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## Practice location preferences among General Practitioners

*A literature review and a statistical analysis highlighting associated factors and characteristics*

—  
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## **Abbreviations**

CI - Confidence Interval

GP - General Practitioner

HELFO - The Norwegian Health-economy administration Norway (Statens helseøkonomiforvaltning)

NSD - Data Protection Official for Research

OECD - Organization for Economic Co-operation and Development

OR - Odds Ratio

SPSS - Statistical Package for Social Science



## Abstract

Recruitment and retention of General Practitioners (GPs) is an urgent matter not only in Norway, but internationally as well. Despite an increase of 7.4 percent of GPs in Norway in 2015 the lack of doctors in parts of the primary sector is still substantial(1). The problem lies not only in the lack of doctors in primary care, but also in the geographical distribution of the GPs. The majority of GPs prefer working in large municipalities – potentially creating a maldistribution of health care services throughout the Norwegian country(2).

The objective of this study is to investigate the GPs preferences in practice location, whether actions have been taken to improve the recruitment and retention of GPs in small municipalities, and if there are any specific characteristics of the GPs that are associated with their preference in practice location.

A literature review has been performed to detect relevant findings upon the objectives of the study. Since recruitment and retention of GPs to rural practice locations is not merely an issue in Norway, but internationally as well, papers from several other nations have been included in the review. Alongside the literature review a statistical analysis of prospective GPs (last-year medical students and medical interns) and currently practicing GPs' characteristics have been performed. Both datasets were retrieved through online questionnaires respectively in 2010 and 2012.

The statistical analyses found, that the currently practicing GPs least preferred practice location were municipalities with less than 5000 inhabitants. The independent variables; *current practice location* (by size of municipality) ( $p < 0.001$ ), *location of medical training* (in

Norway or abroad) ( $p=0.003$ ), *being a specialist in general medicine* ( $p=0.006$ ), *number of patients on list* ( $p<0.001$ ), and *hours at work per week* ( $p=0.006$ ) were significantly associated with the GPs preference in practice location. The strongest predictors for preferred practice location were the variables *current practice location* ( $p<0.001$ ) and *location of medical training* ( $p=0.003$ ).

For the prospective GPs the least preferred practice location was also the municipalities with less than 5000 inhabitants. The preference in practice location was statistically associated with *number of inhabitants in home municipality* ( $p<0.001$ ), and borderline significant with *study location* ( $p=0.055$ ).

In association with results from the literature review, it seems that the strongest predictors for both the practicing and prospering GPs for preferring to practice in small municipalities is the size of their home municipality, their current practice location, and location of their medical training. The literature review highlights certain initiatives where these predictors have been in focus, namely decentralizing medical schools and training, reimbursement and scholarships against mandatory rural practice, and targeting students who originate from small municipalities. Professional isolation, a heavier workload, and more patients listed in small municipalities are some of the factors mentioned in the literature review for why GPs prefer practicing in larger municipalities.

The GPs' preference for rural practice is related to having a relation to a small municipality. Hence, initiatives with the aim of creating or strengthening the bonds between prospective



GPs as well as currently practicing GPs and remote practice locations are essential to improve the preference for rural practice.



## Chapter 1 Introduction

With the Coordination Reform implemented in 2012, and the white paper *Primary Health and Care Services of Tomorrow – Localised and Integrated* (2014-2015) (1) the Norwegian Government and the Parliament have declared that more attention should be given to the primary health care section. More focus on primary health care, includes an increased focus on preventive medicine, i.e. preventing possible illness and diseases, hence hindering hospitalizations (1). An increased focus on the primary sector will also give attention to the accessibility to GPs. This accessibility is important to the health state of the Norwegian population and especially in more rural parts of the country where the accessibility can be challenging due to issues regarding recruitment and retention of doctors (3).

In the report to the Norwegian Parliament it is however mentioned that from 2014 to 2015 there has been a 7.4 percent increase in the amount of doctors in the primary health care sector (1). This increase might help improve the accessibility and hopefully also the continuity in the doctor-patient relationship. Improvements in the accessibility and continuity to GPs and their role in the doctor-patient relationship will not only have a positive effect on the populations health status but will also enhance the GPs function as gatekeepers to specialist care (4). Strong gatekeeping will prevent unnecessary referrals to specialist care and hospital admissions and hence help contain the overall health care expenditures in Norway (1).

Due to more people suffering from non-communicable diseases such as diabetes, cardiovascular diseases, cancer, chronic obstructive pulmonary disease and obesity the need

for primary health care has increased and hence more focus should be given to this sector (1).

The primary health care sector is however a constitution of multiple health-care providers, specialists and institutions, hence improvements in this sector must be split into several initiatives.

Not only in Norway, but internationally the doctors' preference for practicing in rural locations is of concern (5). With an increase in the number of chronically ill people and people above 60 years of age (1), the demand for GPs is increasing. Research has shown that GPs prefer working in more urban locations, hence drawing the flow in supply of GPs away from remote locations (2). This might have a negative effect on the accessibility to health care for the people living in these areas and create a maldistribution of health care services. The great question, which multiple research articles and studies have tried to answer, is what can be done to make it more attractive for GPs to practice in remote locations. Through a literature review of such studies and articles, along with an analysis of data collected from two cross-sectional studies performed in Norway in 2010 and 2012 the aim of this thesis is to highlight potential factors and characteristics of the GPs that might be associated with their preference in practice location.

## **1.1 Objectives**

- *Why do GPs prefer practicing in large municipalities to small municipalities?*
  - *Among the GPs, are there any specific factors that are associated with this preference?*
  - *Have any initiatives been taken to make the GPs more inclined to practice in small municipalities?*

- *Is the preference for practicing in small municipalities specific to any characteristics of the GPs?*

## **1.2 Thesis structure**

The thesis is structured in the following matter: Chapter 2 consists of a literature review of studies. Relevant findings for answering the objectives of this thesis are gathered under subheadings. Chapter 3 describes the methods used to collect and analyze the data from two cross sectional studies. Chapter 4 displays the results from the statistical analyses of the data from the two cross-sectional studies. Chapter 5 discusses the methods and results from both the literature review and the data analyses. Chapter 6 concludes and provides suggestions for further research and initiatives.

## Chapter 2 Literature review

### 2.1 Introduction

Access to health care is a highly debated subject in health politics and decision-making(3).

Access to health care consists of several aspects, non-financial as financial, and can be put into different categories. These categories are also known as the four As: affordability, availability, accessibility and acceptability (3).

- Affordability refers to the consumer's ability to pay for health care. The financial affordability is also related to indirect- and opportunity costs of seeking health care, for instance transportation costs and work-hours lost (6).

However, Norway has universal health care coverage, and health care costs are mainly financed through public funding covering most of peoples' costs related to treatment, medicine and, in some cases, transportation to and from the clinic (7).

The universal coverage helps contain the personal costs of health care hence affordability of health care is, in Norway, not the biggest barrier regarding access to health care.

- Availability reflects the practitioner's availability of resources, such as certain health care services, personnel and technology needed to meet the needs of the patients (6).
- Accessibility is linked to the geographical distribution of health care services, e.g. is there a health care provider within a satisfying distance of the patient.
- Acceptability defines consumers willingness to seek health care, this may be determined by the quality of care, social and cultural factors, such as diagnostics,

gender, age and heritage of the practitioner or the consumer (6).

The objective for this thesis, and background for initiating a literature, is to enlighten an issue within the field of *access* to health care. Namely the possible maldistribution of General Practitioners (GPs) across the Norway (7). Only a minority of the GPs want to practice in the small municipalities. Furthermore a Norwegian study found that the amount of years the GPs practice medicine in small municipalities is substantially lower than those who practice in large municipality, hence creating less consistency in the care of the patients (8).

Recruiting and retaining GPs in positions in remote locations is an issue not only in Norway but internationally as well (5). The problem is not sustained to merely being an issue in developed countries, but it is a matter of concern in developing countries as well (9). The maldistribution of GPs is a political issue concerning many Governments (10) and the consequence of this increasing tendency is unfortunately a decrease in the health status of citizens living in remote locations (11).

Questionnaires, interviews, qualitative and quantitative studies of GPs preferences have been carried out to identify factors that might influence doctors' preferences and choices of practice location. Policy regulations and interventions have been executed to increase the amount of GPs practicing in remote locations (10). It is studies, articles and reviews describing the, above-mentioned, initiatives, that this literature review will focus on (12). The literature review is performed to identify literature upon the subject of interest, and is not a comprehensive systematic review.

