

Doctors' job satisfaction during early career and economic recession

Prospective and cross-national studies in Norway and Iceland

By

Ingunn Bjarnadóttir Solberg



Department of Behavioural Sciences in Medicine
Institute of Basic Medical Sciences, Faculty of Medicine

University of Oslo

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ABSTRACT

The empirical research in this thesis is based on three papers on doctors' job satisfaction and migration considerations. Together with reviewed literature the thesis provides a detailed picture of doctors' job satisfaction. The theoretical discussion of this thesis is guided by two different approaches: The Job Characteristics Model and Locke's Value-Percept Theory. In the end of the Discussion the results are also discussed in the light of the Job Demand-Control model and the Effort-Reward Imbalance model. These theories and models focus on work-related factors that can, with a positive psychology approach, increase employees' job satisfaction. In our papers we mainly focus on work-related factors linked to doctors' job satisfaction. Paper I aimed at investigating the course of doctors' job satisfaction from early career to mid-career and exploring the effects of change in job position and reduction in work-home stress and working hours. The data for Paper I was from a longitudinal study on Norwegian doctors (NORDOC). The data for Paper II and III were collected among all Icelandic doctors in 2010, during the economic recession. The aim of Paper II was to explore whether the recession influenced the job satisfaction of Icelandic doctors. The aim of paper III was to explore the migration considerations among the doctors and whether economic factors were related to these considerations. Results from Paper I show that doctors' job satisfaction increased from early to mid-career. The results also show that a change in job position and a reduction in work-home stress predicted an increase in job satisfaction. Results from Paper II and III show that economic factors influenced the doctors' job satisfaction and migration considerations. Paper II also shows that the Icelandic doctors were less satisfied in their job than Norwegian doctors, particularly with extrinsic elements, and that job satisfaction of doctors during the recession was lower than before the recession. The results from Paper III also show that over half of the Icelandic specialists had considered migration during the recession. The Job characteristics model provides a theoretical element in the discussion on the intrinsic aspects of doctors' job satisfaction, and the conclusion is that our doctors' jobs include many of the core characteristics of the model. This is to some extent a validation of this model and our job satisfaction concept as not being very different. The characteristics in the model are also discussed in relation to the doctors' age and different job positions. Locke's value-percept theory provides a theoretical framework in the discussion about change in 1) job satisfaction, 2) job position, and 3) work-home stress. The effect of economic factors on doctors' job satisfaction and migration considerations as well as the increase in job satisfaction among early to mid-career doctors is also discussed in the light of the Demand-Control model and the Effort-Reward Imbalance model. We have not included any of these models/theories in our papers so these are only reflections, but the theoretical discussion and reflections in this thesis lead to the assumption that future studies on doctors' job satisfaction and migration should include validated theoretical models. Also, several topics in positive psychology are recognized for future research on doctors' well-being at work.

LIST OF PAPERS

- I. Solberg IB, Ro KI, Aasland O, Gude T, Moum T, Vaglum P, Tyssen R. The impact of change in a doctor's job position: a five-year cohort study of job satisfaction among Norwegian doctors. *BMC Health Services Research* 2012, 12:41.

- II. Solberg IB, Tomasson K, Aasland O, Tyssen R. Cross-national comparison of job satisfaction in doctors during economic recession. *Occupational Medicine* 2014, 64:595–600.

- III. Solberg IB, Tomasson K, Aasland O, Tyssen R. The impact of economic factors on migration considerations among Icelandic specialist doctors: a cross-sectional study. *BMC Health Services Research* 2013, 13:524.

CONTENTS

ACKNOWLEDGEMENTS	2
ABSTRACT	4
LIST OF PAPERS	5
1 INTRODUCTION.....	9
1.1 Background	9
1.1.1 Positive psychology	9
1.1.2 Job satisfaction	10
1.1.3 Job satisfaction and work engagement	12
1.1.4 Doctors' job satisfaction.....	14
1.1.4.1 Doctors' satisfaction compared with other occupations and the general population	15
1.1.4.2 The course of doctors' job satisfaction	15
1.1.4.3 Cross-national comparisons of doctors' job satisfaction	16
1.1.3 Migration among doctors.....	17
1.1.4 Theoretical models	18
1.1.4.1 The Job Characteristics model	19
1.1.4.2 Locke's Value-Percept theory.....	21
1.1.4.3 Karasek and Theorells' Demand-Control model	22
1.1.4.4 Effort-Reward Imbalance model.....	24
1.1.5 Factors associated with doctors' job satisfaction	24
1.1.6 Factors associated with doctors' migration	29
1.2 Research model including all dependent and independent variables	34
1.3 Aims	35
1.4 Research questions	36
2 MATERIAL AND METHODS	37
2.1 Material and study design	37
2.2 Dependent variables	38
2.2.1 Job satisfaction	38
2.2.2 Consideration of moving abroad	39
2.3 Independent variables.....	39
2.3.1 Age and gender.....	39
2.3.2 Weekly work hours.....	40

2.3.3 Job position.....	40
2.3.4 Work–home stress	41
2.3.5 Job dissatisfaction.....	41
2.3.6 Influence of cost-containment initiatives on work	41
2.3.7 Worries about personal finances.....	42
2.3.8 Working abroad during vacations.....	42
2.4 Statistical analyses.....	42
2.5 Methodological considerations	43
2.5.1 Sampling procedures	43
2.5.2 Study design and bias – Strengths and limitations	45
2.5.2.1 All samples.....	45
2.5.2.2 The NORDOC sample	46
2.5.2.3 Panel study	47
2.5.2.4 Icelandic sample: All doctors in Iceland in 2010.....	47
2.5.2.5 Landspítali University Hospital sample from 2003	49
2.5.3 Reliability	49
2.5.4 Validity	49
3 SUMMARY OF RESULTS.....	51
3.1 Paper I.....	51
3.2 Paper II	52
3.3 Paper III	54
3.4 Research model with significant adjusted associations	55
4 DISCUSSION OF THE RESULTS	56
4.1 Summary of the main results.....	56
4.2 Doctors’ job satisfaction.....	57
4.2.1 The course of doctors’ well-being through the career	57
4.2.2 Cross-national comparison of doctors’ job satisfaction	58
4.2.2.1 Norwegian vs. Icelandic doctors’ job satisfaction	58
4.2.2.2 Intrinsic and extrinsic aspects of doctors’ job satisfaction	60
4.3 Migration considerations among Icelandic specialist doctors.....	63
4.4 The association of work-related and economic factors with Norwegian and Icelandic doctors’ job satisfaction	65
4.4.1 Working hours	66

4.4.2. Job position.....	67
4.4.3 Work–home interface stress	69
4.4.4 Cost-containment initiatives	71
4.5 The association of economic factors with migration consideration among Icelandic specialists	72
4.5.2 Job dissatisfaction.....	72
4.5.3 Cost-containment initiatives	72
4.5.4 Stressed by personal finances	73
4.5.5 Working abroad during vacations.....	74
4.6 The impact of economic recession on doctors: Warr’s vitamin model.....	74
4.7 Reflections on the Demand-Control model.....	76
4.8 Reflections on the Effort-Reward Imbalance model.....	78
4.9 Doctors’ job satisfaction and engagement.....	79
4.8 Theoretical implications and suggestions for future research.....	81
4.9 Practical implications of main findings.....	83
REFERENCES	84

1 INTRODUCTION

1.1 Background

1.1.1 Positive psychology

Over the last 20 years, a new branch of psychology named ‘positive psychology’ has been growing. Professor Martin Seligman, the president of the American Psychological Association in 1998, was a major initiator of the movement. He and others acknowledged that the overwhelming focus in psychology on pathology undermined the focus on the potential of human resources and virtues that not only can prevent mental illness but also can lead to more satisfying and fulfilling life (4). So the purpose of positive psychology is to aid satisfactory life, from birth to death (5), by focusing on human strength and virtues, rather than merely treating mental illness (6, 7). In 2000, the prestigious journal *American Psychologist* published a special millennial issue on positive psychology (6), which called for more research on the subject. In the following years there has been a growing interest in positive work- and organizational psychology (8). Our research project was inspired by this movement, where job satisfaction among doctors has been our main research issue.

