ORIGINAL ARTICLE

# Drugs and health care expenditure on the aging population

## Výdaje na léky a péči pro stárnoucí populaci

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**Summary**

The aim of this article is to identify the main factors that affect future trends in healthcare expenditures from the perspective of the anticipated ageing of the population. Attention shall be focused on the elderly demography, the inhabitants' pensions and their expenditures on drugs. The article also shows the results of a case study concerning the use of particular types of drugs by elderly people in the Czech Republic and in European union.

For the purpose of this article, I employed a literature search method that uses available sources describing the determinants of public healthcare expenditure and the use of selected types of drugs by the ageing population. The current situation in EU Member Countries is addressed through an analysis of public expenditure using data from public databases, such as Eurostat or OECD. The types of drugs designed for the ageing population are focused on the Czech Republic.

It follows from the executed analysis that the basic determinants of public healthcare expenditure are the demographic structure, income, the legislative conditions and productivity. The aim of effective public health care spending should not only be to achieve a higher age, but also to enable the inhabitants to prolong the period of their work productivity and self-sufficiency. Aging population defines market opportunities open to companies from various sectors.

**Key words:** aging • population, aging population • costs • health care • expenditure on drugs • strategic plan

**Souhrn**

Cílem příspěvku je specifikovat hlavní determinanty ovlivňující budoucí vývoj zdravotnických výdajů vzhledem k předpokládanému stárnutí populace. Pozornost bude zaměřena na demografii seniorů, důchody obyvatel, jejich výdaje na léky a neformální péči o seniory v České republice a v EU. Hlavní metodou pro dosažení cíle byla analýza dostupných dat specifikujících determinanty výdajů veřejného zdravotnictví.

Současná situace v členských zemích EU je řešena pomocí analýzy veřejných výdajů s použitím dat z veřejných databází, jako je Eurostat či OECD. Specifikace typů léků určených pro stárnoucí populaci jsou zaměřeny na Českou republiku.

Z provedené analýzy vyplývá, že základní determinanty výdajů veřejného zdravotnictví jsou demografická struktura obyvatel, legislativní podmínky a produktivita práce. Cílem efektivního vynakládání výdajů veřejného zdravotnictví by mělo být nejen dosažení vyššího věku dožití ale také schopnost obyvatel delšího období produktivity práce a prodloužení doby, kdy jsou soběstační. Za těchto okolností lze v rámci fenoménu stárnutí populace vidět příležitosti pro ekonomický růst.

**Klíčová slova:** stárnoucí populace • náklady • výdaje na léky • strategický plán

### Introduction

The number of elderly people in certain developed nations will soon double that of the younger generations[1]. The impact of this demographic change will be felt in every aspect of life, including economic growth, labour markets, taxation, the transfer of property, health, family composition, housing and migration[2, 3]

This impending change is the result of a number of factors. Last century brought about a dramatic increase in human life expectancy. This increased life expectancy, working in conjunction with declining birth rates, have caused many experts to worry about the sustainability of the cost of the ageing population. The level of available

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health care and the public's health consciousness both continue to improve, and there are constantly new medical breakthroughs and techniques being developed that are allowing people to live longer and remain healthy. In addition, the world's overall standard of living an access to shelter is improving. It has become easier for the elderly to live in more climate-controlled homes (because of increased energy efficiency) and to they are now able to live independently longer because of more age-appropriate home designs. Another factor that has impacted demographics is the 'baby boom' period that occurred after World War II in which a large number of babies was born. These people are now reaching the age of retirement, causing a great surge in the numbers of pensioners[4, 5].

The ageing population has also brought about another tremendous challenge: a rapid increase in the prevalence of non-communicable diseases (NCDs). NCDs are currently responsible for roughly 60% of all deaths and nearly 50% of lost activity and productivity due to disability and death. These loses affect many people in both high- and low-income countries in every region of the world and also afflicts people who are classified as both old and not old (working-age adults). The most common NCDs are cardiovascular disease, cancer, diabetes and chronic respiratory disease[5, 6].