The papers, articles and reviews, which have been included in this literature review, are all found to be relevant for the choice of thesis objectives and to answering parts of the

objectives. The objectives; why GPs prefer to practice in a large to small municipalities and whether there are any factors associated with their preference, is answered through the literature review.

Articles from Australia, Canada, Japan and Norway are part of the literature foundation in the review. These four countries have health care systems, which, to some degree, are comparable, and hence make their research findings to some extent applicable to the Norwegian Health Care system. The articles describe interventions that have been performed to increase health care workers preference for working in remote locations, the effect of financial and non-financial incentives(2, 13, 14), personal factors such as age(11), heritage(15) and gender(16) of the practitioners and mandatory practice in remote locations as part of the medical education(17-20). Not all of the articles focus on the lack of GPs in remote locations, but merely describe the lack of health workers in general in remote areas(8, 9, 18). Four of the articles are reviews of available literature and research on the topic at the time of the study(3, 7, 9, 18). Two of the articles describes qualitative data namely interviews of doctors on their preferences and what might motivate them to work in remote areas(18, 21). Several of the articles are based on quantitative data derived from discrete choice experiments and questionnaires(2, 13, 15, 21-24). The difference in types of study design and methods in the included articles are chosen in hope to give a broader perspective and highlight the complex matter of finding the best suited solutions for attracting and retaining GPs in remote practice-locations.



## **2.2 Findings**

An OECD working paper by Ono et al. found that a maldistribution of doctors, exist in all OECD countries (2). There is however a lack of evidence, nationally and internationally, on the effect of implementing different policies for recruiting and retaining GPs to rural locations and hence correcting for the maldistribution. In the papers included in the literature review such policies, initiatives and factors, which might influence the recruitment and retention of GPs is discussed.

Monetary factors such as income, financial incentives, scholarships and reimbursements are discussed, not only in Ono's text, but throughout several of the papers. The working conditions, the prestige and professional support the doctors are given, are also important factors in the discussion of lack of GPs in rural areas. Characteristics of the GP, such as age, gender and the origin of the GPs are also matters of interest. Geographical issues such as the distance from the GP-practice to larger hospitals and the effect of decentralizing medical schools and medical training are also matters, highlighted in several of the papers. The main factors that influence the doctors' choice of practice location and, which have been highlighted throughout the articles have been made into subheadings to simplify and ease comparisons and to emphasize the key findings.

### **2.2.1 Financial incentives**

Scott et al.'s article found that the more remote area, the higher financial incentive were needed to attract GPs (2). Financial incentives such as increased income, reimbursement of student loans, rurally bonding scholarships, and paid temporary leave of absence are examples of successful interventions (16, 20). However financial incentives alone will not solve the

problem of underservice in remote areas and new research should focus on alternative and non-financial incentives (8). Nevertheless, the effect of financial incentives for attracting and keeping doctors in remote practice has been investigated in many of the included studies. Several of the studies do however not merely state that financial incentives might have an effect, but focuses on specific types of financial incentives. For instance, an article from Norway by Abelsen and Olsen investigates the preferences for alternative payment methods (14). The article describes, how the preference for payment systems differs between young male and female doctors - especially for general practice, with females favouring less variability in payment than their male counterparts (14). Regardless gender, all young doctors preferred a combined payment system. The combined system consists of an activity based-fee and a partial fixed salary. Young male and female doctors found the existing activity based payment system in general practice in Norway the least desirable (14). A Norwegian study by Holte et al. found that young GPs preferred salaried contracts. And that not merely the young GPs preferred this payment system, but also those who; worked in small municipalities, have more patients listed than preferred, work more hours per week, have relatively low income or few patients listed (24).

Li et al. (13) investigated another sort of financial incentives, namely how an increase in the level of locum relief incentives had a high effect on GP retention and that an increase in retention payments had an effect as well. Rural skills loading payments where also found to be significant.

Liu et al. (18) describes the implementation of a financial incentive in Japan, consisting of paid school intuition against 6-7 years of mandatory rural labour. Since school intuition is

publically financed in Norway, this is not relevant, however, reimbursement of loans related to school expenses has proven to be a relevant intervention in recruiting GPs to practice in remote locations (16). Both paid school intuition and reimbursement of loans are well-know incentives in Australia. The incentives are know as bonding schemes for medical schools and were introduced by the Australian Government to address to shortage of doctors outside the metropolitan areas across Australia (20).

However, the effects of such financial incentive programmes are controversial, since there is a lack of evidence to support the long-term effects of such (17). Another study completely dismisses the effect of financial incentives, and states that non-financial incentives, such as increasing the practice size in rural locations, seem to have a higher impact on GP recruitment and retention than financial incentives (23). This theory is supported by findings from Woolley et al.'s paper(20). He specifically investigates the effect of rurally bonding scholarships, bonding schemes for medical schools and decentralizing medical educations, and concludes that the most effective initiative for promoting rural recruitment and retention is the implementation of decentralized medical schools (20).

### **2.2.2 Origin of the GP**

McGrail et al. (15) supports results from the OECD papers (10), concerning the importance of the origin of the GP and specifies that GPs with more than 6 years of their childhood spent in rural areas were more likely to practice in rural areas, than those who had spent less than 6 years of their childhood in rural areas. For medical specialists more than 11 years of childhood in a rural area was significant for preferring rural practice. In Australia knowledge of such associations has led to an increased focus on attracting medical students with rural

backgrounds by orienting the selection process via targeting recruitment of rural high-school students (20).

In the paper by Strasser et al. it is also highlighted that studies performed in a wide range of other countries, developed as well as developing countries, a rural upbringing is strongly associated with entering medical practice in a rural location (19).

### **2.2.3 Mobility**

Scott et al. (2) found that doctors prefer practicing in urban locations to remote locations.

Another of the Australian articles (11) also focused on the mobility of doctors and how the number of years of settlement in a rural area might affect the GPs' choice of practice-location.

These results suggest, that GPs who have practiced less than 3 years in one area are in higher risk of moving away from the area and back to their more urban setting.

Liu et al. (18) found that doctors who have practiced for more than 6 years, in their first years of practicing medicine, are more likely to stay and keep practicing in a rural location, than those who have worked less than 6 years in a rural location (18).

Matsumoto et al. (13) also highlights the importance of experience from rural practice in the early years of the doctors' career as important for the doctors' later choice of rural practice.

### **2.2.4 Age**

McGrail et al. (15) concludes that, GPs under 40 years and those who are either salaried employees or on a contract are more likely to be mobile. However findings from a later

research, described by the same researchers find, that age, gender and family status were not associated with mobility (11).

### **2.2.5 Gender**

According to the article by McGrail et al. female GPs are less likely to be practicing in a rural location than their male colleagues (15).

### **2.2.6 Professional support, geographical distance, and prestige**

When it comes to the preferences of young doctors and newly educated doctors Kehlet and Aaraas (21) found that young doctors prioritize professional support and teamwork over income as a motivation for long-term stay in rural areas (21).

Findings from Andersen et al (25) support the arguments of why doctors' prefer working in more urban locations. These findings show that municipalities with unstable services were further away from the hospitals. These municipalities also report a greater workload on GPs and professional isolation (25), hence it is more attractive for GPs to work in urban locations where the service is more stable, the workload smaller and the practitioner does not experience the same amount of professional isolation. In the paper by Strasser et al. it is also highlighted that rural practicing GPs experience a higher degree of professional isolation than their urban practicing counterparts (19).

Furthermore, a study from 2002 found, that out of 23 different medical specialities, general practice came in as number 19. Hence being a GP was the 4<sup>th</sup> least prestigious medical speciality (26). Even if this study did not investigate the prestige of rural medical practice, one would imagine that it would be even lower on the list than general practice as such. This

might also influence the doctor's choice of practice location and specialization.

### **2.2.7 Working conditions**

The working conditions are also important to the GPs preference for working in remote areas (10). The findings from the article by Andersen et al. (25) reported that the municipalities which were furthest away from the hospitals were also those to reported a greater workload, hence unfavourable conditions for attracting new GPs. The article by Scott et al. (2) also found that the working conditions seemed to worsen by an increase in the distance to the nearest hospital, with hours on call being significantly higher the more remote the practice location. Statements from Strasser et al.'s paper supports these findings by claiming that rural practicing GPs experience a heavier workload than their urban practicing colleagues (19).

