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RSCAS 2016/55

Robert Schuman Centre for Advanced Studies
Global Governance Programme-237

Inequalities by immigrant status in unmet needs for
healthcare in Europe:
the role of origin, nationality and economic resources

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EUI Working Paper **RSCAS** 2016/55

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ISSN 1028-3625

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Printed in Italy, October 2016
European University Institute
Badia Fiesolana
I – 50014 San Domenico di Fiesole (FI)
Italy
www.eui.eu/RSCAS/Publications/
www.eui.eu
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Abstract

The aim of the research is to assess whether there are inequalities in unmet needs for healthcare between natives and migrants within Europe. We used cross-sectional data from the *European Statistics on Income and Living Conditions 2012*. Our dependent variables were perceived unmet needs for medical and dental examination or treatment. Our main independent variable is immigrant status, defined using a combination of country of birth and citizenship (nationals born in the country of residence, reference; European Union-born nationals; non-EU born nationals; EU-born foreigners; non EU-born foreigners). The prevalence ratios of unmet needs according to immigrant status are obtained through sex-stratified robust Poisson regression models, sequentially adjusted by age, health status and socio-economic characteristics.

The prevalence of medical unmet needs, adjusted by age and health status, is higher in foreign women, both EU-born and non-EU born, but it is no longer significant after the socioeconomic adjustment. For dental unmet needs, the risk is significantly higher for all foreigners, EU and non EU-born, men and women. Once adjusted for socioeconomic variables significant inequalities persist, although diminished, for both EU-born and non-EU-born foreign men and EU-born foreign women.

This study contributes to the discussion of adequate access to healthcare systems and adaptation of services for migrants. While inequalities cannot be detected for naturalised immigrants, the higher risk of unmet need affecting foreigners, even within the EU, deserves further attention.

Keywords

Unmet needs, health inequalities, migrant health, Europe

Introduction*

The recent contributions to the literature of migration and ethnic inequalities in healthcare research are numerous (Suess *et al.*, 2014; Essink-Bot *et al.*, 2012; Smith Nielsen and Krasnik, 2010; Norredam *et al.*, 2009) and mainly aim at investigating what should be considered an illegitimate component of the inequalities (Mackenbach, 2012), since inequalities in healthcare occur when healthcare received does not meet the need for healthcare in all groups (Essink-Bot *et al.*, 2012). A systematic review of European studies on migrants' access to somatic healthcare services suggests that it remains difficult to compare the efficiency of health services due to diverging measures of ethnic or migrant background, outcomes and adjustment variables (Essink-Bot *et al.*, 2012).

In this study we focus on unmet needs (thereafter **UNs**) for healthcare as the main indicator of healthcare access for migrants versus native, taking advantage from its availability in the cross-national survey *EU-SILC*. The study of UNs has become very popular in the United States (Litaker *et al.*, 2005; Shi and Stevens, 2005), especially for investigating the conditions of specific groups of population, such as homeless people (Lewies *et al.*, 2003; Baggett *et al.*, 2010), HIV patients (Heslin *et al.*, 2001; Marcus *et al.*, 2000) or children with special needs (Kane *et al.*, 2005; Dusing *et al.*, 2004).

In Europe the first who analysed the relationship between UNs and personal characteristics in the *European Statistics on Income and Living Conditions* (thereafter **EU-SILC**) dataset was Koolman (2007). He observed that the study of subjective needs is a proxy much closer to access than utilisation, since, in order to achieve *horizontal equity* in healthcare, resources should be allocated accordingly to health needs in the societies (Van Doorslaer *et al.*, 2000). The Author, therefore, focused on the relationship between the unmet needs and a selection of non-need factors, labelled as the personal characteristics, which should not affect such allocation. In his study the UNs result for all countries (strongly) concentrated among the lower income households and to a lower degree explained by urbanisation, income and ethnicity group. In terms of medical examinations and treatment, this implies that individuals in equal state of health but unequal in other characteristics, such as the ethnicity group, have unequal probabilities in UNs for healthcare. However, as the causes for inequity vary dramatically from country to country, policies to address these inequities may well be equally diverse accordingly to the countries specificities.

Similarly to Koolman (2007), Allin and Masseria (2009a) have found a strong association between income and healthcare needs and, after adjusting for health indicated by the self-health assessment (thereafter **SAH**) which tends to be worse with the lower income, the relationship with income persisted in almost all countries. In a successive paper Allin and Masseria (2009b) combined the *Survey of Health, Ageing and Retirement in Europe* (thereafter **SHARE**) and *EU-SILC* surveys to analyse the obstacles in the access to healthcare service in Europe, given the high variety of Member States (thereafter **MS**) health systems. In the Allin and Masseria's study the variables of interest were self-reported UNs from *EU-SILC* and forgone care due to costs or unavailability of care from *SHARE*, which represented the utilization of the health system. In order to take into account the access to the health system, they considered the probability of accessing three services in the last 12 months - as general practitioner, specialist and physician - and the *out-of-pocket* expenditure. Combining the two set of information, the Authors found a positive association between forgoing health care and using health services: people who report to forgo care appear to be relatively higher users of the health system than those who do not report this access problem. Further Mielck *et al.* (2009) have studied the association between foregone care and income gradient in five European Western countries - such as France, Germany, Greece, Italy and Sweden - confirming the relationship mainly concentrated in subgroups of individuals with chronic diseases.

* The research leading to these results was partially funded by the 7th Framework Programme (grant 278173, SOPHIE project). The Authors want to thank Samuel Bowles, Marc Helbling, David Ingleby, Tiziano Razzolini, Anna Triandafyllidou, SOPHIE colleagues and anonymous reviewers for useful comments.

Baert and de Norre (2009), analysing the wave 2007 of *EU-SILC*, found that in addition to the equivalised income, the level of stated SAH and working position, the factor that is most strongly related to UNs is the country of residence in the EU-25. Hernández-Quevedo *et al.* (2010) also employed *the EU-SILC* survey to explore the determinants of UNs: they found a positive correlation of medical UNs with low education level - primary or secondary education - and also unemployment or self-employment. A variation of UNs by country of residence was also observed. UNs for dental care were less frequent in elderly people, while employment - such as unemployed, disabled and inactive people - and country of residence were significant predictors of dental UNs.

Political and economic context also matter for UNs, due to changes in affordability and availability of services, especially in vulnerable groups. For a report of the European Commission, Rodrigues *et al.* (2013) analysed a *EU-SILC* panel dataset (2006-2011) and found increases in the UNs in some of the EU countries more hit by the economic crisis – as Cyprus, Greece, Ireland, Italy, Latvia, Portugal, Slovenia and Spain. The Authors found that UNs have increased since the crisis broke in a number of the countries analysed, confirmed by another recent analysis (Reeves *et al.*, 2015) showing a break and reversal in the previously decreasing trend of UNs in Europe since the beginning of the Great Recession and austerity policies. In a recent study (Chaupain-Guillot and Guillot, 2015), the Authors analysed the 2009 cross-sectional wave of *EU-SILC* estimating the probability of experiencing UNs across countries. The country variability is partly explained by the differences in financing the healthcare systems and the share of *out-of-pocket* expenditure, to which UNs seem positively correlated.