New branches of positive psychology such as Positive organizational behavior (POB), Positive organizational scholarship (POS) and Positive occupational health psychology (POHP) have emerged after the introduction of positive psychology (see figure 1). POB is the merging of positive psychology and organizational theory (a subfield of organizational studies) (1) and is primarily concerned with the workers’ psychological states and human strengths that influence employee performance. POS is primarily concerned with the positive aspects of the organizational context that influence employees’ ability to thrive (1). POS is an umbrella concept used to unify a variety of approaches in organizational studies, each of which incorporates the notion of ‘the positive’ (2). The most controversial concept associated with POS is the ‘P’ (positive), as it has been criticized of being restrictive, biased and naïve among other (2). POHP subsumes the approaches of both POS and POB, whilst maintaining its own emphasis on optimal functioning in the workplace, promoting employee health and resiliency (1). Occupational health psychology (OHP) is also a quite youthful research field, which has grown a lot during the last two decades (3). OHP is a multidisciplinary area (3) (see figure 1), where the aim is to improve the quality of work life, and to protect and promote the safety, health and well-being of workers (1, 3). The majority of the research in OHP has focused on negative aspects of work and workers health (1, 9). POHP

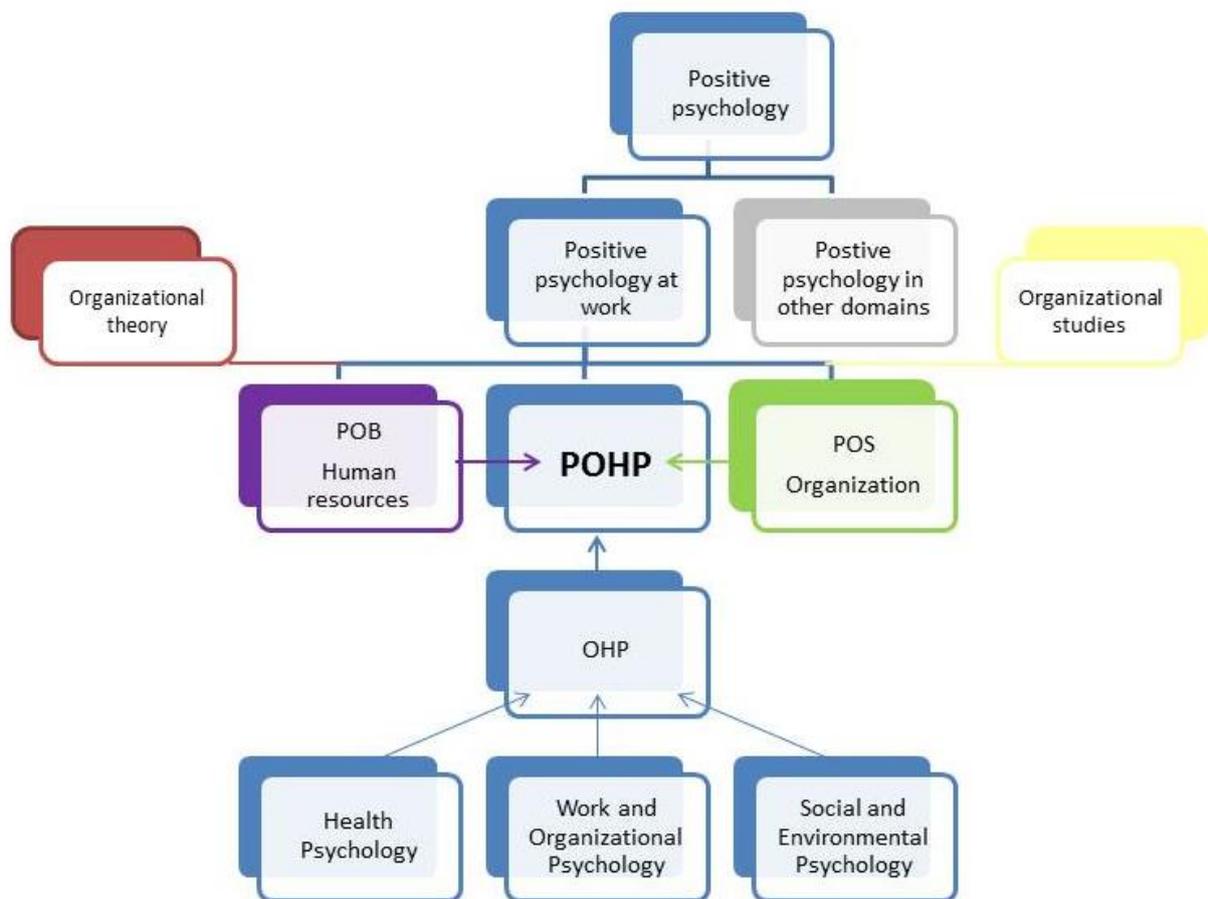


Figure 1 Simplified view of relevant branches of positive psychology (1-3)

shifts the focus to the positive aspects of work and explores how these aspects can provide optimal functioning and health among the workers (1). This thesis takes a positive psychology approach, in particular in line with POHP, focusing on how individual and organizational work factors can lead to higher job satisfaction among doctors. We will also use models that have been developed and researched in OHP in the interpretation of our findings.

1.1.2 Job satisfaction

Subjective well-being is a central concept in positive psychology. A meta-analysis by Heller et al. in 2004 (10) showed that there are different domains of subjective well-being and though other studies have reported that these domains are related to each other (11), they are also independent sources of satisfaction (Figure 2) (10). There is also growing literature on the conflict between the family and work domains. This conflict is strongly related to both job and life satisfaction (12-17).

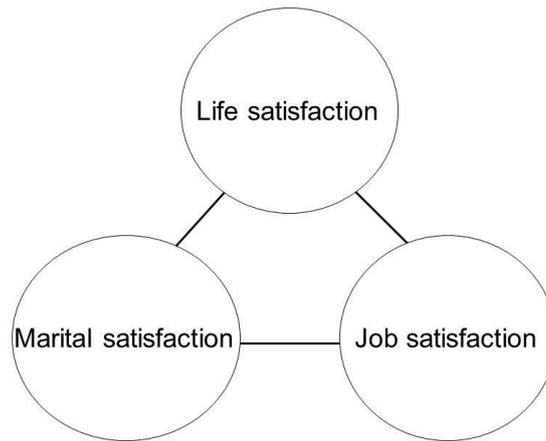


Figure 2 Domains of subjective well-being (10)

In our Western society, jobs and careers are an important part of people's lives. From a positive perspective, a person's career conveys identity, reflects meaning and purpose in life, and contributes to human development, among other things (18). Whether people 1) see their job as a means to providing the resources needed to enjoy their time away from the job or 2) are career orientated, where they invest a lot of time in their work and continually seek advancement, or 3) have a calling, where it is the work itself (not financial gain or career advancement) that brings them fulfillment (18), job satisfaction is of importance.

Job satisfaction is an indicator of well-being and is a central concept in work and organizational psychology. Many papers have been written on the subject and it has been shown to be associated with important work-related and individual antecedents (19-21), and outcomes, such as life satisfaction and job performance (22-25) as well as good health (26). But studies have also shown discrepant effects of job satisfaction on work performance (23, 27), so the concept should be handled with some precaution.

There are many different measurements of job satisfaction in the literature, also among doctors. For example, in the US 'professional satisfaction' is commonly used as a measurement of the doctors' satisfaction (28-30) whereas in Europe the term 'job satisfaction' is more widely used (28, 31-33). We use 'job satisfaction' in our studies. There are two common approaches to the measurement of job satisfaction; 1) a global approach, which often uses a single-item measure to reflect a person's affective reaction to his or her job, e.g., how satisfied are you with your overall job situation, and 2) a person's attitudes regarding various facets of the job, such as coworkers, pay, and job conditions (25), which is based on a more cognitive approach to job satisfaction. In such measurements, 'intrinsic' job features are often

distinguished from 'extrinsic' features (34). In our measurement of job satisfaction among doctors we use both global approach, 'How satisfied are you with your job/overall job situation' and 'facet' approach, with intrinsic and extrinsic facets such as 'How satisfied are you with the amount of responsibility you are given' (intrinsic) and 'How satisfied are you with your rate of pay'(extrinsic). Most researches use an attitudinal/cognitive approach in the study of job satisfaction (25). The question is whether such measurements of employees' perceptions, as in our studies, are solely cognitive evaluations or if they reflect more profound feelings. One of the most widely used definitions of job satisfaction is that of Edwin A. Locke (1976), who defines job satisfaction as a 'pleasurable or positive emotional state, resulting from the appraisal of one's job or job experiences'(35, 36). He uses both cognitive (appraisal) and affective (emotional state) approach to job satisfaction. This twofold approach to job satisfaction is supported by Howard M Weiss (2002) who has explained job satisfaction as an attitude, and suggests that we form attitudes towards our jobs by taking into account our feelings, beliefs, and behaviours (37). In another paper he and coauthors showed that when cognitions about the job and mood were used to predict job satisfaction in the same equation, both were strongly related to job satisfaction and the relative effects were exactly the same (38). In this thesis we build on theories that assume that workers' job satisfaction is more than a cognitive attitude towards the job (the Job Characteristics model and Locke's Value-Percept theory).

Studies back to the sixties have indicated that job satisfaction is not the opposite of job dissatisfaction and that there are different characteristics that are sources for job satisfaction on the one hand and job dissatisfaction on the other (39, 40). This is in line with POHP where it is acknowledged that there are different factors or mechanisms that underlie employee health and good functioning than ill-health and malfunctioning (1). Overall it seems that positive and negative affect are independent states, rather than two opposite poles (41). We focus on job satisfaction and not job dissatisfaction in our research.