### **2.2.8 Decentralizing medical education**

An intervention that, according to Aaraas et al. (22), has had a positive effect on the supply of doctors to rural areas and which has proven sustainable, is the founding of a medical school in Northern Norway. There has ever since the founding of the school been a steady increase in the supply of graduated doctors who have started their careers in Northern Norway.

From the earlier classes, a large minority of doctors have also had their end-careers in Northern Norway, with a noticeable positive inclination in long term stay in primary health care (21).

In 2002 the Australian Government initiated a similar project to reduce the shortage of rural practicing doctors in Australia. The aim of the program was to give medical students at least

one year of clinical training in a rural setting. The results showed an incline in the participants' willingness to work in rural areas (27).

At several rural locations throughout Canada similar decentralized medical schools have been developed with positive effects on the supply of GPs to rural locations (19). In the paper by Woolley et al. it is in fact mentioned to be the most effective intervention out of a range of interventions, such as targeting students with rural backgrounds, scholarships for rural practice, and reimbursement of student loans (20).

### **2.3 How is this relevant for my study?**

Several articles from other countries have been selected and included in the literature review. This is done to emphasize the gravity of the concern in regard to recruitment and retention of GPs in rural practice. The issue is not only of national concern, but is regarded a serious and increasing problem internationally as well. Therefore, it is found relevant to not merely include Norwegian studies, but studies from other nations as well. Furthermore, several of the included studies describe interventions performed in health care systems that are, to a certain degree, similar to the Norwegian Health Care system, hence these interventions may be relevant for Norwegian conditions as well.

### **2.4 Conclusion and emerging issues**

There seems to be a dispute in the research literature regarding the effects of financial versus non-financial incentives to recruit and retain GPs to rural areas. One article claims that there is a lack of research on the long-term effects of financial incentives. That we merely know that financial incentives have a positive effect in solving the acute shortage of GPs in rural

areas, but whether it helps retain them for longer terms, is still unknown (9). However, the article by Abelsen and Olsen suggest that financial incentives might be beneficial if they are tailored to the doctors preferences (14). One of the articles concludes that there is an increasing discrepancy between GPs current contract/payment form and the preferred one (24); hence attention to alternative payment systems should be given.

In general, incentives to attract doctors to practice in rural areas is important, since the trend of wanting to practice in urban settings is increasing (17). Holte et al.'s article concludes, that it may not be a matter of financial versus non-financial incentives, but that there is a need for joint policy programs, combining several types of initiatives if they are to have an effect in motivating doctors to practice in rural areas (23). Unstable health care services and motivation of doctors to practice in rural areas are, according to Andersen et al.'s article, related to structural and organizational issues, such as distance to hospitals, professional isolation and high workload (25).

The decentralization of medical schools and training has also proven to have a positive effect in addressing the shortage of rural practicing GPs (20).

McGrail et al.(15) concludes, that targeting and training medical students with rural backgrounds could solve this issue. It could play an important part of covering the shortage of GPs practicing in rural areas (15). In South Africa training of a new type of health professionals, known as medical assistants, has been implemented as an attempt to cover the shortage of GPs, particularly in rural areas (19). *To do with less* is also a strategy to respond to the imbalances in doctor distribution pointed out by Ono et al (8).



The majority of medical students are female. The study by Abelsen et al. implies that they are more reluctant to practicing in rural areas; hence policies targeting female students should be given attention (15).

Kehlet and Aaraas (21) furthermore conclude that policies regarding retaining and attracting GPs to practice in rural settings should be based on local involvement and control. Models of inter-municipal health care services, to attract GPs, should be developed by a mutual participation of politicians, administrators and the local health care workforce (21).

The increasing maldistribution of GPs is of great concern for policy makers across the world. This is made evident throughout the articles included in this review. In the OECD working paper (10) this is concluded and three approaches to equal out the imbalance are suggested:

- Target future physicians
- Target current physicians
- Learn to do-with-less, i.e. re-designing and restructuring existing limited resources, so they become satisfying (10).

Five of the articles (10) (11) (18) (2) (13) conclude that a lot of policies are implemented in the absence of evidence; hence more research is needed to support future policies and interventions. By the articles included in the review it is made evident that the lack of GPs in remote areas is an important issue in the access to health care. And several of the articles demonstrate propositions to interventions or policies to retain and attract GPs and hence increase the access to health care.

## **Chapter 3 Methods and material**

### **3.1. Data collection**

To highlight the preferences for practice location among Norwegian GPs and prospering GPs, data from two cross-sectional surveys have been exerted. One of the datasets was collected among experienced GPs in Norway; the other dataset was collected among medical interns and last-year medical students in Norway.

Statistical analyses of both datasets have been performed.

#### **3.1.1 The GP dataset**

The data was collected through structured online questionnaires, which were distributed in May 2012. All Norwegian GPs (n=4305) registered in the HELFO database were invited to participate in the survey. The GPs received a postal invitation with an Internet address from where the questionnaire could be found. Three reminders were posted. The response rate after three reminders was 30 percent, which was considered to be enough to give a representative estimate of the general Norwegian population of GPs according to their background characteristics (28). The number of specialists in General medicine are however overrepresented in the sample group.

The questionnaire contained six sections describing certain characteristics and preferences of the GP (See appendix 1 for more information). Only parts of the data from the questionnaire were analysed in this study.

### **3.1.2 The Last-year medical students and interns dataset**

At the end of 2010 all last-year medical students and interns (n=1562) in Norway received an information letter including a link to an online questionnaire. The organizers of the internships (Health Authorities and County Governors) and the four medical faculties supplied the contact information. After receiving the information letter, two reminders were emailed (28). The final response rate after the reminders was 53 percent. The response rate was considered to be satisfying and the sample group large and diverse enough to be representative of all known background characteristics of the main Norwegian population of medical students and interns (14).

The questionnaire consisted of twenty-nine questions covering certain characteristics and preferences of the medical students and interns (see appendix 2 for more information). Only parts of the data from the questionnaire were analysed in this study.

## **3.2 Data selection criteria**

### **3.2.1 GP data**

From the questionnaire section four and five were found relevant to answer this thesis' objectives, and were therefor included in the further study. Section four consisted of two questions. The first question was included in the study the second question was irrelevant and excluded from further research. In the first question (see appendix 1) the GP was asked to choose the size of their current practice location, their least preferred practice location, and their most preferred practice location in regard to size of municipality.

From section four *preferred practice location* was used as dependent variables in the

statistical analysis.

Section five consisted of twelve questions with background information on the GP. Eight of the twelve questions, along with the question of *current practice location* from section four were considered relevant as independent variables and included in the statistical analysis.

### **3.2.2 Last-year medical students and interns data**

In the questionnaire, the participants were asked to answer twenty-nine questions, from question four to eleven were questions concerning the background characteristics of the student or intern. The first three questions were concerning the current position of the prospective doctor, i.e. last-year medical student, intern at a hospital or intern in general practice. In question two the participants were asked to choose their preferred future job position out of six alternatives. Only those who chose *General Practitioner* (n= 437) (see table 5) were of interest for the study (see appendix 2). In question three the participants were asked to choose the preferred number of inhabitants in their future practice location. Question four to eleven were considered relevant as independent variables and included in the statistical analysis.

### 3.3 Variables

#### 3.3.1 GP data

##### *Dependent variable*

- **Preferred practice location:** a continuous variable consisting of four groups: municipalities with: less than 5000 inhabitants, 5000-14.999 inhabitants, 15.000-49.999 inhabitants, municipalities with more than 50.000 inhabitants

##### *Independent variables*

- **Gender:** a binary variable with the categories female and male.
- **Age:** a continuous variable, recoded into four equal sized groups: under 40, 40-49, 50-59, 60 and above.
- **Current practice location:** a continuous variable, coded into the same four groups as the variable *preferred practice location*.
- **Location of medical training:** a binary variable with the categories Norway and abroad.
- **Specialist in general medicine:** a binary variable with the categories yes – a specialist and no - not a specialist
- **Number of listed patients:** a continuous variable, recoded into four equally sized groups of patients, 150-899, 900-1149, 1150-1349, 1350-2500.
- **Hours at work per week:** a continuous variable, recoded into four equally sized groups, 8-39, 40-45, 46-50, more than 50.

