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Health care use and costs of immigrant children in Finland

Department of Economics

Master's thesis

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In this thesis, health care use and costs of immigrant children in Finland were investigated. The number of immigrants and their descendants has increased significantly in the past decades. Studying the utilization of health care services by this growing population group is important for several reasons. In Finland, health care services should be equally accessible for all citizens. Understanding how immigrant children use health services compared to native children may reveal disparities in accessing the services. In particular, the appropriate use of services by children and adolescents is crucial for both, their future, and the future of our society. The evaluation of health care utilization by different population groups is especially topical given the fact that the funding for the wellbeing services counties, that started operating on 1 January 2023, is primarily based on service need.

In the analyses, the health care utilization of immigrant children and native children was compared from several perspectives by using Finnish register data. The study focused on both, children who immigrated to Finland, referred to as first-generation immigrants, and those born in Finland to immigrant parents, referred to as second-generation immigrants. The analyses estimated the probability of using health care services, the intensity of service use, as well as the costs associated with service utilization. Additionally, the analyses examined differences in service use and costs by type of care, divided into psychiatric and non-psychiatric care. Furthermore, the analyses explored the relationship between children's country of origin and service utilization.

The results of this thesis show that there are significant differences in the health care utilization between native children and immigrant children in Finland. In addition, heterogeneity in terms of country of origin was observed. Compared to native children, the probability of using health care services was lower for first-generation immigrant children. On the other hand, the probability was higher for second-generation immigrant children. However, the health care costs were significantly lower for both immigrant generations. One factor explaining the lower costs was the lower intensity of service use; among the children who had used services, immigrant children used them at a significantly lower rate. Examined by care type, this appeared to be mainly due to the significantly lower intensity of psychiatric care. Compared to native children, the annual per capita costs incurred from visits for psychiatric care were even 1000–1300 euros lower per capita for immigrant children in both generations.

In the literature, reasons for the lower health care utilization among immigrants have been suggested to include differences in health, as well as difficulties in accessing services due to cultural differences and language barriers. The results of this thesis suggest that the challenges might lie more in finding the appropriate treatment rather than in accessing services. However, conclusions about the underlying reasons of the lower health care utilization cannot be drawn based on this thesis. More research on this topic is needed to prevent potential underutilization of mental health care services among immigrant children and its possibly costly consequences.

Key words: Immigrant children, health care use, health care costs, register data

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Tässä tutkielmassa tarkasteltiin ulkomaalaistaustaisten lasten terveyspalveluiden käyttöä ja kustannuksia Suomessa. Suomeen muuttaneiden ja heidän jälkeläistensä määrä on kasvanut merkittävästi viimeisten vuosikymmenten aikana. Tämän kasvavan väestöryhmän terveyspalveluiden käytön arviointi on tärkeää monesta eri syystä. Suomessa palveluiden tulisi olla yhdenvertaisesti saatavilla kaikille. Tieto siitä, miten ulkomaalaistaustaiset lapset käyttävät terveyspalveluita suomalaistaustaisiin lapsiin verrattuna, voi paljastaa eroja palveluiden saatavuudessa. Erityisesti lasten ja nuorten tarpeenmukainen palvelukäyttö on merkityksellistä niin heidän omaa kuin yhteiskuntammekin tulevaisuutta ajatellen. Lisäksi eri väestöryhmien palvelukäytön arviointi on tällä hetkellä erityisen ajankohtaista ja tärkeää siksi, että vuoden 2023 alussa aloittaneiden hyvinvointialueiden rahoitus perustuu pääosin palvelutarpeeseen.

Analyyseissa vertailtiin suomalaistaustaisten ja ulkomaalaistaustaisten lasten terveyspalveluiden käyttöä useasta eri näkökulmasta hyödyntäen suomalaisia rekisteriaineistoja. Tutkimuksen kohteena olivat sekä ensimmäisen polven että toisen polven ulkomaalaistaustaiset lapset. Ensimmäisen polven ulkomaalaistaustaisilla tarkoitetaan Suomeen muuttaneita lapsia ja toisen polven ulkomaalaistaustaisilla Suomessa ulkomaalaisille vanhemmille syntyneitä lapsia. Tutkielmassa estimoitiin todennäköisyyttä käyttää palveluita, palvelukäytön intensiivisyyttä ja palveluiden käytöstä aiheutuvia kustannuksia. Analyyseissa tarkasteltiin eroja palveluiden käytössä ja kustannuksissa myös hoitotyypeittäin psykiatriseen ja ei-psykiatriseen hoitoon jaoteltuna. Tämän lisäksi tutkielmassa havainnoitiin taustamaan yhteyttä palveluiden käyttöön ja kustannuksiin.

Tutkielman tulokset osoittavat, että terveyspalveluiden käytössä ja kustannuksissa on merkittäviä eroja suomalaistaustaisten ja ulkomaalaistaustaisten lasten välillä. Tuloksissa havaittiin myös heterogeenisyyttä ulkomaalaistaustaisten lasten taustamaan suhteen. Ensimmäisen polven ulkomaalaistaustaisten lasten todennäköisyys käyttää palveluita oli suomalaistaustaisia lapsia pienempi. Toisen polven ulkomaalaistaustaisilla lapsilla vastaava todennäköisyys oli puolestaan suomalaistaustaisia suurempi. Kustannukset olivat kuitenkin suomalaistaustaisia lapsia merkittävästi alhaisemmat molemmilla ulkomaalaistaustaisten sukupolvilla. Yksi selittävä tekijä tälle oli palveluiden käytön alhaisempi intensiteetti; palveluita käyttäneiden joukossa ulkomaalaistaustaisten palveluiden käyttö oli huomattavasti vähäisempää. Hoitotyypeittäin tarkasteltuna tämän havaittiin johtuvan pääosin psykiatrisen hoidon merkittävästi alhaisemmasta intensiteetistä. Molemmilla ulkomaalaistaustaisten sukupolvilla psykiatrisen hoidon käynneistä aiheutuneet vuotuiset kustannukset olivat suomalaistaustaisiin lapsiin verrattuna jopa 1000–1300 euroa alhaisemmat henkilöä kohden.

Kirjallisuudessa ulkomaalaistaustaisten alhaisemman terveyspalveluiden käytön syiksi on esitetty muun muassa terveyseroja sekä vaikeuksia palveluiden piiriin löytämisessä kulttuuristen erojen ja kielellisten haasteiden takia. Tämän tutkielman tulokset viittaavat siihen, että haasteet saattavat liittyä enemmän tarvetta vastaavan hoidon löytämiseen kuin palveluiden piiriin pääsemiseen. Tutkielman tulosten perusteella ei voi kuitenkaan tehdä johtopäätöksiä taustalla olevista syistä. Aiheesta tarvitaan lisää tutkimusta, jotta ulkomaalaistaustaisten lasten mielenterveyspalveluiden alikäyttöä ja sen mahdollisilta kalliilta seurauksilta voidaan välttyä.

Avainsanat: Ulkomaalaistaustaiset lapset, terveyspalveluiden käyttö, terveyspalveluiden kustannukset, rekisteriaineisto

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1 Introduction

1.1 Background and motivation

Equality, non-discrimination, and fairness are fundamental principles that are guaranteed in the Constitution of Finland (731/1999). In line with these values, the Health Care Act (1326/2010) aims to reduce health inequalities between population groups and ensure equal access, quality, and patient safety in health services. However, significant disparities in health and health care use have been observed in Finland, depending on factors such as socio-economic status (e.g., Karvonen et al. 2019; Vaalavuo 2020) or residential area (Koskinen 2019). It is essential to assess the differences in health care use between different population groups and regions in order to improve equal access to health services and reduce health inequalities.

In Finland, immigration is one of the most important factors affecting the demographic structure today, alongside the ageing population. The number of immigrants and their descendants has grown significantly especially in the past decades. However, relative to the size of immigrant population in Finland, there is very little research on immigrants' health and use of health services. Especially register-based research is very limited. In the international literature, immigrants' health care utilization is often found to be, on average, lower than among the native population (e.g., Wilson et al. 2020; Xu et al. 2021; Barlow et al. 2022). The results available in Finland are similar (e.g., Gissler et al. 2006; Castaneda et al. 2012; Kiesepää et al. 2020). Reasons behind the lower utilization of health services are suggested to include the phenomenon called "healthy immigrant effect", challenges in immigrant integration, and potential cultural differences.

A particularly important and understudied group is immigrant children, including those who moved to Finland as children and those born in Finland to immigrant parents. Immigrant children form a significant population group for the future of our society. However, even less research is available on the health and health care utilization of immigrants' descendants. In Finland, there is only one study focusing on immigrant children's use of health care services (Loi et al. 2021), examining the risk of receiving treatment. Studying the health care utilization of both, first- and second-generation immigrant children, is crucial because it helps identifying potential disparities early on. Ensuring that these children have equitable access to the health care system and receive

appropriate care from an early age is essential for improving health equity. Examining both generations is also a key to understanding the broader integration process and addressing their unique challenges and needs.

For immigrants, integration policy plays an important role in raising awareness of available health services and how to access them. For example, Dang (2024) found that participating in a language training program had significantly improved immigrants' integration into the health care system, with positive health effects extending even to the next generation. Additionally, there is evidence that individualized integration plans have a significant positive effect on the income of disadvantaged immigrants in Finland (Sarvimäki & Hämäläinen 2016). To further improve the integration process and immigrants' integration plans, it is important to identify the groups that may require additional support in accessing health services after arriving in Finland.

The assessment of differences in health care utilization between different population groups is made all the more important by the social welfare and health care reform implemented in Finland in 2023. Since the reform, the funding of the wellbeing services counties and the city of Helsinki has been primarily based on need-based central government funding (Holster et al. 2022). Immigrants differ from native population in several ways. On average, immigrants are younger, tend to concentrate in urban areas (Manderbacka et al. 2019), have lower incomes (Krutova 2019), and their children are at a higher risk of poverty (Obućina & Ilmakunnas 2020). Because of these factors, immigration changes the demographic and regional distribution of the population in Finland. This shift affects the needs and costs of regional health services, as the varying needs of different population groups influence the service demand. Information on health care utilization among these growing population groups is crucial to ensure an equitable and appropriate allocation of funding under the new funding system.

1.2 Goals and research questions

While writing this thesis, I am also working as a research assistant at the Finnish Institute for Health and Welfare (THL). The projects I am involved in focus on assessing the population's service needs and the impacts of immigration on both, the economic and social sustainability of society. My aim in this thesis is to combine the knowledge I have gained from these projects by studying the use and costs of health care services by

immigrant children. I am grateful for the opportunity provided by the Sustainable Growth Programme of Finland (RRP) and SustAgeable projects to explore this topic.

My intention is to compare health care use and costs between native children and children with immigrant parents in Finland. Children are divided into three groups by their origin: natives, first-generation immigrants, and second-generation immigrants. Natives are children whose both parents are born in Finland. First-generation immigrants refer to children born abroad with parents born abroad. Second-generation immigrants include children born in Finland to parents born abroad. I will do detailed analysis by country of origin and different type of health care use. By utilizing the rich register data, I am able to control for important background characteristics, such as gender, age and household income.

My research questions are following:

1. How do health care use and costs differ between first- and second-generation immigrant children compared to native children in Finland?
2. Does a specific kind of health care use explain the differences between children with an immigrant background and native children?
3. How do immigrants' health care use and costs differ by country of origin?

The aim of this thesis is to produce new insights into the differences in health care utilization between immigrant children and native children, as well as between immigrant generations. By examining disparities in health care use among different immigrant groups, whether based on generation or country of origin, we can gain a better understanding of the heterogeneity of immigrants. With this information, it is possible to develop immigrant integration policies and improve the accessibility of health services for immigrant groups based on their specific needs. Additionally, information on differences in health care utilization can be utilized to improve the accuracy of estimates in the social and health care expenditure model (SOME model), which is used as a basis of the funding of wellbeing services counties.

One major advantage of the thesis is that I analyze health care utilization not only in terms of visitation levels but also costs, providing a more comprehensive and comparable measure than visit information alone. In Finland, there is only one register-based study

that includes the cost aspect (Gissler et al. 2006). The study includes only adult immigrants and is nearly 20 years old – both the data foundation and the immigrant population have changed significantly since then. Similar research on immigrants' children has not been done before in Finland. Other advantages of the thesis include the implementation of analyses from multiple perspectives and bringing out the multi-generational perspective by including both, first- and second-generation immigrants. The analyses include estimating the likelihood of using health services, estimating costs, and assessing the intensity of use. Furthermore, these analyses are conducted separately by care type and immigrant's origin group. Studies that conduct similar generational comparisons have not been carried out in Finland from such a broad perspective.

1.3 Structure of the thesis

This thesis is organized into six chapters. In Chapter 2, I present the demographic shifts occurring in Finland as a result of immigration. This includes the growth of the population with an immigrant background and its implications for the age structure and the geographical distribution of the population. Chapter 3 includes a literature review of immigrants' health and their utilization of health care services. First, I discuss the concept of the "Healthy Immigrant Effect". After that, I review what is already known about the health and health care utilization of immigrant generations based on previous empirical research. My primary focus is on studies conducted in the Finnish context. However, for immigrant children, I also include results from Nordic literature due to the limited availability of research in Finland.

In Chapter 4, I discuss the challenges in estimating the causal effects of immigration. This includes the research design considerations and gaps in the data available on immigrants. Finally, the empirical analysis section is detailed in Chapter 5. First, I introduce the data used for the analyses and descriptive statistics. Second, I discuss the research method used in the analyses. After that, I present the results of the analyses using regression tables and various visual patterns. At the end of Chapter 5, I summarize the results of the analyses. In Chapter 6, I discuss how the results relate to previous literature and explore possible factors underlying my findings. Additionally, I address the significance of the results for both individuals and society, as well as future research needs.

2 The population with an immigrant background in Finland

According to Statistics Finland's (2024) classification and the literature in general, an individual with an immigrant background refers to a person whose parents, or the only known parent, were born in a foreign country. Individuals with an immigrant background who were born abroad are referred to as first-generation immigrants. Respectively, those with an immigrant background and born in Finland are referred to as second-generation immigrants. The Finnish background indicates that an individual has at least one parent born in Finland. In the literature, the term "2.5-generation" is also used, referring to a person with one native and one immigrant parent. However, in this Statistics Finland's (2024) classification these individuals are categorized as belonging to the group of Finnish background. Figures 1 and 2 are created using Statistics Finland's FOLK modules.¹

2.1 Population growth

Figure 1 illustrates the increasing trend in the amount of population with an immigrant background in Finland. However, compared to many other countries in the European Union, the proportion of the population with an immigrant background in Finland is still relatively low. For example, in 2019 the proportion of foreign-born population in Finland was the fifth lowest among EU countries (7%), while in contrast in Sweden, it was the second highest (20%) (OECD 2023b).

However, as shown in Figure 1, the population with an immigrant background has been steadily increasing since the 1990s. At the beginning of the 1990s, there were approximately 38 000 individuals with an immigrant background residing in Finland. By 2020, this number had risen to approximately 444 000, which is more than ten times the amount in 1990. The growth is driven by an increase in the number of both, first- and second-generation immigrants. Due to the growth of the first-generation immigrants, the number of second-generation immigrants has also increased significantly, rising from 4 200 in 1990 to 77 000 in 2020. However, the proportion of second-generation immigrants of the total population with immigrant background is still relatively small (17%).