1.1.3 Job satisfaction and work engagement

As we have taken a positive psychology approach in our studies one can ask why we use 'job satisfaction' as a measure and not for example 'work engagement', a popular research concept in the discipline. First, when we started our longitudinal NORDOC studies of repeated measures back in 1993/94 the job satisfaction scale we used was one of the most validated scale already at that time (42). Second, when the study was commenced, work engagement

was poorly developed as a concept. In this 20-year longitudinal study we have for the most part kept the same variables in order to study long-term trajectories. Third, there seems to be more research on the association of important individual and organizational outcomes with job satisfaction than with work engagement (43), also among doctors (44). Fourth, there are also more cross-national comparison studies and longitudinal studies on doctors' job satisfaction than doctors' work engagement that can validate our findings.

Job satisfaction and work engagement have been distinguished by low and high energy states of well-being at work. Bakker AB and Oerlemans WGM drew a two-dimensional view of work-related subjective well-being in a chapter in the Oxford Handbook of POS (1). This circle of high and Low activation and Pleasant and Unpleasant states of work, shown in figure 3 (with only description of the positive states), is based on Russell's circumplex model (45, 46). This model suggests that affective states arise from two fundamental neurophysiological systems, one related to a pleasure-displeasure continuum (the mesolimbic system) and the other to arousal, activation, or alertness (reticular network) (47). Emotions are explained as a linear combination of these two dimensions with varying degrees of both pleasure and activation (45, 46). This is somewhat in conflict with our assumption that positive and negative affect are independent states, but we include this model because of its suggested difference between the state of job satisfaction and work engagement. In adapting this view

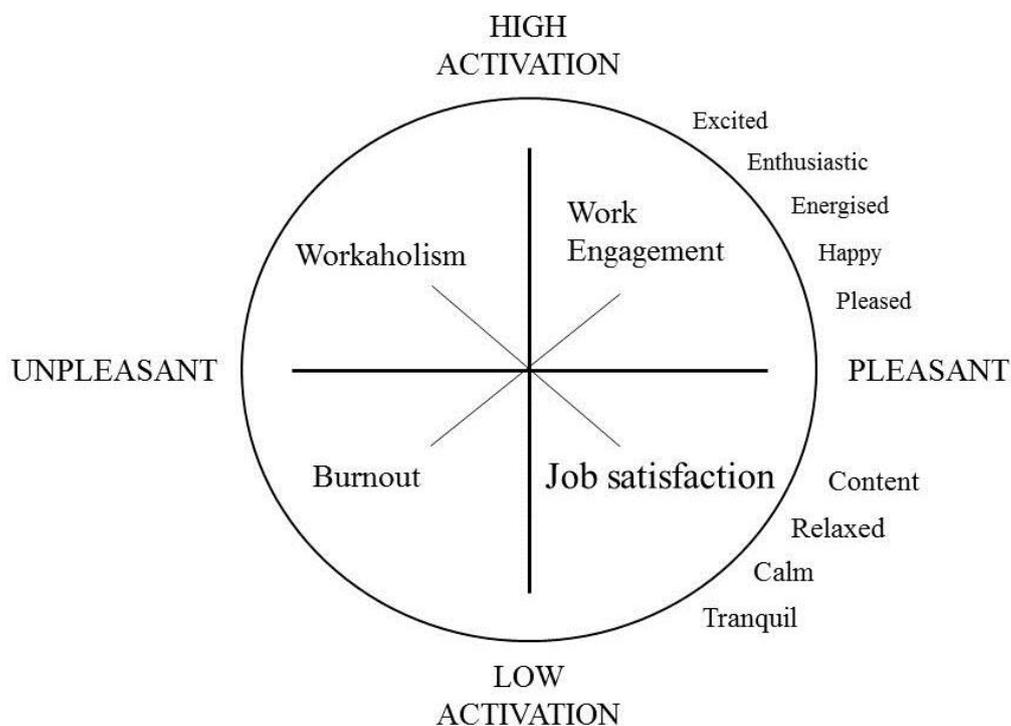


Figure 3 A two-dimensional view of work-related subjective well-being (1)

on emotions to work-related affect, Bakker and Oerlemans drew ‘work engagement’, characterized by energy, involvement, and efficacy, in the higher activation side of the circle (figure 3) (1) and ‘job satisfaction’ in the lower activation side of the circle, ranging from tranquil to content. Others have suggested that work engagement refers more to a *psychological connection* with the performance of *work tasks* whereas job satisfaction is more of an *attitude toward features* of the organization or the job (43).

Research has shown that about 85% of all employees in the European Union and 86% of all employees in the United States are satisfied with their jobs (34). So, why is it important to study job satisfaction? As noted above, this is a relatively new area of research and we still do not have a full understanding of why some people are more satisfied in their jobs than others. And though the job satisfaction-job performance relationship is rather weak or not present in some studies (23, 27), this is an important research issue as studies have shown that satisfaction in the job is related to many important outcomes (22-24, 48). There is increasing evidence that shows that job satisfaction influences job performance among doctors (49-58). The patients of satisfied doctors seem to be more satisfied (59, 60) and have greater trust and confidence in their doctors (51). Patients also have greater adherence to medical treatment if their doctor is satisfied in his/her job (49). Several studies have shown that satisfied doctors provide higher quality of care (50-58). Studies have also shown that doctors that are satisfied in their job are less likely to retire early or leave medicine (61), migrate (62, 63), or to experience turnover (64-68), burnout (69-71), and other health complaints (72). In order to better understand job satisfaction, including its antecedents and outcomes, there is a need for more prospective studies and cross-national comparison studies. The prospective studies are important for defining specific causal factors, and targets for intervention. Cross-national comparisons are important because they may shed light on the effect of country-specific difficulties, such as economic decline, on employees. Comparison between different occupations also provides valuable information on the level of job satisfaction of the occupation of interest. In the next sections we review studies on doctors’ job satisfaction that 1) compare it with the satisfaction of other occupations, 2) use longitudinal design, and 3) use cross-national comparisons.

1.1.4 Doctors’ job satisfaction

In 1976 there was only one paper on doctors’ job satisfaction in PubMed/MEDLINE (MeSH words [Job satisfaction] and [physicians]) (73). In 2001, there were around 600 papers on the

subject whereas there were 2005 papers in October 2016. Several studies over the last decade have shown high work stress and job dissatisfaction among doctors (29, 55, 74-77), but many studies have also shown a high level of doctors' job satisfaction (30, 78-85).

1.1.4.1 Doctors' satisfaction compared with other occupations and the general population

Doctors' satisfaction has been compared with the general population and other occupational groups in some studies. A Norwegian study showed that doctors experience lower life satisfaction and more dissatisfaction with life than the general population (86). There have also been higher suicide rates reported among doctors than other occupational groups (87-89), and doctors (and other health workers) have been found to experience more stress at work than the general population (90, 91). Doctors have been found to be more satisfied in their jobs than nurses and other hospital staff in Norway (92), Finland (93), and the United States (US) (94). US doctors were also more satisfied than chaplains (94). In Sweden, doctors had a similar job satisfaction to nurses (95), whereas in Spain, doctors were found to be less satisfied than nurses (96). In Germany, doctors had lower job satisfaction than the general population (13). To obtain a better picture of doctors' job satisfaction we need longitudinal designs and comparisons between countries.

1.1.4.2 The course of doctors' job satisfaction

Structural changes in the health-care sector in recent decades have threatened the traditional roles of doctors (74, 97-100). Activities indirectly related to patient care take more of doctors time than direct interaction with patients (100). At the same time, patients are more enlightened and there is an increasing focus on patient satisfaction (99, 101). Studies have shown a decrease in job satisfaction among other occupational groups related to the loss of autonomy, status, and respect of the public (29). A review of studies of doctors from the US, which included longitudinal studies, concluded that 'recent overall physician satisfaction is relatively unchanged, although there may be modest declines in primary care physicians and young physicians who report high satisfaction' (102). A stable job satisfaction among US doctors is supported in a more recent review (84). Swiss doctors experienced a decline in job satisfaction between 1998 and 2007 (103). Job satisfaction among British general practitioners declined from 1987 to 1990, probably because of the National Health Service reform of 1990/1991, but increased from 1990 to 1998, probably after adaption to change

(104). Another British study showed that primary care and specialists' career satisfaction was relatively stable from 1997 to 2001 (105). In Norway, there was a high and stable level of job satisfaction among physicians from 1994 to 2002, and from 2000 to 2006 there was an increase in job satisfaction, despite new health-care reforms in the period (78, 106). In Sweden, there has also been an increase in doctors' job satisfaction (from 2002 to 2009) (95). This is good news for health care in the Scandinavian countries, but there is a lack of understanding of the factors that contribute to increase in job satisfaction. This is important both for maintaining high job satisfaction and for increasing job satisfaction among less satisfied doctors, e.g., in countries where doctors' job satisfaction is lower. There is a need for more longitudinal studies on the course of job satisfaction over time (107). There is also a lack of studies that focus on the course of job satisfaction over different stages of doctors' careers, and on the course of job satisfaction prior to and during economic recession.

