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**Specialized healthcare utilization among
children and adolescents in Norway:
Does immigrant background matter?**

A nation-wide register study

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Abstract

The purpose of this register study was to examine whether utilization of somatic and mental specialized healthcare services differed between ethnic Norwegian children and adolescents, and first and second-generation immigrant children and adolescents, respectively. Also, it aimed to examine whether parental educational qualifications and length of residency seemed to influence on utilization of specialized healthcare services. First and second-generation immigrants from Poland, Somalia, Iran, Pakistan and Vietnam were examined. As for the data material, a combination of data from Statistics Norway and Norwegian Patient Registry including information on all registered contacts with specialized healthcare services in the period 2008-2011 was utilized.

Results indicate that there were generational differences with regards to utilization of somatic specialized healthcare, i.e. hospitalizations and outpatient consultations, in the sense that among second-generation immigrants, more individuals had at least one contact. As for specialist mental healthcare, no statistically significant differences were observed among the two generational categories. However, when first and second-generation immigrants were pooled together, statistically significant variations were seen. Among children and adolescents originating from Vietnam, Pakistan and Somalia, the proportion with at least one specialist mental healthcare consultations was low compared to ethnic Norwegians. As for children and adolescents in the Iranian group, the proportion with at least one contact was significantly higher compared to both the remaining immigrant groups and the non-immigrant groups. The Vietnamese group had remarkably few contacts with specialized healthcare overall in the four year period. With regards to parental educational qualifications and utilization of specialized healthcare, it was found that in most immigrant groups, children of highly educated parents had more contacts. For ethnic Norwegians, the effect was reversed. When it comes to length of stay and utilization of specialized healthcare services, findings were inconclusive.

As for implications for future research, a need for more in-depth knowledge about the health of immigrant children and adolescents in general, and specifically their utilization of healthcare services, is identified. An examination of causes for utilization differences could prove valuable if one aims to assess whether individuals are granted equal access to specialized healthcare.

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List of abbreviations

EPHC	Emergency primary healthcare
FHI	Folkehelseinstituttet (Norwegian Institute of Public Health)
GP	General Practitioner
IMDi	Integrerings- og mangfoldsdirektoratet (Directorate of Integration and Diversity)
IRR	Incidence Rate Ratio
ISF	Institutt for samfunnsforskning (Institute for Social Research)
NOVA	Norsk institutt for forskning om oppvekst, velferd og aldring (Norwegian Social Research)
OLS	Ordinary Least Squares
PHBU/BUP	Psykisk helsevern for barn og unge/ Barne- og ungdomspsykiatrisk poliklinikk (Children and Adolescents' Psychiatric Polyclinic Services)
PHC	Primary healthcare
PHV	Mental healthcare for adults
SES	Socioeconomic status
SHC	Specialized healthcare
SSB	Statistisk sentralbyrå (Statistics Norway)
WHO	World Health Organization

1. Introduction

The purpose of this study is to examine whether utilization of specialized healthcare services (SHC) differs between non-immigrant children and adolescents, and first and second-generation immigrant children and adolescents. It also aims to investigate whether parental educational level and length of residency seem to influence utilization rates. For this matter, data from the recently completed project “Health Care Utilization among Immigrants in Norway” conducted by Norwegian Social Research (NOVA) was utilized. The study includes children and adolescents originating from six different countries, and examines SHC utilization in the period from 2008 until 2011.

1.1 Background and study relevance

Per January 1st 2017, individuals with an immigrant background, originating from 221 different countries and independent regions, accounted for 16.8 per cent of the total population in Norway; 13.8 per cent were foreign-born, while 3 per cent were Norwegian-born to immigrant parents. With about 880.000 individuals with an immigrant background currently living in Norway, the number has more than doubled the last decade (Statistics Norway (SSB) 2017). It is expected that immigration to Norway will continue to rise, and research on immigrants’ utilization of healthcare services is considered an important health policy question and field of research in the coming years (Elstad, Finnvold and Texmon 2015, 137; Statistics Norway 2016).

As the population composition changes, Norwegian authorities are facing new challenges, also including the delivery of healthcare. Hence, monitoring and evaluating utilization of healthcare services should be crucial. The immigrant population is characterized by heterogeneity, which requires nuanced knowledge on health behavior. Statistics and analyses of immigrants on different areas of social life are both requested and applied by the authorities. Such descriptions provide policymakers with deeper knowledge of the potential challenges among immigrant groups. Without knowledge of the target groups, it is difficult to form appropriate policies (Østby and Henriksen 2013).

For Norwegian authorities, expressed through the Municipal Health Services Act (§ 3-1, 2011) and the Specialized Health Services Act (§ 1-1, 1999), it is a goal that all citizens have equal access to health care services. Likewise, Patients' Rights Act (§ 1-1, 1999) has the object to “(...) help ensure that all citizens have equal access to good quality healthcare by

granting patients' rights in their relations with the health service" with the scope to apply it "(...) to all persons residing in the realm" (§ 1-2). On an international level, the World Health Organizations' Constitution (1946) declares "(...) the highest attainable standard of health as a fundamental right of every human being."

In 2013, the Ministry of Health and Care Services launched a national strategy on immigrants' health, persisting until 2017 (Ministry of Health and Care Services 2013). The strategy, anchored in the governmental policy of equalizing social health differences, emphasizes that knowledge on immigrants' health should be updated frequently, as it is crucial to gain an understanding of their health challenges.

If healthcare services are not fairly distributed and well-functioning, it may contribute to reinforce already existing health inequalities, as access to healthcare is one of many social determinants of health. The goal of equal healthcare is challenged by variations in morbidity among immigrant groups, cases of poor communication and cultural differences (Ministry of Health and Care Services 2006, 290; Whitehead and Dahlgren 2009, 17; Attanapola 2013, 2; Ministry of Health and Care Services 2013, 3).

Integration of immigrants into the Norwegian society is considered an important socio-political goal, and equivalent healthcare services are one of the preconditions in achieving this (The Ministry of Health and Care Services 2013; Czapka and Sagbakken 2016). A way to illustrate integration is to ask whether children and adolescents with an immigrant background who are born and raised in Norway, have different life courses and are more easily integrated than those born outside of Norway. The choice of comparing SHC utilization between two immigrant categories for this purpose reflects the assumption that, in general, children and adolescents born abroad differ from those who are Norwegian-born to immigrant parents in important respects (as will be further elaborated in section 2.7). As access to healthcare is considered an essential component of integration, a possible investigative approach is to look at utilization of healthcare services.

A report published by the Norwegian Institute of Public Health (FHI) in 2014, points out that current knowledge on immigrants' health and their utilization of healthcare services is insufficient and fragmented, and that particularly little is known about immigrant children's and adolescents' health. The knowledge gap is attributed to a variety of reasons. First of all, most studies on immigrant health in Norway do not differentiate between factors considered relevant for health, like country background and length of stay in Norway. Given the fact that

Norway has very good central health registers and national medical registers, they could be included in analyses and research on immigrant health to a greater extent. So far, health registers have been utilized for research purposes only to a limited degree. However, if information from these registers is combined with information on country of birth from the National Population Registry, it could make up a valuable contribution to health research and improved healthcare services for this part of the population (FHI 2014, 81). As the method section will explain in detail, the combination of data from SSB and the Norwegian Patient Registry is facilitated for this project. Thus, it has the ability to contribute with knowledge on SHC utilization patterns among children and adolescents, differentiating on specific country background and generational affiliation.

1.2 Recent immigration to Norway

Recent immigration to Norway is recognized by specific patterns. The period from late 1960s onwards, is often referred to as the “new immigration”. In late 1960s and early 1970s, immigration to Norway was mainly related to labor. Most immigrants were married men migrating alone from Pakistan, Yugoslavia, Turkey and Morocco. In 1970, immigrants accounted for 1.3 per cent of the total population, whereas about half came from the Nordic countries. The rest originated mainly from North-Western Europe or North America (Brochmann 2016).

Following economic recession and the oil crisis in 1973, which decreased the demand for labor and led to discussions about the welfare state’s capacity, a temporary immigration stop was introduced in 1975. The purpose was to stop immigration of unskilled labor, while highly qualified foreign workers were requested. After 1970, there has been a rapid immigration growth, mainly due to family reunification, refugees and asylum seekers (Brochmann and Kjelstadli 2014).

In late 1970s, a third immigration phase emerged when refugees and asylum seekers arrived from Vietnam and Chile (Brochmann and Kjelstadli 2014). In the 1980s and 1990s, refugees migrated to Norway from Iran, Iraq, Sri Lanka, Somalia and former Yugoslavia (Vassenden 1997).

A fourth immigration wave followed the European Union extension in 2004 and 2007. Alongside opening of the labor market, a rapid increase in labor immigration was observed, especially from Poland and Lithuania. From this period onwards, labor has been the most

frequent cause of migration. However, war and conflicts still cause migration to Norway, Syrian refugees being among the recent immigrant groups. Overall, the immigrant population in Norway is younger than the general population, and is characterized by many young adults, half of them between 20 and 40 years of age. Among Norwegian-born to immigrant parents, about half are younger than 10, and as many as 80 per cent below the age of 20. Only 1.7 per cent has reached 40 years or above (SSB 2017).

1.3 The Norwegian context

Norwegian healthcare services are in principle universal, financed mainly by central and local governments and the National Insurance Scheme, in addition to co-payments (Ringard et al. 2013, 40). Healthcare services are divided into primary healthcare (PHC) and SHC. The PHC sector, often referred to as first-line services, is organized on a municipality level. A fundamental branch is the general practitioner scheme. Among Norwegian citizens, 99 per cent are registered with a General Practitioner (GP), who grants referrals to SHC. Thus, the GP holds a gatekeeper role, in the sense that he or she regulates access to specialists (Norwegian Medicine Agency 2016). GPs are also central in providing primary mental healthcare, including treatment and follow up or, when needed, refer patients to specialized care (Ringard et al. 2013, 115). PHC services also include Emergency Wards. Some patients are provided an acute referral to hospitals when attending out of hour- services. For children and adolescents, PHC services also include child and youth clinics, as well as school health services. Referrals to SHC may be granted from these clinics as well.

In Norway, four regional health authorities provide specialized, or second-line, healthcare services, attached to hospital units. Most hospitals are public, while a few are private owned, of which the majority receive public funding. Somatic SHC services include outpatient consultations, where patients receive medical assessments and day treatment, in addition to inpatient care.

Specialized mental healthcare services, which include psychological evaluation and treatment of more severe cases of mental illness, are divided into mental healthcare for adults (PHV) and mental healthcare for children and adolescents (PHBU/BUP). Children and Adolescents' Psychiatric Polyclinic Services (PHBU/BUP) provide psychological treatment to individuals under the age of 18. Mainly, treatment is provided at an outpatient basis.

1.4 Outline of the thesis

An elaboration of relevant theories and previous research will be provided in Chapter 2. Chapter 3 presents the data material, study sample, variables and statistical techniques. Descriptive statistics and results are accounted for in Chapter 4. Chapter 5 includes a summary of main findings and discussion of results, and, finally, Chapter 6 includes conclusive remarks and implications for future research.

2. Theory and previous research

This section will account for theories, concepts and previous research considered relevant for the issue of SHC utilization among children and adolescents with an immigrant background. In the end of the chapter, hypotheses deriving from the reviewed literature are outlined.

When providing an overview of the existing body of research, European, mainly Scandinavian, studies are emphasized. This choice is justified by assumed differences both according to population composition, cultural contexts and the organization and delivery of healthcare services between Norway and countries outside Europe. Consequently, relevant former research which could otherwise contribute to shed light on this thesis' objective, are, with a few exceptions, excluded. When referring previous findings on health status and healthcare utilization, the main focus is placed on immigrant groups included in the present study, although many studies include a wider range of immigrant groups.

When it comes to research on second-generation immigrants other than within the health field, only educational research is included. Studies conducted on second-generation immigrants and their performance within the labor market are not considered sufficiently relevant as this thesis examines children and adolescents aged 19 and below.

Some of the reviewed literature does not differentiate between first and second-generation immigrants, or it is not specified whether both groups are included. In these cases, “individuals with an immigrant background” refer to both groups.

2.1 The health of immigrant children and adolescents

When discussing levels of SHC utilization among children and adolescents in Norway, knowledge on the burden of disease is relevant, as morbidity levels in principle should decide referrals to specialized care. The health situation of children and adolescents in Norway is, in a global perspective, regarded as very good (FHI 2014, 65), which indicates an overall low burden of disease. Nonetheless, it is suggested that children of immigrants, compared to their majority peers, are more prone to health problems, related both to a childhood in low-income households, migration stress and acculturation difficulties. Migration is in itself considered a determinant of health (Molcho et al. 2010 ; Perreira and Ornelas 2011; Fadnes, Møen and Diaz 2016).

Somatic health

According to Brunvand and Brunvatne (2001, 715), immigrant children and adolescents experience a diversity of health challenges according to cause of migration, ethnic background and social, psychological and genetic factors. The prevalence of certain rare conditions, including thalassemia, sickle cell anemia, malaria, typhoid fever, tuberculosis, serious iron deficiency, vitamin D deficiency and rickets, is higher among this part of the population. Fadnes, Møen and Diaz (2016, 3) identified differences regarding the morbidity spectrum between first and second-generation children. Second-generation children and adolescents more frequently suffered from respiratory tract infections, renal, oral and gastrointestinal conditions, eczema, fever and nausea compared to non-immigrants. When comparing non-immigrants and first-generation immigrants, however, nausea and gastrointestinal conditions were the only health challenges more common among the latter group. Holmboe et al. (2006, 68) found that the prevalence of respiratory disease and other serious illness or injury was higher among children with one or two immigrant parents. In addition, it is claimed that the risk of obesity is greater among children with an immigrant background (Gilbert and Khokhar 2008; Labree et al. 2011; Gualdi-Rosso et al. 2014). A school-based survey carried out in seven European countries, including Norway, draws similar conclusions, and highlights an increased intake of soft drinks as a probable risk factor (Brug et al. 2012). There is a risk that obesity inflicts negatively on the health of children and youth, directly or indirectly, short-term as well as long-term. Co-morbid conditions include Diabetes mellitus type 2, hypertension, lung problems, orthopedic problems and dyslipidemia (Kumar et al. 2004; Abraham et al. 2008). In addition, it is reported that fire related damages are more prevalent among children with an immigrant background, but no evidence indicates that they are more exposed to other accidents or injuries (Assum and Nordbakke 2013, 16).

In the Oslo Health Profile study, no differences in self-reported general health appear between children and adolescents from immigrant families compared to non-immigrants (Grøtvedt and Gimmetstad 2002, 21). Correspondingly, in an examination of findings from the 2006 WHO collaborative survey study “Health Behaviour in School-Aged Children”, Molcho et al. (2010) conclude that immigrant children experience approximately the same level of health and well-being as their peers in most of the participating European countries. A British cross-sectional study on socio-economic and ethnic group differences of self-assessed health, found no differences related to neither SES nor ethnic origin. In general, utilization of both primary and

secondary care seemed to reflect self-reported health status and not SES or ethnic origin (Saxena, Eliahoo and Majeed 2002).

Mental health

Within the immigrant health field, studies on mental health are clearly dominating the body of research. Attanapola (2013, 11) points out that most studies investigating immigrant's mental health are carried out on non-Western immigrant youth and adults, in addition to refugees and asylum seekers. Several Norwegian studies suggest that immigrant adolescents struggle more in terms of mental health problems compared to non-immigrants (e.g. Sund, Larsson and Wichstrøm 2003; Oppedal, Røysamb and Heyerdahl 2005; Lien et al. 2006; Sagatun et al. 2007; Fandrem, Sam and Roland 2009). Immigrant adolescents, with both parents born abroad, may experience a form of cultural stress as they are negotiating between two cultures; their new peers on one side and their parents and origin country on the other, a form of "double alienation". Suddenly, they are holding a minority position and may experience prejudices and discrimination. This is believed to increase the risk of reduced psychological well-being. Important risk factors, particularly among children and adolescents emigrating from countries ravaged by war and conflicts, include trauma and loss of family members (Brunvand and Brunvatne 2001, 715; Lien 2006; Oppedal 2007, 10; Fandrem, Sam and Roland 2009).

Despite the above-mentioned risk factors, research demonstrates no unambiguous evidence that children and adolescents with an immigrant background suffer more in terms of mental health problems in general. Rather, it appears to be great variations, both between individuals, genders and immigrant groups (Lien 2006; Holmboe et al. 2006, 44; Oppedal 2007, 12; Abebe, Lien and Hjelde 2014). Findings from the Youth part of the Oslo Health Study (UngHUBRO) confirm this assumption. Oppedal, Røysamb and Heyerdal (2005) found a clear gender variation in psychological problems among 10th graders. In general, first-generation immigrant girls reported more mental health problems than second-generation, while the findings were opposite for males; second-generation boys reported significantly more problems than first-generation. As for ethnic variations, significantly lower levels of psychiatric problems were reported among Somalis compared to e.g. Vietnamese and Iranians, despite a higher degree of self-perceived discrimination. It is suggested that strong family values may act as a protective factor among the Somali group.

Another study on young Muslim immigrants based on data from UngHUBRO found significant variations in the level of internalizing problems, e.g. symptoms of anxiety and depression. Youth originating from countries with a predominantly Muslim population reported the same level of internalizing symptoms as non-immigrants, regardless of gender or status as first or second-generation immigrant. Compared to other non-Western immigrant youth, the level of such symptoms was significantly lower. Among girls, Iranians reported a significantly higher symptom level than their peers from Somalia and Pakistan. Compared to non-immigrant girls, Iranian girls reported significantly more and Somali girls significantly less internalizing symptoms. No equivalent differences were observed among boys, although Somali boys reported particularly few psychiatric problems overall (Oppedal and Røysamb 2007). Oppedal (2007, 13; 2008) found that adolescents originating from Iran and Vietnam reported significantly higher levels of mental health problems than their peers from Somalia and Turkey. Somali adolescents reported the lowest level of mental health problems and are, together with adolescents originating from Sri Lanka, denoted as apparently healthy national groups.

A study on depressive symptoms among non-immigrant and immigrant adolescents in Norway, found no significant difference between first and second-generation and their self-reported level of such symptoms. Girls with an immigrant background seemed to experience the highest level of depressive symptoms, while non-immigrant boys the least. In general, adolescents with an immigrant background reported significantly higher levels of mood symptoms than non-immigrants. It is suggested that adolescents with an immigrant background, particularly those originating from Asian countries, may be underreporting depressive symptoms, due to cultural differences and difficulties addressing mental health problems (Fandrem, Sam and Roland 2009). Another survey study among adolescents situated in Oslo identified similar tendencies. Immigrant adolescents reported psychological problems to a greater extent than non-immigrants, while no significant difference appeared between first and second-generation immigrants (Oppedal and Røysamb 2004).

A Norwegian report on psychosocial adaption and mental health problems among children aged 8-13 years in immigrant families, based on three separate regional surveys, concluded that the total prevalence of symptoms of psychological distress is equal between non-immigrants and children in immigrant families. Children of both gender with an immigrant background, however, reported considerably more social and emotional problems, and the results were not consistent between the three regions (Oppedal et al. 2008, 22).

In a study on Norwegian-born children and adolescents to Vietnamese parents, Vaage et al. (2009) found indications that their self-reported mental health appeared more favorable compared to that of non-immigrants. It is suggested that possible protective factors include a family structure recognized by tradition and certain values, as well as parental supervision. Important to note, however, is that biasing factors such as cultural perceptions of mental illness and stigma attached to it, may influence respondents. The hypothesis of protective factors is supported by an US study which concluded that first-generation adolescent immigrants experience more favorable psychological well-being than both their majority peers and second-generation adolescent immigrants. The phenomenon is attributed to collective and familial values, and parental support. It is suggested that assimilation processes decrease the level of well-being among second-generation immigrants (Harker 2001).

