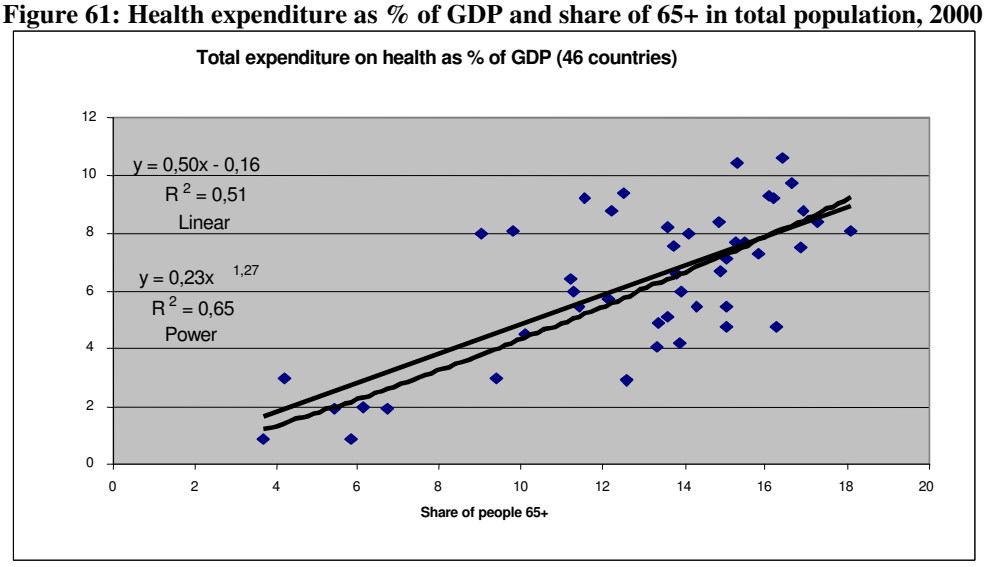
**Figure 60: Health expenditure as % of GDP and Share of 65+ in total population, 2000**




Data source: WHO

Figure 60 presents the same data for total health care expenditures as a percentage of GDP and the share of population aged 65 and over. The figure reveals a weakly significant relation between the two dimensions. A high share of elderly implies a high share of health care expenditures in GDP.

**Figure 61: Health expenditure as % of GDP and share of 65+ in total population, 2000**



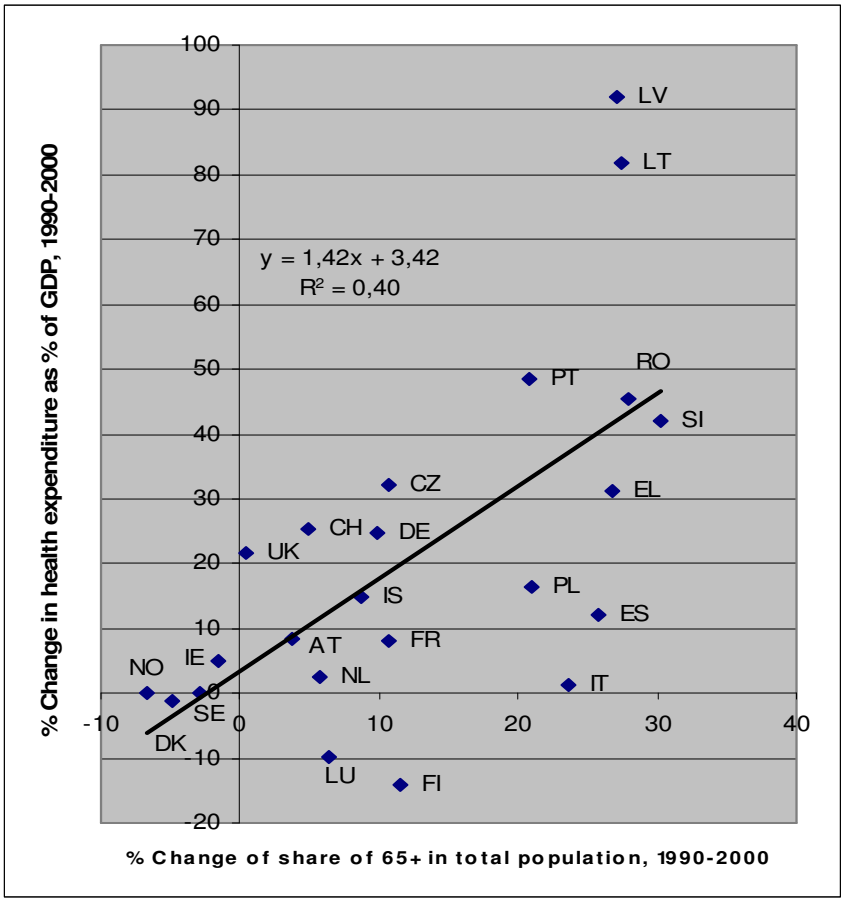

Data source: WHO

It is expected that the share of people aged 65 and over will double between 2000 and 2050, passing from about 15 % to about 30% of the total population. The previous figure indicates that the share of health expenditures will double too. This is the argument of some alarmist studies. For comparison, the share of total health care expenditures to GDP for the EU 25 was 8,3% in 2000[140].

However, the big variability around the fitted line indicates that other factors have to be taken into account. The implied confidence intervals are prohibitive for any reasonable projection.

The next figure presents the same variables as before but in percentage increases. The coefficient of correlation is significative but the two outliers (Lithuania and Latvia) take a disproportionably high weight. Also, the data for the ex-communist countries have to be interpreted with caution. If we exclude the latter, the coefficient of correlation decreases further.

**Figure 62: The impact of ageing on health care expenditures**




Note: The figure covers only European countries. If we exclude the two outliers (LT and LV) we obtain: y = 0,88x + 5,20 and $R^2$ = 0,33. If we exclude the ex-communist countries, the estimation is: y = 0,61x + 5,33 and $R^2$ = 0,17.
Data source: WHO

[140] OECD Health data (2005).

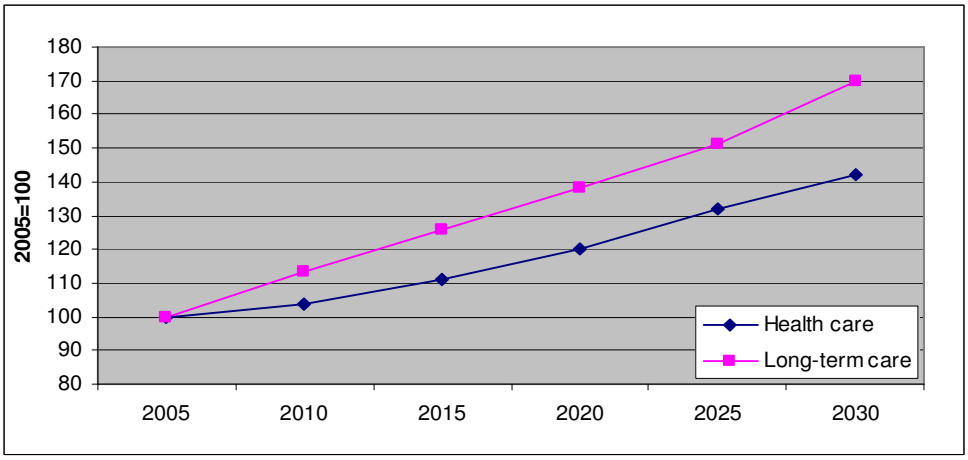
## CHAPTER 2:Projections concerning health care expenditures

The data on health care and long-term care costs at different ages in the life cycle, indicate that costs rise slowly but progressively after the mid-forties and then very steeply in the late seventies. This life cycle implies a continued surge of health care expenditure in an ageing society. This method usually used for projecting health care expenditures consists in applying the current pattern of expenditures across age groups to the future demographic projections.

This is a simple method and one has to keep in mind that an increased life expectancy and associated improvements in the health status of elderly persons are likely to change the age profile of medical spending. Furthermore, projections ought to take into account the different determinants presented above (trends in technology, the intensity of care at older ages, as well as the concentration of health expenditures at the end of life, relative prices for medical inputs, etc.). Consequently, these estimations ought to be considered as an upper limit.

Using Eurostat data, we have calculated the impact of ageing (change in the structure of the population) on health and long-term care expenditures. The following graph indicates that both expenditures grow steadily but long-term care grows much faster.

**Figure 63:The impact of ageing on of health care and long-term care expenditure EU 25 (2005=100)**




Source: Own calculations using Eurostat population projections.

For comparison, we present below some national studies. In Austria, if the health situation remains steady, the health expenditures are estimated to increase 18% in the area of acute health care from 2000 to 2025. In case health status improves in the group of people over 45, the health expenditures will only increase 11%[141].

In France, it has been estimated that the impact of the age structure on the health care expenditures should augment between 2000 and 2020, some 0,7% per year.

A recent Dutch study[142], making the assumption that life expectancy will increase and that the health status of individuals will improve, projects that health care expenditure will decrease due to the smaller positive effect on these expenditure of gains in life expectancy compared to the negative effect of better health.

In Finland, on the basis of the current structure of costs by age, official estimates suggest increases of about 2 percentage points of GDP between now and 2050 for health care spending for the frail elderly.

[141] M. Hofmarcher and M. Riedel (2002)
[142] E. Westerhout and F. Pellikaan (2005).

However, these estimates only take into account the changing population structure and do not allow for a possible lengthening of disability-free lives, or technical progress in the provision of health care (which would lower costs), or more capital intensive health care, or increases in relative wages of health care workers (which would increase it)[143].

It is worth noting that, according to a Finnish study[144], future expenditures trends will not only be affected by ageing and technologic progress but also by the development of public sector wages. At present, labour costs correspond to more than 50% of the total expenditure in the health sector. If the shrinking supply of labour over the next few decades results in rising labour costs in the social welfare and health care sector, the social protection expenditure will increase substantially more than anticipated.

Furthermore, the ageing of the population means that for a given total population a higher demand of physician and nurse services will ensue. This is expected to push upwards wages and the costs of health services. This might have a supplementary impact on total health and long-term care costs.

The last annual report of the Belgian Research Committee on Ageing[145] estimates that health care costs will pass from 6,3% of GDP in 2004 to 6,8% in 2010 and 8,0% in 2030. The estimations of the National Bank of Belgium provide similar results. Public health care spending is expected to represent about 9 to 10% of GDP in 2030 depending on the assumptions concerning relative prices. Both find that non-demographic factors dominate the progression of health care spending. The annual average growth rate for long-term care is calculated at 1,7%, for the period 2010-2030[146]. Long-term care here includes care in homes for the elderly, nursing homes, sheltered housing, psychiatric care institutions and nursing care provided at home. In 1983, these expenditures represented about 3% of total public expenditures related to health and in 2004 they amounted to 13%.

The Economic Policy Committee (2001) forecasts that - with the assumptions of a fertility rate increasing from 1,5 in 2000 to 1,7 in 2050, a life expectancy for male and female reaching respectively 80 and 85 years in 2050 compared to 75 and 81 years in 2000, and a migration of 630 millions in 2050 compared to 660 millions in 2000 - demographic changes would lead to increases in public spending for health care in the range of 0,7 to 2,3 percentage points of GDP over the next fifty years for the countries of the EU 15, with three Member States projecting increases above 2 percentage points (Germany, Ireland and Austria).

**Table 36: Public expenditure on health care for different age groups**

| | Public expenditure on health care as a share of GDP (%) | | | Increase in expenditure in per cent of GDP between | Breakdown of increase between 2000 and 2050 by age groups | | |
|---|---|---|---|---|---|---|---|
| | 2000 | 2030 | 2050 | 2000 - 2050 | 0-64 | 65-79 | 80+ |
| BE | 5,3 | 6,4 | 6,6 | 1,3 | -0,2 | 0,5 | 1,1 |
| DK | 5,1 | 5,7 | 5,7 | 0,7 | -0,3 | 0,4 | 0,5 |
| DE | 5,7 | 6,7 | 7,1 | 1,4 | -0,4 | 0,6 | 1,2 |
| EL | 5,5 | 5,9 | 7,2 | 1,7 | -0,5 | 1,1 | 1,1 |
| IT | 4,9 | 6,0 | 6,5 | 1,5 | -0,4 | 0,8 | 1,2 |
| NL | 4,7 | 5,5 | 5,6 | 1,0 | -0,3 | 0,5 | 0,7 |
| PT (1) | 5,4 | 5,8 | 6,1 | 0,8 | -0,7 | 0,3 | 1,2 |
| FI | 4,6 | 5,6 | 5,7 | 1,2 | -0,3 | 0,6 | 0,9 |
| SE | 6,0 | 6,7 | 7,0 | 1,0 | -0,2 | 0,5 | 0,7 |
| UK (2) | 4,6 | 5,2 | 5,6 | 1,0 | -0,3 | 0,7 | 0,6 |

Note: Central demographic variant; Expressed as a share of GDP, average health expenditure per capita grows at the same rate as GDP per capita. (1) The age breakdown for Portugal is as follow: 0-64, 65-74, and 75+; (2) The age breakdown for the UK is as follows: 0-64, 65-84, and 85+

Source: Economic Policy Committee (2001).

143 P. Antolin, H. Oxley and W. Suyker (2001).
144 ML Parjanne and P Sirén (2003)
145 Conseil Supérieur des Finances. Comité d'Etude sur le vieillisement. 2005.
146 Mutualité Chrétienne (2005).

However, these predictions are subjects to upward and downward risks. The upward risks are linked to the fact that non-demographic drivers of health care expenditure are not explicitly modelled in the projections. And downward risks stem from the fact that the relationship between age and health status is likely to change over time. The results of the baseline scenario are presented in the next table.

For comparison, table 37 presents OECD and EPC estimations. This table covers both health care and long-term care. The main assumptions for the OECD study are: life expectancy is expected to increase by almost five years for males and four years for females from 2000 to 2050. Fertility is expected to rise from an average of 1,5 to 1,8 by 2050, but mostly during the next two decades. Participation rates stay constant for men but increases for women. Labour productivity growth converges toward 1,75 percent between 2020 and 2030. Again, the increase of health care expenses does not seem to be a factor leading to an explosion of spending. Ageing will push this spending upward by about 3 percentage points of GDP.

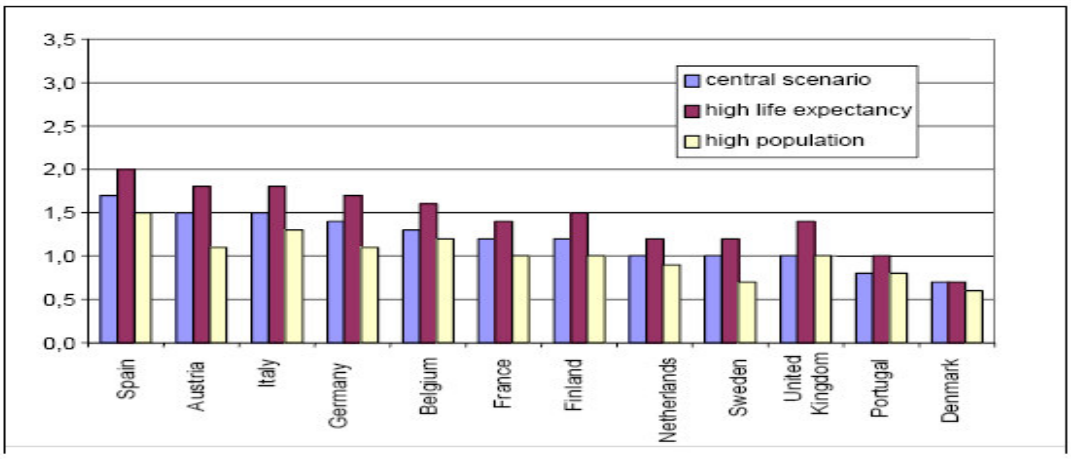
**Table 37: Public health care and long-term care between 2000 and 2050**

| | BE | CZ | DK | DE | FR | FI | NL | SE | UK |
|---|---|---|---|---|---|---|---|---|---|
| Change 2000-2030 | 2,2 | 2,0 | 2,5 | - | - | - | 3,2 | 2,1 | 1,4 |
| **Change 2000-50** | | | | | | | | | |
| OECD | 3,0 | 2,0 | 2,7 | 3,1 | 2,5 | 3,8 | 4,8 | 3,2 | 1,7 |
| EPC | 2,1 | - | 2,7 | - | 1,7 | 2,8 | 3,2 | 3,0 | 1,8 |

Source: OECD reproduced in Paul Atkinson (2001) and EPC (2001).

M.M. Hofmarcher and M. Riedel (2002) present projections of public expenditure on acute care for different population forecasts. When they apply the high life expectancy scenario, the ratio of public health care expenditure on acute care in 2050 increases more sharply than with their central scenario. On the contrary, when applying the "high population" scenario, public health care expenditure on acute care is below the values estimated for the central scenario. This is because the effect of higher fertility and migration rates counterbalance the effects of higher life expectancy.

**Figure 64: Public expenditure on acute care according to different population forecasts, per-capita increase 2000-2050 as percent of GDP**




Source: EPC/ECFIN/630-EN-final, October 2001, IHS HealthEcon 2002
Source: M.M. Hofmarcher and M. Riedel (2002).

Furthermore, it can be assumed that these further years of life are lived in good health. This assumption is based on the fact that health clearly improved in the past and there is no reason to suppose that the increase in healthy life expectancy will come to a standstill in the near future. The importance of this issue for the projections is related to the fact that these improvements in health will reduce acute as well as long-term care expenditures[147]. Estimations have also been run for different

[147] M.M. Hofmarcher and M. Riedel 2002/2003.

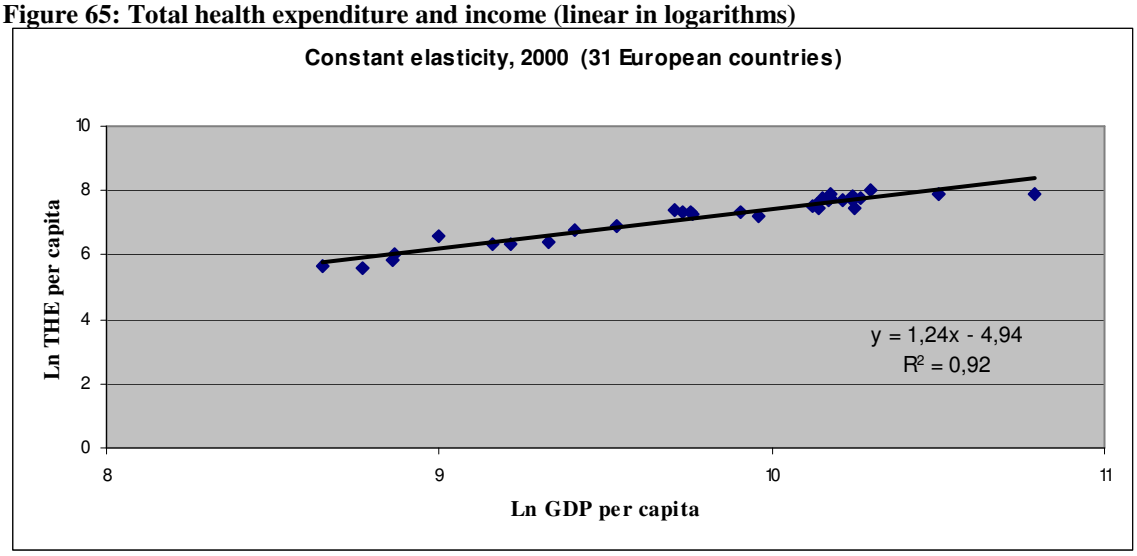
costs scenarios. In the high cost scenario, the values estimated exceed the rates of the central scenario. The difference to the central scenario ranges from 0,8% to 1,0% of GDP.

In the previous paragraphs, we presented estimations based on the age structure of the population and the age profile of health expenditures. In the following, we will present estimations based on cross-national comparisons. We exploit the relation between total health expenditure as a % of GDP and the share of elderly people presented in figure 61 and 62. Total health expenditure includes household health expenses, government-supplied health services, investments and administration costs. The estimation based on absolute values (level) [148] provides higher increases for countries with low health expenditures as if it was capturing a catch up effect and rapprochement with countries nearby the medium values. This might be an indicative estimation of the necessary increases to achieve convergence in the long run among the different countries. The increase of total health expenditure as a percentage of GDP between 2000 and 2030 ranges from about 20% (in Sweden, Greece and France) to more than 60% (Romania, Slovakia, Poland).

However, if the share of elderly people is used alone, the results might overestimate the impact of ageing. In fact, the share of elderly people is strongly correlated with income and other socio-economic factors. The same holds for the share of people aged 80 and over. Consequently, one has to take into account the different factors affecting health expenditures. Another critic relates to the direction of causality. Ageing might lead to high health expenditures, but a good health system may increase life expectancy and the share of elderly people.

The influence of income on health expenditures is widely accepted but the elasticity of health expenditures on income is an open debate. The dominant hypothesis is that health expenditure is a luxury good. A given increase of income will give raise to a more than proportional increase of health expenditure. This has important implications. As most projections assume a positive average growth rate of income per capita, this leads to an increase of the share of health expenditures to total income. At first sight, the following graph supports this hypothesis. The elasticity of total health expenditure per capita to income is higher than "1" (in fact, it is 1,24).

**Figure 65: Total health expenditure and income (linear in logarithms)**




Data source: WHO.

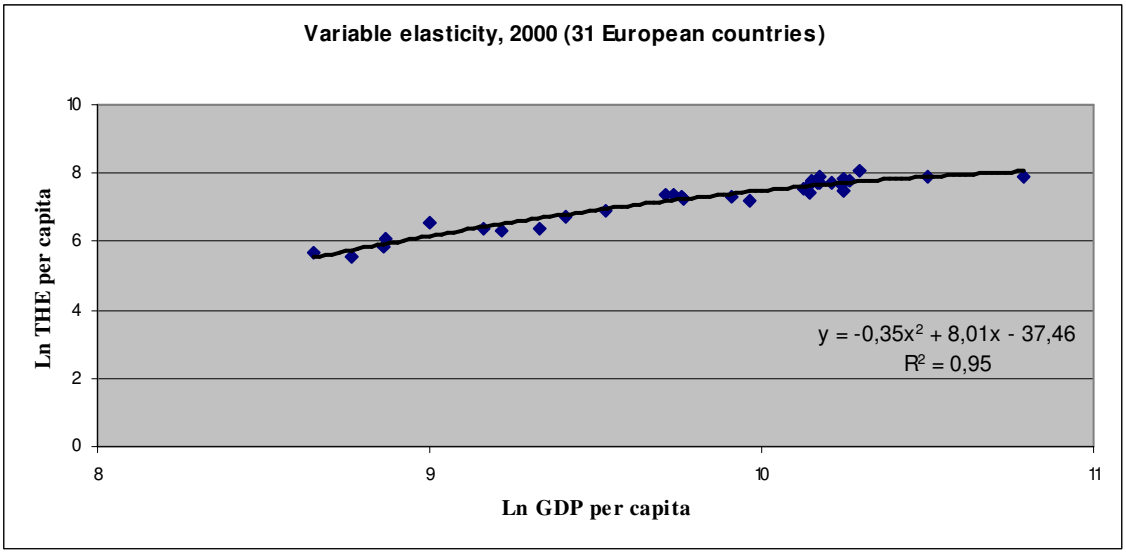
Note: The simple average per capita GDP is about 20.500 PPP$ (The logarithm is 9,9; equal to 22.196 €) and the simple average per capita total expenditure on health is 1.590 PPP$ (The logarithm is 7,4; equal to 1.722 €). In the regression 'y' and 'x' refer to the logarithmic values. Consequently '1,24' is the elasticity.

[148] The dependent variable (y) is total health expenditure as a % of GDP and the exogenous variable (x) is the share of people aged 65 and over in the total population: 1) y = 0,39x + 1,83 : Level estimation on European countries; 2) y = 0,61x + 5,33 : Estimation based on % increases without countries in transition.