¹ The data used in this thesis is described in more detail in Chapter 5.1.

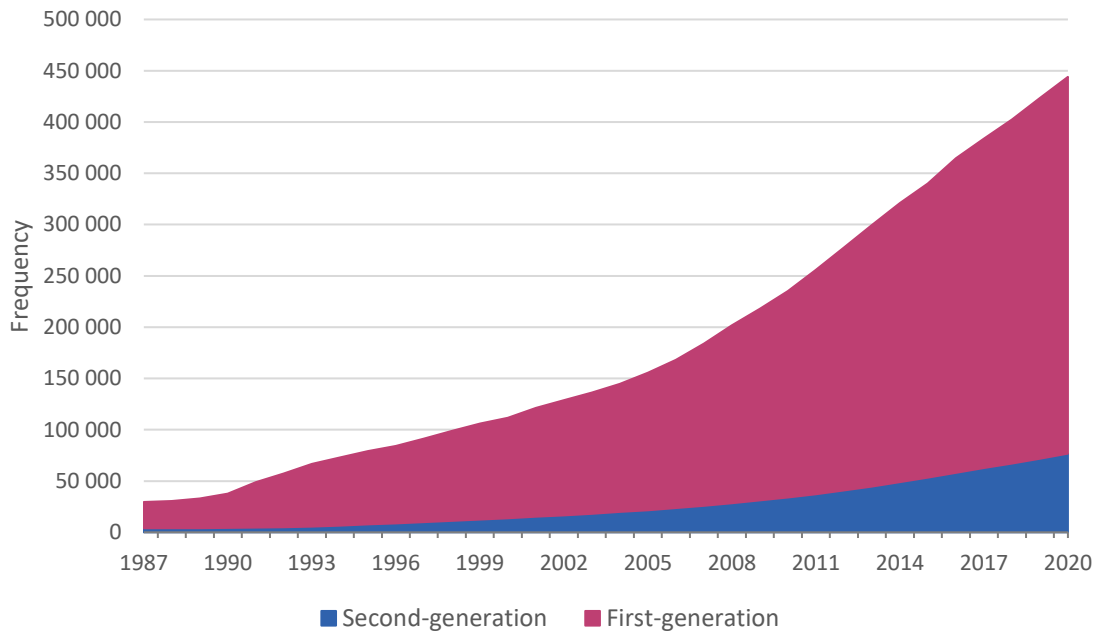


Figure 1 The population with an immigrant background in Finland between years 1987–2020

2.2 Age structure and regional distribution

The growth of the population with an immigrant background has made immigration one of the most significant factors affecting Finland’s demographic structure, alongside an aging population. Particularly, immigration affects the age structure and the regional distribution of the population. Figure 2 illustrates the differences in age structures of people with a Finnish background, first-generation immigrants, and second-generation immigrants.

As illustrated in Figure 2, the age structures of these three population groups differ significantly. The age structure of people with a Finnish background appears to be much more evenly distributed in comparison with people with an immigrant background. In Finland, the age structure is among the oldest in the EU (OECD 2023a), and the birth rate has decreased sharply in the 2010s (Kestilä & Martelin 2019, 38), which has levelled out the size of the age groups.

The majority of first-generation immigrants are of working age. Up to 82 percent of first-generation immigrants are aged 20 to 64. In comparison, approximately 55 percent of people with a Finnish background and 13 percent of second-generation immigrants fall into this age group. The proportion of individuals aged 65 and older (25%) is the highest

for people with a Finnish background (25%). Conversely, the proportion is only 7 percent for first-generation immigrants and only 2 percent for second-generation immigrants.

The age structure of second-generation immigrants is notably younger than that of other population groups. Nearly 75 percent of second-generation immigrants are under the age of 20, and almost one-third are aged 0–4 years old. The low number and young age structure of second-generation immigrants is explained by Finland’s relatively short history of immigration. The first peak of immigration occurred in the 1990s, when immigration started to become more common. However, it was only in the early 2000s that immigration began to increase more strongly as a result of EU policies and the principle of free movement. (Kestilä & Martelin 2019, 40.)

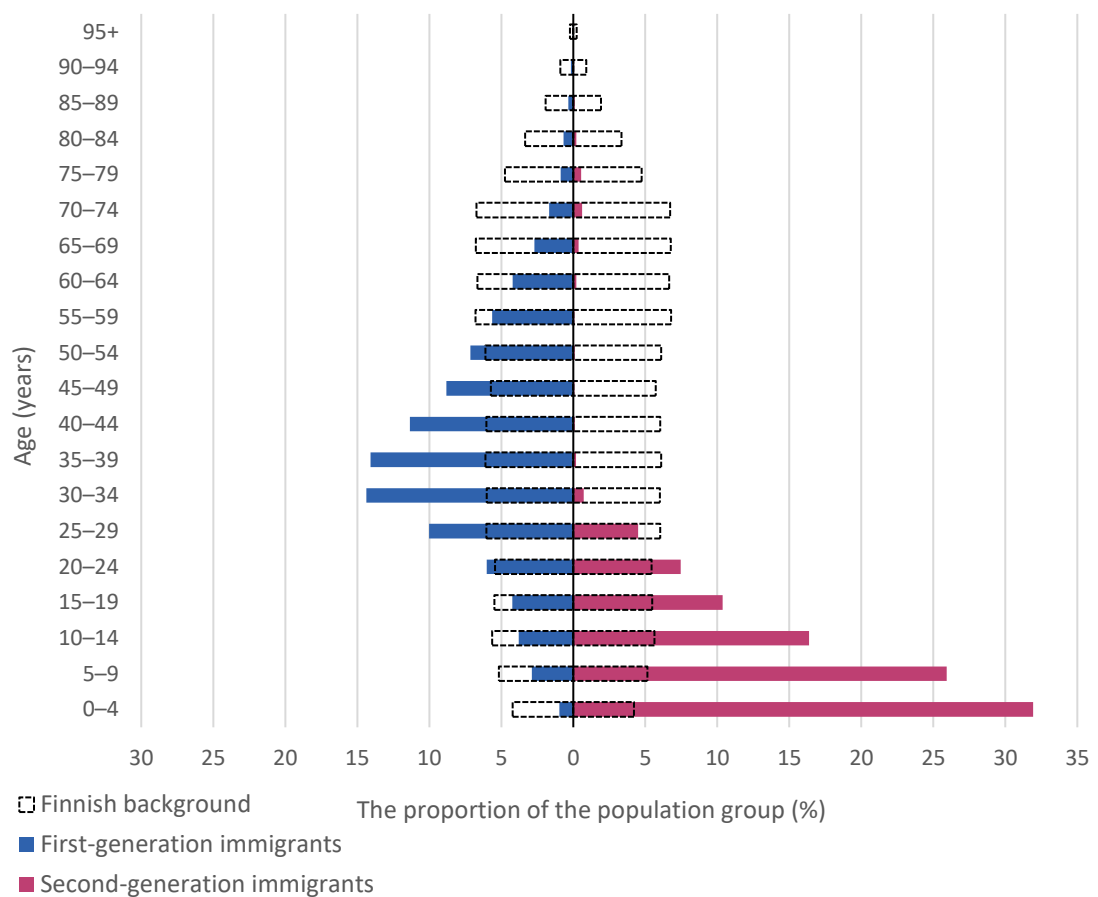


Figure 2 The age structure of the population with a Finnish background and with an immigrant background, year 2021

The relative share of people with an immigrant background also varies significantly between regions. Pie charts in Figure 3 illustrate the regional distribution of people with a Finnish background and those with an immigrant background within Finland. The

urban-rural classification is created by Finnish Environment Institute and the Department of Geography of the University of Oulu.² In Figure 3, the first- and second-generation immigrants are not separated, as there is little difference in their geographical distributions.

Figure 3 demonstrates that the majority of people with an immigrant background live in urban areas (90%), while the corresponding proportion for people with a Finnish background is 72 percent. Out of the total number of people with an immigrant background, only 10 percent live in rural areas, while 85 percent live in core urban areas (including inner and outer urban areas). In contrast, out of the total number of people with a Finnish background, 29 percent live in rural areas and 61 percent live in the core urban areas.

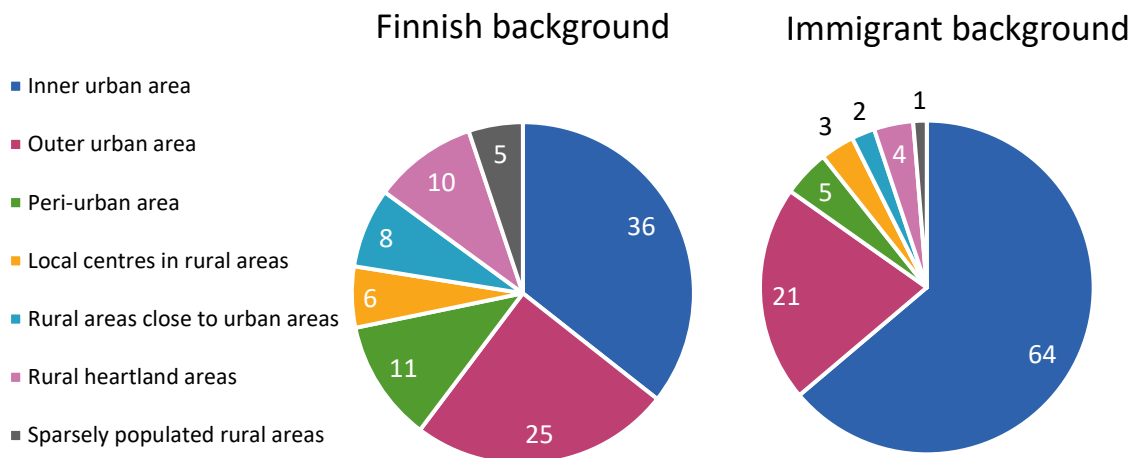


Figure 3 The distribution of people with a Finnish background and an immigrant background by urban-rural regional classification (%), year 2021

Examined by wellbeing services counties of Finland, in 2022 the proportion of people with an immigrant background varies significantly. The proportion was the highest in the wellbeing services county of Vantaa and Kerava, where the proportion of people with an immigrant background was 24 percent. The corresponding proportion in the South Ostrobothnia wellbeing services county was only 3 percent. Interestingly, in the wellbeing services county of Vantaa and Kerava the average age of residents was 40.1

² For more information about the classification, see: https://www.stat.fi/meta/kas/kaupunki_maaseu_en.html

years, and in the South Ostrobothnia well-being services county the average age of residents is 45.2 years. (Statistics Finland 2023.) According to Manderbacka et al. (2019, 3) particularly young and working-age immigrants tend to move to urban areas where the average age of residents is already lower than in rural areas. However, the higher proportion of immigrants also reinforces this difference in average age.

To conclude, the age structure of the population with a Finnish background is significantly older than people with an immigrant background. A clear majority of first-generation immigrants are of working age while a clear majority of second-generation immigrants are children. Additionally, population with an immigrant background tend to settle to the urban areas. As immigration changes the socio-demographic distribution of the population it also affects the needs and costs of health care services per region. To examine the differences in health care use, it is important to consider the age and the place of residence due to the differences in the age structure and the regional distribution between the population with an immigrant background and the population with a Finnish background.

3 Immigrants' health and health care utilization

3.1 Health

3.1.1 Healthy immigrant effect

In the literature examining the health of immigrants, the phenomenon of the “healthy immigrant effect” (HIE) has been widely highlighted. According to the HIE, immigrants tend to have better health outcomes on average compared to both the native-born population and the host population of their country of origin. In other words, immigrants are positively selected with regard to health. The HIE seems to hold true during the initial period after immigrants arrive in their new country but tends to diminish over time. Evidence supporting the validity of the HIE is widely available especially from the USA, Canada, and Australia (see e.g., Betancourt & Roberts 2010; Kennedy et al. 2014), but also from the Europe (see e.g., Helgesson et al. 2019; Ichou & Wallace 2019; Holz 2022). Evidence of the HIE has also been found among undocumented immigrants (Ruhnke et al. 2022).

The results indicate that the validity of this phenomenon seems to depend on the origin of the immigrants. For example, Helgesson et al. (2019) found contrasting results for Western and non-Western immigrants in Sweden. Western migrants demonstrated the HIE by showing a lower or equal risk for most of the health outcomes studied compared to native Swedes over time. In contrast, non-Western migrants showed equal or higher risk for all outcomes, except for mortality, throughout the follow-up compared to native Swedes. On the other hand, utilizing data from the UK, Australia, USA, and Canada, Kennedy et al. (2014) found that the HIE is stronger for immigrants from developing countries than for those from developed countries.

For children, immigrants' selectivity cannot be viewed in the same way as for adults, as they are unlikely to make the decision to move themselves. However, the literature supports the HIE also among immigrant children (see e.g., Hamilton et al. 2011; García-Pérez 2016; Loi et al 2021; Tegunimataka 2022). In these studies, so called “generational gradient”, according to which the health advantage decreases with the generation, is shown in the results. The HIE seems to hold especially for first-generation immigrants, while the results for second-generation immigrants are partly mixed. For the most part, the health indicators of the second-generation seems to lie between first-generation

immigrants and natives, but in some cases the second-generation appears inferior to natives. (Hamilton et al. 2011; Loi et al 2021; Tegunimataka 2022.) Vanishing health advantage is also supported by García-Pérez (2016), who found that the HIE of immigrant children is weaker the longer the mother has lived in their new home country. Additionally, as an interesting finding, Farré (2016) discovered a significant health advantage for immigrants regarding birth outcomes, suggesting better health among immigrant mothers. However, this may also indicate that the HIE could be passed on to the next generation, potentially leading to health advantages for the second-generation immigrants as well.

Studies on the HIE primarily rely on survey data, although some register-based studies are also available (see e.g., Helgesson et al. 2019). In studies focusing on HIE, self-reported health status, mortality rates, chronic disease prevalence are common indicators of health. The HIE has also been examined using the birth outcomes as an indicator of maternal health. The literature on HIE is not unanimous, as contrasting results have also been observed, indicating that immigrants' health is poorer than that of the native population, particularly in the European contexts (see e.g., Iglesias et al. 2003; Solé-Auró & Crimmins 2008; Moullan & Jusot 2014). Especially, in studies focusing also on second-generation immigrants, findings seem to be mixed (Hamilton et al. 2011; Ichou & Wallace 2019; Loi et al. 2021). Besides the immigrants' vanishing health advantage over time, some studies suggest that the health advantage seems to decrease also across generations (Hamilton et al. 2011; Perreira & Ornelas 2011).

3.1.2 Immigrants' health in Finland

In Finland, a few extensive survey studies have been conducted on the well-being and health of immigrants. In 2010–2012 the Finnish Institute for Health and Welfare (Castaneda et al. 2012a) carried out a comprehensive survey focusing on the health, well-being, living conditions and use of health services of immigrants in Finland. Working-age immigrants with Russian, Somali, and Kurdish backgrounds were included in the study. Both interviews and health examinations were conducted with the participants.