A Norwegian register study found considerable differences between immigrants and non-immigrants and the amount of psychiatric diagnoses. The fact that immigrant children were less likely to be diagnosed with such disorders have several possible explanations. Protective factors, as already mentioned, may contribute to lower rates. However, cultural differences may also lead to underdiagnosing. Signs of mental illness may not be recognized, or they may be presented in other ways (Fadnes, Møen and Diaz 2016). The phenomenon of somatization, symptoms on mental illness expressed as somatic symptoms, e.g., pain or stomach conditions, could also contribute. Symptoms presented may differ between immigrant groups (Varvin 2006, 17; Kirmayer and Sartorius 2007; Aragona et al. 2012). Fadnes, Møen and Diaz (2016) found that immigrant children from low-income countries more commonly reported unspecific and gastrointestinal symptoms, potentially related to somatization.

As addressed by Abebe, Lien and Hjelde (2014), a weakness among most studies on the mental health of immigrant adolescents is the lack of differentiation between important factors like origin country and generation. Moreover, there are methodological challenges including low response rate, small samples and surveys conducted without considering the cross-cultural perspective.

2.2 Healthy migrant hypothesis

It is well-documented that immigrants, in particular those migrating for work (Elstad 2016), seem to enjoy better health than the host population at the time of arrival. This may be considered a paradox, as they commonly hold a lower socioeconomic position than non-

immigrants (e.g. Abraído-Lanza et al. 1999; Singh and Siahpush 2001). Positive selection is a possible explanation, in the sense that only the healthiest individuals emigrate, as the migration process requires considerable health resources. This approach is commonly referred to as the healthy migrant hypothesis, and studies on Hispanic immigrants in the US suggests that it is also attributable to children. Immigrant children seem to demonstrate higher levels of well-being and more favourable overall health than their non-Hispanic counterparts. With time and across generations, however, this advantage seem to vanish (Hernandez and Charney 1998; Padilla, Hamilton and Hummer 2009; Balcazar, Grineski and Collins 2015).

The so-called epidemiological paradox may be explained by socio-cultural factors; that health behaviours and social networks hold a central role in maintaining good health among immigrants. Such protective factors may erode as the acculturation process proceeds, and the health advantage impairs over time. The worsening of health may result from acculturation processes in the sense that social norms change and accumulated health system experience leads to more frequent health service use. Thus, the likeliness of being diagnosed with different conditions increase (McDonald and Kennedy 2004; Antecol and Berard 2006; Viruell-Fuentes 2007). Other possible explanations for the initially better health status include a healthier lifestyle and genetic heritage (Balcazar, Grineski and Collins 2015).

In Norway, studies on adult immigrants indicate that labour immigrants typically demonstrate better health than non-immigrants at the time of arrival, with a correspondingly low utilization of healthcare (e.g. Sandvik, Hunskaar and Diaz 2012; Elstad, Finnvold and Texmon 2015, 18). Even if studies suggest that a health benefit among immigrant children diminishes with prolonged time of residency, they are not necessarily applicable to the Norwegian context. To this author's knowledge, few Norwegian studies have examined children's and adolescents' health in a "healthy migrant" perspective. Also, the healthy migrant theory presupposes that immigrant children's health correspond to the health of their presumably healthy parents, and that similar factors influence their health status over time. On the background of a national register study, nonetheless, Fadnes and Diaz (2017, 5) suggest that the healthy migrant theory could apply to children as well, more pronounced among recently arrived immigrant children. These children, especially those arriving in their late teenage years, evidently utilize PHC services to a lesser extent and are prescribed less medications compared to both non-immigrants and descendants. A suggested explanation is the mechanism of positive selection as identified among adults, i.e. the sickest children are not included or are not able to carry out the journey. To the degree this selection effect is likely to exist among second-generation

immigrants, it presupposes that the positive selection process applied to their parents upon the time of arrival. This group, nonetheless, utilizes PHC to the same level, and in some cases more, than non-immigrants. Except the possibility that their overall burden of disease is greater, it is suggested that they have more PHC visits according to increased length of stay among their parents, suggesting that acculturation processes inflict on utilization rates. Oppedal, Røysamb and Heyerdal (2005) report findings indicating that an immigrant health paradox seem to exist among adolescent immigrant boys, but not girls. As previously described, first-generation immigrant girls and second-generation boys seemed particularly prone to reduced psychological well-being, a finding which does not fully support the healthy migrant hypothesis. Overall, the hypothesis of a healthy migrant effect among immigrant children and adolescents in Norway does not seem to be well-documented.

2.3 Social inequalities in health

When it comes to healthcare access, inequity and inequality are central terms. In this context, inequity can be explained as differences which are unnecessary and avoidable, but also unfair and unjust. Thus, the concept of equity contains an element of moral and ethics (Whitehead 1990, 219). When discussing the concept of “equal utilization for equal need”, Whitehead (1992, 9) underlines, however, that utilization differences among groups are not necessarily inequitable. Either way, it requires further investigation to detect underlying causes.

The concept socioeconomic status (SES) commonly refers to the level of income, education and profession an individual holds. These measures in combination gives an indication of his or hers position in the socioeconomic hierarchy (Elstad 2005, 10). In general, children of immigrant parents are considered to have a considerable less favorable socioeconomic position compared to their majority peers (Hermansen 2016, 160).

The relationship between SES and health is well established, in Norway as well as internationally (Dahl, Bergsli and van der Wel 2014, 13). A more advantageous educational and economic position, and stronger attachment to the labour market, is associated with better health. A socioeconomic health gradient, in the sense that a stepwise worsening of health is observed the further down the socioeconomic hierarchy an individual is positioned, is commonly suggested (e.g. Marmot, Kogevinas and Elston 1987). Several explanations for this phenomenon are proposed, but will not be further discussed here.

The health gradient is thought to be evident also among children and adolescents (e.g. Marmot 2010, 112; Dahl, Bergsli and van der Wel 2014, 13; Inchley et al. 2016, 7; Bakken, Frøyland and Sletten 2016, 11; Samdal et al. 2016, 52), although a limited effect of SES on children's and adolescents' health is also suggested (West and Sweeting 2004). Additionally, the phenomenon of an age gradient is argued; a stepwise exacerbation in health among children with low SES as they grow older (Currie and Stabile 2003). Either way, it is important to note that children's socioeconomic position is based on that of their parents, which complicates the measuring. The measuring of adolescents' SES is associated with even greater insecurity (Næss, Rognerud and Strand 2007; Currie et al. 2008; Samdal et al. 2016, 50).

The relationship between low SES and poorer health among children and adolescents is evident both when it comes to somatic and psychological well-being (Norwegian Directorate for Health and Social Affairs 2005, 12; Holmboe et al. 2006). Findings suggest that children and adolescents from families with low SES have an increased risk of chronic conditions like asthma, allergy and eczema (Finnvold, Nordhagen and Schjalm 1997; Grøholt and Nordhagen 2002). In a comparative study of the five Nordic countries, Halldórsson et al. (2000) found that parents with lower SES reported more ill health for their children in terms of both somatic and psychiatric chronic conditions. This was apparent for all age categories in all five countries. Also, injuries and accidents of all kinds are evidently more prevalent among children and adolescents with lower SES (Laflamme, Hasselberg and Burrows 2010, 86).

In Norway, it is established that children with an immigrant background are over-represented among low-income families. This is particularly common among children with an immigrant background from Somalia, Iraq and Afghanistan. While 75 per cent of children with a Somali background lived in low-income families in 2013, the same was the case for about half originating from Iraq and Afghanistan (Directorate of Integration and Diversity (IMDi) 2015; Epland and Kirkeberg 2015). Household income is considered an important determinant of young individuals' health. A number of health challenges are observed among children and adolescents growing up in low-income families, including less favorable self-reported health and satisfaction of life (Norwegian Ministry of Children, Equality and Social Inclusion 2015, 12; Inchley et al. 2016, 228).

Elstad (2010, 204-205) points out the same tendencies in a panel study investigating living conditions among children in low-income households, although the results are less conclusive. Individuals growing up in less affluent households score lower on a range of health indicators,

and the differences between the low-income sample and control sample seem to increase in late teens. In general, both non-Western immigrant parents and their children in the low-income group do not report particularly good general health. Interestingly, however, is that immigrant families less often report problematic health in terms of e.g. diseases and symptoms compared to the two remaining groups. It is emphasized that this tendency is not necessarily related to a lower disease burden, but could might as well result from less healthcare-seeking behavior, possibly due to a weaker integration to the majority health culture (ibid., 204).

Ungdata (“young data”) is a cross-national survey, investigating various aspects of adolescents’ life situation, including self-rated health. The Ungdata report from 2016 concludes that adolescents from families with few socioeconomic resources report worse health compared to their peers from families with higher SES. This is particularly evident among females (Bakken, Frøyland and Sletten 2016, 99). Tendencies of low parental income and less favorable self-reported health is also supported by other Norwegian studies (Elstad and Pedersen 2012; Samdal et al. 2016, 52).

A Norwegian study on health service utilization in the Nordic countries, showed a clear relationship between SES and the degree of consulting behavior among children with chronic diseases. There was, however, little difference when it came to GP consultations, and contacts with specialized healthcare for those without chronic conditions (Grøholt et al. 2003). Similarly, in a Nordic survey study on healthcare utilization and parental educational level, Grøholt and Nordhagen (2002) found no differences in GP visits. However, a reversed social gradient was observed regarding specialist consultations and hospitalizations. While children and adolescents with higher educated parents had more contacts with specialists, those with lower parental educational level were more frequently hospitalized. In their study on healthcare utilization among school children in Akershus county in Norway, Holmboe et al. (2006, 56-64) found that higher parental educational level, but not income, increased the probability of contacts with both primary and secondary somatic healthcare, compared to other children with similar conditions and symptoms. For educational and psychological counselling services, however, utilization rates were higher among children of parents with low educational qualifications and low income. No such differences were found in relation to mental SHC services. In a comparative study on SES and healthcare utilization among children in the Nordic countries, Halldórson et al. (2002) found little variation in the use of GP services when taking SES into account. Regarding SHC utilization, children with lower

socioeconomic backgrounds had significantly lower use, but were more often hospitalized. For the utilization of specialized services, parental educational level, especially the mothers', appeared to be a more decisive factor than income.

In general, results from the Ungdata survey indicate small differences in healthcare utilization related to SES. Among adolescents from families with low SES, however, the proportion who were in contact with youth health clinics, school health services and psychologist/ psychiatrist was higher, particularly among females (Bakken, Frøyland and Sletten 2016, 99).

2.4 Utilization of healthcare services

A limited amount of Norwegian studies are conducted on children and youth with an immigrant background and their utilization of healthcare services. Some examine use of somatic PHC (Fadnes, Møen and Diaz 2016; Fadnes and Diaz 2017) but few studies differentiate on country of origin. Correspondingly, little research is carried out on SHC utilization, especially somatic healthcare, among children and adolescents in Norway.

Primary healthcare services

In 2010, the visitation frequency to GPs differed considerably among children aged 0-5. While one third of children with an immigrant background visited their GP during that year, the according number for non-immigrants was two thirds. A possible explanation may be that these children are followed closely by health stations and later the school health service. Duration of residency may be another. As these children are small, they, and their families, have only lived in Norway for a short period of time, possibly influencing how often they utilize GP services (Lunde and Kjelvik 2012).

According to Lunde and Texmon (2013) immigrants overall (both first and second generation) visit their GP less frequently than non-immigrants. They also find, however, that the number of visits increases according to time spent in Norway. Nørredam and Krasnik (2011, 69-71) refer to several European studies on immigrants' use GPs, and summarize that there is a tendency towards immigrants having relatively high frequency rates overall compared to non-immigrants. They find the same tendency when reviewing studies of emergency department use, although the evidence is inconclusive. A registry-based study conducted by Sandvik, Hunskaar and Diaz (2012) concludes that immigrants in Norway have a lower utilization rate of emergency primary healthcare (EPHC) overall, although there are significant differences

between immigrant groups. Polish and German immigrants had a contact rate far below Native Norwegians, while Somalis and Iraqis had more contacts. Regarding utilization of GP services, evidence suggests that a significant lower share of immigrants over the age of fifteen utilize such services compared to non-immigrants (Diaz et al. 2014). Those who visited their GP, however, had a higher contact rate than non-immigrants. Except from immigrants originating from high income countries, the immigrant population had higher levels of EPHC utilization. A relationship between length of stay and increased use of PHC was observed. Straiton, Reneflot and Diaz (2014) found lower rates of psychiatric consultations with both EPHC and GPs among adult immigrants overall. The likeliness was particularly low among Polish immigrants, and also among Pakistani women. Among the latter group, fear of stigma is a suggested explanation for the possible inadequate level of healthcare seeking behavior. In general, prolonged time of residency predicted higher utilization of psychiatric consultations.

A register study on immigrants' utilization of EPHC in Norway found that the youngest immigrant children, most of them descendants, utilized EPHC more frequently than non-immigrants. It is suggested that the frequency of contacts is attributed to insecurity among parents and the absence of support from older generations. Among children aged 6 to 15 years and adolescents between 16 and 19, non-immigrants had higher utilization rates, although just slightly among the youngest group (Sandvik, Hunskaar and Diaz 2012). Another register study on immigrant children (0-18 years) and PHC utilization (GP and EPHC visits in combination) concludes that first-generation immigrant children's utilization frequency of EPHC was considerably lower than among non-immigrants. Second-generation immigrants, however, utilized both branches of PHC to a greater extent than non-immigrants, although variations were seen between immigrant groups (Fadnes, Møen and Diaz 2016). A third register study examined PHC utilization (GP and EPHC) and prescriptions among first and second-generation immigrant children according to age at arrival. It appeared that immigrant children (0-18 years) utilized PHC and medications to a significantly lower extent than non-immigrants. This was particularly evident among immigrants arriving at an older age, and thus fit with the hypothesis that length of stay forecasts PHC utilization (Fadnes and Diaz 2017).

Specialized healthcare services

In an analysis of the British general household survey, Cooper, Smaje and Aber (1998) investigated the relationship between healthcare utilization, ethnicity and social class among children and youth. No evidence indicated socioeconomic differences in the utilization of PHC and SHC. However, considerable differences were found regarding the use of GP and secondary care among immigrant groups. In general, children and adolescents originating from South Asian countries had many visits to their GP, and simultaneously low levels of SHC utilization. After controlling for health status, children and adolescents from all ethnic groups had significantly lower use of SHC compared to non-immigrants. It is suggested that the low referral rate might indicate GP discrimination and bias leading to fewer referrals (ibid.).

The NOVA report “Use of hospitals and other specialized health services among immigrant and non-immigrants in Norway” concludes that immigrants’ overall utilization level of SHC were relatively small compared to the host population in the period from 2008 until 2011. This was especially true for utilization of mental healthcare. Importantly, nonetheless, is the finding that utilization rates differed considerably between immigrant groups, which is obviously nuancing the impression of generally low usage among the immigrant population. Overall low utilization rates of both branches of SHC were seen among Polish and Vietnamese immigrants in all age categories. Among children, somatic SHC usage was relatively similar compared to that of non-immigrants, while contacts with mental healthcare were less frequent among those with an immigrant background. Children and adolescents originating from Somalia had particularly low usage of mental SHC, and a similar tendency was observed among Somali women. Iranian adult immigrants of both genders had relatively frequent contacts in comparison. Both men and women from Iran had a particularly high utilization level of outpatient mental SHC services, and similar tendencies, although lower rates, were observed among men from Iran. Among children originating from Iran, contact rates with somatic SHC were relatively high, while adolescents had a lower level compared to non-immigrants. Utilization rates of mental healthcare among children originating from Iran were lower among the youngest age categories compared to non-immigrants. Adult Pakistani immigrants had particularly high utilization rates of somatic SHC, and the same was the case for mental healthcare among men. The youngest children in this group had relatively high somatic utilization rates, while both children and adolescents had low levels of mental healthcare contacts (Elstad, Finnfold and Texmon 2015, 127-132). Utilizing the same register

data, a Norwegian nation-wide study found large differences in mental SHC utilization. Children and adolescents originating from Poland, Somalia, Sri Lanka, Pakistan and Vietnam appeared to have very low usage of mental healthcare services. Children and youth from Iran, on the other hand, had high utilization rates (Abebe, Lien and Elstad 2017).

Elstad, Finnvold and Texmon (2015, 118) found the same overall tendencies regarding immigrants' educational level and their utilization of specialized health services as among ethnic Norwegians. In general, the higher educational level, the lower utilization rates of SHC. However, this tendency was not identical between immigrant groups, and in some groups it appeared to be the opposite- the more education, the higher utilization rates. This was evident among immigrants from Vietnam, Sri Lanka and remaining Asian countries. Moreover, tendencies towards less discrepancy in utilization level with increased time of residency in Norway emerged. However, it is not possible to conclude with certainty as the demographic composition of immigrants from a country could differ from one period to the next, as well as the reason for migration.

2.5 Explanations for variations in healthcare utilization

The following sections suggest explanations for possible differences in healthcare utilization between non-immigrants and immigrants, and among different immigrant groups. In addition, research on some specific immigrant groups is assessed, although there are few Norwegian studies which differentiate on country background when investigating this matter.

Barriers to access and utilization

Nørredam and Krasnik (2011, 68) list several factors explaining why immigrants' healthcare utilization may differ from that of the host population. Such differences could relate to the migration process, and factors like "(...) health and socioeconomic status, self-perceived needs, health beliefs, health-seeking behavior, language barriers, cultural differences, trauma and newness" are considered to be possible contributing causes. It is probable that some of these factors co-occur, which makes it a challenging task to determine with accuracy exactly what influences access. Some obstacles are more likely experienced by recent immigrants, particularly the challenge of navigating within a different healthcare system (ibid.). In a study aiming at identifying sources of healthcare underutilization among immigrants in California, Chi and Handcock (2014) found significant disparities in utilization rates between recent and

non-recent immigrants. It appeared that recent immigrants were far less likely to seek healthcare when needed, among other things related to language proficiency. This corresponds well with a Norwegian qualitative study on immigrants' enrolment in the GP scheme, where increased length of stay seemed to predict higher satisfaction with the scheme (Goht and Berg 2011). Informants mentioned that routine information on the organization of GP services were distributed solely in Norwegian, which was perceived especially challenging by labour and family-reunification immigrants. Additionally, many informants were unaware of the fact that they had been allocated a GP shortly after arrival.

Both formal and informal barriers may hinder healthcare access. Formal barriers have to do with health policies and the way health systems are organized, e.g. co-payments. Informal barriers include factors like language difficulties and sociocultural factors (Nørredam and Krasnik 2011, 71-72). In a systematic review, Scheppers et al. (2006) identify three levels of potential barriers: patient level, provider level and system level. Barriers at patient level include, among other factors, ethnic origin, educational level, socioeconomic status (SES), living conditions, lifestyle, social support, health beliefs and attitudes, acculturation level, residency time, health knowledge, language and communication. In addition, patients may ascribe health personnel too much authority, and thus hesitate to seek their expertise. Likewise, perceived cause of illness, traditional medicine and self-treatment could act as barriers. An example of provider level barriers include the nature of medical practices, like physical examinations, which may be experienced as frightening and unfamiliar. Additionally, communication skills, stereotypical attitudes and discrimination, and lack of cultural competence may hinder adequate access to healthcare. Barriers on system level include a physician's potentially biomedical perception of illness, thus ignoring the aspect of culture and religion which affects the patient's view of illness and healing processes. Another possible obstacle is a perceived discrepancy between medical treatment received in the origin country compared to the host country, and the lack of ability to approach a medical specialist directly without a referral. Likewise, the process of arranging appointments, short consultations and long waiting periods before treatment is obtained may act as barriers (ibid.).

The above mentioned factors are in agreement with a Norwegian qualitative study on Polish labor immigrants and healthcare utilization. Among respondents, the lack of adjusted information and limited knowledge of the healthcare system, the perception of long waiting time, skepticism towards doctor's qualifications and the wide responsibility of the GP, as well as the attitude of health personnel, are highlighted as barriers (Czapka and Sagbakken 2016).

A complicating factor when presenting potential barriers for healthcare utilization, and subsequently aiming to interpret the results of this study, is the relationship between parents and their children in the process of seeking healthcare. At a GP visitation, for instance, the caregiver is an important part of the consultation, as he or she is aware of the child's habitual health condition and is able to observe and communicate deviations from it. Brunvand and Brunvatne (2001, 715) point out that positive exchange from a GP consultation is dependent on doctor-parents communication. As children may be unable to describe symptoms precisely, the adult's role is crucial. Research suggests that children often take on a passive role during consultations, and at the same time are little engaged when information is exchanged and decisions about their health are made (Coyne 2008). On this background, and because research on barriers for healthcare utilization are mostly carried out on adult immigrants, the following sections are founded on the assumption that such obstacles are most commonly faced by caregivers, although the child's role should obviously not be underestimated.