However, this has been contested. The argument is that poor countries may well experience a high elasticity but as income increases, this elasticity is decreasing. In other terms, for relatively rich countries this elasticity might turn to be less than the unity at a certain level of income. In simple terms this means, that if we double the income of rich people or countries, total health expenditures might not be doubled. This seems a realistic hypothesis for forecasting in the long run, where the relative increase of income is expected to lead income over this threshold. Furthermore, the following graph indicates that a non-linear fit is better than the linear estimation. The figure reveals that at high incomes the elasticity (slope) is decreasing. A high-income elasticity is true for poor countries (e.g. Bulgaria and Romania) but a low one is true for high-income level countries (e.g. Luxembourg and Norway).

In the following figure, the elasticity is variable. For the average GDP per capita of 22.196 € (20.500 PPP$[149]) the elasticity is 1,06. This means that if we increase GDP per capita by 1.083 € (1.000 PPP$, equal to an increase of 4,88%), then health expenditure per capita will pass from 1.722 € (1.590 PPP$) to 1.811 € (1.672,2 PPP$). This represents an increase of 5,17% (=1,06x4,88). For a GDP per capita higher than 24.192 € (22.343,4 PPP$) the elasticity becomes less than '1'. The previous values are indicative as we use a simplified model. However, it is sufficient to convince that at a certain level of income, the elasticity becomes less than '1'.

**Figure 66: Total health expenditure and income (quadratic form in logarithms)**




Data source: WHO

Note: The simple average per capita GDP is about 20.500 PPP$ (The logarithm is 9,9) (22.196 €) and the simple average per capita total expenditure on health is 1.590 PPP$ (The logarithm is 7,4) (1.722 €). In the regression 'y' and 'x' refer to the logarithmic values. The elasticity is variable. For a GDP per capita equal to 22.343,4 PPP$ (24.192 €) the elasticity is equal to '1'.

In order to take into account all factors affecting health expenditures, we have estimated total health expenditure per capita as a function of GDP per capita, life expectancy and the ratio of people aged 80 and over to persons aged less than 25 years. Estimations including 52 European countries and ex-soviet republics yield similar results. Here, we present only the estimations for 27 European countries.

We have run regressions (OLS) using absolute values and values in logarithms. The income values are in purchasing power parities (PPP). The data in logarithms are preferred because there is no homoscedasticity (high estimation error for high values). Also, the linear model in absolute values implies an increasing elasticity of income. The definition of total health expenditure is relatively large as it includes investments in health infrastructures. However, it does not include the social assistance element of long term care.

[149] In 2000, the exchange rate was 1€=0,9236$.

Concerning the regressions in logarithms, we have run two regressions, one linear in logarithms and one with the presence of a squared term in order to have a variable elasticity of health expenditure to income. It is interesting to note that even in the simple case, the elasticity is lower than one (0,806) but less than twice the standard error from the unity ('1' is less than 0,806+2*0,119). Life expectancy is highly significant despite the fact that it is correlated with the GDP per capita.

The inclusion of a quadratic term ((GDP/cap)²) increases slightly $R^2$ but increases the problems related to multicollinearity. The standard error of the income coefficient has increased and the regression coefficients are sensitive to small changes of data. It is thus hazardous to use the equation with the quadratic variable for forecasting.

**Table 38: Total health expenditures (THE)**

| **(1) THE per capita = α+β(GDP per capita)+γ(Life expectancy)+δ (Ratio 85+/25-)** | | | | | |
|---|---|---|---|---|---|
| **α** | **β** | **γ** | **δ** | | **$R^2$** = 0,92 |
| -7098 | 0,045 | 95,947 | 43,547 | | **DW** = 2,16 |
| (1926) | (0,008) | (27,575) | (19,027) | | Homoscedasticity |
| | | | | | |
| All variables divided by GDP per capita (to reduce homoscedasticity) | | | | | **$R^2$** = 0,63 |
| -5722 | 0,054 | 76,338 | 36,701 | | **DW** = 2,27 |
| (1415) | (0,009) | (20,323) | (15,062) | | Heteroscedastic |

Note: N=27. Correlations: GDP/capita and Life expectancy: 0,8; GDP/capita and ratio 80+/25-: 0,6; Life expectancy and ratio 80+/25-: 0,7. GDP per capita in PPP$; Ratio 85+/25- in %. Source of data: WHO

| **(2) Ln(THE per capita)=α+β(LnGDP per capita)+γ(LnLife expectancy)+δ(LnRatio 85+/25-)** | | | | | |
|---|---|---|---|---|---|
| **α** | **β** | **γ** | **δ** | - | **$R^2$** = 0,954 |
| -25,254 | 0,806 | 5,564 | 0,181* | - | **DW** = 2,35 |
| (6,302) | (0,119) | (1,683) | (0,118) | - | Heteroscedastic |

Note: THE : Total Health Expenditure ; GDP : Gross Domestic Product. Number of observations=27. The correlations are: GDP/capita and Life expectancy: 0,9; GDP/capita and ratio 80+/25-: 0,6; Life expectancy and ratio 80+/25-: 0,7. GDP per capita in PPP$; Ratio 85+/25- in %. The regression on 24 EU Member states gives for α : -22,111 (5,778), β : 0,786 (0,115), γ : 4,867 (1,545) and δ: 0,216 (0,113); $R^2$=0,952. As noted above the presence of multicollinearity renders the estimators very sensitive even to small changes.

*: Not significant at 0,05.

| **(3) Ln(THE per capita)=α+β(GDP per capita)+γ(Life expectancy)+δ(Ratio 85+/25-)+ε(GDP per capita)²** | | | | | |
|---|---|---|---|---|---|
| **α** | **β** | **γ** | **δ** | **ε** | **$R^2$** = 0,964 |
| -43,582 | 5,918 | 4,014 | 0,199 | -0,260 | **DW** = 2,18 |
| (8,758) | (1,868) | (1,613) | (0,106) | (0,095) | Heteroscedastic |

Source of data: WHO and Eurostat

We present the projections for 2030 in the next figures. We have retained only the equation (2), which is linear in the logarithms in order to reduce the problems related to the presence of multicollinearity. We suppose that GDP increases on average by 2% each year. Life expectancy and the ratio of very old to very young are taken from the baseline scenario of Eurostat demographic projections.

For information, the linear model in logarithms provides higher values compared to the quadratic model. In fact, in the latter the income effect is very small. Total health expenditure per capita continues to increase but at a much lower pace than GDP.

We can distinguish two cases:

- For relatively poor countries, all factors tend to increase the share of health expenditures to GDP. This is the case for transition countries. The constant and the variable elasticity models provide similar increases.
- For relatively richer countries, the variable elasticity scenario indicates that the income effect tends to reduce the share of health expenditures to GDP while the other two factors work in the opposite direction.

The main conclusion is that all models reveal sharp increases of the share of health expenditures to GDP for the new Member States. On the contrary for relatively rich countries, the increase is small. The previous results hold if the growth rate of GDP is positive.

**Figure 67: Total expenditure on health as % of GDP**[150]

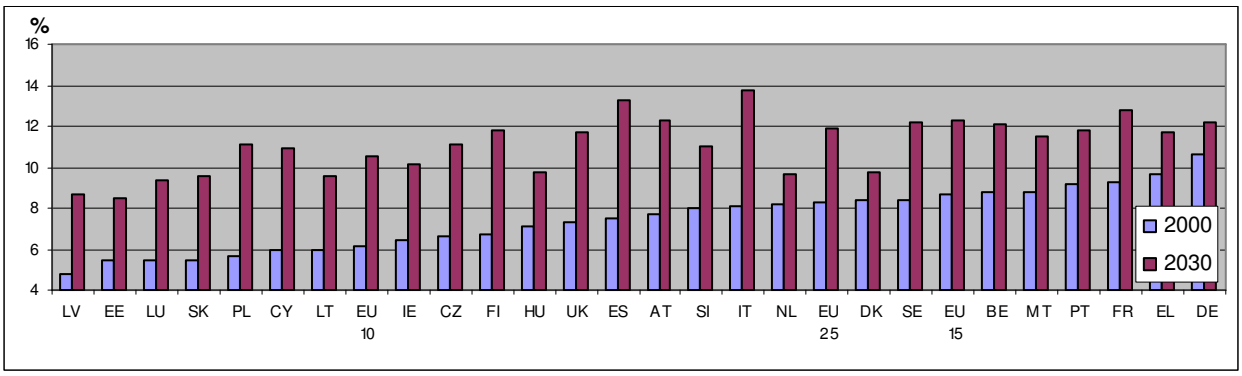
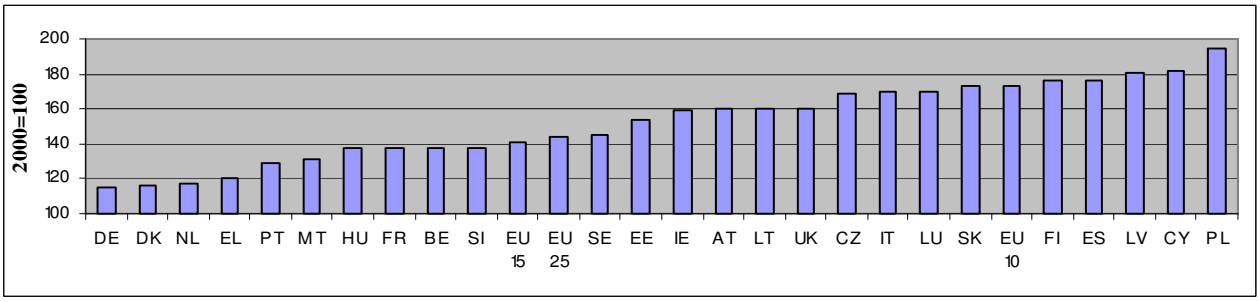



**Figure 68: Evolution of total expenditure on health as % of GDP between 2000 and 2030 (2000=100)**




Note: The estimations for DE, ES, HU, LU, PT have to be treated with caution.

The regression (2) enables us to give a very rough approximation on what is the impact of each factor (income, life expectancy and relative ageing) on total health expenditure per capita between 2000 and 2030. The starting point is a situation close to the average situation in the EU 25 (per capita total expenditure on health: 1.973 €, and Gross domestic product per capita: 24.432 €. We assume that GDP per capita increases on average by 2% per year, life expectancy passes from 77,94 to 82,63 and the ratio of very old to very young people (in percentage) increases from 11,81 to 28,32. Except income, the remaining are derived from the Eurostat baseline scenario. It is important to note that a 6% increase of life expectancy has an impact close to the income effect.

In fact, the high elasticity of life expectancy implies that a small increase of life expectancy (about 6%) generates an increase of total expenditure per capita which is close to the impact of income,

[150] For comparison: **BE**: The High Council on Finance estimates that total health expenditures will increase to 12,8% of GDP in 2030, Conseil supérieur des Finances: Comité d'études sur le vieillissement, Rapport annuel, 2005. **NL**: R. Beetsma et al. find that in the Netherlands the public health sector as a share of GDP (%) will increase by about 30%. R. Beetsma et al. : « The budgeting and economic consequences of ageing in the Netherlands » ; Economic Modelling 20 (2003) 987-1013.

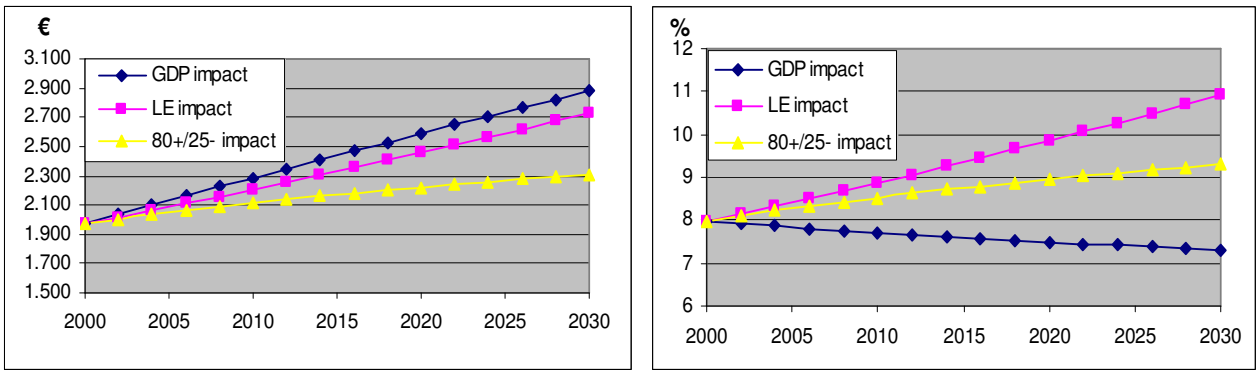
supposed to increase by 60% over the same period. A small increase of life expectancy implies that health expenditures might grow faster than per capita GDP and thus increase the share of heath to the economy.

The figure in absolute values (€) indicates that all factors push towards an increase of health expenditures. However, when we calculate the share of health expenditures as a share of GDP, the share decreases as the estimated income elasticity is lower than '1'. The increase of life expectancy increases the share as we maintain income constant under this path.

Now suppose that the income elasticity is close to '1' so that an increase of GDP has no effect on health expenditure as a share of GDP. Both health expenditures and GDP increase at the same rate and the ratio is constant. In this case, health expenditures as a share of GDP will increase as a result of the increase in life expectancy.

The translation of more years of life into healthy years means that the impact on health expenditure ought to be null. However, in the reality more years postpone death related costs but at the same time add years with a certain degree of chronic sicknesses. Consequently, life expectancy ought to be translated into higher health care expenses for a given population and age structure.

**Figure 69: Total health expenditure in absolute values (€) and as a share of GDP (%), EU 2000 – 2030.**




Note: GDP: Gross domestic product; LE: Life expectancy; 80+/25-: Ratio in % of very old (80+) to young (-25) people.

Alternative specifications[151] indicate that the expected change in total health expenditure per capita can be allocated as follows: 40 to 55% to life expectancy, 12 to 18% to relative ageing and the difference to income.

The above results are indicative. However, they reveal that the expected improvements in life expectancy in the New Member States could increase significantly total health expenditures per capita. This might be the principal component of the increase in the ratio of health expenditures to GDP. This increase could be partly outweighed if the additional years of life are years in good health.

Furthermore, the above results suppose the absence of any policy change in the future. In fact, recent national policies indicate that the rise in health care spending has been limited in countries with an active policy. For example, in the Netherlands, restrictions on reimbursement under the national health insurance scheme and moderate increase in wage costs in the care institutions contributed in the slow down of the increase in expenses[152]. Restrictions covered entitlements to nursing care, home care and care for the disabled. However, this short term budgetary reductions might be counterbalanced by a deterioration of the health status and possibly an increase of chronic illness and disabilities in the future.

[151] Ln(THE per capita) = $\alpha+\beta$(GDP per capita)+$\gamma$(Life expectancy)+$\delta$ (Ratio 85+/25-)
[152] Statistics Netherlands: "Much smaller rise in care spending"; Press release May 2005.

## CHAPTER 3:Costly ageing or costly deaths

There is an ongoing debate on whether ageing or deaths are costly. Several studies find that once proximity to death is accounted for, population ageing has either a negligible or even negative effect on health care demand. The association between age and health care expenditures appears for some as a statistical illusion. The individual costs are mainly determined by remaining lifetime and not by chronological age. The major relationship appears to be proximity to death and health care expenditures. Most studies analysing the impact of ageing on health care costs are using average expenditure data, which do not separate between the costs of survivors and decedents[153]. The positive relationship between age and health care expenditure may then rather be caused by the simple fact that at age 80, for example, there are many more individuals living their last year than at age 65 al.[154].

Consequently, the major increase in health costs in later life depends on the lifetime remaining before death occurs rather than on calendar age, at least beyond 65 +. On this basis, increased life expectancy would not increase health costs per person significantly.

Available information indicates that in several countries a considerable share of health care expenditures is spent for the care of the terminally ill.

H. Brockmann (2002) examines hospital discharge data from Germany's largest health insurer (AOK). They show that the cost of caring for patients during their last year of life makes up a large part of total health expenditures. And this last year of life is less costly if patients die at an advanced age. In fact, the 1,1% of all AOK members in Westphalia-Lippe who died in 1997 accounted for 10% of the total annual hospital related costs. The following graph presents an estimation of the gap in Germany, between the amount spent on surviving and non-surviving patients. Furthermore, as a multivariate analysis reveals, oldest old patients as a rule receive less costly treatment than younger patients for the same illness. He concludes that these findings suggest that health care is informally rationed according to the age and sex of the patient. The findings in Germany might indicate the presence of age discrimination, which need to be studied further.

In Belgium, the analysis of the affiliates of a major health care insurance fund (Mutualité Chretienne) in 2002[155], reveals that decedents represent 7,5% of total health related expenditures, while they represented only 0,8% of the affiliates; The average cost of deceased persons (having being alive for at least nine months during the year of death) amounts to 13.228 euros while the average cost of survivors is 1.002 euros. The choice between chronological years or years before death is an important factor. In fact, the average cost of persons deceased during 2002 is only 9.745 euros, but they have being alive only for an average period of 6 months. The average cost of the last twelve months of life amounts to 15.434 euros.

In the UK, it has been estimated that around a fifth of health care costs are devoted to persons in their last year of life (P. Kanavos, 1999)[156]. Furthermore, some evidence indicates that institutionalisation increases in the years preceding death, particularly in the final year[157].

In the Netherlands, the share of spending during the last year of life in total health care spending on elderly is estimated to be even more than a quarter. Calculations that neglect this fact could then produce estimates of expenditure growth that are too high. The errors involved may be as large as 20% or more[158].

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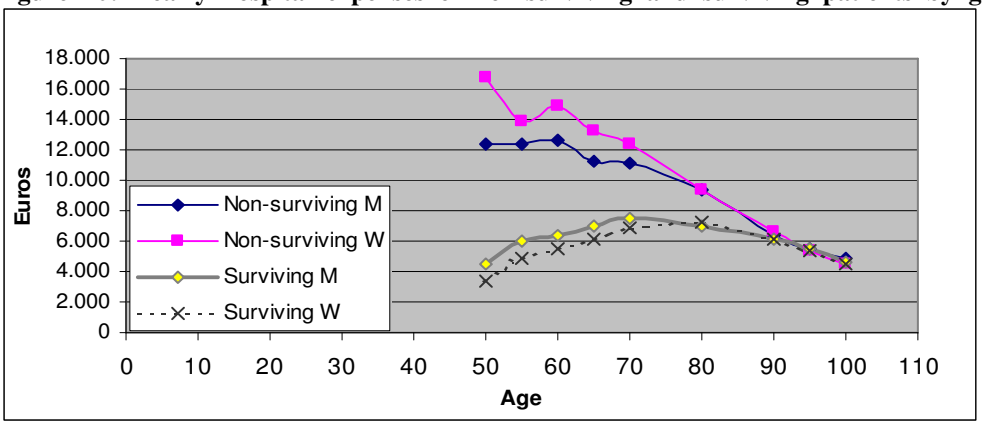
153 A. Gandjour and K. W. Lauterbach (2004)
154 P. Zweifel et al. (1999).
155 H. Avalosse et al., (2005).
156 P.Kanavos (1999).
157 Anne Scott et al. (2001).
158 E. Westerhout and F. Pellikaan, (2005).

**Figure 70: Yearly hospital expenses of non-surviving and surviving patients by gender in Germany**




Note: We have taken the average of yearly hospital expenses in Westphalia-Lippe and Thuringia.
Data source: H. Brockmann (2002).

S. Felder et al.[159] examine the Swiss case and find that health care expenditures increases with closeness to death and for retired individuals, health care expenditures decreases with age. In fact, it is closeness to death, which increases sharply health care costs and not age per self.

In Switzerland[160], health care expenditure of the terminally ill is relatively high. Payments by health insurance companies for persons in their last year of life constitute about 20% of the total health care costs of retired persons. Furthermore, the share of health care expenditures in the last quarter of life for deceased aged 65+ amounts to about 45% of the total for the last year of life[161]. P. Zweifel et al. (1999) note that this cost surge in the last quarter of life reflects the fact that the majority of elderly persons die in hospitals. In 1992, the average health care expenditures during the last year of life amounted to 8.242 euros compared to 1.538 euros for survivors, indicating a ratio of 5,3. For the elderly this ratio was 3,7.

For the US, 5,1% of Medicare beneficiaries who died in 1988 accounted for 29,1% of total Medicare payments[162]. Payments per person-year for decedents were 7,1 times larger than for survivors.

The previous studies indicate that approaching death, rather than age, seems to be the main factor determining health care costs. It is not ageing which is costly but proximity to death. Studies that do not make this distinction overstate the cost of health in the coming years. Additional years of life might not increase significantly health care costs. However, the cost of death is just postponed. This postponement of the cost of last year might frein the progression of health care growth by 0,25% of GDP in the horizon 2030 (Avalosse, 2005).

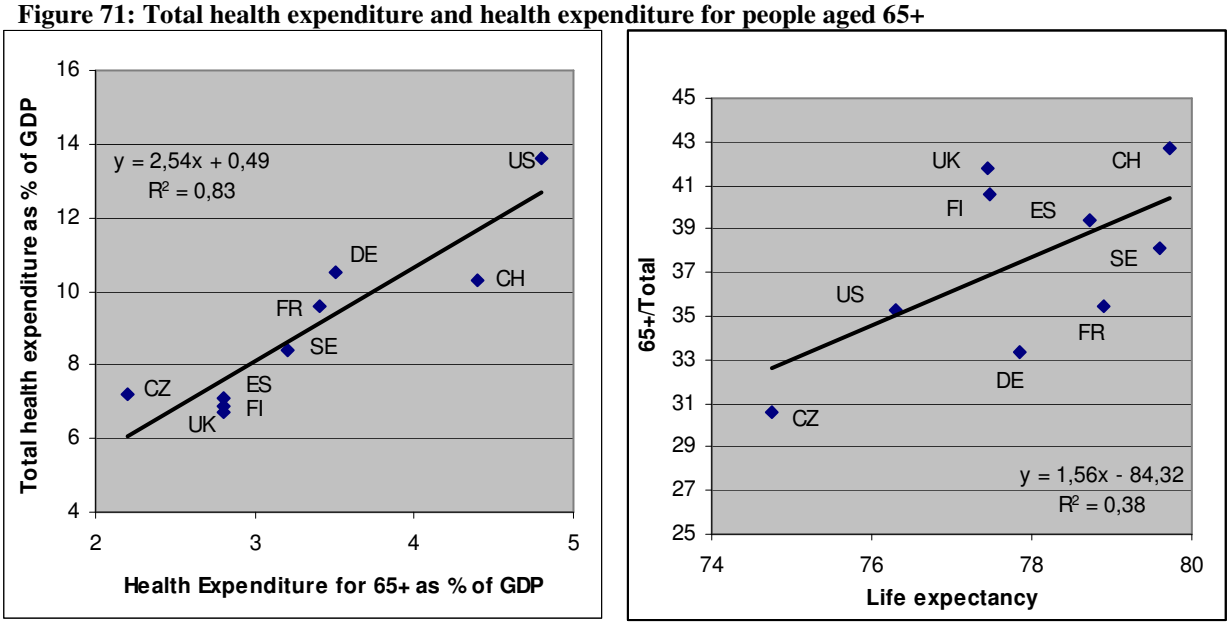
Critics will argue that as life expectancy rises, people experience more episodes of major medical intervention. On this basis, an increase in life expectancy would lead to an increase in costs per person. So the key element is to determine if the increase in life expectancy would be related to an increasing period of life in bad health or if these additional years of life will be associated with a better health condition[163].

The first figure presents the relation between health expenditure for people aged 65 and over as a % of GDP and total health expenditure as a % of GDP. Health expenditures for people aged 65 and over represent on average 37% of total health expenditure. Life expectancy explains a significant part of differences across countries in the ratio. The share of people aged 65 and over does not seem to have

159 S. Felder et al., (2000).
160 S. Felder et al., (2000).
161 P. Zweifel, S. Felder and M. Meiers (1999).
162 J. D. Lubitz and G. F. Riley (1993)
163 D. Roseveare et al. (1996).

any influence. The figures bring some evidence that as life expectancy rises, people experience more episodes of illness. An increase in life expectancy is leading to an increase in health expenditures for 65 and over as a percentage of GDP. However, we have to note that the number of data is small and the conclusions ought to be treated with caution.

