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## Population ageing and healthcare demand: The case of Slovenia<sup>☆</sup>

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### ABSTRACT

The aim of this paper is to explore the consequences of demographic ageing on healthcare demand in Slovenia for primary care, secondary care, hospital day-care treatments, and hospitalisations. In the paper, we develop a model for making projections of the total number of treatments using the age-group projection method with the scenario approach. The model allows the number of treatments to be observed with respect to medical services, age groups and main disease groups. The results are presented for the cross-section years 2015, 2025 and 2035. The smallest increase in the number of treatments occurs in primary care, a larger one for secondary care, and the largest for hospital day-care services and hospitalisations (up to 29.9%). The structure of demand will also change. Demand for healthcare services for children and infants will decrease while demand for diseases associated with older age groups will increase, particularly for diseases of the circulatory system, eye and adnexa, and diseases of the blood and blood-forming organs. The results presented in this paper can help improve understanding of similar processes in other countries for total healthcare demand and for changes in the structure of demand. The results show that the healthcare system in Slovenia will face a major additional burden in the next 20 years.

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### 1. Introduction

The European population is currently in a period of significant demographic transition. Due to the dynamics of fertility, life expectancy and migration rates, the overall size of the population is expected to only slightly increase,

yet the population will become much older than it is now. Past population projections generally underestimated the gains in life expectancy at birth, which is still increasing [1], causing a rise in the number and share of the older people in the population. This process is also present in Slovenia where the total population will remain stagnant at around 2.1 million, but the share of people older than 65 years will rise from 17.3% in 2015 to 26.7% in 2035. At the same time, the share of prime-age population aged from 25 to 54 will fall from 43.8% to 34.9% [1].

Changes in the population structure will impact the main social systems (workforce, pension systems, long-term care and education) and the healthcare system. The aim of this paper is to explore the consequences of the changing age structure on the future demand for healthcare in Slovenia. The demand for healthcare in Slovenia is observed for four major groups of healthcare services: pri-

<sup>☆</sup> The content is taken from a doctoral dissertation on the effects of population ageing on healthcare demand in Slovenia written by Jure Vrhovec, Faculty of Economics, University of Ljubljana. The dissertation was prepared under the supervision of Prof. Dr. Maks Tajnikar. General results described in the article were presented at a doctoral student conference at the Faculty of Economics, University of Ljubljana in June 2015 in a short 20-min presentation. A discussion paper of approximately 3000 words was available to the conference participants.

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mary care, secondary care, hospital day-care treatments, and hospitalisations. The definitions of healthcare services and types of treatments are further explained in Section 3. Long-term care and supportive care services are excluded from the analysis since no appropriate data on long-term care were available to allow a comparison with data from the healthcare system. Further, long-term care in Slovenia is not yet regulated by a law in a similar way as the national healthcare system.

The available data also allow changes to be identified in the demand for healthcare within the four groups of healthcare services and with respect to those disease groups which are the primary cause of contact with a healthcare organisation. Results of the research are important for public bodies concerned with healthcare system management and healthcare organisation management. Analysis of the impact of population ageing on the demand for healthcare is performed for each year between 2015 and 2035 with the base year 2008. The results are presented for the cross-section years 2015, 2025 and 2035.

## 2. Literature review

Forecasting future demand on the level of healthcare organisations is a critical element in the planning process [2]. Understanding the differential impact of ageing on particular clinical areas such as hospitals, medical groups and others is essential for preparing long-term plans for future medical care [3]. Therefore, such predictions receive special attention in the relevant literature.

Many authors argue that ageing will increase demand for healthcare in Europe. Such patterns can be observed for specialised ambulatory care, general practice doctors and hospitals [4,5].

The increase is based on the fact that older people use proportionally more healthcare services in hospitals and at general practice doctors [6]. In Slovenia, most hospital visits are caused by the oldest population aged 85 and more. On the other hand, children aged 5 or less make up the second largest group [7]. Since population ageing is causing the share of older people to increase and the share of children and infants to shrink, a significant influence on healthcare demand can be expected.

Research in Canada shows an increase in visits to specialist clinics and a decrease in visits to general practice doctors [8], which slightly contradicts results from Europe where the number of visits is rising for both services. In the United States, authors have researched future changes in demand for hospital services and assessed which diseases will contribute the most to the rise in demand for hospital services [9]. The study found that hospital utilisation will go up by 7.6% due to ageing and that the rise will be most prominent for the diseases and disorders of the circulatory system. Other conditions also shown to have a relatively large impact on utilisation of hospital services include diseases and disorders of the male reproductive system (such as prostate cancer), diseases and disorders of the respiratory system and disorders of the musculoskeletal system and connective tissue [9].

In Ireland, a large-scale research project addressed how ageing influences demand for various healthcare services

[10–17]. The main findings of the study for a projection period from 2006 and 2007 to 2020 and 2021 include a rise in the total cost of prescription drugs of up to 126%, a 54% increase in the need for inpatient beds, an about 30% rise in general practice consultations, up to a 60% increase in outpatient consultations and a 59% increase in long-term care services [13]. A comparison of the results in studies from the USA, Canada and Ireland shows the same general trends, but the projected increases are the largest in Ireland.

Similar studies have not been performed for many countries even though, without them, long term healthcare capacity planning is not practically feasible. In Slovenia, no study has analysed future healthcare demand for all four major groups of healthcare services or changes in the structure of future healthcare demand due to population ageing.

In the literature mentioned above, the most common method for calculating the effect of population ageing is the age-group projection. It calculates the influence of changes in the age structure on healthcare demand on the assumption that the demand by age will remain constant [18]. The effect of the age cohort is decomposed into demand per capita and the size of the age cohort. The level of demand at a defined future date is calculated by multiplying the projected share of the population in the age cohort at that date with the historical effect size per capita in the age cohort.

Age-group projection and similar methods are often supplemented with the scenario approach [4–6]. The scenarios are not exact predictions of the future, but illustrate possible future development [19]. The scenario approach has some advantages like straightforward execution, comparatively simple possibility to study different outcomes, possible inclusion of expert opinions and it is also easy to explain to the general public. The drawbacks of the scenario approach are mostly associated with the lack of a possibility to analyse aspects of scenarios like forecast errors, possibilities for certain types of scenarios to happen, variances and similar [20].

## 3. Data and methods

This paper explores the effects of population ageing on healthcare demand in Slovenia. The demand for healthcare is observed for four major groups of healthcare services: primary care, secondary care, hospital day-care treatments, and hospitalisations. The four main services consume 70% of all healthcare funds in Slovenia [21]. The remaining 30% is spent on dental services, nursing care within long-term care institutions, prison healthcare services and others.

Primary care includes general practice and family doctors, emergency services performed by GP doctors, paediatricians and gynaecologists who work outside hospitals [22]. Secondary care includes specialised outpatient clinics (internal diseases, neurology, cardiology, orthopaedics, dermatology and others). Hospital day-care treatments include treatments performed in hospitals which do not entail overnight stays and hospitalisations include hospital treatments which do involve overnight stays [23].

The aim of the research presented in this paper is to explore two effects of ageing. The first is an increase in total demand (the overall number of treatments) for each of the

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