Communication and interpretation

Communication is a crucial part of the doctor-patient relationship and the interpreter's role is central in many consultations with immigrant patients. Linguistic barriers, which may in turn hinder adequate communication with healthcare personnel, is recognized as a possibly challenging factor for equal healthcare services (Kale 2006, 46; Le 2013, 11). A survey study among GPs and health workers in the SHC sector in Oslo, Norway indicated an underutilization of interpreters, and that interpreting was not sufficiently integrated as a part of patient care. Utilization of family or friends for interpreting purposes was relatively common. Also, some respondents pointed out issues with low qualifications among interpreters, and they requested more focus on cultural communication, to reveal factors of relevance for the consultation and communication in general (Kale 2006, 42-43). Findings from a qualitative study among minority patients and health personnel at Oslo University Hospital suggested a discrepancy regarding the perception of when an interpreter was required. Healthcare personnel appeared to overestimate patients' language knowledge, especially those who knew "some Norwegian", and thus ran the risk of underutilizing interpreters. Patients, on the other hand, perceived this level of language skills ***too poor to carry on*** without an interpreter. Moreover, patients reported a lack of information regarding their entitlement to an interpreter, in meetings with GPs as well as SHC workers. Together, these circumstances contributed to an inadequate level of interpretation (Le 2013, 11-12). In

another study from the same hospital, 71 patients with an immigrant background were interviewed regarding their hospital stays. Most patients reported an experience of being treated politely and with respect, and had an overall satisfaction level corresponding to non-immigrant patients. However, several patients reported linguistic barriers and insufficient utilization of interpreters. Despite the fact that poor language skills were widespread, interpreters attended only one out of ten consultations, and many patients reported to have brought their own interpreter (Djuve and Pettersen 1998, 30).

Findings from a study on immigrants in Norway and participation in the GP scheme, indicate that informants may experience translation as too time-consuming, thus affecting the level of received help. Also, when other members of the community were engaged as interpreters, patients reported a fear that information was not kept confidential (Goht and Berg 2011). Another potential issue is insufficient medical knowledge among interpreters (Spilker, Indseth and Aambø 2009, 40).

Lysheim (2016, 43-44), on the background of interviews with Polish labor immigrants, found that some of them express reluctance to seek healthcare in Norway as they expect language difficulties and cultural differences, and thus limited understanding from the physician. This is an important reason for the preference of seeking healthcare in their home country. In addition, they report better time for medical care in Poland, as they have a break from their extensive work load. The study sample is limited, which obviously affects generalizability, but the results can still provide knowledge on barriers for seeking medical care.

Attitudes, knowledge and beliefs

Both cultural differences and attitudes towards Norwegian healthcare services may contribute when aiming to interpret differences in utilization of SHC services. Immigrant patients' perception of disease sometimes differ from that of healthcare personnel, and there may be differences both within and between immigrant groups. Differences in educational level and whether an individual originate from a rural or urban area, are, however, thought to have greater impact than country background (Abraham et al. 2008, 12).

In a qualitative study investigating Polish children's inclusion in the Norwegian school system, Wærdahl (2016) describes how parents often express the belief that Norwegian schools hold a lower quality than in Poland. Other studies have revealed low interpersonal and

institutional thrust among Poles, also when it comes to the quality of healthcare services (Czapka 2010, 26; Goht and Berg 2011; IMDi 2014, 50; Blom 2017, 174).

Health literacy, as defined by WHO (1998, 10) “(...) represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health.” It is denoted an important determinant of health and, when measured, immigrants generally score lower on health literacy (WHO 2013). An adequate level of health literacy increases the probability of pursuing medical care when needed, as symptoms and signs of illness are more easily recognized. Low levels of health literacy may result in less trust in healthcare providers and lead to less favorable patient experiences. Health literacy is also suggested to affect access to and utilization of healthcare services, although findings are inconclusive (Lee, Arozullah and Cho 2004; Paasche-Orlow and Wolf 2007; Khuu et al. 2016).

Economy

Economy as a barrier for utilization of healthcare services could obviously serve as an explanation for lower use among certain groups. The organizing of the Norwegian healthcare system, however, is organized with co-payments which are supposed to reduce such differences. A study conducted by Eurostat finds that less than 0.5 per cent of Norway’s population experience an unmet need for healthcare related to economic costs (Dahl, Bergsli and van der Wel 2014, 269).

For both PHC and SHC, no deductibles are required from children and adolescents under the age of 16. For mental healthcare services, it is free up to the age of 18. The remaining population, with a few exceptions, must co-pay up to a certain limit, until an exemption card is received. Then, they are exempted for payment the rest of that year. For all age groups, there are costs related to medications, although some are free of charge if the exemption card is received.

Despite relatively limited costs related to healthcare for children and adolescents under the age of 18, the role of economy as a barrier for healthcare utilization should not be completely excluded. For example, there may be costs related to transportation etc. Among Polish labor migrants, cost is one of several reported reasons for preferring Polish medical services over Norwegian services, except when it comes to acute illness (Czapka 2010, 26; Lysheim 2016, 40). Even if their children are eligible to free healthcare, there might be misunderstandings

regarding this entitlement stemming from linguistic challenges (Nørredam and Krasnik 2011, 72), which in turn affects utilization rates among children as well.

The GPs role

In health systems where GPs act as gatekeepers for SHC, communication challenges may result in insufficient referral practices (Nørredam and Krasnik 2011, 71-72). A Dutch study investigating cultural meetings in general practice, using GPs and parents of child patients as informants, concluded that cultural background and communication is related. Compared to consultations with non-immigrant patients, communication was considered less efficient, thus resulting in misunderstandings and less compliance among patients. Higher levels of parental language proficiency, but not educational level, impacted mutual understanding positively, but did not affect compliance. Important limitations include a relatively low number of informants, and the fact that most patients originated from Turkey and Surinam (Harmsen et al. 2003). Another Dutch study comparing non-Western immigrant patients and their majority counterparts found that consultations were shorter and the GP-patient relationship more asymmetrical among immigrants. It is concluded that ethnic origin may predict a different patient outcome, as GPs appeared to be more involved and empathetic when meeting non-immigrant patients. Nonetheless, they seemed to put more effort into understanding when meeting immigrant patients with limited linguistic ability (Meeuwesen et al. 2006). As for the previously mentioned Dutch study, informants were relatively few and the patient population was differently composed compared to the Norwegian. Either way, the possibility of similar patterns appearing among GPs in Norway should not be completely excluded.

In a Norwegian study, twelve GPs were interviewed about intercultural challenges in their practice (Goht, Berg and Akman 2010, 30). Some pointed out the challenging factor that many patients were provided information, often incorrect, about the healthcare system from others within the immigrant population. It was reported that it may take as long as five years until an immigrant fully understands the healthcare system, and emphasized that information should be provided in their mother tongue as soon as possible after arrival. Moreover, many GPs reported that patients communicated challenging experiences when attending secondary care, in terms of lacking understanding. Additionally, GPs experienced that some immigrant patients express symptoms differently, e.g. describe painful symptoms the GP cannot identify during medical examination, and communicate expectations which cannot be met, e.g. related to drug prescriptions.

Alternative explanations

As implied in previous sections, utilization differences could have several explanations. Elstad, Finnvold and Texmon (2015, 146) refer to differences in morbidity as an immediate explanation, as a natural consequence of such differences is unequal utilization of healthcare services. Although evidence is inconclusive, this might be applicable to children and adolescents as well. There is, nevertheless, a possibility that utilization differences could be explained on the background of other factors. One possible scenario is that patients refuse to seek medical treatment as they have the perception of not being taken seriously. However, the report “Use of hospitals and other specialized medical services among immigrants and non-immigrants in Norway” concludes that immigrant groups which could be considered more prone to marginalization and discrimination than others, often have relatively high utilization rates of somatic, but not mental, healthcare (ibid.). These findings indicate the complexity of causes lying behind utilization patterns of healthcare services.

A Norwegian report on perceived discrimination among adults from ten different immigrant groups identified great variations in the level of self-perceived discrimination. Immigrants from Iraq and Somalia most frequently reported the experience of unequal treatment due to ethnic origin. It is suggested, nevertheless, that this may relate to social marginalization, as a consequence of short residence time, low educational level and weak attachment to the labor market. As a whole, they seem to be less included in important areas of society compared to other immigrant groups. In many cases, still, similar tendencies are reported among immigrants with high educational levels and language proficiency. For example, neither first nor second-generation Iranian immigrants report lower levels of self-perceived unequal treatment compared to other groups (Tronstad 2009, 3).

In relation to healthcare services, however, the picture appears somewhat different. Nearly 80 per cent report the experience of receiving similar treatment as non-immigrants, whereas 7 per cent report worse treatment (Tronstad 2009, 21-22). Another study on self-perceived discrimination among non-Western immigrants in Norway suggests that, in general, the majority of respondents perceive themselves as well integrated, although half report the experience of discrimination on various areas of social life. Among all public services listed, respondents were most satisfied with the GP service, and more than 80 per cent reported no experience of discrimination during consultations. Important to note, however, is the study’s limited representativeness, as most respondents score higher on important integration indicators and in general are considered more resourceful than the remaining immigrant

population (IMDi 2008, 5-7). Another study on adults confirms generally low levels of perceived discrimination related to the utilization of healthcare services, both among first- and second-generation immigrants. Among first-generation immigrants, individuals from Somalia and Iraq most frequently report discrimination (75 per cent), followed by immigrants from Sri Lanka, Pakistan and Poland (60 per cent). Among second-generation immigrants as a whole, 60 per cent report similar experiences. Respondents with high levels of education report discrimination somewhat more often (IMDi 2014, 5). This corresponds well with findings from the survey on immigrants' living conditions from 2016 (Hamre 2017, 166-167), where the majority report an experience of equal treatment when receiving healthcare services. Immigrants from Sri Lanka, Vietnam and Bosnia-Herzegovina report the lowest levels of experienced unequal treatment (3-4 per cent), while Iranian and Somali immigrants are among the groups who most frequently report this experience (but no more than 8-9 per cent). The adult part of the Oslo Health Study (2000-2001) indicates that non-immigrants and immigrants from Western countries were more frequently satisfied with their latest consultation with a doctor, than immigrants from other world regions (Grøtvedt 2002, 60). In another Norwegian study, informants from Somalia, Pakistan, Poland, Turkey and Russia more frequently expressed the view that immigrants receive healthcare of poorer quality compared to non-immigrants (Goht and Berg 2011).

2.6 Differentiating immigrants and descendants

A fundamental element in one part of this thesis is the differentiation between individuals born abroad and those born in Norway to immigrant parents. Descendants are believed to have other prerequisites for maneuvering well in the Norwegian society, which presumes a higher level of integration and adaptation both when it comes to educational settings, their neighborhood and elsewhere in society (Øia 2005, 14; Tronstad 2016, 46). Despite this, descendants' parents have another country of birth, and differ, more or less, from the majority population in terms of language skills and cultural background. Hence, they are to a lesser extent able to provide their children with the same "cultural capital" as non-immigrant parents. Children with an immigrant background may suffer from parents' poor language skills and "inherit" certain social problems such as children poverty, low educational level and residential segregation. Even if they perceive themselves as "Norwegians", they still have visible characteristics like different names and skin color, making them prone to

discrimination during both their childhood and adulthood (Henriksen and Østbye 2007; Epland and Kirkeberg 2015; Friberg 2016; Hermansen 2016, 158).

Clearly, it is not unproblematic to draw a strict line between individuals born in the host country to immigrant parents and immigrant children who arrived during their early years (Rumbaut 2004). In many families, some siblings are born abroad and some in Norway. If a child arrived very young, it is not obvious that he or she has experiences from the origin country which justifies a dividing of siblings into two different generational categories (Øia 2003, 28). Rumbaut (2004) suggests a differentiation between the immigrant categories “1.75 generation”, “1.5 generation” and “1.25” generation, arriving in early childhood, middle childhood and adolescence, respectively. The latter group is thought to have adult outcomes more in consistence with first-generation than second-generation immigrants. Although this thesis do not operate with similar categories, it illustrates how age at arrival might predict different trajectories, and that an absolute differentiation between two immigrant categories has its weaknesses.

2.7 Acculturation and integration

The concept of acculturation is commonly included when discussing integration. referring to the level of which individuals with an immigrant background are included as full members of the society, i.e. are granted access to central institutions like the educational system and labor market (Alba and Foner 2015, 5). Acculturation is considered a collective term, referring to psychological processes initiated by intercultural contact (e.g. Graves 1967; Berry 1997). Such processes are related to acquisition of cultural competence, and may lead to a sense of belonging and ability to participate. In this way, a child is able to achieve success both within the majority culture and his or hers culture of origin. Important social settings include among others kindergartens, schools and health services, where social norms and interpersonal interaction are clearly influenced by the majority culture (Oppedal et al. 2008, 10).

The long-term consequences of immigration are largely determined by the “success” of descendants in the Norwegian society, and the degree to which they are included in the labor market and other important social institutions (Friberg and Midtbøen 2017; ISF 2017). The so-called “litmus test” refers to a form of integrational measurement (Henriksen and Østbye 2007). The idea is that how descendants adapt to the Norwegian society in terms of educational attainment and labor market attachment indicates the degree of successful long-

term integration. As they, contrary to their parents and grandparents, are born in Norway, they are thought to have other prerequisites for performing well in these areas. Their attainments and whether they are included on important areas of society, or oppositely are directed into marginal positions, are decisive both for the individual's life chances and the sustainability of the Norwegian societal model (Friberg and Midtbøen 2017; ISF 2017).

2.8 Research on school performances

Among Norwegian-born children to immigrant parents, great variations appear between immigrant groups regarding the completion of secondary school. While descendants with parents from Vietnam, India, Iran and Sri Lanka complete secondary education at the same or even higher level than the majority population, Norwegian-born children to Moroccan, Turkish, Chilean and to some extent Pakistani immigrants have low completion rates. A study looking into grade point average among secondary school students found that those with Vietnamese, Sri Lankan and Bosnian background perform particularly well, while the lowest grade point average was seen among students originating from among other Somalia and Iraq (Støren 2006).

When it comes to higher education, second-generation children have, on average, higher attendance rates than their non-immigrant peers, despite their relatively lower SES. A possibility is that immigrant parents are eager to regain a potentially degraded SES acquired after arriving the host country, and thus serve as a motivation for upwards social mobility (Hermansen 2016, 164-168). Among Vietnamese second-generation immigrants, findings have indicated that parents' educational level seem to inflict less on school performances than among majority children (Fekjær and Leirvik 2011). Evidence suggests the same difference between immigrant groups and non-immigrants as a whole, and especially non-Western students seem to benefit less from parents' high educational level (Fekjær 2007; Støren and Helland 2010).

Age at arrival is considered crucial when it comes to school performance, and a steep decline is found for each year a child spends outside the Norwegian school system (Bratsberg, Raaum and Røed 2011, 5). Similarly, a clear age-at-arrival effect is observed regarding immigrant children's adult life chances (Hermansen 2017). Considerable differences are seen between immigrant children arriving in Norway before and after school-starting age, in terms of adult outcome like labor market attachment and income. Limited differences are found when

comparing second-generation immigrants and immigrants arriving early in life, regarding e.g. educational attainment and economic outcomes. The least favorable socio-economic outcome is observed among those entering Norway during late childhood or their teenage years, and in particular those arriving from less developed, geographically distant countries.

2.9 Hypotheses

In the previous literature review, theories and former research related to this thesis' area of focus are assessed. Both when it comes to health status, medical diagnoses, healthcare utilization and school performances, findings are evidently ambiguous. Thus, when comparing the utilization of SHC services, country origin is considered a crucial factor. Moreover, when assessing healthcare usage among first-generation immigrants, length of stay is taken into account. On this background, the following three hypotheses are developed:

1. There are differences in SHC utilization between non-immigrants, immigrants and descendants. It is expected that within each country group, a larger proportion of descendants had at least one contact with somatic SHC compared to immigrants, related mainly to parents' acquisition of the Norwegian "health culture". Nonetheless, when it comes to specialist mental healthcare, it is hypothesized that a greater proportion of immigrants had at least one contact compared to descendants, deriving from migration stress and «newness». Overall, it is expected to observe significant differences among country groups with regards to all three types of SHC.
2. When it comes to parental educational qualifications, it is hypothesized that individuals with lower parental educational level utilize both somatic and mental SHC more frequently, regardless of country background and generational category. This is related to empirical evidence indicating more ill health in general among groups with lower parental SES (Finnvold, Nordhagen and Schjalm 1997; Grøholt and Nordhagen 2002 Halldórsson et al. 2000) as well as an elevated risk of accidents and injuries (Laflamme, Hasselberg and Burrows 2010, 86). Previous findings suggest that children with high parental SES, in particular high parental education, are more frequently attending specialist somatic healthcare, while children from low educated and low income households were more likely to attend educational and psychological

counselling services (Grøholt and Nordhagen 2002; Halldórson et al. 2002; Holmboe et al. 2006). However, findings have indicated that children with lower parental SES are more frequently hospitalized (Grøholt and Nordhagen). Thus, it is expected that discrepancies between children with high and low parental SES is less pronounced in terms of somatic outpatient contacts, while children from lower educated households are clearly overrepresented when it comes to somatic hospitalizations and contacts with PHV/BUP.

3. Regarding length of stay, a pattern of higher utilization rates among longstanding immigrants is expected to emerge within somatic, but not mental, SHC. This relates to the fact that immigrant children and adolescents born abroad are more prone to mental health problems (Lien 2006; Oppedal 2007, 10; Fandrem, Sam and Roland 2009).

3. Data and methods

This chapter will briefly account for the study's design and provide information about registers and data set utilized for this thesis. Then, operational definitions of variables and information on missing data are provided. Finally, statistical methods and ethical considerations will be shortly elaborated.

3.1 Study design

The design of this study could be regarded as a prospective cohort study, as it follows a selected group of individuals residing in Norway at January 1st 2008, and on the background of registers follows their contacts with SHC in the period 2008 until 2011 (Elstad, Finnfold and Texmon 2015, 24). For the purpose of examining access to healthcare services, utilization of registries are considered particularly suitable (Gliklich, Dreyer and Leavy 2014).

3.2 Data set and registers

The data material is made accessible through the NOVA project "Health care utilization among immigrants in Norway", funded by Research Council of Norway. The material consists of nearly all individuals, about 4.7 million, residing in Norway per January 1st 2008. There are, however, some important exceptions. As it is only possible to analyze individuals born in or immigrating to Norway before 2008, those born or arrived after 2008 are not included in the material. Also, there are no data on individuals without a residence permit, e.g. undocumented migrants, and those residing in Norway for a shorter period of time, due to work, studies etc., are excluded.

By linking personal identification numbers, two registers are combined for the purpose of this project. Socio-demographic data (gender, age, immigrant background, income, educational qualifications, household size etc.) is obtained from Statistics Norway. These data are combined with information from the Norwegian Patient Registry about contacts with SHC services in the period from January 1st 2008 until December 31st 2011. It is therefore possible to describe the composition of patients in SHC, and how frequent such services are utilized. In addition, it provides the ability to analyze the amount of contacts with specialized health services among immigrants and non-immigrants. Except from the Nordic countries and the Netherlands, it is generally not possible to construct similar material by linking registers (Elstad, Finnfold and Texmon 2015, 24).

Norwegian Patient Registry

Registered contacts with both branches of SHC, somatic hospitals and mental healthcare services, during the four-year period are available. Patient contacts with somatic healthcare services include day treatment and surgery as well as hospitalizations, while contacts with mental healthcare include outpatient treatment and hospitalizations.

The following contacts will be analyzed: outpatient contacts and hospitalizations in somatic hospitals and outpatient mental healthcare (BUP/PHV) contacts. For BUP/PHV, very few individuals between 0 and 19 years were hospitalized: 0.2 per cent within the age group 0-9 and 1.7 per cent among those aged 10-19. For this reason, BUP/PHV hospitalizations are not included in the analyses for any age group.