Based on the survey conducted in 2010–2012, the health experienced by immigrants varies between immigrant groups, especially across genders. Immigrants with Somali background felt healthier than other immigrant groups or those with a Finnish background. In contrast, immigrants with Kurdish and Russian backgrounds, felt that

their health was worse than that of the general population. The health status reported by women with Kurdish and Russian backgrounds was notably weaker, whereas Somali men reported having relatively good health. (Koskinen et al. 2012a.) The results were similar in terms of perceived psychological symptoms. Immigrants with Kurdish and Russian backgrounds exhibited significantly higher rates of severe depression and anxiety symptoms compared to the general population. The prevalence of severe depression and anxiety symptoms among Somali immigrants did not differ from the overall population rate. (Castaneda et al. 2012b.)

The results in long-term morbidity were similar to those seen in perceived health (Koskinen et al. 2012b). In clinical measurements, however, the results were mixed. Elevated blood pressure was less common among immigrants with Kurdish and Somali backgrounds compared to the general population, while no differences were observed for immigrants with Russian backgrounds (Jula et al. 2012). Similarly, the results for total cholesterol levels showed a comparable pattern of differences between the general population and immigrant groups (Laatikainen et al. 2012). Vitamin D levels were alarmingly low among immigrants, particularly those with Kurdish and Somali backgrounds. Additionally, anemia was prevalent across all immigrant groups. These two clinical measurements were not compared with the general population. (Jääskeläinen et al. 2012.)

Similar surveys were conducted in 2014 (Nieminen et al. 2015) by Statistics Finland and in 2018–2019 (Kuusio et al. 2020a) by Finnish Institute for Health and Welfare. These surveys included immigrants aged 15 to 64 from a wider range of different countries of origin compared to an earlier study conducted by Castaneda et al. (2012). However, any clinical measurements were not conducted in these more recent studies. The findings of these two surveys are largely consistent, though some differences exist.

The primary discrepancy between these more recent surveys is that in the 2018–2019 survey, immigrants were less likely to report their health as good or fairly good compared to the general population (Laatikainen et al. 2020), while in the survey conducted in 2014, immigrants reported significantly less frequently that their health was average or worse compared to the general population (Koponen et al. 2015a). However, there was heterogeneity in the results depending on the country of origin. In most other respects, the results were fairly similar. All immigrant groups – except those with background in

Russia – reported fewer long-term conditions. Additionally, immigrants from the Middle East and Northern Africa reported higher rates of diabetes, depression, and other mental health problems.

Register-based studies on immigrants' health are scarce. Gissler et al. (2006) studied morbidity, health care use, and health care costs among immigrants aged 15 to 64 who had moved to Finland between 1989 and 2003. They found that on average, immigrants had lower levels of morbidity than the native population. However, the immigrant population was characterized by a higher prevalence of abdominal and pelvic pain, dialysis treatments and gallstone disease. In contrast, cancer, cardiovascular diseases, mental health problems, and accidents were more prevalent among Finnish population. Gissler et al. (2006, 87) discussed that the "healthy immigrant effect" seems to hold true especially for immigrants coming from neighboring areas and OECD countries. However, they also noted that the assessment of service needs cannot be adequately addressed in their study.

Markkula et al. (2017) utilized Finnish registers to examine the incidence and prevalence of mental health disorders among immigrants and native Finns aged over 15. Their findings indicated that immigrants on average had a lower risk of mental disorders compared to native Finns. The most significant disparities were observed among immigrants from Asia, North Africa, and the Middle East. Regardless of gender, immigrants from North Africa and the Middle East exhibited a higher incidence of mental disorders, while Asians showed a lower risk compared to native Finns. The study highlighted variations in mental health outcomes among different immigrant groups, suggesting the importance of considering factors such as country of origin, migration history, and socio-economic status when examining mental health disparities among immigrants.

There are few studies available on the health of immigrant children in Finland. Matikka et al. (2014) evaluated the well-being of children with an immigrant background in Finland using the School Health Promotion study conducted in 2013. They observed that the health status of first-generation immigrants was poorer than that of natives across various measures. First-generation immigrants reported poorer health than all others. Additionally, first-generation immigrants were more likely to experience symptoms such as headache and fatigue, as well as feelings of anxiety and school burnout compared to

native children. Comparable patterns were observed among second-generation immigrants, although the differences between them and native children were not as substantial. Similar results were found by Halme et al. (2017), who analyzed comparable variables using the School Health Promotion studies from years 2013–2017. No clear changes in the outcomes for better or worse occurred during the period.

In the report conducted by Kääriälä et al. (2020), the health of children with an immigrant background was compared to native children. The report focused on mental health and somatic health in terms of asthma and atopic dermatitis. Analyses were restricted to children born in Finland in 1997; therefore, first-generation immigrants were not included. Children were followed until the age of 18. Compared to native children, second-generation immigrants were more often diagnosed with atopic dermatitis, but less often with asthma. When analyzed by country of origin, the diagnosis of atopic dermatitis was particularly evident among children from the origin group of the EU, EFTA, and North America, as well as those from the Middle East and Africa. Mental health or behavioral disorders were significantly less frequently diagnosed in second-generation immigrants compared to natives.

There are a couple of other health-related studies on immigrant children in Finland, focusing on more specific health issues. Kyrölahti et al. (2020) studied the cancer mortality and survival among immigrant children. They found that the cancer mortality of children with an immigrant background was clearly higher than that of Finnish children. The findings applied to first-generation immigrants. Lehti et al. (2018) compared the incidence of neurological developmental disorders and learning disabilities between natives and Finnish-born immigrant children with both parents born abroad (second-generation), and children with one parent born abroad (2.5-generation). They found that immigrant children are diagnosed with neurological developmental disorders and learning disabilities more often than children with both parents of Finnish origin. This result held true for both generations, although the difference between natives and children with both parents being immigrants was higher.

The studies conducted by Gissler et al. (2006), Markkula et al. (2017), Lehti et al. (2018) and Kääriälä et al. (2020) are all based on the data of the Care Register for Health Care. Hence, their results of morbidity and incidence are based on health care visits and therefore do not take into account those who have not visited health care. Recent studies

suggest that immigrants in Finland use less services than they need. In a study conducted by Çilenti et al. (2021) immigrants reported significantly higher levels of unmet health care need compared to natives. Additionally, Kiesepä et al. (2022) found dissatisfaction in accessing services, particularly among immigrants from the Middle East and Africa, whose health in the study conducted with the same data by Laatikainen et al. (2020) was shown to be worse compared to natives. Neglecting the consideration of unmet health care needs makes it difficult to draw reliable conclusions about health based on register data.

To summarize, health outcomes observed in previous studies for adult immigrants appear to be mixed. There is considerable heterogeneity in terms of country of origin and gender. However, for immigrant children, the results are mostly in line with each other, although the number of studies is limited. Compared to native children, the health outcomes appear to be poorer for immigrant children, regardless of the immigrant generation. However, the differences seem to diminish with immigrant generation.

3.2 Health care utilization

In addition to health, the utilization of health care services depends on many other factors. The Andersen model (Andersen & Newman 1973; Andersen 1995), was developed to explain key patterns and trends in health care use. The model suggests that the individual determinants of health care utilization are 1) predisposing characteristics, 2) enabling resources, and 3) need. Predisposing characteristics include several factors. These are demographic factors such as age and gender, social structure elements like education and ethnicity, and beliefs that involve health-related values, knowledge about diseases, and attitudes toward health care services. Enabling factors, on the other hand, encompass family background aspects such as household income and health insurance, as well as the community factors like residential area and the cost of health care services. Need factors, in turn, include how individuals perceive their own health, as well as the professional's assessment of individual's health status and need for medical care.

Among immigrants, also the accessibility of health care services plays a significant role in the utilization of health care services. Though in Finland, everyone permanently residing in the country has an equal right to access health care services, it does not guarantee the accessibility of services for immigrants. According to several studies (see e.g., Kalich et al. 2016; Lebano et al. 2020; Pandey et al. 2022), immigrants' access to

health services is hindered by various barriers such as language, limited knowledge about available services, and cultural differences. If any of these reasons lead immigrants to use health services less than necessary, it will result in unmet health care needs.

The same surveys discussed in the previous subchapter 3.1.2 were also used to examine the utilization of health services of immigrants. In the earliest survey conducted by Castaneda et al. (2012), a significantly lower proportion of immigrants with Somali background reported at least one doctor visit in past 12 months compared to the general population. No differences were observed between individuals with a Russian or Kurdish background and the general population. However, immigrants with Somali and Kurdish backgrounds reported a higher number of outpatient care visits to health centers compared to both the general population and immigrants with Russian background. A sizeable proportion of these visits were to the emergency department. In turn, immigrants with Somali and Kurdish backgrounds reported lower number of outpatient care visits to hospitals compared to general population and immigrants with Russian background. The use of private and occupational health services was lower across all immigrant groups. (Koponen et al. 2012.)

The results from the survey conducted in 2018–2019 by Kuusio et al. (2020a) are similar. Compared to the general population, lower proportion of immigrants had reported at least one doctor visit in the last 12 months, regardless of the gender or origin group. Immigrants had the highest number of visits to health centers, whereas the general population primarily used occupational health care services. Additionally, the proportion of immigrants who had visited a private health care was lower compared to the general population. (Kuusio et al. 2020b.) In the 2014 survey, however, no significant differences were observed between immigrant groups and the general population in the proportions who had visited a doctor (Koponen et al. 2015b). However, all the studies emphasize the heterogeneity based on immigrant origin.

Regarding mental health service use, Castaneda et al. (2012b) highlight that the current system needs to be improved, as it only reaches a portion of the immigrants who require these services. Only 1.7% of immigrants with Somali background reported at least one visit in past 12 months in mental health care. In general population, the corresponding proportion was 9.1%. In turn, there was no statistically significant difference between the general population and immigrants with Kurdish background, despite a significantly

larger proportion of Kurdish immigrants reporting severe depression and anxiety symptoms. The results are in line with the 2014 survey (Koponen et al. 2015b).

In Finland, there has been relatively little register-based research on health care service utilization among immigrants. Gissler et al. (2006) found that, on average, immigrants used less of both primary and specialized health care services compared to natives. However, immigrant women aged 15–29 had more visits, particularly regarding to pregnancy and childbirth. Examined by country of origin, all immigrant groups had lower numbers of visits to specialized health care services, regardless of the origin. In contrast, primary health care usage showed more heterogeneity. Immigrants from refugee countries – former Yugoslavia, Somalia, Iraq, and Iran – had the highest number of visits, higher than natives. Other immigrant groups had mainly fewer visits to primary health care.

Besides this thesis, the study conducted by Gissler et al. (2006) is the only one in Finland, that has also incorporated the cost perspective in examining the differences between natives and immigrants in health care utilization. With the lower use of health care services by immigrants, the associated costs were also lower in both, primary and specialized health care. The differences in the costs of specialized health care were larger. Additionally, Gissler et al. (2006) found that the costs for more recent immigrants were lower than those for immigrants who had lived longer in Finland. However, as presented in Chapter 2, the population with an immigrant background in Finland has changed significantly over the past two decades, which means that the results of the study of Gissler et al. (2006) may no longer be generalizable.

Kieseppä et al. (2020) studied over 15 years old immigrants' use of mental health services by comparing the intensity of treatment between immigrants and native Finns. Utilizing Finnish registers, they followed the number of new visits to mental health care for one year from the initial visit. They found that immigrants had significantly lower treatment intensity in mental health care. However, the probability of receiving treatment of high intensity increased with the time lived in Finland. The probability of receiving treatment of high intensity was lower for immigrants from Eastern Europe, Sub-Saharan Africa, the Middle East, and Northern Africa compared to the immigrants from the region of EU/EFTA, North America, and Australia.

Even less information is available about the use of health services among immigrant children in Finland. However, study conducted by Loi et al. (2021) focuses on the utilization of health care services among immigrant children in Finland. Loi et al. (2021) studied immigrant adolescents' physical and mental health by estimating the risk of receiving inpatient or outpatient care by immigrant generation. Their analyses were restricted to children aged 10–18. Their aim was to assess the role of families with one native and one immigrant parent arrangements (2.5-generation) and test the contributions of family material and social resources to children's outcomes. They used data derived from various Finnish registers. As a method they used logistic regression with individual-clustered standard errors.

Loi et al. (2021) examined separately the health care utilization for three causes: psychopathological disorders, somatic conditions, and injuries. They found clear evidence of a “generational gradient”, meaning that the odds of receiving care increase with immigrant generation. For any of the three causes, first-generation immigrants had significantly lower risk of receiving care compared to natives. 2.5-generation instead had significantly higher risk, and for the second-generation immigrants they found no significant difference. As an interesting finding, among 2.5-generation, the risk was higher for children with immigrant father and native mother than that of children with immigrant mother and native father.

Similar results were observed when Loi et al. (2021) examined the risk separately for the three different cause groups. The risk of receiving care was significantly lower for first-generation immigrants in all three cause groups. For the second-generation, the only clearly significant difference was in psychopathological disorders, for which their risk of receiving care was significantly lower compared to natives. For 2.5-generation the risk of receiving care was mainly higher in each cause group. The largest differences were observed in psychopathological disorders, followed by injuries. However, again the fact that which one of the parents is immigrant seems to affect the size and significance of the difference. Children with an immigrant father and native mother had higher risk in every cause group compared to children with immigrant mother and native father.

Loi et al. (2021) also did the analyses by immigrant's origin group. For first-generation the risk of receiving care for any cause was significantly lower regardless of the origin group. For second-generation, the only group that was significantly different from natives

was children with origin in Africa. Their risk was significantly lower than that of natives. More heterogeneity was observed among 2.5-generation. For those with immigrant mother from America or Asia, the risk of receiving care was lower, and for those with immigrant mother from Europe, the risk was higher. In turn, for those with immigrant father from Europe, Asia, or Africa the risk was significantly higher. Notably, which parent is an immigrant appears to have an impact on the risk of receiving care. For example, for children in 2.5-generation with Asian origin, the results are opposite depending on which parent is an immigrant.

Children's use of specialized health care for somatic reason has been superficially examined in the report of Kääriälä et al. (2020) as well. They found that compared to natives, a slightly higher proportion of second-generation immigrants had a visit to specialized health care. Additionally, there were more children among second-generation immigrants who used the services more than once during the 18-year study period compared to natives. However, the differences were small, and randomness cannot be ruled out as an explanation for the results. The use of psychotropic drugs by second-generation immigrant children was also examined in the report of Kääriälä et al. (2020). They noted that a significantly lower proportion of second-generation immigrants had purchased psychiatric medications, and the quantity of purchases was also considerably lower. First-generation immigrants were not included in this report.

Ansala et al. (2020) studied the use of medical services of immigrant adolescents in Finland. Their study included 1) children of natives, 2) children of immigrant-natives, defined as children with one immigrant and one native parent (2.5-generation), and 3) children of immigrants, defined as children with both parents born abroad (first- and second-generation immigrants). Their analyses were restricted to those over 15 years old. They classified medication use into two categories: receiving a full reimbursement for medical costs related to treating a severe and long-term illness and being reimbursed for purchasing psychotropic medication. These outcomes were analyzed by estimating the probability of receiving reimbursement or purchasing medication by the age of 23.