Giannoni (2010) analysed the 2007 *EU-SILC* cross-sectional dataset for the different Italian Regions, concentrating the analysis on the migration status. Given the disposable income, Giannoni underlined the presence of inequities experienced by non-EU citizens due to income and migrant status, both in the SAH measure as in the equity of access to healthcare services on the basis of the UNs variable, more high in the North and South than in the Centre.

To sum up, several studies report that individuals in equal state of health but unequal in other characteristics, such as the income class or immigrant status, may have unequal probabilities in UNs for health care. *EU-SILC* appears to be a promising dataset to explore the determinants of UNs, and migration-related inequalities in UNs. However, even if the dataset is a harmonized dataset, a large heterogeneity in methods of sampling, data collection and response rates exists between countries (Malmusi, 2014). Moreover, the limited participation and the under-representation of migrants in population surveys could represent a limit but the standardized quality of data makes the comparison among nationals and across countries possible.

To our knowledge, a comprehensive analysis of UNs and immigrant status in Europe is still missing and this paper aims to fill this gap. In this study we propose a novel classification of immigrant status taking into account the citizenship and country of birth, and the impact of these two variables on medical and dental UNs is analysed for the whole European population. The attention is focused on the conditions suffered by the intra-EU migrants in addition to the third country nationals. This study aims at answering the following questions:

- a) are there systematic differences in the satisfaction of health care needs in immigrants as compared to natives?
- b) and which are the factors and reasons that influence or explain the inequalities in the satisfaction of healthcare needs?

1. Methods

The cross-sectional study is conducted on the 2012 *EU-SILC* individual dataset of 17 European countries: 15 EU MS (Austria, Cyprus, Czech Republic, Denmark, Finland, France, Greece, Italy, Luxembourg, Netherlands, Poland, Portugal, Spain, Sweden, United Kingdom) plus Norway and Switzerland. We have included all the countries presenting foreign-born citizens interviewed > 0,5% and distinct categories for foreign-born within and outside the EU, as also proposed by Malmusi (2014).¹ The total sample is composed by 308,728 individuals of over 16 years of age. In general, the EU-SILC questions are posed to all current household members (aged 16 and over) at an individual level but in some specific countries (Denmark, Finland, Netherlands, Norway and Sweden), only to the selected respondent. The randomised selection procedures are used to ensure that a representative sample of people is obtained from the representative sample of households.

Our dependent variables were **Unmet needs** (UNs) for medical and dental care: the needs for medical and dental examination or treatment which do not meet any response from the health system. They were expressed through the questions: “*Was there any time during the past 12 months when you really needed a medical (dental) treatment but did not?*”. The two possible answers were yes or no. Our main independent variable is **immigrant status** and its classification is given by a combination of the citizenship declared by interviewees, which determines their entitlement to public healthcare, and the country of birth, as even naturalised foreign-born may experience origin-based inequalities in access related with culture, knowledge of the system, socioeconomic differences or ethnic discrimination. The weighted total sample of 302,815 individuals is, therefore, divided into five groups: native nationals (89.9%), EU-born nationals (1.21%), non EU-born nationals (3.34%), EU-born foreigners (EU-born with EU nationality, 2.33%) and non EU-born foreigners (non EU-born with non EU nationality, 3.55%). A residual group of less than 1,000 subjects (0.32%), including native foreigners, EU-born non-EU-nationals and non-EU-born EU-nationals, are excluded from the analyses.

The main socio-demographic characteristics considered are: age, divided in five groups (16-30; 31-45; 46-60; 61-75; 76-over), and the maximum educational level reached, classified as primary, secondary and tertiary education according to *International Standard Classification of Education* (thereafter **ISCED**). Plus, the occupational level, based on the *International Standard Classification of Occupations* (thereafter **ISCO**) arranged in six categories - managers and professionals, technicians, clerks, skilled manual workers, elementary occupations and armed forces - and the activity status, divided in seven categorizations - employees, employed persons except employees, other employed, unemployed, retired, inactive and other inactive. Lastly, the equivalised household income, categorised in country-specific quintiles and the ability to make ends meet, regrouped in four categories (very) difficult, with some difficulties, fairly easily and (very) easily – in order to define the financial position. The country of residence concludes the socio-demographic control variables. The main health characteristics declared by the interviewees used to control for different health care needs are: the SAH measure, classified into three categories - (very) good, fair, (very) bad, the reported presence of a limiting chronic or longstanding illness and the limitations in activities due to health problems suffered (yes strongly, yes and no). In addition, we consider also the accessibility to primary health services (with difficulty and easily).

Further, the follow-up questions on the main reason for UNs for medical and dental examination or treatment are considered in this analysis. The questionnaires offered eight possible categories: (1) *Could not afford to (too expensive)*; (2) *Waiting list*; (3) *Could not take time because of work, care for children or for others*; (4) *Too far to travel/no means of transportation*; (5) *Fear of doctor/hospitals/examination/treatment*; (6) *Wanted to wait and see if problem got better on its own*; (7) *Didn't know any good doctor or specialist* and (8) *Other reasons*. We decided to recode them into

¹ This selection criteria is necessary as some countries mix together data on EU migrant population and third-country nationals.

six groups as financial (1), structural (2 and 4), time (3), fear and lack of knowledge (5 and 7), wait and see (6), other (8). The six groups of reasons define different causes for the presence of UNs. In order to establish the relationship between independent variables and dependent variables, we run some non-parametric tests – Kruskal-Wallis, chi squared and Spearman tests. Almost all variables present low p-values (<0,05) suggesting a significant impact of independent variables on UNs: this result confirms the importance to model the data and measure the impact of independent variables.

The *EU-SILC* personal cross-sectional weight is applied to all analyses to account for the sampling design and non-response and all analyses are stratified by sex. In the epidemiological literature, an established model is the robust Poisson regression (Zou, 2004). This model has been proved to better than the logit model when the probability of success of the binary variable is particularly low. Comparing to a logit model, the Poisson model reports unbiased prevalence ratios which are the parameters of primary interest in this kind of inequality distribution study and immediately interpretable by policy makers. The prevalence ratio is obtained by the robust error variance - procedure known as *sandwich estimator* – and expresses the ratio of prevalence between the exposed and non-exposed. In the study we report the prevalence ratios (thereafter **PRs**) of medical and dental UNs, sequentially adjusting by several explanatory variables.

The Poisson regression models are calculated for medical as for dental UNs, computing the PRs in respect to a baseline category. A set of nested models are reported for the subsample of women and men, considering distinctly the gender as potential effect modifier. Indeed, the PRs for medical and dental UNs by immigrant status were computed adjusting for age and country of residence, after controlling for health characteristics, then also for socio-economic variables. First we have controlled for the equivalised income and the ability to make ends meet, which impact substantially on the PRs, then also adding the maximum education level reached in order to picture all the economic and financial explanatory variables. The models present a pseudo R^2 between 0,4-0,12: these levels sensibly increase modifying the definition of models.

