Health care usage among immigrants and native-born elderly populations in eleven European countries: Results from SHARE[1]

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Abstract

Differences in health care utilization of older immigrants relative to the native-born populations in eleven European countries are investigated. The analysis is based on the SHARE database which provides comparable cross-national individual data on populations 50 years of age and older from a number of countries in Europe. Negative Binomial regression is used to examine differences between immigrants and native-born in number of doctor visits, visits to GPs, and hospital stays.. We find evidence that in some countries immigrants 50+ use more health services on average than the native-born population with the same characteristics.. Differences in the presence of health conditions indicate differences in the need for health care between the two groups but after controlling for this variation, immigrants have between 6% and 27% more visits to the doctor, GP or hospital stays than native-born persons. The largest differences are in physician visits. If differences in use are due to cultural reasons or lack of information, then campaigns should be designed to explain to the citizens how medical care units should be used. If the cause is the fragility of social networks, then efforts must be made to strengthen social links. If no efforts are carried out in this direction, then a growing immigrant elderly population will exert more pressure on the health care systems in the subsequent years.

Keywords: count data, physician services, elderly, immigration, microeconometrics.

JEL Classification: D0, C01, I11, I18.

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1. Introduction

The purpose of this study is to examine differences in health care utilization between the foreign and the native-born populations in a number of countries. The analysis is based on a relatively new multinational survey, the SHARE database which provides comparable cross-national individual data for eleven countries. The sample is nationally-representative of individuals who are 50 years old and over.

In the present research, there are three types of factors explaining health care usage: need, predisposing and enabling factors, which are already used in prior studies for explanations of observed disparities in health care usage (Lillie-Blanton and Hoffman, 2005; Weinick et al., 2005). Two possible explanations for medical care usage disparities are cultural background or the lack of a strong social network, which are generally stronger for more recent immigrants compared to those who are better established (Roan et al., 2007). The Andersen Model provides the basic theoretical approach (Andersen, 1968). Following this approach we include a variety of indicators of need for health care, factors that predispose one to use medical care and factors that enable or encourage the use of medical care. The hypothesis is that need for health care might differ between immigrants and natives and affect the relative levels of health care usage, and the lower socioeconomic status of immigrants groups could be related to the increased use of GPs (Stronks et al., 2001). Enabling factors are the conditions that make health services resources easier to use. Studies have shown that older immigrants' health service usage is significantly affected by their health insurance status (Angel et al, 2002). This approach allows us to clarify the mechanisms related to differential use of health care by immigrants and the native-born, keeping in mind that the role of individual factors may differ for the two groups and between countries.

Healthcare utilization varies considerably among European countries and may contribute to cross-country health disparities (OECD, 2004). Some of the variation may reflect differences in use of and dissemination of medical technologies. It is also possible that variability in use of some services is related to the policies by which access to some services is controlled even though universal coverage for the majority of health care services is provided in most of these countries

(OECD, 1993). Utilization is particularly high in the United States compared to Europe and it is unclear how this may be related to health status, because quality of care might play an important role (Börsch-Supan, et al. 2008), as it is suggested in the literature that immigrants receive poorer quality health services than natives (Chen et al., 1996). Many European countries have been the recipients of numerous immigrants over the past half century. One concern in planning future medical care needs is the pattern of health care usage of these now aging immigrants.

Immigrants might use medical services differently across countries because they face different policies, which are dissimilar from their own country of origin. A variety of factors - e.g. language, culture (health beliefs and traditions), health care organization, or living environment (Lorant et al., 2008) - might impact on the usage intensity of health care system in the country of destination. Moreover, countries may vary in their acceptance of immigrants and cultural differences between immigrants and natives may be greater in some situations than in others.

The relative importance of determinants of health care use might differ by type of medical care and by country. For instance, in Canada, general practitioner use increases as duration of residence increases, and the proportion of the immigrant population that reported use of a GP often exceeded that recorded in the native-born population (Newbold, 2009). Differences in access have been shown to play an important role in the probability of choosing type of physician (Rodríguez and Stoyanova, 2004). The increasing use of emergency room services as opposed to other alternatives is in some cases a consequence of differing barriers and level of satisfaction with primary care services (Puig-Junoy et al., 1998). When immigrants are from low-income countries their use of emergency services is even higher, which might be attributable to greater needs, barriers to access or reflect the way that immigrants access health care in their country of origin (Rué et al., 2008).

Some other explanations of the lower utilisation rates for the immigrant population are focussed on the healthy immigrant effect (Burón et al., 2008), where immigrants have better health than expected as a consequence of their selection on the basis of health and social factors, but subsequently their health status declines and converges towards that of the native-born

population. This effect is thought to be strongest among recent immigrants (Martikainen et al., 2008). Previous work of the authors examined immigrants' health in multiple European countries, finding generally worse health for immigrants (Solé-Auró and Crimmins, 2008). The healthy immigrant effect is noted in many studies (McDonald and Kennedy, 2004; Crimmins et al., 2007), and is also well known that immigrants appear to be positively selected when they are leaving from their country of origin (Jasso, et al. 2004), but some years after immigration the health differences may have disappeared (Stronks, 2003). Besides, costs resulting from emergency visits by immigrants are lower than those due to visits by the native-born population, and this effect is especially marked by adults (Cots et al., 2007). Some other researchers find higher utilization rates among some immigrant groups which are explained by disparities in health status or lack of knowledge about the health care system (Norredam et al., 2004) or more compulsory admissions (vs. voluntary) by immigrant population (Lay et al., 2006). Studies of immigrant/native born health care usage employ different datasets and different models, for countries with different cultures and types of immigrants, making the results difficult to compare.