**Figure 71: Total health expenditure and health expenditure for people aged 65+**




Data source: Healthy ageing and Biotechnology, OECD 2002

The cost of death by age group

Another dimension is the cost of death. Several studies find that death costs might be less for very old people compared to younger people. This difference might arise from the following factors:

- The structure of diseases leading to death varies across ages;
- Aggressive and multiple treatments might be less supported by elderly people;
- Life expectancy and life gains might be discriminating factors against elderly people;

Several studies find that as longevity increases the cost of last year is decreasing. This might result from less aggressive care at higher ages resulting in a decrease in hospital health care expenditures. This contradicts the myth that older people receive expensive, high tech treatments at the end of life.

This goes often in parallel with another misconception that the majority of people die in hospitals. M. Seshamani and A. M. Gray (2004) find that in the UK (England), the proportion of people who die in hospital is 53%, in nursing homes 16% and in private address 30%. H. Brockmann (2002) reports that in Germany, a large majority of elderly people would die at home than in hospital. In the Netherlands, a quarter of decedents over 80 die in hospital. The big majority die in nursing homes and homes for the elderly[164]

In Germany, according to R. Buss et al. persons who die young "consume" more hospital days in their last years of life than those who die older. Similarly, Felder et al. report that health care expenditures in the last months of life are relatively higher for younger persons compared to very old.

RC van Vliet and LM Lamers [165] study health care costs, hospitalizations, and year of death in the Netherlands. They find that for a general population, costs per person-year in the last calendar year of

[164] Statistics Netherlands Webmagazine, June 2004.
[165] van Vliet RC, Lamers (1998).

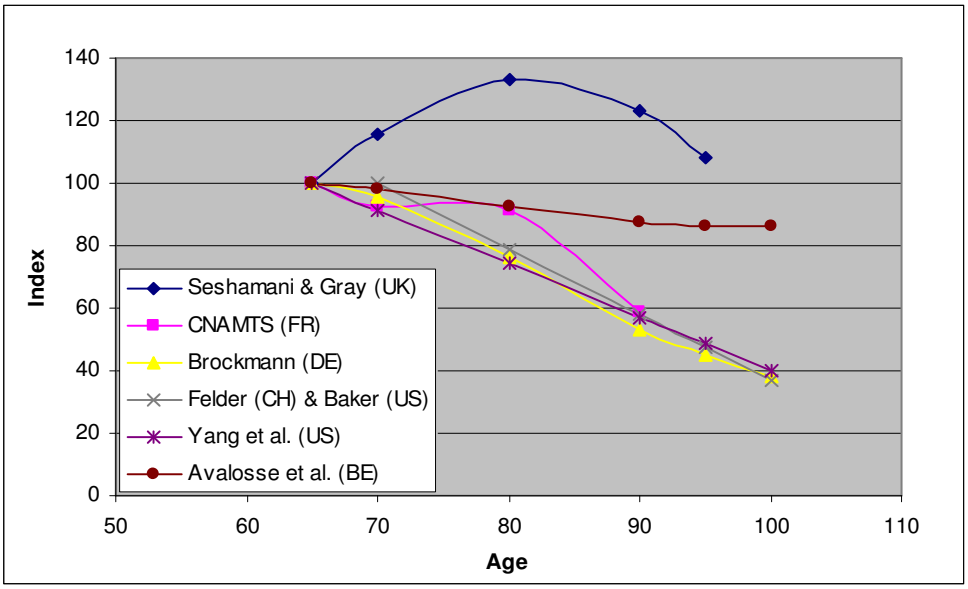
life were estimated at 15.3 times average. For those younger than 65 years, this number was 27.3 times average, and for the elderly, it was 4.7 times average.

In the United States, Lubitz and Riley report that 30% of the total Medicare budget is paid out on behalf of persons in their last year of life[166].

Several experts[167] find that costs in the last year of life was lower for those who died at 100 years of age compared to those incurred by persons who died younger.

J. Madsen et al. [168] present projections concerning future costs of hospital in-patient care and primary health care services in Denmark on the basis of demographic changes, both with and without account for the high costs in the last year of life. The traditional projection method does not account for the high costs in the last year of life while the 'improved' method does. The Danish population was projected to increase by 8.2% during the period 1995-2020, and health care costs by 18.5% according to the traditional projection method and 15.1% according to the improved one.

**Figure 72: Health care cost in the last year of life by age**




Source: S. Felder et al. (2000) ; C. Baker et al. (1995); Yang et al. (2003)[169] . CNAMTS, (2003) H. Brockmann, (2002); H. Avalosse et al. (2005).

Note: M. Seshamani and A. M. Gray report average yearly hospital cost 1 year prior to death. Felder and Baker report the last 2 years in life. CNAMTS present the cost of medical consumption. H. Brockmann presents the yearly hospital expenses of non-surviving patients. Yang et al. report medicare expenditures within one year of death. H. Avalosse et al. present total expenditure for the last 2 years (year of death and 1 prior) and include partly long-term care.

T. Stooker et al.(2001) contest the previous studies. They investigate the development of health care costs at the end of life for all age groups in The Netherlands. In contrast with earlier studies, their research analyzes both acute care (cure) and long-term care (care) costs. They find that when life approaches its end, health care expenditures indeed rise sharply, especially in the last months. However, when they compared total cure costs in the last year of life to the total cure costs for the entire population, they found that the end-of-life share was only about 10%. They conclude that interventions to reduce costs in the last year of life will have only a modest impact compared to the total health care budget.

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166 Lubitz and Prihoda (1984) find that the use of services became more intense as death approached. Despite the idea that heroic efforts to prolong life are common, only 6 percent of persons who died had more than $15,000 in Medicare expenses in their last year of life.

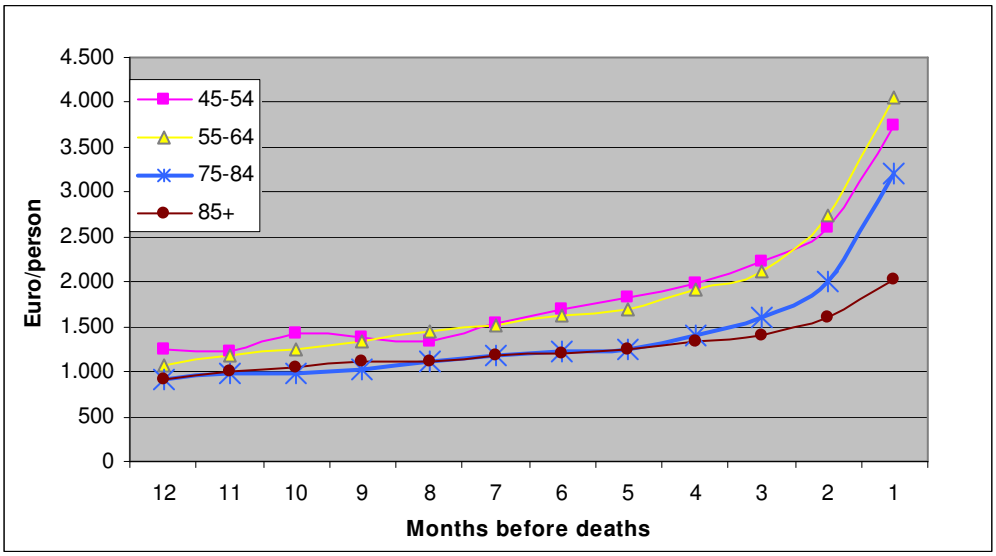
167 S. Felder et al., 2000 ; C. Baker et al., 1995 ;

168 J. Madsen, Serup-Hansen N, Kristiansen IS (2002)

169 Yang et al. (2003) cited in A. Gandjour et K. L. Lauterbach (2005).

The Belgian data[170] cover both health and long-term care spending. Long-term care, which is part of compulsory insurance scheme amounts to 12% of total public health spending, in 2002 and is expected to increase to 20% in 2050. This long-term care spending represents only 28% of total national spending for long-term care. They confirm that the cost of death is lower for elderly people. However, the difference is much less than the one reported by other analyses. They confirm the Dutch findings that when life approaches its end, health-care expenditure rises sharply, especially in the last months.

**Figure 73: Average monthly health expenditures of decedents by age group, in Belgium; 2002**




Data source: H. Avalosse et al. (2005).

S. Felder et al. (2000) find that low-income individuals, as compared to high-income individuals ,incur lower health care expenditures in the last months of life. Patients who have a supplementary hospital insurance policy incur significantly higher health care costs. P. Zweifel et al. (1999) find also that patients who have a supplementary hospital insurance policy in Switzerland incur significantly higher health care expenditure. On the contrary, C. Hogan et al.[171] find that end-of-life costs in the US were higher for minorities and for those living in areas with high poverty rates. Medicare per capita spending for minority decedents was about 28 percent higher than for others, while spending for beneficiaries in high-poverty areas was 43 percent higher than in areas with the lowest poverty rates.

Westerhout and Pellikaan (2005) take into account death related costs and compare their findings with the EPC-study. They assumed that the cost of death follows a U-shaped function of age. At young ages (less than 34), the cost of death is relatively high but from a certain age these costs gradually decline (35-64). However, at higher ages (65 and over) long-term care costs become important during the last years of life and this result in an upward rise in total death costs by age. They have carried out projections of health and long term care expenditure based on three scenarios. The projections carried out by the Economic Policy Committee (2001) are considered as the base case scenario. The three scenarios are: a) living longer scenario adopts a 3,2 years higher life expectancy at birth compared to the base case scenario, 85,8 years as opposed to 82,6 years, b) living better scenario is based on the indicator 'life expectancy in good health', and living longer in better health scenario integrates the previous two scenarios.

When looking at the EU average, long-term care is expected to increase at the same rate as acute health care when assuming a life expectancy at birth 3,2 years higher than in the base case scenario.

[170] H. Avelosse et al., 2005.
[171] Christopher Hogan, June Lunney, Jon Gabel, and Joanne Lynn (2001)

Under the 'living in better health scenario', long term care and acute health care will decline by some 1% for the EU compared with the base case scenario. Improvement in health status is expected to decrease both acute health and long term care expenditures.

When combining both scenarios of living longer and in better health, regarding EU average, they reduce the expenditure on acute health care compared to the base case scenario. Health improvement effects dominate the longer life expectancy effect. The contrary is observed for long-term care where the living longer effect dominates the health effect. But the impact of the living longer in better health scenario is very small in raising long term care expenditure compared to the base case scenario.

**Table 39: Health care and long-term care, 2002 and 2050;**

| | Additional increases (% of GDP) in comparison to the base case scenario | | | | | |
|---|---|---|---|---|---|---|
| | **Living longer scenario** | | **Living in better health scenario** | | **Living longer in better health scenario** | |
| | Acute health care | Long term care | Acute health care | Long term care | Acute health care | Long term care |
| AT | 0,5 | 0,3 | -0,8 | -0,2 | -0,4 | 0,0 |
| BE | 0,4 | 0,3 | -0,5 | -0,1 | -0,2 | 0,1 |
| DK | -0,1 | 0,9 | -0,3 | -0,3 | -0,4 | 0,5 |
| FIN | 0,3 | 0,7 | -0,6 | -0,4 | -0,4 | 0,2 |
| FR | 0,4 | 0,2 | -0,7 | -0,2 | -0,4 | 0,0 |
| DE | 0,6 | 0,1 | -1,3 | -0,1 | -0,8 | -0,1 |
| EL | 0,4 | | -0,5 | | -0,1 | |
| IRL | 0,3 | 0,2 | -0,4 | -0,1 | -0,2 | 0,1 |
| IT | 0,5 | 0,1 | -1,0 | -0,2 | -0,6 | -0,1 |
| LU | | | | | | |
| NL | 0,1 | 1,0 | -0,3 | -0,3 | -0,2 | 0,6 |
| PT | 0,5 | | -1,5 | | -1,2 | |
| ES | 0,6 | | -0,6 | | 0,0 | |
| SE | 0,0 | 1,0 | -0,6 | -0,6 | -0,5 | 0,2 |
| UK | 0,1 | 0,7 | -0,3 | -0,3 | -0,2 | 0,4 |
| **EU average** | **0,4** | **0,4** | **-0,8** | **-0,2** | **-0,4** | **0,1** |

Note: The baseline scenario is similar to the Economic Policy Committee (2001) base case scenario
Source: Westerhout and Pellikaan (2005)

J. J. Polder and P.W. Acherberg (2004) have taken explicitly into account the distinction between the cost of ageing and the cost of death. Their projections, separates the effects of more people, more elderly people, longevity, higher age of death and increasing health care use. The next table presents the results for the Netherlands. The higher age at death presents a small gain in health care costs.

**Table 40: NL: Projections of future health care costs based on demographic changes and major trends in health care use (annual growth rate in %)**

| | **2002 - 2010** | | | | | | | **2010 - 2020** | |
|---|---|---|---|---|---|---|---|---|---|
| | Men | | Women | | **Total** | | | **Total** | |
| Growth of the population | | 0,6 | | 0,6 | | **0,6** | | | **0,4** |
| | | | | | | | | | |
| Ageing | | 0,8 | | 0,4 | | **0,6** | | | **0,7** |
| - More elderly people | 0,42 | | 0,43 | | 0,43 | | | 0,58 | |
| - Longevity | 0,40 | | -0,04 | | 0,14 | | | 0,15 | |
| - Higher age of death | -0,06 | | 0,02 | | -0,02 | | | -0,04 | |
| | | | | | | | | | |
| Trends in health care use | | 2,3 | | 1,8 | | **2,0** | | | **2,0** |
| | | | | | | | | | |
| Total | | 3,6 | | 2,8 | | **3,1** | | | **3,0** |

Source: J. J. Polder and P.W. Acherberg (2004)

Finally, a Swedish study[172] estimates that the demographically determined rise in health care costs in the period 2000-2030, arrived at by means of extrapolation, is some 10-12 per cent. The method used aims at estimating the average costs of health care per capita, given age, gender and remaining years of life. The extrapolation has then been based on a demographic projection in which people's distribution in their respective age/gender group in terms of remaining years of life was calculated using the factual results concerning mortality and health development. But if the methodology used takes into account the effect of the health care costs linked to the death, estimated costs will be inferior to when it is limited to a fix profile along the time. The reduction is of almost 37% of acute expenses in percentage of the GDP for Sweden at the horizon 2030 compared to a projection that does not take into account end of life expenses.

[172] I. Batljan, (2003).

## CHAPTER 4: The cost of prevention policies

In part B covering health prevention and lifestyles, we presented a certain number of evaluations concerning specific actions. These evaluations are however linked to a specific disease or risk factor.

National accounts adopting a narrow definition of prevention indicate that expenditures on prevention activities amount to only 2,3% of total current health expenditure in 1998, in France[173]. However, if we take into account prevention activities initiated by physicians (screenings, etc.) and campaigns on lifestyles and accident prevention, it amounts to 7%.

Prevention tackling risk factors like diabetes, obesity, alcohol, smoking, etc. accounts for about 60% of total expenditures.

Technology assessment and economic appraisal during the introduction of new medical techniques is increasing in a certain number of countries (notably NL and the UK). These methods have been useful during the elaboration and selection of prevention programmes. The following table is indicative of the challenges concerning the choice of targets and the allocation of limited resources. The most promising (in terms of life years) age groups are also the more costly methods.

**Table 41: Effects on mortality, costs, and cost-utility for different breast cancer screening policies in the NL; (1990-2017)**

| **Age group** | **50-70** | **40-70** | **50-70** | **50-75** | **50-65** |
|---|---|---|---|---|---|
| **Screening interval** | 2 year | 2 year | 1,3 year | 2 year | 3 year |
| Difference in costs | 233 | 346 | 328 | 265 | 133 |
| Breast cancer deaths prevented | 6.000 | 6.115 | 6.780 | 6.790 | 3.770 |
| Life years gained | 61.000 | 64.000 | 70.000 | 64.500 | 41.000 |
| QALYs | 57.500 | 59.500 | 66.000 | 59.500 | 39.300 |
| Cost per QALY US $ | 4.050 | 5.815 | 5.000 | 4.450 | 3.400 |

Note: 5% discount rate and costs in million US$. Cost amounts are expected differences between situation with and without screening (prices 1990).
Source: E. Elsinga and F. F. H. Rutten (1997).

The US Department of Health and Human services reports that:

- Vaccination of older adults saved an estimated $30 to $60 in hospitalisation costs per $1 spent on vaccination and reduced mortality from influenza and pneumonia, all acute and chronic respiratory conditions, and congestive heart failure by 39% to 54% during the 1990–1993 influenza seasons, according to the results from a serial cohort study. Other estimates indicate that vaccination costs Medicare $145 per life-year gained for the 1988– 1992 period.
- Studies on the cost effectiveness of the vaccine among populations aged 65 years or older indicate net savings of $141 per person vaccinated (US$ 1986–88) to $6,154 per life-year gained (US$ 1983).
- Etc.

For the projection of future health care costs to be realistic, it will be useful to determine what kind of diseases we will suffer from during the years we have gained. The impact of non-communicable diseases such as ischeamic heart diseases and strokes will increase sharply. And so will injuries and accidents too. According to estimates, the share of mental and neurological impairments in the total disease burden will increase from 10.5 to 15% until 2020. And the sharpest increase in the burden of

[173] Ph. LE FUR et al. (2003).

disease in the future will be due to tobacco consumption that will account for 9% in 2020 compared to 2.6% in 1990[174].

A. Grandjour and K. W. Lauterbach (2004) argue that published cost-effectiveness analyses may overstate the cost-effectiveness ratio of preventive care if they do not take into account the costs of the last year of life. In fact, prevention simply postpones the cost of the last year of life. From this perspective, increasing life expectancy does not significantly change health care costs. However, one has to take into account any reduction of morbidity, which might increase the cost-saving potential of prevention.

In the Netherlands, W. J. Meerding et al.[175] note that the five highest healthcare costs are for mental retardation, musculoskeletal disease, dementia, other mental disorders, and ill-defined conditions. Coronary heart disease, all cancers, and stroke accounted for only 9% of costs. The main healthcare costs are for care not cure and costs are likely to increase rapidly in an ageing society. They conclude that a large share of the healthcare budget is spent on long term nursing care, and this cost will inevitably increase further in an ageing population. Non-specific cost containment measures may endanger the quality of care for old and mentally disabled people. This means that future policies ought to focus on preventing mental disability.

Concerning projections, the cost of technology is uncertain. On the one hand, the productivity of health care services might improve. Taking advantage of developed technology may also help elderly people stay healthy. But on the other hand, a technology-based treatment might be more expensive. It might lead to longer periods of medical care for the elderly, as effective treatments become available for more medical conditions. For example by reducing the length of stays in hospitals or saving on specialists' costs, technology would be cost saving. However, a Finnish study[176] argues that it is the inverse consequence that dominates. Effectively, most of the increase in health care expenditures at older ages is due to the more intensive use of high-cost technology. While some technologies will reduce unit costs, overall new technology is likely to continue to put upward pressure on health care spending as it enables more people to be treated and for longer periods of time. More research has to be performed in order to determine which effect will dominate.

A last concerns the organisation of prevention. There is a general tendency to put more stress on disease prevention and health promotion in the Member States. The responsibility for the implementation of disease prevention and health promotion is shifted more and more towards the level of municipalities, notably in the UK, Netherlands and Sweden. The Dutch experience however has given rise to a public controversy concerning the potential of lack of coordination and innovation at this level. Consequently, some form of central coordination and scientific output is a necessary complement to local actions.

Health promotion at local level seems promising in disadvantaged areas. In this case, it might combine health and social issues. The UK experience in this field aims at associating local groups in order to reach a high number of isolated and disadvantaged people.

174 M.M. Hofmarcher and M. Riedel (2002/2003).
175 Willem Jan Meerding et al. (1998)
176 ML Parjanne and P Sirén (2003).

## SUMMARY AND CONCLUSIONS

Health expenditures for the elderly amount to about 30% to 43% of health expenditures. In most countries, the rise of health care expenditures has been more rapid than GDP. This has led to a significant increase of the ratio of health care expenditures to GDP, which is used as an indicator for the long-term sustainability of the financing of the health care system.

Different factors have been advanced in order to explain this increase: 1) The income elasticity of health care expenditures is higher than 1. This means that health care is a "superior good" and its share is expected to increase with income. 2) Technical progress, attitudes and medical practices have pushed medical costs upwards for every age group. Technological progress might account for about 75% of the increase in health care expenditure. 3) The age profile of health and long-term care expenditures may play a significant role in the increase of health care expenditures. A high share of elderly implies a high share of health care expenditures in GDP.

Available data on health care and long-term care costs at different ages in the life cycle, indicate that costs rise slowly but progressively after the mid-forties and then very steeply in the late seventies. This life cycle implies that population ageing will result in a continued surge of health care expenditure. Projections based on the changing structure of the population (persons aged 65+) indicate that health care and long-term care are expected to increase in an alarmist way (respectively by 40% by 70%) over the next 50 years. However, this mechanical projection ought to be considered as a maximum as it does not take into account improvements in health and medical technologies.

The Economic Policy Committee (2001) predicts that demographic changes would lead to increases in public spending for health care in the range of 0,7 to 2,3 percentage points of GDP over the next fifty years for the countries of the EU 15. However, these predictions are subjects to high confidence intervals. Estimations presented by OECD are very close to those presented by the EPC. Again, the increase of health care expenses does not seem to be a factor leading to an explosion of spending. Ageing will push total care expenditure (health care and long-term care) this spending upward by about 2 to 3 percentage points of GDP, between 2000 and 2050.

The different projections share a certain number of important characteristics for policy elaboration.

If we assume further gains in life expectancy, the ratio of public health care expenditure on acute care in 2050 increases more sharply than with the central scenario. On the contrary, when applying a "high population" scenario, public health care expenditure on acute care is below the values estimated for the central scenario. This is because the effect of higher fertility and migration rates counterbalance the effects of higher life expectancy.

An important lesson from the different projections is that additional years of life in good health lead to a significant reduction of care costs in comparison to the baseline scenario. Improvements in health are expected to reduce acute as well as long-term care expenditures.

Different estimations report higher increases for countries with low health expenditures, indicating a catch up effect and rapprochement with countries nearby the medium values. This might be an indicative estimation of the necessary increases to achieve convergence in the long run among the different countries.

However, if the share of elderly people is used alone, the results might overestimate the impact of ageing. One has to take into account the different factors affecting health expenditures. Another critic relates to the direction of causality. Ageing might lead to high health expenditures, but a good health system may increase life expectancy and the share of elderly people.

The influence of income on health expenditures is widely accepted but the elasticity of health expenditures on income is an open debate. The dominant hypothesis is that health expenditure is a

luxury good. A given increase of income will give raise to a more than proportional increase of health expenditure. This has important implications. As most projections assume a positive average growth rate of income per capita, this leads to an increase of the share of health expenditures to total income.

However, this has been contested. The argument is that poor countries may well experience a high elasticity but as income increases, this elasticity is decreasing. In simple terms this means, that if we double the income of rich people or countries, total health expenditures might not be doubled. This seems a realistic hypothesis for forecasting in the long run, where the relative increase of income is expected to lead income over the threshold associated with unitary elasticity.

In order to take into account all factors affecting health expenditures, we have estimated total health expenditure per capita as a function of GDP per capita, life expectancy and the ratio of people aged 80 and over to persons aged less than 25 years. The definition of total health expenditure is relatively large as it includes investments in health infrastructures. However, it does not include the social assistance element of long term care.

We have retained an equation which is linear in the logarithms. We suppose that GDP increases by 2% each year. Life expectancy and the ratio of very old to very young are taken from the baseline scenario of Eurostat demographic projections.

We can distinguish two cases: a) For relatively poor countries, all factors tend to increase the share of health expenditures to GDP. This is the case for transition countries. The constant and the variable elasticity models provide similar increases. B) For relatively richer countries, the variable elasticity scenario indicates that the income effect tends to reduce the share of health expenditures to GDP while the other two factors work in the opposite direction.

The high elasticity of life expectancy implies that a small increase of life expectancy (about 6%) generates an increase of total expenditure per capita which is close to the impact of income, supposed to increase by 60% over a period of 30 years. A small increase of life expectancy implies that health expenditures might grow faster than per capita GDP and thus increase the share of heath to the economy.

The above results reveal that the expected improvements in life expectancy in the New Member States could increase significantly total health expenditures per capita. This might be the principal component of the increase in the ratio of health expenditures to GDP. This increase could be partly outweighed if the additional years of life are years in good health.