- **Gross income in 2011:** a continuous variable, coded into seven equally sized groups, less than 700.000 NOK, 700.000-849.000 NOK, 850.000-999.000 NOK, 1.000.000-1.149.000 NOK, 1.150.000-1.299.000 NOK, 1.300.000-1.500.000 NOK, more than 1.500.000 NOK

### 3.3.2 The Last-year medical students and interns data

The dataset analysed was created from the background variable *future job position*. The medical interns and last-year students could choose between six different future job positions. The only respondents of interest for this study were those who chose *general practitioner* as their potential job position. Those who answered *yes* on wanting a future job as a GP were selected, and a dataset with only these respondents was analysed.

#### ***Dependent variable***

The dependent variable of interest was *preferred practice location by size of municipality among prospective GPs*.

- **Preferred practice location among prospective GPs:** coded as a continuous variable consisting of four groups: municipalities with: less than 5000 inhabitants, 5000-14.999 inhabitants, 15.000-49.999 inhabitants, municipalities with more than 50.000 inhabitants

#### ***Independent variables***

- **Present occupation:** a categorical variable, coded as three groups, last-year medical student, medical intern at a hospital, or medical intern in general practice.

- **Gender:** coded as a binary variable with the categories female and male.
- **Age (in years):** a continuous variable, recoded into four equally sized groups: 23-26, 27, 28-29, 30 and above.
- **Marital status:** a categorical variable, coded as three groups, single, in a steady relationship, and married.
- **Children:** coded as a binary variable with the categories yes – one or more kids and no kids.
- **Study location:** a categorical variable, coded into 5 groups, Tromsø, Trondheim, Bergen, Oslo and abroad. Because it was irrelevant for the analysis to have 5 groups, the variable was recoded into a binary variable, studied in Norway or studied abroad.
- **Parents with medical education:** a categorical variable, coded as three groups, my mom, my dad or none of my parents have a medical education. It was irrelevant for the analysis to know which of the parents had a medical education, the variable was therefor recoded into a binary variable, yes –one of my parents have a medical education and no – none of my parents have a medical education.
- **Origin of home region:** a categorical variable, coded as the 19 municipalities in Norway along with a group named, foreign country. Recoded into 5 new groups of equal sizes, Northern Norway, South-and East Norway, Mid-Norway, West Norway and foreign country.
- **Number of inhabitants in home municipality:** a continuous variable, coded as 7 groups, under 3000, 3000-4999, 5000-9999, 10.000-14.999, 15.000-29.999, 30.000-49.999, 50.000 or more. To ease interpretation, the variable has been recoded into the same groups as the dependent variable *preferred practice location among future GPs*.

For all variables which have been recoded into groups, it has been attempted to create as equally sized groups as possible, in respect to discrete values, hence the cutting points only include whole numbers.

### **3.4 Statistical analyses**

The software program SPSS version 23 was used to perform all statistical analyses.

Descriptive and inferential statistics were used to describe the independent and dependent variables in the study and to find possible associations between the variables. Frequency counts and cross-tables were produced. The frequency and distribution of all variables are displayed in tables (see table 1, 2, 3, 5, 6, and 7) in the results-section. From these the distributions can be assessed in numbers and percentages.

By creating cross-tables and performing chi-square tests the associations between dependent and independent variables were found. These are also displayed in tables (see table 3, 4, 8 and 9) in the results-section. The chi-square test (see the p-value in table 3, 4, 8 and 9 in the results section) indicates whether the variables are statistically associated or not (29). A p-value below 0.05 indicates that there is a statistical significant association between the variables. In this study p-values of 0.055 have been assessed as *borderline* significant, indicating that they are close to being significant, but are however not significant. Had the sample sizes been larger the now borderline p-values of 0.055 might have been below 0.05.

The independent variables from table 3 and 8, which were found to be significantly associated with the dependent variables were used to create logistic regression analyses to measure the



strength of the simultaneous associations (30). Hence to see which independent variables had the strongest association to the dependent variables.

In table 4 and 9 in the results-section, the results of the logistic regression analyses are displayed. To make logistic analyses possible, several of the independent variables were recoded into dummy variables. In the tables the reference category for each variable is marked with a *1* in the odds ratio column, and represents the group to which the other groups are compared. I.e. for the variable *age groups* the age group *below 40 years* is the reference group, marked 1, and all other age groups are compared to this group. Hence, the risk of the outcome is compared to the reference group for each variable. The *95% confidence interval* (CI) indicates the precision of the odds ratio (OR). A large CI indicates a low level of precision of the OR, whereas a small CI indicates a higher precision of the OR (31). If the 95% CI does not include 0 it also indicates that the association is statistically significant.

### **3.5 Ethics**

All participants were informed about the objectives of the study through the letter of invitation. It was emphasized that the participation was voluntary, and that they were free to withdraw from the study at any given time. The surveys were carried out according to the existing licenses, e.g. the Personal Data Act and reported to the Data Protection Official for Research (NSD). The surveys did not require approval from the Regional Committee for Medical and Health Research Ethics (14, 28).

## Chapter 4 Results

### 4.1. Results from the GP dataset

Table 1 depicts the characteristics of the GPs, i.e. how the characteristics of the GPs are distributed across the independent variables; *gender, age, current practice location, location of medical training, specialist in general medicine, number of listed patients, hours at work per week, gross income in 2011.*

**Table 1: GP characteristics**

Variable	Value	Percent	n
Gender of the GP	Female	37.2	468
	Male	62.8	791
Age of the GP (years)	Under 40	28.4	345
	40-49	23.4	284
	50-59	31.0	377
	60 and above	17.3	210
Current practice location (municipality size by number of inhabitants)	Under 5.000	14.9	187
	5.000-14.999	23.1	291
	15.000-49.999	29.0	365
	50.000 or more	33.0	415
Location of medical training	Norway	69.7	877
	Foreign country	30.3	382
Specialist in general medicine	Yes	70.3	885
	No	29.7	374
Number of listed patients	150-899	19.2	241
	900-1.149	28.7	359
	1.150-1.349	26.2	328
	1.350-2.500	25.9	324
Hours at work per week	8-39	17.0	210
	40-45	39.7	490
	46-50	26.7	329
	51 or more	16.6	205
Gross income in 2011 in NOK	Less than 700.000	11.0	137
	700.000-849.000	16.5	205
	850.000-999.000	20.4	253
	1.000.000-1.149.000	17.4	216

	1.150.000-1.299.000	16.7	208
	1.300.000-1.500.000	10.1	125
	1.500.000 or more	8.0	99

### **Preferred practice location among GPs**

Table 2 displays the preferred practice location by size of municipality. Among the GPs 10.4 percent preferred to practice in municipalities with less than 5.000 inhabitants. The preferences for working in municipalities with more than 5.000 inhabitants are quite equally distributed between categories. The distribution of preference in practice location creates a bell-formed curve, peaking in the larger mid-sized municipalities with 15.000-49.999 inhabitants, before decreasing in the largest municipalities.

***Table 2: Preferred practice location among GPs***

<b>Municipality size</b>	<b>Percent</b>	<b>n</b>
<b>Under 5.000 inhabitants</b>	10.4	129
<b>5.000-14.999 inhabitants</b>	27.3	337
<b>15.000-49.999 inhabitants</b>	32.8	406
<b>50.000 or more inhabitants</b>	29.4	364
<b>Total</b>	100.0	1 259

#### **4.1.2. Associations between preferred practice location and GP characteristics**

In table 3 several independent variables have been crossed with the dependent variable *preferred practice location*. By doing this the association between certain GP characteristics and the preference in practice location can be measured. The gender, age or gross income level of the GP does not influence the GP's preference in practice location.

In regard to the association between preferred practice location and current practice location the highest percentage throughout table 3 is in the cells, which indicate a high positive correlation between preferred practice location and current practice location. This means that in all cases more than 60 percent of the GPs are currently practicing in their preferred location. However, there is a relatively high percentage of GPs who currently practice in municipalities below 5.000 inhabitants but would prefer to work in a larger municipality. I.e. 143 (11.6 percent) of the GPs would prefer working in a larger municipality than the one they are currently working in. Whereas 132 GPs (10.7 percent) would prefer working in a municipality smaller than the one they are currently working in. Besides those who currently work in their preferred practice location, the highest percentages are centred in the municipalities with 5.000-49.999 inhabitants. The p-value of this result is less than 0.001, indicating that there is a strong association between preferred practice location and current practice location.

A greater percentage of GPs who have received their medical training abroad prefer working in municipalities below 5.000 inhabitants than those who have received their training in Norway. The results are significant with a p-value below 0.05, meaning that there is a

statistically significant association between location of medical training and preferred practice location.