Separate analyses will be conducted for the age groups 0-9 and 10-19. For mental healthcare outpatient contacts, contacts with BUP and PHV are combined. In the latter age group, adolescents aged 18 and 19 years have contacts with PHV and not BUP. During the four-year period a part of this group will have reached 18 years and are thus receiving mental healthcare services for adults (PHV).

3.3 Study population

The original data material covers 1,161,412 individuals, whereas 1,104,195 ethnic Norwegians, 17,290 immigrants and 39,927 Norwegian-born to immigrant parents. Statistics Norway (2016) defines “immigrants” as foreign-born individuals with two foreign-born parents and four foreign-born grandparents, who at some point have migrated to Norway. The term “Norwegian-born to immigrant parents” refers to an individual born in Norway to two foreign-born parents and four foreign-born grandparents. “Individuals with an immigrant background” is a collective term including both immigrants and Norwegian-born to immigrant parents. This thesis refers to individuals with a Norwegian background, born to either one or two non-immigrant parents, as non-immigrants or ethnic Norwegians.

Immigrants and individuals who are Norwegian-born to immigrant parents are referred to as either immigrants and descendants or first- and second-generation immigrants, respectively.

The data file classifies individuals by country origin into twenty different categories; eleven single countries and nine country regions. Single countries include Sweden, Poland, Bosnia, Russia, Somalia, Turkey, Sri Lanka, Iraq, Iran, Pakistan and Vietnam. Regions include

remaining Nordic countries except Sweden, remaining Western Europe except the Nordic countries, remaining Eastern European EU member countries (Czech Republic, Hungary, Romania, Latvia etc.), Serbia/Montenegro/Croatia, remaining Eastern Europe non-EU member countries (e.g. Ukraine and Belarus), remaining Africa, remaining Asia, USA/Canada/Australia/New Zealand and Latin America/ remaining Oceania.

This thesis' analyses encompass a subpopulation and the utilization patterns of individuals originating from Norway, Poland, Somalia, Iran, Pakistan and Vietnam are examined (n=1,138,041). The five latter groups are all represented among the ten largest immigrants groups in Norway as per January 1st 2008 (figure 1).

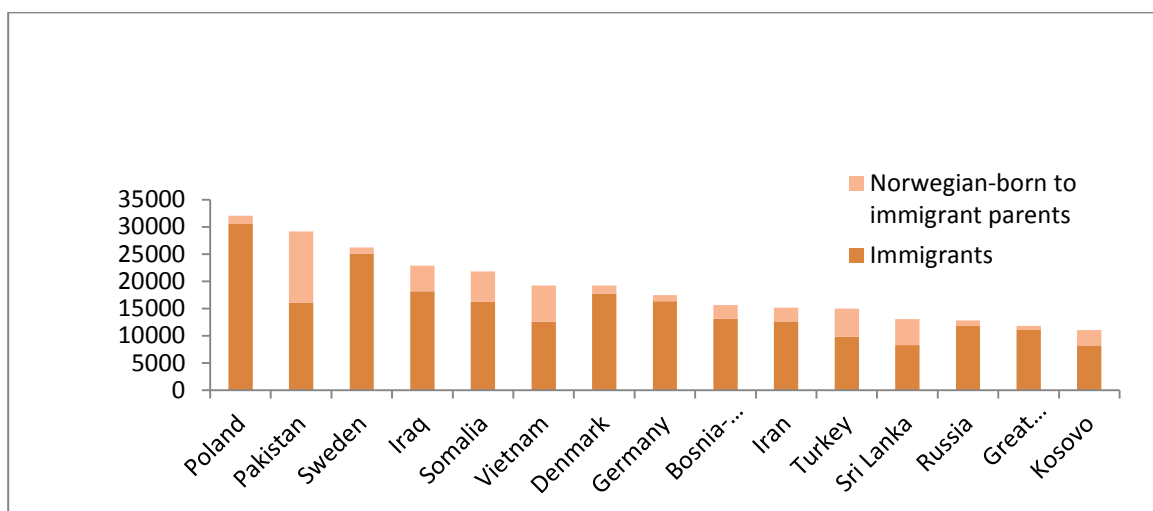


Figure 1. Immigrants and Norwegian-born to immigrant parents. January 1st 2008 (Statistics Norway 2008)

As discussed in the previous chapter, former research on health and healthcare utilization among young immigrants comprises mainly non-Western individuals. For this reason, it is considered relevant to hold results from the present study together with previous research on immigrant children and adolescents' health status, which is believed to justify the choice of a non-Western study population. First of all, the selected individuals represent large immigrant groups in Norway, during 2008-2011 as well as today. Also, studies referred to in the precedent chapter include findings on these specific groups, which is considered of interest when examining utilization patterns.

Despite internal differences within a country category, an analysis of single countries is thought to provide a more accurate picture of immigrants' utilization of healthcare services than an analysis of heterogeneous categories. For the same reason, the two immigrant

categories are examined separately for analyses of the proportion with at least one SHC contact in the four year period.

The data file classifies children and adolescents with a Norwegian background into one of four categories: Norwegian-born to two Norwegian parents (84.5 per cent), born abroad to two Norwegian parents (1.2 per cent), Norwegian-born to one immigrant and one Norwegian parent (8.6 per cent) and born abroad to one immigrant and one Norwegian parent (.9 per cent). For the purpose of the analyses, individuals with a “Norwegian” background includes all four categories.

3.4 Operational definitions of variables

The following section will describe the data preparation, computing and recoding of variables.

Dependent variables

Three discrete dependent variables are included in the analysis: somatic outpatient contacts, somatic hospitalizations and specialist mental healthcare outpatient contacts (PHV/BUP). Information about the number of contacts with all three branches of SHC was provided as two continuous variables for each category; separate for each year and for the total four-year period. For analysis, the latter variable is utilized.

A dichotomy was created for each dependent variable to provide an overview of the proportion of individuals with at least one admission, taking either the value of 1 (at least one contact) or 0 (no contacts). The variable *somatic outpatient contacts* was computed and recoded into a nominal variable with four categories indicating the number of outpatient contacts: no contacts, 1-4 contacts, 5-10 contacts and 11+ contacts.

Similar procedures were conducted for the variable *somatic hospitalizations*.

As described, outpatient contacts with BUP and PHV are analyzed together. First, the two variables *contacts with BUP* and *contacts with PHV* were collapsed into *contacts with BUP/PHV*. Additionally, a nominal variable was created for utilization frequency: no contacts, 1-10 contacts, 11-30 contacts and 31+ contacts. As the utilization patterns of specialist mental healthcare services differ somewhat from that of somatic healthcare, and more individuals had at least one contact compared to somatic healthcare, it is categorized differently.

Independent variables

Gender is measured as a dichotomous variables, males coded 0 and females 1. The *age* variable includes the categories 0-9 years, coded 0, and 10-19 years, coded 1.

Two categorical variables include information on country origin and immigrant category. For *country background*, six cases, as previously described, were selected and copied to a new data set. The variable *immigrant category* was operationalized as follows: four categories of non-immigrants (country background Norway), immigrants and Norwegian-born to immigrant parents. The variable was computed and recoded into three groups: Norwegians, immigrants and Norwegian-born to immigrant parents.

Measured as a continuous variable, *migration year* ranging from 1988 to 2007 was computed into the categorical variable *length of residence*, indicating the number of years spent in Norway per January 1st 2008. Length of residence was divided into four categories; 1988-1992, 1993-1997, 1998-2002 and 2003-2007, and later relabeled into 16-19 years, 11-15 years, 6-10 years and 0-5 years.

Information about the level of parental educational attainment was provided in identical categories for each parent: up to lower secondary school (referred to as primary school), basic upper secondary school, completed upper secondary school, first degree higher education and second degree higher education. A new variable indicating the level of *household education* was created by identifying the holder of the highest completed education in each household. In order to ease the presentation, it was computed into a dichotomous variable with the value 0 for those with a parental educational level corresponding to completed secondary education or lower, and 1 for children with high parental educational qualifications, that is, completed education from either university college or university. As depicted in

Table 1 and discussed under the “missing data” section, information on educational qualifications are lacking in quite a few cases, more pronounced among some immigrant groups, which is obviously a weakness when educational level is included as a predictor variable.

Finally, a set of dummy variables were created for the purpose of regression analysis, in addition to the dichotomous variables already referred described. One dummy variable was created for *descendants* (immigrants coded 0 and descendants 1), five *country origin* dummy variables were created for Poland, Somalia, Iran, Pakistan and Vietnam and four dummy

variables for *length of residency* (0-5 years, 6-10 years, 11-15 years and 16-19 years). Then, five interaction variables were created from the dummy variables *country origin* and *descendants*, i.e. Polish descendants, and five interaction variables combined *country origin* and *high education*, i.e. individuals originating from Poland with at least one highly educated parent.

3.5 Missing data

In general, the data set includes little missing values. An important exception is information on educational qualifications, where 0.6 percentage of the study population have no registered parental educational level. For the purpose of the analyses, missing data on education are excluded. There is some uncertainty regarding information on education. Some immigrant groups, e.g. Eastern European immigrants from recent EU countries, have a greater proportion of individuals with no education registered. Asylum seekers and refugees normally provide information on their educational background when arriving in Norway. Some immigrants have completed education from their home country, which are not considered equivalent to the Norwegian educational system and is thus a potential source of error (Elstad, Finnfold and Texmon 2015, 34).

3.6 Statistical methods and analysis

IBM SPSS Statistics version 24 for Windows was used for data preparing and analysis. First, descriptive statistics on the study population was carried out. Then, linear probability models and negative binomial regression were applied in order to assess whether country background, generational category, parental educational qualifications and length of stay seem to predict utilization of SHC services.

Descriptive statistics

Cross tables were created for providing an overview of the study sample. First, a table was constructed to illustrate the number of immigrants and descendants within each country group, and the distribution of age, gender and parental educational level, as well as length of stay for the immigrant category. Then, cross tables illustrating the proportion with at least one contact with one of the three branches of SHC in the period from 2008 until 2011 were set up. Additionally, the mean number of contacts and standard deviation was calculated.

OLS regression analysis

Linear probability models (LPM), i.e. Ordinary Least Square regression analysis (OLS), were run to examine whether there were differences in the probability of having at least one SHC contact in the four year period. Non-immigrants, i.e. ethnic Norwegians, were included as reference group. Multiple linear regression is a method for exploring how two or more independent variables affects the dependent variable, when the other independent variables are held constant. The model can be expressed as follows:

$$Y = b_0 + b_1 \times X_1 + b_2 \times X_2 + \dots + b_k \times X_k + e$$

where Y represents the dependent variable, b_0 (constant) denotes the mean value of Y when all units have the value of 0 on all independent variables, i.e. $X_1 = 0$, $X_2 = 0$ etc. b_1 estimates the increase in Y if X_1 increases with one unit while all other independent variables are held constant. Likewise, the parameter b_2 estimates the increase in Y if the variable X_2 increases by one unit and the remaining independent variables are unchanged. e represents the residual, i.e. the effect of all non-observed causal factors. This estimation method ensures that potentially confounding effects of the remaining independent variables on the relationship between Y and X_j are removed (Skog 2004, 261-262).

In a linear regression model, the OLS method aims to, on the background of a set of observations, minimize the sum of squared residuals from the regression line. In this way, the regression coefficient b_1 and the constant b_0 can be estimated. When all residuals are squared and summarized, a measure of how well the line fits the data is provided, i.e. the sum of squared errors (SSE) (Skog 2004, 222; Thrane 2017, 31).

It is advised that certain assumptions are met in order to conduct an OLS analysis, e.g. the presence of homoscedasticity, no perfect multicollinearity of independent variables and the regression should involve a continuous dependent variable. Homoscedasticity concerns the variance of residuals, that is, the variance should be equal at each level of the independent variable (Field 2009, 220). The author is well aware of the potentially statistical weaknesses of applying LPM when data violates quite a few of the assumptions for linear regression analysis. Utilizing this form of analysis on binary dependent variables is commonly dissuaded, and logistic regression analysis is considered more appropriate (e.g. Long 1997, 35). The choice of utilizing this form of regression analysis, however, is justified by a more intuitive interpretation of regression coefficients and hence an easier comprehension of

results. The parameters in the LPM, that is, linear regression applied to a binary outcome variable, is interpreted in the same manner as in a regular regression model, and an unit change in X results in the same increase in the probability, given that all other independent variables are held constant (ibid., 36). A study which applied logistic regression and OLS regression to common data sets with a binary coded outcome variable, found that the results did not differ substantially from each other, although logistic regression is suggested to be the method of choice when aiming to predict a probability with highest possible accuracy (Pohlmann and Leitner 2003). Nonetheless, acknowledged scholars in the field have argued that OLS regression may be as appropriate as logistic regression in these situations. This is due both to difficulties with the interpretation of odds ratio, as is the effect measure in logistic regression models, and the fact that coefficients cannot be compared across identical models and across groups, which is a possibility when using LPM. It is argued that, in many cases, fewer error might occur if OLS was chosen over logistic regression (Mood 2010; Mood, unpublished manuscript, 2017). On the background of empirical comparison it is argued that the violation of homoscedasticity, as described above, in reality has little influence on the results of significance tests in the two analytical approaches (Hellevik 2009).

Hierarchical LPM were run for the three branches of SHC under study. In addition to one binary outcome variable, multiple independent dummy variables were applied to the regression models, including age, gender, country variables, descendants and five interaction variables indicating descendants within each country group. In the result section, the linear probability model coefficient is additionally referred to as percentage points relative to the reference category.

Count data regression analysis

Count data, as is the basis for the present data analysis, refers, in its simplest form, to something which can be counted, e.g. the number of contacts with SHC. These data are acquired by registering the number of occurrences or events (Everett 2006, 96). As such, data are discrete and can exclusively take non-negative integer values. For this data type, a common analytical approach for is count data regression. There are two standard models, including Poisson regression and negative binomial regression (Thrane 2017, 243-244), both recognized as generalized linear models. In the data set utilized for this thesis, distributions of all three dependent variables included in the analyses are excessively right skewed (*figure x-*

kommer). In many cases, Poisson regression models are applied to studies on healthcare utilization (e.g. Chang et al. 2014; Abebe, Lien and Elstad 2017). For this study, data on the number of contacts with SHC are recognized by an overdispersion of zeros, that is, the majority of individuals had no such contacts in the period from 2008 until 2011. Normally, the negative binomial model is considered more appropriate and robust when dealing with overdispersion compared to Poisson regression, and when the variance exceeds the conditional mean. Negative binomial models take into account variations in the mean parameter for individuals in a population. The model includes an additional dispersion parameter, k , estimated by maximum likelihood (Lawless 1987; Cameron and Trivedi 2005, 676; Snijders and Bosker 2012, 318; Lee et al. 2012). For the response variables included in the present study, it is evident that standard deviation exceeds the mean, indicating that assumptions for negative binomial regression, i.e. variance > mean, are met (Table 2). Negative binomial regression was thus considered an adequate approach, and was applied in order to analyze the number of contacts with the three branches of SHC in the period from 2008 until 2011, according to parental educational level and length of stay.

The following sets of dummy variables were included as predictors: age, gender, five country variables, high education and four variables indicating length of stay. Additionally, interaction variables for country background \times high education and country background \times length of stay were applied. Each model included one continuous response variable indicating the number of contacts with SHC in the period from 2008 until 2011

Coefficients are reported as incidence rate ratios (IRRs) with 95% confidence interval (CI), and are mainly referred to as percentage point differences in IRR compared to the reference category. Incidence refers to the number of new cases in a given period of time, e.g. the number of new occurrences of a certain disease. As for this thesis, IRR expresses the number of visits to SHC in the four year period.

When analyzing SHC utilization according to parental educational level, first and second-generation immigrants within each country category were included in the “immigrant” group and compared to the reference group consisting of ethnic Norwegians with low educated parents. For analyses on the effect of length of stay on SHC utilization, Somali, Iranian, Pakistani and Vietnamese immigrants were compared to Polish immigrants. For an overall comparison, immigrants pooled together were also compared to ethnic Norwegians.

3.7 Significance testing

Significance testing refers to the examination of whether possible differences between samples could be generalized to the respective population, such as differences between immigrant groups. Normally, a null hypothesis is formulated (H_0), suggesting that there are no differences between the samples, and an alternative hypothesis (H_a) that there are in fact differences. The significance level specifies the level of probability one is willing to accept regarding the possibility of draw the wrong conclusion when H_0 is actually correct, that is, falsely reject the null hypothesis. For social sciences, a significance level of 5 per cent is commonly applied, indicating the researchers' acceptance of 5 per cent risk of falsely rejecting the null. Results from significance tests are reported as probability values, i.e. p -values, ranging from 0 to 1. The confidence interval (CI) estimates an interval of which the mean population, with a certain probability, is located, on the background of sample size. In social sciences, the confidence interval is normally set to 95 per cent (Johannessen, Tufte and Christoffersen 2011, 336-347). For the present study, a significance level of $p \leq .05$ was adapted.

As the data material covers practically the whole population, it may not appear to be immediate reasons for applying significance tests. Significance testing is mainly conducted when a study sample is randomly drawn from a population, and one want to test whether results are likely to apply to the population as a whole. When the entire population is understudy, the issue of generalizability is not as prominent. Despite this, it is argued that researchers utilizing data on the whole population should conduct significance testing (Skog 2004, 225), as e.g. utilization rates may differ from one period to the next. Registry studies, similar to other study types, may include measurement errors and random variation (Hoem 2008; Fekjær 2011, 191), and it is thus considered relevant to include probability theory models corresponding to those utilized for sample studies (Skog 2004, 121). Moreover, it is suggested that statistical generalization is relevant whenever the study sample is not identical to other samples studied on other time points or when the methodological approaches differ (Midtbø 2007, 68). Testing for significance when study populations are large, however, is not unproblematic, as will be further discussed in Chapter 5.

In multiple regressions, R squared, or the coefficient of determination is commonly utilized for examining how well the regression models fit the data, that is, it measures the amount of variation in the dependent variable which could be explained by the independent variables

(Skog 2004, 224). Also, it is crucial to examine the results' statistical significance, that is, the significance value which suggests the likeliness that observed variations in the data material is due to chance. As for regression models, given a set significance level at $p \leq 0.05$, a value above 0.05 indicates that the model does not statistically significant predict the dependent variable.

Both R^2 and test of the models' overall significance will be reported in the result section.

3.8 Ethics and data protection

The research project "Use of hospitals and other specialized medical services among immigrants and non-immigrants in Norway" has been approved by the Norwegian Data Protection Authority and the Regional Committee for Medical and Health Research Ethics (REC South East). As such, the author was not required to apply for an additional approval for this sub-study.

All information is unidentified and anonymized. The unique personal identification number, assigned to all registered inhabitants in Norway, was used for linking data, but subsequently deleted from the data file. Variables that could potentially be used for identifying individuals have either been deleted or recoded into broad categories, as stipulated by the Norwegian Data Protection Authority.

Information about age is provided in large categories; 0-9 years and 10-19 years. As for country background, single countries are collapsed into regions if the number of individuals residing from a specific country is too small. In this way, privacy is granted, but the possibility of conducting more detailed analyses is eliminated (Elstad, Finnvoid and Texmon 2015, 26).

4. Results

The main objective of this study was to examine whether first and second-generation immigrant children and adolescents from five country groups differ in terms of SHC utilization, as compared to non-immigrants. Additionally, the purpose was to assess whether parental educational qualifications and children's and adolescents' length of residency seem to influence on utilization. This section will first provide an overview of the study population. Then, descriptive tables illustrating contacts with three branches of SHC are presented, that is, the proportion of individuals with at least one contact in the period from 2008 until 2011, and the mean number of contacts within the same period. Thereafter, results from linear probability models, applied in order to analyze the proportion with at least one SHC contact, are reported. Finally, a presentation of results from negative binomial regression analysis on SHC utilization according to parental educational level and length of stay in Norway is provided.

4.1 Descriptive statistics of the study population

As depicted in Table 1, ethnic Norwegian children and adolescents constituted 97 % of the total study sample, immigrants 0.9 % and descendants 2.1 %, as per January 1st 2008. It can be observed that the number of first and second-generation immigrants as well as the age distribution differs considerably between immigrant groups.