There is an ongoing debate on whether ageing or deaths are costly. Several studies find that once proximity to death is accounted for, population ageing has either a negligible or even a negative effect on health care demand. The major relationship appears to be proximity to death. Consequently, the major increase in health costs in later life depends on the lifetime remaining before death occurs rather than on calendar age, at least beyond 65 +. On this basis, increased life expectancy would not increase health costs per person as high as predicted by traditional methods.

Several studies find that health care expenditures increase with closeness to death and for retired individuals, health care expenditures decreases with age. In fact, it is closeness to death, which increases sharply health care costs and not age per self. Studies that do not make this distinction overstate the cost of health in the coming years. Additional years of life might not increase significantly health care costs. However, the cost of death is just postponed.

The above results suppose the absence of any policy change in the future. In fact, recent national policies indicate that the rise in health care spending has been limited in countries with an active policy.

Another dimension is the cost of death. Several studies find that death costs might be less for very old people compared to younger people. This difference might arise from the following factors:

- The structure of diseases leading to death varies across ages;
- Aggressive and multiple treatments might be less supported by elderly people;
- Life expectancy and life gains might be discriminating factors against elderly people;

Several studies find that as longevity increases the cost of last year is decreasing. So, elderly patients cost less than younger patients suffering from the same disease. This might result from less aggressive care at higher ages resulting in a decrease in hospital health care expenditures. This contradicts the myth that older people receive expensive, high tech treatments at the end of life.

Critics contest the previous studies. In contrast with earlier studies, they analyze both acute care (cure) and long-term care costs. Also, they find that the end-of-life share is relatively small. They conclude that interventions to reduce costs in the last year of life will have only a modest impact compared to the total health care budget.

Projections taking into account the cost of last year and the difference between decedents and survivors find that under the 'living in better health scenario', long term care and acute health care are expected to decline by some 1% for the EU compared with the base case scenario. Improvement in health status is expected to decrease both acute health and long term care expenditures.

When combining both scenarios of living longer and in better health, regarding EU average, they reduce the expenditure on acute health care compared to the base case scenario. Health improvement effects dominate the longer life expectancy effect. The contrary is observed for long-term care where the living longer effect dominates the health effect. But the impact of the living longer in better health scenario is very small in raising long term care expenditure compared to the base case scenario.

Projections, which isolate higher age at death, find that a higher age at death presents a small gain in health care costs.

Technology assessment and economic appraisal during the introduction of new medical techniques is increasing in a certain number of countries (notably NL and the UK). Concerning projections, the cost of technology is uncertain. On the one hand, the productivity of health care services might improve. Taking advantage of developed technology may also help elderly people stay healthy. But on the other hand, a technology-based treatment might be more expensive. Technology assessments, might be useful during the elaboration and selection of prevention programmes. These assessments may contribute further to a better targeting of prevention, better use of funds and hence cost savings. However, technology may bring small changes in the long-term care sector, where productivity gains are low.

Certain activities related to disease prevention and health promotion need some coordination at national level. The local level seems promising in cases where health care needs to be complemented by social services, notably in actions aiming to reach isolated and disadvantaged groups.

Lifestyles play an important role. Furthermore, the same lifestyle may affect several risk factors and health conditions. Consequently, actions orientated towards single specific health issues might lead to a replication of efforts at national level. Some coordination at national level ought guarantee the integration of the different policies able to modify the same risk factor. The local level ought to favour actions, which aim to decrease health inequalities by reaching disadvantaged groups.

# PART F: GOOD PRACTICES FOR HEALTHY AGEING

# INTRODUCTION

Several member states have adopted the concept of active ageing and highlighted the responsibility people have in caring for their health status and well-being (e.g. Austria, Germany, Finland, Sweden). Consequently, there is an increasing focus on implementing prevention policies and programmes in order to promote healthy lifestyles and to encourage the empowerment of elderly people. An important and innovative aspect is that older people are becoming the target of specific prevention programmes and measures.

In this section, we present a selection of good practices in various fields of prevention in several member states, as well as an evaluation of these prevention programmes, when available. Indeed, it is hard to carry out an evaluation of a prevention programme as a result of the difficulty to disentangle the separate effects of an intervention. It rarely relates to a single risk factor and adopts rather a multi-factorial dimension.

Furthermore, the effect of some prevention programmes needs to be analysed in a long term perspective requiring hence, the follow-up of a cohort of individuals. Given the somewhat recent awareness regarding the health of the ageing population in some countries, evaluations may not yet be significant because of the short time of implementation.

The areas of prevention cover empowerment of elderly people, independent living, lifestyles, cardiovascular diseases, cancer, diabetes, mental health and falls and osteoporosis. We have presented the good practices according to the field of intervention for the clarity of the report, knowing however that the effects go beyond that specific field and are closely intertwined (e.g. effects of programmes focusing on independent living, empowerment and physical activity or lifestyles and diseases etc.).

# CHAPTER 1:Empowerment of elderly people

## 1.1 Criteria for action

As highlighted by WHO, empowerment is considered as a process of self-determination and responsibility for own health status and health concerns. The principle of active ageing has been recognised in several countries and ad hoc programmes have been implemented (e.g. Austria, Germany, Finland, Sweden) to promote the empowerment process of older people. In Sweden alone, the concept of empowerment is integrated in the national objectives for elderly people.

A form of empowering older people is to reach out to them and identify their needs but also to provide them with the necessary information regarding available services and activities they could benefit from. As access to this information may be hampered by physical and mental difficulties, home visits are being organised in several member states in order to overcome these obstacles and include older people in social life.

Generally, these initiatives combine community interventions and personalised actions. One of the interesting aspects of these projects are their capacity to highlight the vulnerability of some groups of older people who are more at risk of social exclusion.

Consequently, special attention is given to reaching those very isolated ones. The individual approach, through home visits, seems promising in coming up with specific strategies adapted to the individual needs of elderly individuals. From these initiatives, it seems relevant to offer measures accounting for gender differences and for social and cultural differences.

The first results show that widowed persons are culturally less active and participate rarely in social activities. Very old-aged and widowed women suffer frequently from a lacking social network and report depression and somatic pain. Widowed and the very old see the family doctor very frequently but rarely see a specialist. The recently retired do not take advantage of the yearly medical check-ups but show a better quality of life.

A Finnish evaluation group[177] assessed the best available scientific evidence on the effects of home visits on the functional capacity of people aged 65 or older. According to the authors, studies do not clearly indicate that preventive home visits would affect functional capacity, referral to permanent institutional care, mortality and costs of care among people aged 65 or older. There is some evidence according to which preventive home visits may reduce or postpone referral to long-term or permanent institutional care, among "young elderly", i.e., those under 75 years. Also mortality was slightly decreased by these visits. It is not sufficiently known, however, if the effects are due to the contents of the visits, psychosocial factors, home environments, or the state of health and functional capacities of the elderly persons.

## 1.2 Good practice

### 1.2.1 Networking and social isolation (AT)

The Empowerment – Plan 60[178] (Austria) is a good example of improvement that can be achieved in terms of greater participation and empowerment of older people as a result of community-based interventions. Funded by the Austrian Health Promotion Foundation and carried out by the Research Institute of the Viennese Red Cross, it aims at promoting structures that enable the elderly to be an active independent and assertive part of society. It targets people aged 60-75 in urban settings. Building up social networks is also an important component of the project.

[177] Toljamo et al. (2005).
[178] http:// www.plan60.at

Elderly people work together and initiate new projects in the community, encouraging other older people (e.g. those from disadvantaged groups) to be active. In order to assist these "initiative groups" and to enhance cooperation with existing structures, a "network shop" is installed, with the support of organizations and initiatives working in the area of health promotion for the elderly. The idea is that the projects initiated by the networks of older people will reach the project's "real" target group, namely the socially isolated elderly.

The preliminary evaluation of the effectiveness of the 10 courses with 15 participants each shows significant changes in a relatively short timeframe. The changes affect the behaviour, the mental state and reflect the satisfaction of the participants of the courses. There were additional psychosocial effects as a result of enlargement of competency, which is necessary for increased activity, interest and interaction. However, the evaluation of the projects and initiatives is still ongoing and there is still some uncertainty as to how much of a multiplication effect these projects will have and whether they will also succeed in targeting a more disadvantaged group of older people.

An analysis of the current living situation of the elderly was initially performed within this project. Though it is primarily carried out in Vienna, it is transferable to other urban settings. Furthermore, the sustainability of the project is assured due to its community approach.

Similar interventions are being carried out: the "Living environment project" in 13 communities in two regions of Styria (AT) from 2003 until March 2006, or the "Life World Project"[179] (AT) with workshops and empowerment classes organised and targeted at older people of various ages, and where nutrition, English courses, exercise, communication and memory practice are covered.

Furthermore, the "Ripe, mature Apples"[180] (AT) project is interesting for its gender approach. It is a health and social project for women in their second half of life. The project started in March 2002 and the preliminary phase lasted until February 2004. Women met in villages with a group leader and discussed several themes. These meetings aimed at promoting competencies for women within their villages. Further information about events in the region was circulated. The women also had the opportunity to identify their needs. The evaluation of the project is undergoing and negotiations are underway about the expansion of the project nationwide. However, this is an informative example of initiatives geared solely towards women and their special needs.

### 1.2.2 Home visits

Another form of empowering older people is to reach out to them and identify their needs but also to provide them with the necessary information regarding available services and activities they could benefit from. As access to this information may be hampered by physical and mental difficulties, home visits are being organised in several member states in order to overcome these obstacles and include older people in social life.

The main objective of the home visits is to assess the problems and the service needs of the seniors, to increase their resources, and to give information about available possibilities and services offered by the city or municipality. These measures aim at strengthening the feeling of security of older people and supporting them in coping at home (e.g., the project of the City of Jyväskylä in Finland[181]).

Home visits carried out in Nordmaling (SE) are the most well documented example in terms of cost-effectiveness of health promotion through home visits. The project is currently being analysed by a team at the University of Umeå. The final report is expected in December this year, but the interim report gives some indications on the financial aspects of the evaluation.

[179] Noack et al. (2004)
[180] http://www.seniorweb.at/reifeaepfel/index.html
[181] Salminen et al. (2004).

Home visits were organised for senior citizens aged 75+ who did not already benefit from social and health care services at home. The test group included 196 persons, and the control group 347.

The home visits (4 visits per person) included information on:

- how to prevent risks in the home environment,
- dietary behaviour
- access to facilities for sports/ physical exercise,
- access to social activities, local associations and NGOs
- available social and health services and key contacts

The proportion of persons included in the test group who considered themselves to be always or frequently in pain decreased during the course of the project from nearly 40% to slightly above 20% for women, and from nearly 30% to slightly below 20% for men[182]. In addition, the number of people frequently experiencing anxiety decreased significantly from 9% to 2,5% among men and from 7,5% to 0% among women. The self-reported health status also improved for both men and women. In particular, the number of women declaring themselves as having an ill health decreased from 10% to 5%. Compared to the control group, the home visit group made significantly less use of emergency care, and also displayed a lesser need for health and social services at home.

Sahlén et al. estimated the total cost of the project[183].
Total cost = 159.093 + 1.124 afterwards = 160.217€

Gains deriving from the implementation of the project:
59.284 (home services) + 83.339 (hospitalisation) + 9.256 (emergency care / district doctor)
= 151.871€

Total gain = 8.347€

However, the gains could be larger if the project had been implemented on a larger scale. Furthermore, the small sample poses problems of representativity of the population.

Preventive home visits are also carried out in Finland. They aim at preventing disability and supporting elderly persons living in home environments. During these visits the person's functioning ability and his/her need for support in home environment is assessed. In 2001 preventive home visits were carried out in 36 municipalities.

1.2.3 Other programmes

In Germany, a similar project is carried out under the name of "Healthy and active ageing in Radevormwalde"[184] and is a WHO Euro demonstration project. In addition to activities similar to the ones carried out in the frame of the previous projects, the city of Radevormwalde seeks to evaluate whether its services are adapted to its citizen's needs, especially older people, and whether single institutions cooperate with each other and whether networking is sufficient. It seeks to improve its provisions, help its inhabitants to better their quality of life and activate the city's resources towards the goal of health promotion.

The preliminary report states that 2.750 visits and 1.192 agreements on health promoting activities have been made. In the WHO-questionnaire, 40% report that their quality of life has improved. A strong networking among participants was noted, crisis situations were overcome, and projects are under way.

[182] Sahlén et al. (2005).
[183] The costs were converted from Swedish crows based on 2005 exchange rates (1€ = 9,33199 SEK).
[184] http://www.aktiv55plus.de

A contact centre for elderly people was opened in the Schilderswijk district of The Hague (Netherlands). This contact centre picks up signals at district level about isolated elderly people from social workers, local residents, immigrants' organisations, volunteers, the police, housing associations, churches, etc. The contact centre then calls on social workers or volunteers to work with isolated elderly people. They organise and co-ordinate progress. The contact centre also concentrates on preventing isolation by stimulating early detection and devoting much attention to the social infrastructure around the older persons.[185]

The sustainability of the above-mentioned projects is ensured due to their community settings. They also encourage the involvement of already existing structures working for the elderly people and their cooperation with senior networks. Elderly people are included as active members in the development of community programmes targeted at them and particularly at socially excluded members.

[185] Ministry of Health, Welfare and Sport (2004).

# CHAPTER 2:Independent living

## 2.1 Criteria for action

The previous section highlighted the initiatives that set as goals the enhancement of the empowerment process of older people and the networking between relevant actors, including the target group.

Surveys show that dependency increases with age and over the next decades, certain dependencies in terms of climbing stairs, shopping, doing housework and participating in community and social life will constitute an important aspect of limitations faced by older people. The increase is expected to be more significant among the very old persons.

Several countries, e.g. Sweden, Austria, Finland, Germany and the United Kingdom have adopted the concept of independent living and integrated it in specific programmes. The idea is to delay the onset of disease and the referral to care services.

Loss of autonomy is also costly in terms of additional need for help with self-care at home or admission to a nursing home. An American study[186] looked into the additional cost due to the change of level of autonomy within one year of observation. Of the €23 billion additional costs[187], some 85% were caused by change from an autonomous status to the need for care as a result of limitation in ADLs. Half of care costs included nursing home care and paid home care. The other half was for medical care. The remaining 15% of the additional costs were caused by a change from a dependency state to the admission in a nursing home care.

The total average annual cost of care[188] was almost 4 times and 7 times higher for those who ended up needing help with ADLs and for those who entered a nursing home respectively, compared to those who remained independent in the community. Regarding average annual long-term care costs, they amounted to €2.998 for those who became dependent with self-care care activities, to €5.996 for those who had stable dependency with ADLs and to €18.517 for those who entered a nursing home. This implies that postponement and prevention of dependency would have considerable impact on health care and long-term care costs, and entering a nursing home is the most costly option for dependent people.

The previous data justify the promotion of independent living among elderly people in order to delay referral to care services and to provide them with the necessary knowledge and skills to live healthy and independent for as long as possible.

M. Luchetti et Al. (2001) analyse an independent population of 50-75 years living at home in a variety of middle-sized towns in Italy. The sample is composed by persons enrolled in a health promotion programme. They find that socialising activities play an important role for successful ageing.

## 2.2 Good practice

### 2.2.1 The Active Ageing project (AT)

It addresses 55-80 years old Viennese in 3 large districts, including immigrants. Along with street and social workers, it identifies the needs, resources and potentials to live an autonomous self-dependent life.

[186] Guralnik, et al. (1999).
[187] For the purposes of the report, prices were converted from US dollars on the basis of 1997 exchange rates (1€ = 1,13404 USD).
[188] The costs refer to medical and long-term care.

A preliminary report shows that mostly women were reached (2/3) out of the 250 participants as of November 2004. Concerning the age groups, the distribution is the following: 43% between 55-65, 43% between 66-75 and 13,6% between 76-80. Some 28,4% was widowed. The educational standard was surprisingly low and 75% were already retired. It became clear that the quality of life depends considerably on the district in which a person lives. The existence of social networks with neighbours is also correlated with the district of residence. However, all participants judge their environment and housing as being unsafe and not looking pleasant. Concerning the perception of the future, natives of the studied districts thought that their life situation would remain the same. Only people aged 55-65 assumed that their life would become better in the future. Subjective health satisfaction is dependent on nationality and gender (only 16% of immigrants and 1/3 of women were satisfied). Participation in health promoting activities is correlated with costs, and considered as time and energy consuming. Visits to the doctor were the most frequent "social" service used.

2.2.2 Active Health Promotion in Old Age (DE)

In order to delay the onset of disease and disability, and hence postpone the recourse to care services, the geriatrics and gerontology centre Albertinen-Haus in Hamburg (DE) initiated a practice on "preventive health counselling for successful ageing"[189] through the training and assignment of nursing staff for health promotion and measures in the setting of preventive home visits for older people still living independently. The cooperation between geriatrics centres, participants and family doctors is the main focus of the project.

The goal was to evaluate different measures, to define the target population and to make recommendations to support family doctors. Fourteen doctors cooperated with the Abertinen-Haus. Parallel to the program, a study was carried out called the "Family doctor study Part 2"[190].

The programme was estimated to be a model of good practice for the entire State. The study was to inform and educate geriatric centres, gerontologists, family doctors and outpatient nursing services about the importance and usefulness of health promotion for the elderly. Furthermore, it contains a theoretical framework as well as a practical part for an autonomous programme design in several regions[191]. Different curricula for health care professionals in several settings were developed.

In a second step, a health counselling team gave information about the "trefoil" model of health intervention, which includes exercise with physiotherapists, nutrition with nutritionists and social environment with social workers:

The main pillars of the approach were:

- Integrating the family doctor's office and using it as a guide through the health care system
- Promoting geriatric competency in community provision
- Geriatric networking (in-patient and outpatient)
- Empowerment of older people
- Integration of a preventive concept for older people
- Behaviour oriented approach (didactic concept with small groups)
- Integration of experts (physiotherapists, home-economists and nutritionists, social educators)
- Implementation of standardized instruments

Interdisciplinary health-counselling team guided the interventional group work in the Albertinen-Haus, other patients however were visited at home. In the long run, 503 of 580 participants came to group events into the geriatric centre twice. The average age was 70, and 60% were female.

[189] Anders et al.
[190] Dapp et al. (Teil 1,2,3).
[191] Federal Ministry for Family, Seniors, Women and Youth http://www.bmfsfj.de/Kategorien/Forschungsnetz/forschungsberichte,did=18438.html

The project has been evaluated and the results are the following:

- The nursing staff was trained in six months and a curriculum was developed.
- A standardized assessment tool was developed.
- Criteria for the definition and documentation of risks for the health and the autonomy of elderly were developed.
- People visited at home presented themselves as high-risk patients in screening and assessment as compared to the participants of the counselling sessions in the Albertinen-Haus.
- The assessment tool (AHA) was approved.
- The outcomes show that the health counselling resulted in a change of life style and attitude.
- All participants integrated at least one recommendation of the health counsellors into their everyday life.
- 63% report that they made lasting changes in both areas: nutrition and exercise.

The project was well accepted among the participants. All would definitely recommend the project to other older people, 2/3 want the project to be continued regularly, 90% approved of the setting inside the geriatric centre, 74% think that a co-payment (meaning out of pocket payment either partially or entirely) would be meaningful and reasonable.

The doctors also approved of the project. The counselling of older people relieves the doctors and improves the patient's willingness to invest in social promotion. Further, the doctors improved their own knowledge in the preventive and geriatric areas. According to their wish, the quality circles will be continued regularly.

The project is interesting due to its transferability (curricula, assessment tools) and the innovative element of the setting (inside the geriatric centre). The interdisciplinary approach is also relevant to the success of the project (trefoil model). Three curricula were designed: a) for people in the health sector working with elderly but without any special knowledge about geriatrics, b) for the same target group as a build-up to curriculum 1 and for therapists in geriatric departments; curriculum 2 qualifies staff to work as health counsellors for older people, and c) curriculum 3 is addressed to the group performing home visits in order to counsel the elderly; health care personnel are integrated into the interdisciplinary health counselling team and assess the individual situations during home visits. Additionally, the published book contains information about health counselling for the elderly and organization of group seminars as well as documentation and evaluation.

### 2.2.3 Rehabilitation in Nursing Homes (DE)

Preserving the cognitive capacity of elderly people is an essential component to ensuring they enjoy an independent and active life. Autonomy and competence in old age is essential and activation of cognitive functions is desirable. The combination of memory training and exercise seems to be a guarantee for healthy and satisfactory ageing and furthermore, assures sustainability.

In the frame of the SIMA-P research project "Rehabilitation in nursing homes"[192] carried out by the Institute for Psychogerontology of the Friedrich-Alexander-University Erlangen-Nürnberg and funded by the Ministry of Health and Social Security, therapists worked with biographically oriented, psychomotoric and cognitive training units. Cognitive activation promotes perception, attention and concentration, absorption of information and processing performance of the short-term and long-term memory. Also strategies from SIMA[193] were used. Biographical orientation means using the patient's long-term memory for trainings and activation and is seen as an alternative to specific cognitive training. Psychomotoric training means taking into account the individual's mental situation, analysing his or her motoric expression, which reflects the mental situation. Further, power and endurance are essential to maintain the ability to walk.

[192] http://www.sima-training.de
[193] SIMA stands for Maintaining and Supporting Independent Living in Old Age.

The 294 participants were between 70 and 99 years old. Some 137 remained after an implementation period of 12 months. The results demonstrate that rehabilitative measures work also for cognitively and functionally disabled people. In the long run, the inhabitants kept their autonomy longer and some could even improve their status concerning autonomy. Further, the mobility increased, whereas the injuries from falling decreased. Thus, these changes led to an improved mood and an increasing quality of life. Lastly, the improvement of the inhabitants resulted in reducing the burden on and better work satisfaction of nursing care professionals.

In addition, the focus on secondary prevention and health promotion in rehabilitation is interesting. Transferability is assured due to the highly professional documentation and evaluation. Also long-term follow-up is performed. Elements of the cognitive training have been used in and transferred to several projects and settings in Germany and Austria.

# CHAPTER 3:Lifestyles

## 3.1 Criteria for action

The Dutch cabinet estimates that at least 20 percent of all disabling illnesses are attributable to unhealthy lifestyles and hence theoretically avoidable. The Ministry considers that unhealthy lifestyles represent a major loss of quality of life. Moreover, these diseases and symptoms cost society between € 2,5 and € 4 billion (thousand million). The Ministry notes that the elderly who have had (and still have) the healthiest lifestyles, the better the chance of avoiding chronic disorders.

Unhealthy dietary habits and physical inactivity pose major public health problems, to which some countries have responded by launching various programmes targeting changes in lifestyle, either aimed at the general population or at the elderly more specifically.

The Dutch Ministry considers that traditional forms of promoting good health, such as public information via the mass media, no longer seem to work sufficiently in promoting healthy lifestyles. Communication about health risks, especially with young people and people with limited education (including many immigrants), is often difficult with only public information. It states that, lifestyle intervention works much better when it reaches people, from within the immediate social environment – the so-called settings: at home, in the schools, during recreation, at work, in health care and in the neighbourhoods.

Health promotion interventions, targeted at social groups with the highest prevalence of risk factors, might have a great potential impact in reducing socio-economic differences in health. As noted above, economically disadvantaged groups might benefit less from health promotion than advantaged groups, consequently individual interventions should be accompanied by complementary measures linked to poverty. . However, targeted programmes risk stigmatising the target group, and this ought to be taken into account during the design process.

Several Member States have included in their priorities the reduction of health related inequalities, notably the UK, France, Netherlands and Sweden. They complement their national policies by health prevention among disadvantaged groups.

### 3.1.1 Smoking

The European region has the highest alcohol consumption in the world. The rates are notably high in Nordic countries.

It has been estimated that smoking causes 20.000 deaths a year in Belgium. It is the principal cause of evitable mortality. Non-smokers live on average 7 years more than smokers[194].

In the UK, "in 2000 - 2001, 12.900 of people aged 60 and over who had attended NHS Stop Smoking Services and set a quit date, had successfully quit smoking at the four weeks follow up stage in England. This figure has increased to 42.900 in 2003/04. Monitoring of the NHS Stop Smoking Services shows that the likelihood of success increases with age in England. 67% of those aged 60 and over who had set a quit date in 2003/2004 were successful at the four week follow up, compared to 38% of those aged under 18 years. In comparison, only 51% of people aged 18-34 years successfully quit smoking at the four week follow up and only 59% of those within the age group 45-49 had done so"[195].