1.1.4.3 Cross-national comparisons of doctors' job satisfaction

There is no doubt that national differences in the organization of health-care service delivery structurally influence doctors' working conditions (28, 108-111). Comparison studies on doctors' job satisfaction between countries show that there are country differences in doctors' job satisfaction: Norway, Australia, New Zealand, and Canada have more satisfied doctors and UK and Germany have less satisfied doctors (31-33, 112-114). There should be more such studies, which are valuable for the respective countries' health-care systems (51-53, 56).

There are no cross-national comparison studies that explore the effect of economic recession on doctors' job satisfaction. Although many countries were affected by the worldwide recession in 2008 (115), Iceland was one of the first countries in Europe to be severely affected by the recession (October 2008) (115-118). Norway was barely affected and thus is a suitable country to be compared with Iceland. Iceland and Norway are neighboring countries with common historical roots, which means that they are culturally and politically close. The welfare state model, which also applies to the other Scandinavian countries, is characterized by a relatively large public sector with many public employees (119). Both countries provide health care with equal access for all, regardless of income, gender, ethnicity, or place of residence (120), and their health-care policy performances are among the best in Europe (121). In both countries, health care is financed by general taxation and governmental reimbursement. The doctor density is relatively high, with one doctor per 272 citizens in Iceland (122) and one per 213 in Norway in 2009 (123). The health-care expenditure as a

percentage of the gross domestic product (GDP) is similar in the two countries (around 9.5% in 2010) (124), but the total health-care expenditure per capita (adjusted by power parity) decreased in Iceland between 2008 and 2010 and increased in Norway in the same time period (125). This partly reflects the differing impact of the economic crisis in the two countries.

1.1.3 Migration among doctors

A key factor in providing medical care is the availability of qualified and motivated health-care professionals (126). Globalization has facilitated the employability and migration of doctors almost anywhere in the world. Many papers have been written on the ‘brain drain’ and migration of health-care professionals from developing countries and the impact of this on their health-care systems (127-134). However, there is limited evidence on the migratory movement of health-care professionals from Western and developed countries (135-139). The papers that aim to provide an overview of the migratory movements in Europe (135, 136, 138) point out that the data used in the studies are provided by each of the countries and that most countries have no reliable data on their stock of health-care professionals. However, the data can show some trends in doctors’ migration. For example, a study with data from around 2005 showed that in the UK, foreign doctors accounted for 31% of all working doctors in the country, and 9% of the doctors had migrated from another European country (135). Another study showed that in New Zealand, 46% of all foreign-trained doctors in 2006 were from the European region where the United Kingdom and, to a lesser extent, Ireland were the primary ‘supply’ countries (138). In Canada, European region doctors accounted for 38% of all foreign-trained doctors in 2005, mainly from the United Kingdom, Ireland, and France (138). Other major destination countries for UK doctors are neighboring countries such as Ireland and France, but they also relocate to Spain and the US (138). In Germany, foreign doctors accounted for 6% of the doctors in the country; most of these doctors had migrated from another European country (65%) (135). One study indicated that Germany, France, Italy, UK, and Spain are among the major destination countries in Europe. The doctors who migrate to these destination countries are from countries such as Poland, Greece, Romania, Switzerland, and the Czech Republic (138). Germany is not only a major destination country, but many German doctors choose to migrate, mainly to the United Kingdom and Italy, followed by Switzerland and the US (138). In Austria, Norway, Portugal, and France, more than half of all foreign doctors were from other European Union countries (135). In Norway, foreign doctors accounted for about 16% of the total number of working doctors (2833/18,173) (138, 140).

Ireland, Malta, and Poland had a high number of doctors working abroad (135). Some areas within Eastern European countries (e.g., rural Romanian areas) may be particularly vulnerable, with some of the highest emigration rates among medical doctors and nurses (139).

These studies show that there is indeed migration among doctors in Europe. The studies also indicate that migration is a growing phenomenon in Europe (135, 138). We lack studies on the effect of recent economic crises on doctors' migration within Europe. Because Icelandic health care is so small and dependent on relatively few specialists, such doctor migration may threaten the whole structure of health-care services, in addition to the more direct consequences of economic crisis.

1.1.4 Theoretical models

There are different theories about what makes an employee satisfied in his or her job. These theories can be categorized as 1) situational theories, where it is suggested that job satisfaction results from the nature of one's job or other aspects of the environment, 2) dispositional approaches, that assume that job satisfaction is rooted in the employees' personality and 3) interactive theories, which propose that job satisfaction results from the interplay of situational and personological factors (141, 142). According to Judge et al. (2001), situational theories have gained the most support in research (141). In the literature regarding doctors' job satisfaction, the use of work-related predictors or associations is the most common way of explaining job satisfaction (because most of the studies have a cross-sectional design, it is therefore more correct to refer to them as associated factors, rather than as predictors, which require prospective/longitudinal design). In our studies we mainly focus on how work-related factors, such as change in job position and cost-containment at work, influence doctors' job satisfaction and migration. The theoretical discussion in this thesis is therefore based on theoretical perspectives that embrace the relationship between work-related factors/characteristics and job satisfaction. The two theories we use throughout the discussion are 1) Job Characteristic model (mostly a situational theory) and 2) Locke's Value-Percept theory (an interactive theory). In the end of the Discussion we reflect on our findings in the light of the validated OHP models: Job Demand-Control model and the Effort-Reward imbalance model.

1.1.4.1 The Job Characteristics model

Job design theories focus on how the nature of a person's job affects the employee, where one of the major aims is to improve the employees' motivation and job satisfaction, for example by increasing variety at work (143). Frederick Herzberg had a revolutionary approach to job design in the 1960s, where he emphasized the importance of motivation among employees. During those years, most jobs were repetitive and standardized. Herzberg saw the motivational potential of giving the workers responsibility, achievement, growth in competence and recognition. He had a theory that extrinsic job facets (hygiene factors) are more related to employees' job dissatisfaction and that intrinsic job facets (motivators) are more related to job satisfaction. His theory has not gained much empirical support (141, 144). There is more evidence that show that both intrinsic and extrinsic factors contribute to both satisfaction and dissatisfaction (141). But his work provided a 'valuable point of departure' (145) for research on the motivational potential of jobs, including the Job Characteristics model.

The Job characteristics model (JCM) is a job design theory introduced by Hackman and Oldham in 1976 (144), based on the earlier work of Hackman and Lawler (146). Hackman and Oldham created the Job Characteristics Model to explain the relationship between employees and their jobs (144, 146-148). They argue that the quality of this relationship has a major influence on organizational productivity. The theory argues that every job has a specific motivational potential based on five core job characteristics. Through critical psychological states (experiencing meaning, responsibility and understanding) the employees develop a sense of job satisfaction based on these job characteristics. *Task identity* refers to the degree to which one can see one's work from beginning to end. *Task significance* refers to the degree to which one's work is seen as important and significant. *Skill variety* is the extent, to which job includes tasks that require different skills and talents of the worker. *Autonomy* refers to the degree to which employees have control and discretion for how to conduct their job. *Feedback* refers to the degree to which the work itself provides feedback for how the employee is performing the job (144). According to the theory, jobs that are enriched to provide these core characteristics are likely to be more satisfying and motivating than jobs that do not provide these characteristics.

The model has received critique, especially regarding the role of critical psychological states in the model (149). The need to extend the range of variables affecting work experiences has also been emphasized (150). But strong empirical support exists for the

relationship between the five job characteristics and job satisfaction (151-153). However, most of this research was done in the 1980s and 1990s. In a more recent overview (2010) of their work and the future of work design, Oldham and Hackman write: 'That was then. At the time, it made sense to focus on the job itself, since jobs were what people did at work and therefore surely also should be the core concept in research on work motivation, satisfaction, and productivity. But there have been some interesting developments in organizational life over the last few decades ... the world of work is different than it was then, perhaps fundamentally so' (145). But they also write: 'The increasing popularity of self-managing teams, re-engineering, and sundry other organizational innovations, coupled with the increased flexibility in work arrangements made possible by advances in information technology, has expanded considerably the scope, challenge, and autonomy of front-line work. Professional jobs, on the other hand, appear to be shrinking, which is perverse because professionals are the people we rely on to make wise decisions in uncertain circumstances. Consider, for example ... the constraints on physicians about the diagnostic tests and treatments they are allowed to select' (145). This implies that the basic job characteristics in the model are still relevant for doctors. We choose to use this model in the discussion of our results on doctors, because of its emphasis on the intrinsic work factors in relation to job satisfaction. We have not measured the doctors' perceptions on the five characteristics directly in our study, which limits our interpretation. Also, we have not found studies on Job characteristics model and job satisfaction among doctors. But studies among nurses (154) and hospital staff (including few doctors) (155) have shown a significant relationship between these chore characteristics and job satisfaction. There is some evidence that the Job Characteristics model is relevant also in the modern organizational context (145, 156).