Inequalities in health and the use of health care in the older population have been investigated by researchers in the last few decades (Jiménez-Martín et al., 2004; Hernández and Jiménez, 2008; Dormont and Huber, 2006). While inappropriate use of health care among immigrants is often reported, there is no evidence of excessive and inappropriate use of other health-care resources; however, the percentage of immigrants hospitalised is reported to be higher (Albin et al., 2005; Carrasco-Garrido et al., 2007). Individual differences in health accounted for the most of the between country variation in physician visits, while organization factors played a less important role (Bolin et al., 2008). There are a number of recent comparative analyses of health care systems in the literature (Peytremann and Santos, 2007). Among the studies, only a few focused on the differences between immigrants and native-born populations in terms of health care utilization (Cacciani et al., 2006).

The increase in spending on medical services, as a percent of gross domestic product (GDP), in some European countries in the last few years, could affect the supply of medical

services for adults. Table 1 shows the characteristics of national health care systems in 11 European countries. France and Switzerland are the countries spending the highest percentage of GDP and Spain the lowest. The number of physicians per 1,000 persons in 2006 also varies across countries. Denmark is the country with the lowest physician per person ratio and Greece the highest. In 7 out of 11 of these European countries, a general practitioner (GP) acts as a gatekeeper and must be seen before a visit to a specialist (SP) can be arranged (in other countries the patient can visit an SP directly). Where the GP acts as a gatekeeper one might expect it to be harder to use specialists, and this might reduce usage. Almost half of the countries require a fee for physician's services payment as a part of their national health system, and this should reduce usage among all, but be a larger barrier to those who have less socioeconomic status – e.g. immigrants -.

[Insert Table 1 about here]

While immigrant movements have increased rapidly in the last decade, especially in Europe, we hypothesize that under the conditions to which immigrants are exposed because of their immigration – such as lack of economic integration, language, cultural and economic differences, social barriers and other social network factors - they might not use the medical system in the same way as the native-born population. Results obtained may be important for planning the future needs in medical care.

2. Data

2.1 The Survey of Health, Ageing and Retirement in Europe

The data come from the first wave of the Survey of Health, Ageing and Retirement in Europe (SHARE, 2004) which is coordinated centrally at the Mannheim Research Institute for the Economics of Aging (MEA). SHARE provides information on the population 50 and over in participating countries based on probability samples of the noninstitutionalized population in each country. While this is a multi-national project, each country conducted its own national survey using a common questionnaire translated into the appropriate languages. The questionnaire was administrated face-to-face by computer-assisted personal interview (CAPI). In addition a self-

completion drop-off questionnaire was returned after the interview (Börsch-Supan et al., 2005). Our study includes information from eleven countries, which range from Scandinavia through central Europe to the Mediterranean. We do not include Israel or Eastern European countries because of their different patterns of immigration. The list of individual countries used in the analysis is shown in Table 1. The second wave of SHARE database is not used in this research because of the lack of some variables of interest – e.g. they do not ask about supplemental health insurance in wave 2 -.

The overall response rate in the first wave of SHARE database is 61.6%; This response rate is slightly lower than that in the two official Eurostat surveys but it is substantially higher than the response rate of other scientific surveys (Börsch-Supan and Jürges, 2005). There is variation in the response rates of the SHARE database across countries. Five countries exceeded 60%; Denmark (63.2%), France (81.0%), Germany (63.4%), Greece (63.1%) and the Netherlands (61.6%). The remaining countries were lower; Austria (55.6%), Belgium (39.2%), Italy (54.5%), Spain (53%), Sweden (46.9%) and Switzerland (38.8%). The most common reason for household non-response was refusal to participate; Switzerland had the highest percentage of refusals (50%) and France the lowest (21%) (Börsch-Supan and Jürges, 2005).

2.2 The sample

Table 2 shows the size and composition of the SHARE sample. The data used in the present analysis include information on 27,444 individuals aged 50 years and older including 12,552 males (996 immigrants) and 14,892 females (1,224 immigrants). There are 545 individuals eliminated from the sample because their immigration status was unknown. The percentage of immigrants in the sample is 8.1% ranging from 18.7 percent in Germany to 1.5 percent in Italy. Most immigrants, 71.6 percent, have citizenship in the country in which they reside. This ranges from 50 percent in Belgium to 100 percent in Italy. Immigrants studied here arrived, on average, in the 1960s, so this may be the reason for high proportions of individuals with citizenship (at least 65% in 8 out of 11 countries) in their countries of residence. Overall the number of foreign-born females exceeds that of immigrant males, this may reflect the higher mortality of older males

rather than differences in immigration by gender. The countries with the highest proportion of female immigrants are Italy, Greece and Spain; male immigrants are the highest in Denmark and Netherlands. While the sample ranges in age from 50 to 104, the average age is 65.3 years old. However, immigrants are a half-year younger on average (64.7) than the native-born (65.3). In almost all countries, the mean age is higher for the native-born than the immigrant population except for Austria, Belgium, Germany and Greece where immigrants average almost two years older than the native-born. The difference in mean age between immigrants and the native-born population ranges from 0.2 years (Belgium) to 5.5 years (Spain).

2.3 Measures

Immigrant Status:

Immigration status is defined as living in a country you were not born in. Each survey respondent is asked whether he or she was born in the country of interview. This response is used to divide the sample into the native-born and immigrant groups. Immigrant respondents also report their year of migration into the country. The mean year of immigration ranges from 1953 in Greece to 1980 in Spain. While people indicate in which country they were born, these data are not yet available. Citizenship is not used in the definition of immigrant status in this paper. While respondents are also asked whether they hold citizenship in the country of interview because it is residence, not citizenship, that is required to obtain healthcare. An individual could have a double nationality (from both, the country of origin and the country of destination), nationality of the country of origin, or even only nationality of the country of destination. Citizenship may indicate the integration of immigrants into the population into which they move and may indicate expanded rights. SHARE data do not provide information about the country of origin of the parents, which could be a useful tool to identifying cultural differences in the native born population. Therefore, with the available information of the survey, the best way to identify an immigrant is through the country of birth variable.