Table 3 displays that both specialists and non-specialists prefer a practice location in a municipality with more than 5.000 inhabitants. However, a significantly higher percentage of those who are not specialized in general medicine would prefer working in a municipality with less than 5.000 inhabitants compared to those who are specialized in general medicine.

The least preferable practice location is to work in a municipality with less than 5.000 inhabitants and have more than 1.350 patients listed (see Table 3). Around 45 percent of the GPs would prefer working in a municipality with more than 50.000 inhabitants and have more than 1.350 patients on their consultation list. These results are highly significant.

The least preferred practice location, regardless the amount of hours at work per week are municipalities with less than 5.000 inhabitants (see Table 3). Among GPs who work 46-50 hours a week 38 percent would prefer a practice location with 15.000-49.999 inhabitants. The association between hours at work per week and preferred practice location are significant with a p-value of 0.006.

**Table 3: Association between preferred practice location by size of municipality and GP characteristics**

Variable	Value	Municipality size (inhabitants)				Total	n	p-value
		Under 5.000	5.000-14.999	15.000-49.999	50.000 and above			
<b>Gender</b>	Female	11.5	27.8	32.5	28.2	100	461	0.736
	Male	9.8	27.0	33.0	30.2	100	775	
<b>Age groups (in years)</b>	Under 40	13.3	25.7	34.8	26.3	100	339	0.249
	40-49	9.3	28.2	34.3	28.2	100	280	
	50-59	8.9	27.3	30.0	33.8	100	125	
	60 and above	7.3	28.3	33.7	30.7	100	63	

<b>Current practice location (municipality size by number of inhabitants)</b>	Under 5.000	61.4	23.4	11.4	3.8	100	184	< 0.001
	5.000-14.999	2.8	79.1	15.7	2.4	100	287	
	15.000-49.999	0.6	12.3	81.5	5.6	100	357	
	50.000 and above	1.5	5.6	12.0	80.9	100	408	
<b>Location of medical training</b>	Norway	8.9	28.9	31.2	31.0	100	865	0.003
	Foreign country	14.0	23.5	36.7	25.9	100	371	
<b>Specialist in general medicine</b>	Yes	8.5	28.1	33.6	29.1	100	873	0.006
	No	15.2	25.3	31.1	28.4	100	363	
<b>Number of listed patients</b>	150-899	28.3	35.4	22.8	13.5	100	237	< 0.001
	900-1.149	10.3	34.0	32.6	23.1	100	350	
	1.150-1.349	5.9	27.7	35.7	31.7	100	322	
	1.350-2.500	1.9	14.4	37.8	45.9	100	320	
<b>Hours at work per week</b>	8-39	14.5	32.4	24.2	29.0	100	207	0.006
	40-45	12.3	24.9	33.7	29.1	100	478	
	46-50	6.5	24.7	38.0	30.9	100	324	
	51 or more	8.9	21.2	32.2	27.7	100	202	
<b>Gross income in 2011 in NOK<sup>1</sup></b>	Less than 700.000	13.4	26.9	27.6	32.1	100	134	0.238
	700.000-849.000	11.6	31.8	27.8	28.8	100	198	
	850.000-999.000	9.2	30.0	36.4	24.4	100	250	
	1.000.000-1.149.000	9.8	24.7	37.2	28.4	100	215	
	1.150.000-1.299.000	10.3	27.9	35.8	26.0	100	204	
	1.300.000-1.500.000	8.1	21.1	33.3	37.4	100	123	
	1.500.000 or more	12.2	23.5	27.6	36.7	100	98	

<sup>1</sup> NOK = Norwegian Crowns (the Norwegian valuta)

#### 4.1.3. Strength of association between preferred practice location and GP characteristics

The results from table 3 which were statistically significant have been used to conduct a logistic regression analysis to find which independent variables have the strongest association on the GPs preference for working in small municipalities. In addition it was controlled for gender and age. As in the above logistic regression, the dependent variable *preferred practice location* has been recoded into a binary variable, with small municipalities (Y =1), and all other sizes of municipalities (Y = 0). Hence the logistic regression is applied to check how the

independent variables *GP characteristics* influence the preference of preferred practice location being a small municipality (Y=1).

Table 4 displays that for the variables *gender*, *age*, and *hours at work per week* there is no statistical significant association with the preference in practice location. Hence; these variables do not impact significantly on the GPs preferences in practice location.

For the variables *current practice location*, *location of medical training* and *specialist in general medicine* the association with preferences in practice location are highly significant.

The GPs who currently practice in a municipality with less than 5.000 inhabitants are 42 times more likely to continue practicing in a small municipality than those who originate from a municipality with 15.000-49.999 inhabitants. Those who currently practice in a municipality with 5.000-14.999 inhabitants are 33 times more likely to prefer practicing in a small municipality than those who are from a municipality with 15.000-49.999 inhabitants. For those who currently practice in a municipality with more than 50.000 inhabitants the likelihood for them to prefer practicing in a small municipality is 50 percent lower than for their colleagues who practice in municipalities of 15.000-49.999 inhabitants.

For the GPs who have done their medical training abroad the likelihood for them to prefer practicing in a small municipality is 45 percent lower than for those who have received their medical training in Norway. The GPs who are not specialized within the field of general medicine are also almost 41 percent less likely to practice in a small municipality compared to the specialists in general medicine.

For the largest group categorized by the variable *number of listed patients*, a significant association is detected. I.e. the GPs with more than 1.350 listed patients tend to be 50 percent less likely to prefer a small practice location than those with 900-1.149 patients on their list.

**Table 4: Strength of association between preferred practice location and GP characteristics**

Variable	Value	Odds Ratio	95% CI of the Odds Ratio	p-value
<b>Gender</b>	Female (reference)	1		
	Male	1.21	0.83-1.80	0.326
<b>Age group (in years)</b>	40 or younger (reference)	1		
	40-49	0.84	0.50-1.41	0.494
	50-59	1.08	0.65-1.80	0.769
	60 or older	1.09	0.60-1.98	0.788
<b>Current practice location</b>	Under 5.000 inhabitants	42.11	23.66-74.97	<0.001
	5.000-14.999 inhabitants	33.50	21.21-52.91	<0.001
	15.000-49.999 inhabitants (reference)	1		
	50.000 and above inhabitants	0.51	0.31-0.83	0.007
<b>Location of medical training</b>	Norway (reference)	1		
	Foreign country	0.55	0.37-0.82	0.003
<b>Specialist in general medicine</b>	Yes (reference)	1		
	No	0.59	0.37-0.95	0.028
<b>Number of listed patients</b>	150-899 patients	1.22	0.74-2.03	0.435
	900-1.149 patients (reference)	1		
	1.150-1.349 patients	0.95	0.60-1.50	0.825
	1.350-2.500	0.53	0.32-0.89	0.017
<b>Hours at work per week</b>	8-39 hours	1.57	0.94-2.61	0.082
	40-45 hours (reference)	1		
	46-50 hours	0.82	0.52-1.28	0.386
	51 hours or more	0.84	0.50-1.40	0.494



## 4.2. Results from the last year medical student and medical interns dataset

Last-year medical students and medical interns were asked to choose which profession they would prefer to be in in ten-fifteen years. They could choose between six different options. These options being; GP, practitioner or specialist at a Community hospital, practitioner or specialist at a University hospital, practitioner at a private clinic, performing research, studying or doing a Phd-program or an undefined *other* category. In table 5 it is given that more than 50 percent wanted to work as a GP.

**Table 5: Future job position**

	Percent	n
<b>General Practitioner</b>	52.6	437
<b>Other</b>	47.4	394
<b>Total</b>	100.0	831

Those who chose *General Practitioner* are the ones of interest for further research in this study. The category *other* represents those who answered that they would prefer one of the five other options. A new dataset was created only including the 52.6 percent (n=437) who wanted a future career in general medicine.

Table 6 depicts the characteristics of the prospective GPs, i.e. how the characteristics of the future GPs are distributed across the independent variables; *present occupation, gender, age, marital status, children, study location, parents with medical education, origin of home municipality* and *number of inhabitants in home municipality*.