The findings of Ansala et al. (2020) showed that compared to native children, immigrant children are less likely to have reimbursement right for severe illness or to purchase psychotropic medication. This result applies to both, children of immigrant-natives and children of immigrants. However, the difference to the native children is larger for the

children of immigrants. First- and second-generation immigrants cannot be distinguished in this study. However, the outcomes used in the study of Ansala et al. (2020) cannot straightforwardly be considered as a measure of health care service utilization, especially when comparing natives to the population with an immigrant background. Immigrants may suffer more from infectious diseases or chronic conditions that do not qualify for reimbursement in Finland. In addition, it is conceivable that immigrants may face challenges in obtaining reimbursement rights, as language barriers, for example, make it more difficult for them to fill the applications.

Results from register-based studies conducted in other Nordic countries indicate that, on average, the utilization of health care is lower among immigrant children compared to native children. In Sweden register-based research has focused particularly on mental health services. Immigrant children tend to use less mental health services than native Swedes. In addition to first-generation immigrants, this applies to children born in Sweden with at least one immigrant parent (second-generation and 2.5-generation). Even if immigrants had been diagnosed with a mental health disorder, they were less likely to receive recommended treatments. (Gubi et al. 2022a; Gubi et al. 2022b.) In Norway, the utilization of primary health care was lower for first-generation immigrants, but higher for second-generation immigrants – especially those under 10 years old (Fadnes & Diaz 2017.) Additionally in Denmark, immigrant children primary health care utilization has been found to be lower compared to native children. However, first- and second-generation were not distinguished in this study. (Dyhr et al. 2007.)

To conclude, based on the previous research, immigrants in Finland use on average less health care services than natives. According to the studies focusing on adults, immigrants may use health center services more frequently than natives, but they tend to use less specialized care and occupational health services. Additionally, there are significant differences in the proportions of mental health services users among certain immigrant groups, with immigrants generally receiving less intensive mental health treatment. As before, immigrants' heterogeneity is evident in terms of country of origin and gender. There is limited amount of information available about immigrant children health care utilization. According to Loi et al. (2021) the odds of receiving care increase with immigrant generation; compared to natives, the risk of receiving care was significantly lower for first-generation immigrants, and significantly higher for 2.5-generation immigrants. For the second-generation immigrants, the service usage most closely

resembled that of natives. However, particularly the risk of receiving care for psychopathological disorders was significantly lower for both, first- and second-generation immigrants. The result is supported by the findings by Ansala et al. (2020) and Kääriälä et al. (2020), indicating that the use of psychotropic medication is significantly lower among immigrant children. These results are alarming, given the findings of Matikka et al. (2014), that both first- and second-generation immigrants experience more anxiety and school-exhaustion than natives.

4 Challenges in assessing the causal effects of immigration

Immigration is generally regarded as a significant life change, which it undoubtedly is. However, research evidence on the causal effects of immigration on individuals is limited. Immigrants are often studied by comparing them to the native population of the new host country. However, this approach does not consider the role of immigration in explaining the differences between immigrants and natives. When differences in health care utilization between immigrants and native population are observed, it is essential to understand what causes the differences. Are these differences simply a result of differences in health? Does immigration itself reduce the use of services? Is it because of the health benefits associated with immigration, or is it because immigrants struggle to access the new health care system?

Without understanding the underlying factors behind the differences in health service utilization, it is difficult – if not nearly impossible – to implement the right policy measures. For example, if the lower usage of mental health services among immigrants is due to mental health stigma, or if it results from immigrants struggling to access services despite their willingness, the required policy measures are very different. Gaining insight into what happens to the use of health services after immigration would provide us with valuable information. For example, if immigrants use fewer health services than natives but maintain consistent service usage levels after immigration, this may be less concerning than a scenario where there is a sharp decline in service use following immigration. Immigration, health, and health services form a complex combination. In this chapter, I will explore the challenges associated with identifying the causal effects of immigration.

To study the effects of immigration, a model which can be used to assess the cause-effect relationship is needed. The main challenge in modelling causal inference is that, at any given time point, an individual can only be observed once. That is, when comparing an individual's use of health services before and after immigration, we cannot know how their service use would have developed without immigration; the counterfactual outcome remains unobservable. To estimate this counterfactual, a genuinely comparable control group is required. In practice, however, finding such a comparable control group is difficult, as individuals often end up in a treatment group for a specific reason. Differences between the control group and the treatment group lead to a selection bias,

making it uncertain whether the observed differences after treatment are due to pre-existing disparities or the treatment itself. (Duflo et al. 2007, 4–6.)

The simplest and most reliable way to eliminate selection bias is randomization, in which individuals are randomly assigned to the treatment and control groups. (Duflo et al. 2007, 7; Angrist & Pischke 2009, 15.) However, in the context of immigrants, randomization is usually not possible due to practical and ethical constraints. Hence, selection bias becomes a significant concern. Immigrants are not randomly selected; rather, they form a highly selective group. For example, research indicates that immigrants tend to be healthier (Kennedy et al. 2014), better educated (Feliciano 2005), and have higher income levels (McKenzie et al. 2010) compared to those staying in their country of origin.

There are some policy experiments where randomization can create an effective research design for studying the effects of immigration. For example, in the United States, the U.S. Diversity Visa Lottery, and in New Zealand, Pacific Access Category, are programs in which immigrants are randomly drawn among eligible applications (McKenzie & Yang 2010, 251–253). These programs offer a unique identification strategy because applicants must meet specific health, language, and other criteria to qualify. For example, Stillman et al. (2009) utilized New Zealand’s lottery program as a natural experiment to study the short-term impacts of immigration on mental health. They used a comprehensive household survey to compare the mental health of those who applied to migrate from Tonga to New Zealand and won in the lottery to those who applied but did not win. They found that immigration improved mental health, particularly among immigrants who had low mental health scores prior to immigration.

These natural experiments provide perhaps the most reliable way to study the effect of immigration. However, there have been only a few such experiments, and research based on them is limited. Additionally, the generalizability of the results from the programs of New Zealand and the U.S to Finland’s context is challenging. In the Nordic countries, similar programs relying on lottery are not commonly found. When randomization is not feasible, as is often the case in immigration and more generally in social sciences, quasi-experimental designs are utilized to study causal effects. In the following, I will discuss two commonly used quasi-experimental designs: the difference-in-differences method (DiD) and regression discontinuity design (RDD). I will particularly focus on the challenges related to the assumptions of these methods in the context of immigration.

In the difference-in-differences method (DiD), the change in the variable of interest for the treatment group after the intervention is compared to the change in the same variable for the control group. To do this, both groups must be observed at least twice, once before and once after the treatment. The model relies on the parallel trend assumption, which requires that the pre-treatment trends in the variable of interest are similar for both groups. This assumption suggests that, in the absence of treatment, the average outcomes for both the treatment and control groups would have developed in the same way. (Angrist & Pischke 2009, 227–233; Roth et al. 2023, 2221–2222.) Another important assumption is related to the exogeneity of the covariates; the covariates included in the model must not be affected by the treatment (Lechner 2010, 177).

Perhaps the most famous application of the DiD method is a study conducted by Card and Krueger in 1994. They studied the effect of a minimum wage increase on employment in the fast food sector in New Jersey. They compared the change in the employment rate in New Jersey, where the minimum wage was raised, to the change in the employment rate in Pennsylvania, where the minimum wage remained unchanged during the same period. Contrary to expectations, they found that raising the minimum wage did not have a negative impact on employment; instead, it had positive effects. (Card & Krueger 1994).

As a simple example in the context of immigration, we could consider applying the DiD method to study how immigration affects the use of health care for individuals moving from country A to country B. In this design, individuals staying in country A form the control group, while those migrating from country A to country B form the treatment group. In DiD method, the fact that immigrants form a selective group in their host country is not inherently a problem, if the assumption of parallel trends holds. This means that if, on average, healthier individuals are selected as immigrants, their use of services may be lower than that of the control group, as long as the trend between the groups is shared. Otherwise, we would need to control for all variables that could cause differences in the trend of health care utilization.

In the regression discontinuity design (RDD) the probability of belonging to a treatment group is a discontinuous function of one or more observable factors (Duflo et al. 2007, 11). In practice, the study population is divided into control and treatment groups based on whether the value of an exogenous variable falls on either side of a fixed threshold. The key assumption of RDD is that the threshold variable used to determine the treatment

is continuous (Hahn et al. 2001, 202.), which ensures that individuals on either side of the threshold are similar. This allows the regression discontinuity design to effectively eliminate selection bias. For example, Black (1999) utilized RDD to study the effect of school quality on housing prices. She used school district boundaries as a threshold to compare houses that are geographically close but associated with schools of differing qualities. She found that parents are willing to pay more for houses associated with higher-performing schools.

RDD could be applied to study the effects of immigration in situations where the entry into a country is determined by a specific threshold. This kind of practice exists in Australia. The Department of Home Affairs invites individuals with skills in demand to apply for a visa. Before inviting, potential invitees have shown their interest in the visa by submitting an expression of interest. After submission, potential applicants are evaluated and scored based on specific criteria, including factors such as age, education, and work experience. Only those who achieve a minimum score of 65 points will be invited to apply for the visa. (Department of Home Affairs 2024.)

Using the 65-point threshold, we could compare individuals who scored just above 65 points and were granted to immigrate to those who scored just below 65 and were not allowed to immigrate. However, one challenge with this Australian practice is that, to immigrate, those who score above 65 need to meet certain health requirements, which may be assessed only after they receive the invitation and submit their visa application. This raises the possibility that those who eventually become immigrants are generally healthier than those who scored just below 65 and missed receiving the invitation, whose health status remains unknown. However, because the health requirements are outlined in advance, it is likely that individuals who believe they do not meet these requirements choose not to submit an expression of interest. While this reduces concerns about health disparities between the two groups, the comparability of these groups should be assessed. The unfortunate truth is that immigration policies often do not have a suitable, clearly defined threshold value for granting the entry into the country, which makes applying RDD challenging.

If all factors, except those that changed exogenously due to immigration, remained constant, a suitable research design could allow us to assess the impact of immigration on the use of health care services. However, the major challenge in studying the effects of

immigration and applying the previously described methods is that simultaneously with the immigration, endogenous variables affecting health care use are likely to change. For example, the income level of immigrants might change due to different career opportunities in a new country (see e.g., Stillman et al. 2009, 686). This violates the exogeneity assumption. Since income level also affects the health care utilization, we cannot distinguish which part of the difference in health care use is due to the immigration and which part is due to the changes in income level.

To distinguish these effects, we would need comprehensive information on how immigration influences all potential factors affecting health care use, as well as how these factors are specifically associated with health care utilization. However, obtaining such comprehensive information is rarely possible. This challenge is also evident in the previously discussed study on immigration effects on mental health conducted by Stillman et al. (2009). They attempt to distinguish the impacts of changes in income and smoking on the mental health improvement after immigration by first examining how mental health correlates with income and smoking, and then calculating the average treatment effect on the treated for these covariates. By combining these results, they aim to assess what portion of the outcomes can be explained by these covariates and how much is attributable to immigration.

From the parallel trend assumption in the DiD method, it follows that during the follow-up period, there should be no other affecting the control and treatment groups differently, aside from the treatment itself. In the context of immigration, this means that in the immigrant's country of origin, there cannot be changes that impact the health care utilization of its residents – our control group. An example of such a change could be an increase in the price of health services. Additionally, immigration is often driven by some health-related threat, such as war. The course of the war affects the use of health care for those who remain in the country. Therefore, we would be unable to identify which part of the difference in health care utilization is explained by immigration and which is due to changes resulting from the war. Consequently, this method is not suitable for studying the effects of immigration on health care utilization among refugees. This illustrates one of the complexities of immigration that makes it challenging to find an appropriate methodological approach.

McKenzie et al. (2010) studied the income gains from immigration by utilizing the New Zealand's Pacific Access Category program discussed earlier in this chapter. They applied both an experimental method and a non-experimental DiD method, comparing the results from each. They found that immigrants experienced a significant increase in income after immigration. However, considering the differences in GDP between New Zealand and Tonga, the income gain was less than predicted. Comparing the experimental results with those from the DiD method, they found that the latter overestimated the income increase by 20%. They attributed this upward bias to challenges also discussed in this chapter: 1) unobserved characteristics, such as drive and ability, may be rewarded differently in the labor markets of New Zealand and Tonga, leading to time-varying individual effects, and 2) the potential issue of control variables not fully accounting for all the differences in underlying trends between migrants and non-migrants.

Even if an ideal research design could be established, practical issues complicate the examination of immigrants' health care utilization. As Stillman et al. (2009) and McKenzie et al. (2010) demonstrated in their analysis based on New Zealand's Pacific Access Category program, it is theoretically possible to study the effects of immigration using surveys. However, surveys are not particularly well-suited for accurately measuring health care utilization, especially concerning health care costs. Therefore, register data provides a more robust, comprehensive, and reliable foundation for analyzing health care visits and costs. However, challenges regarding the availability and quality of register data persist. To apply the DiD method, it is essential to have data both, before and after the immigration. Furthermore, to utilize DiD or RDD methods the data should be collected from two different countries. Unfortunately, information on immigrants is often available from only one country, either before or after the immigration. In addition to challenges related to data permissions, the variations in register data infrastructures across different countries make it difficult to combine the data.

In Finland, we have exceptionally high-quality register datasets concerning citizens and health care visits. Still, there are deficiencies in data quality particularly regarding immigrants. One challenge is the delay before immigrants are included in official registers. An immigrant is entered into the Population Information System only after getting a personal identity code, which requires legal residence in Finland under specific conditions (Digital and Population Data Services Agency 2024). The migration information in Statistics Finland's FOLK modules, used in this thesis, is based on the

Population Information System, and is further restricted to those who have applied and obtained permanent residency in Finland. The process of applying for residency depends on immigrant's country or origin: those from EU and EEA countries can apply for residency more quickly than those from third countries, who must first obtain a residence permit (Municipality of Residence Act 201/1994). As a result, the immigration date in the FOLK migration-module is not a reliable measure of the actual time spent in Finland. Additionally, the delay in the immigration date is not randomly distributed among immigrants; it tends to be greater for certain groups, making the variable incomparable across different immigrant populations.

Deficiencies have also been identified in how immigrants' background information is recorded in the registers. For example, information on the education of the immigrant population is incomplete, as a large proportion of the degrees completed abroad is missing from the data. Sutela and Larja (2015) compared the educational attainment of immigrants in Statistics Finland's degree register with survey-based information. Their findings reveal a significant underrepresentation of immigrants' secondary and higher education degrees in the register. The proportion of individuals with secondary or higher education nearly doubled once survey-based information was added. Since identifying this gap, targeted surveys have been used to supplement the degree register for immigrants, though some degrees completed abroad remain missing.