Among descendants, Pakistani second-generation children and adolescents formed the largest group in the sample followed by Vietnamese and Somali descendants. As for immigrants, Somalis constituted the largest group with nearly twice as many individuals as Poland, the second largest group. In the Polish group, immigrants were almost twice as many as descendants. Regarding age distribution, both the Iranian and Vietnamese group had a clear overweight in favour of the oldest children. Among descendants, the Polish, Somali and Iranian group had considerably more individuals aged 0 to 9 years.

As for educational qualifications, Iranian descendants was the only group with a parental educational level corresponding to that of ethnic Norwegians, i.e. about 50 per cent had completed higher education. Particularly low educational levels are seen among Somali and Vietnamese immigrants, and except from Poles in both generational categories and Iranian descendants, no group had more than 20 per cent of individuals with at least one highly educated parent. However, as mentioned in the previous chapter, missing information is an issue, indicating that the proportion with at least one highly educated parent is greater than

reported in the table. When it comes to length of residency, it is confirmed that Poles, and to some extent Somalis, are relatively recent immigrant groups.

Table 1 Descriptive statistics of the study population

Country origin	Immigrants (N= 9,957; 0.9 %)						Descendants (N= 23,889; 2.1 %)				
	Norway (% = 97)	Poland	Somalia	Iran	Pakistan	Vietnam	Poland	Somalia	Iran	Pakistan	Vietnam
<i>N</i>	1,104,195	2,291	4,355	1,508	1,228	575	1,129	5,563	2,474	8,903	5,820
<i>Age(%)</i>											
0-9 years	48.1	53.7	32.6	15.6	27.0	15.8	69.7	84.0	65.0	51.2	51.5
10-19 years	51.9	46.3	57.4	84.4	73.0	84.2	30.3	16.0	35.0	48.8	48.5
<i>Male(%)</i>											
0-9 years	51.1	49.7	52.3	50.4	47.0	50.5	51.3	52.2	52.3	50.7	51.1
10-19 years	51.4	53.4	51.7	52.9	51.9	51.9	48.0	51.9	51.1	50.9	51.5
<i>Parental educational qualifications (%)</i>											
Higher education	49.9	31.5	10.9	19.5	17.3	6.3	53.9	16.6	49.4	18.7	20.1
Missing information	0.2	25.1	18.0	10.4	18.1	21.9	9.80	5.90	1.70	4.7	1.7
<i>Years in Norway (%)</i>											
0-5	-	88.6	54.4	25.3	36.6	54.5	-	-	-	-	-
6-10	-	6.8	36.4	48.7	34.9	30.2	-	-	-	-	-
11-15	-	3.3	7.3	17.8	17.9	9.9	-	-	-	-	-
16-19	-	1.4	2.0	8.2	10.7	5.4	-	-	-	-	-

Table 2 presents the mean number of contacts with three branches of SHC from 2008-2011, both genders and age groups combined and separate for ethnic Norwegians, immigrants and descendants.

The mean number of hospitalizations ranged from 0.12 overnight stays among Vietnamese immigrants to 0.26 among ethnic Norwegians and Somali descendants, indicating a relatively even distribution of overnight stays. Numbers for somatic outpatient contacts varied from 1.06 among Vietnamese immigrants and 2.55 among Pakistani descendants. For specialist mental healthcare, Somali descendants had the lowest number of contacts, i.e. an average of 1.02 consultations. Additionally, few contacts are observed among Pakistanis and Vietnamese in

both generational categories. The highest number of average PHV/BUP consultations is seen among Iranian descendants and immigrants, that is, 4.60 and 4.47 contacts, respectively, indicating more contacts than non-immigrants.

Table 2 Mean numbers of contacts with three branches of SCH, 2008-2011, both genders and age groups

Country origin	¹ Hospitalizations		² Outpatient		³ PHV/BUP	
	Mean	⁴ SD	Mean	SD	Mean	SD
<i>Norway</i>	0.26	1.018	2.21	5.477	3.50	19.553
<i>Poland</i>						
Immigrants	0.14	0.566	1.35	3.383	1.87	11.61
Descendants	0.21	0.769	1.86	5.018	2.42	17.88
<i>Somalia</i>						
Immigrants	0.25	0.775	2.10	4.35	1.82	14.597
Descendants	0.26	0.9	2.25	5.655	1.02	9.234
<i>Iran</i>						
Immigrants	0.22	0.649	2.11	7.755	4.47	26.481
Descendants	0.21	1.032	2.21	5.185	4.60	23.538
<i>Pakistan</i>						
Immigrants	0.18	0.749	1.96	4.857	1.39	8.213
Descendants	0.23	0.933	2.55	6.574	1.73	14.509
<i>Vietnam</i>						
Immigrants	0.12	0.409	1.06	2.454	1.43	12.147
Descendants	0.15	0.671	1.63	5.103	1.46	10.481
Immigrants total	0.20	0.694	1.85	4.837	2.16	15.752
Descendants total	0.21	0.873	2.19	5.831	1.83	14.058

¹Somatic hospitalizations ²Somatic outpatient contacts ³Specialist mental healthcare outpatient contacts ⁴Standard deviation

Children originating from Vietnam had particularly low utilization rates of both somatic and mental SHC, as compared to the remaining sample.

When we look at immigrants and descendants as a whole, the mean number of contacts was lower compared to non-immigrants for all three SHC branches. The numbers of hospitalizations are practically identical among the two generational categories, while descendants had more somatic outpatient contacts and immigrants more contacts with PHV/BUP on average.

Table 3 illustrates the proportion of individuals between 0 and 9 years with at least one contact with SHC services in the period 2008-2011.

Table 3 Proportion of individuals in the age group 0-9 years with at least one SHC contact 2008-2011 (percentage)

Country origin	¹ Hospitalization		² Outpatient		³ BUP	
	Male	Female	Male	Female	Male	Female
<i>Norway</i>	14.9	11.8	51.4	45.1	9.2	5.2
<i>Poland</i>						
Immigrants	11.0	8.4	39.6	35.9	6.4	3.1
Descendants	16.3	12.3	50.7	44.4	6.4	3.1
<i>Somalia</i>						
Immigrants	14.7	13.3	50.7	45.2	5.9	2.8
Descendants	17.8	14.1	55.8	44.7	4.0	2.1
<i>Iran</i>						
Immigrants	10.9	10.3	50.4	37.6	11.8	3.4
Descendants	13.8	10.8	54.9	49.5	10.2	6.8
<i>Pakistan</i>						
Immigrants	12.8	8.5	48.1	42.6	4.5	6.3
Descendants	15.5	10.7	55.7	44.2	5.6	2.8
<i>Vietnam</i>						
Immigrants	6.5	6.7	39.1	31.1	2.2	6.7
Descendants	12.5	8.8	46.9	37.6	5.5	2.4
All immigrants	12.7	10.5	46.1	40.5	6.3	3.4
All descendants	15.5	11.5	53.6	43.6	5.6	2.9

¹Somatic hospitalizations ²Somatic outpatient contacts ³Specialist mental healthcare outpatient contacts

The numbers indicate that in the youngest age group, males had more contacts with all three branches of SHC compared to females. With few exceptions, this is evident among children originating from all countries in the study sample and regardless of their status as immigrants or descendants. Overall, it is evident that Vietnamese immigrants of both genders utilized SHC considerably less than all other groups in the four year period. This pattern is less prominent among descendants within the same country category, except from contacts with BUP, where a very low proportion of descendants had at least one contact.

The proportion of males who received inpatient care during the four-year period varied considerably with country background. In all groups, the proportion of individuals with at least one overnight stay was higher among descendants. Among descendants from Poland,

Somalia and Pakistan, a greater share was hospitalized compared to boys without an immigrant background. Among Vietnamese immigrant boys, the proportion with at least one hospital stay was low compared to most other groups (6.5 per cent), and less than half compared to Somali descendants (17.8 per cent), the group with most overnight stays. Among females, Somali descendants had the highest proportion of individuals with at least one hospitalization.

About half of males in each category, and a somewhat lower proportion of females, had at least one somatic outpatient contact during the four-year period. Among immigrants of both genders from Poland and Vietnam, however, 10-15 per cent less had at least one outpatient contact compared to the remaining groups. For all country groups and both genders, a greater proportion of descendants had at least one somatic outpatient contact compared to immigrants. Male descendants from Somalia, Iran and Pakistan were more likely to have at least one somatic outpatient contact compared to their non-immigrant counterparts. Female immigrants from Poland, Vietnam and Iran as well as Vietnamese descendants had a smaller proportion with at least one outpatient contact compared to the remaining sample. Among female Iranian descendants, the proportion was high in comparison and also higher than among non-immigrants.

For outpatient contacts with BUP among males, only Iranian immigrants and descendants had a larger proportion of individuals with at least one contact compared to ethnic Norwegian children, 11.8 per cent and 10.2 per cent, respectively. The lowest proportion of individuals with at least one contact with specialist mental healthcare is observed among male Vietnamese immigrants (2.2 per cent). Relatively few females were in contact with BUP compared to males in the youngest age group. Among girls, particularly low proportions with at least one specialist mental healthcare contact are seen among Poles and Somalis in both generational categories, and among Pakistani and Vietnamese descendants. Compared to ethnic Norwegian girls, immigrants from Vietnam and Pakistan, as well as Iranian descendants had a greater share with one or more BUP contacts. Regarding differences between immigrants and descendants within each group, the picture differs somewhat from somatic healthcare. Among all groups, only Pakistani and Vietnamese male descendants and Iranian female descendants had higher proportions of individuals with at least one contact than immigrants with similar country background. All the remaining groups, except Poland, had an overweight of immigrants seeking mental healthcare compared to descendants.

If we look at immigrants and descendants irrespective of country group, it is evident that second-generation immigrants as a whole had higher proportions with one or more hospitalizations and somatic outpatient contacts. For specialist mental healthcare, the proportions are somewhat higher among first-generation immigrants.

Table 4 shows the proportion of adolescents (10-19 years) with at least one contact with SHC from 2008 until 2011. Among adolescents, a different picture emerges regarding gender and contacts with SHC. With few exceptions, a greater proportion of females had at least one contact compared to males. This is true for both somatic healthcare services and contacts with PHV/BUP.

Table 4 Proportion of individuals in the age group 10-19 years with at least one SHC contact 2008-2011 (percentage)

	¹ Hospitalizations		² Outpatient		³ PHV/BUP	
Country origin						
<i>Norway</i>	14.7	18.8	49.6	52.9	11.9	14.6
<i>Poland</i>						
Immigrants	9.3	13.0	40.4	39.1	7.8	9.7
Descendants	9.1	17.4	37.2	55.6	7.9	10.7
<i>Somalia</i>						
Immigrants	11.3	19.5	48.7	49.7	7.5	6.3
Descendants	8.2	9.6	43.9	37.9	7.8	3.5
<i>Iran</i>						
Immigrants	12.6	19.7	48.1	54.6	12.0	16.9
Descendants	12.7	13.2	54.3	51.5	13.1	22.5
<i>Pakistan</i>						
Immigrants	8.6	14.6	49.2	43.2	6.9	8.1
Descendants	12.5	12.6	53.4	42.6	6.5	6.5
<i>Vietnam</i>						
Immigrants	7.6	12.0	29.5	38.6	5.2	5.2
Descendants	8.9	9.3	37.5	34.0	4.9	8.0
All immigrants	10.6	17.3	45.9	47.3	8.2	9.0
All descendants	10.9	11.6	47.1	40.9	6.8	8.3

¹Somatic hospitalizations ²Somatic outpatient contacts ³Specialist mental healthcare outpatient contacts

Some tendencies are observed when all categories are examined together. Adolescents with a Vietnamese background had generally low utilization rates of SHC services, among both genders and generational categories, compared to all other groups. Relative to the remaining groups, except from Iran, ethnic Norwegians had generally high utilization rates for all three categories.

As for hospitalizations among adolescents, distribution appears relatively even, also between immigrants and descendants in each group. In the study population, Somali and Iranian female immigrants had the greatest proportion of individuals with at least one overnight stay (about 20 per cent each), while the lowest is observed among Vietnamese and Somali female descendants, i.e. 9.3 per cent and 9.6 per cent, respectively. Among males, the share of Iranian and Somalian immigrants was close to that of non-immigrants (little less than 20 per cent), while low levels are observed among Vietnamese immigrants (7.6 per cent). When it comes to first and second-generation immigrants in each group and their amount of hospitalizations, there are no clear tendencies. Whether immigrants or descendants had the greatest share of overnight stays varies with country background. For hospitalizations in the four-year period, the spread between generations is somewhat greater for females compared to males. In the Somali female group, twice as many immigrants were hospitalized at least once compared to descendants.

When it comes to somatic outpatient contacts in the same period, the proportion with at least one contact ranged from 29.5 per cent among Vietnamese male immigrants to 55.6 per cent among Polish female descendants. Only among females in the Polish group did descendants have a greater proportion of contacts compared to immigrants. Among males, descendants in the Iranian and Pakistani groups had a greater share of individuals with at least one outpatient contact than individuals without an immigrant background. The share of male Iranian descendants with at least one outpatient contact was nearly 20 per cent higher than among male Vietnamese immigrants. The distribution of contacts was more or less evenly distributed between generational categories.

Among both genders, Iranian immigrants and descendants had the greatest proportion of individuals with one or more BUP/PHV contacts, slightly more than the non-immigrant group. In the Vietnamese group, i.e. immigrants of both genders and male descendants, very few were in contact with specialist mental healthcare compared to the majority of other groups. As for females and the proportion with at least one contact with BUP/PHV, there are some distinct findings. Among Somali descendants, only 3.5 per cent had such contacts, while the corresponding number for Iranian descendants is 22.5 per cent. Also Iranian immigrants had a greater proportion with at least one contact as compared to adolescents without an immigrant background. Among descendants, low proportions with BUP/PHV contacts are seen among Pakistani descendants. For all groups, there are no considerable discrepancies

between immigrants and descendants regarding the share of individuals with at least one contact.

When country background is excluded, it is evident that both immigrants and descendants as a whole utilized less of all types of SHC between 2008 and 2011 compared to non-immigrants. Among females, the proportion of immigrants with at least one hospitalizations was about five per cent higher than for descendants, while about 7 per cent more had at least one somatic outpatient contact compared to descendants. For specialist mental healthcare, immigrants of both genders had a higher share with one or more contacts compared to descendants.

Appendix A provides an overview of distribution of contacts for the three SHC branches, in four categories: 0, 1-4, 5-10 and 11+ contacts, respectively, for the two age categories.

Overall, contacts appear to be more or less similarly distributed among individuals with one or more contacts, indicating small differences between groups, across gender, age groups and generational category. As such, the main variations between country groups was related to the proportion with at least one contact with somatic and specialist mental healthcare.

Linear probability models

Table 5, 6 and 7 report the results from linear probability models. In order to examine whether there were statistically significant differences between ethnic Norwegians and first and second-generation immigrants, the proportion who had at least one hospitalization in the four year period was analyzed. For all linear probability models, the reference categories include ethnic Norwegians, males and age group 0-9 years.

For *hospitalizations*, two linear probability models were compared, whereas the latter included interaction variables for descendants from each country category. The model summary in SPSS¹ informs that the second model is statistically significant ($p < 0.001$). R^2 implies that the model is able to explain 0.2 per cent of variations in the data. A small, but significant effect of gender is observed, and shows that a slightly larger proportion of females were hospitalized compared to males. Also, there are statistical significant age differences, indicating that the oldest age group had a larger proportion with at least one hospitalization, that is, a linear probability coefficient of 0.032, i.e. 3.2 percentage points higher.

¹ Not included

In the second model, country background, e.g. Somalia, refers to first-generation immigrants. When controlling for age and gender, some significant variations between countries are observed.

Table 5 Hospitalizations in the period 2008-2011, linear probability models

	Model 1			Model 2		
	B	¹ p	95% CI	B	p	95% CI
Constant	0.132	<0.001***	0.131/0.133	0.132	<0.001***	0.131-0.133
² Gender	0.006	<0.001***	0.004/0.007	0.006	<0.001***	0.004-0.007
³ Age	0.032	<0.001***	0.031/0.033	0.032	<0.001***	0.031-0.033
⁴ Poland	-0.032	<0.001***	-0.044/-0.020	-0.046	<0.001***	-0.061/-0.032
Somalia	0.002	<0.001***	-0.005/0.009	-0.008	0.160	-0.018/0.003
Iran	-0.016	<0.001***	-0.027/-0.005	-0.01	0.271	-0.028/0.008
Pakistan	-0.024	<0.001***	-0.031/-0.017	-0.045	<0.001***	-0.065/-0.025
Vietnam	-0.052	<0.001***	-0.061/-0.044	-0.069	<0.001***	-0.098/-0.040
⁴ Descendants						
Poland				0.043	<0.001***	0.017/0.068
Somalia				0.017	<0.001***	0.003/0.031
Iran				-0.01	0.403	-0.033/0.013
Pakistan				0.024	0.028*	0.003/0.045
Vietnam				0.018	0.241	-0.012/0.049
R ²	0.002			0.002		

1 p=p-values; *** <0.001, **<0.01, *<0.05, 2 Reference males, 3 Reference age group 0-9, 4 Ethnic Norwegians reference category for all groups

The coefficient for Pakistan, i.e. minus 0.045, for Poland, minus 0.046, and for Vietnam, minus 0.069, indicates that the proportion with at least one hospitalization was 4.5 percentage points, 4.6 percentage points and 6.9 percentage points, respectively, lower as compared to non-immigrants. As for differences between immigrants and descendants originating from the same country, it is expressed by the linear probability models coefficient for descendants. It is observed that for Poles, the proportion of descendants with at least one overnight stay was 4.3 percentage points higher compared to immigrants. Correspondingly, for Somali and Pakistani descendants the proportion was 1.7 and

2.4 percentage points higher, respectively. In the Iranian and Vietnamese groups, there are small differences suggesting that more descendants had at least one contact as compared to immigrants, but differences are not statistically significant.

In order to compare descendants to ethnic Norwegians, the linear probability coefficients for e.g. Poland and Polish descendants were added together, i.e. minus 0.046 + 0.043 = minus 0.003, which implies a very small difference of second-generation Poles compared to ethnic Norwegians. Correspondingly, among second-generation Pakistanis the proportion was 2.1 percentage points lower, and for second generation Somalis slightly higher, i.e. 0.9 percentage points compared to ethnic Norwegians. For Iranian and Vietnamese descendants there is a negative, but not statistically significant effect.

For *somatic outpatient consultations*, as for hospitalizations, two linear probability models were compared (Table 6). The first model was included in the second, in order to decide which model fitted the data better. For model 2, which additionally contained second-generation immigrants according to country background, the *p*-value (<0.001) indicates that the larger model explains variations in the outcome variable better than the first. The R² value, however, suggests that only 0.1 per cent of differences in the data are explained by each model.

Table 6 Somatic outpatient contacts in the period 2008-2011, linear probability models

	Model 1			Model 2		
	B	¹ <i>p</i>	95% CI	B	¹ <i>p</i>	95% CI
Constant	0.492	<0.001***	0.490/0.493	0.492	<0.001***	0.490/0.493
Gender	-0.015	<0.001***	-0.017/-0.013	-0.015	<0.001***	-0.017/-0.013
Age	0.027	<0.001***	0.026/0.029	0.028	<0.001***	0.026/0.029
Poland	-0.080	<0.001***	-0.097/-0.063	-0.110	<0.001***	-0.131/-0.090
Somalia	-0.006	0.259	-0.016/0.004	-0.014	0.058	-0.029/0.000
Iran	0.017	0.032	-0.24/0.011	-0.007	0.591	-0.032/0.018
Pakistan	-0.011	0.026	-0.059/-0.029	-0.044	0.002**	-0.072/-0.016
Vietnam	-0.111	<0.001***	-0.124/-0.099	-0.167	<0.001***	-0.207/-0.126
Descendants						
Poland				0.092	<0.001***	0.056/0.127
Somalia				0.016	0.124	-0.004/0.035
Iran				0.039	0.018*	0.007/0.071
Pakistan				0.037	0.014*	0.008/0.067
Vietnam				0.061	0.006**	0.018/0.103
R ²	0.001			0.001		

¹*p*=*p*-values; ***<0.001, **<0.01, *<0.05

As for first-generation immigrants compared to non-immigrants, we see that a lower proportion within each immigrant group had at least one somatic outpatient contact, however not statistically significant for Somalis and Iranians. For Poles, it is implied that the proportion with at least one contact was 11.0 percentage points lower compared to ethnic Norwegians, 4.4 percentage points lower for Pakistanis and as much as 16.7 percentage points lower for Vietnamese immigrants.