A study of Vetter and Ford (1990) aimed to test the hypothesis that people aged 60 and older respond to assistance in stopping smoking. They found that, using a single general practitioner visit backed up

[194] Fondation contre le Cancer, 'Quelques chiffres des impacts sur la santé', http://www.cancer.be
[195] Philp (2004).

by a practice nurse, 14% of the smokers had discontinued the habit 6 months after the intervention period. The intervention group also showed some improvements in a standardized measure of breathlessness.

In the United States, the *Clear Horizons* guide, which is a guide especially addressed to older smokers has been proven effective. This guide is targeted to the special quitting needs and barriers faced by older adults. Its effectiveness can further be enhanced with the use of brief telephone counselling[196].

3.1.1 Physical activity

Physical inactivity increases with age and particularly among individuals aged over 65. Evidence support the need for older people to exercise, even when starting late in life. Public interventions to promote physical activity among older people have proven to be effective in reducing premature deaths and to be cost-effective in terms of additional years lived in good health.

Certain studies have estimated the cost-effectiveness of physical activity for people aged over 65 years. They concluded that a publicly funded program of moderate exercise for people over 65 years of age would prevent premature death, reduce inpatient episodes and would cost about 400 Euros (costs given at 1993-1994 prices) per life-year saved, with a mean expectation of life of 10 years after 65 years of age[197] [198].

Another study by Munro et al. (2004), aiming at assessing the cost-effectiveness of a community based exercise programme as a population wide public health intervention for older adults, concluded that, despite a low level of adherence to the exercise programme, there were significant gains in health related quality of life. The programme was more cost-effective than many existing medical interventions, and would be practical for primary care commissioning agencies to implement.

Hu et al. (2005) found that regular physical activity and normal weight are both important indicators for a decreased risk of mortality from all causes, cardio-vascular disease (CVD) and cancer. Physical activity had a strong independent effect on mortality, whereas the effect of BMI (body mass index) was partly mediated by other obesity-related risk factors.

Another study by Hu et al. (2004) covered 18.898 Finnish men and women aged 25-74 years without history of coronary heart disease, stroke, or heart failure at baseline. The median follow-up time was 9,8 years. They found that physical activity had a strong, independent, and inverse association with CVD risk in both genders. All obesity indicators had a significant direct association with CVD risk after adjustment for age, smoking, education and physical activity.

A British simulation model estimated the costs to health and the health care resource implications of exercise in total population. They arrived at the conclusion that, for older adults (at least 45 years), the estimated costs saved as a result of disease prevention (effect of exercise) greatly outweighed the costs that would be incurred as a result of full participation in sports and exercise[199].

Several surveys indicate that exercise is beneficial for people over 65 and there are health benefits to be derived even when starting to exercise late in life, whilst it is harmful to stop exercising[200].

Another study[201] followed about 700 pensioners between 61 and 81 years old, who took part in an organised programme of regular walks. When compared to control groups, it was established that regular low-intensity physical activity in pensioners led to significantly lower mortality. The study

[196] American Association of Health Plans (2001).
[197] Munro et al. (1997).
[198] Haapanen-Niemi (2000).
[199] Nicholl et al. (1994) and Haapanen-Niemi (2000).
[200] Berleen (2004).
[201] Hakim et al. (1998).

showed that this reduced mortality concerned both cardio-vascular disease and cancer. Those who walked less than 1,6 kilometres a day were 60% more likely to die prematurely, compared to those who walked more than 3,4 kilometres a day. The risk of dying from cardio-vascular disease and cancer was more than double in the former group.

An English study[202] showed that moderate physical activity could be successfully encouraged in previously sedentary men and women aged 45-74 through a primary care based intervention.

3.1.2 Nutrition

Better nutrition is recommended for all, but particularly in older individuals at increasing risk of developing diseases. Fruit and vegetable intake is still not at its recommended level in most member states. According to the American Nutrition Screening Initiative, nutrition programmes can generate health care costs savings.

In Norway[203] the cost-effectiveness of a population-based promotion campaign of healthier eating habits was compared with dietary and medical treatment of individuals. The cost per life year gained over 20 years of a population based strategy was projected to be €14.480 and of dietary treatment €14.961. However if drugs were added for 50% of the subjects with a high cholesterol concentration, costs per life year gained were nearly tenfold the costs of the dietary treatment.

For example, if saturated fat and vegetables and fruit were consumed in the Netherlands according to the nutrition guidelines, the number of cases of cancer would fall by about 13.000 and there would be over 2.200 fewer events of fatal coronary heart disease. Similarly, a reduction of 1% in serum cholesterol, which can be achieved through health promotion, is related to a 2-3% reduction in CHD[204].

As we have shown in the discussion of the impact of socio-economic factors on health, people from lower socio-economic groups face relatively higher mortality rates, morbidity and activity limitations than those from a higher socio-economic status. Apart from material conditions, such as income and employment status, differences in behaviour might underlie a substantial part of inequality in health.

Important behavioural risk factors, clustered in lower socio-economic groups include smoking, physical inactivity, excess alcohol consumption, obesity, hypertension and poor diet[205].

The diet of the lower socio-economic groups provide cheap energy from foods such as meat products, full cream milk, fats, sugars, preserves, potatoes, and cereals. There is, however, little intake of vegetables, fruit, and whole-wheat bread. This type of diet is lower in essential micronutrients, such as calcium, iron, magnesium folate, and vitamin C than that of the higher socio-economic group[206].

The HALE project highlighted that individuals aged 70 to 90 years, who adhere to Mediterranean diet, to moderate alcohol consumption, and who abstain from smoking and are physically active have a 50% or lower rate of all-cause and cause-specific mortality[207]. The total percentage of disability adjusted life years (DALYs) related to poor nutrition and physical inactivity is estimated at 9,7%, compared with 9% related to smoking[208].

[202] Stevens et al. (1998).
[203] Kristiansen et al. (1991) cited in International Union for Health Promotion and Education (2000).
[204] Law et al. (1994) cited in International Union for Health Promotion and Education (2000).
[205] James et al. (1997) and Ruwaard et al. (1998).
[206] Gomel et al. (1997).
[207] Knoops et al. (2004).
[208] WHO (2002).

The British Nutrition Foundation recommends a combination of increased physical activity and suitable weight reducing diets for overweight/obese adults who wish to lose weight[209].

## 3.2 Good practice

### 3.2.1 Moving more often (UK)

The British Department of Health commissioned "Moving More Often", a three-year partnership project, led by the British Heart Foundation National Centre for Physical Activity and Health at Loughborough University. This project:

- Is developing a national training programme for health and care workers and volunteers who work with older people in a range of settings such as day centres, shelters and other supported living accommodations and residential and nursing settings
- Is aimed at promoting regular physical activity and independence for older people in the transitional phase and frail elderly people
- In phase one (2003/2004), established 8 pilot projects recruiting some 40 Moving More Often Trainers working in over 45 different settings with older people with a variety of health and social needs
- In phase two (2004/2005), has set up additional four local partnership projects looking at issues not covered in the first phase e.g. rural environment, additional work with ethnic minority communities. In addition, the project has an electronic network of approximately 80 interested agencies.

The "Up for Owt programme"in the UK is a community physical activity project launched in 2002 in Blackburn and Darwen. The programme aims to coordinate exercise classes run by different agencies and also to target older people not already cared for – those who find it difficult to get out of the house.

The home-based exercise programme targeted people who may have just been discharged from hospital after suffering a stroke or a heart attack or who were visually impaired. An instructor goes into the home over six weeks to teach functional exercises including improving balance, joint strengthening, getting in and out of a chair properly and building up leg strength and stamina – all building on work by physiotherapists and occupational therapists.

The programme aims to improve capabilities for everyday life and build their confidence so that elderly people feel like living again. Some success stories tell us about older people who were very immobile and now they are enjoying tai chi and water aerobics.

As a result the project had to provide more bikes and horse riding was added after requests from older people. Furthermore, they organise activity holidays and day trips. The project won the Queen Mother's Award for Care of Older People at the National Health Service (NHS) Health and Social Care Awards 2004.

### 3.2.2 Activating older people to physical activity (FIN)

The Lähde project of the city of Oulu (Finland) offers activities directed at all persons 65 years or over, living in the centre or in Heinäpää in the City of Oulu. The total number of potential participants is 2600.

The aim is to activate people to physical activity and to form active social networks. At the beginning of the project all potential participants were sent a questionnaire, which surveyed the functional

[209] British Nutrition Foundation, 'Obesity and overweight', 2004.

capacity, physical activities, attitudes and social networks. Almost two thirds answered. On this basis, the planning of project activities has taken place.

The project offers many kinds of activities, altogether 50 hours each week. Examples are gymnastics with therapy balls, pool gymnastics, gym exercise, choir singing, dance group, nature club, expeditions, excursions, lectures and open discussion groups. Three times a year a newsletter is posted to all participants. It tells about different events, groups and gives guidance in different exercises. The project started in April 2001 and by April 2002 it had 530 participants. The project is partly financed by the Slot Machine Association, and the City of Oulu, the parish and the Oulu Deaconesses Institution are the actors of the project.

### 3.2.3 Physical activity for better health and well-being (SE)

In an effort to promote healthy lifestyles, Sweden has launched the "Sweden on the move 2001" campaign. The national programme placed in the forefront the benefits of physical activity for better health and well-being, and its efficiency in preventing disease. The message was built around the importance of daily physical activity to promote good health, and that 30 minutes of daily physical activity can have a positive preventive effect on health. Although elderly people were not specifically highlighted as a target group in the objectives of the campaign, it is clear that they would benefit from it and acquire healthy habits through increased physical activity, since they represent a group with health risks.

Consequently, physical activity on prescription is emerging, a handbook for GPs on how to prescribe physical activity is about to be published, and health enhancing physical activity is one of the most important public health issues. The 2001 campaign led to a new one, "Keep Sweden Moving". Enhancing physical activity was stressed upon throughout years 2003 and 2004. The commission also included a request for a proposed national strategy for increased physical activity in society[210].

[210] National Institute of Public Health (2001).

# CHAPTER 4: Cardiovascular diseases (CVD)

## 4.1 Criteria for action

As illustrated by statistics in chapter I, cardiovascular diseases are the leading cause of burden of disease in Europe and the main factor for years of life lost due to premature death.

At population level, the interventions to prevent stroke are broadly the same as those for coronary heart disease - increasing levels of physical activity, encouraging healthy eating (particularly reducing salt intake and increasing fruit and vegetable consumption), and supporting smoking cessation as well as identifying and managing high blood pressure[211].

The main risk factors for stroke are notably: previous stroke, hypertension, metabolic (diabetes, high cholesterol level, obesity, etc.) and lifestyle (alcohol misuse, poor diet, low level of physical activity, smoking, etc.). Smoking cessation effect on decreasing the risk of stroke in middle-aged men (40-59 years) is most likely to benefit light smokers (less than 20 cigarettes per day) and patients with hypertension more specifically.[212]

Effective health prevention here requires changes in certain lifestyles. However, lifestyle changes might also be beneficial to other for prevention of other non-communicable diseases. This is the main argument for an integrated approach of health promotion by WHO.

Some argue that lifestyles and their changes are community factors and interventions in sub-settings (home, etc) only are not sufficient.[213] Health promotion requires a set of different strategies involving the whole community. A community-based approach is proposed.

National policies (e.g. UK) consider that preventing stroke involves health promotion initiatives designed to reduce the risk factors for stroke in the general population and the development of systems to identify and treat those at risk of a first or repeated stroke. Consequently, a systematic cardiovascular health check seems to reveal the gaps of the opportunistic risk assessment screening. The systematic screening amounted to some 43,5 € per patient.[214]

A recent US synthesis of community based heart health interventions concluded that ' the community approach to CVD prevention has a high degree of generalisation, cost effectiveness due to the use of mass communication methods, ability to diffuse information successfully through use of mass communication methods, ability to diffuse information successfully through the use of community networks, and potential for influencing environmental, regulatory and institutional policies that shape health"[215].

In Germany, the sickness funds also note that the preventive possibilities to reduce costs in the health care sector are not fully used. Germany has one of the highest health expenditures relative to the GNP, but only an average life expectancy. The so-called "preventive potential of rationalization" is estimated at 25-30% of the current expenditures[216].

Kruse et al. (2003) considers that a lack of improvement of prevention and health promotion would result in an increased demand of care for people with cardio-vascular disease, disease of the muskuloskeletal system, cancer, disease of the respiratory system and vascular dementia. According to Schulz et al. (2000), the need of care for cardiovascular disease will increase by 44% until 2020; in the

[211] Kawachi et al. (1993) and Wannamethee et al. (1995).
[212] Wannamethee et al. (1995).
[213] International Union for Health Promotion and Education (2000).
[214] The initial amount was set at 30£ per patient. We converted it to Euro for the purposes of this report (for 2005).
[215] Schooler et al. (1997).
[216] Sachverständigenrat für die Konzertierte Aktion im Gesundheitswesen, Jahresgutachten 200/2001.

age group over 75, the need will increase 77% due to stroke and heart insufficiency, 74% due to organic psychosis, 69% due to diabetes, and 63% due to femoral neck fractures.

The cumulated potential of cost savings for cardiovascular disease according to Schwartz et al. (1999) is presented in the following table. However, the costs should not be added, since there is interdependency between the individual risk factors.

**Table 42: Cost savings for cardiovascular disease (Mio)**

| Risk factors | Treatment costs | Follow-up costs | Total cost |
|---|---|---|---|
| Hypertension | 1.008 | 309 | 1.317 |
| Hypertension and smoking | 1.141 | 349 | 1.490 |
| Smoking | 451 | 138 | 590 |
| - Men | 173 | 53 | 227 |
| - Women | 108 | 33 | 141 |
| Diabetes | | | |
| - Men | 284 | 87 | 371 |
| - Women | 237 | 73 | 310 |
| Well-known diabetes | 212 | 65 | 277 |
| Asymptomatic diabetes | 80 | 25 | 104 |
| Obesity (men) | 531 | 163 | 693 |

Source: Schwartz et al. (1999)

The theoretically possible potential of economy for stroke after elimination of the risk factors smoking, hypertension and diabetes is presented in the following table:

**Table 43 : Cost savings related to stroke (Mio)**

| *Risk factors* | *Treatment costs* | *Follow-up costs* | *Total cost* |
|---|---|---|---|
| | **Ischaemic heart disease** | | |
| Cholesterol | 2.083 | 819 | 2.902 |
| Blood pressure | 822 | 323 | 1.145 |
| | **Cardiac arrest** | | |
| Cholesterol | 372-419 | 142-160 | 514-578 |
| Stress management | 342 | 130 | 471 |
| Cholesterol, smoking, BMI, mobility and blood pressure | 386 | 148 | 533 |

Source: Schwartz et al. (1999)

Different approaches have been evaluated in population based hypertension reduction[217]. Medication could save €1.368 Million in treatment and consecutive disease; a nutritional blood pressure reduction could save €936 Million; stress management could reduce costs by €1.144 Million. Population based anti-smoking campaign could only save €87 Million[218].

Another study on the cost-effectiveness of exercise as a health promotion activity to reduce coronary heart disease mortality documented a cost of $3.433 per life-year gained of a regular exercise regime.[219]

[217] Schwartz et al. (1999).
[218] Costs were converted from DM based on 1€ = 1,95583DM.
[219] U.S. Department of Health and Human Services (1999).

If the United Kingdom were to lower cholesterol level in its general population, it would register 25.000 fewer coronary heart disease (CHD) related deaths each year, lowering smoking prevalence and blood pressure would lead to respectively 17.000 and 50.000 fewer CHD deaths[220]. In the United Kingdom, the proportion of 75 years old and over, who had their blood pressure reduced to normal level as a result of treatment increased from 7,5% in 2001 to 10% in 2002.

Studies indicate that secondary prevention for CHD should particularly target older people, providing them with advice and counselling on risk factor control and medication. When identifying the risk factor control in older patients who have a CHD in the UK, it appears that they control poorly these risks (cholesterol level, obesity, hypertension)[221]. Therefore, this leaves room for intervention in terms of preventive practice in the frame of primary and secondary care.

## 4.2 Good practice

### 4.2.1 Dietary changes for circulatory disease mortality reduction (FIN)

The favourable trend in mortality from circulatory diseases in Finland is a success story. The Finnish North Karelia project started as a pilot project. It was based on community-based heart health prevention. The project assumed that the provision of measures to reduce the risk of high risk people in the health service institutions might have a limited impact. On the contrary, general risk reduction measures and healthy lifestyles might have a huge public health impact.

In the early 1970s, the Finnish diet was high in saturated fatty acids, low in unsaturated fatty acids, low in vegetables and fruit and high in sodium. Dietary changes in the past few decades have been remarkable. Saturated fat intake and the use of salt have decreased and the consumption of fruit and vegetables has increased[222]. A wide range of policy decisions in the areas of agriculture, health and welfare, education, trade and commerce, fisheries and finance have had an either direct or indirect impact on food consumption in Finland.

The North Karelia experience revealed that the experiment had a significant success in reducing risk factors and CHD mortality. A remarkable decline has taken place in smoking and major changes on dietary habits. As a result serum cholesterol and blood pressure levels had markedly reduced. The ensuing significant reduction in CHD mortality could be explained by changes of the main risk factors, notably dietary changes[223].

Kiiskinen et al. (1995)[224] assessed the overall CVD related costs in the North Karelia area and in all Finland in 1972 (at the outset) and in 1992, i.e. 20 years later when the age adjusted CVD rates had remarkably reduced. Their conclusions were as follows: 'The social cost generated by CVD are likely to have declined since 1972, especially in terms of cost per capita. The decreases in annual costs in all Finland have been about € 76,45 million and € 458,72 million for all persons over and (only) 35-64 years of age respectively. The estimated proportional reduction was greater in North Karelia than in all Finland. This could translate as a € 26,76 million saving in 1992 alone.' The gains for elderly people are significant but seem relatively low.

The Action Plan for Promoting Heart Health for the years 2005-2011 prolongs the efforts undertaken so far and includes a strategy for the promotion of heart health and prevention of cardiovascular diseases, and secondary prevention and rehabilitation. Together with smoking reductions these

[220] Kelly et al. (2004).
[221] Lawlor et al. (2004).
[222] Aromaa et al. (1999).
[223] Vartiaainen et al. (1994).
[224] For the costs, we have used 1€=1,308$ in 1995.

changes in risk factors have importantly contributed to the decline in mortality from circulatory diseases.[225]

The Norsjö project in Västerbotten, (Sweden) is a similar project. It began in 1984 and focused on reducing the serum cholesterol level in the population. The cholesterol level was measured every year between 1985 and 1995 and treated when necessary. This measure resulted in an increase of the average life expectancy more notably in Västerbotten than in other Swedish counties over the last five-year period.[226]

However, the Belgian experience provided less strong results. In Belgium, a prevention programme for cardiovascular disease has been implemented in the years 1970 within the framework of a European study. It is the Belgian Heart Disease Prevention Project. This study concluded that it was possible to influence the incidence of cardiovascular disease by diminishing the risk factors. But, this effect "evaporates" quite rapidly after the efforts of prevention and after 10 years there are no more differences between the "test" and the "control" groups[227].

### 4.2.2 A Heart for Vienna (AT)

In the frame of "A Heart for Vienna" programme held by Vienna Social Fund, the City of Vienna, and the Institute for Social Medicine from the Medical University of Vienna, people on the streets were asked whether they knew heart-related health promoting programmes.

The Viennese population is aware of the preventive factors of nutrition and exercise in relation to cardio-vascular disease. However, the elderly[228] cite exercise less often as a preventive factor, possibly due to their physically limited possibilities for exercise in older age. The elderly use the term "healthy life (style)" more often in the context of preventive measures. The role of smoking is generally underestimated, especially in younger men. The elderly think more of the medical check-up as a preventive strategy than younger people do. Other factors such as depression, social isolation, stress or unhappiness are underestimated. People's self-assessment reflects that Viennese overestimate the quality of their nutrition and exercise and the frequency of check-ups.[229]

The programme is addressed at the general population but has a specific focus on groups at risk such as disadvantaged people, seniors and adopts a gender perspective by designing a specific programme for women. Over 40% of persons, excluding women aged over 60, want more opportunities for exercising in groups. Concerning both themes of exercise and nutrition, women argue for a gender specific offer. Health promotion at the work place is also presented as a reasonable approach.

The areas of intervention are nutrition, exercise, smoking, cholesterol, and blood pressure, losing weight, and attending a yearly preventive medical check-up. In each area, tips for a healthy life style, self applied tests, and important contacts are given.

Folders and posters are available in doctor's offices, pharmacies, health care institutions and centres. Also, some restaurants and bakeries specifically offer "heart-healthy" food.

This is a very popular and well-known active community based approach in a major city. The actors assume that most people can follow the comprehensive steps towards a healthier lifestyle. In addition, a special programme for women exists. Another interesting aspect of this project is the broad involvement of actors within and outside the health sector.

[225] Wilk et al. (2004).
[226] Berleen (2004).
[227] Capet et al. (2001).
[228] In the evaluation," the elderly " is referred to people over 60.
[229] Rafetseder et al. (2004).

# CHAPTER 5:Cancer

## 5.1 Criteria for action

The cost-effectiveness of the screening tests in older people is still under debate and the economic gains are contested[230]. The difficulties in identifying the benefits for older people over 70 are related to their lower participation in screening tests and clinical trials,[231] to the variability of life expectancy at different ages, and to the competing causes of death, which could decrease screening efficacy.

Extending biennial screening to age 75-80 years was estimated to cost € 27.200 to € 70.400 (2002) per life-year gained, compared with stopping screening at age 65. Evidence shows that biennial breast cancer screening after age 65 reduces mortality at reasonable costs for women without significant comorbid conditions.[232] As cancer incidence increases with age, so do other health conditions, reducing the cost-effectiveness of cancer screening programmes, as older women are more likely to die of other life-threatening condition before breast cancer.

Over the age of 70-74, individualised decisions may be more appropriate. Instead of establishing an upper age limit for screening, the decision on screening elderly women should be made based on the health status and life expectancy.[233] These factors can help establish the potential treatment benefits (survival versus quality of life benefits) versus risks of a proposed treatment strategy.

Given the increasing proportion of older women in the population and hence, the increase of chronic disease incidence among them, the need emerges to introduce a more gender-based analysis of the effectiveness of health prevention strategies. Although data indicate that women do not benefit from them as much as men, the health interventions generally target both sexes. [234] This leaves room for further consideration of the differential management of risk factors among men and women

Opinions converge regarding the lower age limit (50 years) and diverge concerning the upper age limit (59, 64, 69 years or beyond) for screening tests. The lack of standardisation of age limits is linked to the uncertainty about the cost-effectiveness of cancer screening tests in older people, mainly after the age of 70. International trials have showed its effectiveness in reducing by 20-40% breast cancer mortality in women over 50[235]. Other studies highlight the effectiveness of mammography particularly in women aged 50-69 years. According to the IARC[236], there is still limited evidence on the effectiveness of mammography in women under 40 and over 69 years.[237] The European Institute for Women's Health indicates the necessity to screen women even over 70, as they are likely to benefit from the treatment. The Department of Health in the UK has extended the upper age limit for breast cancer screening to 70 years, and the over 70 can self-refer for screening every 3 years. This objective was to be applied by all local breast-screening services by 2004. Some 44% increase in women going through a screening for breast cancer has been registered between 2000 and 2003.

There is some statistical evidence that a number of countries have recently experienced stabilisation or a slightly declining trend in mortality from breast cancer. This decline might be attributed to the effects of breast cancer screening. For instance, Jonsson et al. (2003) find that the recent decline in mortality from breast cancer in Sweden has been most marked in those regions that were the first to introduce breast cancer screening[238].

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[230] Østbye et al. (2003).
[231] "Only 35% of women 65+ participated, compared with 51% of women less than 65 years" *in* Holmes et al. (2003).
[232] Mandelblatt et al. (2003).
[233] Lee (2002).
[234] Flanagan et al. (1999).
[235] European Institute of Women's Health (1997).
[236] The International Agency for Research on Cancer.
[237] Tyczynski et al. (2002).
[238] Jonsson et al. (2003).