Studying the effects of immigration is important for both individuals and society. However, there is very little research on this subject, as identifying the impacts of immigration is difficult. Finding a suitable research design is challenging due to the facts that immigrants form a selective group, and same time with the immigration many other factors are likely to change. To enable more research on this topic, governments could consider developing immigration policies that create favorable conditions for natural or quasi-experimental studies. Of course, this must be done with careful regard for ethics and fairness, which may not always be possible – for example, in the case of refugees. Improving the reliability of register data and integrating data across different countries is another key area for future development. A major EU project, European Health Data Space, is currently underway to advance these goals (European Commission 2024).

5 Empirical analysis

5.1 Data and descriptive statistics

In this thesis, I utilize the rich register data collected by the Inequalities, Interventions, and New Welfare State (INVEST) research flagship.³ My dataset combines population background information from Statistics Finland's FOLK modules with detailed data on health care use and costs from Finnish Institute for Health and Welfare (THL). Additionally, I utilize the Social Insurance Institution of Finland's (Kela) register on medicine reimbursement rights. These comprehensive register data allows me to conduct extensive analyses of health care use in Finland, with the advantage of observing a wide range of demographic and socioeconomic background variables, such as gender, household income, and municipality of residence.

The information on health care visits is based on Care Register for Health Care, which includes inpatient care and specialized outpatient care.⁴ Inpatient care covers services provided by both private and public sectors, although private provides represent a very small proportion. Specialized outpatient care includes visits only to public service providers. Each visit has been linked with an estimated cost. This estimation has been done in the Finnish Institute for Health and Welfare for statistical purposes. The costs for visits in non-psychiatric specialty, which are used in the Statistics of Hospital benchmarking (Finnish Institute for Health and Welfare 2024), are based on diagnosis-related groups (DRG). For psychiatric specialty, the costs have been estimated based on the cost information reported by hospitals.⁵ The estimated costs for a visit cover all expenses related to patient's care during the episode, including physician and nursing labor, hospital medications, clinical test, procedures, as well as other general hospital-related overhead costs, such as administrative expenses. The costs have been adjusted to reflect the value of money in year 2020.

³ For more information on INVEST and its' data infrastructures, see: <https://invest.utu.fi/invest-data-infrastructures/>

⁴ In accordance with the guide for Care Register for Health Care (Finnish Institute for Health and Welfare 2014, 76) visits, whose service sector is inpatient ward of the hospital or health centre (1), day surgery (2), substance abuse services (5), rehabilitation facility care (6), day hospital care in psychiatric (83), emergency visit (91), initial appointment visit (92), follow-up appointment visit (93), or consultation visit (94) have been included as health care visits.

⁵ Not all hospitals had provided information on costs, but the estimation was made based on the information from the hospitals that provided the cost information.

In this thesis, my focus is on immigrant children. The sample includes children born between 2000 and 2010 who have been continuously living in Finland between 2010 and 2018. These restrictions are made for excluding temporary migrants and population over 18 years old at the end of the study period. Hence, all individuals included in the sample have had equal right to use health care services. The follow-up period over which the health care use and costs are observed is from year 2011 to 2017. Health service utilization of children is aggregated to an annual level, forming a balanced panel data in which each child is represented once every year.

Children are divided into three groups: natives, first-generation immigrants, and second-generation immigrants, based on their own and their parents' countries of birth. Parents are defined as adults living in the same household. Primarily, the classification relies on the mother's country of birth. However, if the father is the only parent living with the child, the father's country of birth is used instead. In accordance with the definition described in Chapter 2.1, a child born abroad with both parents, or with the only known parent, born abroad is considered as a first-generation immigrant. Correspondingly, a child born in Finland with both parents, or with the only known parent, born abroad is classified as a second-generation immigrant. However, the literature suggests treating the 2.5-generation – those with one native and one immigrant parent – as a distinct group, separate from both natives and second-generation immigrants (e.g., Ramakrishnan, S. K. 2004; Loi et al. 2019). Therefore, contrary to the definition of Statistics Finland presented in Chapter 2.1, my analyses exclude the 2.5-generation, and “natives” specifically refers to children with both parents born in Finland.

Immigrants are classified into seven groups by their origin as follows: 1) Western countries, including countries of EU and European Free Trade Association (EFTA), North America, United Kingdom, Australia and New Zealand 2) Eastern Europe, including Russia and the former Soviet Union 3) the Middle East and Northern Africa 4) Sub-Saharan Africa 5) Asia and 6) Others, including those who don't belong to any of the earlier five categories 7) Unknown, including those whose country of origin is either missing or unknown in the register. The determination of a child's origin follows the definition described earlier: a child's origin is primarily based on the mother's country of birth, except in cases where the child lives only with the father, in which case the origin is defined by the father's country of birth.

Table 1 presents the background characteristics by immigrant generation. The sample sizes are as follows: natives (N=556 602), first-generation immigrants (N=6 715), and second-generation immigrants (N=23 942). Background characteristics are reported using values from the year 2011, the first year of the study period. Compared to native children, first-generation immigrants are on average slightly older, while the second-generation immigrants are slightly younger. Additionally, the average age of mothers at childbirth is lower among both immigrant groups, particularly for first-generation immigrants. There is hardly any difference in the number of children per family or in gender distribution.

When it comes to income, the differences between natives and immigrant generations are remarkable. In Table 1, children are divided into income quintiles based on annual household income. Natives appears to be evenly distributed across the five income groups, while noticeable differences exist among immigrant generations. Up to 65 percent of first-generation and 58 percent of second-generation immigrants belong to the lowest income quintile. In contrast, 21 percent of natives fall into the highest income quintile, while the corresponding proportion for first-generation immigrants is just 3 percent, and 5 percent for second-generation immigrants. The disparities between natives and first-generation are greater than those between natives and second-generation, although both differences being substantial. Additionally, there are differences in housing habits – a larger proportion of native children live with both parents, while the percentage of children living only with their mother is higher among both immigrant groups.

Table 1 Background characteristics by immigrant generation

	Natives		First-generation immigrants		Second-generation immigrants	
Age (Mean, SD)	6.0	(3.2)	7.3	(2.7)	5.3	(3.1)
Mother's age at the child's birth (Mean, SD)	30.1	(5.4)	27.3	(5.8)	29.1	(5.7)
Number of children in family (Mean, SD)	2.5	(1.3)	2.5	(1.4)	2.6	(1.4)
Gender (n, %)						
Male	284 497	(51.1%)	3 418	(50.9%)	12 241	(51.1%)
Female	272 105	(48.9%)	3 297	(49.1%)	11 701	(48.9%)
Income quintile (n, %)						
1 st (lowest)	99 139	(17.8%)	4 335	(64.6%)	13 890	(58.0%)
2 nd	111 156	(20.0%)	1 262	(18.8%)	4 960	(20.7%)
3 rd	114 267	(20.5%)	537	(8.0%)	2 390	(10.0%)
4 th	115 618	(20.8%)	354	(5.3%)	1 559	(6.5%)
5 th (highest)	116 422	(20.9%)	227	(3.4%)	1 143	(4.8%)
Living with (n, %)						
Both parents	473 595	(85.1%)	4 965	(73.9%)	15 203	(63.5%)
Mother	74 731	(13.4%)	1 671	(24.9%)	8 263	(34.5%)
Father	8 276	(1.5%)	79	(1.2%)	476	(2.0%)
Region of origin (n, %)						
Finland	556 602	(100.0%)	0		0	
Western countries	0		1 961	(29.2%)	3 294	(13.8%)
Eastern Europe	0		1 797	(26.8%)	6 849	(28.6%)
Middle East and Northern Africa	0		958	(14.3%)	4 403	(18.4%)
Sub-Saharan Africa	0		915	(13.6%)	3 338	(13.9%)
Asia	0		822	(12.2%)	2 425	(10.1%)
Others	0		58	(0.9%)	174	(0.7%)
Unknown	0		204	(3.0%)	3 459	(14.4%)
Observations	556 602		6 715		23 942	

Notes: Table represents background characteristics from the first year of the study period (2011).

5.2 Methods

To estimate the differences in the probabilities of annual health care utilization among first-generation immigrants, second-generation immigrants, and natives, I use a linear probability model with time fixed effects:

$$y_{it} = \beta_0 + \gamma_t + \beta_1 I_i + \beta_2 X_{it} + \epsilon_{it} \quad (1)$$

where y_{it} represents the probability of individual i using health care services in year t , γ_t is the year fixed effect, I_i is an indicator variable for immigrant status, X_{it} is a vector of covariates and ϵ_{it} is an error term. The year fixed effects are included into the model to control for the factors that vary annually but are consistent across all individuals within the same year. Such factors are, for instance, macroeconomic shocks or changes in the health care system.

The decision to use a linear probability model for binary outcome instead of non-linear models is based on its simplicity and ease of interpretation. Despite its theoretical limitations in estimating probabilities, the linear probability model often serves a practically sufficient tool and produces estimates that are similar to those of non-linear models (Angrist & Pischke 2009, 69–72; Wooldridge 2010, 454–455). To ensure that the results are consistent regardless of the model, I conduct robustness checks by running the analyses also with Logit and Probit models. These results are presented in the Appendix 1. The results are nearly identical, indicating that results in Chapter 5.3.1 are both, valid and robust.

To estimate the number of visits and annual costs of health care utilization, I use a linear regression model with time fixed effects:

$$y_{it} = \beta_0 + \gamma_t + \beta_1 I_i + \beta_2 X_{it} + \epsilon_{it} \quad (2)$$

This Model 2 is similar to the Model 1 except for the continuous outcome variable y_i which represents individual i 's annual health care costs or the number of visits in a year.

In my dataset, each individual is observed every year. This is likely to cause a serial correlation problem in which the observations for the same individual are correlated (e.g., Angrist & Pischke 2009, 236–240). In other words, an individual's use of health care services in one year is likely to be related to their usage in the following year. To address

this problem, standard errors are clustered at the individual level. The analyses were conducted using Stata version 17.

5.3 Results

5.3.1 Health care use and costs for the entire sample

Table 2 presents the estimation results for the probability to use health services (Panel A) and annual health care costs (Panel B) with different model specifications. The constant term represents the predictor for natives in the baseline year 2011. Model Specification 1 shows the results without any control variables, providing a straightforward comparison of the differences in the outcome variable means between natives and immigrant groups. In Specification 2, the results are adjusted for individual characteristics: age and gender. Specification 3 further includes controls for familial characteristics: household income and the number of children in the family. Additionally, in Specification 4, the municipality of residence is included as a control variable in order to rule out potential differences in service provision across municipalities.

The baseline results in Specification 1 of Table 2 show that first-generation immigrants are 1.7 percentage points less likely to visit health services compared to native children (Panel A). However, the result appears to be the opposite for the second-generation immigrants. Among the second-generation, the probability of using health services is 4.2 percentage points higher than that of natives. Both results are statistically significant ($p < 0.01$). The different specifications have a negligible effect on the results. This suggests that the differences between natives and immigrant children cannot be explained by factors such as varying income.

Panel B of Table 2 represents the results of average annual health care costs per capita by immigrant generation. For both first- and second-generation immigrants, annual costs are lower in comparison with native children. In Specification 1 of Table 2, the annual costs for first-generation immigrants are shown to be 56 euros lower than those for native children. In relative terms, this means 11.6 percent lower costs for first-generation immigrants in 2011. The results are statistically significant ($p < 0.01$). Moreover, when controlling for individual and familial characteristics and the municipality of residence the differences in health care costs become more pronounced. This suggests that the

observed difference is driven by first-generation immigrant status, rather than by differences in for example, income level or service provision.

The baseline results in Specification 1 show no significant differences in annual health care costs between second-generations immigrants and natives. However, after adjusting for individual and familial characteristics and the municipality of residence the results for second-generation immigrants become statistically significant ($p < 0.05$). However, the coefficient is so small (-26 euros) that the results are not necessarily practically significant. This is likely due to the large sample size (4 110 813 observations), which can yield statistically significant results even when the effect size of the finding is small.

Table 2 Health care use and costs for immigrant generations compared to natives

Model Specification	(1)	(2)	(3)	(4)
<i>A: Probability of using health services</i>				
Constant (Natives)	0.287*** (0.001)	0.343*** (0.001)	0.733*** (0.009)	0.596*** (0.011)
First-generation (ref. natives)	-0.017*** (0.003)	-0.009*** (0.003)	-0.024*** (0.003)	-0.021*** (0.003)
Second-generation (ref. natives)	0.042*** (0.002)	0.038*** (0.002)	0.028*** (0.002)	0.035*** (0.002)
<i>B: Annual costs</i>				
Constant (Natives)	479.7*** (3.9)	424.4*** (7.3)	1611.6*** (50.0)	1384.8*** (70.4)
First-generation (ref. natives)	-55.6** (22.4)	-81.2*** (22.5)	-126.2*** (22.8)	-134.5*** (23.0)
Second-generation (ref. natives)	-2.4 (12.1)	9.9 (12.1)	-20.7* (12.2)	-25.5** (12.7)
<i>Controlling for:</i>				
Individual characteristics	–	X	X	X
Familial characteristics	–	–	X	X
Municipality of residence	–	–	–	X
Observations	4 110 813	4 110 813	4 110 813	4 110 813

Notes: Robust standard errors clustered at the individual level are shown in parentheses.

****, **, and * indicate statistical significance at the 1%, 5%, and 10% significance levels.*

In summary, first-generation immigrants had both a lower probability of using health services and lower annual health care costs compared to natives. For second-generation immigrants, however, the findings differ between service usage and costs: while their probability of using health services was slightly higher than that of natives, their annual

health care costs were slightly lower. This may be due to a lower intensity of service use or a tendency to utilize more affordable services. In the following chapters, I will explore the intensity of service use in more depth (Chapter 5.3.2) as well as the utilization of different types of health services (Chapter 5.3.3).

5.3.2 Health care use and costs for service users

In this chapter, the estimation is done only for those who have used services to investigate the differences in health care utilization in more detail. By focusing only on service users, it is possible to achieve a more detailed understanding of the intensity of the health care utilization. Table 3 presents the results from the Model 2, which regresses indicators for the number of health care visits (Panel A) and annual health care costs (Panel B) for individuals who had at least one health care visit during the year. Based on the results in Table 3, both – first and second-generation immigrants – have fewer health care visits per year. Additionally, the annual costs of health care use are lower for both immigrant generations than for natives. Model specifications 2, 3, and 4 suggest that the difference in health care utilization between natives and first-generation immigrants is greater than the difference between natives and second-generation immigrants.

In the analyses focused on service users, I also aim to exclude the effect of differences in morbidity by using the number of medicine reimbursement rights as a control variable (Specification 5). In Finland, individuals can receive reimbursement for medicines based on diagnosed illness. In that case, the Social Insurance Institution of Finland covers a certain proportion of the medicine costs depending on the type of reimbursement right. The register on medicine reimbursement rights includes all types of reimbursement categories. (Social Insurance Institution of Finland 2024.) Medicine reimbursement rights have been used to describe morbidity, or as part of it, in reports focusing on the financing of health services in Finland (Vaalavuo et al. 2013; Häkkinen et al. 2020; Holster et al. 2022).