**Table 6: Characteristics of prospective GPs**

<b>Variable</b>	<b>Value</b>	<b>Percent</b>	<b>n</b>
<b>Present occupation</b>	Last-year medical student	35.7	156
	Medical Intern (hospital)	35.5	155
	Medical Intern (general practice)	28.8	126
<b>Gender</b>	Female	61.7	269
	Male	38.3	167
<b>Age groups (years)</b>	23-26	31.0	134
	27	16.7	72
	28-29	25.9	112
	30 or older	26.4	114
<b>Marital status</b>	Single	20.6	90
	Steady relationship	19.5	85
	Married	59.9	261
<b>Children</b>	Yes	25.5	111
	No	74.5	324
<b>Study location</b>	Studied in Norway	78.0	340
	Studied abroad	22.0	96
<b>Parents with medical education</b>	Yes	17.6	77
	No	82.4	360
<b>Origin of home municipality</b>	Northern Norway	16.0	70
	Mid Norway	18.1	79
	Western Norway	21.1	92
	East/South Norway	41.9	183
	Foreign country	3.0	13
<b>Number of inhabitants in home municipality</b>	Less than 5.000	13.1	56
	5.000-14.999	23.1	99
	15.000-49.999	26.1	112
	50.000 or more	37.8	162

Table 7 was created and displays the preference of municipality size in which the prospective GPs would want to practice. Among the prospective GPs, 311 answered the question of preferred practice location (126 missing). Of the 311 prospective GPs, 37.3 percent of them would prefer to practice in a community with 15.000-49.999 inhabitants, 35 percent would

prefer practicing in the largest municipalities, 24.5 percent in municipalities with 5.000-14.999 inhabitants, and only 3.2 percent (10 prospective GPs) would prefer a practice location with less than 5.000 inhabitants.

**Table 7: Preferred practice location among prospective GPs**

Municipality size	Percent	n
<b>Under 5000 inhabitants</b>	3.2	10
<b>5000-14.999 inhabitants</b>	24.5	76
<b>15.000-49.999 inhabitants</b>	37.3	116
<b>50.000 or more inhabitants</b>	35.0	109
<b>Total</b>	100	311

#### **4.2.1. Associations between preferred practice location and prospective GP characteristics**

In table 8, several independent variables have been crossed with the prospective GPs preferred practice location in regard to municipality size, to see which variables might significantly influence the choice of practice location. The majority of the independent variables do not significantly influence the prospective GPs preference in practice location. This includes the independent variables *present occupation, gender, age groups, marital status, children, parents with medical education* and *origin of home municipality*. The independent variable *study location* is borderline significant, which means that the p-value is not below 0.05, but lies very close with a p-value of 0.055.

Both among the prospective GPs who have studied in Norway and those who have studied abroad, the smallest municipalities are the least favourable practice locations. However, compared to those who have studied in Norway, only half of those who have studied abroad would prefer working in the smaller mid-sized municipalities, while 48.3 percent of those

would prefer working in the largest municipalities. For those who have studied in Norway the preference in practice location is quite evenly distributed among the municipalities with more than 5.000 inhabitants, with a small majority of them preferring the larger mid-sized municipalities.

The only independent variable that is statistical significantly associated with the prospective GPs preferred practice location is *the number of inhabitants in home municipality*.

Table 8 displays the number of inhabitants in the home municipality, which, with a p-value below 0.001, is significant to the size of preferred practice location. The majority of those who originate from one of the three largest municipalities would prefer working in a similar sized municipality. The majority of those who originate from the smallest municipalities would prefer working in a larger municipality. However almost 20 percent of those who originate from the smallest municipalities would prefer working in a municipality with less than 5.000 inhabitants.

**Table 8: Associations between preferred practice location and prospective GP characteristics**

Variable	Value	Municipality size				Total	n	p-value
		Under 5.000	5.000-14.999	15.000-49.999	50.000 and above			
<b>Present occupation</b>	Last-year medical student	2.4	31.5	33.9	32.3	100	127	0.336
	Medical intern (hospital)	3.6	20.0	37.3	39.1	100	110	
	Medical intern (general practice)	4.1	18.9	43.2	33.8	100	74	
<b>Gender</b>	Female	2.6	25.0	36.7	35.7	100	196	0.823
	Male	4.3	23.5	38.3	33.9	100	115	
<b>Age groups (years)</b>	23-26	1.8	23.9	42.2	32.1	100	109	0.108
	27	9.4	30.2	34.0	26.4	100	53	
	28-29	4.1	23.3	32.9	39.7	100	73	
	30 or older	0.0	22.7	36.0	41.3	100	75	
<b>Marital status</b>	Single	2.9	25.0	30.9	41.2	100	68	0.494
	Steady relationship	6.6	24.6	41.0	27.9	100	61	
	Married	2.2	24.2	38.5	35.2	100	182	
<b>Children</b>	None	3.7	25.3	35.7	35.3	100	241	0.630
	1 or more	1.4	21.7	42.0	34.8	100	69	
<b>Study location</b>	Studied in Norway	3.2	27.1	37.8	31.9	100	251	0.055
	Studied abroad	3.3	13.3	35.0	48.3	100	60	
<b>Parents with medical education</b>	Yes	5.6	29.6	25.9	38.9	100	54	0.224
	No	2.7	23.3	39.7	34.2	100	257	
<b>Origin of home municipality</b>	Northern Norway	3.8	32.1	35.8	28.3	100	53	0.325
	Mid Norway	1.9	37.7	32.1	28.3	100	53	
	Western Norway	3.9	19.7	32.9	43.4	100	76	
	East/South Norway	3.4	19.3	42.0	35.3	100	119	
	Foreign country	0.0	10.0	50.0	40.0	100	10	
<b>Number of inhabitants in home municipality</b>	Less than 5.000	18.4	50.0	23.7	7.9	100	38	<0.001
	5.000-14.999	0.0	54.4	33.8	11.8	100	68	
	15.000-49.999	1.3	16.3	65.0	17.5	100	80	
	50.000 or more	1.7	5.8	24.8	67.8	100	121	

#### **4.2.2. Strength of association between preferred practice location and prospective GP characteristics**

The results from table 8 which were statistically significant have been used to conduct a logistic regression analysis to find which independent variables have the strongest association with the prospective GPs preference for working in small municipalities (see Table 9). In addition, the dependent variable was controlled for gender and age. The dependent variable *preferred practice location* was recoded into a binary variable, since logistic regression analysis is used to answer a question that can have only one of two possible values. Hence, the dependent variable *preferred practice location* was recoded into small municipalities (Y= 1), and all other sizes of municipalities (Y= 0). The independent variables prospective *GP characteristics* are checked for their association with the preferred practice location being a small municipality (Y=1).

For the variables *gender*, *age* and *study location* there is no statistical significant association with preference of practice location. Hence; these independent variables do not impact significantly on the preferences of the prospective GPs choice in practice location.

However, *number of inhabitants in home municipality* is highly associated with the preference of practice location. I.e. those who originate from a municipality with less than 5.000 inhabitants are almost 30 times more likely to prefer working in a small municipality than those who come from a municipality with more than 50.000 inhabitants. This likelihood decreases as the size of home municipality increases. I.e. those from a municipality with 5.000-14.999 inhabitants are 15 times more likely to prefer a small practice location than

those from a municipality with more than 50.000 inhabitants. Those from a municipality with 15.000-49.999 inhabitants are almost two times more likely to practice in a small municipality compared to those from a municipality with more than 50.000 inhabitants.

**Table 9: Strength of association between preferred practice location and prospective GP characteristics**

Variable	Value	Odds ratio	95% CI of the Odds ratio	P-value
<b>Gender</b>	Female (reference)	1		
	Male	0.89	0.48-1.65	0.700
<b>Age groups (in years)</b>	23-26 (reference)	1		
	27	2.09	0.89-4.87	0.090
	28-29	1.47	0.66-3.26	0.348
	30 or older	0.89	0.40-2.02	0.786
<b>Number of inhabitants in home municipality</b>	Less than 5.000	29.30	10.76-79.77	<0.001
	5.000-14.999	16.03	6.83-37.61	<0.001
	15.000-49.999	2.91	1.18-7.1	0.020
	50.000 or more (reference)	1		
<b>Study Location</b>	Studied in Norway (reference)	1		
	Studied abroad	0.95	0.40-2.24	0.907

## **Chapter 5 Discussion**

The objectives of this thesis was to investigate why GPs prefer to practice in a large municipality over a small municipality, whether there are any specific factors associated with the preferences, and if any initiatives have been taken to improve the inclination.

Furthermore, possible associations between GP characteristics and the preference in practice location have been detected and whether any of these characteristics were significant in predicting the GP's preference in practice location.