2. Results

The main characteristics of the sample are reported in **Table 1**. The relevant statistics are stratified by sex and immigrant status. The EU and non EU-born foreigners are mainly concentrated in the 31-45 age group, respectively in the former men 37.9%, women 39.2% and in the latter men 44.7%, women 43.3%, while less than 3% are in the 76-over range the EU and non EU-born foreigners are minimal (respectively men 2.7% and 1.2%, while women 2.8% and 1.4%). The non EU-born foreigners are more likely having a primary education (men 41.7%, women 37%) than secondary (men 33.1%, woman 33.7%) while the reverse is true for the other groups.

The EU and non EU-born foreigners are more concentrated in elementary occupations, while the non EU-born foreigners are more likely being unemployed (men 17.7%, women 12.9%) than the others. Non-EU foreigners are the most concentrated in the lowest income quintiles (men 43.7%, women 43.2%), followed by non-EU born nationals (men 30.8%, women 31.8%). This is confirmed also in the distribution by ability to make ends meet, similar to the whole income distribution.

Surprisingly, non-EU born nationals and foreigners are less likely to report problems in accessibility to primary health care services. Native, EU-born and non-EU born nationals are more likely to declare a bad SAH than foreigners, having chronic diseases and limitations in activities due to health issues. The distribution of having bad SAH, chronic diseases and limitations in activities is slightly worse in women than in men.

Table 1. Description in percentage of the sample by sex, immigrant status, socio-demographic and health characteristics

EU SILC 2012		Men					Woman					
		Native Nationals	EU-born Nationals	Non EU-born Nationals	EU-born Foreigners	Non EU-born Foreigners	Native Nationals	EU-born Nationals	Non EU-born Nationals	EU-born Foreigners	Non EU-born Foreigners	
	Sample	132,668	1,822	3,393	4,314	2,903	142,273	2,591	4,182	4,721	3,948	
	Weighted	131,247	1,551	4,702	3,322	5,204	140,009	2,103	5,409	3,722	5,545	
Socio-demographic Characteristics	Age	Years 16-30	22.3	14.2	16.2	21.9	28.4	20.2	7.7	15.9	24.2	31.3
		Years 31-45	25.9	28.9	31.0	38.0	44.7	24.0	25.8	30.8	39.2	43.3
		Years 46-60	33.2	31.2	37.9	27.9	23.0	32.3	32.1	38.5	27.0	21.2
		Years 61-75	10.6	15.2	8.2	9.5	2.6	11.6	16.6	7.9	6.7	2.6
		Years 76-over	8.1	10.5	6.6	2.8	1.3	11.9	17.9	6.8	2.9	1.4
	Education	Primary	32.4	30.1	28.7	25.8	41.8	36.5	34.2	31.0	25.9	37.0
		Secondary	44.0	44.0	35.8	39.4	33.1	39.4	39.2	38.3	35.8	33.7
		Tertiary	22.0	22.5	31.2	28.8	22.1	23.0	25.0	26.7	32.6	27.1
		Missing	1.6	3.5	4.3	6.1	3.0	1.1	1.6	3.9	5.7	2.2
		Managers and Professionals	20.1	21.0	22.9	20.7	10.8	17.4	19.6	16.8	17.9	11.3
	Working position	Technicians	13.0	16.3	12.7	9.5	6.6	11.2	11.6	10.8	9.6	5.8
		Clerks	14.8	16.5	17.9	11.0	16.4	31.7	34.7	33.5	30.0	25.8
		Skilled manual workers	34.2	30.1	27.9	40.7	36.5	11.2	9.3	5.7	7.7	6.1
		Elementary occupations	7.5	5.8	9.7	11.8	18.1	11.4	11.9	14.2	24.0	23.7
		Missing	10.4	10.4	8.9	6.3	11.5	17.1	12.9	18.9	10.9	27.4
	Activity status	Employees (SAL)	45.7	45.4	52.1	56.9	53.1	39.1	35.5	44.7	52.8	40.5
		Employed persons (NSAL)	10.9	8.8	9.9	10.6	7.9	4.8	5.0	4.4	6.6	3.8
		Other employed	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1
		Unemployed	6.7	6.3	9.0	8.3	17.7	5.7	4.7	7.7	8.1	12.9
		Retired	22.6	29.2	16.6	14.9	4.5	22.5	34.8	14.8	11.0	3.2
Equivalised Income	Inactive	12.8	9.1	10.7	7.9	15.0	26.7	18.9	27.0	19.7	37.9	
	Other inactive	0.3	0.5	0.4	0.2	0.1	0.3	0.2	0.2	0.4	0.2	
	Missing	1.0	0.8	1.2	1.1	1.6	0.9	0.9	1.1	1.5	1.5	
	First quintile	18.8	24.5	30.9	26.2	43.7	21.0	26.4	31.8	28.3	42.2	
	Second quintile	18.6	19.0	20.4	18.8	23.8	20.4	21.7	20.8	20.1	23.8	
Ability to make ends meet	Third quintile	19.8	18.0	16.8	21.1	14.2	19.9	17.1	16.0	18.4	14.7	
	Fourth quintile	21.0	21.8	16.6	16.8	10.8	19.6	16.9	15.1	16.5	10.4	
	Fifth quintile	21.9	16.7	15.3	17.1	7.5	19.1	17.9	16.4	16.6	8.9	
	Difficulty	24.8	23.9	32.2	25.4	47.5	26.7	24.0	35.0	28.9	47.2	
	With some difficulties	30.0	28.0	28.2	28.4	30.4	30.9	28.9	28.5	28.7	28.2	
Access to	Fair easily	25.9	27.7	20.4	24.7	12.6	24.9	24.4	18.6	23.6	14.6	
	Easily	19.0	19.8	17.9	20.8	8.9	17.2	22.3	16.9	18.4	8.9	
	Missing	0.3	0.7	1.3	0.8	0.7	0.2	0.5	1.0	0.4	1.0	
	Difficulty	16.7	14.3	10.1	15.6	11.7	17.3	17.0	11.6	16.6	12.1	

Health Characteristics	healthcare services	Easily	81.2	83.1	88.3	81.7	86.0	80.9	80.9	86.8	81.8	86.4
		Missing	2.1	2.6	1.5	2.7	2.3	1.8	2.1	1.6	1.5	1.5
		Good	66.8	64.4	66.8	77.6	80.6	62.1	58.8	60.6	76.6	76.6
	SAH	Fair	18.2	20.8	17.6	13.0	11.5	21.5	21.7	20.9	14.2	13.8
		Bad	8.3	7.7	7.8	5.7	5.0	10.7	12.9	10.2	5.4	6.3
		Missing	6.7	7.1	7.8	3.7	3.0	5.7	6.6	8.4	3.8	3.3
	Chronic Diseases	No	65.5	60.4	64.8	76.7	81.3	62.1	55.2	60.5	76.3	78.4
		Yes	27.7	32.6	27.5	19.7	16.3	32.1	38.2	31.4	20.0	18.3
		Missing	6.8	7.1	7.7	3.6	2.4	5.7	6.6	8.1	3.7	3.3
	Limitations in activities	Yes. strongly	7.4	8.4	7.1	5.5	3.6	9.4	12.6	9.1	4.3	5.6
		Yes	14.0	14.8	12.1	8.9	8.6	16.8	16.7	15.0	11.0	9.3
		No	71.8	69.8	73.2	81.8	85.2	68.0	64.1	67.7	80.8	81.6
		Missing	6.8	7.0	7.7	3.8	2.6	5.8	6.6	8.2	3.9	3.6

Graph 1 shows the descriptive distribution of medical and dental UNs. Dental UNs are more frequent than medical ones, especially among non EU-born foreigners (medical UNs: men 5.4%, women 6.3%; dental UNs, men 12.4%, women 11%). Men are more likely than women to have dental UNs, while the reverse occurs for medical UNs.