Health care utilization:

We examine use of three different types of medical care in the past 12 months: the number of times the respondent has seen a medical doctor, visits to a general practitioner (GP) and the number of times the patient has been in hospital for at least a night. Visits to a medical doctor are determined through response to the following question: "During the last twelve months, about how many times in total have you seen or talked to a medical doctor about your health? Dentist visits and hospital stays are excluded, but emergency room or outpatient clinic visits are included". Contact with a GP is reported in response to the question "How many of these medical doctor contacts where with a general practitioner or with a doctor at your health care center?" Finally, for hospital stays individuals answer the question "How often have you been a patient in a hospital overnight during the last twelve months?" The level of health services utilization was estimated for the total of the eleven participating countries and in each of them separately.

[Insert Table 2 about here]

Other variables and descriptive:

Factors affecting health care can be divided into need, enabling, and predisposing factors. Need is measured using three dimensions of health. First the number of symptoms out of eleven reported by each individual. Symptoms include pain in back, knees, hips or other joint, heart trouble, breathlessness, persistent cough, swollen legs, sleeping problems, falling down, fear of falling down, dizziness, faints or blackouts, stomach or intestinal problems and incontinence. Second, the presence of five chronic diseases are reported in response to the question "Has the doctor told you that you had any of the following conditions?": heart and cardiovascular diseases problems (heart attack or other heart problems, high blood pressure, high blood cholesterol, stroke or cerebral vascular disease), diabetes, lung disease (chronic lung disease or asthma), cancer (malignant tumor) and hip or femoral fracture. Finally, we included an indicator of self-perceived health. Self-perceived health is assessed using the question "Would you say your health is very good, good, fair, bad or very bad?" and answers were categorized into two categories: good or very good health, and less than good health.

Extended access to health care utilization may include direct access to specialists, medical care with a wider choice of doctors, as well as an extended choice of hospitals and clinics for hospital care. No extra payments for medical care or full coverage of costs for doctor visits (no co-payment) and full coverage of costs for hospital care (no co-payment) may be another enabling factor. As indicated above, three types of factors explaining health care usage are used: need, predisposing and enabling. Predisposing factors may include age, gender and higher education. Enabling factors can include the presence of a spouse or children, occupation, and the presence of voluntary supplementary health insurance that reduces the need for co-payment or increases access to physicians and services. As it is done in the Andersen Model (Andersen, 1968), we use the same pattern of variables in the factors affecting health care (need, enabling and predisposing factors).

Descriptive statistics for the dependent and independent variables are shown in Table 3. There are important differences across a number of health and other dimensions between immigrants and the native-born population in the eleven countries under study. There is an extensive variability in the use of medical care across these countries. As indexed by the average number of physician visits, GP visits and hospital stays during the last twelve months for immigrants and native-born populations in each European country under study. The lowest use of physicians and GPs in the last twelve months is reported in Sweden for both immigrants (4.0) and native-born (2.9). The highest physician use for immigrants is in Belgium (9.3) and in Spain for the native-born (9.2). The average number of GP visits ranged from 2.4 to 7.4 for immigrants and from 2.0 to 7.6 for native-born populations. The average number of hospital stays in the last twelve months ranged from 0.15 in Italy to 0.44 in Denmark for immigrants and from 0.13 in Greece to 0.37 in Austria for native-born populations. In most countries, immigrants have more physician visits, GP visits and hospital stays than the native-born populations. Exceptions include Italy, where the native-born population uses more of all three types of medical care, and in Austria and in Spain where the native-born have more GP visits when compared to immigrant populations. In Spain, native-born also have more physician visits than immigrants. In Austria and France, the native-born have on average more hospital stays than the immigrant population.

The proportion of immigrants reporting bad or very bad health varied from 31.5% in Switzerland to 55.7% in Germany. Among the native-born populations, it varied from 17.5% in Switzerland to 52.1% in Italy. Only in three countries, Austria, Italy and Spain, the percentage of immigrants reporting fair, bad or very bad health was lower among immigrants than among the native-born population. Switzerland and Spain, respectively, had the lowest and the highest mean number of chronic conditions for native-born populations, and for immigrants Austria and Italy, respectively, had the lowest and the highest mean number of chronic conditions. The countries with the lowest number of symptoms are the same as those for the mean number of chronic conditions, whereas the highest number of symptoms occurs in Spain among the native-born and Denmark for immigrants. Regarding marital status, both immigrants and the native-born populations more than half are married with the exceptions of Denmark and Greece.

[Insert Table 3 about here]

There were wide variations in educational attainment across countries. The mean number of years of education for the Spanish native-born population was 5.6, whereas for Germany it was 13.5. On the contrary, for immigrants, the mean years of education was 7.3 in France and 13.9 in Denmark. Participation in the labor force ranged from 19.7 percent for the native-born population in Italy to 41.6 percent in Switzerland. While the corresponding figure for immigrants is 18.4 percent in Germany to 44.0 percent in Spain.

As can be seen in Table 3 in five countries (Belgium, Denmark, Greece, Italy and Spain) immigrants have a higher extended access to the system as compared to native-born populations. Moreover, it is twice as high in Spain and Greece. However, the percentage of individuals with full coverage of costs for doctor visits and for hospital care is higher for immigrants than native-born populations in Austria, Denmark, Greece, Spain and Switzerland.

3. Methodology

3.1 Statistical Approach

Poisson or Negative Binomial models are nonlinear models developed for variables whose form is counts with nonnegative integer values. Poisson regression models are the starting point for

count data analysis, but in some cases this model is inadequate because of the assumption of equidispersion. The Poisson model produces misleading inference about the regression, if the data are over-dispersed. In this case, it is important to consider an alternative more general model, the Negative Binomial model, where a random term reflecting the unexplained part between subject differences is included in the regression model (Cameron and Trivedi, 2005).