These diseases share four voluntary risk factors – tobacco use, physical inactivity, unhealthy eating and the excessive use of alcohol – and one involuntary risk factor is age[5]. From the economic perspective, how we address longer lifespans will require a number of tough changes to be made to both public policies and business practices. Businesses will soon have little choice but to pay more attention to the needs and capacities of older their employees and their willingness and ability to adapt will surely play a larger role in their ability to form a competitive advantage[7, 8]. A lot of studies analyse symptoms of this disease and economic impact[9–13].

***The aim of this article is to specify the main determinants affecting the future development of healthcare expenditure from the perspective of the anticipated population aging. Attention shall be focused on the elderly demography, the amount of their pensions and their expenditures on drugs. The article will also show the results of a case study concerning the use of particular types of drugs by elderly people in the Czech Republic.***

## Methods

For the purpose of this article, I employed a literature search method that uses available sources describing the determinants of public healthcare expenditure and the use of selected types of drugs by the ageing population. The current situation in EU Member Countries is addressed through an analysis of public expenditure using data from public databases, such as Eurostat or OECD. The types of drugs designed for the ageing population are focused on the Czech Republic.

## The determinants of public health care expenditure with a focus on long-term care

Healthcare expenditure is significantly affected by the age structure of a country's inhabitants, their life style and the level of health in the given population, the revenue level and the economic situation in the given country, as well as by its legislative definition and the level of innovation, research and development in the given area (Figure 1).

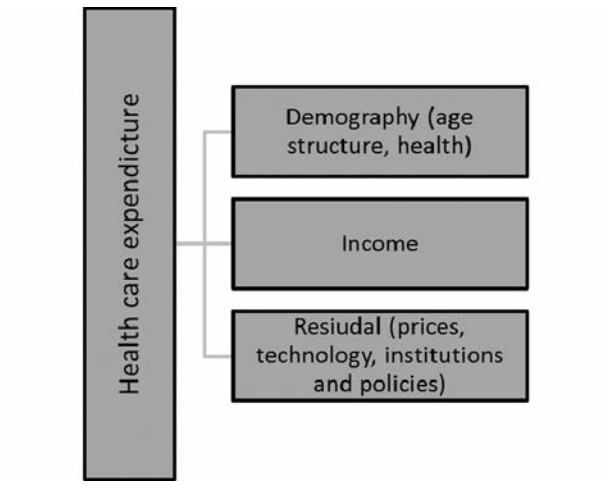


*Fig. 1. The determinants of public health expenditure[14]*

### *Demography*

In the next years, the number and the age-structure of people in the EU countries will be radically changing due to low fertility rates, constant growth in life expectancy and the retirement of the baby-boom generation. By 2050 the demographic development of the EU countries will decline by two-thirds. At present the number of people living in the EU countries reaches 492.3 million and this is in fact 7.4% of the world's population (6.624 billion). And one of the biggest issues is not the decrease in the numbers of population but its aging[15].

Thus, predictions clearly show that the population in developed countries is ageing and the health care intensity is anticipated to grow. Health care will mainly be related to old-age diseases that have not yet been addressed to such a large extent.

Table 1 provides the anticipated numbers of persons in the 65+ and 80+ categories in the next sixty years. It follows from the table that the 80+ category, i.e. the group of inhabitants who shall be impacted by neurodegenerative diseases and other diseases that occur less frequently today thanks to a lower life expectancy, will more than double.