Many Member States organise breast screening in the aim to detect earlier the tumour and, hence, increase the chances of treating it efficiently. This is for example the case of Belgium, France and Austria.

Furthermore, the Eurobarometer 44.0 (1995) data on cancer prevention possibilities show the importance of raising awareness among the general population about the issue of cancer prevention as in some countries, the percentage of people who thought that cancer could not be prevented reached 61,5 per cent.

Several studies in Sweden and The Netherlands have looked into the effectiveness of a screening programme and concluded that one in three deaths from breast cancer can be prevented if women are screened.[239] Mammography carried out in randomised trials has proven to reduce mortality from breast cancer by 30%. The 1989-1992 follow-up of Finnish women undergoing screening tests for breast cancer has recorded a 24% decrease of related mortality. Conducting breast cancer screening on a yearly or biennial basis in women aged 50 through 69 years may reduce breast cancer mortality by 20% to 30%.[240] The Dutch Ministry estimates that, if we take the best European practices as a standard, Netherlands could lower incidences of disabling illnesses such as lung cancer, for example, by 25 percent and that of coronary heart disease by 15 percent

Also, in France, several studies[241] revealed that the participation rate was significantly higher in areas with a history of screening campaigns. The authors concluded that sensibilisation campaigns had a significant impact on the decision to undertake screening test.

However, mortality rates alone seem insufficient in determining the effectiveness of mammography. Breast cancer mortality in women undergoing a mammography test does not decrease significantly compared to women not exposed to a mammography test. However, when introducing the "time" variable, mortality from breast cancer is reduced by 55%[242] after allowing a delay of minimum 8 years (and even 11 years) in the older women. Only then did the trial show considerable improvement in case-fatality rate of breast cancer[243] [244].

## 5.2 Good practice

### 5.2.1 Breast cancer screening (AT)

Conducted by Vienna's Office for Women's Health, Vienna Social Fund, the Viennese Sickness Fund, and the Viennese Medical Association, the aim was to sensitise the public about breast cancer, to increase the knowledge of women about mammography and the risk factors and to increase the number of women between 50-70 who regularly undergo mammography. Furthermore, this was for the first quality assurance implementation and evaluation of a breast cancer early detection programme. Another aim was to improve networking between hospital and community service as well as improving communication between different professions and with patients. The final goal was to establish the documentation and evaluation of mammography according to EU guidelines.

The target population were women above 50 living in Vienna who rarely to never take advantage of a yearly mammography. They were contacted and invited to a free mammography at their nearest radiological institute. To make the programme as accessible as possible, the invitation already included the appointment and a cheque for the radiologist. No more communication with the insurance company was necessary. A mammography pass reminded the women of the next necessary examination.

[239] Hakama et al. (1997).
[240] U.S. Department of Health and Human Services (1999).
[241] Grignon (2004); Briolais (2000)
[242] With a 95% confidence interval of 16%-76%.
[243] Julian-Reynier et al. (décembre 2002/ janvier 2003).
[244] Miettinen et al. (2002).

In addition awareness campaigns were conducted: information days were organized and folders and posters widely distributed. To make the information as broadly accessible as possible, several translations were made into the most frequently spoken languages in Vienna other then German (Turkish, Bosnian and Serbian-Croatian). A free information hotline was also installed.

The programme was evaluated[245] and substantially improved the take up of mammography in the targeted age groups, especially since the information was available in several languages. Prior to the programme, only every second women between 50 and 70 took up the yearly mammography. The rate of all Viennese women who attend a yearly check up reached 68% after the implementation of the screening programme. This means a 20 % increase in the target age group, with a marked increase in the group of women whose last examination dated to five years back or more. The second most important increase was seen in women whose last examination dated to two years back and among socially isolated women. Some 93% approved of the programme and 2/3 only undertook the mammography because of the personal invitation. The programme aims at high quality standards, networking, communication, documentation and evaluation according do EU-guidelines.

The approach to improve access to mammography for all women (due to folders in several languages) was successful. Furthermore, the main actors were brought together and quality standards discussed and implemented. The project is easily transferable to other regions.

5.2.2 Mammography (BE)

The prevention programme informs women, practitioners and gynaecologists, sets the agreement procedure of the radiologists and the mammography units, a reference community centre for the tracking of the breast cancer as well as provincial coordination centres, and organises a quality assurance process[246].

Organised tracking of cancer could reduce by 1/3 related mortality if it reached a coverage rate of 70% among women aged 50 to 69 and if it respected the frequency of one examination every two years as well as quality criterions[247].

Studies indicated the efficiency of the tracking examination by mammography realized in regular intervals (13-24 months) among women aged 50 to 69. A lot of experts recognized it to be the “key and pertinent examination” that can reduce mortality due to cancer among women of this age. More than 80% of detected breast cancers are curable.

Women are more likely to take the screening test if the call for screening is done via an invitation letter provided the date, the time and the location of the examination are mentioned clearly and the practitioner signs all. It is crucial to follow up on women reluctant to pass the examination.

Women essentially respond to an invitation for screening coming from a practitioner, specialized or not (57%), but also after reception of a mail of follow-up (19%) and last, after the appearance of an anomaly (14%).

Finally, the French Plan Cancer 2003 – 2007 combines lifestyles (e.g. smoking), screening, quality of care and training. This plan also proposes the establishment of a National Cancer Institute to better coordinate all players involved in the fight against cancer[248].

[245] Wimmer-Puchinger et al. (2003).
[246] Ministère de la Communauté française de Belgique (2003).
[247] Ministère de la Communauté française de Belgique (2004).
[248] Mission Interministérielle pour la Lutte contre le Cancer (2003-2007).

# CHAPTER 6:Diabetes

## 6.1 Criteria for action

Diabetes shortens healthy life by several years, affects quality of life and places a burden on curative care. Encouraging sensible nutrition, healthy exercise and the detection of risk groups is expected to contribute to the prevention of diabetes mellitus. Furthermore, early diagnosis and prevention of complications by proper care could bring about a substantial reduction in disabling illnesses.

The Dutch Ministry estimates at 414.000 'official' diabetes patients in 2000 and 65.000 new cases each year. Between 1990 and 2000 diabetes mellitus is among the most rapidly increasing chronic diseases. Diabetes shortens healthy life by several years, affects quality of life and places a burden on curative care. Estimates by the RIVM indicate that a minimum of €160 million could be saved annually on medical costs through better, timely care. The Dutch Ministry notes that people with limited education run twice the risk of diabetes than those with higher education.

Risk factors for type-2 diabetes mellitus (also called old-person's diabetes) include obesity, too little physical exercise and wrong diet. Also, the increase in type-2 diabetes in children and young people is a problem.

When treatment is too little or too late many diabetes patients have to contend with serious complications such as cardiovascular diseases, blindness, abnormalities of the feet (leading to amputation) and kidney disorders.

According to Schwartz and al. (1999), 48% of diabetes prevalence is due to overweight and obesity, in Germany. There is a respective potential of economisation of € 1.517 Million.

By 2050, diabetics are expected to increase by some 42% in developed countries. Diabetes accounts for 2% to 3% of the total health-care budget, leading to believe that any further increase in the prevalence of the disease will incur an additional financial burden[249].

According to the Swedish Council on Technology Advancement in Healthcare (SBU), the direct costs of obesity-related diseases represent 2 per cent of the total cost of health care, around €320 million in 2002. In Europe, they are estimated around 2 to 8 per cent of all medical costs. Although there is less evidence on the indirect costs generated by obesity, it has been estimated that loss of production as a result of sick leave and premature retirement among women in 1988 amounted to €320 million per year, i.e. 10 per cent of the total indirect costs for sick leave and retirement for that year among women. Furthermore, the cost of medication was 77 per cent higher for obese people[250].

The share of older people being obese varies across countries. In the age group 65 and over, it ranges from 6 to 30 per cent for women, and from 5,5 to 18 per cent for men. In the case of Sweden, the share of overweight and obese people is expected to reach 60 per cent in 2030 if the rate of increase of obesity during the 1990s is maintained. In parallel, direct medical costs related to obesity are expected to increase by 120 per cent between 2003 and 2030[251].

Healthy nutrition, more physical exercise, non-smoking and moderate use of alcohol is expected to reduce the risk of diabetes.

A Finnish study by Tuomilehto et al. (2001) was the first study in the world to show that the risk of diabetes can be markedly reduced by lifestyle modification. In this study, 522 middle-aged,

[249] Giorgianni et al. (2000).
[250] National Food Administration (2005).
[251] National Food Administration (2005).

overweight subjects with impaired glucose tolerance were randomly assigned to the intervention (Intensive Counselling Group) and control group (Ordinary Counselling Group).

Each subject of the intervention group received individualized counselling aimed at reducing weight, total intake of fat, and intake of saturated fat and increasing intake of fiber and physical activity. The exercise programme included exercises using gym equipment and physical activity in groups, and the subjects were also instructed to get as much physical exercise as possible in connection with daily chores. The mean duration of the follow-up was 3.2 years. The incidence of new cases of diabetes was in the intervention group 58 % lower than in the ordinary counselling group. The reduction was directly associated with changes in lifestyle. The results indicate that it is possible to prevent diabetes by self-motivated efforts once experts have provided the requisite counselling. The study participants themselves carried out all the measures that produced reductions in diabetes risk. The mean age of the subjects of the study was 55 years.

The lifestyle intervention program used in the Finnish Diabetes Prevention Study was practical and could be implemented in primary health care systems. According to Lindström et al. (2003), the observed difference between the groups indicates that the intervention needs to be individualized and continuing, and performed by skilled professionals in order to be effective. Lifestyle changes do not have to be extreme. Lindström et al conclude that if the population would adopt a lifestyle in line with the official nutrition recommendations, the obesity and diabetes trend could at least be stabilised.

## 6.2 Good practice

### 6.2.1 Programme for the Prevention of Type 2 Diabetes in Finland 2003-2010

The Finnish Diabetes Prevention Study (DPS) was the first study to show that the risk of diabetes can be reduced by lifestyle modifications. Building on the evidence given by the DPS study, a Programme for the Prevention of Type 2 Diabetes in Finland 2003-2010 was started in 2003[252]. The programme comprises of three concurrent strategies:

- *The Population Strategy* is aimed at promoting the health of the entire population by means of nutritional interventions and increased physical activity; this strategy comprises of both society-oriented measures and measures targeting individuals with the important aim of preventing obesity.
- *The High-Risk Strategy* targets individuals at a particularly high risk of developing type 2 diabetes. It provides a systematic model for the screening, education and monitoring of people at risk. People at risk are screened using the Type 2 Diabetes Risk Assessment Form developed by the National Public Health Institute.
- *The Strategy of Early Diagnosis and Management* is directed at persons with newly diagnosed type 2 diabetes. It aims to bring people into systematic treatment and thus prevent the development of complications. This strategy offers practical instructions for intensive lifestyle management.

The programme includes 12 key measures for achieving the intended goals. The implementation of key measures requires wide-ranging cooperation among various players for promoting healthy nutrition and physical activity, as well as the improvement of the preparedness of the Finnish health-care system and restructuring of preventive health care. To get the programme underway, four hospital districts (South Ostrobothnia, Central Finland, Pirkanmaa, North Ostrobothnia) have been appointed as pilot districts for a period of five years, 2003-2007.

[252] Programme for the Prevention of Type 2 Diabetes in Finland 2003-2010
http://www.diabetes.fi/english/prevention/programme/foreword.html

The population-level effects of the programme will be studied in terms of coverage, effectiveness, feasibility, and permanence. The results for the pilot districts will be compared with those for all hospital districts in Finland. By 2010, the prevention of type 2 diabetes and, at the same time, of cardiovascular disease and obesity, should be a planned and evidence-based form of activity for primary and occupational health care, backed by an extensive cooperation network of non-governmental organizations and other players.

In 2003, as part of a Finnish Research Project on Ageing and Well-being, Ikihyvä Päijät-Häme, a large intervention study was also started in the primary health care centres in 14 municipalities, to prevent type 2 diabetes. The intervention is planned for 50-65-year-old persons who have an elevated risk to type 2 diabetes. The intervention is based on the evidence given by earlier studies on the effects of food intake and physical activity. It includes counselling, empowering techniques and measures developed in cognitive therapy. The evaluation study of the intervention is implemented by, e.g., the University of Helsinki, the National Health Institute, and the UKK INSTITUTE for Health Promotion etc.[253].

[253] Finnish Research Project on Ageing and Well-being, http://www.palmenia.helsinki.fi/ikihyva/InEnglish.html

# CHAPTER 7:Mental health

## 7.1 Criteria for action

In the coming decades, the WHO expects depression in industrialised countries to develop into a number one public illness.

Because of the nature of the symptoms and the fact that many older people live alone, mental illness in older people could be largely under detected. Furthermore, mental health problems may be perceived by older people and their families, as well as by professionals, as an inevitable consequence of ageing, and not as a health problem, which requires treatment.

In studies by Heikkinen et al. (1995, 2002), the depressive symptoms of 75-year-old people were compared in three cities in Finland, Sweden and Denmark. The incidence of depression was 33,5 % in Jyväskylä (Finland), but lower in Göteborg (Sweden) and Glostrup (Denmark). Chronic diseases, ill health and loneliness were predictors of depression in a 5-year follow-up[254]. Many elderly people with depressive symptoms share the lack of feeling of security and loss of autonomy.

It has been recommended that preventive programmes (e.g., community-based regular screening of the elderly clients) and screening practices in the primary care settings be developed.[255] The results of Arve et al. (2000) give reason to believe that home-care staff is in a key position to identify depressed subjects. In doing this, they should understand the relationship between depression and the effect of various diseases. The first results in the Member States indicate that preventive home visits are probably a good strategy for the detection of mental health problems of elderly persons.

It is also important to ensure efficient communication between those responsible for health care. The first results in the Member States indicate that preventive home visits are probably a good strategy for the detection of mental health problems of elderly persons.

Older people represent a high-risk group and depression along with dementia is under diagnosed among them, since symptoms are often mistaken for the process of ageing. Mild cognitive impairment converts to dementia in a laps of time of 3 to 4 years. Some of the predictors of these disorders are chronic illness, isolation and dependency. Preventive home visits offer the possibility to reach out to and to detect older people suffering from related psychological and mental disorders. Furthermore, a link can be established between socio-economic factors and mental health. Prevention and early detection of psychological disorders, especially among disadvantaged individuals, could ensure timely and efficient treatment of symptoms, keeping them from worsening – with fewer radical consequences for the individual, the family and society.

Mild cognitive impairment (MCI) has been suggested as a term for a boundary area between normal aging and dementia. In follow-up studies, more than 50 % of MCIs have been converted to dementia in 3-4 years. MCI was found in 5,3 % of a total of 806 persons aged 60-76 years from a population-based random sample living in the city of Kuopio in Eastern Finland. MCI was more prevalent in older and less-educated subjects, but no difference was found between men and women. According to the authors, probable candidates for trials of preventive intervention for dementia can be screened from the elderly population using these diagnostic criteria.[256] According to other assessments, the share of those having mild cognitive impairment is 15-30 percent in those 60 years or over[257].

A Dutch study[258] examined the potential economic impact of the treatment of Alzheimer's disease by estimating its long-term costs under a number of treatment scenarios. The patients were divided in two

[254] Kivelä (1993).
[255] STAKES the National Research and Development Centre for Welfare and Health (2000).
[256] Hänninen et al. (2002).
[257] Viramo et al. (2001).
[258] McDonnel et al. (2001).

groups. One of the groups received a treatment, which slows cognitive decline as measured by the Mini-Mental State Examination, and the other group received standard treatment. The conclusions were that the cost was almost €100.000 under all scenarios and that the savings made in treating Alzheimer's disease will almost certainly be small in comparison with total costs and may well be offset by the cost of the treatment itself.

Studying and learning are regarded as an efficient measure in developing one's cognitive functioning. Elderly persons have in a number of Member States relatively good possibilities of studying.

### 7.2 Good practice

#### 7.2.1 Northern Dementia Services Collaborative[259] (UK)

This project aims at modernising dementia services and improving the quality of care for older people across the North East of England, Yorkshire and North Lincolnshire.

The Dementia Services Collaborative was set up in 2003 and has so far made 200 changes to the way that patients with dementia are detected and treated. It covers four strategic health authorities with 29 teams made up of professionals from frontline National Health Service (NHS) services, primary care and social services, charities as well as carers and older people.

Experiences of service users, carers and frontline staff are all used to identify areas for improvement and to test and monitor small changes, which if successful, are rolled out to other areas.

The first step for the teams was to map out the patient journey for a person with dementia in their areas – a powerful way of understanding the real problems within a service. They then designed a model for improvement to develop, test and implement changes, such as providing more education and training for those involved in looking after dementia patients.

The project wants also to raise awareness and early diagnosis. The project elaborated a leaflet for employers showing them what to look for and where to find help. It has been very well received and it's hoped that the Alzheimer's Society will consider using it for their service users.

Another leaflet 'This is me' gives the opportunity to patients and carers to write information about the patient's life, and likes and dislikes so that new carers know what the patient is interested in. The project has also helped find a weekly day club in the area where carers and patients meet socially and occasionally go on day trips.

Dementia services did exist but very little effort was being made to modernise them or make sure that patients were getting early enough diagnosis.

The project promoted discussions with GPs and nurses in GP practices to make sure that they know how to recognise the early signs of dementia. The organisers consider that it can be difficult because GPs may only see two to three new people with dementia a year, although a GP may have 15 people with dementia on their practice list.

The project promoters consider that early diagnosis is vital for the patient so they can access services and it helps families plan for the future and prevents future crises. However, early detection is only part of the project. Improving communication was also important so that everyone who supports dementia patients – professionals and families – works together and is given good quality information.

[259] Philp (2004).

7.2.2 SIMA: Conditions of preservation and promotion of autonomy in older age[260] (DE)

The Institute for Psychogerontology of the Friedrich-Alexander-University Erlangen-Nürnberg carried out the programme and it was funded by the Ministry of Family, Seniors, Women and Youth. It aims at increasing the competence, memory and psychomotoric capacities of older people and thus decreases or prevents dementia and depression. The training program was established in 1991 as a study.

Special memory, exercise and competency trainings were designed and the effectiveness alone or in combination was reviewed on a sample of elderly during several years (375 participants at the beginning between the age of 75 and 93).

The memory training was developed according to typical everyday life problems. Basic function and memory strategies were practiced to improve daily life situations. The psycho-motor training aimed to enhance the coordination and safety of movements. In the competency training, the problems of ageing were discussed first. Then respective new strategies were presented and trained in order to encounter and solve these problems better.

From the evaluation of 340 participants following results emerged:

- The study population showed a much higher cognitive status than the control group with either memory training or even more with combined memory and psycho-motor training.
- Further long lasting decreases in depressive symptoms and dementia were also seen with the combined training.
- Concerning autonomy, lasting improvement was noted in the psychomotoric and memory training group as well as in the competence and pychomotoric group.
- Single training modules showed no long-term effects.
- After 4 years the specific combination of memory and psychomotoric training had by far the best and long-lasting results concerning capacity, health, autonomy and psychopathology.
- The participants will all be followed until they (possibly) become in need of care and until the end of their life.

The combination of memory training and exercise seems to be a guarantee for healthy and satisfied ageing and further assures sustainability. In addition, the focus on secondary prevention and health promotion in rehabilitation is interesting. Transferability is assured due to the highly professional documentation and evaluation. Also long-term follow-up is performed. It is one of the first studies in the area of health prevention and promotion for the elderly and is quite known in Austria and in Germany. Elements of the cognitive training have been used in and transferred to several projects and settings in both countries.

7.2.3 Other

The German "Dementia programme" [261], aims at educating and informing the population about local help and support. Further it is noted that women are more likely to suffer from chronic disease, multi-morbidity and disability than men, due to their longer life expectancy and therefore over-representation in the very old age group. Preventive measures have therefore been designed towards women and their specific diseases and needs.

The German Green Cross Society runs a similar project in Germany named "Ageing in dignity". It focuses on Alzheimer disease. The goals are a broad education, awareness and lobbying campaign about Alzheimer disease and dementia. From 25th to 30th of October of 2004, there was a nationwide promotion week. Apart from that a special Alzheimer disease information bus has been touring through Germany since May 2004. Information about the disease and accompanying conduct

[260] http://www.sima-training.de
[261] Federal Ministry for Family, Seniors, Women and Youth, p.27-29.

disorders, about treatment and relief programmes for relatives, about tips for interaction, and of course about early detection is offered. Due to the importance of the theme, doctors and pharmacists are also targeted.

A course helps combat depression in the Netherlands. The course, 'In the Doldrums, Out of the Doldrums' is a structured intervention based on behavioural therapy, geared towards the approach to depression. The aim of the course is to teach skills to break through the negative spiral of depressive symptoms and thereby avoid any worsening of these symptoms. This takes place by means of relaxation exercises, cognitive skills (recognising and breaking through negative ways of thinking) and social skills. Studies show that the depressive symptoms of the subjects diminished faster and more fully than people in a control group. There are numerous variants of the course: for people aged 55 and older, for people with chronic physical illnesses, for young people, young adults and for Turkish and Moroccan immigrants. The course for adults and those 55 years or older is currently being introduced in more than 90 percent of the AHA regions in the prevention departments of the Area Health Authority agencies. The course's low threshold approach will also reach people who are not (yet) seeking help for their depressive symptoms.

# CHAPTER 8:Falls and osteoporosis

## 8.1 Criteria for action

Because of osteoporosis, falls can result in serious health and psychological complications among elderly people, and affecting their quality of life. Activity limitation, dependency, isolation, depression and lack of security and confidence among older individuals may be caused by a fall as insignificant as it may be. Osteoporosis and fractures are an important cause of health care consumption. Although persons 85 years and over represent a small proportion of the population, they represent one third of the hospitalisations for hip fractures.[262]

As data indicates, very elderly people aged over 80 are at the highest risk of hip fracture and the number of hip fractures are expected to increase considerably by 2050. Targeted falls prevention, notably at very old individuals, is likely to reduce health, psychological and social costs.

A comprehensive programme on falls prevention including exercise, both physical and cognitive, and risk assessment interventions are more likely to reduce fall rates than simple education programmes on falls risk factors targeted at older people. The benefits of physical activity are known to benefit other health areas as well. The prevention programme should be implemented both at community level and at institutional level. Polypharmacy is also of great concern in the occurrence of falls. There is a need for regular medical reviews and for alternative strategies for cognitively impaired persons.

First, education and health promotion seem to have a role to play. Specific education programmes targeting older people can be used to favour their awareness on risk factors and behaviours and to give them advice on how to prevent or to manage a fall. It is also important for health care workers to be trained about this issue. Although education programs targeting older people are commonly used in falls prevention programs, and although changes have been reported in knowledge of falls risk factors, there is limited evidence of the effect of these interventions on reducing falls rates. Programs incorporating cognitive-behavioural approaches may have greater likelihood of achieving this goal. Preliminary evidence of the effectiveness of training general practitioners to convey health promotion messages indicates that this approach may be successful in achieving behavioural change in older people[263].

There is strong evidence that exercise incorporating some degree of balance training is effective in reducing falls rates among community dwelling older people. Both group and customised home exercise programs have been shown to reduce falls rates[264].

Another important issue in avoiding falls is the safety of the environment. This especially relates to a safe home installation but it also includes the removing of public falls hazards.

According to a review published in the *Nursing Research* Journal,[265] on the effectiveness of fall prevention programmes for the elderly, exercise interventions alone are not effective in preventing falls in adults aged 60 years or over. Exercise and risk modification seems more efficient, while comprehensive risk assessment intervention studies achieve even better results. A multifactorial fall prevention programme[266] should then be more effective [267] and even cost-effective. Intervention cost per participant varied from €470 to €1.077 (combination of medication adjustment, behavioural recommendations, and exercises). The mean intervention cost per fall saved varied between €1.418 and €1.558.

[262] Laet et al. (1996).
[263] Idem.
[264] Idem.
[265] Hill-Westmoreland et al. (2002).
[266] Rizzo et al. (1996).
[267] Gardner et al. (2000).