We assume that the dependent health care utilization variables in this analysis follow a Poisson basic model, with each individual having a separate gamma distribution mean, giving rise to a Negative Binomial specification. Let y_{ij} represent the count of the response variable for the i^{th} person residing in country j. Let x_{ij} the vector for the covariates and μ_{ij} the expected number of occurrences. So, the Poisson regression model may be represented as:

$$P\left(y_{ij} = y\right) = \frac{e^{-\mu_{ij}} \mu_{ij}^{y_{ij}}}{y_{ij}!} \qquad y_{ij} = 0, 1, 2\ldots$$

where,

$$\mu_{ij} = \exp\left(\beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2ij} + \ldots + \beta_k x_{kij}\right) = \exp\left(x_{ij}^{'}\beta\right) > 0 \qquad (1)$$

and where x_{ij} is the vector of independent variables and β the vector of parameters to be estimated.

The expected value of y_{ij} given x_{ij} is μ_{ij}. The Poisson model restricts the conditional variance to equal the conditional mean of the endogenous variable, and then the variance of y_{ij} given x_{ij} is μ_{ij}.

Over-dispersion means that given the exogenous information, the variance of y_{ij} exceeds its expectation. The observed count of a Poisson model often exhibits more variability than the prediction and estimation from a Poisson regression model, for over-dispersed data which are unbiased (Gourieroux et al., 1984). Inappropriate assumption of mean-variance equality restriction may produce a small estimated standard error of β. We can measure the extra

variation by a dispersion or scale parameter. A simple over-dispersion statistic test, the likelihood ratio test, is developed to examine the null hypothesis of no over-dispersion. The likelihood ratio follows the Chi-squared distribution with one degree of freedom. If the null hypothesis is rejected, the Negative Binomial regression model is preferred to the Poisson regression (Cameron and Trivedi, 1998). Data analysis was conducted using SAS statistical analysis software. To produce accurate national country estimates, we used the sampling weights to account for the survey sample design of SHARE data.

4. Results

4.1 Regression Results

Negative Binomial regression results are presented in Tables 4 to 7. The results indicate the effect of being an immigrant on the use of each of the medical services (physician visits, GP visits and hospital stays) in each country and with data pooled across countries (Total).

The regression models include the following sets of individual characteristics among the explanatory variables:

Model 1 (M1): The regressions are estimated controlling for age and gender and a binary variable indicating that the respondent is an immigrant.

Model 2 (M2): Controls for health status or need for health care are added to the variables in model 1. These include the number of symptoms and the presence of heart and vascular diseases, lung conditions, cancer, diabetes and fractures. Once health status is controlled we are able to determine the effect of being an immigrant on the use of health services net of differences in health.

*Model 3 (M3): A*dds controls for socio-economic variables to M2 (years of education and employment status).

Model 4 (M4): Controls for the presence of voluntary supplementary health insurance are added (extended access and full coverage).

[Insert Table 4, 5, 6 and 7 about here]

4.2 Impact of individual factors on health care utilization: immigrants versus native-born population

As noted earlier, we have estimated Negative Binomial regression models for each country and for the pooled sample. The dependent variables are the number of visits to the doctor in the last twelve months, the number of visits to the GP in the last twelve months and the number of stays in hospitals in the last 12 months. In Table 4 we present only the coefficients related to immigrant status, controlling for age and gender. A positive and significant coefficient means that immigrants have a significantly larger use of medical services than native-born individuals with the same age and gender. According to the results of the pooled sample, we conclude that the expected numbers of all types of health care visits are significantly larger for immigrants than for native-born populations. The parameter estimate for the immigrant indicator for the number of visits to the physician in the overall sample model M1 is equal to 0.15. This means that the expected number of visits to the doctor is multiplied by exp(0.15)=1.16 if the respondent is an immigrant. So, we estimate that there exists a significantly higher (16%) number of physician visits for an immigrant compared to a native-born individual with the same age and gender. When interpreting the parameter corresponding to the immigrant indicator for GP visits in model M1 for the whole sample, we see that the expected number of visits to a GP is multiplied by exp(0.12)=1.13 if the respondent is an immigrant. So, we estimate that there exists a significant greater level of approximately 13% in the expected number of GP visits for an immigrant compared to a native-born individual with the same age and gender. The largest difference between immigrants and native-born individuals is found when modeling the number of hospital stays. For an immigrant, the expected number of hospital stays increases by 27% when compared to a native-born individual of the same age and gender.

Despite the small samples of immigrants in some countries, we find significant disparities in health care usage between immigrants and native-born in several countries. For instance, in Table 4 we see that in seven countries (Belgium, Denmark, France, Germany, The Netherlands, Sweden and Switzerland), the expected number of visits to the physician in the previous 12 months is significantly larger for immigrants when compared to the native-born population when

controlling for age and gender as we have done in model M1. The focus variable in this study is strongly significant in four countries, whilst is significant at 5% in two countries and at 10% in only one country (see Table 4). The same results appear when considering GP visits, being more significant in Belgium and the Netherlands, and less significant in France. Hospital stays do not show significant differences between immigrants and native-born population except in the case of Switzerland, where the expected number of visits is significantly larger for immigrants than for the native-born population and for Austria, where there is a significantly negative impact (contrary effect).

In Table 4, we see that Switzerland is one of the countries where there are more differences between the native-born and the immigrant populations. For the three indicators of health service usage, there is significantly more usage for immigrants than for native-born individuals. In other countries, like Denmark, France, Germany, The Netherlands and Sweden, there are differences in the expected number of visits between native-born individuals and immigrants for the number of physician visits and the visits to the GP, again controlling for age and gender. Austria is the only case where the expected number of hospital stays is significantly smaller for immigrants when compared to native-born individuals of the same age and gender. The exponential of the parameter estimate equals 0.6, which means that the expected number of hospital stays is 40% lower for the immigrant group with the same characteristics.