Herzbergs' and the Job characteristics models' approach to the design of work is generally top-down in nature, where the employers or managers make decisions on changes in job characteristics. Oldham and Hackman believe that 'Job crafting' is a relevant approach to job design in the modern working environment (145). 'Job crafting' is and has been a popular positive psychology approach to job design in the recent years. Job crafting implies that employees continuously shape and influence the design of their jobs while performing the job (157). In previous job design theories it is the *perceptions* of job characteristics that are addressed whereas job crafting refers to the *changes* employees make in their job characteristics (158). Researchers have used the Demand-Resources theory (159) as a framework for defining which aspects of the job that employees can proactively change (160).

Job demands refer to aspects of work that require physical and/or psychological effort from the employee. Job resources refer to aspects of the job (e.g. autonomy and social support) that help the employee to achieve his/hers work goals, to reduce job demands, and to stimulate personal development (150). According to the theory these job resources have intrinsic motivational potential, in line with the Job characteristics model, as well as extrinsic motivational role (9). We have not measured ‘Job crafting’ or Demands and Resources according to the Demand-Resources theory in our studies. The Demand-Resources theory has been used more in relation to burnout and engagement and not job satisfaction, whereas the job characteristic model has been used to explain job satisfaction. We will not discuss ‘Job crafting’ further, but future studies among doctors should include this modern approach to job design and explore its effect on doctors’ job satisfaction.

1.1.4.2 Locke’s Value-Percept theory

Discrepancy theories of job satisfaction are based on the premise that job satisfaction results from the comparison between what the job provides and what the employee needs or wants from the job (161). One of the most influential discrepancy theories of job satisfaction was developed by Locke (35, 36). Locke explains high job satisfaction as a state where there is little discrepancy between what one wants in a job, which reflects the persons’ values, and what one has in a job (35, 36). Locke’s value-percept model explains job satisfaction as: $Satisfaction = (want - have) \times importance$ (36). This applies to various job facets. For example satisfaction with Pay is high if there is little discrepancy between $Pay_{want} - Pay_{have}$ and if Pay is important to the employee. The theory has been criticized for the similarity between ‘want’ and ‘important’, as many people will find it difficult to distinguish the two, and thus they are likely to be highly correlated. Despite this and other limitations (161) research on Locke’s’ theory has been supportive (162).

Locke’s value-percept theory is mentioned in the person-job fit literature (161, 163). Person-job fit is a branch of Person-environmental fit theory, a central concept in organizational behavior research. This is not a very strong and valid theory, with limitations such as lack of descriptions of both elements in the fit relationship as well as the relationship with outcomes (161). But there are numerous of studies on the subject and studies have shown that person-job fit is related to job satisfaction (163). Person-job fit has been researched as 1) Demands-Abilities fit and 2) Needs-Supplies fit (163). Demands-Abilities fit refers to the fit between demands of a particular job, such as required knowledge, skills and abilities, and the

abilities of the employee, such as education, experience, knowledge and skills. The gravitational hypothesis (from 1972) states that employees will gravitate towards jobs that best fit their ability level (164, 165). The Needs-Supply fit refers to the fit between the employees' goals, psychological needs, interests, and values (as described by Locke) and the general characteristics of an occupation, pay and other job attributes.

No studies on doctors (that we know of) have included Locke's value-percept model. We want to explore, through the discussion of our results, whether this theory might be relevant in the understanding of doctors' job satisfaction.

1.1.4.3 Karasek and Theorells' Demand-Control model

Karasek's Demand-control model (DCM) (166) and the Effort-reward imbalance theory (ERI) (167), have been widely used and validated to predict stress, mental health problems and coronary heart disease, but as we will argue in the end of the discussion, these models might also be relevant in relation to doctors' job satisfaction, in particularly during early career and economic recession.

In the book 'Healthy work' of Karasek and Theorell from 1990 (166), Karasek and Theorell drew a figure of the interaction of Control and Demands where the main aim was to explain the risk of strain and illness, see figure 4. According to the model, it is the combination of low control and high demands that leads to a negative stress reaction and hence to negative health symptoms (166). The authors also found that high demands combined with high control, freedom and being able to use own skills lead to satisfaction and motivation. A Danish paper concluded that perceived job control across different professions seems to be the most health promoting variable in the demand-control model, as well as it has a positive effect on well-being and productivity (168). Karasek and Theorell use the job of surgeons as an example of an active job in the upper right-hand corner of the figure (figure 4). For a surgeon, a difficult operation is intensely demanding, but if he or she feels a large measure of control and has the freedom to use available skills he/she will experience high levels of job satisfaction and continue to learn and grow (169). 'Statistics Norway' shows that doctors have relatively active jobs, that is, high demands and high control (SSB, LKU 2013) (170). The Fifth European Working Conditions survey from 2010 (Eurofound) showed that employees in Norway experience more active job situations compared with e.g. employees from Eastern European countries who experience high strain jobs (high demands, low control) (171). This might be because of the magnitude of manufacturing industries and

hierarchical organization with strong leadership, and less autonomy among the employees. The survey also shows that German employees experience high strain jobs (171).

It has been suggested that job control in the demand-control model can come in two broad forms; 1) skill discretion and 2) decision authority (172). Skill discretion refers to the level of skill and creativity required on the job and the flexibility an employee is permitted in deciding what skills to use (e.g. opportunity to use skills, similar to job variety). Decision authority refers to the organizationally mediated potential for employees to make decisions about their work (e.g. opportunity to make decisions, similar to autonomy). Here it also should be mentioned that the Demand-Control model has been expanded with the dimension of social support, which is suggested to work as a buffer in the relationship between high demands and low control (173).

The Demand-Control model has been criticized of being simplistic and static, with too few job-related variables (174), and too much credit to the control variable (173). In response to this and in the spirit of positive psychology the Job Demands-Resources model has been developed. As mentioned, this model specifies how various job demands and job resources (intrinsic and extrinsic) can lead to burnout and engagement (174). Again, we chose to use the more simplistic Demand-Control model, because it specifies the relationship between active jobs (high demands and high control), as the jobs of doctors (170), and job satisfaction. Also, it is easier to discuss our results on doctors' job satisfaction in the light of well-established theories with concrete variables as we have not measured such models or theories in our papers. Future studies should include theories/models in the research on doctors' job satisfaction, where the Job Demands-Resources model is a good candidate.

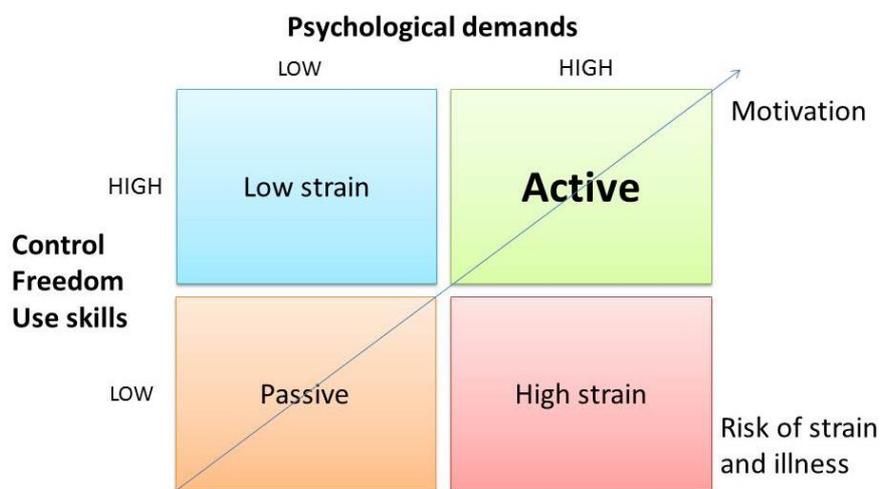


Figure 4 Karasek and Theorells' Demand-Control model (166)

1.1.4.4 Effort-Reward Imbalance model

Inspired by the demand-control model Johannes Siegrist suggested a more subjective model of work stress. His main aim was to show that imbalance between high effort spent at work and low rewards received (ERI) leads to chronic stress, including activation in neurohormonal pathways, that influences the employees' health (mainly focus on cardiovascular health) (167). This relationship has been supported by other studies (175, 176), and ERI has been shown to be related to burnout as well (177-179). Instead of 'task control' in relation to demands (DCM) (166) Siegrist talks about 'status control' in relation to effort. Status represents the occupational position or role which is a crucial social role for most people. Threats to the continuity of occupational roles are assumed to produce sustained emotional distress. Examples of a particularly stressful working context are 1) a demanding, but unstable job and 2) achieving at high level without being offered any promotion prospects (167). Siegrist mentions money (extrinsic) and esteem or approval (intrinsic) as important rewards.