### **5.1. Discussion of results**

In the literature review the effect of financial incentives on the GPs preference in practice location is debated. An association between remoteness of practice location and amount of financial incentives was detected, with more remote practice locations demanding a higher financial incentive to allure GPs to practice there. However, it is furthermore stated that financial incentives are not the solution to the underservice of GPs in small and remote municipalities, and new research should focus on initiatives such as improving the professional support and minimizing the workload (25) to raise the GPs preference for practicing in rural locations (2). In line with this statement, the datasets used in the descriptive studies do not include questions concerning financial incentives, but focuses on characteristics of the GP (experiences and prospective respectively). One relevant question is how this knowledge might be useful in developing new interventions and policies.



The review highlights a possible association between the origin of the GP and the preference in practice location. The origin of the GP is unfortunately not one of the GP characteristics, which have been included as a variable in the datasets collected among Norwegian GPs. It has however been included in the dataset from the prospective GPs. In this dataset the variable *size of home municipality* was found significantly associated with the doctors preference in practice location, with those from small municipalities being more positively inclined to practice in small municipalities. Hence; the size of the GP's home municipality is a significant predictor of the GP's preference in practice location.

Mobility and geographical distance is a matter of concern, which is identified in the literature review (10). Doctors who fulfil part of their medical training in small, remote municipalities are more inclined to practice in small municipalities (17), and the longer time the young doctors have spent practicing in a small municipality, the greater the chance is that he/she will continue practicing in a similar sized municipality (11). The GP-dataset however only displays a minority of the GPs having done part of their medical training in small municipalities (see table 3). This tendency is regardless if the GPs have studied in Norway or abroad, overall, the smallest percentage of the GPs have done parts of their medical training in municipalities with less than 5000 inhabitants. For GPs the percentages was 8.9 percent for those who studied in Norway and 14.0 percent for those who received their medical training abroad. For the prospective GPs the number was even lower; 3.2 percent of those who studied in Norway did parts of their medical training in municipalities with less than 5000 inhabitants and for those who studied abroad the number was 3.3 percent. To make matters worse the percentage of prospective GPs who had received training in small municipalities was lower than the percentage of GPs who had received training in small municipalities. Hence, the

results indicate that fewer doctors have done parts of their medical training in small municipalities than earlier. As stated above doctors who fulfilled parts of their medical training in rural or small municipality are more inclined to continue practicing in small municipalities, so if only a small and declining minority receives parts of their medical training in small municipalities, it will continue to merely being a minority that would prefer practicing in a small municipality.

Initiatives to try to ameliorate this tendency should therefore be given priority. Increased financial support from the Governments to the medical schools to attract more students, increased quotas to students with a rural origin, and financial support to internships in small municipalities offered by the rural municipalities themselves are examples of initiatives, which could help ameliorate the tendencies. However these initiatives will due to limited financial resources in the health care sector meet resistance, since money spent on these initiatives are money foregone somewhere else (4). It is however important to bare in mind, that this is a long term investment that will likely have effect on the overall health state of the population for years to come.

The medical school in Northern Norway withholds 60 percent of its quotas to students from the North with a positive effect on the supply of doctors to small municipalities (22).

Decentralization of medical education, has, according to the literature review, been performed in Northern Norway, Canada, England and Australia with a positive effect on the medical candidates preference towards practicing medicine in small municipalities (19, 22). One of the most up-to-date articles included in the literature review actually investigates the importance of the GPs origin, different types of rurally oriented scholarship schemes for prospective GPs,

and decentralizing medical schools. The factor that had the strongest effect on the GPs preference for rural practice, was decentralizing the medical educations (20).

In Norway many students take up loans in order to finance their living expenses while studying. As seen in Australia, reimbursement of such loans against a mandatory period of practice in a rural location after graduation could be a possible intervention to improve the preference for rural practice (32).

The associations between the GP characteristics *age* and *gender* and the preference in practice location are mixed. The literature review found no significant association between age, gender and the preference in practice location. Even though the findings are non-significant McGrail et al.'s article claims, that women doctors are less likely to preferring to practice in a remote area than their male colleagues (15). This is however not concurrent with the results from the Norwegian datasets where we found no statistically significant indication that gender is a valid predictor of practice location preference.

When assessing the GPs and the prospective GPs preferences in practice location by size of municipality (see table 2 and table 7 in the results section) it is detected that for both groups the least preferred practice locations are the smallest municipalities (those with less than 5000 inhabitants). For the GPs 10.4 percent would prefer a practice location with less than 5000 inhabitants, whereas for the prospective GPs only 3.2 percent would prefer to practice in this size of municipality. Among the prospective GPs, 13.1 percent originate from municipalities with less than 5000 inhabitants (see table 6), hence it is only a small percentage of these that would prefer returning and practicing in a small municipality. The size of hometown municipality was not included in the GP questionnaire, hence no variable upon this subject

was created in the dataset and therefore we cannot make any assumptions upon the GPs preference for returning and practicing in a similar size municipality as the one they originated from.

For both groups, current practicing and prospering GPs, the preferred sizes of practice locations are the larger mid-sized municipalities with 15.000-49.000 inhabitants. Among the prospective GPs 37.3 percent would prefer this municipality size compared to 29.4 percent of the current practicing GPs.

The explanation for these distributions - fewer of the prospective GPs would prefer to practice in the small municipalities, and more of the prospective GPs would prefer one of the largest municipalities - can be found in the factors and characteristics mentioned throughout the literature review. I.e. the prospective GPs lack experienced and hence fear professional isolation in small municipalities more than an experienced doctors (19). Professional isolation may also have an effect on the workload the prospective GPs would be able to cope with, since there is not the same degree of professional assistance in small municipalities. At the time of answering the questionnaires, the prospective GPs all had a close relation and attachment to the larger sized municipalities, since they were still studying or practicing in a municipality of this size. Furthermore, many of them might not even have a relation to how it might be to practice in a small municipality, therefor; the majority might prefer a large municipality since this is what they are most familiar with.

The review suggests several influential causes to the preferences in practice location. As mentioned above, a lack of professional support and teamwork is something young doctors

have reported as an issue in practicing in small municipalities. Furthermore, it is stated that the working conditions in rural areas, i.e. having a greater workload and longer hours on call are also problematic factors, which might influence the GP's choice of practice location.

In the descriptive study among current practicing GPs it is found that a higher amount of non-specialized GPs would prefer working in municipalities with less than 5000 inhabitants compared to those who are specialized in general medicine. It is not stated why it is so, but a suggestion could be that the non-specialized GPs are young doctors who are not yet specialized and who undertake a short term vacancy due to the financial benefits of such employment (17). It might also be to gather experience from general medicine and to learn to work more independently. The isolated working conditions (19) and the increased workload in rural practice (33) allows the young doctor to obtain a large amount of training in a relatively short amount of time compared to if they had worked in a more urban practice.

## **5.2 Discussion of methods**

Due to time- and space limitations not all articles on the subject of interest were included in the literature review. However, a comprehensive literature search was performed and a select at random representative of the subject of interest was chosen.

The data used in the descriptive study focused on small municipalities versus large municipalities, whereas most of the articles from the review focus on rural versus urban locations. These are not completely comparable, but have however been used interchangeably of each other throughout the thesis. The labelling are not completely comparable since the size of a municipality does not reveal anything about the distance to a larger city, i.e. a small municipality can be both geographically close to a large city and geographically far away and hence creating a higher degree of professional isolation the farther away from a large city

(10). Whereas for the labels *rural* and *urban* location the distance to a metropolis lies implicit in the labelling.

In the descriptive data analyses an inconsistency in the amount of participants who have answered the questions can be observed by viewing the columns labelled “*n*”. Not all of the participants have answered all questions. This may have an effect on the validity of the results, since the larger the sample size, the more narrow the confidence interval (CI), and the more narrow the CI the more reliable is it that the sample is representative of the true population (34).

Several of the associations achieved in the statistical analyses, were found to be borderline significant with p-values above 0.055, i.e. for the variable *study location* of prospective GPs. It could be discussed whether this cutting point due to a small sample size should have been raised to 0.1, but the conventional cutting point (significance level) of 0.05 was chosen. Had the sample sizes been larger, the borderline significant results might have been highly significant. However, we cannot know this for certain.

Specialists in general medicine were overrepresented in our GP sample (see chapter 3). A likely explanation is that one tends to be more interested in one’s own profession, and therefore more specialists in general medicine have been inclined to participate in a study examining working conditions in general practice. The overrepresentation of specialists in general medicine is known as a sampling bias, and leads to the results from the sample not being as accurate and representative of the general population of doctors in general practice (35).