In model M2 where we include variables indicating the presence of health problems, the differences between immigrants and the native-born population persist (Table 5). The magnitude of the difference between immigrants and native-born individuals in model M2 is slightly lower than in model M1, but it is still significant and positive, which means that immigrants with the same age, gender and health conditions are expected to use health services more often than their native-born counterparts. The overall sample results show that 10%, 6% and 21%[2] increases in the frequency of physician visits, visits to the GP and in hospitals stays in the last twelve months,

[2] The exponential of the parameter estimate for physician visits (0.1) equals 1.10, which means a 10% increase. Similarly, the exponential of the parameter estimate for GP visits (0.06) equals 1.06, so the immigrant effect corresponds to a 6% increase and for the hospital stays model, the exponential of the parameter estimate (0.19) equals 1.21, showing that the expected increase for immigrants is 21%.

respectively, are expected for immigrants when compared to the native-born individuals of the same age, gender and health conditions.

The results presented in Table 5 also show the results for each country controlling for health conditions. Controls for health conditions are introduced to see whether immigrants use health care more as a consequence of their health differences compared to natives. In terms of hospital stays and for Austria, we see no evidence (the parameter is negative but non significant) that immigrants use hospitals more frequently than the native-born, whilst it appears to be significant in Greece (at 10%) and the Netherlands (at 5%). In Switzerland, significant differences between immigrants and the native-born population persist for the expected frequency of physician, GP visits, and hospital stays (less significant) but the parameter estimates are substantially reduced. For hospital stays, the parameter estimate is now less significant (at 10%). In Belgium and Denmark, for physician visits, in France, for GP visits, and Germany, for both, the differences in health service usage between native-born population and immigrants vanish when controlling for health conditions. In the Netherlands, model M2 in Table 5 indicates no difference between immigrants and native-born individuals for the expected number of visits to the physician, however strongly significant differences are still found for GP visits and now the expected number of hospital stays appears to be significantly higher (at 5%) for immigrants compared to the native-born population. In Sweden, the expected number of GP visits is less significantly different for immigrants and native-born populations of the same gender, age and health conditions.

Table 6 shows the results for the three different health care services using model M3. Controls for socio-economic variables are examined whether to see the differences in the social status of the individuals and how can affect to the health care consumption. The results for the whole sample are very similar to the ones obtained in model M2 (10%, 7% and 17% significantly higher for physician visits, GP visits and hospital stays, respectively). Now, we see that the expected number of physicians visits is 10% larger for immigrants than for the native-born population, the expected number of visits to the GP is 7% higher and the expected number of hospital stays is 17% higher for immigrants when compared to the native-born population with the

same age, gender, health conditions and socio-economic circumstances. The magnitude of the differences between those populations is about the same for model M2 and model M3, but is considerably smaller for hospital stays in model M3. When looking at the results in Table 6 for each country, we find evidence of positive and significant parameters for the immigrant effect only in France (visits to the doctor), in Denmark (visits to the GP), in the Netherlands (visits to the GP and hospital stays), Sweden and Switzerland (visits to the physician and to the GP). In all other countries, we do not find a significant effect, but we must bear in mind that we are only examining people 50 years and over, an age where the number of immigrants in the sample is small in some countries.

Finally, the results presented in Table 7 show the analysis for each country and the entire sample when controls for voluntary supplementary health insurance are added. Controls for health insurance allow us to control for the availability of insurance coverage that might affect health consumption. People with coverage are more likely to use the health care services if they know that they will be reimbursed for the services. The overall sample results are very similar to those obtained in models M2 and M3. The effects for the entire sample are virtually the same: 12%, 8% and 17% are the expected increases for immigrants in the frequency of physician visits, GP visits and hospital stays. When looking at the results in model M4 for each country, we obtain very similar results to the preceding model, M3. The only differences being that France has consistently higher physician visits for immigrants and lower physician visits for Switzerland as compared to the native-born population in model M4, and for hospital stays the significantly effect for immigrants disappear.

5. Discussion

The comparison of the elderly immigrant and native-born populations in use of health services in European countries had not been much explored in the previous countries. There is evidence that a difference in health conditions exists between immigrants and native populations, but after controlling for this variation, we examine whether immigrants use the health care system more extensively than native-borns.

After our model results, we conclude that immigrants on average appear to be using health services more than native-born individuals with the same characteristics in some European countries. The larger difference in the use of medical care between immigrants and native-born individuals is in physician visits, but in general there are also more visits to the GP and hospital stays for immigrants.

In Belgium, Denmark, France, Germany, the Netherlands, Sweden and Switzerland immigrants have a significantly larger number of visits to the doctor than the native-born population[3]. In the same countries, differences appear in the GP visits. Swiss immigrants compared to native-born have the largest differences in the expected number of visits to the doctor, GP and hospital stays when we do not control for their health status (model M1).

These findings point out to the fact that the health differences between the native-born population and the immigrants do not explain the total disparity in the use of medical care services. Because both the use of services and the health conditions generally occur many years after migration, we see that the differences in medical care usage at the ages when health tends to deteriorate generate more demand on the health care system. Although in the majority of these countries, where significant physician and GP visits differences exists between immigrants and native-born, the doctor type of payment is fee for service and at least 10,3% of GDP in health expenditure is spent (except for Denmark and Sweden), immigrants are still using more health care services (physicians and GP) than natives. Moreover, these differences can be more explored knowing the type of immigrants arrived in each country (data not available), to see whether – e.g. the climate - could effect the willingness of using health services more than natives and then predict possible differences between countries. A more extensive study is warranted to determine whether the particularities of each health system among these two groups could affect the use of care services in older population.

There are some limitations in this research. For instance, populations may be selected for health at the time of migration and that may affect immigrant health. When we did not find

[3] We refer to the number of visits to the doctor but we mean the expected number given the explanatory characteristics.

significant differences in the use of health care usage among immigrants and native-born, in some cases can be explained by the healthy immigrant effect. Some immigrants may also have returned to their countries of origin after becoming ill affecting differences, which is known as the salmon effect.