*Table 1. Demographic development in the European Union (28 countries)[15]*

| | 2015 | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 |
|---|---|---|---|---|---|---|---|---|
| **Population aged 65+** | 18.9 | 20.4 | 23.9 | 26.9 | 28.1 | 28.4 | 28.1 | 28.7 |
| **Population aged 80+** | 5.3 | 5.8 | 7.1 | 9.0 | 10.9 | 11.8 | 12.2 | 12.3 |

*Table 2. Mean and median income by household type (in EURO)[15]*

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|
| **European Union (28 countries)** | : | : | : | : | : | 14 847 | 14 965 | 15 454 | 15 430 |
| **European Union (27 countries)** | 12 632 | 12 916 | 13 878 | 14 465 | 14 801 | 14 926 | 15 046 | 15 540 | 15 519 |
| **European Union (15 countries)** | 15 420 | 15 629 | 16 633 | 17 185 | 17 381 | 17 631 | 17 683 | 18 262 | 18 219 |
| **Czech Republic** | 4233 | 4802 | 5423 | 6068 | 7295 | 7058 | 7451 | 7791 | 7694 |

***Income***

Table 2 shows the growing trend of household revenues in the European Union in the 2005 to 2013 period. A rather significant difference in the growth can be seen in the Euro 15 and Euro 27 groups, which has mainly been caused by newly-acceding countries with lower economic levels.

To obtain a complete picture regarding the growth of the population, we would also have to analyse trends in changing prices and other economic indicators, such as GDP. From the perspective of growing income, we cannot devise the need of greater healthcare expenditures by individuals[4, 16].

***Prices and policies in healthcare***

With regards to the legislative setting, the healthcare system in the individual countries and the level of direct payments made by patients are the most significant factors.

Direct payments made by Czech patients for drugs, food supplements, cosmetic surgeries, dental surcharges or regulation charges amount to 17%, which is one of the lowest values in the OECD Member States. For example, in the USA, Mexico and Chile, direct payments amount to more than 50%, while in the Netherlands, Greece and Switzerland it is approximately 40%. The average in the OECD Member States is 27%.

Direct payments paid by Belgian patients for visits to specialized or general practitioners range from 25% to 35% of the prices. Surcharges for drugs (25% to 80% of the drug price) are also quite high; the amount of surcharge differs depending on the drug category. A flat rate of 14.71 EUR is paid per each day spent in the hospital.

In Denmark, the patient's contribution in the payment for drugs ranges from 15% to 100%. It depends on the drug consumption per inhabitant. For drugs costing up to 120 EUR per year, the inhabitant must pay for 100% of the drug price, for drugs costing between 121 EUR and 195 EUR, the inhabitant must pay 50% of the drug price, for drugs costing between 196 EUR and 421 EUR, the inhabitant must pay 25% of the drug price and for drugs costing over 421 EUR per year, the inhabitant must pay 15% of the price for their drugs.

The contribution in Luxembourg for common drugs (according to the statutory regulation) amounts to 40% of the drug price. For special drugs (according to the statutory regulation), the contribution amounts to 80% or 100% of the drug price. The hospitalization fee is 20.42 EUR per day. Patients must pay for up to 30 days of hospitalization.

Adult inhabitants in Germany pay a quarterly fee of 10 EUR to their practitioner and dentist. Ten percent of every drug price is paid (a minimum of 5 EUR and a maximum of 10 EUR); however, this fee may not exceed the drug price.

Patients in Austria pay 5.15 EUR per item on each prescription. The hospitalization charge per patient differs according to the type of hospital and federal state. It is around 10 EUR per day.

In Sweden, patients pay all drug costs up to 126 EUR per year, drugs costing between 127 EUR and 241 EUR per year are subsidized at 50%, drugs costing between 242 EUR and 421 EUR per year are subsidized at 75 %, drugs costing between 422 EUR and 501 EUR per year are subsidized at 90%, and drugs costing over 505 EUR per year are fully subsidized. The amount of hospitalization contribution differs according to the individual healthcare facilities[4, 14, 16, 17].

**Determinants of long-term care and healthcare expenditures**

According to the OECD, long-term care expenditure is related to the number of elderly persons who will be dependent on others' care, what the work productivity of elderly people will be and how long it will take. The effect of changes in informal care with respect to the aforementioned trends is a decrease in home carers due to the need for people to remain working longer and this will also be significant. The fundamental factors in this area are shown in Figure 2.