Graph 1. Description of medical and dental unmet needs by immigrant status and sex

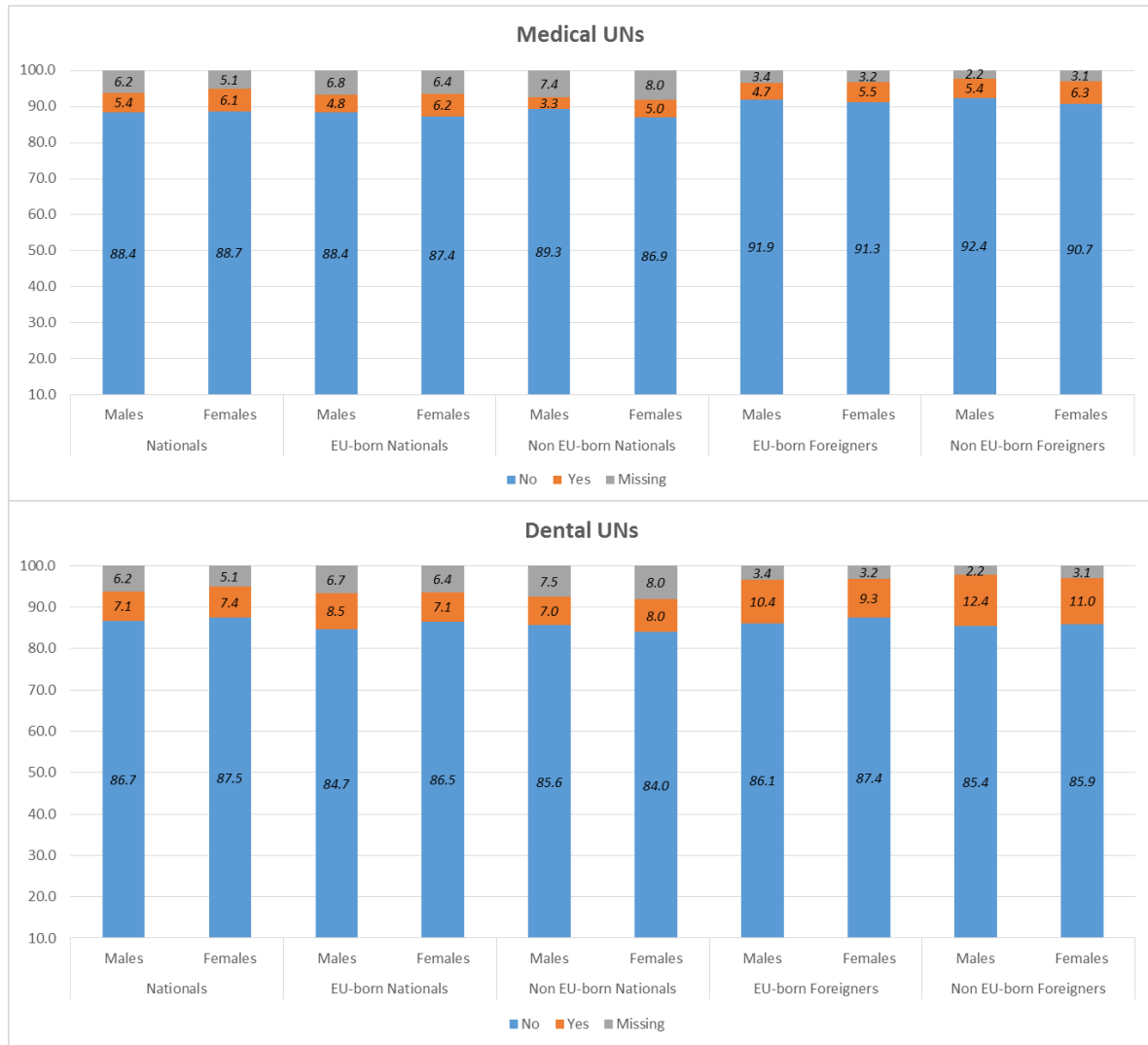
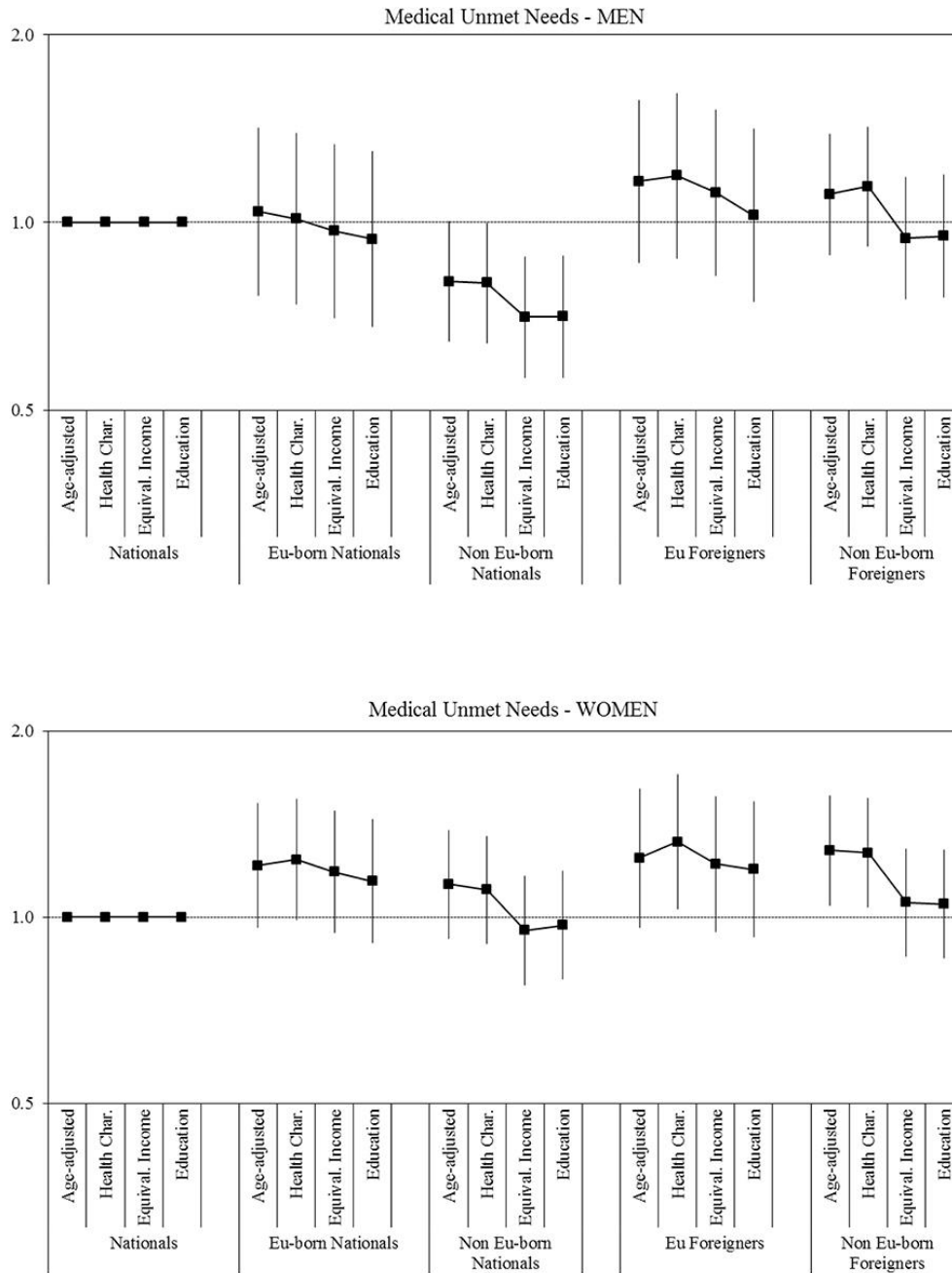