Studies have shown that physicians are highly exposed to ERI (177). Marmot, Siegrist, & Theorell point out that 'effort-reward imbalance is frequent among service occupations and professions, in particular the ones dealing with person-based interactions' (180). A study showed that an increase in Effort-Reward imbalance at work was related to depressive symptoms among junior physicians (181). ERI has also been shown to relate to stress among doctors (113). In relation to the effort-reward imbalance model it has also been found that overcommitted employees are at a high risk of poor well-being (178).

A study that used DCM and ERI among physicians concluded that theoretical models of psychosocial stress at work can enrich the analysis of effects of working conditions on health care quality (182). Studies have indicated that physicians' stress according to the DC-model and ERI, is related to quality of care (182, 183). We have not measured Effort-Reward imbalance in our studies, and there is scarce evidence on the relationship between good Effort-reward balance and well-being. We found only one study among doctors that used effort and reward to predict job satisfaction (113). But this thesis has a positive psychology approach and it is interesting to reflect on the results on doctors' job satisfaction in the light of such well-established theory on psychosocial working conditions.

1.1.5 Factors associated with doctors' job satisfaction

In this section we will review the literature on the variables (on doctors) that we use in our studies to explain why we use these particular variables. See figure 5 for an overview over the

independent and dependent variables. There are many other variables that have been found to be related to doctors' job satisfaction, such as social factors (184), organizational support (185) and personality (186), but because of the length of this thesis we will focus on the variables we used in our papers.

AGE: A review on US doctors' job satisfaction concluded that age is likely weakly, but independently, associated with satisfaction, although interpretation is limited by the heterogeneity of the physician samples and the manner in which age is reported. The studies support a U-shaped association, with the highest satisfaction in those at the extremes of ages; however, not all studies found significant associations between age and job satisfaction among primary care physicians (102). A U-shaped association has also been found among doctors from Australia (187) and among other employees (188). Norwegian studies have found that older doctors were more satisfied in their job than younger doctors (78, 106). This has also been found among general practitioners in England (189). This might be related to more secure and permanent jobs, higher perceived competence and autonomy, and increased wages (190). There are no studies that focus on job satisfaction and age among Icelandic doctors.

GENDER: In the US, most studies have shown no gender differences regarding job satisfaction (102). However, one large study found differences in facets of satisfaction: women were more satisfied with relationships with colleagues and patients, but less satisfied with autonomy, pay, resources, and community relationships (191), which was supported by a review on the subject (192). Female doctors from China were found to be less satisfied in their job than male doctors, but the study sample was small and there was no further interpretation on causes (193). In England, female general practitioners, whose job satisfaction was most affected by work-home balance, were found to be more satisfied in their job than their male colleagues whose job satisfaction was most affected by demands of the job and patients' expectations (194). More recent studies from England have confirmed that female general practitioners are more satisfied in their work than male general practitioners (104, 189). In Italy, female radiologists were less satisfied in their job than male radiologists, which was partly explained by less recognition, a perceived lack of procedural and distributive justice, and a lack of fairness in the information flow (195). Norwegian studies have shown no gender differences in the levels of job satisfaction among doctors

(106), although one study among young physicians showed different predictors of job satisfaction, where well-being with peers was the most important predictor among male physicians and perceived clinical skills was the most important predictor among female physicians (196). No studies have focused on gender differences in job satisfaction among Icelandic doctors of all specialties. In summary, some studies have shown no gender differences in job satisfaction among doctors (US, Norway), whereas other studies have shown differences. It varies across studies which gender is more satisfied, and it appears to be different factors that predict job satisfaction among men and women.

WORKING HOURS: A review on job satisfaction among general practitioners showed that too many working hours and heavy workloads were related to decreased job satisfaction (197). A study of oncologists from the US showed that doctors' well-being started to be affected when weekly working hours exceeded 60 hours (198). In Norway and Iceland, working hours are regulated by the state, but doctors often have to take on extra work so it is hard to know exactly how many hours they work each week. A study among young Norwegian doctors showed that working hours were less than 50 hours a week, decreasing with advancement in career (199). Norwegian doctors were more satisfied with their working hours than German doctors in a study among hospital doctors (31). There are no published studies on how many hours Icelandic doctors work each week and there are no studies of whether working hours among doctors in Norway and Iceland influence their job satisfaction after controlling for other relevant individual and organizational factors.

JOB POSITION AND SPECIALTY: Workplace conditions are important for doctors' job satisfaction (200). Differences in job satisfaction between different job positions have been found; e.g., in the UK, hospital doctors were slightly more satisfied than general practitioners (201), while Norwegian general practitioners were more satisfied than hospital doctors (78, 106, 202). In Norway, general practitioners are highly esteemed and well paid (202). They also experience a high amount of autonomy (202), which is known to be related to high levels of job satisfaction (105). In the US, self-employed physicians (solo or group practices) were found to be more satisfied than employed physicians (by Health Maintenance Organizations and hospitals), which was partly explained by higher autonomy and decision-making power among self-employed physicians (203). This is in line with findings from Finland and New Zealand, which show that private practice physicians were more satisfied than physicians in the public sector (204, 205). Regarding areas of specialization, a study from the US found that

pediatric, geriatric, and internal medicine specialists were more satisfied in their job than family doctors (206). Obstetricians/gynecologists and neurological surgeons (among others) were less satisfied than the family doctors (206), possibly because of rising expectations for perfect birth outcomes and high medico-legal risk (206). In the same study, there was a relatively high proportion of dissatisfied physicians among those practicing certain ‘procedural’ specialties (e.g., ophthalmology and orthopedic surgery). The authors argue that the reason why ‘cognitive’ specialties, such as pediatrics and family medicine, were more satisfied than the ‘procedural’ specialties was that the ‘procedural’ specialties, especially surgical subspecialties, had experienced more payment reforms and managed care than the ‘cognitive’ specialties. The ‘procedural’ specialties experienced a change in income, autonomy, and prestige levels, which might have led to less satisfaction in the job (206). In Finland, psychiatrists were found to be less satisfied than other medical specialists, which was probably related to higher levels of patient-related stress and psychological distress (207). In Norway, internists, anesthesiologists, and gynecologists/obstetricians were found to be less satisfied than average in their job, and primary care doctors and psychiatrists were the most satisfied doctors (78). The reason for the difference in job satisfaction was not discussed by the authors, but the higher job satisfaction of primary care doctors and probably also psychiatrists is, as argued above, likely to be related to a high amount of autonomy and rate of pay (202). Why psychiatrists are the most satisfied doctors in Norway, but the least satisfied doctors in Finland is not known. This shows that the doctors’ job position and specialty is relevant to their job satisfaction. However, there is a lack of prospective studies on the subject. Despite one study among general practitioners in Finland (208), there are no prospective studies on the effect of change in job position on doctors’ job satisfaction.

WORK-HOME INTERFACE STRESS: In work and occupational health psychology the concept of work-family conflict or work-home interference is a well explored concept in relation to job stress. Here the source of stress is in the balance *between* the work and home domain whereas in the DCM and ERI theory the stress is localized in an imbalance *within* work. The effect of work interfering with family (work–home stress or work-family stress) has been found to be more strongly related to job satisfaction than family interfering with work (home–work stress or family-work stress) (14, 15). In our studies, we use work–home interface stress. We use a reliable and validated measurement (199), that includes the questions: ‘I am stressed by the job interfering with my family life,’ ‘I am stressed by

problems with balancing job and private life,' and 'I am stressed by the job interfering with my social life.' Our measurement is based on a factor analysis (with varimax rotation) on factors from a modified version of Cooper Job Stress Questionnaire (209). These questions have been included in the NORDOC study from the beginning (1993/94) and the work-home stress measurement has been used in several studies (209, 210). All the doctors in our studies were asked to answer these questions, also those without spouse or children.

In the recent years authors have distinguished among four different dimensions underlying the work and non-work (211, 212). In addition to the negative effect of work to home conflict and home to work conflict, researchers have identified positive effect of work to home facilitation and home to work facilitation. For instance, when employees experience sufficient job resources (e.g. control) to deal with high job demands at work, they may be stimulated to learn and 'grow' and energy will be mobilized rather than depleted. This will facilitate their functioning in the non-work domain (211). A figure by Frone (2003) shows the direction of the interplay (work to family and family to work) on the y-axis and effect (conflict and facilitation) on the x-axis (212). This entails four squares with the four dimensions. Our measurement refers to the dimension of work to home interplay and conflict. Studies have indicated that there are different antecedents and outcomes of work-home conflict and work-home facilitation.

There are several job characteristics that seem to be related to work-home interference, such as workload and work role conflict (211). Researchers have used different theories to explain the relationship between antecedents and work-home (and home-work) interference. In our studies we do not study the antecedents of work-home stress. We measure the doctors' stress related to the work-home interference directly and study the relation of this with their job satisfaction. Thus, in the discussion, we will use the same theories as for the other measured antecedents of job satisfaction.