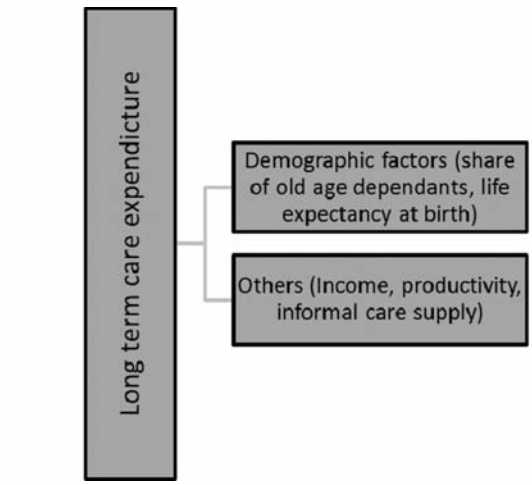


*Fig. 2. The determinants of long-term care expenditure[14]*

There are currently a lot of patients in home care, which significantly lowers the government's direct cost of care. Žumárová's research looking into the subjective feeling of well-being and the quality of life had 376 respondents: 242 females and 134 males from the Czech Republic. Its

results proved that there exists a statistical dependence between the subjective perception of old age and the character of housing (nursing home, house, or flat)[1]. The home-living respondents perceive old age more positively than patients who live in nursing homes. In comparison with Prášilová's study, Žumárová arrives at a similar conclusion. Seniors are satisfied with their own housing and the feeling of safety and privacy brought by it. They prefer to stay at home even in case of further deterioration of their health state. If they are able to live in their home, they tend to be less dependent on other people and they therefore perceive the stage of their lives more positively. Žumárová also proved a statistical dependence between the subjective perception of old age and housing based on whether the respondents live alone or not. People living with their partners or families tend to be more satisfied[1]. Disability benefits, care benefits or money for medical devices are received, but the patients are not treated properly. At the same time, the expenditures on care in the Czech Republic and other countries are not high enough to cover the care giver's lost salary[18].

**Drugs for elderly persons in the Czech Republic**

With increased age comes an increased occurrence of some types of diseases. Cardiovascular diseases are the most frequent disease in general for those aged over 65; 30–45% of patients die due to cardiovascular diseases. The heart muscle contractility decreases, the minute output also decreases and peripheral vascular resistance increases. Other changes include valvular defects, high blood pressure or pneumology, where the lung tissue loses its elasticity. The most frequent disease is chronical bronchitis. Another frequent disease in elderly people is lung cancer, where old age unfortunately makes surgery less feasible. Involution changes also occur in the digestive system, although they do not lead to its limited functioning. The production of saliva in the mouth cavity decreases and teeth are lost. Elderly people most frequently suffer from defects in swallowing, known as dysphagia, which can also be caused by other GIT problems. Hiatal hernia, a gliding oesophageal hernia causing unpleasant burning, regurgitation and pain in the breast and lower abdomen is also very frequent. With increased age, the occurrence of peptic ulcer and diverticula in the colon increases. A decrease in kidney functioning is caused by worsening blood flow in the kidneys, decreased glomerular filtration and tubular functions. A frequent disease of elderly people is pyelonephritis caused by frequent infections. Kidney failure often occurs in elderly people due to extra-renal causes – dehydration, decreased blood pressure and decreased blood flow related to other diseases. Increased age is related to a reduction in bone marrow, but blood pressure does not change significantly. Anaemia occurs the most frequently and it is often caused by a lack of iron, by chronic blood losses or other chronic diseases. Due to ageing, the musculoskeletal system suffers changes concerning bones, muscles, joints and ligaments. Osteoporosis or bone loss naturally accompanies ageing and is a disease that reduces overall bone mass. Other typical changes in the musculoskeletal system are arthritic changes in joints and diseases of a rheumatic nature. Elderly people also suffer from atrophy of muscular tissues, which leads to a reduction in muscle mass. Every disease can significantly change the social situation of an elderly person who had otherwise been independent and self-sufficient[19, 20, 22].