We would like to point out that SHARE does contain information about social network – e.g. living arrangements (family and friends) – and this information has been tested in previous analyses, but the results obtained did not change that much (data not shown). Immigrants might have fewer family ties and less community support. In addition, there are differences in the response rates to the surveys across countries, which could affect our results. We should note again, that the lowest response levels were in Switzerland.

Another limitation in this analysis is the lack of information on the area of origin of migrants and how that differs across countries. The time of migration and its movements, in these European countries, differed across the eleven countries. For instance, the Southern European countries of Spain, Greece and Italy were sending immigrants to the Northern counties in the sixties. In the eighties, the characteristics of migrants to European countries changed and many migrants were motivated to move because of political conflicts, civil wars, and economic crises in the Middle East, South America and Africa (Massey, 1990). Future research should examine the link between health of migrants and the place of origin, as well as regional health care usage differences – rural and urban communities- among immigrants and natives.

Moreover, immigration has been part of the new political agenda in most of the developed countries and many European countries have been reviewing their health care systems in order to update them so that they can adapt dynamically to changes in the society. It is necessary that governments modify their public policies to meet new tendencies in health.

The results of this study add to our understanding of the behaviour of elderly citizens' across Europe. If the main reason for immigrants to be using medical care more often than the native-born is due to cultural reasons or lack of information, then campaigns should be designed to explain to the citizens how medical care units should be used. If the cause of the differential demand is the lack of social networks, then efforts must be made to integrate the elderly

immigrants into European society. If no efforts are carried out in this direction, then a growing immigrant elderly population will exert more pressure on the health care systems in the subsequent years. In fact, there already exists little evidence that health care utilization increased over time with concomitant declines in health status.

The complexity of healthcare systems and the heterogeneous nature of physician visits, GP visits and hospital stays call for deeper analysis before tangible policy recommendations to increase efficiency and quality of healthcare can be produced. Therefore, a comparison of both, Europe and the US, should be done in order to understand, more precisely, variations in the level of health services utilization, as well as considering longitudinal design will enable us to move into causality results over time.

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Table 1: Characteristics of national health systems and the distribution of health spending by countries

Country	*Total health expenditure as a percent of GDP (%), 2006*	*Physicians/1000, 2006*	*GP gatekeepers*	*Doctor type of payment*[a]
Austria	10.1	3.6	YES	Fee for service
Belgium	10.3	4.0	NO	Fee for service
Denmark	9.5	3.3[2]	YES	Fee for service
France	11.0	3.4	YES	Fee for service
Germany	10.6	3.5	NO	Fee for service
Greece	9.1	5.0[2]	NO	Salary
Italy	9.0	3.7	YES	Capitation
Netherlands	9.5[1]	3.8	YES	Capitation
Spain	8.4	3.6	YES	Salary
Sweden	9.2	3.5[2]	YES	Capitation
Switzerland	11.3	3.8	NO	Fee for service

Source: OECD Health Data (2008) – Frequently Requested Data; [a] WHO (2004)
Remuneration for doctors: a) Capitation is when doctors are paid as a function of the number of registered patients; b) Salary is when doctors are employed by the state or the insurer; c) Fee for service is when doctors are paid (at least partially) on the basis of the services provided.
[1] 2004; [2]2005.

Table 2. Number of respondents

Country	*N*	*Males*	*Females*	*Immigrants*	*Mean year of immigration*	*% of immigrants with citizenship*	*% of Immigrants*		
							Total	*Males*	*Females*
Austria	1,849	777	1,072	173	1963	73.5	9.4	41.0	59.0
Belgium	3,649	1,715	1,934	253	1960	50.0	6.9	46.6	53.4
Denmark	1,615	757	858	59	1963	66.7	3.7	47.5	52.5
France	3,038	1,367	1,671	454	1964	65.1	15.1	46.3	53.7
Germany	2,941	1,370	1,571	550	1961	87.3	18.7	47.6	52.4
Greece	2,669	1,241	1,428	64	1953	90.3	2.4	39.0	61.0
Italy	2,508	1,126	1,382	37	1962	100	1.5	27.0	73.0
Netherlands	2,865	1,348	1,517	173	1967	82.5	6.0	46.8	53.2
Spain	2,353	989	1,364	52	1980	50.0	2.2	32.7	67.3
Sweden	2,997	1,407	1,590	250	1965	67.6	8.4	41.2	58.8
Switzerland	960	455	505	155	1964	52.9	16.2	45.8	54.2
Total	27,444	12,552	14,892	2,220	1964	71.6	8.1	44.9	55.1

Source: SHARE data 2004 (individuals 50+).

Table 3. Descriptive Statistics: Means or percentages by country

Native-born

Variables	Countries	All	Austria	Belgium	Denmark	France	Germany	Greece	Italy	Netherlands	Spain	Sweden	Switzerland
	Number of respondents	25,168	1,673	3,394	1,552	2,545	2,390	2,604	2,470	2,691	2,300	2,745	804
Dependent	Times physician	6.5	6.4	8.3	4.3	7.0	7.9	5.6	8.9	4.5	9.2	2.9	4.4
	Times GP	5.0	5.0	6.4	3.3	5.5	5.5	4.2	7.4	2.9	7.6	2.0	3.2
	Times Hospital	0.20	0.37	0.22	0.23	0.22	0.25	0.13	0.19	0.13	0.19	0.20	0.15
Explanatory													
Health status	Less than good heath	38.4%	39.6%	32.6%	30.6%	37.2%	44.7%	38.2%	52.1%	31.1%	50.0%	36.0%	17.5%
	Chronic Diseases	1.5	1.3	1.7	1.6	1.6	1.5	1.5	1.7	1.3	1.8	1.5	1.0
	Number of Symptoms	1.5	1.3	1.6	1.5	1.6	1.5	1.3	1.7	1.2	1.9	1.7	1.0
Marital Status	Married	63.7%	59.2%	68.9%	61.4%	64.8%	62.1%	67.1%	63.6%	65.9%	63.0%	56.1%	66.1%
Socio-economic characteristics	Age	65.3	65.0	64.9	64.6	65.7	65.1	65.2	65.9	64.4	66.4	66.2	64.7
Gender	Female	54.1%	55.6%	54.0%	53.5%	55.3%	55.2%	53.4%	55.0%	53.3%	54.3%	52.6%	53.6%
Education	Years of education	9.9	11.4	10.3	12.8	8.7	13.5	8.4	7.1	11.0	5.6	10.2	12.3
Occupation	Employed	27.9%	21.5%	22.5%	38.0%	26.9%	30.9%	25.0%	19.7%	30.8%	22.5%	39.1%	41.6%
Supplementary insurance coverage	Extended access	13.9%	18.7%	6.2%	13.1%	80.0%	7.5%	2.6%	3.7%	0%	6.9%	1.6%	25.6%
	Full coverage	15.0%	7.3%	56.2%	2.6%	50.9%	5.8%	2.3%	1.2%	0%	4.8%	1.7%	2.7%