Figure 1 reports the PRs and 95% Confidence Intervals (thereafter **95% CI**) obtained by the Poisson models for medical UNs for men and women. The group of natives is chosen as baseline. The age and health characteristics-adjusted risk of medical UNs is significantly lower for the non-EU-born national males (PR=0.80; 95%CI: 0.64-1.00). This trend is confirmed also after adjusting for the equivalised income and education (PR=0.70; 0.56-0.88). The age-adjusted risk of medical UNs is statistically significantly higher only for non EU-born foreigners women (PR=1.28; 1.05-1.57) compared to natives. Considering the health characteristics the risk is significantly higher in EU foreigner women (PR=1.32; 1.03-1.70) and non-EU foreigner women (PR=1.27; 1.04-1.56) than national women. After adjusting for the equivalised income both differences are no longer significant.

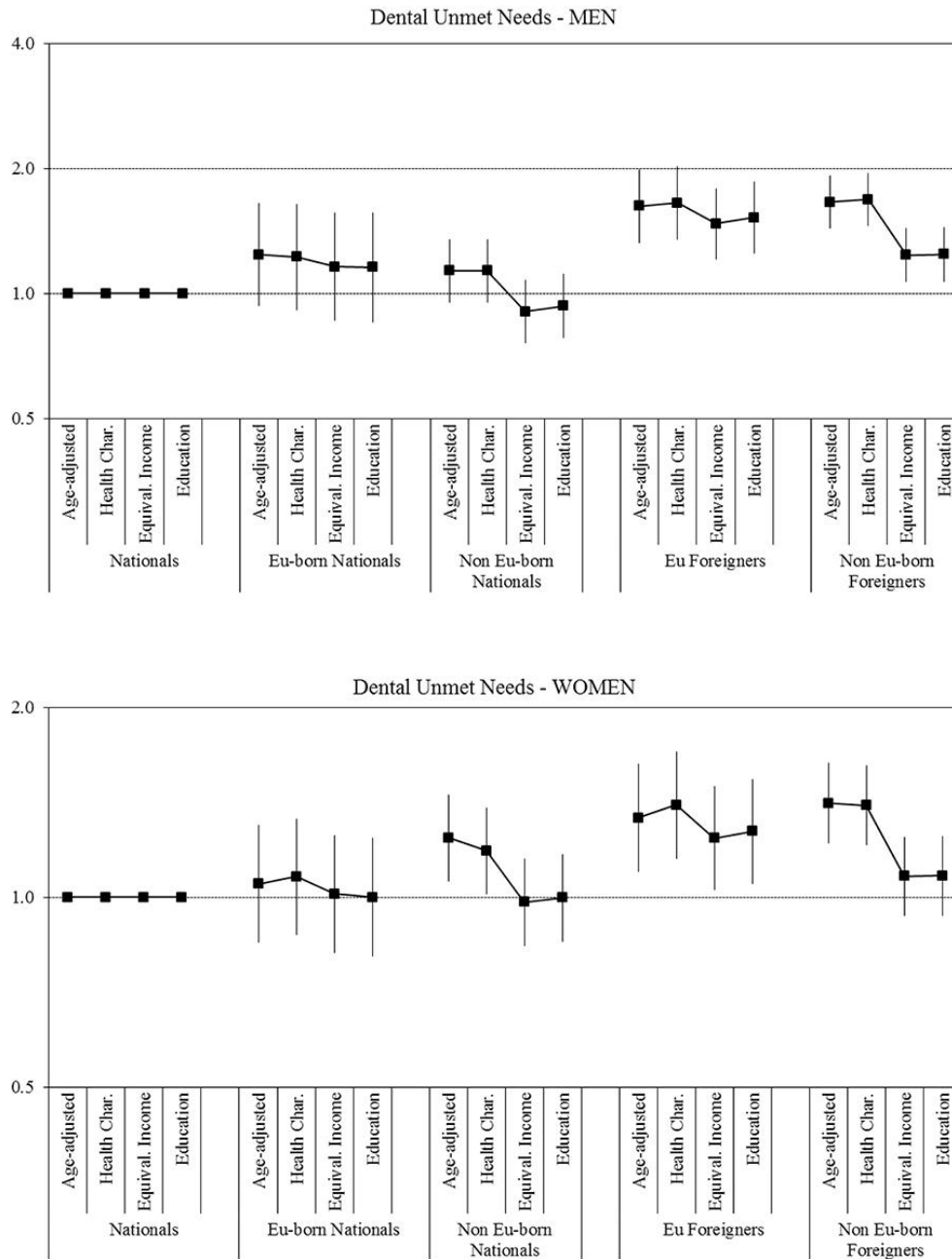
Figure 1. Prevalence Ratios of medical unmet needs by immigrant status and sex



In **Figure 2**, we report the PRs for dental treatment UNs. The individual and health characteristics adjusted risk is significantly higher in the EU-born (men: PR=1.65; 1.35-2.02; women: PR=1.40; 1.15-1.70) and non EU-born foreigners (men PR=1.69; 1.46-1.95; women PR=1.40; 1.21-1.62). Once adjusted for the economic and education variables the EU-born foreigners present the highest risks

(men PR=1.53; 1.25-1.86; women PR=1.27; 1.05-1.54) although the non-EU foreigners men still show significant results (PR=1.24; 1.07-1.45).