The work-home interference has been identified as the most important job-stress factor among Norwegian doctors over the years after leaving medical school (199). In today's society, people are experiencing high amounts of stress related to the balance between work and family (14, 15). Doctors are no exception (199); in fact, studies have shown higher work-home interface stress among doctors than the general population (13, 213, 214). In a Norwegian study, physicians experienced similar work-home balance stress as other occupational groups, such as lawyers and church ministers (215). A recent study among US doctors showed a decline in satisfaction with work-life balance and an increase in burnout

between 2011-2014 (216). Studies have shown a relationship between work–home interface stress and burnout among doctors (217-219). Among Norwegian doctors, work–home stress was a predictor of emotional exhaustion in a recent five-year follow-up study (210). Among other occupations, it has been shown that work-home stress is also related to poor physical health, heavy alcohol use and turnover intentions (211). Among work-related attitudinal outcomes, job satisfaction is most frequently related to work-family conflict (16, 220). High work–home interface stress has been related to low levels of job satisfaction among doctors (12, 194) and low work–home interface stress has been related to high levels of job satisfaction among doctors (13). Therefore, this stress factor should be included and controlled for in any studies that aim to explain job satisfaction, and adjusted for when we look at change in work satisfaction over time.

COST-CONTAINMENT AT WORK: Most of the publications that deal with economic and financial incentives focus on doctors’ pay (107). But there are studies that have linked financial constraints on doctors to reduced career satisfaction (221, 222) and autonomy (223), and one study of anesthesiologists showed no effect of cost-containment on job satisfaction (224). Studies have shown that difficult working conditions as a result of limited resources and lack of medications and supplies can influence doctors’ job satisfaction (225). Also, environmental market factors have been shown to impact physician career satisfaction (226). But we lack nationwide studies about the effect of cost-containment initiatives on doctors’ job satisfaction, especially when controlled for other possible factors. Between 2008 and 2010, health expenditure in Iceland decreased by 5% per year as a result of general expenditure cuts (227). In the same period, Landspítali University Hospital reduced its costs by 16% by reducing both paid overtime and the number of doctors and nurses on call and by limiting diagnostic tests as well as other expenditure (227). It remains to be explored whether such cost-containments have affected the Icelandic doctors’ job satisfaction.

1.1.6 Factors associated with doctors’ migration

Factors related to doctors’ migration are often presented as ‘push factors’ from the country of origin and ‘pull factors’ from the destination country (133, 228, 229). Push factors have been found to be more important than pull factors (133). We only look at ‘push factors’, though it would be interesting to explore which ‘pull factors’ influence the migration considerations among the Icelandic doctors. Below we will review the individual and work-related factors

that we use in our study on migration considerations among Icelandic specialist doctors. Some studies have shown that age, gender, job position and job satisfaction are related to doctors' migration. No studies have explored the role of cost-containment initiatives and stress related to personal finances on migration among doctors. During the recession some Icelandic doctors worked abroad in their vacations (230), this factor might also be related to permanent migration. Below we review the literature on the variables we have used in our study.

AGE: Younger age was related to higher probability of having planned migration among Canadian family physicians (62). Another Canadian study showed that younger age was related to migration (231). Job satisfaction is related to migration (133), so a lower job satisfaction among younger doctors might partly explain a possible higher migration among young doctors. Age should therefore be included in all multivariate analyses regarding doctors' migration.

GENDER: Research has shown that skilled-worker emigration rates are substantially higher among women than men in most developing countries (232). Women with tertiary education are more than 40% more likely to emigrate to OECD (Organisation for Economic Co-operation and Development) countries than men with tertiary degrees in Zambia, Malawi, Togo, Ghana, and Uganda, among other countries (232). A plausibly large contributor to this pattern is structural barriers to professional achievement by skilled women in their countries of origin (232). There are few studies that focus on gender difference and migration among doctors. A cross-sectional study among medical students in Addis Ababa showed that male students were more likely to say that they would like to emigrate than females (233). In Canada, male family physicians were more likely to have considered migration than their female colleagues; however, this relationship diminished when other variables were controlled for (62). In Japan, male doctors were more prone to migration than female doctors (234). Among junior doctors in the UK, there were different reasons why female and male doctors wanted to migrate. Women were more likely than men to comment that they wanted to work in medicine abroad to broaden their work experience, to do relief and voluntary work abroad, or to travel abroad for its own sake. Men were more likely than women to give reasons related to perceived underfunding and poor facilities in the UK, generally poor working conditions, and low levels of job satisfaction (235). In summary, there are studies that show gender differences in relation to migration among doctors; male doctors being more prone to migration than female doctors. There seem to be different factors that predict

migration among male and female doctors. All studies on migration among doctors should control for gender.

JOB POSITION AND SPECIALTY: In Canada, family physicians were less likely to move than other specialists (231). In Ghana, house officers and medical officers were more likely to intend to migrate than residents, specialists, and consultants (63). This was likely because house and medical officers were younger and it is common that younger doctors seek career advancement abroad (63). There was no difference in migration intentions between government employers and private employers in the same study (63). Because there are different political systems and health-care services in different countries, the effect of job position should also be studied within each country and its health-care system.

JOB SATISFACTION: Job dissatisfaction has been found to be related to doctors' migration (62, 133, 225, 236). When explored in detail, satisfaction with salaries often stands out as the major factor influencing migration (63), though factors such as recognition are also of importance (225). In Canada, dissatisfaction with professional life was the most important predictor of planned international migration among family doctors (62). In the UK, job dissatisfaction was related to migration intentions in both female and male junior doctors (235). We lack studies on whether job satisfaction is of importance with respect to migration among doctors, especially when controlled for other economic and financial factors.

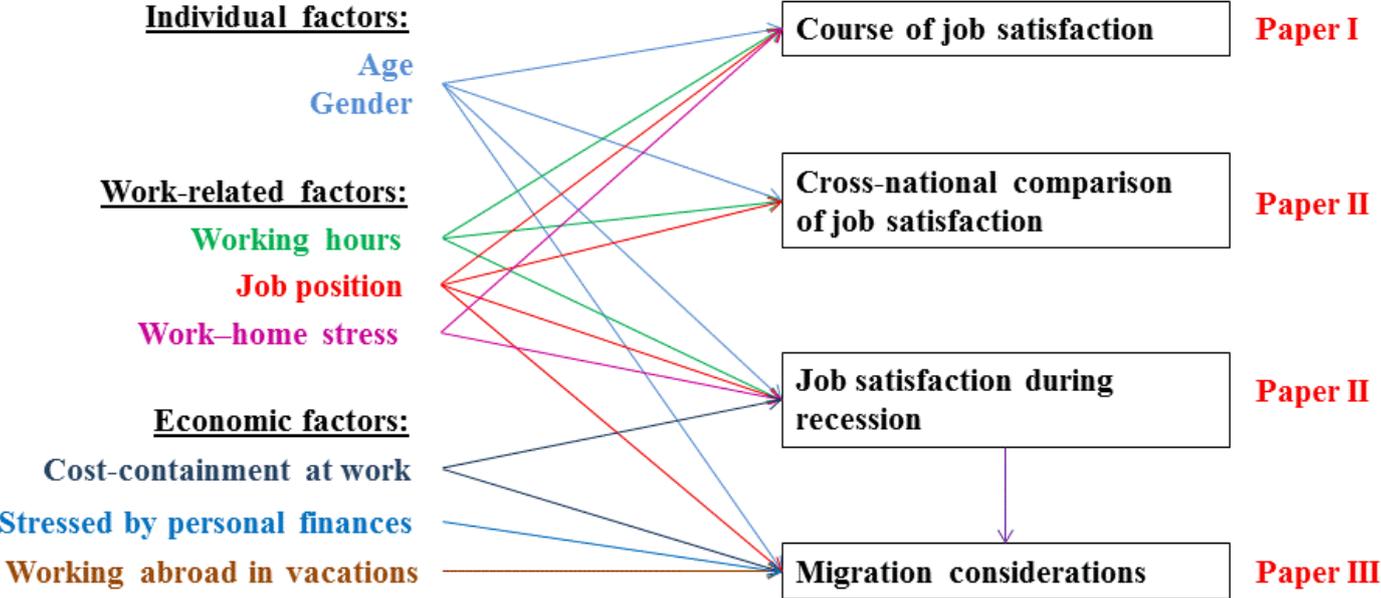
COST-CONTAINMENT AT WORK: Poor working conditions related to lack of economic resources have also been shown to be related to migration among doctors (133, 139, 225). Resource availability influenced both job satisfaction and migration among South African doctors working in rural regions (133). The working conditions in Serbia were influenced by an economic downturn in the 1990s followed by an increase in doctors' migration (139). Serbian doctors still migrate to more economically stable countries where the doctors perceive the working conditions to be better and the health-care systems more effective (139). A desire for increased access to enhanced technology, equipment, and health facilities is a known motivational factor for migration among doctors (237). About 40% of doctors who were considering leaving the UK cited working conditions as being important (235). However, it is not known whether recession and related factors influence doctors' contemplation of moving and working abroad (136).