Immigrants

Variables	Countries	All	Austria	Belgium	Denmark	France	Germany	Greece	Italy	Netherlands	Spain	Sweden	Switzerland
	Number of respondents	2,220	173	253	59	454	550	64	37	173	52	250	155
Dependent	Times physician	7.4	6.9	9.3	5.9	7.6	9.0	7.5	8.8	5.4	6.7	4.0	7.0
	Times GP	5.5	4.8	7.4	5.3	5.7	6.5	5.3	7.3	3.9	5.5	2.4	5.2
	Times Hospital	0.25	0.25	0.26	0.44	0.21	0.28	0.23	0.15	0.20	0.25	0.20	0.31
Explanatory													
Health status	Less than good health	46.7%	37.9%	35.7%	38.4%	49.7%	55.7%	54.4%	41.9%	49.6%	30.9%	50.5%	31.5%
	Chronic Diseases	1.6	1.0	1.9	1.8	1.5	1.7	2.0	2.0	1.3	1.6	1.8	1.2
	Number of Symptoms	1.8	1.3	2.0	2.3	1.6	2.0	2.2	1.9	1.5	1.6	2.0	1.3
Marital Status	Married	60.8%	51.7%	67.6%	48.6%	64.8%	61.3%	45.8%	70.0%	59.4%	64.4%	54.6%	66.2%
Socio-economic characteristics	Age	64.7	66.6	65.1	63.4	63.5	66.6	68.5	64.7	62.7	60.9	63.9	63.5
Gender	Female	55.0%	56.4%	54.4%	51.0%	53.0%	54.3%	63.7%	66.8%	52.9%	59.6%	57.3%	55.6%
Education	Years of education	10.6	11.6	9.4	13.9	7.3	12.9	9.2	9.2	10.7	10.0	11.0	11.6
Occupation	Employed	27.2%	20.5%	19.6%	37.0%	31.5%	18.4%	22.0%	24.7%	31.8%	44.0%	37.5%	36.3%
Supplementary insurance coverage	Extended access	19.0%	17.3%	10.0%	15.4%	66.5%	3.6%	7.8%	4.6%	0%	14.5%	0.9%	19.3%
	Full coverage	14.6%	8.0%	47.1%	4.6%	33.7%	3.7%	4.7%	0%	0%	4.9%	1.2%	4.3%

Source: SHARE data, 2004 (Individuals 50+). Weights are used in this table.

Table 4. Parameter Estimates for Immigrant vs. native-born populations in the per country and whole sample model M1

Country	*Physician visits*		*GP visits*		*Hospital visits*	
	ß	*95% CI*	*ß*	*95% CI*	*ß*	*95% CI*
Austria	0.07	(-0.12,0.25)	-0.07	(-0.25,0.12)	-0.50**	(-0.95,-0.04)
Belgium	0.11*	(-0.01,0.23)	0.16**	(0.04,0.28)	0.14	(-0.22,0.50)
Denmark	0.32***	(0.02,0.62)	0.47***	(0.19,0.75)	0.56	(-0.20,1.33)
France	0.12***	(0.04,0.21)	0.08*	(-0.00,0.17)	0.02	(-0.27,0.32)
Germany	0.10**	(0.01,0.20)	0.14***	(0.04,0.23)	0.11	(-0.14,0.36)
Greece	0.21	(-0.08,0.50)	0.07	(-0.26,0.40)	0.56	(-0.29,1.41)
Italy	-0.03	(-0.43,0.37)	-0.05	(-0.46,0.37)	-0.25	(-1.35,0.84)
Netherlands	0.22**	(0.05,0.40)	0.36***	(0.20,0.53)	0.43	(-0.08,0.93)
Spain	-0.23	(-0.54,0.08)	-0.20	(-0.52,0.12)	0.46	(-0.42,1.33)
Sweden	0.35***	(0.21,0.49)	0.21***	(0.07,0.35)	0.27	(-0.14,0.68)
Switzerland	0.53***	(0.33,0.74)	0.56***	(0.35,0.76)	0.88***	(0.36,1.39)
Total	0.15***	(0.11,0.20)	0.12***	(0.07,0.17)	0.24***	(0.11,0.37)

M1: age and gender controlled. The model is estimated in each country and in the entire sample.
*** p<0.01, ** p<0.05, * p<0.1
Wald 95% Confidence Intervals in parentheses.
Source: SHARE data, 2004 (individuals 50+).