## **Chapter 6 Conclusion**

Results from the statistical analyses discovered that the most preferable size of municipality to practice in, preferred by both GPs and prospective GPs, are the municipalities with more than 5000 inhabitants. This knowledge is informative but not useful in answering the objective of this thesis. It does however support findings from the literature review and confirms the fact that attention is needed in order to create policy interventions and incentives to motivate and raise the GPs preference for practicing in small municipalities.

Results from the literature review found that the GPs' low preference for practicing medicine in remote areas is associated with a higher degree of professional isolation, a heavier workload, longer hours on call, and the fact that being a GP is among the least prestigious medical specialties (2, 10, 19, 21, 25, 26). The literature review also highlights different kinds of initiatives in the attempt to improve the preference for practicing in remote locations. Financial incentives such as an increase in the amount of locum relief, an increase in retention payments and rural skill loading payments were found to be significant to the retention of the rural GPs(13).

To address the low preference for rural practice Governments have also applied initiatives focusing on the prospective GPs such as scholarships, paid school tuition, reimbursement of school loans to students in turn of mandatory rural labour (16). However, according to results from the literature review, the most effective initiative is the decentralization of medical educations (20).

Hence an increased focus on implementing medical training in remote areas should be given. As of now medical interns in Norway have half a year of mandatory primary care practice, it is however not mandatory that the primary care practice is in a remote location. Therefore regulations to assure that medical interns are obliged to receive rural experience could be a positive intervention to increase the preference for rural practice.

Both the literature review and the medical students and interns dataset found that the origin of the GP is significantly associated with the preference in practice location. Hence; new interventions, such as an increased intake of students from remote and small municipalities and initiatives such as scholarships for students with a rural background should be given more weight.

Several of the articles included in the literature review stress the positive effect of decentralizing medical schools and of medical training in remote and small municipalities. It is namely these two results from the review that are given attention since these interventions had the strongest effect on the preference against practicing in rural areas. In a future study it would be interesting to analyse data on Norwegian GPs who have received medical training in small municipalities and GPs who have attended decentralized medical schools. The effect of the latter intervention is briefly mentioned in this study, but an independent study of this data could be relevant as well. Especially since the medical school in Northern Norway recently have taken decentralizing initiatives by placing 5<sup>th</sup> and 6<sup>th</sup> year students in Bodø since 2009, and plan to do the same in the county of Finnmark from 2017 (36).



From the descriptive study, the strongest significant predictor of the prospective GP's preference in practice location is the origin of the GP, i.e. GPs who originate from small municipalities are more inclined to prefer a practice location in a small municipality. As for the practicing GPs, the strongest significant predictor is the current practice location. Hence; GPs who currently practice in a small municipality are more inclined to continue practicing in a small municipality. From this, we can conclude that the preference for practicing in remote locations is related to having a relation to a small municipality, hence initiatives as suggested throughout the thesis, with the aim of creating or strengthening the bonds between prospective GPs as well as currently practicing GPs and remote practice locations are essential to improve the preference for rural practice.

## Chapter 7 References

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## Chapter 8 Appendices

### 8.1 Appendix 1. Questionnaire for General Practitioners

#### SPØRRESKJEMA TIL FASTLEGER (Utdrag)

##### Del 4: Foretrukket praksissted og driftsform

For hver dimensjon nedenfor, sett et kryss i ruten for det alternativet som passer best for nåværende praksissted, foretrukket praksissted og minst foretrukket praksissted.

##### Kommunestørrelse (antall innbygger)

	Under 5000	5000 - 14999	15000 - 49999	50000 eller flere
Nåværende praksissted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Foretrukket praksissted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minst foretrukket praksissted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

##### Hvor stor økning i inntekt vil du kreve for å jobbe i en kommune med mindre enn 5.000 innbyggere?

- 100.000 økt inntekt
- 250.000 økt inntekt
- 500.000 økt inntekt
- Det vil være uaktuelt for meg å flytte til en slik kommune uansett inntektskompensasjon

##### Del 5: Noen bakgrunnsopplysninger

###### Kjønn:

- kvinne
- Mann

###### Alder

Antall år:

###### Hvor er du født?

- Norge

Utlandet

---

**Hvor har du din medisinske utdanning fra?**

- Norge  
 Utlandet
- 

**Er du spesialist?** Flere svaralternativer er mulig

- Ja, spesialist i allmenntidisin  
 Ja, spesialist i samfunnsmedisin  
 Ja, annen spesialitet  
 Nei
- 

**Hvor lenge har du jobbet som allmennlege/fastlege?**

Antall år:

**Omtrent hvor høy var din brutto skattbare inntekt i 2011 etter at driftsutgifter og sosiale utgifter (pensjon, sykepenger, etc) er fratrukket?**

- Mindre enn 700.000  
 700.000 - 849.000  
 850.000 - 999.000  
 1.000.000 - 1.149.000  
 1.150.000 - 1.299.000  
 1.300.000 - 1.500.000  
 Mer enn 1.500.000
- 

**Hvor mange pasienter har du på listen?**

Antall pasienter på listen:

**Hvor mange pasienter ville du foretrekke å ha på listen?**

Antall pasienter på listen:

**Hva er ditt gjennomsnittlige antall arbeidstimer pr uke?**

Timer:

---



**Hvor mange arbeidstimer pr uke ville du foretrekke å jobbe?**

Timer:

---

**Hvor mange innbyggere er det i kommunen der du bor?**

Ca antall:

**8.2 Appendix 2. Questionnaire for last year medical students and interns**  
**SPØRRESKJEMA TIL SISTE ÅRS MEDISINSTUDENTER OG TUNUSLEGER**  
(Utdrag av de mest relevante spørsmålene)

**1. Hva er din hovedbeskjeftigelse?**

- Jeg går siste året på medisinstudiet
- Jeg er turnuslege i sykehuspraksis
- Jeg er turnuslege i allmennpraksis

**2. Hvilken jobb ønsker du at du har om 10-15 år? Det er mulig å sette flere kryss.**

- Jobb som allmennlege/fastlege
  - Jobb som sykehuslege/spesialist i lokalsykehus
  - Jobb som sykehuslege/spesialist i universitetssykehus
  - Jobb som privatpraktiserende spesialist
  - Jobb på universitet eller liknende med undervisning/ forskning
  - Annet, spesifiser:
- 

**3. Hvor mange innbyggere tenker du at det må være i den kommunen hvor du skal slå deg ned?**

- Under 5 000
- 5 000 – 14 999
- 15 000 – 49 999
- 50 000 eller flere

**Bakgrunnsopplysninger om deg**

**4. Fødselsår:** \_\_\_\_\_

**5. Kjønn:**

- Kvinne
- Mann

**6. Hva er din sivile status?**

- Singel
- Fast partner
- Gift/samboer

**7. Har du barn?**

- Nei
- Ja, antall barn under 6 år: \_\_\_\_\_ antall barn 6 -18 år: \_\_\_\_\_

**8. Hvor tar du / har du tatt medisinsk embetseksamen?**

- Tromsø
- Trondheim
- Bergen
- Oslo
- I utlandet, oppgi land: \_\_\_\_\_

**9. Har noen av dine foreldre legeutdanning?**

- Min mor
- Min far
- Nei

**10. Hvilket fylke er ditt opprinnelige hjemfylke?**

- |   |   |                                     |                                   |
|---|---|-------------------------------------|-----------------------------------|
| <input type="checkbox"/> Finnmark       | <input type="checkbox"/> Møre og Romsdal  | <input type="checkbox"/> Vest-Agder | <input type="checkbox"/> Hedmark  |
| <input type="checkbox"/> Troms          | <input type="checkbox"/> Sogn og Fjordane | <input type="checkbox"/> Telemark   | <input type="checkbox"/> Akershus |
| <input type="checkbox"/> Nordland       | <input type="checkbox"/> Hordaland        | <input type="checkbox"/> Buskerud   | <input type="checkbox"/> Oslo     |
| <input type="checkbox"/> Nord-Trøndelag | <input type="checkbox"/> Rogaland         | <input type="checkbox"/> Vestfold   | <input type="checkbox"/> Østfold  |
| <input type="checkbox"/> Sør-Trøndelag  | <input type="checkbox"/> Aust-Agder       | <input type="checkbox"/> Oppland    |                                   |

**11. Hvor mange innbyggere er det i din opprinnelige hjemkommune?**

- Under 3 000
- 3 000 – 4 999
- 5 000 – 9 999
- 10 000 – 14 999
- 15 000 – 29 999
- 30 000 – 49 999
- 50 000 eller flere