Controlling for morbidity seems to have some bearing on the coefficients (Specification 5). When morbidity is accounted for, the differences in the number of visits and costs are reduced. Additionally, the differences in the coefficients between first- and second-generation immigrants are levelled out. Nevertheless, the differences between natives and both immigrant generations remain statistically significant. This indicates that among

health care service users, the costs and both the frequency of visits and the associated costs are lower for first- and second-generation immigrants compared to natives.

Table 3 Health care use and costs for immigrant generations compared to natives, service users

Model Specification	(1)	(2)	(3)	(4)	(5)
<i>A: Number of visits</i>					
Constant (Natives)	3.7*** (0.0)	2.7*** (0.0)	6.3*** (0.3)	6.2*** (0.3)	7.2*** (0.3)
First-generation (ref. natives)	-0.4*** (0.1)	-0.6*** (0.1)	-0.7*** (0.1)	-1.0*** (0.1)	-0.7*** (0.1)
Second-generation (ref. natives)	-0.6*** (0.0)	-0.4*** (0.0)	-0.5*** (0.0)	-0.8*** (0.0)	-0.6*** (0.0)
<i>B: Annual costs</i>					
Constant (Natives)	1672.2*** (13.1)	1198.3*** (21.8)	2866.3*** (180.4)	2994.3*** (268.6)	3486.7*** (257.7)
First-generation (ref. natives)	-87.0 (77.9)	-220.5*** (78.3)	-262.9*** (78.9)	-308.5*** (79.2)	-160.6** (74.9)
Second-generation (ref. natives)	-247.0*** (35.1)	-162.8*** (35.0)	-198.8*** (35.4)	-261.6*** (37.1)	-161.3*** (35.9)
<i>Controlling for:</i>					
Individual characteristics	–	X	X	X	X
Familial characteristics	–	–	X	X	X
Municipality of residence	–	–	–	X	X
Number of reimbursement rights	–	–	–	–	X
Observations	1 162 393	1 162 393	1 162 393	1 162 393	1 162 393

Notes: Only service users are included.

Robust standard errors clustered at the individual level are shown in parentheses.

****, **, and * indicate statistical significance at the 1%, 5%, and 10% significance levels.*

5.3.3 Heterogeneity by type of care: psychiatric vs. non-psychiatric care

For care-specific analyses, health care utilization is divided into visits for psychiatric care and visits for non-psychiatric care by using ICD-10 codes. Psychiatric care refers to visits with a primary diagnosis under any ICD-10 F-code (Mental and behavioural disorders). In contrast, non-psychiatric care includes visits diagnosed with any other ICD-10 code as the primary diagnosis. Results are presented separately for all children (Table 4) and only for the children who have used services (Table 5).

The first finding from Table 4 is that psychiatric care is used significantly less in all groups than non-psychiatric care. As shown in the baseline model (1), the average proportion of with a visit for psychiatric care is 2.6 percent for natives, 3.3 percent for first-generation immigrants, and 4.5 percent for second-generation in year 2011. The corresponding proportions for non-psychiatric care are higher: 27.7 percent for natives, 25.5 for first-generation immigrants and 30.8 for second-generation immigrants. Additionally, the costs associated with psychiatric care are lower for all three groups compared to non-psychiatric care. However, the difference in costs between these two types of service use is relatively smaller than the difference in the proportions of service users. This suggests that psychiatric care may either be more intensively utilized by those who access it, or that visits for psychiatric care are more expensive.

After adjusting for individual and familial characteristics, and the municipality of residence (Specification 4), the probability of having a visit is lower for first-generation immigrants in both psychiatric and non-psychiatric care. This suggests that the coefficient in the baseline model is influenced by the different distribution of these background characteristics. For second-generation immigrants, however, the coefficients remain positive in both, visits for psychiatric and non-psychiatric care. This indicates a consistently higher likelihood of using both, psychiatric and non-psychiatric care, compared to natives. All results related to the probabilities of having a visit are statistically significant.

When it comes to costs, the adjusted model (Specification 4) reveals no significant difference in non-psychiatric care costs between natives and first-generation immigrants. For second-generation immigrants, although the cost difference is statistically significant ($p < 0.1$), it remains practically small (15.9 euros). In contrast, after controlling, the differences in costs for psychiatric care between natives and both immigrant generations are more pronounced and statistically significant ($p < 0.01$). For first-generation immigrants, annual psychiatric care costs are notably lower by 117.5 euros. The difference between natives and second-generation is smaller (41.4 euros). My previous finding regarding overall service use from Table 2 showed that second-generation immigrants had lower costs despite the higher probability of using services. This pattern appears to recur for psychiatric care visits, but not for non-psychiatric care.

Table 4 Health care use and costs by care type for immigrant generations compared to natives

Model Specification	Psychiatric care		Non-psychiatric care	
	(1)	(4)	(1)	(4)
<i>A: Probability of using health services</i>				
Constant (Natives)	0.026*** (0.000)	0.136*** (0.004)	0.277*** (0.001)	0.545*** (0.011)
First-generation (ref. natives)	0.007*** (0.002)	-0.007*** (0.002)	-0.022*** (0.003)	-0.019*** (0.003)
Second-generation (ref. natives)	0.019*** (0.001)	0.010*** (0.001)	0.031*** (0.002)	0.030*** (0.002)
<i>B: Annual costs</i>				
Constant (Natives)	88.1*** (2.1)	759.0*** (37.5)	391.5*** (3.2)	625.8*** (56.5)
First-generation (ref. natives)	-24.7** (12.2)	-117.5*** (12.7)	-30.9* (17.8)	-17.0 (18.2)
Second-generation (ref. natives)	3.5 (7.7)	-41.4*** (8.3)	-5.9 (8.8)	15.9* (9.0)
<i>Controlling for:</i>				
Individual characteristics	–	X	–	X
Familial characteristics	–	X	–	X
Municipality of residence	–	X	–	X
Observations	4 110 813	4 110 813	4 110 813	4 110 813

Notes: Robust standard errors clustered at the individual level are shown in parentheses.

****, **, and * indicate statistical significance at the 1%, 5%, and 10% significance levels.*

Table 5 presents the estimation results for those who have utilized the type of care under consideration.⁶ Results from Table 5 reveal noteworthy findings from the determinants behind the differences in health care use and costs depicted in Chapter 5.3.1 and Chapter 5.3.2. It appears that the lower health care utilization and costs among immigrant generations are specifically driven by the lower use of psychiatric care. The differences in the number of visits and costs related to psychiatric care between natives and both immigrant generations are substantial and statistically significant ($p < 0.01$). The result holds regardless of the model specification.

⁶ The analyses of psychiatric care include only individuals who have had at least one visit for psychiatric care, and the same applies to non-psychiatric care. However, the results remain valid even if the analyses were limited to individuals who have had any type of visit.

Conversely, there are no analogous differences in the number of visits and costs for non-psychiatric care. In the baseline model (Specification 1), the number of visits for non-psychiatric care is slightly lower for both immigrant generations. The average costs for non-psychiatric care among first-generation immigrants are closely aligned with those of natives, whereas costs for psychiatric care are even 32 percent lower. For second-generation immigrants, non-psychiatric care costs are 12 percent lower compared to natives, while the difference in psychiatric care costs is 39 percent. After controlling for background characteristics and morbidity (Specification 5), the difference in non-psychiatric care between second-generation and natives diminishes. For first-generation, the costs for non-psychiatric care turn out to be even higher, as controls are included.

Table 5 Health care use and costs by care type for immigrant generations compared to natives, service users

Model Specification	Psychiatric care			Non-psychiatric care		
	(1)	(4)	(5)	(1)	(4)	(5)
<i>A: Number of visits</i>						
Constant (Natives)	5.6*** (0.1)	1.3 (1.1)	1.4 (1.1)	3.3*** (0.0)	2.9*** (0.3)	3.8*** (0.2)
First-generation	-2.1*** (0.3)	-3.3*** (0.3)	-3.3*** (0.3)	-0.2** (0.1)	-0.2** (0.1)	0.1 (0.1)
Second-generation	-2.7*** (0.1)	-3.2*** (0.1)	-3.2*** (0.1)	-0.4*** (0.0)	-0.2*** (0.0)	0.0 (0.0)
<i>B: Annual costs</i>						
Constant (Natives)	3418.0*** (73.9)	3147.8*** (965.7)	3306.2*** (967.8)	1414.1*** (11.2)	940.4*** (231.8)	1411.7*** (219.2)
First-generation	-1087.3*** (221.9)	-1344.8*** (223.1)	-1326.9*** (222.3)	-0.4 (68.9)	37.8 (69.6)	184.3*** (65.2)
Second-generation	-1343.8*** (118.7)	-1026.3*** (122.9)	-1006.8*** (122.9)	-163.6*** (27.9)	-69.9** (28.9)	26.9 (27.1)
<i>Controlling for:</i>						
Individual characteristics	–	X	X	–	X	X
Familial characteristics	–	X	X	–	X	X
Municipality of residence	–	X	X	–	X	X
Number of reimbursement rights	–	–	X	–	–	X
Observations	165 628	165 628	165 628	1 093 644	1 093 644	1 093 644

Notes: Only service users are included.

Robust standard errors clustered at the individual level are shown in parentheses.

***, **, and * indicate statistical significance at the 1%, 5%, and 10% significance levels.

5.3.4 Heterogeneity by region of origin

In these heterogeneity analyses, health care utilization and costs are compared in more detail between immigrant and native children by utilizing the information on the immigrants' country of origin. The analyses include immigrant children with country of origin in 1) the Western countries, 2) Eastern Europe, 3) the Middle East and Northern Africa, 4) Sub-Saharan Africa, and 5) Asia. A more detailed explanation of this classification is provided in Chapter 5.1.

In Figures 4 and 5, the results of the linear probability model with 95% confidence intervals are presented by region of origin. The baseline estimates are derived from the model specification with no controls (Specification 1), while the full control estimates are derived from the model controlled with individual and familial characteristics and the municipality of residence (Specification 4). Standard errors are clustered at the individual level. The results are presented in full and by care type in Table A.4 and Table A.5 in Appendix 1.

For first-generation immigrant children, significant differences are observed depending on the region of origin (Figure 4). Compared to native children, children with origin in Asia, Eastern Europe, or in the Western countries are less likely to use health services. Conversely, children with origin in Sub-Saharan Africa or in the region of the Middle East and Northern Africa are more likely to use health services compared to native children. Importantly, controlling for background characteristics appears to mainly strengthen the results. This suggests that the differences cannot be explained by, for example, variations in income distributions between groups. The differences between first-generation immigrants and native children are statistically significant ($p < 0.01$) in all origin groups.

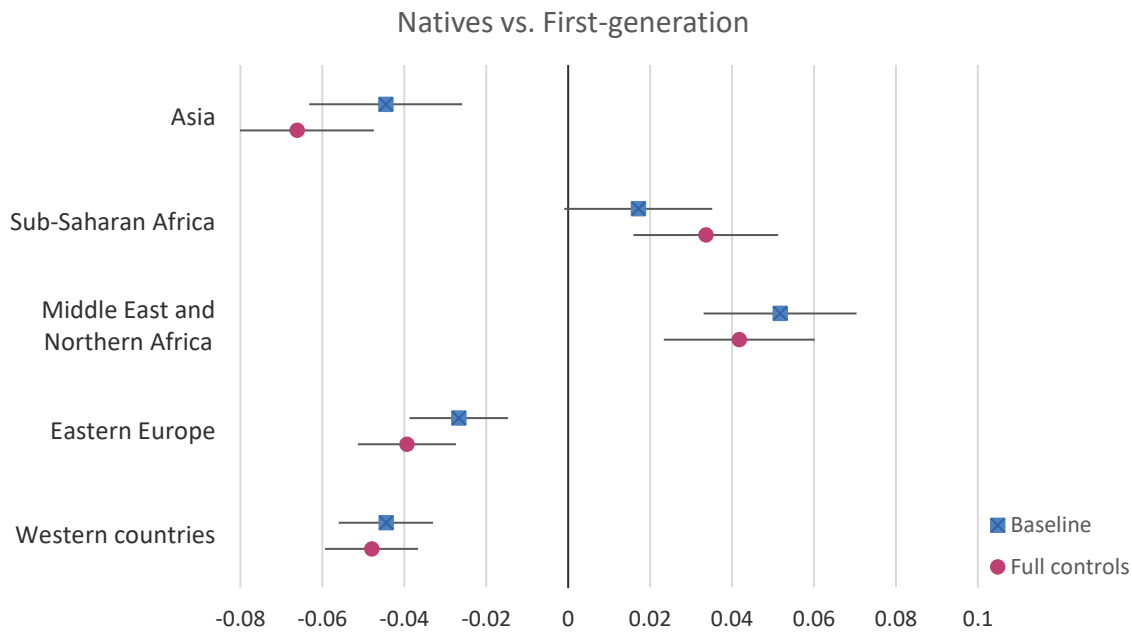


Figure 4 Differences in the predicted probabilities of using health services by region of origin, natives vs. first-generation immigrants

As shown in Figure 5, the probability of using health services is higher for all second-generation immigrant groups compared to native children, regardless of the region of origin. For immigrant children with origin in Sub-Saharan Africa or in the region of the Middle East and Northern Africa, the likelihood of using services is more than 6 percentage points higher compared to natives in the full control model. The differences in the predicted probabilities between natives and second-generation immigrant groups are statistically significant ($p < 0.01$), except for the difference between natives and children with origin in Asia in the full control model.

These results confirm that there is heterogeneity in the probability of using health services among immigrants based on region of origin. Additionally, they highlight the differences between first-generation and second-generation immigrants within the same origin group. For the immigrants with origin in Asia, Eastern Europe or in the Western countries, the probability of using health services compared to natives, is lower for the first-generation, but higher for the second-generation with the same region of origin. Conversely, for the immigrants with origin in Sub-Saharan Africa or in the region of the Middle East and Northern Africa, the results are consistent regardless of the generation.

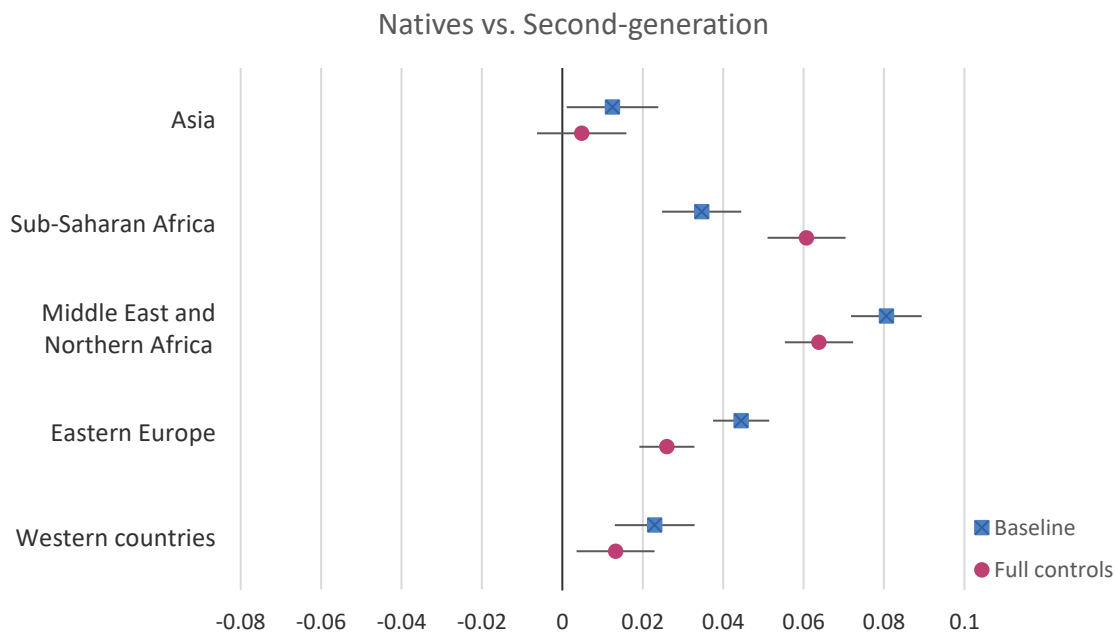


Figure 5 Differences in the predicted probabilities of using health services by region of origin, natives vs. second-generation immigrants

In Figures 6 and 7, the average annual health care costs by region of origin and care type are presented. These figures illustrate the results of the baseline model without any control variables, natives' average costs aggregated across all years. Both, the total average health care costs, and average costs for psychiatric and non-psychiatric care, as well as the relationships between them, are demonstrated in Figures 6 and 7.