According to WHO, based on evidence from Australia and New Zealand, the cost per fall prevented by home-based exercise ranged from €80 to €880, and to about €2.700 as a result of modification of the home environment. Costs for injury reduction by home-based exercise amounted to €208 up to €3.654 and home modification costs were of €9.500 per injury prevented.[268]

However, other studies[269, 270, 271, 272, 273] claim that simple exercise programmes are cost-effective. Furthermore, exercises' benefits for older people's health are wide and do not only permit to avoid falls but also to decrease fear of falling, improve functional reserve by increasing strength, and improve other important health areas as varied as cardiovascular health, sleep, depression, and mortality[274].

Concerning the effect size according to study setting, it can be derived from the different evaluations carried out[275] that community-based fall prevention programmes are more effective than institutional-based programmes. This essentially is due to the fact that individuals residing in the community tend to be less frail than those residing in institutions.

Furthermore, fall prevention interventions seem to be more effective when the outcome is measured for the long-term effect (more than 12 months) and when the studies are more tightly controlled (randomised experiments rather than quasi-experiments).

In Sweden, costs of care and rehabilitation for municipalities and county council during a patient's first year after suffering a femoral fracture, were estimated at €18.600 in current prices. Linköping municipality has implemented measures to prevent fall accidents and was the first municipality in Sweden to be designated *a safe and secure community* by the national injury programme and WHO. [276] If, using the injury prevention initiative in Lindköping as a working example, femoral fractures might drop by 6 per cent for the country as a whole (from about 19.000 to 17.900), representing a saving of nearly € 22,31 million in one year. One study indicated a reduction in femoral fractures by 6,6 per cent per year for women and 5,4 per cent for men in Linköping during 1987–1992.

In Tidaholm municipality, the incidence of hip fracture among pensioners has dropped by 50 per cent between 2000-2002, largely attributable to information campaigns targeting older people on how to prevent fall accidents. The drop in accidents has saved an estimated €500.000 in medical care costs.

In Denmark, a two-year programme targeting 23.000 elderly people resulted in a 46% reduction of fractures. The reductions were higher after 9 months of intervention, implying the benefits of a long-term approach[277].

There is some evidence about the unmet needs regarding falls among elderly people, presenting a challenge for policy makers. First, only 41% of older people surveyed had any contact with health services after experiencing a fall or nearly falling. Under-utilisation of healthcare professionals poses a major problem, although referral to a comprehensive specialist falls clinic has proven to reduce falls incidence by 50%.[278] Second, as much as raising awareness of the target population regarding the risk of falling is important, it appears that health specialists themselves need further education about the management of osteoporosis. One third of women and one in 12 men aged over 50 are affected by

[268] WHO (2003).
[269] Close et al. (1999).
[270] Gardner et al. (2000).
[271] Robertson et al. (2001).
[272] Idem.
[273] Robertson et al. (2001), 'Economic evaluation of a community based exrecise programme to prevent falls'.
[274] Gardner et al. (2000).
[275] Hill-Westmoreland. (2002).
[276] Berleen (2004).
[277] Bennett (2003).
[278] Department of Health UK, standard 6 (falls), http://www.dh.gov.uk/Home/fs/en

osteoporosis, but only 2% report taking related drugs after attending their GP or being admitted to hospital.

As mentioned earlier, beyond the physiological effect of falling, psychological side effects can be very damaging to the person's well-being and quality of life too. The fear of falling can lead to social isolation and activity restriction, as older men were 23% to declare being a little afraid to fall whereas they were 41% of women to declare it. Consequently, 46% of men and 40% of women reported restricting their activity as a result of fear of falling[279].

In a Finnish study[280], the effects of a 4-week individualized visual feedback-based balance training on the incidence of falls were investigated, with frail elderly women living in residential care and using a 1-year follow-up. Possible changes in the fear of falling and in physical activity were examined. The members of the exercise group attended a 20 to 30 minutes long individualized specific balance exercise sessions 3 times a week for 4 weeks. A clear positive effect of balance training on fall incidence was found. In addition, the exercise group reported a reduced fear of falling and increased physical activity after a training period; these changes declined, however, during the follow-up period. High compliance (97,5 %) with the training period showed that carefully targeted training programs can be carried out among older people with health limitations[281].

It is interesting to summarise here the conclusions of the Accidental Injury Task Force's Working Group on Older People, in the UK.

The Accidental Injury Task Force's Working Group considers that a strategic approach to falls and fracture prevention ought to include three stages:

- Identification of at-risk groups of older people
- Detailed assessment of older people to identify whether they are at increased risk of falling
- Facilitate intervention to address the risk factors identified.

Furthermore, policy has to take into account the fact that risk factors related to falling may result from intrinsic factors and/or extrinsic factors. The importance of each risk factor depends upon age. For example, very old people are more prone to intrinsic factors.

Intrinsic factors include both personal physical and mental condition (balance, visual impairment, etc.). Extrinsic factors include notably the physical and social environment (stairs, slippery floors, lighting, isolation, etc.).

A relevant policy here might require a wider range of tools including accessibility of physical environment and public transport, the abolition of architectural barriers and the design of homes for elderly people. Falls occur often in the home or in public buildings[282].

What precedes mean that policy ought to favour a mix of personalised and community approaches. For example the UK approach considers that a community strategy to prevent falls should include notably:

- Ensuring that pavements are kept clear and there is adequate street lighting
- Providing information (e.g. leaflet *Avoiding Slips, Trips and Broken Hips*)
- Making property safer.

[279] Stoddart et al. (2002).
[280] University of Jyväskylä
[281] Sihvonen et al. (2004).
[282] Accidental Injury Task Force's Working Group on Older People (2001).

## 8.2 Good practice

8.2.1 Northampton Healthy Communities Collaborative Project[283] (UK)

This is one of the three pilot schemes across England aimed at getting older people more involved in preventing falls. The project, covering five localities, was set up by several stakeholders including Northampton Borough Council, Northampton PCT and Age Concern.

The five teams were asked to draw up plans on how to reduce falls by 30%, based on accident and emergency admissions and ambulance service figures. The first results indicate that the project has reduced falls by 31%.

One of our first initiatives was sourcing rechargeable smoke alarms. Organising a falls awareness session, which attracted 75 people, was also included.

A medicine management team talked about medication, a reflexologist gave practical demonstrations, a community podiatrist talked about looking after feet, a Mr Motivator did a session on armchair exercises for balance, and health professionals talked about diabetes and nutrition.

Other work undertaken by the team includes establishing exercise classes once a week in two locations, and designing a course on falls prevention for carers in residential homes.

The project treated a big array of issues connected with falls. The aim is to attract those who have suffered a fall or have lost confidence in movement. Simple dances are taught in an effort to encourage confidence and greater mobility.

Other initiatives specifically targeted South Asian and Afro-Caribbean communities. A retired teacher also talked to schoolchildren about how falls can affect older people, and shops and civic premises were assessed for safety and accessibility. A 'sloppy slippers' day was also held at the town's shoe museum.

The National Service Framework for Older People (NSF) notes that services must be designed to ensure that the impact, as well as the number, of falls is reduced. It promotes a sustained effort to establish fully integrated services with a strong emphasis on the prevention and treatment of osteoporotic fracture. Councils, together with the local NHS and the voluntary sector are developing and implementing plans for healthy communities. A national programme led by the Primary Care Development Team has shown the value of engaging whole communities in this effort, helping to reduce falls and their consequences by increasing opportunities for exercise and balance activities, such as dancing and Tai Chi, removing environmental hazards, improving footwear (including "sloppy" slippers), and improving medicines management.

The Post Acute Care Team (PACT) of the Leicester Royal Infirmary (UK) aims at reducing the length of stay after hospitalisation due to a fracture of the neck of femur, while ensuring they receive support for about 15 days after discharge. The objective is to reduce time spent under care while making sure they are safe and independent. This is achieved through intensive physiotherapy at the hospital and a full assessment of daily activities so that the patient can rehabilitate at home. The initiative resulted in the transfer of half the patients to their homes. The average inpatient days was 8,2 days and the average length of time under home care of the hospital was 13 days, a total saving of 680 days. The approach is successful and patients themselves are satisfied to regain their social environment[284].

[283] Philp (2004).
[284] Department of Health UK, standard 6 (falls), http://www.dh.gov.uk/Home/fs/en

### 8.2.2 Walking safely above 60[285] (AT)

This is an initiative to prevent accidents among the elderly aged 60 years and above. The Institute for Safe Living and the City of Vienna (being part of the WHO Healthy Cities and the EU-Mégapoles project) are cooperating in this project. The goal is to reduce falls accidents and therefore femoral neck fractures. As the evaluation[286] shows, this goal was fulfilled in Vienna compared to other regions (5% reduction).

The strategy adopted includes information material, a checklist "how healthy is my apartment", magazines and videotapes. Furthermore, afternoons for seniors to inform them on preventing risks of falling are organized. Training for social workers and health professionals is also offered.

A first research project about falls in elderly people in Vienna was carried out. There is an improvement in the level of understanding of dangers and ways to prevent these among organizations dealing with old people and a change in outlook among the very old. Viennese senior citizens that are hospitalised after accidents in their own homes or during leisure and sports activities develop more favourably (concerning length of stay, frequency, severity) than senior citizens in the rest of Austria. Throughout Austria in-patient admissions following accidents have risen, in Vienna. However, the increase has been significantly smaller. In addition there is a decrease in the share of patients with home and leisure time accidents compared to all patients hospitalised. With regard to length of stay, there is also a more favourable trend in Vienna, meaning that average hospital stay is shorter than in other areas of Austria. Since hospital days are the most significant cost-factor in the Austrian Health Services, this campaign not only reduces pain but also cuts down on real costs.

### 8.2.3 Other programmes

In Finland, in the 1990's a campaign for the prevention of home accidents was started and in 1999 the emphasis was on the prevention of accidents of elderly people. A guide for professionals of social and health care was prepared concerning prevention of fall accidents among elderly persons[287]. The factors increasing the probability of falls were divided into internal factors and risk factors of living environments. Prevention of fall injuries includes both measures preventing osteoporosis (i.e., physical exercise, nutrition, etc.), training programs aimed at decreasing the incidence of falls (e.g., muscle strength and balance training) and measures aimed at creating safe environments (e.g., non-slippery surfaces, good lighting, handrails). Safe environment for older people has been the aim of a certain number of Finnish projects[288]. These projects include a number of recommendations concerning the city planning, i.e., lighting, proper cleaning of streets, number of benches, safety problems in pedestrian walks, steps, etc.

In France, in 1995 and 1996, a campaign targeting the elderly and called "Faire attention chez soi, c'est faire attention à soi" was implemented. The principal objective was to induce behavioural change in the population by giving them means to identify risks, anticipate danger and avoid the accident. In 1999, it focussed on preventing falls among the French elderly people: "Aménagez votre maison pour éviter les chutes"[289].

[285] City of Vienna, http://www.wien.gv.at/who/senioren.htm
[286] Buresch, Die Initiative Sicher gehen über 60.
[287] Ikäihmisten kaatumistapaturmat ja niiden ehkäisy. Opas sosiaali- ja terveydenhuollon ammattilaisille. Päivitetty painos, toukokuu 2003.
[288] Tampereen kaupunki ja eläkeläisneuvosto (2004).
[289] Institut National de Prévention et d'Education pour la Santé (2000).

## SUMMARY AND CONCLUSIONS

The principle of active ageing has been recognised in several countries and ad hoc programmes have been implemented (e.g. Austria, Germany, Finland, Sweden) to promote the empowerment process of older people. The approach of active ageing covers health promotion, personal commitment and social activities. Generally, these initiatives combine community interventions and personalised actions.

One of the interesting aspects of these projects are their capacity to highlight the vulnerability of some groups of older people who are more at risk of social exclusion. Consequently, a special attention is given to reach isolated ones. The individual approach, through home visits, seems promising in coming up with specific strategies adapted to the individual needs of elderly individuals. These groups see the family doctor very frequently but rarely see a specialist. The physician may thus play an important role in prevention and healthy ageing.

There is some evidence according to which preventive home visits may reduce or postpone referral to long-term or permanent institutional care, among those under 75 years. Also mortality was slightly decreased by these visits. The nurses may play an important role here. Home visits carried out in Nordmaling (SE) are the most well documented example in terms of cost-effectiveness of health promotion. The proportion of persons included in the test group who considered themselves to be always or frequently in pain decreased during the course of the project. In addition, the number of people frequently experiencing anxiety decreased significantly and the self-reported health status also improved for both men and women.

One of the interesting aspects of home-visits is their capacity to highlight the vulnerability of some groups of older people who are more at risk of social exclusion. Home visits have been supplemented in certain cases by contact centres. They pick up signals at district level about isolated elderly people from social workers, local residents, and organisations.

Several countries, e.g. Sweden, Austria, Finland, Germany and the United Kingdom have adopted the concept of independent living and integrated it in specific programmes. The idea is to delay the onset of disease and the referral to care services. Loss of autonomy is costly in terms of additional assistance for at home or admission to a nursing home. The postponement and prevention of dependency might have considerable impact on health care and long-term care costs, and entering a nursing home is the most costly option for dependent people. Furthermore, socialising activities play an important role for successful ageing and ought be a component of health promotion programmes.

An Austrian project addresses elderly people, including immigrants. Along with street and social workers, it identifies the needs, resources and potentials to live an autonomous self-dependent life. The project revealed that the quality of life and social contacts depend considerably on the district in which a person lives. Participation in health promoting activities is correlated with costs, and considered as time and energy consuming. Visits to the doctor were the most frequent "social" service used.

The geriatrics and gerontology centre Albertinen-Haus in Hamburg (DE) initiated a practice on “preventive health counselling for successful ageing” through the training and assignment of nursing staff for health promotion and measures in the setting of preventive home visits for older people still living independently. The programme was estimated to be a model of good practice for the entire State. The project has been evaluated and the results show that the health counselling resulted in a change of life style and attitude, all participants integrated at least one recommendation of the health counsellors into their everyday life, and 63% report that they made lasting changes in both areas: nutrition and exercise.

Preserving the cognitive capacity of elderly people is an essential component to ensure that they enjoy an independent and active life. The combination of memory training and exercise seems to be a

guarantee for healthy and satisfactory ageing. In the frame of the SIMA-P research project "Rehabilitation in nursing homes" carried out in Germany demonstrated that rehabilitative measures work also for cognitively and functionally disabled people. In the long run, the inhabitants kept their autonomy longer and some could even improve their status concerning autonomy. Further, the mobility increased, whereas the injuries from falling decreased. Elements of the cognitive training have been used in and transferred to several projects and settings in Germany and Austria.

An important share (20%) of all disabling illnesses is attributable to unhealthy lifestyles and hence theoretically avoidable. Unhealthy dietary habits and physical inactivity pose major public health problems, to which some countries have responded by launching various programmes targeting changes in lifestyle, either aimed at the general population or at the elderly more specifically.

The Dutch Ministry considers that traditional forms of promoting good health, such as public information via the mass media, no longer seem to work sufficiently in promoting healthy lifestyles. It states that, lifestyle intervention works much better when it reaches people, from within the immediate social environment – the so-called settings, notably at home and in the neighbourhoods.

Health promotion interventions, targeted at social groups with the highest prevalence of risk factors, might have a great potential impact in reducing socio-economic inequalities in health. As noted above, economically disadvantaged groups might benefit less from health promotion than advantaged groups, consequently individual interventions should be accompanied by complementary measures linked to poverty. However, targeted programmes risk stigmatising the target group, and this ought to be taken into account during the design process.

It has been estimated that smoking is the principal cause of evitable mortality and non-smokers live on average 7 years more than smokers.

In the UK, "in 2000 - 2001, 12.900 of people aged 60 and over who had attended NHS Stop Smoking Services and set a quit date, had successfully quit smoking at the four weeks follow up stage. Another study finds that, using a single general practitioner visit backed up by a practice nurse, reduced smoking in 14% of the smokers six months after the intervention period.

Physical inactivity increases with age and particularly among individuals aged over 65. Public interventions to promote physical activity among older people have proven to be effective in reducing premature deaths and to be cost-effective in terms of additional years lived in good health. Several surveys indicate that exercise is beneficial for people over 65 and there are health benefits to be derived even when starting to exercise late in life, whilst it is harmful to stop exercising.

Certain studies have estimated the cost-effectiveness of physical activity for people aged 65 and over. They concluded that publicly funded program of moderate exercise for elderly people would prevent premature death, reduce inpatient episodes and are cost-effective.

Assessment of the cost-effectiveness of a community based exercise programme for older adults indicates that, despite a low level of adherence to the exercise programme, there were significant gains in health related quality of life. The programme was more cost-effective than many existing medical interventions.

Several studies find that physical activity has a strong, independent, and inverse association with cardio-vascular disease risk in both genders. All obesity indicators had a significant direct association with CVD risk after adjustment for age, smoking, education and physical activity.

Another study on pensioners aged 61 to 81 years old, who took part in an organised programme of regular walks, established that regular low-intensity physical activity in pensioners led to significantly lower mortality. The study showed that this reduced mortality concerned both cardio-vascular disease and cancer.

Better nutrition is recommended for all, but particularly in older individuals at increasing risk of developing diseases. In Norway the cost-effectiveness of a population-based promotion campaign of healthier eating habits was compared with dietary and medical treatment of individuals. The cost per life year gained was significant. In the Netherlands, if saturated fat and vegetables and fruit were consumed according to the international nutrition guidelines, the number of cases of cancer would fall significantly. The HALE project highlighted that individuals aged 70 to 90 years, who adhere to Mediterranean diet, to moderate alcohol consumption, and who abstain from smoking and are physically active have a 50% lower rate of all-cause and cause-specific mortality.

People from lower socio-economic groups face relatively higher mortality rates, morbidity and activity limitations than those from a higher socio-economic status. Important behavioural risk factors, clustered in lower socio-economic groups include smoking, physical inactivity, excess alcohol consumption, obesity, hypertension and poor diet. Several countries have noted the need to complement national strategies by specific actions aiming at reducing health related inequalities. Such policies are proposed notably in the UK, France, Netherlands and Sweden.

Several national projects aim at promoting regular physical activity and independence. Others aim to activate people to physical activity and to form active social networks.

Cardiovascular diseases are the leading cause of burden of disease in Europe and the main factor for years of life lost due to premature death. At population level, the interventions to prevent stroke are broadly the same as those for coronary heart disease - increasing levels of physical activity, encouraging healthy eating (particularly reducing salt intake and increasing fruit and vegetable consumption), and supporting smoking cessation as well as identifying and managing high blood pressure.

Effective health prevention here requires changes in certain lifestyles. However, lifestyle changes might also be beneficial to other for prevention of other non-communicable diseases. This is the main argument for an integrated approach of health promotion by WHO. Some argue that lifestyles and their changes are community factors and interventions in sub-settings (home, etc) only are not sufficient. Health promotion requires a set of different strategies involving the whole community. A community-based approach is proposed.

Certain studies conclude that the community approach to CVD prevention has a high degree of replication, cost effectiveness due to the use of mass communication methods, and ability to diffuse information successfully through use of mass communication methods.

Studies indicate that secondary prevention for CHD should particularly target older people, providing them with advice and counselling on risk factor control and medication.

The favourable trend in mortality from circulatory diseases in Finland is a success story. The Finnish North Karelia project assumed that the provision of measures to reduce the risk of high-risk people in the health service institutions might have a limited impact. On the contrary, general risk reduction measures and healthy lifestyles might have a huge public health impact. The experiment had a significant success in reducing risk factors and CHD mortality. A decline has taken place in smoking and major changes on dietary habits. As a result serum cholesterol and blood pressure levels had markedly reduced. The ensuing significant reduction in CHD mortality could be explained by changes of the main risk factors, notably dietary changes.

However, the Belgian experience provided less strong results. The Belgian Heart Disease Prevention Project concluded that it was possible to influence the incidence of cardiovascular disease by diminishing the risk factors, but, this effect “evaporates” itself quite rapidly after the efforts of prevention and after 10 years there are no more differences between the “test” and the “control” groups (IPH/EPI).

The cost-effectiveness of the screening tests in older people is still under debate. However, some evidence shows that biennial breast cancer screening after age 65 reduces mortality at reasonable costs for women without significant comorbid conditions. As cancer incidence increases with age, so do other health conditions, reducing the cost-effectiveness of cancer screening programmes, as older women are more likely to die of other life-threatening condition before breast cancer. Over the age of 70-74, individualised decisions may be more appropriate. Opinions converge regarding the lower age limit (50 years).

There is some statistical evidence that a number of countries have recently experienced stabilisation or a slightly declining trend in mortality from breast cancer. This decline might be attributed to the effects of breast cancer screening. For instance, several studies (France and Sweden) find that the recent decline in mortality from breast cancer and participation in screening programmes was most marked in those regions that had a history of breast cancer screening.

Several studies in Sweden and The Netherlands have looked into the effectiveness of a screening programme and concluded that one in three deaths from breast cancer can be prevented if women are screened. Mammography carried out in randomised trials has proven to reduce mortality from breast cancer by 30%.

However, mortality rates alone seem insufficient in determining the effectiveness of mammography. Breast cancer mortality in women undergoing a mammography test does not decrease significantly compared to women not exposed to a mammography test. However, when introducing the "time" variable, mortality from breast cancer is reduced by 55% after allowing a delay of minimum 8 years (and even 11 years) in the older women.

Diabetes shortens healthy life by several years, affects quality of life and places a burden on curative care. Encouraging sensible nutrition, healthy exercise and the detection of risk groups is expected to contribute to the prevention of diabetes mellitus. Furthermore, early diagnosis and prevention of complications by proper care could bring about a substantial reduction in disabling illnesses. The Dutch Ministry notes that people with limited education run twice the risk of diabetes than those with higher education.

By 2050, diabetics are expected to increase by some 42% in developed countries. Diabetes accounts for 2% to 3% of the total health-care budget. The share of older people being obese varies across countries. Healthy nutrition, more physical exercise, non-smoking and moderate use of alcohol is expected to reduce the risk of diabetes.

A Finnish study showed that the risk of diabetes can be markedly reduced by lifestyle modification. Each subject of the intervention group received individualized counselling aimed at reducing weight, total intake of fat, and intake of saturated fat and increasing intake of fibber and physical activity. The exercise programme included exercises using gym equipment and physical activity in groups, and the subjects were also instructed to get as much physical exercise as possible in connection with daily chores. The incidence of new cases of diabetes was in the intervention group 58 % lower than in the ordinary counselling group. The mean age of the subjects of the study was 55 years. The lifestyle intervention program used in the Finnish Diabetes Prevention Study was practical and could be implemented in primary health care systems. The intervention needs to be individualized and continuing, and performed by skilled professionals in order to be effective. Lifestyle changes do not have to be extreme.

In the coming decades, the WHO expects depression in industrialised countries to develop into a number one public illness. Because of the nature of the symptoms and the fact that many older people live alone, mental illness in older people could be largely under detected.

Home-care staff is in a key position to identify depressed subjects. The first results in the Member States indicate that preventive home visits are probably a good strategy for the detection of mental health problems of elderly persons. Furthermore, a link can be established between socio-economic factors and mental health. Prevention and early detection of psychological disorders, especially among disadvantaged individuals, could ensure timely and efficient treatment of symptoms, keeping them from worsening – with fewer radical consequences for the individual, the family and society.

The Institute for Psychogerontology of the Friedrich-Alexander-University in Germany carried it out a programme aiming at increasing the competence, memory and psychomotoric capacities of older people and thus decreases or prevents dementia and depression. The study population showed a much higher cognitive status than the control group with either memory training or even more with combined memory and psychomotor training. Further, long lasting decreases in depressive symptoms and dementia were also seen with the combined training. Concerning autonomy, lasting improvement was noted in the psychomotor and memory training group as well as in the competence and psychomotor group. After 4 years the specific combination of memory and psychomotor training had by far the best and long-lasting results concerning capacity, health, autonomy and psychopathology.

Because of osteoporosis, falls can result in serious health and psychological complications among elderly people, and affecting their quality of life. Activity limitation, dependency, isolation, depression and lack of security and confidence among older individuals may be caused by a fall as insignificant as it may be. Targeted falls prevention, notably at very old individuals, is likely to reduce health, psychological and social costs.