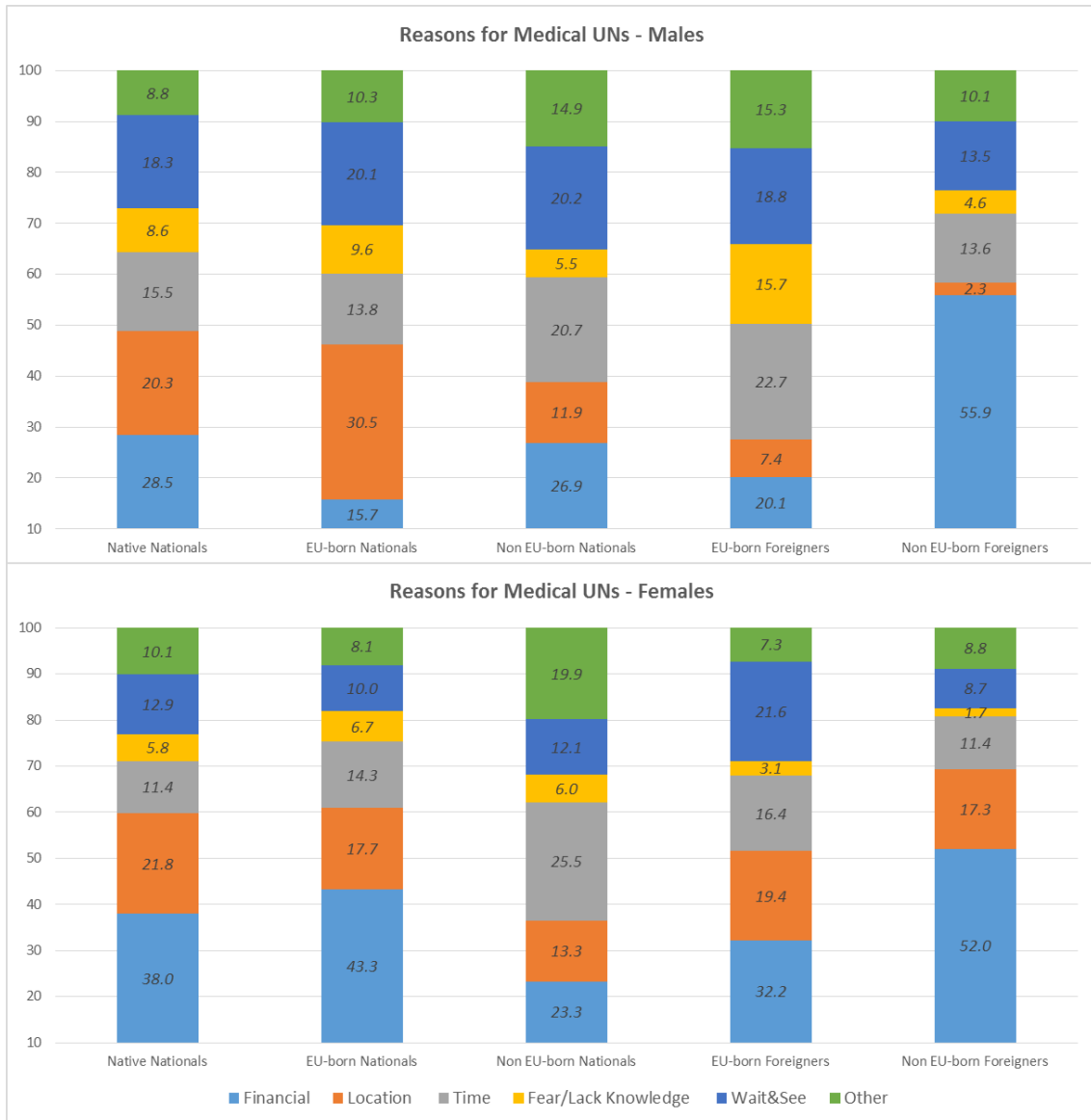
Figure 2. Prevalence Ratios of dental unmet needs by immigrant status and sex



The analysis of the six groups of reasons for the presence of UNs may help to better describe the needs profile of our groups, as reported in **Graph 2** and **3**.

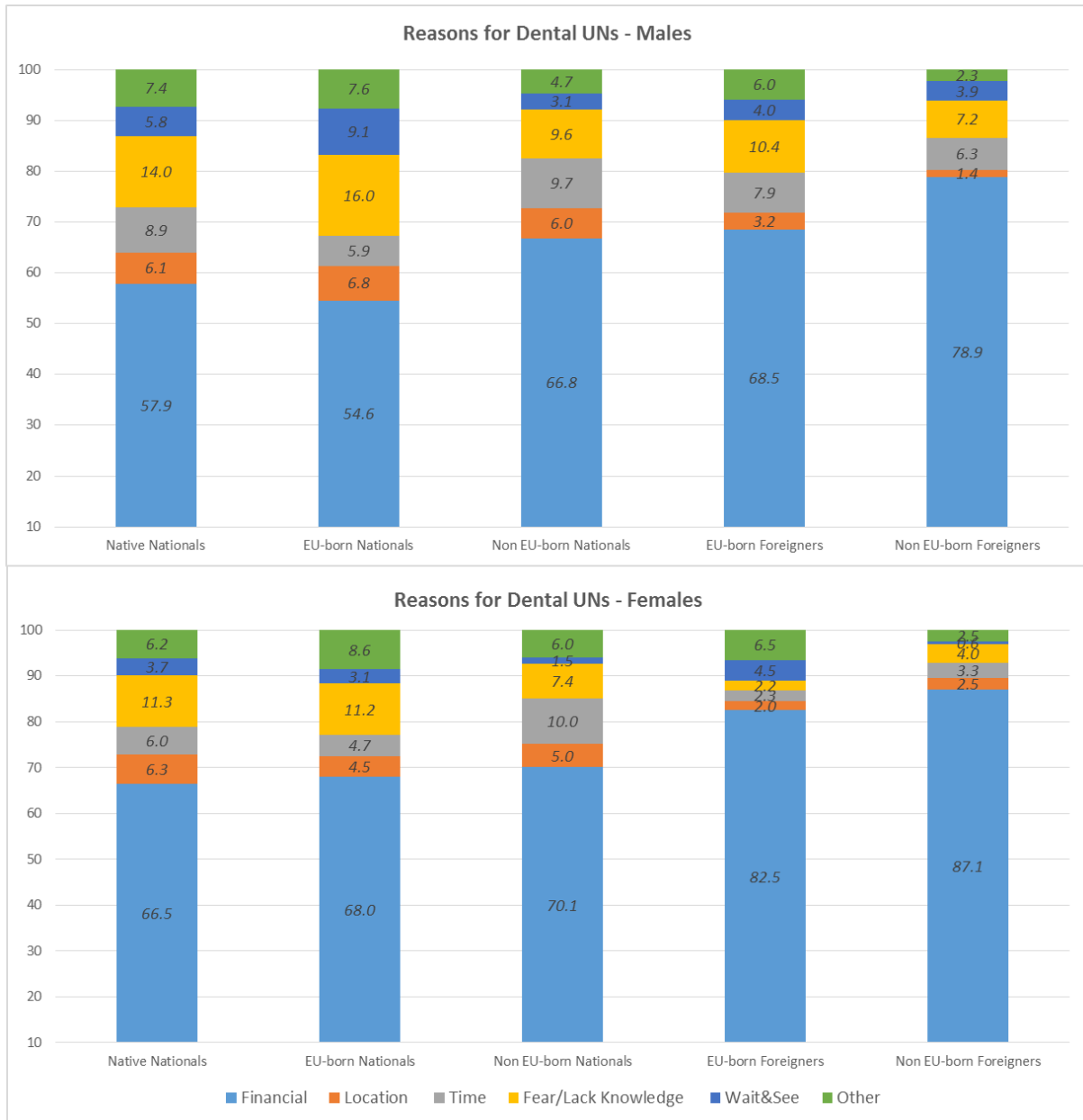
For males and females nationals the prior reasons for having medical UNs is financial (respectively 28.5% and 38%). For EU-born national men the most prevalent reasons are related with the structure of healthcare services (30.5%) while for women the main problem is still financial (43.3%). Non EU-born national men are more likely having financial reasons (26.9%) while the women are more likely having shortage of time (25.5%) and vice versa for EU-born foreigner males (22.7%) and females (32.2%). Half of the sample having medical UNs and being non EU-born foreigners are likely having financial reasons (men 55.9% and women 52%).