According to Figures 6 and 7, there are noticeable differences in the average annual health care costs between native and immigrant children with different regions of origin. Especially for first-generation immigrants (Figure 6), the differences are great: children with origin in Eastern Europe have the lowest average annual costs (415 euros) and children with origin in the region of the Middle East and Northern Africa have the highest costs (671 euros). In relative terms, children with origin in the region of the Middle East and Northern Africa have on average 62 percent higher costs than children with the origin in Eastern Europe. For second-generation immigrants (Figure 7), the differences in average annual health care costs across the immigrant groups are smaller.

Additionally, the distribution of costs between psychiatric and non-psychiatric care varies depending on the region of origin. In the comparison for first-generation immigrants (Figure 6), the share of psychiatric care costs as a percent of total costs is 21 for children with origin in Asia, and 41 for children with origin in the Western countries. For second-

generation immigrants (Figure 7), children with origin in Sub-Saharan Africa have the lowest share of psychiatric care costs (20%), and as with the first-generation, children with origin in the Western countries have the highest share (39%). Between immigrant generations, the difference in how costs are distributed between non-psychiatric and psychiatric care is the largest among children with origin in Asia. For the Asians in the first-generation, psychiatric care accounted for 21 percent of the costs, but in the second-generation, psychiatric care accounted for 38 percent.

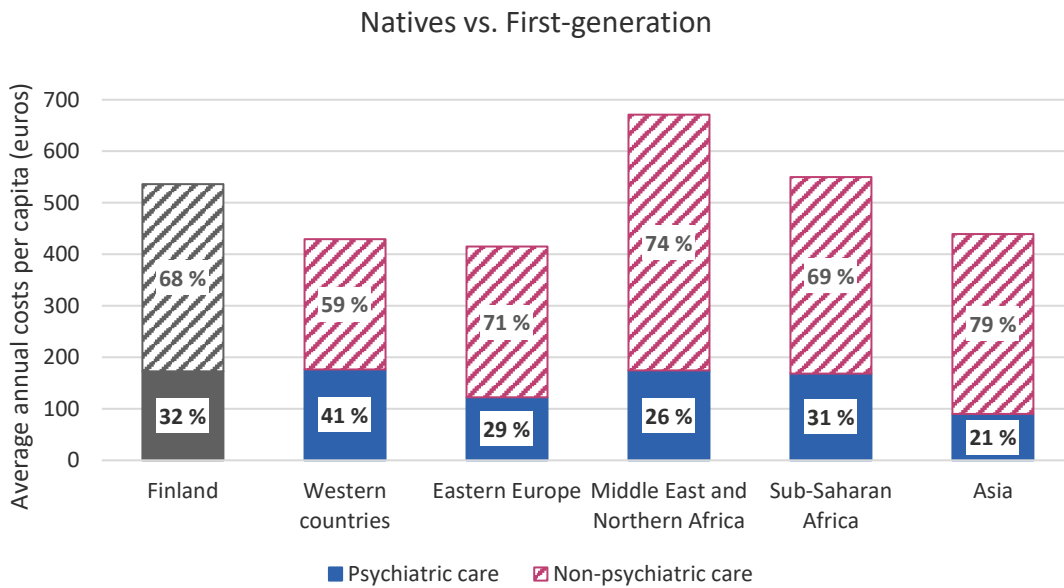


Figure 6 Average annual health care costs by region of origin and care type, first-generation immigrants

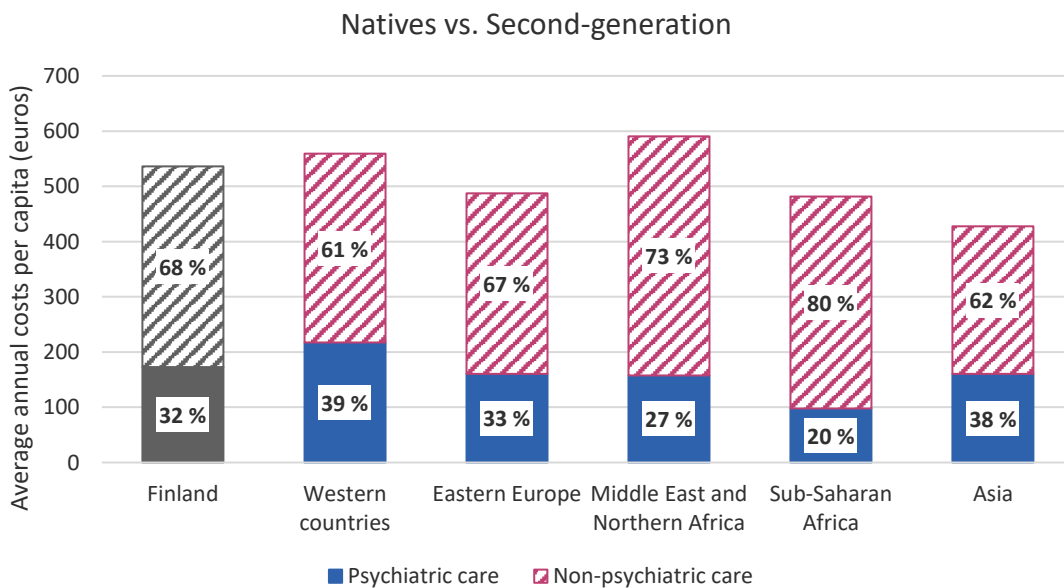


Figure 7 Average annual health care costs by region of origin and care type, second-generation immigrants

Table 6 presents the results from the linear regression model estimating annual health care costs by immigrant generation, region of origin, and type of care. The results of the baseline model (Specification 1) were illustrated in Figures 6 and 7; therefore, only the results for Specification 4 are included in Table 6. In Specification 4, the results are adjusted for individual characteristics (age and gender), familial characteristics (household income and the number of children in the family), and the municipality of residence.

Compared to natives, average costs for all visits are significantly lower for first-generation immigrant children with origin in the Western countries (-180.2e), Eastern Europe (-226.2e), or Asia (-217.8e). These differences appear to be due to significantly lower costs in both, psychiatric care costs and non-psychiatric care, except for children with origin in Asia. For them, the difference is driven by lower costs in psychiatric care. Conversely, Table 6 reveals that the differences in the costs for all visits between natives and the first-generation immigrants with origin in the region of the Middle East and Northern Africa or Sub-Saharan Africa are not statistically significant ($p > 0.01$). This is because, for these immigrant groups, the costs are significantly higher for non-psychiatric care but significantly lower for psychiatric care, which balances out the difference in the costs for all visits.

For the second-generation, the estimation results for costs are mostly similar to the results of first-generation. For second-generation immigrant children with origin in Eastern Europe or Asia, the costs are significantly lower than those of natives in both, psychiatric and non-psychiatric care. However, there are no significant differences between natives and immigrants with origin in the Western countries, even when examined separately by different care types ($p > 0.01$). For immigrants with origin in the region of the Middle East and Northern Africa or Sub-Saharan Africa, the results are in line with the results of first-generation: compared to natives the costs are significantly higher in non-psychiatric care but significantly lower in psychiatric care.

Like in the probabilities of using health services, there is heterogeneity in health care costs among immigrants based on the region of origin. However, within the same origin groups, the coefficients for cost differences are similar across both immigrant generations to every origin group, except for children with origin in the Western countries. The heterogeneity of immigrants by region of origin is particularly emphasized in the costs of

non-psychiatric care. For first-generation immigrants with origin in the Western countries, the average costs are 100.5 euros lower than those of natives. In contrast, for children with origin in the region of the Middle East or Northern Africa, the average costs are 141.7 euros higher. Among second-generation immigrants, children with origin in Asia, the average costs are 69.1 euros lower than those of natives. For children with origin in Sub-Saharan Africa, the costs are 111.0 euros higher.

As an interesting finding, the average costs of psychiatric care are significantly lower for all immigrant groups compared to natives, regardless of the immigrant children's origin or generation. However, the magnitude of the differences between natives and immigrant origin groups varies. Among the first-generation, the greatest difference is between natives and immigrants with origin in Asia (-202.0e). For the second-generation, the difference is the greatest for immigrants with origin in Sub-Saharan Africa (-131.5e). Notably, only second-generation immigrant children with origin in Western countries show no significant difference in the costs of psychiatric care.

Table 6 Health care use and costs by immigrant generation, region of origin, and care type

	All visits	Psychiatric care	Non-psychiatric care
Model Specification	(4)	(4)	(4)
<i>A: First-generation</i>			
Constant (Natives)	1487.4*** (72.6)	839.0*** (39.1)	648.3*** (57.9)
Western countries	-180.2*** (33.8)	-79.7*** (27.6)	-100.5*** (17.0)
Eastern Europe	-226.4*** (45.2)	-159.5*** (19.0)	-66.9* (39.7)
Middle East and Northern Africa	35.3 (79.5)	-106.4*** (37.2)	141.7** (64.6)
Sub-Saharan Africa	-23.6 (52.6)	-92.3** (35.9)	68.7* (36.2)
Asia	-217.8*** (65.7)	-202.0*** (19.4)	-15.7 (62.0)
Observations	3 941 385	3 941 385	3 941 385
<i>B: Second-generation</i>			
Constant (Natives)	1478.5*** (72.2)	823.5*** (38.9)	655.0*** (57.6)
Western countries	6.6 (38.3)	17.6 (30.4)	-11.0 (21.7)
Eastern Europe	-95.0*** (17.3)	-65.3*** (11.3)	-29.7** (11.9)
Middle East and Northern Africa	16.7 (30.9)	-63.0*** (16.6)	79.7*** (25.0)
Sub-Saharan Africa	-20.6 (37.8)	-131.5*** (9.3)	111.0*** (35.3)
Asia	-141.3*** (25.5)	-72.1*** (16.4)	-69.1*** (18.4)
Observations	4 038 377	4 038 377	4 038 377

Notes: Robust standard errors clustered at the individual level are shown in parentheses.

****, **, and * indicate statistical significance at the 1%, 5%, and 10% significance levels.*

5.4 Summary of findings

In Chapter 5, the health care use and costs of immigrant children were examined using a linear probability model and a linear regression model with different sets of control variables. Analyses were restricted to children born between 2000 and 2010, and children

were followed from year 2011 to 2017. Children with an immigrant background were classified into two groups: first-generation immigrants and second-generation immigrants. The former refers to a child born abroad with both parents, or with the only known parent, born abroad. The latter refers to a child born in Finland with both parents, or with the only known parent, born abroad. Natives – children with both parents born in Finland – were used as a reference group. Health care utilization and costs were investigated from various perspectives. The analyses assessed the probability of using health care services, the intensity of service utilization, and the costs associated with health care utilization. Additionally, the analyses were conducted by care type, immigrant's origin group, and only among those who had used services.

Compared to native children, the probability of using health care services was lower for first-generation immigrants. In turn, for second-generation immigrants, the probability was higher. Second-generation immigrants were more likely to use both, psychiatric and non-psychiatric care. Conversely, for first-generation immigrants, the lower probability of using health services appeared to be mainly due to the lower probability of using non-psychiatric care. However, the average annual costs of using health services were significantly lower for both immigrant generations compared to natives. The lower costs appeared to be primarily due to lower costs in psychiatric care. The differences were mainly larger between native children and first-generation immigrant children. After controlling for individual and familial characteristics and the municipality of residence, these findings remained robust and appeared to be gaining even stronger support.

When focusing only on service users, the differences became even more substantial. Both, the number of visits and costs among service users were significantly lower for both immigrant generations compared to natives. One factor explaining the immigrant generations' lower costs was the lower intensity of service use; those who used services had fewer visits. Examined by care type, this trend appeared to be primarily due to the lower intensity of psychiatric care. For both immigrant generations, the number of visits for psychiatric care was significantly lower compared to natives. Additionally, the average annual costs of psychiatric care were up to 1000–1300 euros per capita lower for both immigrant generations.

There was significant heterogeneity in the health care use and costs with respect to the country of origin. For first-generation immigrants with origin in Sub-Saharan Africa, or

in the region of the Middle East and Northern Africa, the probability of using health services was significantly higher than that of natives. Conversely, for immigrants with origin in Asia, Eastern Europe, or Western countries, the probability was significantly lower. For second-generation immigrants, the probability of using health services was higher compared to natives regardless of the origin group. These differences were statistically significant in all origin groups except for the immigrants with origin in Asia.

In the costs of non-psychiatric care, the heterogeneity of immigrants by region of origin was particularly evident. For immigrant children in both generations, the costs were significantly higher for those with origin in the Middle East and Northern Africa or Sub-Saharan Africa. In turn, the costs were significantly lower for immigrants with origin in Eastern Europe. For immigrants with origin in Western countries or Asia there was clear heterogeneity between generations as well. In psychiatric care, the costs compared to natives were significantly lower for all immigrants regardless of the origin or the generation. However, the differences varied in size – only second-generation immigrants with origin in the Western countries showed no significant difference.

6 Discussion

In Finland, the number of immigrants has increased significantly in recent decades – immigrants and their descendants form a substantial population group in Finland. The knowledge of health and health care utilization of immigrants is primarily based on survey studies and focused on adults. However, not much is known about immigrant children. Studying the use and costs of health care services by this growing population group is important from many perspectives. Firstly, everyone in Finland should be guaranteed an equal access to health services. Understanding how immigrant children utilize health services can reveal disparities in access and quality of care compared to native population. Second, it is important that immigrant children find their way to health care services. Children and adolescents are at a particularly sensitive stage of development, and proper health care can have a significant importance not only for their future but also for the society. Thirdly, knowledge of service use among different population groups helps in designing an equitable and appropriate allocation of funding. What makes this particularly important is that the funding of welfare services counties in Finland is currently mainly based on service need.