The linear probability model coefficient for the interaction variables (country background \times descendants) expresses differences in utilization among descendants relative to immigrants in each country group. We see that the proportion with at least one somatic outpatient contact in the four year period is higher among descendants in all country groups, although not statistically significant for Somalia. In the Polish group, the proportion with at least one contact was 9.2 percentage points higher among descendants compared to immigrants, and 6.1 percentage points higher for descendants in the Vietnamese group. For the Iranian and Pakistani groups, the proportion among descendants with at least one contact was about 4 percentage points higher compared to immigrants, and for the Somali group slightly higher, although non-significant.

In order to compare descendants to non-immigrants, calculations similar to the case of hospitalizations were carried out. Such that, in order to find the linear probability coefficient for Vietnamese descendants, -0.167 was added to 0.061, indicating that the proportion among Vietnamese descendants was with at least one somatic outpatient was 10.6 percentage points (i.e. a linear probability model coefficient of -0.106) lower compared to ethnic Norwegians. For second-generation Poles and Pakistanis, the proportion with at least one somatic outpatient consultation was slightly, but statistically significant, lower compared to ethnic Norwegians.

For the analysis of contacts with *specialist mental healthcare*, two linear probability models were set up in order to evaluate whether the inclusion of five interaction variables, i.e. second generation immigrants within each country group, statistically improved the models ability to explain differences in mental SHC utilization (Table B1). The p -value for the second model ($p = 0.325$) indicates that model 1, which does not differentiate on immigrants and descendants, is sufficient for explaining differences in the outcome variable. Thus, it cannot be concluded that first and second-generation immigrants differ statistically when it comes to specialist

mental healthcare contacts, and model 2 is excluded. The R^2 value of 0.001 suggests that 0.1 per cent of data variations can be explained by the independent variables included.

Table 7 Outpatient contacts with PHV/BUP 2008-2011, linear probability model

	B	¹ p	95% CI
Constant	0.075	<0.001***	0.074/0.076
² Gender	-0.005	<0.001***	-0.006/-0.004
³ Age	0.059	<0.001***	.0.058/0.060
⁴ Poland	-0.033	<0.001***	-0.043/-0.023
Somalia	-0.049	<0.001***	-0.055/-0.043
Iran	0.019	<0.001***	0.009/0.028
Pakistan	-0.048	<0.001***	-0.054/-0.042
Vietnam	-0.052	<0.001***	-0.059/-0.045
R^2		0.001	

¹p=p-values; ***<0.001, **<0.01, *<0.05 ²Ref. Males ³Ref. 0-9 years ⁴Ethnic Norwegians ref. for all country backgrounds

As such, Table 7 reports utilization among the five immigrant groups, first and second generation pooled together, relative to ethnic Norwegians. It can be observed that the proportion with at least one specialist mental healthcare contact was 5.2 percentage points higher among the oldest age group, and that the proportion was slightly lower among females, i.e. minus 0.5 percentage points. As for variations between country groups, holding age and gender constant, it is implied that among all groups, except for Iran, the proportion was lower than for ethnic Norwegians, ranging from 5.2 percentage points (country background Vietnam) to 3.3 percentage points (country background Poland) lower. Additionally, among the Somali and Pakistani group, the proportion with at least one specialist mental healthcare contact was nearly 5 percentage points lower compared to non-immigrants. In comparison, the linear probability models coefficient for Iran indicates a proportion which was 1.9 percentage points higher than for non-immigrants.

4.2 SHC utilization according to parental educational level

This section will present findings of SHC utilization in relation to parental educational qualifications, for six country groups: Norway, Poland, Somalia, Pakistan, Iran and Vietnam. In order to limit the number of significance tests, first and second-generation immigrants are analysed together. As such, Somali immigrants, for instance, refer to all individuals with a Somali background, born either in Norway or abroad. However, the variable “descendants” is included as an explanation variable in all three regression models in order to give an impression of the data material, i.e. examine whether an overall difference can be observed among descendants and immigrants, all country groups pooled together.

Utilizing negative binomial regression analysis, the number of contacts with three branches of SHC in the period 2008-2011 were modelled. Ethnic Norwegians are included as the reference group, i.e. $IRR = 1$.

In order to assess regression models' explanatory power, two tables from the SPSS output were examined². The “Value/df” in the Goodness of fit table was > 1 , indicating overdispersed data, and thus, the assumption for negative binomial regression analysis is not violated. The Omnibus test, i.e. a likelihood ratio test, was examined in order to consider whether the combination of predictor variables contributed to a statistically significant improvement of the model, compared to an intercept-only, i.e. null, model. *P*-values for the models on hospitalizations, somatic outpatient contacts and contacts with specialist mental healthcare were all statistically significant at the <0.001 level, implying that all models were more appropriate as compared to an intercept-only model (Lærd Statistics 2017).

Table 8 provides an overview of results from negative binomial regression analysis of the number of contacts in the four year period, including three models. We see a clear age effect for PHV/BUP, in that IRR for the oldest children ($= 1.928$) was almost twice as high compared to the youngest children. For gender, it can be observed that girls had an overall higher number of overnight stays, but somewhat less somatic outpatient contacts and PHV/BUP consultations. Results indicate that, overall, all immigrant groups differed significantly from ethnic Norwegians (with low parental education) when it came to hospitalizations, somatic outpatient contacts and contacts with PHV/BUP. The only exception

² Not included

is the number of contacts with PHV/BUP among individuals with an Iranian background, with an IRR about 12 percentage points higher compared to non-immigrants. In comparison, the IRR for Somalis, Vietnamese and Pakistanis was about one third of that of the reference group, while about half for Poles, for visits to specialist mental healthcare. For somatic outpatient consultations and hospitalizations, Poles and Vietnamese had particularly few contacts compared to non-immigrants.

As for the main objective, utilization of SHC according to parental educational level, we see that among ethnic Norwegians, children of highly educated parents had less contacts with all three branches of SHC compared to children of low educated parents, particularly evident for PHV/BUP. The interaction effect of high education and country background expresses internal differences within immigrant groups, e.g. the interaction effect of high education and Vietnamese background is 1.274, indicating that the IRR of overnight stays for Vietnamese immigrants with highly educated parents was 27.4 percentage points higher compared to their peers with low educated parents. For the two remaining SHC services, Vietnamese children with high parental educational level had more contacts, particularly for specialist mental healthcare (IRR = 2.146). As for Somalis, children of highly educated parents had significantly more contacts with all three services. For children of Polish and Pakistani parents with high education, the IRR for contacts with PHV/BUP was nearly 50 percentage points higher compared to children of low educated parents. For Iranian immigrants, the model indicate a certain positive effect of high parental education. However, the uncertainty in estimates is sufficiently large in order to say that the effective is positive when it comes to hospitalizations and PHV/BUP contacts. Thus, no statistical conclusions should be drawn. The IRR for somatic outpatient contacts, however, were about 20 percentage points higher among children of highly educated parents from Iran ($p = <0.001$).

Table 9 presents IRR as the effect of combined factors, that is, the IRR factor for a given country background \times the factor of high education \times the combined effect of country background and high education. Such that, for instance, the IRR of hospitalizations for Somali immigrants with high parental education is the product of IRR for Somalia (0.761) \times high education (0.748) \times the interaction factor between Somalia and high education (1.276) \approx 0.726. This indicates that IRR for Somalis with high education is about 27.0 percentage points lower compared to the reference group, that is, ethnic Norwegians with low parental education.

Table 8 Negative binomial regression analyses of number of SHC visits 2008-2011

	¹ Hospitalization			² Outpatient			³ PHV/BUP		
	⁴ IRR	⁵ P	95% CI	IRR	p	95% CI	IRR	p	95% CI
⁶ Norway	1			1			1		
Poland	0.525	<0.001***	0.455/0.605	0.614	<0.001***	0.573/0.657	0.515	<0.001***	0.483/0.550
Somalia	0.761	<0.001***	0.712/0.813	0.826	<0.001***	0.798/0.855	0.320	<0.001***	0.309/0.332
Iran	0.682	<0.001***	0.615/0.757	0.796	<0.001***	0.754/0.840	1.123	<0.001***	1.068/1.181
Vietnam	0.411	<0.001***	0.372/0.455	0.547	<0.001***	0.521/0.574	0.305	<0.001***	0.291/0.321
Pakistan	0.635	<0.001***	0.586/0.689	0.910	<0.001***	0.873/0.948	0.368	<0.001***	0.352/0.384
⁷ High education,	0.748	<0.001***	0.741/0.754	0.870	<0.001***	0.866/0.874	0.620	<0.001***	0.617/0.622
⁸ Gender	1.101	<0.001***	1.092/1.110	0.989	<0.001***	0.985/0.993	0.895	<0.001***	0.891/0.899
⁹ Age	1.200	<0.001***	1.190/1.210	1.045	<0.001***	1.040/1.049	1.928	<0.001***	1.919/1.936
¹⁰ High education									
Poland	1.205	0.075	0.981/1.480	1.150	0.004**	1.044/1.266	1.480	<0.001***	1.349/1.623
Somalia	1.276	<0.001***	1.120/1.454	1.124	<0.001***	1.048/1.205	1.138	0.002**	1.050/1.234
Iran	0.995	0.951	0.845/1.172	1.215	<0.001***	1.122/1.314	1.043	0.260	0.969/1.123
Vietnam	1.274	<0.001***	1.066/1.523	1.322	<0.001***	1.222/1.430	2.146	0.000***	1.981/2.324
Pakistan	1.294	<0.001***	1.147/1.460	1.097	<0.001***	1.033/1.166	1.472	0.000***	1.378/1.572

¹Somatic hospitalizations ²Somatic outpatient contacts ³Specialist mental healthcare ⁴IRR = incidence-rate ratio. ⁵p=p-values; ***<0.001, **<0.01, *<0.05 ⁶Ref. Ethnic Norwegians with low parental education level

⁷Ref. Low education ⁸Ref. Males ⁹Ref. 0-9 years ¹⁰Ref. Low educated within the same country group

In order to calculate IRR of hospitalizations among e.g. Somalis with high parental education relative to ethnic Norwegians with high parental education (Table 9), the IRR for Somalis with highly educated parents was divided by the IRR for ethnic Norwegians with similar parental educational level: $0.726 \div 0.748 \approx 0.970$ (Table 9). The IRR is about 3.0 percentage points lower for the first group, suggesting little differences in the number of overnight stays according to parental education between the two groups.

For the cases where one or more factors are non-significant, as for the effect of education in the Iranian group, we cannot be sure that it differs statistically from the reference category, i.e. ethnic Norwegians (IRR=1). As such, taking into account the possibility that there are in fact no differences, the non-significant factor is replaced by 1 and the result is highlighted as non-significant.

Table 9 Negative binomial regression analysis of utilization of three branches of SHC 2008-2011, among individuals with high parental educational level

Country Origin				⁴ Comparison of Norway and five immigrant groups		
	Hospitalizations	Somatic outpatient	PHV/BUP	Hospitalizations	Somatic outpatient	PHV/BUP
	¹ IRR	IRR	IRR	IRR	IRR	IRR
² Reference						
³ Norway	0.748	0.870	0.620	1	1	1
Poland	0.398*	0.614	0.473	0.762	0.705	0.760
Somalia	0.726	0.808	0.226	0.970	0.930	0.360
Iran	0.510*	0.841	1.123	0.680	0.970	0.696*
Pakistan	0.615	0.868	0.336	0.820	1	0.540
Vietnam	0.392	0.629	0.406	0.520	0.720	0.650

¹ Incidence rate ratio, ² Reference group ethnic Norwegians with low parental education (IRR=1), ³ Ethnic Norwegians with high parental education level ⁴ IRR calculated by dividing the IRR for individuals with high parental educational level by IRR for ethnic Norwegians with high parental educational level, separate for each immigrant group

*not significant (p>0.05)

Compared to the reference group, i.e. ethnic Norwegians with low educated parents, all groups including non-immigrants, had fewer contacts with all three types of SHC services in the period under study. For Somalis, the IRR of contacts with specialist mental healthcare was

nearly 80 percentage points lower than for the reference group. Similar tendencies are observed among those with Polish, Pakistani and Vietnamese background. For hospitalizations, the Vietnamese high education group had few overnight stays compared to the reference group (IRR=0.392).

When looking at the three right columns (Table 9), IRR calculations imply, with a few exceptions, that immigrants with highly educated parents utilized SHC services to a lesser extent than non-immigrants with parents in the same educational category. For individuals originating from Somalia, the IRR of contacts with specialist mental healthcare was about 60 percentage points lower compared to ethnic Norwegians. For somatic outpatient contacts and hospitalizations, however, little difference is observed between the two groups. Correspondingly, Pakistanis had few PHV/BUP contacts compared to ethnic Norwegians within the high parental education category (IRR=0.540). When comparing the Vietnamese group with ethnic Norwegians, IRR implies that the first group had relatively few contacts, especially evident for overnight stays, but also PHV/BUP consultations.

4.3 SHC utilization according to length of stay

As for SHC utilization in relation to length of stay in Norway, it was examined by negative binomial regression analysis. First, all first-generation immigrants, irrespective of country background, with 0-5 years, 6-10 years, 11-15 years and 16-19 years of residency, respectively, were compared to ethnic Norwegians. Regarding the country specific effect of length of stay, Poland was included as the immigrant reference category.

With respect to the regression models' ability to explain variance and how well the models fit the assumption of negative binomial regression, the Goodness of fit table implies a Value/df > 1 for all three models, and Omnibus tests are all statistically significant at the <0.001 level.

The full regression model (Table 10) includes the explanatory variables country background, including exclusively first-generation immigrants, gender, four categories of length of residence and the interaction effect of country origin and length of stay.

As for the effect of gender, it can be observed that females had more hospitalizations compared to males and somewhat more contacts with PHV/BUP, while IRR for males regarding somatic outpatient contacts was slightly higher. Compared to the reference category, there is an overall tendency that number of hospitalizations and somatic outpatient contacts were lower among immigrants in all "length of stay" categories, however not

statistically significant for all groups. For specialist mental healthcare, nevertheless, some large, significant differences appear. The IRR for recent immigrants (0-5 years) was about 50 percentage points lower compared to ethnic Norwegians, and that of longstanding immigrants (16-19 years) about one third. For the two mid-categories, nevertheless, an overall higher number of visits are observed. The IRR for immigrants, pooled together, with a residence time of 6-10 years was about 90 percentage points higher compared to the IRR for non-immigrants.

Table 10 Negative binomial regression analysis of contacts with three branches of SHC, 2008-2011

	Hospitalizations			Somatic outpatient contacts			Mental healthcare outpatient contacts			
	Hospitalizations			Somatic outpatient			PHV/BUP			
	IRR ¹	P ²	95% CI	IRR	p	95% CI	IRR	p	95% CI	
³ Reference	1			1			1			
⁴ Gender	1.110	<0.001***	1.101/1.119	0.994	0.013*	0.990/0.999	1.015	<0.001***	1.011/1.019	
⁵ Length of residency										
0-5 years	0.646	<0.001***	0.535/0.779	0.698	<0.001***	0.636/0.766	0.548	<0.001***	0.500/0.599	
6-10 years	0.459	0.005**	0.265/0.793	0.955	0.665	0.774/1.177	1.881	<0.001***	1.560/2.268	
11-15 years	0.996	0.990	0.571/1.740	0.948	0.722	0.708/1.271	4.692	<0.001***	3.669/6.001	
16-19 years	0.907	0.830	0.374/2.200	0.799	0.340	0.504/1.267	0.332	<0.001***	0.195/0.565	
⁶ Country origin										
Poland	0.828	0.008**	0.720/0.952	0.840	<0.001***	0.781/0.903	0.693	<0.001***	0.647/0.743	
Somalia	1.003	0.912	0.946/1.064	1.016	0.337	0.984/1.048	0.292	<0.001***	0.281/0.303	
Iran	0.819	<0.001***	0.745/0.901	0.998	0.920	0.951/1.046	1.316	<0.001***	1.260/1.375	
Pakistan	0.891	<0.001***	0.849/0.935	1.153	0.000**	1.125/1.182	0.495	<0.001***	0.482/0.508	
Vietnam	0.581	<0.001***	0.541/0.624	0.738	0.000***	0.714/0.762	0.419	<0.001***	0.405/0.433	
⁶ Length of residence										
Poland	1			1			1			
Somalia										
0-5	1.638	<0.001***	1.321/2.031	0.000***	1.454	<0.001***	1.303/1.621	3.106	<0.001***	2.783/3.466
6-10	1.815	0.038*	1.033/3.189	0.877	0.242	0.703/1.093	0.800	0.029*	0.654/0.978	
11-15	1.189	0.575	0.649/2.178	0.895	0.504	0.648/1.238	0.818	0.157	0.620/1.080	
16-19	0.587	0.331	0.201/1.717	0.962	0.886	0.565/1.637	5.042	<0.001***	2.784/9.132	

Iran										
0-5	1.322	0.100	0.948/1.844	1.255	0.006	1.068/1.476	2.309	0.000***	1.992/2.677	
6-10	2.383	0.003**	1.333/4.260	0.890	0.325	0.705/1.123	0.499	0.000***	0.405/0.615	
11-15	1.088	0.793	0.579/2.043	0.888	0.482	0.637/1.237	0.112	0.000***	0.084/0.149	
16-19	1.646	0.309	0.630/4.301	2.633	0.000***	1.593/4.353	3.751	0.000***	2.129/6.608	
Pakistan										
0-5	1.223	0.198	0.901/1.660	0.991	0.901	0.852/1.151	1.889	0.000***	1.628/2.192	
6-10	1.610	0.122	0.880/2.946	0.814	0.094	0.640/1.036	0.286	0.000***	0.226/0.360	
11-15	0.978	0.945	0.516/1.853	0.898	0.529	0.643/1.255	0.150	0.000***	0.111/0.203	
16-19	0.854	0.755	0.317/2.302	1.087	0.747	0.655/1.803	3.225	0.000***	1.818/5.721	
Vietnam										
0-5 years	1.048	0.854	0.635/1.731	0.860	0.179	0.690/1.172	0.740	0.017	0.578/0.947	
6-10	1.230	0.643	0.512/2.956	0.630	0.008**	0.447/0.887	0.400	0.000***	1.290/0.553	
11-15	0.946	0.889	0.434/2.063	0.586	0.009**	0.392/0.876	0.424	0.000***	0.305/0.590	
16-19	1.101	0.848	0.411/2.954	1.005	0.984	0.606/1.667	3.481	0.000***	1.974/6.137	

¹IRR = incidence-rate ratio. ² p -values; ***<0.001, **<0.01, *<0.05 ³Ref. Ethnic Norwegians ⁴Ref. Males ⁵Ref. Ethnic Norwegians ⁶Country specific effects of length of stay, ref. Polish immigrants

The table displays an IRR of 4.692 for the 11-15 years group, i.e. implying a probability more than four times that of non-immigrants for visits to specialist mental healthcare.

When all five country groups are compared to ethnic Norwegians, regardless of length of stay, significant differences are observed. It appears that all immigrant groups utilized all three types of SHC less than non-immigrants, the only exceptions being Iranian immigrants' utilization of PHV/BUP and Pakistanis' number of somatic outpatient contacts. Regarding PHV/BUP contacts and the remaining immigrant groups, it can be observed some relatively large, statistically significant differences between Somalis and ethnic Norwegians, i.e. an IRR about 70 percentage points lower for Somalis, and Pakistani and Vietnamese immigrants compared to ethnic Norwegians, i.e. an IRR more than 50 percentage points lower.