Graph 2. Description of reasons by immigrant status and sex among subjects with medical unmet needs



Graph 3 reports the analysis of the reasons for dental UNs. All groups seems to confirm that the high costs of care and treatments are the main reason to neglect their oral health: this is especially relevant in foreigners, both EU-born (men 68.5%, women 82.5%) and non EU-born (men 78.9%, women 87.1%), and non-EU nationals (men 66.8%, women 70.1%). Unfortunately in both cases, medical and dental UNs, EU-SILC does not provide further variables to investigate the nature of “other reasons” answer, which seems to have an impact, but we were forced to exclude in modelling the analysis.

Graph 3. Description of reasons by immigrant status and sex among subjects with dental unmet needs



We have calculated the Poisson regression models, respectively for medical and dental specific reasons for having UNs. **Figure 3**, reports the PRs for each of the reasons of medical UNs versus no unmet needs. The probability of having UNs due to financial reasons is significantly higher for the non-EU born foreigners males (PR=1.47; 1.11-1.94) than for national men, while considering the structural reason a statistically significant probability is registered by EU-born (PR=2.19; 1.14-4.24) and non EU born (PR=1.84; 1.14-2.98) foreigner women compared to national women. The risk of having unmet needs for lack of time is higher for non-EU born national women (PR= 2.34; 1.37-4.00) than national women.

Figure 3. Prevalence Ratios of medical unmet needs for specific reasons by immigrant status and sex

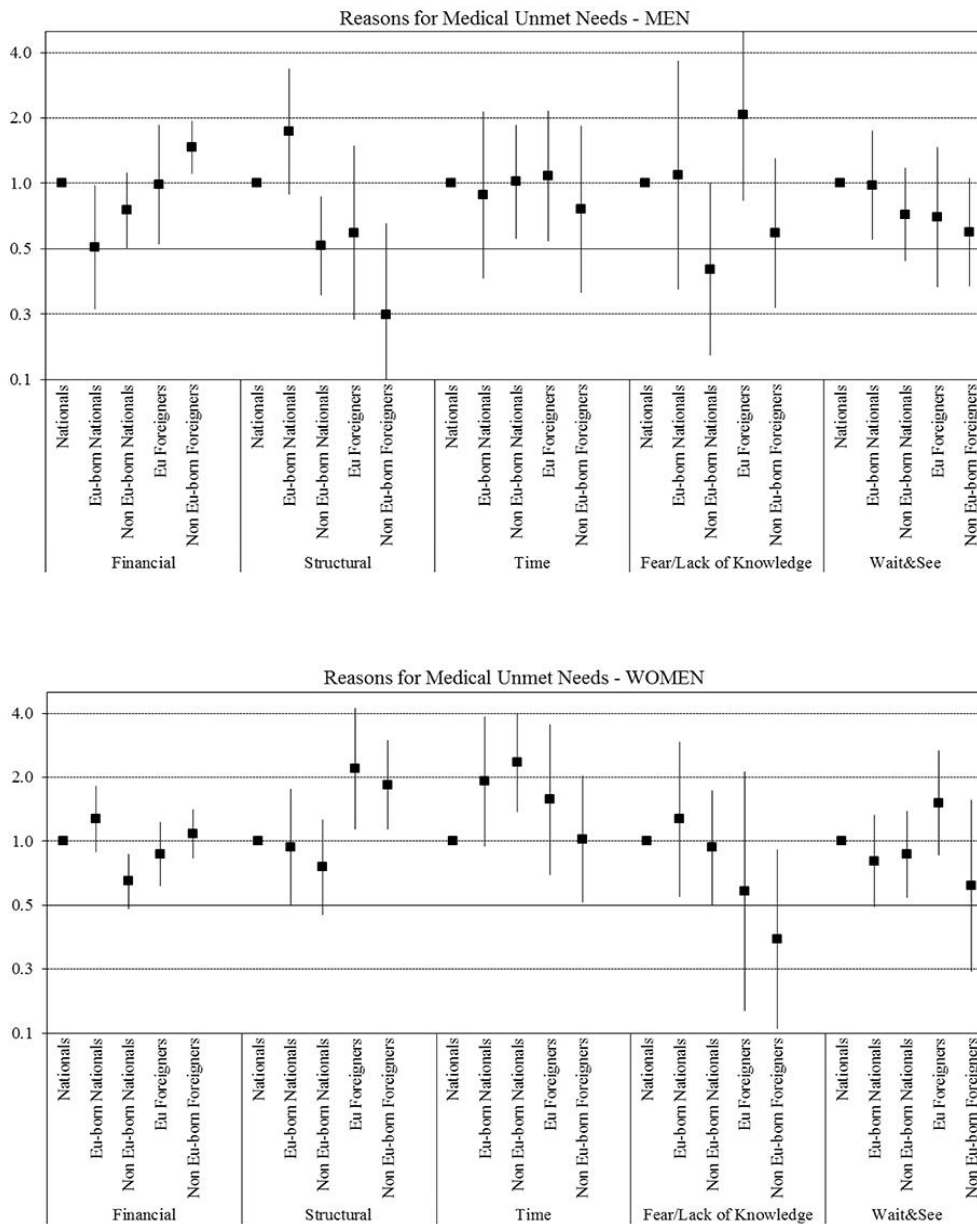
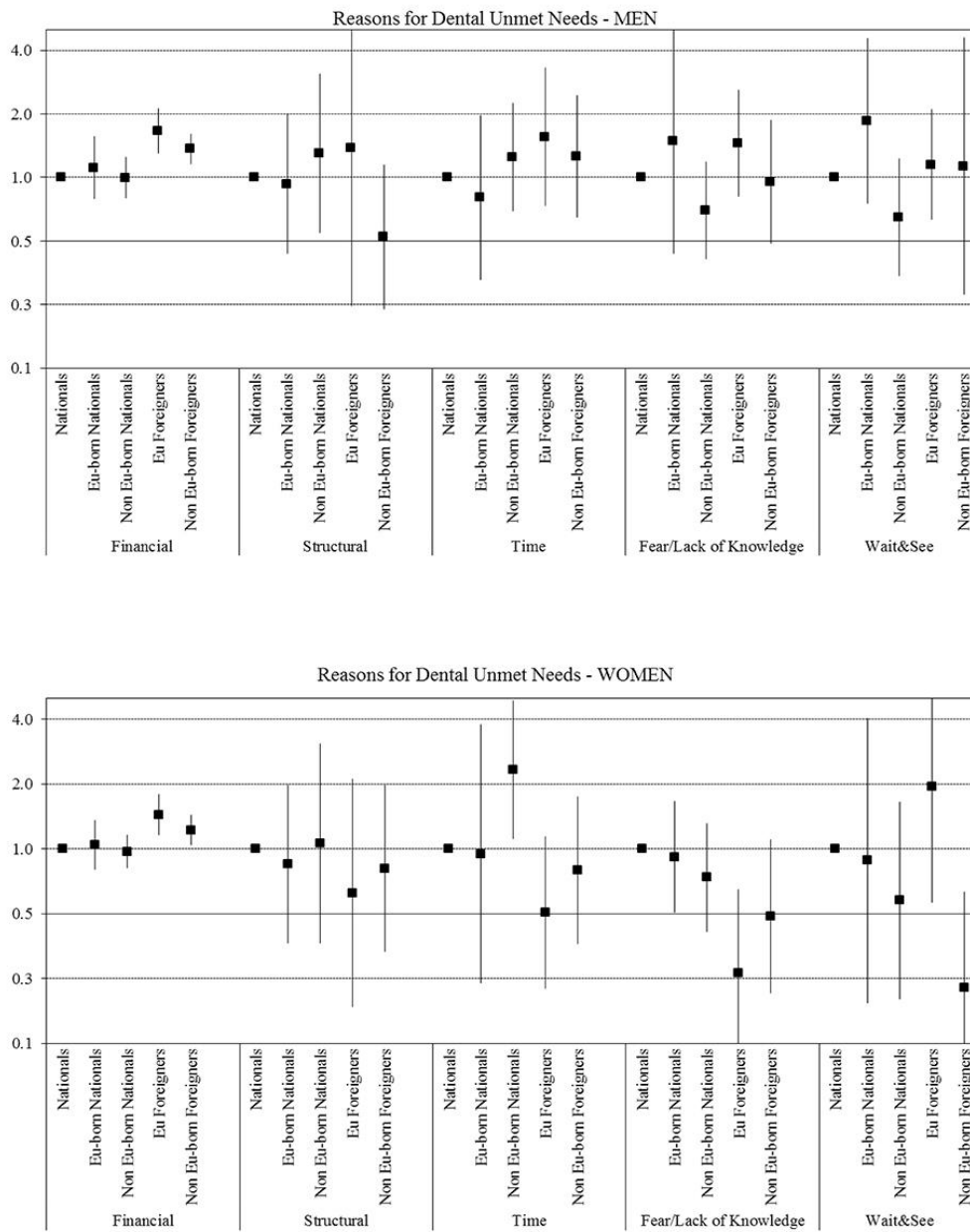