Schmader also identified frequent health disorders in elderly people, i.e.: chronic pain, incontinence, urinary infections, frequent falling, oncologic diseases, hypertension, heart failure, diabetes mellitus, dementia, Parkinson's disease, sleeping disorders, viral respiratory diseases, sight and hearing defects, osteoarthritis and osteoporosis[22].

In response to the frequent occurrence of such diseases, we can also identify the drugs that are most frequently used by elderly people. The drugs most frequently prescribed to elderly people in the Czech Republic are non-steroidal anti-inflammatory medicines (NSAIDs), which have a serious adverse effect of bleeding in the gastrointestinal tract. According to the available date collected in 2002, the preparations most frequently used by the elderly people in the Czech Republic regardless of their sex were preparations affecting the cardiovascular system (45.47% of the overall number of drugs, mainly cardiac preparations, diuretics, peripheral vazodilators), the gastrointestinal tract and metabolism (15.08%; main minerals supplements, anti-diabetics and antacids, anti-ulcerous preparations and anti-flatulencies), the central nervous system (12.270%; very frequently represented by psycholeptics and analgesics) and drugs affecting the musculoskeletal system (10.56%; mainly anti-rheumatics, anti-flogistics and drugs reducing pain in the muscles and joints for topical application). The group of drugs affecting blood and blood-making organs has a special status; these drugs are significantly used by men (7.23%, mainly Anopyrin, which was also the most frequently prescribed drug for both sexes)[22, 23].

Elderly people also frequently use five or more drugs per day, which brings about a greater risk of adverse effects. In 2014, a questionnaire was conducted in two elderly care homes in Prague and in the Central-Bohemian Region. It included 58 respondents aged 65 or more who gave informed consent. The average age was 82 and 74% of all the respondents were women. The average number of used drugs was 8.9 drugs available only by prescription, 1.2 over-the-counter drugs and 0.6 food supplements. A potential drug interaction was detected in 86% of the respondents. Serious and very serious interactions were detected in 8.6% of the respondents[11]. Drugs not suitable for elderly people were prescribed to 65% of the patients in the monitored sample**.** If we compare this data with older research carried out across the entire elderly population (on average, they used maximally 6 prescribed drugs + 2 other preparations, published by Dr. Práznovcová), we discover that polypragmazia is higher in elderly care homes (more than 8 prescribed drugs + "almost" two other preparations)[20].

**Discussion and conclusions**

It follows from the aforementioned that the main determinants influencing expenditures in public health

care show a clear increase of expenditures in the future due to the population. They include increasing needs for drugs, treatment, and both formal and informal care for the elderly. The aim of providing healthcare should be not only to achieve the highest possible age, but also to maintain a good physical condition. And particularly the mobility of these elderly people and their overall fitness can reduce the adverse impact of these determinants[16].

At present there are ample chances for companies to operate in different areas of business connected with the aging population. They are as follows:

- economic chances for specific products for older people,
- increasing job opportunities to work or do business in home care,
- rapidly expanding business in the area of building retirement homes and flats,
- opportunities for older people to travel or go on holiday even to exotic countries at any time during the year,
- there are marketing niches for the group of aging population,
- younger pensioners can assist their children in grandchildren's care,
- social benefit of reduced crime as older people incline to be more law abiding,
- older people might assist in volunteering activities and offer their expertise consultations free of charge,
- companies might take advantage of older people's expertise,
- new inflow of migrants into the country can cover any lack of relevant skills, including home care,
- migrants might be willing to work for lower wages; this also means that they have to pay taxes and national insurance, which might contribute to covering costs for older people's care,
- a low birth rate causes a smaller number of pupils in classes, which might significantly improve teaching[13].

These facts can lead to economic growth and subsequently to the ability to successfully deal with the increased costs of public health care.

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