In this thesis, significant differences in children's health care use and costs were observed both between immigrant generations and across care types. Compared to native children, the probability of using health services was lower for first-generation immigrants and higher for second-generation immigrants. This result holds true regardless of the care type. However, when examining the intensity of service utilization through costs and number of visits, the differences in psychiatric care were significant. For both immigrant generations, the number of visits was significantly lower, and the average annual costs were 1000–1300 euros per capita lower than that of native children. As a result, lower overall service utilization and costs appear to be primarily due to the lower utilization of psychiatric care.

Many different reasons have been put forward behind the immigrants' lower use of health services. The literature refers to a phenomenon called "healthy immigrant effect", according to which immigrants are on average healthier than both, the native population, and the population of their own home country. In addition, other possible reasons for lower use include challenges related to the integration of immigrants, and possible cultural differences. For example, according to the results received by Pandey et al.

(2022), immigrants were hindered from accessing mental health services by language barriers, stigma, inadequate information on existing health care services, and individuals' perceptions about what and when services should be accessed.

Remarkably, immigrant children appear to use significantly less health services due to mental health disorders. One could think this indicating that the phenomenon of the healthy immigrant effect holds true, and immigrant children have fewer mental health challenges. However, considering the findings of Pandey et al. (2022) described earlier and the studies based on the School Health Promotion surveys (Matikka et al. 2014; Halme et al. 2017), this is unlikely to be the explanation. According to the findings of Matikka et al. (2014) and Halme et al. (2017) children in both immigrant generations felt their health worse compared to natives. Additionally, immigrant children experienced more anxiety and school burnout. First-generation immigrants experienced also significantly more school bullying than natives, as did boys among second-generation immigrants.

Additionally, stigma related to mental health disorders may explain immigrants' lower utilization of psychiatric care. There are cultural differences in attitudes toward mental health disorders. In this thesis, the largest difference in the annual costs of psychiatric care between first-generation immigrant children and native children was observed among children with origin in Asia. For second-generation immigrant children, the largest difference was found among children with origin in Sub-Saharan Africa. For example, in some African cultures, disorders are believed to stem from spiritual or supernatural causes, such as being possessed by evil spirits. Attitudes toward people with mental health disorders are often highly negative, and patients are considered dangerous. (Oye et al. 2005, 437.) In Asian cultures, mental health disorders are seen to be caused by personal weakness or failure to control emotional feelings. Disorders are perceived as highly shameful, and they are considered to bring disgrace to the family. (Kramer et al. 2002, 228.) Feelings of shame and a lack of accurate information about mental health disorders hinder seeking help and accessing services.

One concern is that, despite their willingness to seek help, immigrants may not find their way to health services. This may be due to language barriers or a lack of information about available services and how to access them. In the study of Matikka et al. (2014), immigrant children did not experience significant challenges in accessing school

psychologists. Second-generation immigrants found it even easier than natives, and for first-generation immigrants the proportion reporting difficulties in accessing was almost as high as in the native children. In addition, a larger proportion of both immigrant generations reported seeking professional help for depression compared to native children. For second-generation immigrants the proportion was 19%, for first-generation even 28%, and for natives, 17%. These proportions were relatively in line with their findings on children's perceived feelings of anxiety and school burnout.

The findings of this thesis regarding the probability of having a visit for psychiatric care are in line with the results by Matikka et al. (2014) concerning perceived difficulties in accessing services. Compared to natives, the probability of having a visit for psychiatric care was slightly lower for first-generation immigrant, but higher for second-generation immigrants. This means that second-generation immigrants tend to access services more easily. This is likely due to the fact that, unlike first-generation immigrants, they are born in Finland and are integrated into the service system from birth. However, the intensity of the use was significantly lower for both immigrant generations. These results suggest that the challenges might lie more in finding the right type of treatment rather than in accessing services. Still, both possibilities should be further investigated among immigrant children.

It is evident to investigate the factors behind the lower utilization of psychiatric care among immigrant children. It is possible that immigrants experience unmet needs for mental health care; they use less services than they would need. There is no evidence that immigrant children experience fewer mental health disorders than natives in Finland. Based on the School Health Promotion survey (Matikka et al. 2014), the situation appears to be the opposite. However, this survey covers a limited age group, so more research on the topic is needed. Access to the services and receiving the right treatment in a timely manner is important not only for the well-being of the patients and their family members, but also from a cost perspective. If people with mental health disorder do not receive necessary treatment, mental health disorders are unlikely to just disappear. Instead, due to untreated disorder or delayed access to treatment, health problems are likely to accumulate. The failure to treat the mental health disorders may lead to substantial financial burden to the society (Taylor et al. 2023). For example, among long-term unemployed in Finland the level of untreated mental health disorders is high (Karjalainen & Kerätär 2010.)

This thesis provided a comprehensive overview of the differences in health care utilization between immigrant children and native children. However, further research on the factors behind immigrant children's lower utilization of psychiatric care is needed. Understanding how the use of health services changes due to the immigration would provide us with valuable information. If, for example, a significant decrease in health care utilization was observed following immigration, it would be important to provide targeted support to this group to help them access health services if needed. However, studying the effects of immigration is challenging due to the lack of suitable research design. Existing lottery-based immigration programs offer a potential experimental setup and should be utilized more. Additionally, it would be beneficial to compare the use of health services between natives and immigrants who have similar, treatment-requiring conditions. One limitation of register-based research is that it does not reach those who do not use services. This is also a concern in this thesis: controlling for morbidity using medication reimbursement rights might be problematic, as those who do not visit doctors also do not receive the reimbursement right. This can lead to an underestimation of actual morbidity, particularly among immigrants who may face challenges in accessing health services. Therefore, combining register-based research with survey research is essential for a comprehensive examination of this topic. More research using both methods is urgently needed.

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Appendices

Appendix 1 Model comparison and robustness checks

Table A. 1 Probability to use health care services: Marginal effects from Linear Probability, Logit, and Probit Models (see, Chapter 5.3.1, Table 2)

Model Specification	Linear Probability Model		Logit Model		Probit Model	
	(1)	(4)	(1)	(4)	(1)	(4)
First-generation (ref. natives)	-0.017*** (0.003)	-0.021*** (0.003)	-0.017*** (0.003)	-0.021*** (0.003)	-0.017*** (0.003)	-0.021*** (0.003)
Second-generation (ref. natives)	0.042*** (0.002)	0.035*** (0.002)	0.042*** (0.002)	0.034*** (0.002)	0.042*** (0.002)	0.034*** (0.002)
<i>Controlling for:</i>						
Individual characteristics	–	X	–	X	–	X
Familial characteristics	–	X	–	X	–	X
Municipality of residence	–	X	–	X	–	X
Observations	4 110 813		4 110 813		4 110 813	

Notes: Robust standard errors clustered at the individual level are shown in parentheses.

****, **, and * indicate statistical significance at the 1%, 5%, and 10% significance levels.*

Table A. 2 Probability to use health care services by care type: Marginal effects from Linear Probability, Logit, and Probit Models (see, Chapter 5.3.3, Table 4)

Model Specification	Linear Probability Model		Logit Model		Probit Model	
	(1)	(4)	(1)	(4)	(1)	(4)
<i>A: Psychiatric care</i>						
First-generation (ref. natives)	0.007*** (0.002)	-0.007*** (0.002)	0.007*** (0.002)	-0.005*** (0.001)	0.007*** (0.002)	-0.005*** (0.001)
Second-generation (ref. natives)	0.019*** (0.001)	0.010*** (0.001)	0.019*** (0.001)	0.010*** (0.001)	0.019*** (0.001)	0.010*** (0.001)
<i>B: Non-psychiatric care</i>						
First-generation (ref. natives)	-0.022*** (0.003)	-0.019*** (0.003)	-0.022*** (0.003)	-0.019*** (0.003)	-0.022*** (0.003)	-0.019*** (0.003)
Second-generation (ref. natives)	0.031*** (0.002)	0.030*** (0.002)	0.031*** (0.002)	0.030*** (0.002)	0.031*** (0.002)	0.030*** (0.002)
<i>Controlling for:</i>						
Individual characteristics	–	X	–	X	–	X
Familial characteristics	–	X	–	X	–	X
Municipality of residence	–	X	–	X	–	X
Observations	4 110 813		4 110 813		4 110 813	

Notes: Robust standard errors clustered at the individual level are shown in parentheses.

****, **, and * indicate statistical significance at the 1%, 5%, and 10% significance levels.*

Table A. 3 Full results and model comparison for the probability of using services by region of origin and care type, natives (ref.) vs. first-generation (see, Chapter 5.3.4, Figure 4)

Model Specification	Linear Probability Model		Logit Model (Marginal Effects)		Probit Model (Marginal Effects)	
	(1)	(4)	(1)	(4)	(1)	(4)
<i>A: All visits</i>						
Western countries	-0.044*** (0.006)	-0.048*** (0.006)	-0.044*** (0.006)	-0.048*** (0.006)	-0.045*** (0.006)	-0.047*** (0.006)
Eastern Europe	-0.027*** (0.006)	-0.039*** (0.006)	-0.027*** (0.006)	-0.038*** (0.006)	-0.027*** (0.006)	-0.038*** (0.006)
Middle East and Northern Africa	0.052*** (0.010)	0.042*** (0.009)	0.052*** (0.010)	0.041*** (0.009)	0.052*** (0.010)	0.042*** (0.009)
Sub-Saharan Africa	0.017* (0.009)	0.034*** (0.009)	0.017* (0.009)	0.035*** (0.009)	0.017* (0.009)	0.034*** (0.009)
Asia	-0.045*** (0.010)	-0.066*** (0.010)	-0.045*** (0.010)	-0.063*** (0.009)	-0.045*** (0.010)	-0.063*** (0.009)
<i>B: Psychiatric care</i>						
Western countries	0.008** (0.004)	-0.005 (0.004)	0.008** (0.004)	-0.005* (0.003)	0.008** (0.004)	-0.004 (0.003)
Eastern Europe	0.003 (0.003)	-0.014*** (0.003)	0.003 (0.003)	-0.011*** (0.002)	0.003 (0.003)	-0.011*** (0.002)
Middle East and Northern Africa	0.019*** (0.005)	0.004 (0.005)	0.019*** (0.005)	0.003 (0.004)	0.019*** (0.005)	0.004 (0.004)
Sub-Saharan Africa	0.013*** (0.005)	0.001 (0.005)	0.013*** (0.005)	0.002 (0.004)	0.013*** (0.005)	0.002 (0.004)
Asia	-0.004 (0.004)	-0.021*** (0.004)	-0.004 (0.004)	-0.017*** (0.003)	-0.003 (0.004)	-0.016*** (0.003)
<i>C: Non-psychiatric care</i>						
Western countries	-0.051*** (0.005)	-0.047*** (0.005)	-0.051*** (0.005)	-0.047*** (0.005)	-0.051*** (0.005)	-0.047*** (0.005)
Eastern Europe	-0.032*** (0.006)	-0.036*** (0.006)	-0.032*** (0.006)	-0.036*** (0.006)	-0.032*** (0.006)	-0.035*** (0.006)
Middle East and Northern Africa	0.047*** (0.009)	0.044*** (0.009)	0.047*** (0.009)	0.045*** (0.009)	0.047*** (0.009)	0.045*** (0.009)
Sub-Saharan Africa	0.010 (0.009)	0.035*** (0.009)	0.010 (0.009)	0.036*** (0.009)	0.010 (0.009)	0.036*** (0.009)
Asia	-0.048*** (0.009)	-0.061*** (0.009)	-0.048*** (0.009)	-0.059*** (0.009)	-0.048*** (0.009)	-0.058*** (0.009)
<i>Controlling for:</i>						
Individual characteristics	–	X	–	X	–	X
Familial characteristics	–	X	–	X	–	X
Municipality of residence	–	X	–	X	–	X
Observations	3 941 385		3 941 385		3 941 385	

Notes: Robust standard errors clustered at the individual level are shown in parentheses.

***, **, and * indicate statistical significance at the 1%, 5%, and 10% significance levels.

Table A. 4 Full results and model comparison for the probability of using services by region of origin and care type, natives (ref.) vs. second-generation (see, Chapter 5.3.4, Figure 5)

Model Specification	Linear Probability Model		Logit Model (Marginal Effects)		Probit Model (Marginal Effects)	
	(1)	(4)	(1)	(4)	(1)	(4)
<i>A: All visits</i>						
Western countries	0.023*** (0.005)	0.013*** (0.005)	0.023*** (0.005)	0.013*** (0.005)	0.023*** (0.005)	0.013*** (0.005)
Eastern Europe	0.044*** (0.004)	0.026*** (0.003)	0.044*** (0.004)	0.025*** (0.003)	0.044*** (0.004)	0.025*** (0.003)
Middle East and Northern Africa	0.081*** (0.004)	0.064*** (0.004)	0.081*** (0.004)	0.062*** (0.004)	0.081*** (0.004)	0.062*** (0.004)
Sub-Saharan Africa	0.035*** (0.005)	0.061*** (0.005)	0.035*** (0.005)	0.063*** (0.005)	0.035*** (0.005)	0.062*** (0.005)
Asia	0.012** (0.006)	0.005 (0.006)	0.012** (0.006)	0.005 (0.006)	0.013** (0.006)	0.005 (0.006)
<i>B: Psychiatric care</i>						
Western countries	0.016*** (0.003)	0.010*** (0.003)	0.016*** (0.003)	0.009*** (0.002)	0.016*** (0.003)	0.009*** (0.002)
Eastern Europe	0.018*** (0.002)	0.007*** (0.002)	0.018*** (0.002)	0.007*** (0.002)	0.018*** (0.002)	0.007*** (0.002)
Middle East and Northern Africa	0.024*** (0.002)	0.014*** (0.002)	0.024*** (0.002)	0.013*** (0.002)	0.024*** (0.002)	0.014*** (0.002)
Sub-Saharan Africa	0.012*** (0.003)	0.001 (0.003)	0.012*** (0.003)	0.003 (0.002)	0.012*** (0.003)	0.003 (0.002)
Asia	0.024*** (0.004)	0.014*** (0.003)	0.024*** (0.004)	0.012*** (0.003)	0.025*** (0.004)	0.012*** (0.003)
<i>C: Non-psychiatric care</i>						
Western countries	0.016*** (0.005)	0.010** (0.005)	0.016*** (0.005)	0.010** (0.005)	0.016*** (0.005)	0.010** (0.005)
Eastern Europe	0.034*** (0.003)	0.021*** (0.003)	0.034*** (0.003)	0.020*** (0.003)	0.034*** (0.003)	0.021*** (0.003)
Middle East and Northern Africa	0.071*** (0.004)	0.059*** (0.004)	0.071*** (0.004)	0.058*** (0.004)	0.071*** (0.004)	0.058*** (0.004)
Sub-Saharan Africa	0.025*** (0.005)	0.061*** (0.005)	0.025*** (0.005)	0.066*** (0.005)	0.025*** (0.005)	0.064*** (0.005)
Asia	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)
<i>Controlling for:</i>						
Individual characteristics	–	X	–	X	–	X
Familial characteristics	–	X	–	X	–	X
Municipality of residence	–	X	–	X	–	X
Observations	4 038 377		4 038 377		4 038 377	

Notes: Robust standard errors clustered at the individual level are shown in parentheses.

***, **, and * indicate statistical significance at the 1%, 5%, and 10% significance levels