Figure 4 complements the analysis reporting the reasons for dental UNs. EU-born foreigner men and women present the highest risks of UNs for financial reasons (respectively PR=1.66; 1.30-2.12 and PR=1.44; 1.16-1.79), followed by non-EU born foreigners (respectively men PR=1.37; 1.16-1.61 and women PR=1.22; 1.05-1.43). In case of UNs due to time, again the non-EU born national females present the higher risk (PR=2.33; 1.12-4.87).

Figure 4. Prevalence Ratios of dental unmet needs for specific reasons by immigrant status and sex



3. Discussion

Inequalities by immigrant status in healthcare unmet need are observed in Europe. These inequalities mostly affect foreign citizens, both from within and outside the EU, and are partly explained by socioeconomic circumstances.

If we consider UNs as a proxy of access to healthcare services, as previously done in the literature discussed (Rodrigues *et al.*, 2013; Hernandez-Quevedo *et al.*, 2010; Allin and Masseria, 2009a/b; Koolman, 2007), our results suggest that in the analysed countries needs for healthcare services are not satisfied in the same way for nationals and foreigners. The non-EU foreigners suffer a poorer access to the health care services, but also for the EU foreigners, the EU affiliation does not seem sufficient to avoid inequalities in healthcare access. According to their specific framing, in fact, countries provide several level of health care coverage for different groups of migrants and the decision of what constitutes a medical emergency if patients cannot afford to pay are usually left to the provider (FRA, 2011; PICUM, 2010; Stanciole and Huber M., 2009; Romero-Ortuño, 2004).

As previously reported in Rodrigues *et al.* (2013), the socio-economic position (thereafter **SEP**) and cultural factors may influence the way in which people perceive UNs among different countries. Access inequalities between migrants and non-migrants are reduced or disappear after controlling for their SEP, demonstrating that poor SEP might itself be the result of migrant status and ethnic origin, because of processes of social exclusion (Rechel *et al.*, 2013; Malmusi *et al.*, 2010 Davies *et al.*, 2009), and may amplify the inequalities suffered by migrants.

Moreover, a possible explanation of our results would be that intra EU-citizens have more high expectations towards EU healthcare facilities, both in terms of access and utilization, than nationals do. Pursuing the analysis in that direction, it would be interesting seeing if the Cross-border Health Directive n. 24 is playing a role in redeeming the health inequalities suffered by the EU citizens. The Directive, adopted by the European Parliament in 2011 but came in to force in all EU Member States only at the end of 2013, assesses the right for all the EU citizens to go to another EU country for treatment and get reimbursed for it. Clearly this new right should not be more linked to personal funds availability and willingness to pay, which, we have seen, affects Europeans in the self-assessment of their needs.

As also tested by Hasanali (2015) for the U.S. case, as foreign-born the more you become familiar with the system and a gain formal access to the healthcare system, the more your needs increased. Another possible explanation would be considered as *de facto* no-existence of the EU in terms of healthcare systems: nationals represent the priority of all the countries' welfare systems and foreigners, irrespectively of their country of origin or nationality, come later for macro-level legal aspects or meso- and micro-level interactions between patients and providers. Moreover, EU and non-EU foreigners may share barriers related to the language or lack of knowledge of the system, and suffer in similar ways from the insufficient adaptation of healthcare systems to the diversity.

4. Strengths and limitations

While we believe that this study represent the first comprehensive analysis of immigrant status inequalities in healthcare access in Europe and contributes to the debate on migration and equality of health treatment, we acknowledge that limited participation and the under-representation of migrants in population surveys could represent a limit to the dataset. We may expect survey non-responders to be more marginalised and with more access problems, therefore we may have underestimated the actual level of access inequalities by immigrant status. However, the standardized quality of data makes the comparison among nationals and across countries possible.

We acknowledge that our results might underestimate the effect of health inequalities due to sampling non-response bias. Results remain valid and comparable across countries as similar non-response bias are suffered by whole countries. However, the huge variety of health systems across Europe may influence our aggregated results. Further research is needed to analyse if health inequalities are particularly concentrated in some country clusters (Nielsen *et al.*, 2013) where country-level socio-economic and political circumstances might play a role on health outcomes, beyond individual SEP.

5. Conclusions

The European perceived UNs present health inequalities affected by immigrant status and only partly explained by socioeconomic circumstances. We claim that this study represents the first comprehensive analysis of immigrant status inequalities in healthcare access in Europe and contributes to the debate on migration and equality of health treatment.

Our results show that EU affiliation plays a marginal role in protecting European citizens by suffering healthcare discrimination, even though it might be improved with a re-adaption of the Cross-border Health Directive. Improved access and adaptation of healthcare services to migrant health needs, is, therefore, essential to minimize disadvantages for nationals and migrants and maximise advantages for the host societies (Marmot *et al.*, 2010; European Commission, 2008).

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