Moving on to the country specific effect of residence time, similar calculations as for the effect of high parental education were conducted in order to identify IRR for the four categories within each country group (Table 11). For instance, in order to calculate IRR of PHV/BUP for Vietnamese immigrants with length of residency equal to 16-19 years, the effect of "Vietnamese" (IRR=0.419) was multiplied with the overall effect of residency time, e.g. 16-19 years (IRR=0.332) and the country specific effect, i.e. Vietnamese and 16-19 years (IRR=3.481) = an IRR of 0.484 for Vietnamese relative to Poles with the equivalent number of years in Norway. Corresponding to analyses of parental educational level and SHC utilization, when non-significant factors are included in calculations (Table 11), it is replaced by 1 in the calculation related to uncertainty whether the group differs from the reference group or not.

The impression of large differences between recent and longstanding immigrants is somewhat modified in comparison with the reference category, i.e. Polish immigrants. As can be observed in Table 10, there seem to be certain differences between immigrant groups and the reference category in terms of somatic SHC utilization, in the sense that all groups, except Somalis, have an IRR lower compared to the reference group. This is especially evident for the Vietnamese group. Important, however, is the lack of statistical significance overall. For somatic contacts, differences appear to be somewhat smaller, and a higher IRR is observed among longstanding Iranian immigrants and the two "mid-categories" in the Pakistani group. Nevertheless, none of the differences are statistically significant.

For contacts with specialist mental healthcare, however, statistically significant variations can be observed. As for Somali immigrants, it is indicated that the probability of contacts with

PHV/BUP is about half compared to Poles with a corresponding length of stay in Norway, however not significant for the 11-15 years group. For the Iranian group, there were significant variations compared to Poles, except for the recent immigrant category, which suggests relatively high, but not statistically significant, utilization rates compared to Poles. The categories 6-10 years and 16-19 years had an IRR about 20 and 60 percentage points higher, respectively, compared to the reference group. The IRR for Pakistanis was significantly lower for all groups. As for Vietnamese immigrants, the results indicate an IRR considerably lower, but not statistically significant for the recent group, i.e. 0-5 years, compared to the reference group.

Results suggest that for all groups, except from Vietnam, the IRR of contacts with specialist mental healthcare was nearly identical among recent (0-5 years) and longstanding (16-19 years) immigrants, however not statistically significant for the Iranian group. For the Vietnamese group, the table displays an IRR for specialist mental healthcare considerably lower, but not statistically significant, compared to the reference category. For the remaining categories, nonetheless, Vietnamese immigrants' probability of receiving specialist mental healthcare was low compared to that of Poles.

Table 11 Negative binomial regression analysis of number of outpatient visits 2008-2011, according to length of stay in Norway

Country background	¹ Hospitalization IRR	² Outpatient IRR	³ PHV/BUP IRR
⁴ Reference	1	1	1
<i>Somalia</i>			
0-5 years	1.058*	1.104*	0.497
6-10 years	0.833*	1*	0.439
11-15 years	1*	1*	1.370*
16-19 years	1*	1*	0.488
<i>Iran</i>			
0-5 years	0.529*	0.698*	1.665*
6-10 years	0.895	1*	1.235
11-15 years	0.819*	1*	0.691
16-19 years	0.189*	2.633*	1.623
<i>Pakistan</i>			
0-5 years	0.575*	0.804*	0.512
6-10 years	0.408*	1.153*	0.266
11-15 years	0.891*	1.153*	0.348
16-19 years	0.891*	0.921*	0.534
<i>Vietnam</i>			
0-5 years	0.375*	0.515*	0.169*
6-10 years	0.266*	0.464*	0.315
11-15 years	0.581*	0.432*	0.334
16-19 years	0.581*	0.738*	0.484

³Not significant ¹Somatic hospitalizations ²Somatic SHC outpatient contacts ³Specialist mental healthcare outpatient contacts ⁴Reference category Poland

5. Discussion

In the following sections, this study's main findings will be summarized and results discussed in relation to theory and previous research. Then, strengths and limitations of the previous study are accounted for.

5.1 Main findings

Results from the present study indicate significant variations between immigrant groups and between first and second-generation immigrants in terms of SHC utilization. As for the comparison of ethnic Norwegians and children and individuals with an immigrant background, findings suggest an overall higher utilization among non-immigrants. An important finding is the remarkably low utilization among Vietnamese immigrants in the four year period, irrespective of age, gender and generational category, and for all three contact types. Similarly, children and adolescents originating from Somalia appeared to have particularly low utilization of specialist mental healthcare in the four year period, but utilization of somatic SHC did not differ substantially from that of non-immigrants. A similar tendency regarding specialist mental healthcare was observed among Poles. As for Iranian first and second-generation immigrants, a notably high proportion had at least one contact with PHV/BUP. Also, the mean number of contacts as well as incidence rates appeared to be high compared to all other groups, thus confirming the impression of overall high utilization of specialist mental healthcare among children and adolescents originating from Iran.

Results from negative binomial regression analysis confirmed the hypothesis that all groups with high parental education utilized less of all branches of SHC, as compared to ethnic Norwegians with low parental education level. Moreover, it could be observed that individuals with highly educated parents from all country groups had more somatic outpatient contacts than hospitalizations and specialist mental healthcare consultations, thus confirming the second expectation. Interestingly, however, was the finding that there seem to be a form of reversed educational gradient within immigrant groups, in the sense that immigrants with highly educated parents had more contacts with all branches of SHC compared to children with low educated parents originating from the same country . The Somali, Pakistani, Vietnamese and partly the Polish group had significantly more contacts compared to those with low educated parents from the same country. Except for somatic outpatient contacts, statistically significant differences were not observed among Iranians.

As for SHC utilization according to length of stay, findings were inconclusive. When first-generation immigrants, pooled together, were compared to ethnic Norwegians and divided into four length of stay categories, an overall impression was lower utilization of somatic healthcare among immigrants, but differences were not statistically significant. For specialist mental healthcare, however, significant variations were observed among immigrants and the Norwegian group. Among recent and longstanding immigrants, i.e. a residence period of 0-5 and 16-19 years, respectively, the number of PHV/BUP visits were notably fewer as compared to ethnic Norwegians. For the mid categories, however, rates above the Norwegian level was observed, and an IRR of 4.692 for the group with 11 to 15 years in Norway was particularly striking. This impression was, however, somewhat modified when Polish immigrants were included as reference group. For specialist mental healthcare, nevertheless, significantly fewer contacts are observed among Somali immigrants, except from the 11-15 years category, although the latter was not significant. Fewer contacts were seen among Pakistanis and Vietnamese in general, while significantly more contacts are observed among Iranians with 6-10 years and 16-19 years in Norway, respectively.

5.2 SHC utilization among first and second-generation immigrants

It was hypothesized that second-generation immigrants use less mental SHC services than first-generation immigrants with the corresponding country background. For somatic healthcare, it was expected that second-generation immigrants had more contacts overall.

When immigrants and descendants were compared irrespective of country origin, the first hypothesis was partly confirmed. Among children aged between 0 and 9, a larger proportion of immigrants had at least one contact with mental SHC compared to descendants, while the opposite was seen in relation to somatic healthcare. For the older children, a larger proportion of immigrants had at least one contact with all forms of SHC compared with descendants, except from immigrant males where a marginally smaller proportion had at least somatic outpatient contact. When differentiating on country background, however, results were less conclusive. In sum, findings are contradictive with regards to the distribution of PHV/BUP contacts among immigrants and descendants. As for the linear probability model, including descendants did not result in a significant improvement of its explanatory ability. Hence, it cannot be concluded that there are statistical significant differences between descendants and immigrants regarding utilization of PHV/BUP.

When immigrants and descendants were examined together, nonetheless, and compared to ethnic Norwegians, statistical significant differences could be observed. All groups had a lower proportion with at least one consultation compared to non-immigrants, except from Iranians, who had a proportion 1.9 percentage points higher. Negative binomial regression analysis on SHC utilization according to parental educational level and length of stay included immigrant groups as for an overall comparison to ethnic Norwegians. Tendencies emerging from linear probability models were largely confirmed when IRR for the different groups were examined. When first and second-generation immigrants were examined together, it appeared that Somalis, Pakistanis and Vietnamese had particularly few contacts with PHV/BUP. Additionally, it was observed that IRR for the Iranian group exceeded that of non-immigrants.

To summarize utilization of specialist mental healthcare, the overall findings indicate high utilization among children and adolescents originating from Iran, and low utilization among individuals originating from Somalia, Pakistan and Vietnam. The Polish group had a lower proportion with one or more PHV/BUP contacts, but differed somewhat less from non-immigrants as compared to the remaining groups. These findings are in agreement with previous studies among the same immigrant groups (Elstad, Finnvold and Texmon; Abebe, Lien and Elstad 2017).

With regards to previous research, it is suggested that young immigrants are more prone to mental health challenges compared to ethnic Norwegians (e.g. Sund, Larsson and Wichstrøm 2003; Oppedal, Røysamb and Heyerdahl 2005; Lien et al. 2006; Sagatun et al. 2007; Fandrem, Sam and Roland 2009). However, studies have indicated few variations between generational categories (Oppedal and Røysamb 2004; Fandrem, Sam and Roland 2009), which could possibly explain little variations with regards to specialist mental healthcare utilization.

Findings from a study among 10th graders indicated more mental health problems among first-generation immigrant girls compared to second-generation girls, and the opposite for males (Oppedal, Røysamb and Heyerdal 2005). When the proportion in the oldest age group with at least one specialist mental healthcare contact is examined (Table 4), it can be observed that a larger proportion of Somali and Pakistani female immigrants were in contact with PHV/BUP compared to descendants, while the situation was opposite for the Polish, Iranian and Vietnamese groups. Among males, few variations appeared between immigrants and descendants. As such, findings from the present study, to the degree utilization of mental SHC

accurately reflects the actual need for mental healthcare, do not suggest a similar tendency. Thus, it is unable to identify an overall healthy migrant paradox in terms of specialized mental healthcare utilization.

Previous findings indicate significantly lower levels of psychiatric problems among Somalis and Pakistanis, and high levels among Iranian and Vietnamese immigrants (Oppedal 2007; Oppedal and Røysamb 2007). However, for Vietnamese second-generation immigrants, it is also suggested a more favorable mental health status to non-immigrants, possibly related to strong collective values (Vaage et al. 2009), although an underreporting of psychiatric problems should not be disregarded (Fandrem, Sam and Roland 2009).

As the suggested lower level of psychiatric problems among Somalis and Pakistanis are in agreement with the level of specialist mental healthcare utilization found in the present study, it may be that few contacts reflect a generally high level of mental well-being among Somalis. However, the possibility of other causes influencing utilization levels cannot be excluded. It is found that immigrant children are less likely to be diagnosed with psychiatric disorders, which could be related to certain protective factors. However, cultural differences and stigma could be a possible cause of underdiagnosing, and symptoms which in fact relates to mental illness may be presented differently, i.e. as diffuse symptoms like stomach ache (Varvin 2006, 17; Kirmayer and Sartorius 2007; Aragona et al. 2012; Fadnes, Møen and Diaz 2016). The present study indicates, nonetheless, that utilization of somatic healthcare among Somali and Pakistani immigrants does not differ substantially from non-immigrants. This finding could be compatible with the somatization theory, although it might as well accurately reflect somatic morbidity levels. Regarding Vietnamese immigrants and the high level of reported mental health problems (Oppedal, Røysamb and Heyerdal 2005) it is not reflected in utilization of PHV/BUP in the four year period, thus it may, on the contrary, indicate a higher level of mental well-being, as suggested by Vaage et al. (2009). Either way, specialist mental healthcare utilization among Iranians fits well with previous findings regarding their self-reported mental health (Oppedal 2007; Oppedal and Røysamb 2007). As for the mechanisms behind Iranians' utilization of specialist mental healthcare services, that is, high utilization compared to all other groups, it is suggested that reasons for high levels of mental distress may be related to cultural distinctions, which affects interaction within the family and how the family, in turn, relates to society (Oppedal 2007).

For both types of somatic healthcare, descendants had an overall significantly higher proportion with at least one overnight stay and at least one somatic outpatient contact, thus

confirming the expectation that second-generation immigrants utilize somatic SHC to a larger extent. When second-generation immigrants were compared to ethnic Norwegians, no substantial variations appeared. Thus, it is evident that second-generation immigrants demonstrate a behavior pattern more in agreement with non-immigrants with regards to utilization of somatic SHC services. As for the causes of these differences, it is not possible to conclude with certainty why such variations appear. With regards to the healthy migrant hypothesis, this study cannot confirm nor reject the possibility that first-generation immigrants are in fact healthier than those who are Norwegian-born to immigrant parents, e.g. as a result of positive selection. Within the Polish group, for example, descendants had a significantly higher proportion with at least one somatic outpatient contact compared to immigrants, that is, about 10 percentage points, and a significantly higher share with at least one hospitalization. As for Polish immigrants, it has been suggested that reasons for avoiding to seek healthcare may be related to e.g. costs, low linguistic abilities and lack of trust in the Norwegian healthcare system (e.g. Czapka 2010; Lysheim 2016). The relatively higher proportion among descendants with somatic SHC contacts compared to immigrants could both be an indication of improved linguistic abilities among their parents, or, for example, more accurate information about the healthcare system. On the other hand, it may indicate a higher burden of disease.

It is observed that second-generation immigrants utilize PHC services more frequently than first-generation immigrants, and more in line with non-immigrants (Fadnes and Diaz 2017). Moreover, it is found that the youngest immigrant children attend GP services less often (Lunde and Kjølvik 2012). The same pattern is evident among immigrants in general, regardless of generational category. However, attendance rates increase according to length of stay in Norway (Lunde and Texmon 2013). Among children, it has been observed a higher attendance frequency for ethnic Norwegians compared to first-generation immigrants in terms of out-of-hours PHC services, while second-generation immigrants utilized both out-of-hours and GP services more frequently than non-immigrants (Fadnes, Møen and Diaz 2017). In sum, it is indicated that second-generation immigrants have an overall higher attendance frequency of GP services. As mentioned, most referrals to secondary care are carried out by GPs. It is thus a possibility that first-generation immigrants experience an inadequate level of referrals, as a consequence of seeking PHC less often. As for factors mentioned above, it is suggested that acculturation level is likely to be an important factor in the process of seeking healthcare. As such, it is probable that parents, as they are gradually socialized into the

Norwegian health culture and acquire more knowledge about the way healthcare services are organized, attend PHC more frequently and, in turn, are referred to specialized healthcare when needed.

There is a variety of reasons for avoiding to seek healthcare, including both formal and informal barriers. As for formal barriers, it has previously been suggested that economic factors are likely to be of less importance as healthcare in Norway is in principle free of charge. When it comes to the organization of healthcare, however, several factors could influence on how often immigrants seek healthcare. For example, both patients and GPs have addressed the issue of poor information about the Norwegian healthcare system, i.e. information material which does not take linguistic ability into account (Goht, Berg and Akman 2010; Czapka and Sagbakken 2016). Closely related is the issue of communication and interpretation. It is suggested that patients may refuse to seek healthcare due to linguistic barriers (Lysheim 2016), and that low health literacy, thought to be more prominent among immigrants (WHO 2013), may hinder healthcare utilization (Lee, Arozullah and Cho 2004; Paasche-Orlow and Wolf 2007; Khuu et al. 2016). Both underutilization of interpreters (e.g. Kale 2006; Le 2013), interpreters' lacking medical knowledge (Spilker, Indseth and Aambø 2009) and fear of inadequate confidentiality (Goht and Berg 2011) may result in less favorable outcomes of GP consultations. In addition, patient level barriers, e.g., perceived cause of illness and health beliefs and attitudes are suggested to influence healthcare-attendance behavior. With regards to GPs, possible provider level barriers should also be addressed, e.g. ignorance of culture or religion. or a strictly biomedical perception of illness (Scheppers et al. 2006). Moreover, ethnic origin is suggested to act as a predictor for patient outcome, as it may occur that consultations are shorter (Harmsen et al. 2003) and physicians less engaged in patients (Meeuwesen et al. 2006). For the Norwegian healthcare context, however, self-perceived discrimination is suggested to be an issue which is present, although less prominent compared to other institutions where immigrants may experience barriers (IMDi 2008; Tronstad 2009; IMDi 2014; Hamre 2017).

As for the present study, to the degree barriers for healthcare seeking inflicts on SHC utilization, it is probable that a variety of causes are involved. Also, it is possible that immigrant groups face different barriers, although some issues are most probably common, e.g. linguistic difficulties. The majority of research on barriers for healthcare utilization does not differentiate on immigrant background. Hence, it is difficult to suggest reasons for utilization variations. For somatic healthcare, distinct findings include very low utilization

levels among children and adolescents originating from Vietnam. To this authors knowledge, there are no Norwegian studies which examines reasons for low healthcare utilization among Vietnamese immigrants, other than studies which point out that such differences are present (Elstad, Finnvold and Texmon 2015; Abebe, Lien and Elstad 2017). As such, it is difficult to determine whether Vietnamese immigrants in Norway belong to a particularly healthy immigrant group, whether cultural perceptions of illness may be of importance or whether other causes are more likely to influence on SHC utilization.

Despite generally low levels of self-perceived discrimination within the healthcare context, discrimination should nonetheless be addressed as a possible barrier for seeking healthcare or as a factor which is decisive for referrals to specialized healthcare. With regards to healthcare services, self-perceived discrimination is more frequently reported among Somali and Iranian immigrants compared to other groups in the present study, while low levels are reported among Vietnamese immigrants. In general, first-generation immigrants report self-perceived discrimination somewhat more often compared to second-generation immigrants (IMDi 2014). This study found that the level with at least one admission to somatic hospitals or somatic outpatient contacts among Somalis and Iranians did not differ substantially from ethnic Norwegians. For specialist mental healthcare, however, Somalis had few contacts in general. It is, however, suggested that relatively few psychiatric symptoms are reported among this group, which indicates that there are also other possible reasons for low utilization. As for children and adolescents originating from Vietnam, utilization of both somatic and mental SHC were remarkably low. On this background, it does not appear an immediate impression that there are systematically inadequate referral practices with regards to SHC services. However, it is observed that less first-generation immigrants utilized SHC services compared to second-generation immigrants in the four year period overall, and the possibility that this could be due to unequal treatment cannot be completely excluded.

As for the utilization of SHC services among second-generation immigrants in relation to the acculturation perspective, the relatively higher proportion among descendants with at least one contact with somatic healthcare could indicate a form of integration, at least into the healthcare system. However, there are obvious sources of error if healthcare utilization is to be included as a litmus test of integration. It is difficult to consider whether Norwegian-born children to immigrant parents have a greater need for healthcare due to more ill health, or whether they are successfully integrated into the Norwegian healthcare culture and thus receive the adequate amount of help. For contacts with specialist mental healthcare, however,

most immigrant groups had less contacts compared to non-immigrants, which indicates that underutilization may be present. As such, it is suggested that the acculturation process is less evident with regards to utilization of mental healthcare, even if analyses did not differentiate on generational category.

5.3 Does parental educational level predict utilization of SHC?

Higher SES among parents, measured on the background of educational qualifications, was hypothesized to predict less utilization of SHC among all groups under study, as the health status among this group is commonly considered more favorable compared to children with low parental SES. Previous findings suggest that children of parents with low SES suffer from more ill health, both in terms of psychiatric and physical conditions, compared to children with higher parental educational level (Finnvold, Nordhagen and Schjalm 1997; Grøholt and Nordhagen 2002; Halldórsson et al. 2000). Regarding utilization of healthcare, it is suggested that there are few differences with respect to the number of GP visits, while findings have indicated more contacts with SHC among children with highly educated parents. Children with low educated parents were, however, more frequently hospitalized, and it is observed that the same group had more contacts with educational and psychological counselling services (Grøholt and Nordhagen 2002; Grøholt et al 2003; Holmboe et al. 2006)

In order to confirm or reject the hypothesis that high parental educational level were associated with lower rates of SHC utilization, although less pronounced with respect to somatic outpatient contacts, negative binomial regression analysis was carried out. For assessing whether parental educational level seem likely to inflict on the level of SHC utilization, first and second-generation immigrants within each country group were pooled together for simplicity reasons. Then, ethnic Norwegians with at least one highly educated parent and first and second-generation immigrants within the same parental educational category were compared to the reference group, i.e. ethnic Norwegians with low educated parents.