A comprehensive programme on falls prevention including exercise, both physical and cognitive, and risk assessment interventions are more likely to reduce fall rates than simple education programmes on falls risk factors targeted at older people. The benefits of physical activity are known to benefit other health areas as well. The prevention programme should be implemented at community level and in institutions.

Education and health promotion seem to have a role to play. Specific education programmes targeting older people can be used to favour their awareness on risk factors and behaviours and to give them advice on how to prevent or to manage a fall. Preliminary evidence of the effectiveness of training general practitioners to convey health promotion messages indicates that this approach may be successful in achieving behavioural change in older people.

There is strong evidence that exercise incorporating some degree of balance training is effective in reducing falls rates among community dwelling older people. Both group and customised home exercise programs have been shown to reduce falls rates.

Certain argue that exercise interventions alone are not effective in preventing falls in adults aged 60 years or over. Exercise and risk modification seems more efficient, while comprehensive risk assessment intervention studies achieve even better results. A multifactorial fall prevention programme should then be more effective and even cost-effective.

In Tidaholm municipality, the incidence of hip fracture among pensioners has dropped by 50 per cent between 2000-2002, largely attributable to information campaigns targeting older people on how to prevent fall accidents. In Denmark, a two-year programme targeting 23.000 elderly people resulted in a 46% reduction of fractures. The reductions were higher after 9 months of intervention, implying the benefits of a long-term approach.

In a Finnish study, possible changes in the fear of falling and in physical activity were examined. The members of the exercise group attended individualized specific balance exercise sessions. A clear positive effect of balance training on fall incidence was found. In addition, the exercise group reported a reduced fear of falling and increased physical activity after a training period; these changes declined, however, during the follow-up period.

A relevant policy here might require a wider range of tools including accessibility of physical environment and public transport, the abolition of architectural barriers and the design of homes for elderly people. Falls occur often in the home or in public buildings.

## GENERAL CONCLUSIONS

The ageing of the population generates an increasing gap between active people in the labour market and elderly people. This raises the question of the financial sustainability of social security systems. Health costs related to elderly people constitute an important share of total health care expenditures. Consequently, savings on health care costs could help reduce future strains on public budgets. Cardiovascular diseases and cancers appear to be the main killers of elderly people. Mental health constitutes also an important share of the total burden of disease. This requires monitoring the health of elderly people in order to better design future programmes. Non-communicable diseases are essentially diseases of later life and many are preventable or can be postponed.

Lifestyles seem to play an important role in preventing disease and ensuring an active ageing. Unhealthy lifestyles (lack of physical activity, nutrition, smoking, etc.) are responsible for a significant part of morbidity, mortality and consequently health costs. Furthermore, they appear to be associated with economic disadvantage even among elderly people.

The socio-economic status either directly or through lifestyles influences in a significant way life expectancy, morbidity and mortality. Income, previous occupational status, education and social capital generate health inequalities among elderly people, which do not decrease over time. On the contrary, in several countries health inequalities linked to socio-economic conditions are increasing, despite a general improvement of public health. This means that our general health policies ought to focus or be complemented with specific actions in favour of disadvantaged elderly people.

The expected increase of care dependent elderly people might be less than initially thought. Both medical and socio-economic approaches indicate that the prevalence of people with activity limitations is expected to decrease. However, this is not an automatic effect and pressures in the labour market might increase further the number of older workers with activity limitations. This requires the development of new services to meet needs for assistance concerning activities of daily living.

The increasing number of dependent people is expected to put some pressure on informal carers, which might affect adversely their participation in the labour market. Policies aiming to increase the labour participation, notably for persons aged 50 to 64 ought to be accompanied with policies favouring the development of formal help. Also, they ought to take into account the needs of elderly carers, as the mean age of carers is increasing with the ageing process. The needs of elderly carers are not currently taken into account, as most policies focus on activity rates.

Projections concerning health expenditures reveal the importance of factors like income growth, life expectancy, care, etc. and agree that the best way to contain future increases of health care costs is through healthy ageing. If additional years of life are years in good health, public budgets ought to be alleviated.

Furthermore, health care costs ought not increase as much as initially thought. In fact, it is approaching of death, which is costly, and not age. Also, some evidence indicates that the cost of death is lower for elderly people compared to younger age groups. However, long-term care is increasing at an exponential rate with age and this might dominate costs at the end of life.

Good practices for disease prevention and health promotion have been tested in the Member States. They provide a set of criteria, which future policies ought to respect in order to be effective and contain the increase of health care costs. The efficacy of general campaigns on screening is limited and the debate is open on the age of the target groups. However, several projects stress the importance of lifestyles for all ages. These actions may modify several risk factors at the same time. An integrated approach is thus desirable. This could be coordinated at a national level. Local level actions ought to complement national wide policies. They ought to target disadvantaged elderly people and combine health care services with social assistance.

## ANNEX A: GLOSSARY

**Activities of daily living**

Activities of daily living (ADL)

They include self-care activities, such as bathing, dressing and feeding oneself. The Katz index is the most often used index.

Instrumental activities of daily living (IADL)

They include domestic activities such as cooking, shopping and house keeping.

Katz index (ADL):

This index has six items: washing (bathing), dressing, transfer (to or from a bed or chair), going to the toilet, continence and eating. For each item, we distinguish four cases. Let's take washing. A person able to wash without assistance receives a score of zero points. A person needing assistance in washing lower part of body receives one (1) point, etc. A fully self-dependent person has a total score of zero (0), etc.

- Full self-dependent person: Katz index = 0,
- Moderately care dependent: Katz index = 1 or 2,
- Highly care dependent: Katz index = 3 or 4,
- Very highly care dependent: Katz index = 5 or 6.

Lawton and Brody index (IADL):

This index includes using the telephone, shopping, food preparation, housekeeping, laundry, travel, responsibility for own medicine and ability to handle finances.

**Disability free life expectancy (DFLE)**

Number of years of projected life expectancy that will be spent free of disability. Disability free life expectancy is important because it indicates not only the increase in the number of years but also the quality of life during these additional years.

Healthy life expectancy

Healthy life expectancy is commonly used as a synonym for "disability-free life expectancy". It measures how long people can expect to live without chronic illness and disabilities.

**Prevalence**

Proportion of cases of a given social/medical condition at any time in the population studied.
Incidence is the proportion of people contracting/acceding the condition in question over a specified period of time. The first refer to a stock and the second to a flow.

**International Statistical Classification of Diseases & Related Health Problems** (Tenth Revision)

ICD-10 is a classification of health conditions (diseases, disorders, injuries, etc.). Functioning and disability associated with health conditions are classified in ICF. Consequently, ICD-10 and ICF are complementary.

Tabular List of inclusions and four-character subcategories (10th Revision. Version 2003).

Chapter List

| | | |
|---|---|---|
| I | A00-B99 | Certain infectious and parasitic diseases |
| II | C00-D48 | Neoplasms |
| III | D50-D89 | Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism |
| IV | E00-E90 | Endocrine, nutritional and metabolic diseases |
| V | F00-F99 | Mental and behavioural disorders |
| VI | G00-G99 | Diseases of the nervous system |
| VII | H00-H59 | Diseases of the eye and adnexa |
| VIII | H60-H95 | Diseases of the ear and mastoid process |
| IX | I00-I99 | Diseases of the circulatory system |
| X | J00-J99 | Diseases of the respiratory system |
| XI | K00-K93 | Diseases of the digestive system |
| XII | L00-L99 | Diseases of the skin and subcutaneous tissue |
| XIII | M00-M99 | Diseases of the musculoskeletal system and connective tissue |
| XIV | N00-N99 | Diseases of the genitourinary system |
| XV | O00-O99 | Pregnancy, childbirth and the puerperium |
| XVI | P00-P96 | Certain conditions originating in the perinatal period |
| XVII | Q00-Q99 | Congenital malformations, deformations and chromosomal abnormalities |
| XVIII | R00-R99 | Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified |
| XIX | S00-T98 | Injury, poisoning and certain other consequences of external causes |
| XX | V01-Y98 | External causes of morbidity and mortality |
| XXI | Z00-Z99 | Factors influencing health status and contact with health services |
| XXII | U00-U99 | Codes for special purposes |

**International Classification of Functioning, Disability and Health (ICF)**

ICF constitutes a revision of the International Classification of Impairments, Disabilities and Handicaps (ICIDH). ICF was endorsed by the Fifty-fourth World Health Assembly for international use on 22 May 2002 (WHO, 2001). It defines components of health and some health-related components of well-being (such as education and labour). It presents two basic lists:

Part 1. Functioning and Disability
  a) Body Functions and Structures, and
  b) Activities and participation
Part 2. Contextual factors
  a) Environmental factors
  b) Personal factors.

Terms in Part 1. replace the formerly used terms "impairment", "disability" and "handicap". ICF also lists environmental factors that interact with all other constructs.

| Body functions | Body structures |
|---|---|
| Body functions are the physiological functions of body systems (including psychological functions),<br><br>1. Mental functions<br>2. Sensory functions and pain<br>3. Voice and speech functions<br>4. Functions of the cardiovascular, haematological, immunological and respiratory systems<br>5. Functions of the digestive, metabolic and endocrine systems<br>6. Genitourinary and reproductive functions<br>7. Functions of the skin and related structures | Body structures are anatomical parts of the body such as organs, limbs and their components.<br><br>1. Structures of the nervous system<br>2. The eye, ear and related structures<br>3. Structures involved in voice and speech<br>4. Structures of the cardiovascular, immunological and respiratory systems<br>5. Structures related to the genitourinary and reproductive systems<br>6. Structures related to movement<br>7. Skin and related structures |

| Activities and participation | Environmental factors |
|---|---|
| Activity is the execution of a task or action by an individual. Participation is involvement in a life situation.<br><br>1. Learning and applying knowledge<br>2. General tasks and demands<br>3. Communication<br>4. Mobility<br>5. Self-care<br>6. Domestic life<br>7. Interpersonal interactions and relationships<br>8. Major life areas<br>9. Community, social and civic life | Environmental factors make up the physical, social and attitudinal environment in which people live and conduct their lives<br><br>1. Products and technology<br>2. Natural environment and human-made changes to environment<br>3. Support and relationships<br>4. Attitudes<br>5. Services, systems and policies |

Impairments are problems in body functions or structure such as significant deviation or loss.
Activity limitations are difficulties an individual may experience in involvement in life situations.

**WHO Classification of countries**

The World Health Organisation uses the following country classification concerning EUROPE:

EUROPE: Regional reporting categories for Global Burden of Disease 2000 project: WHO regions and subregions

| WHO region | Mortality stratum | WHO Member States |
|---|---|---|
| EURO | A | Andorra, Austria, Belgium, Croatia, Czech Republic, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom |
| EURO | B | Albania, Armenia, Azerbaijan, Bosnia And Herzegovina, Bulgaria, Georgia, Kyrgyzstan,Poland, Romania, Slovakia, Tajikistan, The Former Yugoslav Republic Of Macedonia, Turkey, Turkmenistan, Uzbekistan, Yugoslavia |
| EURO | C | Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine |

Source: WHO

EUROPE: Regional epidemiological analysis categories for Global Burden of Disease 2000 project: GBD regions and subregions

| GBD region | Mortality stratum | Region code | WHO Member States | Reporting subregion |
|---|---|---|---|---|
| EURO | A | 8 | Andorra, Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom | EURO A |
| EURO | B1 | 9 | Albania, Bosnia And Herzegovina, Bulgaria, Georgia, Poland, Romania, Slovakia, The Former Yugoslav Republic Of Macedonia, Turkey, Yugoslavia | EURO B |
| EURO | B2 | 10 | Armenia, Azerbaijan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan | EURO B |
| EURO | C | 11 | Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine | EURO C |

Source: WHO

Most reported statistics labelled EUROPE A refer to the first table. The only difference with the second is the inclusion of Cyprus in the first definition.

Global Burden of Disease in 2002: data sources, methods and results.Colin D. Mathers, Christina Bernard, Kim Moesgaard Iburg, Mie Inoue, Doris Ma Fat, Kenji Shibuya, Claudia Stein, Niels Tomijima, Hongyi Xu; Global Programme on Evidence for Health Policy Discussion Paper No. 54 World Health Organization, December 2003, (revised February 2004)

## ANNEX B: NOTE ON METHODOLOGY

The table presents the estimations of **total disability** prevalence using the ECHP data collected by Eurostat. Prevalence rate = $1 / (1 + EXP\{-(\alpha + \beta \cdot age)\}$.

We have used ordinary least squares (OLS) on pooled national data for the years 1996, 1998, 1999 and 2000. We have used dummy variables for the different waves. Estimations without dummy variables provide similar results.

| | D 96 | D 98 | D99 | 'β' Age | 'α' Constant | $R^2$ | DW | 'n$R^2$ |
|---|---|---|---|---|---|---|---|---|
| BE | 0,098 | 0,537 | 0,001 | 0,041 | -3,874 | 0,98 | 1,44 | 0,30 |
| | 0,070 | 0,070 | 0,070 | 0,001 | 0,077 | | | |
| DK | 0,022 | 0,027 | -0,003 | 0,037 | -3,164 | 0,95 | 1,77 | 2,46 |
| | 0,110 | 0,110 | 0,110 | 0,002 | 0,121 | | | |
| DE | -0,996 | -0,010 | 0,049 | 0,052 | -2,995 | 0,98 | 1,58 | 3,70 |
| | 0,093 | 0,093 | 0,093 | 0,001 | 0,102 | | | |
| EL | -0,118 | 0,035 | -0,062 | 0,063 | -5,248 | 0,98 | 1,17 | 5,98 |
| | 0,116 | 0,116 | 0,116 | 0,002 | 0,128 | | | |
| ES | -0,005 | 0,124 | -0,009 | 0,051 | -4,429 | 0,96 | 1,56 | 2,37 |
| | 0,120 | 0,120 | 0,120 | 0,002 | 0,132 | | | |
| FR | 0,020 | 0,092 | 0,006 | 0,052 | -3,822 | 0,97 | 1,1 | 7,84 |
| | 0,109 | 0,109 | 0,109 | 0,002 | 0,120 | | | |
| IE | -0,134 | -0,075 | -0,179 | 0,041 | -3,613 | 0,96 | 2,87 | 2,11 |
| | 0,112 | 0,112 | 0,112 | 0,002 | 0,123 | | | |
| IT | 0,220 | 0,247 | 0,114 | 0,058 | -5,303 | 0,99 | 2,05 | 2,23 |
| | 0,084 | 0,084 | 0,084 | 0,001 | 0,092 | | | |
| NL | -0,204 | -0,134 | -0,117 | 0,034 | -2,711 | 0,97 | 2,10 | 0,16 |
| | 0,068 | 0,068 | 0,068 | 0,001 | 0,075 | | | |
| AT | 0,134 | 0,070 | 0,068 | 0,059 | -4,748 | 0,98 | 1,86 | 1,36 |
| | 0,089 | 0,089 | 0,089 | 0,001 | 0,099 | | | |
| PT | 0,169 | 0,105 | 0,129 | 0,046 | -3,609 | 0,95 | 1,74 | 3,61 |
| | 0,135 | 0,135 | 0,135 | 0,002 | 0,150 | | | |
| FI | 0,035 | 0,014 | - | 0,052 | -3,407 | 0,97 | 1,74 | 3,59 |
| | 0,103 | 0,103 | - | 0,002 | 0,125 | | | |
| UK | 0,674 | 0,027 | - | 0,051 | -4,436 | 0,95 | 0,66 | 1,19 |
| | 0,155 | 0,155 | - | 0,003 | 0,188 | | | |
| EU 15 | -0,302 | 0,051 | -0,122 | 0,048 | -3,562 | 0,996 | 1,64 | 0,37 |
| | 0,040 | 0,040 | 0,040 | 0,001 | 0,044 | | | |

Note: 'DW': a value close to "2" indicates no autocorrelation
'n$R^2$': A high value (e.g. France) indicates the presence of homoscedasticity. 'n' is 32 (except FI and UK) and $R^2$ refers to the regression of residuals to the estimated value of the disability prevalence.

The table presents the estimations of **severe disability** prevalence using the ECHP data collected by Eurostat. Prevalence rate = $1 / (1 + EXP\{-(\alpha + \beta \cdot age)\}$.

We have used ordinary least squares (OLS) on pooled national data for the years 1996, 1998, 1999 and 2000. We have used dummy variables for the different waves. Estimations without dummy variables provide similar results.

| | D 96 | D 98 | D99 | Age | Constant | $R^2$ | DW | '$nR^2$ |
|---|---|---|---|---|---|---|---|---|
| BE | 0,294 | 0,256 | 0,037 | 0,053 | -5,789 | 0,98 | 2,07 | 2,05 |
| | 0,103 | 0,103 | 0,103 | 0,002 | 0,114 | | | |
| DK | 0,3342 | 1,2895 | 0,0171 | 0,0499 | -5,6341 | 0,94 | 2,07 | 1,12 |
| | 0,1695 | 0,1695 | 0,1695 | 0,0026 | 0,1872 | | | |
| DE | -0,1948 | 0,1852 | 0,1200 | 0,0566 | -5,4897 | 0,96 | 2,15 | 2,11 |
| | 0,1503 | 0,1503 | 0,1503 | 0,0023 | 0,1660 | | | |
| EL | -0,1512 | 0,0581 | 0,0212 | 0,0602 | -6,0223 | 0,98 | 1,68 | 0,19 |
| | 0,1132 | 0,1132 | 0,1132 | 0,0017 | 0,1251 | | | |
| ES | -0,0076 | 0,2129 | -0,0519 | 0,0502 | -5,5432 | 0,95 | 2,62 | 15,17 |
| | 0,1381 | 0,1381 | 0,1381 | 0,0021 | 0,1526 | | | |
| FR | 0,0073 | 0,0787 | -0,0001 | 0,0512 | -4,9254 | 0,98 | 2,00 | 5,53 |
| | 0,0857 | 0,0857 | 0,0857 | 0,0013 | 0,0947 | | | |
| IE | 0,0959 | -0,0797 | -0,1573 | 0,0393 | -5,2405 | 0,90 | 1,67 | 1,37 |
| | 0,1658 | 0,1658 | 0,1658 | 0,0026 | 0,1831 | | | |
| IT | 0,0786 | 0,1218 | -0,0066 | 0,0627 | -6,6007 | 0,96 | 1,58 | 10,16 |
| | 0,1576 | 0,1576 | 0,1576 | 0,0024 | 0,1740 | | | |
| NL | -0,0643 | -0,0799 | -0,0756 | 0,0381 | -4,3689 | 0,97 | 2,06 | 3,32 |
| | 0,0891 | 0,0891 | 0,0891 | 0,0014 | 0,0984 | | | |
| AT | 0,1431 | 0,1876 | 0,0628 | 0,0636 | -6,4835 | 0,97 | 2,55 | 2,13 |
| | 0,1408 | 0,1408 | 0,1408 | 0,0022 | 0,1555 | | | |
| PT | 0,1528 | 0,1184 | 0,0787 | 0,0487 | -4,8220 | 0,97 | 2,77 | 2,99 |
| | 0,1031 | 0,1031 | 0,1031 | 0,0016 | 0,1139 | | | |
| FI | 0,072 | -0,045 | - | 0,064 | -5,758 | 0,96 | 1,72 | 7,57 |
| | 0,168 | 0,168 | - | 0,003 | 0,203 | | | |
| UK | -0,8374 | -0,0943 | -1,1415 | 0,0524 | -4,5376 | 0,96 | 1,45 | 0,52 |
| | 0,1435 | 0,1435 | - | 0,1435 | 0,0022 | | | |
| EU 15 | -0,2150 | 0,0840 | -0,1897 | 0,0520 | -5,1613 | 0,99 | 1,80 | 5,21 |
| | 0,0624 | 0,0624 | 0,0624 | 0,0010 | 0,0689 | | | |

Note: 'DW': a value close to "2" indicates no autocorrelation
'$nR^2$': A high value (e.g. ES, FR, IT, FI, and EU 15) indicates the presence of homoscedasticity. 'n' is 32 (except FI) and $R^2$ refers to the regression of residuals to the estimated value of the disability prevalence.

## ANNEX C: ABREVIATIONS

**Country abbreviation**

BE Belgium
CZ Czech Republic
DK Denmark
DE Germany (including ex-GDR from 1991)
EE Estonia
EL Greece
ES Spain
FR France
IE Ireland
IT Italy
CY Cyprus
LV Latvia
LT Lithuania
LU Luxembourg (Grand-Duché)
HU Hungary
MT Malta
NL Netherlands
AT Austria
PL Poland
PT Portugal
SI Slovenia
SK Slovakia
FI Finland
SE Sweden
UK United Kingdom
BG Bulgaria
HR Croatia
RO Romania
TR Turkey
IS Iceland
LI Liechtenstein
NO Norway
CH Switzerland
AL Albania
BA Bosnia and Herzegovina
MK, the former Yugoslav Republic of Macedonia
CS Serbia and Montenegro
US United States

EU 15: Member states before 1 May 2004
EU 10: New Member states since 1 May 2004
WHO: World Health Organisation

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## Additional links

Active Health Promotion in Old Age (DE)
*http://www.bmfsfj.de/Kategorien/Forschungsnetz/forschungsberichte,did=18438.html*

AOK – health insurance (DE)
*http://www.aok.de*

British Nutrition Foundation
*http://www.nutrition.org.uk/home.asp?siteId=43&sectionId=s*

Deutsches Forums Prävention und Gesundheitsförderung (DE)
*http://www.forumpraevention.de*

EURAG österreich (AT)
*http://www.eurag.at*

European Federation of Older Persons
*http://www.eurag-europe.org*

EUROSTAT
*http://epp.eurostat.cec.eu.int/portal/page?_pageid=1090,30070682,1090_33076576&_dad=portal&_schema=PORTAL*

Federal Ministry of Health and Social Security (DE)
*http://www.bmgs.bund.de/*

Federal Ministry of Social Security, Generations and Consumer Protection (AT)
*http://www.bmsg.gv.at*

Finnish Research Project on Ageing and Well-being
*http://www.palmenia.helsinki.fi/ikihyva/InEnglish.html*

Fondation contre le Cancer (BE)
*http://www.cancer.be*

'Fortify Prevention – Conserve Health' law (DE)
*http://www.die-praevention.de/*

Health Promotion (AT)
*http://www.webheimat.at/magazin/Arbeit-Beruf-Pension/Archiv-Arbeit-Beruf-Pension/Betriebliche-Gesundheitsfoerderung.html*

Healthy and Active Ageing Radevormwalde (DE)
*http://www.aktiv55plus.de*

Institut National de Statistiques de Belgique (INS)
*http://statbel.fgov.be/home_fr.asp*

The International Agency for Research on Cancer
*http://www.iarc.fr/*

Die Krankenkasse, die ihr Hanwerk verstecht (DE)
Weiterentwicklung der Prävention und Gesundheitsförderung in Deutschland, Vorstellung der Spitzenverbände der Krankenkassen vom 22.5.2002
*http://www.ikk.de/ikk/generator/ikk/32768,i=l.html*

Meals on Wheels, Nutrition programmes, Programme evaluation and cost-effectiveness
*http://www.meals.org/meals/nutrition.htm*

National Public Health Institute (FI)
*http://www.ktl.fi/portal/english/*

Plan 60 (AT)
*http://www.plan60.at*

Policy concerning older people and IST (IT)
*http://www.seniorwatch.de/country/italy/a)General(Italy).htm*

Prävention (DE)
*http://www.forumpraevention.de*

Prévention de maladies cardiovasculaires (FR)
*http://www.prevention-cardio.com*

Programme for the Prevention of Type 2 Diabetes in Finland 2003-2010
*http://www.diabetes.fi/english/prevention/programme/foreword.html*

Recommandations nutritionnelles pour la Belgique, Révision 2000
*http://www.health.fgov.be/CSH_HGR/Francais/Brochures/recommandations%20nutritionnelles.htm*

Senior Web (AT)
*http://www.seniorweb.at*

SIMA Training - Maintaining and Supporting Independent Living in Old Age (DE)
*http://www.sima-training.de*

Vienna University of Economics and Business Administration (AT)
*http://wu-wien.boku.ac.at/fides/?search=show_project_data&pr_id=976*

Walking safely above 60 (AT)
*http://www.wien.gv.at/who/senioren.htm*