Table 5. Parameter Estimates for Immigrant vs. native-born populations in the per country and whole sample model M2

Country	*Physician visits*		*GP visits*		*Hospital visits*	
	ß	*95% CI*	*ß*	*95% CI*	*ß*	*95% CI*
Austria	0.08	(-0.09,0.25)	-0.08	(-0.25,0.10)	-0.32	(-0.76,0.12)
Belgium	0.08	(-0.03,0.19)	0.13**	(0.02,0.24)	0.05	(-0.31,0.40)
Denmark	0.08	(-0.19,0.35)	0.23*	(-0.03,0.49)	-0.07	(-0.86,0.72)
France	0.12***	(0.04,0.20)	0.06	(-0.02,0.14)	0.04	(-0.25,0.33)
Germany	-0.04	(-0.13,0.04)	-0.01	(-0.10,0.08)	-0.05	(-0.30,0.20)
Greece	-0.01	(-0.28,0.26)	0.04	(-0.27,0.36)	0.71*	(-0.08,1.50)
Italy	-0.03	(-0.41,0.34)	-0.07	(-0.45,0.32)	-0.04	(-1.09,1.01)
Netherlands	0.13	(-0.03,0.30)	0.27***	(0.12,0.42)	0.54**	(0.05,1.03)
Spain	-0.17	(-0.47,0.12)	-0.15	(-0.47,0.16)	0.49	(-0.36,1.35)
Sweden	0.26***	(0.13,0.40)	0.13*	(0.00,0.27)	0.23	(-0.17,0.63)
Switzerland	0.28***	(0.09,0.47)	0.31***	(0.12,0.50)	0.49*	(-0.01,0.99)
Total	0.10***	(0.05,0.14)	0.06**	(0.01,0.10)	0.19***	(0.07,0.32)

M2: age, gender, number of symptoms, heart and vascular diseases, lung conditions, cancer, diabetes and fractures controlled. The model is estimated in each country and in the entire sample.
*** p<0.01, ** p<0.05, * p<0.1
Wald 95% Confidence Intervals in parentheses.
Source: SHARE data, 2004 (individuals 50+).

Table 6. Parameter Estimates for Immigrant vs. native-born populations in the per country and whole sample model M3

Country	*Physician visits*		*GP visits*		*Hospital visits*	
	ß	*95% CI*	*ß*	*95% CI*	*ß*	*95% CI*
Austria	0.01	(-0.17,0.18)	-0.13	(-0.30,0.05)	-0.31	(-0.75,0.13)
Belgium	0.07	(-0.05,0.18)	0.08	(-0.03,0.19)	0.07	(-0.29,0.42)
Denmark	0.06	(-0.21,0.33)	0.23*	(-0.03,0.49)	-0.15	(-0.98,0.66)
France	0.11**	(0.03,0.19)	0.02	(-0.06,0.10)	0.04	(-0.26,0.33)
Germany	-0.07	(-0.15,0.02)	-0.05	(-0.13,0.04)	-0.07	(-0.32,0.19)
Greece	-0.02	(-0.29,0.25)	0.03	(-0.28,0.35)	0.78*	(-0.02,1.57)
Italy	0.02	(-0.35,0.40)	0.05	(-0.34,0.44)	0.04	(-1.01,1.10)
Netherlands	0.13	(-0.03,0.29)	0.27***	(0.12,0.42)	0.51**	(0.02,1.00)
Spain	-0.07	(-0.37,0.23)	0.01	(-0.30,0.33)	0.70	(-0.18,1.57)
Sweden	0.30***	(0.16,0.43)	0.16**	(0.02,0.30)	0.26	(-0.15,0.67)
Switzerland	0.18*	(-0.02,0.37)	0.22**	(0.02,0.41)	0.24	(-0.31,0.78)
Total	0.10***	(0.05,0.15)	0.07***	(0.02,0.11)	0.16**	(0.03,0.29)

M3: age, gender, number of symptoms, heart and vascular diseases, lung conditions, cancer, diabetes, fractures, years of education and occupation controlled. The model is estimated in each country and in the entire sample.
*** p<0.01, ** p<0.05, * p<0.1
Wald 95% Confidence Intervals in parentheses.
Source: SHARE data, 2004 (individuals 50+).

Table 7. Parameter Estimates for Immigrant vs. native-born populations in the per country and whole sample model M4

Country	*Physician visits*		*GP visits*		*Hospital visits*	
	ß	*95% CI*	*ß*	*95% CI*	*ß*	*95% CI*
Austria	-0.01	(-0.19,0.17)	-0.09	(-0.27,0.09)	-0.26	(-0.71,0.19)
Belgium	0.08	(-0.03,0.19)	0.09	(-0.02,0.21)	0.11	(-0.25,0.46)
Denmark	0.06	(-0.21,0.33)	0.23*	(-0.03,0.49)	-0.13	(-0.94,0.68)
France	0.13***	(0.04,0.22)	0.04	(-0.04,0.12)	0.07	(-0.23,0.37)
Germany	-0.03	(-0.12,0.06)	-0.02	(-0.11,0.07)	-0.07	(-0.34,0.19)
Greece	0.01	(-0.26,0.29)	0.06	(-0.25,0.38)	0.69	(-0.15,1.53)
Italy	0.03	(-0.35,0.40)	0.05	(-0.34,0.44)	0.08	(-0.97,1.13)
Netherlands	0.13	(-0.03,0.29)	0.27***	(0.12,0.42)	0.51**	(0.02,1.00)
Spain	-0.09	(-0.38,0.21)	-0.01	(-0.32,0.30)	0.72	(-0.15,0.60)
Sweden	0.30***	(0.16,0.43)	0.16**	(0.02,0.30)	0.25	(-0.16,0.66)
Switzerland	0.17*	(-0.03,0.37)	0.21**	(0.02,0.41)	0.24	(-0.31,0.79)
Total	0.11***	(0.07,0.16)	0.08***	(0.03,0.13)	0.16**	(0.03,0.29)

M4: age, gender, number of symptoms, heart and vascular diseases, lung conditions, cancer, diabetes, fractures, years of education, occupation, extended access and full coverage controlled. The model is estimated in each country and in the entire sample.
*** p<0.01, ** p<0.05, * p<0.1
Wald 95% Confidence Intervals in parentheses.
Source: SHARE data, 2004 (individuals 50+).