Findings indicate lower levels of both somatic and mental SHC among all groups with highly educated parents, and thus confirm the hypothesis. In addition, it was found that discrepancies was larger for hospitalizations and contacts with PHV/BUP compared to somatic outpatient contacts, i.e. children with highly educated parents differed less from the reference group for the latter contact type. When all groups were compared to ethnic

Norwegians with high parental education, findings more or less confirmed tendencies as seen in results from the linear probability models.

Then, children with high parental educational level were compared to those with low educational level within each immigrant group. As mentioned, results differed substantially from what was observed among the Norwegian group. Children and adolescents with high parental educational level originating from Poland had significantly more somatic outpatient and specialist mental healthcare contacts, i.e. an IRR about 50 percentage points higher compared to the low education group. In the Somalian group, children with at least one high educated parent had more contacts with all three branches of SHC, which was also the case for Pakistanis, especially for PHV/BUP contacts among the latter group. While statistically significant differences could not be confirmed for the Iranian group, apart from somatic outpatient contacts, the Vietnamese group differed significantly in terms of SHC utilization. Those with high parental education had more contacts with all three branches of SHC, and an IRR more than twice as high for specialist mental healthcare contacts.

The tendency towards higher utilization among Vietnamese immigrants with high educated parents corresponds well with findings on the adult Vietnamese population (Elstad, Finnvold and Texmon 2015, 118). As for the general tendency of higher SHC utilization among children of high educated parents in nearly all groups, there does not seem to be any immediate, obvious reasons. However, it is a possibility that parents with high education have a higher level of health literacy, and possibly a perception of illness which differs from that of parents with lower education, thus resulting in more frequently seeking of healthcare, and at earlier stages compared to low educated.

Although a social gradient of health is widely accepted, and also thought to be present among children, there seem to be a lack of research examining immigrant children and adolescents' health with regards to parental SES. However, findings from a panel study indicate that among a low-income sample, neither non-Western immigrant parents nor their children regarded the child's health as particularly good (Elstad 2010, 204-205).

Since there is greater insecurity with regards to the registered information on education among immigrants, and the SES acquired after arriving in Norway may differ from the social position an individual held in the home country, the comparison between children from different immigrant groups with non-immigrants on the background on parental educational qualifications is not straightforward. Moreover, when few Norwegian studies have assessed

the health of immigrant children according to parents' SES , it is challenging to conclude whether higher utilization among immigrants with highly educated parents suggest an unfair distribution of healthcare services or not.

5.4 Length of stay as a predictor for SHC utilization

It is suggested that first-generation immigrant children and adolescents run a greater risk of developing mental health problems (Lien 2006; Oppedal 2007, 10; Fandrem, Sam and Roland 2009), but evidence have indicated that this group present with fewer symptoms, both in terms of somatic and mental illness, in PHC (Fadnes, Møen and Diaz 2016). As for healthcare services, findings indicate that utilization increases over time (e.g. Straiton, Reneflot and Diaz (2014; Chi and Handcock 2014).

Regarding length of stay, it was suggested that prolonged time of residency in Norway predicted more utilization of somatic SHC, which is thought to relate to acquired knowledge about the healthcare system with prolonged length of stay. As for psychiatric symptoms, it was hypothesized that an improvement in mental health may be observed as the experience of “newness” decreases.

With regards to length of stay and SHC utilization, findings were inconclusive. When all immigrants were compared to ethnic Norwegians, it could be observed that all groups seemed to have less contacts with both types of somatic SHC. As for hospitalization, the number of overnight stays were notably lower compared to non-immigrants, for immigrants with 0-5 and 6-10 years in Norway, respectively. An increase in IRR for the two remaining categories, suggesting a convergence towards the “Norwegian” level, but it was not statistically significant. For specialist mental healthcare, the two mid categories, had more contacts compared to ethnic Norwegians, the latter category with an IRR more than four times that of ethnic Norwegians, which is in agreement with another study on length of stay and psychiatric consultations (Straiton, Reneflot and Diaz 2014).

When four immigrant groups were compared to Polish immigrants, statistically significant differences appeared with regards to contacts with PHV/BUP, but there did not appear any clear tendency with regards to an increasing or decreasing number of contacts according to years spent in Norway. For Somalis and Pakistanis, it was evident that recent and longstanding immigrants had about the same level of contacts, which was higher compared to the mid categories. For Iranians, immigrants with a residence time of 6-10 and 16-19 years had statistically significant more contacts compared to Poles. In sum, however, few

conclusions can be drawn on the background of the results, with respect to both somatic and outpatient contacts. Thus, it may seem as there are other factors which explains utilization differences better than length of residency. However, no individuals are older than 19 years, and, in general, children and adolescents are more often healthy, i.e. not in need of healthcare, than ill. If the same was to be examined among adult immigrants, it is probable that a convergence towards the “Norwegian” level would be observed, as is previously suggested (Elstad 2016).

5.5 Validity

When assessing the quality of a quantitative study, the concept of validity is crucial. In general, and in simple terms, the validity of a study refers to whether it measures what it intends to measure (Johannessen, Tufto and Christoffersen 2010, 229-231). External validity, as is considered relevant for this study, concerns generalizability, which relevance has already been discussed. The main strength of this nation-wide registry study is its representativeness, as it is possible to study nearly the whole population. Given the combination of registers which is considered to be of high quality, the results apply to all individuals with a given country background during the study period. The risk of measurement error is present in all studies (Hoem 2008; Fekjær 2011, 191), however, and the current one is no exception. Also, the results do not necessarily apply to the present population of immigrants and descendants in Norway. In sum, nevertheless, the study is regarded to contain a high degree of external validity.

The issue of completeness, referring to whether the registers comprise all individuals and whether accurate information is registered, is highly relevant when assessing the value of register studies (Sørensen, Sabroe and Olsen 1996, 437). It is claimed that health registers are normally recognized by a relatively high degree of completeness and validity of variables included in the registers, which is confirmed by a number of validity studies (Sund et al. 2014, 713). As for this study, data are accessible for all individuals who were legally residing in Norway on January 1st 2008. When it comes to the occurrence of SHC contacts, all visits are registered. As this is not an epidemiologic study which is dependent on the accuracy of diagnoses registered, but merely the contact as such, it is not of concern whether patients receive the correct diagnosis and that it is properly registered. Regarding the question of whether parental SES seems to predict SHC utilization, lacking information on educational qualifications represents a weakness. Among children and adolescents originating from Poland, for example, about 20 per cent of the households had no registered information on

education (Table 1). Due to large sample sizes, however, this is not considered to challenge validity to a large extent.

5.6 Strengths and limitations

A great advantage of registry data is the fact that information exists on nearly all inhabitants. Also, registers may provide information that would not be easily accessible with other methods, e.g. from informants with low levels of language proficiency. Since data are already gathered it requires fewer resources, and there are no issues with response rates and recall bias, as may be a problem in survey studies. Such data also permit attempts to follow individuals over time and look for causal relationships (Fekjær 2011, 182-183).

The data material provided for this thesis is unique in the sense that it covers practically the whole population and all contacts with SHC services. Such material and combination of registers on the basis of personal identification number is seldom available outside of the Nordic countries (Fekjær 2011, 181; Elstad, Finnvold and Texmon 2015, 24; Elstad 2016). These registers are regularly updated and recognized by high quality. As practically the whole population is covered, the challenge of selection bias is minimized, and the sample size (in this case $n= 1,138,041$) leads to considerable statistical power (Thygesen and Ersbøll 2014). Additionally, large sample sizes provide the opportunity to study sub groups, which would otherwise be challenged by categories with limited size (Fekjær 2011, 189).

Some important study limitations should be addressed, however. As it is only possible to analyze individuals born in or immigrating to Norway before 2008, those born or arrived after 2008 are not included in the material. The number of immigrants after January 1st 2008 until January 1st 2017 has increased considerably and the composition of today's immigrant population is only partly reflected in the study sample. Thus, generalizability is somehow limited to the rather narrow four year period, even though it is not unlikely that similar utilization patterns also existed among comparable samples before and after the four year period under study. Moreover, individuals who are not granted a legal residency in Norway cannot be taken into account. Hence, data on those not registered in the National Register, e.g. asylum seekers, refugees and undocumented migrants, which could make up a valuable contribution when aiming to gain insight into immigrants' utilization of healthcare, are excluded from the material. Many indisputably have great health challenges and individuals lacking a legal residency are entitled to these services in emergency situations. Still,

information on their contacts with SHC cannot be retrieved for this study. In addition, individuals staying in Norway for shorter periods, due to work, studies, vacation etc. cannot be taken into account.

The variable providing information on length of hospitalization is excluded as the thesis questions primarily focus on contact frequency. Nevertheless, if the number of overnight stays was compared between individuals with the same diagnosis/ condition, it could be investigated whether some individuals were hospitalized for longer periods of time, or more frequently re-hospitalized, despite similar causes of hospitalization. However, a wide range of factors could influence on the length of hospitalizations and this is not considered sufficiently appropriate to shed light on this thesis' research questions. Additionally, there are challenges related to the registered reason for contact. A considerable part of the contacts among children and adolescents are registered as "factors related to health condition". This category is unspecific and provides little insight when it comes to the study of utilization patterns. Also, this study is not an epidemiological one, and therefore does not examine the prevalence of medical conditions.

Another issue following registry data utilization is its lacking ability to answer *why* certain things are observed. It can provide partial knowledge of an individuals' behaviour, but never on attitudes. Thus, many questions may remain unanswered (Fekjær 2011, 184), as for the reasons behind utilization differences, in this case.

Finally, a few methodological issues are present. First, in relation to the role of significance testing in register studies. The results should be interpreted with caution as a large amount of tests, which are commonly carried out in such studies, statistically are associated with the risk of rejecting a true null hypothesis. If one operates with a significance level of five per cent, an incorrect rejection will appear in 5 of 100 cases. Moreover, studying large sample sizes often leads to significant results. Even small variations which would not otherwise be taken into account may appear as significant (Fekjær 2011, 191-192; Midtbø 2007, 67). In an attempt to limit this issue, five groups were selected for analysis. For the same reason, immigrant categories were pooled together for the examination of SHC utilization according to parental educational level. As for the second methodological issue, reasons for carrying out linear probability models with a binary outcome variable is discussed in the method section.

6. Conclusion

This study has examined whether utilization of three branches of SHC differed between non-immigrants, immigrants and adolescents in the period from 2008 until 2011. Also, it has been assessed whether parental educational level and first generation immigrants' length of stay seem to inflict of utilization of services.

The results indicate variations between immigrant groups when it comes to utilization of somatic and mental specialized healthcare, and partly with regards to generational category. Compared to ethnic Norwegians, no statistically significant differences were observed among first and second-generation immigrants with regards to specialist mental healthcare, while second-generation immigrants within most groups had a higher proportion with at least one contact with somatic SHC.

When both groups were examined together, it appeared that all immigrant groups had low levels of contacts with specialist mental healthcare, as compared to ethnic Norwegians. An important finding, however, is the high utilization observed among Iranian immigrants, which were higher compared to non-immigrants. Individuals with a Vietnamese background had remarkably few contacts with both somatic and mental SHC, while few contacts with specialist mental healthcare were additionally seen among Somali and Pakistani healthcare. As for parental educational level, all groups with high parental educational qualifications had fewer contacts with all three branches of SHC, irrespective of immigrant background and generational category. When immigrants with highly educated parents were compared to ethnic Norwegians within the same parental educational category, nearly all groups demonstrated lower levels of all services. Interestingly, however, was the finding that a form of reversed parental education effect was observed among the Somali, Vietnamese, Pakistani, and partly the Polish group, in that high parental educational level seemed to be related to higher utilization of all three specialist services. As for length of stay in Norway and utilization of SHC, no clear tendencies emerged.

Regarding implications for future research, a need for more in-depth knowledge about the health of immigrant children and adolescents in general, and specifically their utilization of healthcare services, is identified. An examination of causes for utilization differences could prove valuable if one aims to assess whether individuals are granted equal access to specialized care.

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Appendices

Appendix A

Table A1 Contacts with three branches of SHC among children 0-9 years in the period 2008-2011 (percentage)

	Hospitalizations								Somatic outpatient contacts								PHV/BUP outpatient contacts							
	No contacts		1-4 contacts		5-10 contacts		11+ contacts		No contacts		1-4 contacts		5-10 contacts		11+ contacts		No contacts		1-10 contacts		11-30 contacts		31+ contacts	
	¹ M	² F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
<i>Norway</i>	85.1	88.2	14.3	11.3	0.5	0.4	0.2	0.1	48.6	54.9	36.9	33.5	9.4	7.6	5.1	4.0	90.8	94.8	2.6	1.8	3.1	1.7	3.5	1.7
<i>Poland</i>																								
1 st gen	89.0	91.6	10.6	8.4	0.2	0.0	0.2	0.0	60.4	64.1	30.4	30.5	5.9	4.7	3.3	0.6	93.6	96.9	2.3	1.6	1.1	0.6	2.9	0.8
2 nd gen	83.7	87.7	15.8	11.7	0.2	0.3	0.2	0.3	49.3	55.6	36.4	35.8	10.4	6.5	4.0	2.1	93.6	96.9	3.2	0.8	1.7	0.8	1.5	1.6
<i>Somalia</i>																								
1 st gen	85.3	86.7	14.4	12.7	0.3	0.6	0.0	0.0	49.3	54.8	34.5	32.5	11.0	8.4	5.2	4.3	94.1	97.2	2.4	1.3	2.3	1.0	1.2	0.4
2 nd gen	82.2	85.9	16.7	13.6	0.9	0.5	0.2	0.1	44.2	55.3	38.1	33.5	11.6	7.3	6.0	3.9	96.0	97.9	1.2	1.0	1.4	0.6	1.3	0.5
<i>Iran</i>																								
1 st gen	89.1	89.7	10.9	10.3	0.0	0.0	0.0	0.0	49.6	62.4	34.5	28.2	12.6	6.0	3.4	3.4	88.2	96.6	2.5	0.9	1.7	0.0	7.6	2.6
2 nd gen	86.2	89.2	12.9	10.3	0.5	0.3	0.4	0.3	45.1	50.5	39.8	37.9	9.9	7.6	5.2	4.0	89.8	93.2	3.9	2.9	2.4	1.7	3.9	2.2
<i>Pakistan</i>																								
1 st gen	87.2	91.5	10.9	8.5	1.9	0.0	0.0	0.0	51.9	57.4	36.5	30.7	7.1	7.4	4.5	4.5	95.5	93.8	1.3	3.4	2.6	2.3	0.6	0.6
2 nd gen	84.5	89.3	14.3	10.1	1.1	0.5	0.1	0.1	44.3	55.8	38	31.1	9.4	8.1	8.3	5.1	94.4	97.2	2.1	0.9	1.6	1.1	1.9	0.8
<i>Vietnam</i>																								
1 st gen	93.5	93.3	6.5	6.7	0.0	0.0	0.0	0.0	60.9	68.9	30.4	28.9	4.3	2.2	4.3	0.0	97.8	93.3	0.0	2.2	2.2	4.4	0.0	0.0
2 nd gen	87.5	91.2	12.1	8.4	0.3	0.3	0.0	0.1	53.1	62.4	34.9	28.8	7.6	5.3	4.3	3.5	94.5	97.6	1.6	0.7	2.2	1.0	1.7	0.7

¹ Male ²Female

Table A2 Contacts with three branches of SHC among adolescents 10-19 years in the period 2008-2011 (percentage)

	Hospitalizations								Somatic outpatient contacts								PHV/BUP outpatient contacts							
	No contacts		1-4 contacts		5-10 contacts		11+ contacts		No contacts		1-4 contacts		5-10 contacts		11+ contacts		No contacts		1-4 contacts		5-10 contacts		11+ contacts	
	¹ M	² F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
<i>Norway</i>	85.3	81.2	14.2	17.9	0.4	0.8	0.1	0.2	50.4	47.1	36.4	36.8	8.9	10.3	4.3	5.8	88.1	85.4	4.7	5.3	3.6	4.3	3.6	5.0
<i>Poland</i>																								
1 st gen	90.7	87.0	9.0	12.8	0.4	0.2	0.0	0.0	59.6	60.9	33.3	29.6	4.9	7.5	2.1	2.0	92.2	90.3	3.7	3.6	2.1	3.0	1.9	3.0
2 nd gen	90.9	82.6	9.1	17.4	0.0	0.0	0.0	0.0	62.8	44.4	25	43.8	7.9	9.0	4.3	2.8	92.1	89.3	3.0	3.9	1.2	2.8	3.7	3.9
<i>Somalia</i>																								
1 st gen	88.7	80.5	11.1	18.3	0.1	1.1	0.1	0.0	51.3	50.3	35.8	33.1	9.9	9.9	3.0	6.7	92.5	93.7	3.2	3.1	2.4	1.5	1.8	1.7
2 nd gen	91.8	90.4	7.4	9.6	0.9	0.0	0.0	0.0	56.1	62.1	32.9	28.3	7.4	4.9	3.7	4.7	92.2	96.5	3.2	1.6	1.3	1.6	3.2	0.2
<i>Iran</i>																								
1 st gen	87.4	80.3	12.3	19.2	0.3	0.5	0.0	0.0	51.9	45.4	35.4	39.7	9.5	10.4	3.3	4.5	88.0	83.1	5.1	8.7	3.1	4.5	3.9	3.7
2 nd gen	87.3	86.8	12.7	13.0	0.0	0.2	0.0	0.0	45.7	48.5	39.1	35.5	10.6	11.1	4.5	5.0	86.9	77.5	5.2	7.1	4.3	6.1	3.6	9.2
<i>Pakistan</i>																								
1 st gen	91.4	85.4	8.4	14.2	0.0	0.2	0.2	0.2	50.8	56.8	36.6	32.0	8.6	7.2	4.1	3.9	93.1	91.9	2.8	4.4	2.4	1.6	1.7	2.1
2 nd gen	87.5	87.4	11.8	12.1	0.6	0.4	0.1	0.0	46.6	57.4	37.4	29.5	10.3	7.2	5.7	5.8	93.5	93.5	2.8	2.7	1.9	1.9	1.8	1.9
<i>Vietnam</i>																								
1 st gen	92.4	88.0	7.6	12.0	0.0	0.0	0.0	0.0	70.5	61.4	25.1	30.9	3.2	5.6	1.2	2.1	94.8	94.8	2.0	2.6	1.2	0.9	2.0	1.7
2 nd gen	91.1	90.7	8.7	9.1	0.2	0.2	0.0	0.0	62.5	66.0	28.9	26.4	6.1	4.9	2.5	2.8	95.1	92.0	2.2	4.2	1.2	1.9	1.4	2.0

1 Male 2Female

Appendix B

Table B1 Contacts with PHV/BUP 2008-2011, linear probability models

	Model 1			Model 2		
	B	¹ p	95% CI	B	¹ p	95% CI
Constant	0.075	0.000***	0.074/0.076	0.075	0.000***	0.74/0.076
Gender	-0.005	0.000***	-0.006/-0.004	-0.005	0.000***	-0.006/-0.004
Age	0.059	0.000***	0.058/0.060	0.059	0.000***	0.058/0.060
<i>Immigrants</i>				-0.035	0.000***	-0.047/-0.022
Poland	-0.033	0.000***	-0.043/-0.023			
Somalia	-0.049	0.000***	-0.055/-0.043	-0.052	0.000***	-0.061/-0.043
Iran	0.019	0.000***	0.009/0.028	0.010	0.000***	-0.005/0.25
Pakistan	-0.048	0.000***	-0.054/-0.042	-0.047	0.000***	-0.064/-0.030
Vietnam	-0.052	0.000***	-0.059/-0.045	-0.072	0.000***	-0.097/-0.047
<i>Descendants</i>						
Poland				0.006	0.581	-0.015/0.28
Somalia				0.005	0.455	-0.007/0.017
Iran				0.014	0.149	-0.005/0.034
Pakistan				-0.02	0.853	-0.020/0.016
Vietnam				0.022	0.092	-0.004/0.048
R ²		0.01				

¹p=p-values; ***<0.001, **<0.01, *<0.05