STRESSED BY PERSONAL FINANCES: Financial motivation and rates of pay are some of the most cited factors related to doctors' migration, although many studies also point to the role of career development and learning and training possibilities among doctors (133, 136, 238-242). One study showed that 90.8% of doctors from Colombia, Nigeria, India, Pakistan and the Philippines rated a desire for higher income or more buying power as a highly significant motivating factor for migration (237). In a study among doctors who had migrated from South Pacific island nations, 46% indicated income was a major reason for moving. In Europe, there are major differences in salaries between countries. For example, an Estonian doctor can earn six times more in Finland while a Romanian general practitioner can earn 10 times more in France (136). In 2009, a 25% cut in the salaries of health-care professionals in Romania led to an increase in the number of doctors seeking work abroad (136). The opposite was observed in Poland, Lithuania, and Slovenia, where an increase in annual salary diminished the outflow of medical doctors (139). In Iceland, doctors have to achieve their specialist training abroad (except general practitioners and psychiatrists). Many specialists return to Iceland in considerable debt and many take up additional loans in order to settle down. Between 2008 and 2009, the salaries of Icelandic doctors increased by only 3.7% (243), during which time the consumer price index increased by 27% (122). In the same period, the doctors stopped getting paid overtime (227). Therefore, it is likely that the economic crisis affected doctors' private lives, and concerns about personal finances may have influenced their decision to migrate. However, since other factors may also be of importance, the roles of cost containment and personal finances should be controlled for other factors and confounders in multiple regression models.

WORKING ABROAD DURING VACATIONS: Available training opportunities vary considerably across Europe (136). Training and career opportunities influence doctors' migration considerations, either temporarily or for a long period of time (136). Some Icelandic specialist doctors work abroad during vacations, which is often where they became specialists (230). It is not known how many specialists work abroad during vacations, but their numbers are likely to have increased during the recession given that doctors get paid two or three times more in countries such as Norway and Sweden (230). Studies among nurses have shown that new forms of temporary migration have developed more recently, where workers maintain family and work lives in separate countries, either migrating for short periods or working abroad for a few days at a time while retaining positions in their own

countries (244, 245). Such temporary work abroad among doctors might influence their consideration of permanent migration, and this should also be taken into account in a study of migration considerations among doctors.

1.2 Research model including all dependent and independent variables



1.3 Aims

Our main aims were to explore:

- 1) The course of doctors' job satisfaction from early to mid-career;
- 2) The level of doctors' job satisfaction during recession by prerecession and cross-national comparisons;
- 3) Whether doctors facing recession have considered migration; and
- 4) Relevant predictors/associated factors of: 1) change in job satisfaction, 2) job satisfaction during recession, and 3) migration considerations.

1.4 Research questions

To obtain these aims, we explored the following research questions:

- a) What is the course of job satisfaction among Norwegian doctors over a five-year period, from early to mid-career? (Paper I)
- b) Was there a difference in the job satisfaction of doctors working at Landspítali University Hospital (the main hospital in Iceland) before and during the economic recession? (Paper II)
- c) How does job satisfaction among Icelandic doctors compare with job satisfaction among Norwegian doctors, including when adjusted for age, gender, workplace, and work hours? (Paper II)
- d) Have specialist doctors working in the Icelandic health-care system considered moving and working abroad? (Paper III)
- e) Which work-related factors influence the job satisfaction of doctors from early to mid-career, including when controlled for relevant individual factors? (Paper I)
- f) Is work–home stress related to job satisfaction among Norwegian and Icelandic doctors? (Papers I and II)
- g) Is cost-containment at work associated with job satisfaction and migration considerations among Icelandic doctors? (Papers II and III)
- h) Is stress related to personal finances associated with migration considerations among Icelandic specialist doctors? (Paper III)

2 MATERIAL AND METHODS

2.1 Material and study design

Table 1 shows the description of the study samples. The material in Paper I is from a longitudinal national cohort of all physicians who graduated from the four medical schools in Norway in 1993 and 1994 (N = 631), the Young Doctor Cohort of The Longitudinal Study of Norwegian Medical Students and Doctors (NORDOC). This cohort has been surveyed by postal questionnaires at five stages over a period of 15 years, and the sixth follow-up took place in 2014. The NORDOC focuses on mental health, well-being, and work among Norwegian doctors. In addition to the present Young Doctor Cohort, NORDOC also includes the Medical Student Cohort (N = 421), which consists of all students that entered Norwegian medical schools in 1993. The survey includes quite comprehensive questionnaires of 30–40 pages each, which have been distributed every fifth year over the last stages. Results from the first five stages have been described previously (199, 246, 247). At the baseline in 1993 and 1994, 83% of subjects (522/631) responded. The first paper of the present thesis includes the results from the fourth and the fifth stage surveys in the Young Doctor Cohort: T1 (2003), 10 years after graduation, and T2 (2008), 15 years after graduation, with only the respondents who participated in both surveys, 2003 and 2008, being included in the data analyses. The response rates were 75% (390/522) at T1 and 65% (338/522) at T2, while 59% (306/522) responded at both time points.

The material in Papers II and III is from a cross-sectional web-based survey conducted among 96% (n=1024) of all working physicians in Iceland between March and May 2010, who had registered their email address with the Icelandic Medical Association. The response rate was 61% (622/1024). Paper III includes only the specialist doctors, which represents 55% of all specialist doctors working in Iceland in March 2010 (n = 467/846). The Norwegian data in Paper II is from a representative sample of 1521 active doctors, from a 2010 postal survey by the Institute for Studies of the Medical Profession (LEFO) in Oslo (former Research Institute of the Norwegian Medical Association). The response rate was 67% (1025/1522). The data is from the panel study, which is the prospective and longitudinal part of the Norwegian Physicians' Survey. This survey is repeated biennially and has generated data for several previous studies (248-250). In Paper II, we also conducted a historical comparison using a sample of Icelandic doctors working at the Landspítali University Hospital in March 2003. This was a postal survey conducted by the Administration of Occupational Health and

Safety in Iceland (251) with a response rate of 59% (345/581). The doctors who worked at Landspítali University Hospital in our study represented 62% (n = 343/552) of the doctors working there.

Table 1 Description of the study samples

Country	Year of study	Subjects	Response rate	Paper	Outcome	Design
Norway	2003 and 2008	Young Doctor Cohort* (NORDOC)	59% (n = 306/522)	I	Job Satisfaction Scale	Prospective
Iceland	2010	All doctors	61% (n = 622/1024)	II	Job Satisfaction Scale	Cross-sectional
Norway	2010	All doctors (panel study)	67% (n = 1025/1522)	II	Job Satisfaction Scale	Cross-sectional
Iceland	2003	Landspítali Hospital doctors	59% (n = 345/581)	II	Job satisfaction single item	Cross-sectional
Iceland	2010	Landspítali Hospital doctors	62% (n = 343/552)	II	Job satisfaction single item	Cross-sectional
Iceland	2010	Specialist doctors	55% (n = 467/846)	III	Migration considerations	Cross-sectional

*All Norwegian medical students graduating in 1993 and 1994

2.2 Dependent variables

2.2.1 Job satisfaction

Job satisfaction was measured with the 10-item Job Satisfaction Scale constructed by Warr et al. (1979) (42), which employed a seven-point Likert scale ranging from 1 = ‘extremely dissatisfied’ to 7 = ‘extremely satisfied.’ The scale was originally developed and used among different British occupations, where there were originally 15 items (42); these were reduced to 10 items by Cooper et al. because of five items irrelevant for doctors (194). The validity and reliability of the scale is known to be satisfactory (42, 252). Cronbach’s α in our samples were 0.86 at T1 (2003) and 0.83 at T2 (2008) in the NORDOC sample (Paper I), 0.90 in the Icelandic sample (2010, all doctors) and 0.87 in the Norwegian panel study sample (2010) (Paper II). The scale has previously been validated in studies on physicians from Norway, Germany, the US, New Zealand, Australia, and the UK, among others (31, 33, 106, 252-255).

The scale includes both intrinsic and extrinsic elements of job satisfaction (42), such as ‘How satisfied are you with...the amount of variety in your job’ and ‘...the amount of responsibility you are given’ (intrinsic), and ‘...your rate of pay’ and ‘...your working hours’ (extrinsic). We used the total sum score of the 10 items as the job satisfaction measure. In Paper I, we used the change in job satisfaction from T1 to T2 as our dependent variable, and this was calculated as job satisfaction total score at T2 minus job satisfaction total score at T1. In Paper II, we analyzed each of the items separately when comparing Icelandic and Norwegian doctors, which has also been done in other studies (31, 33), in addition to using the whole scale. In the study of difference in job satisfaction before (2003) and during (2010) the economic recession among doctors working at the Landspítali University Hospital (Paper II) we used one item, ‘How satisfied are you with your job?’, measured on a ten-point Likert scale (i.e., 1–10, where 10 indicated the highest satisfaction level). A one-item instrument may produce less reliable results than a multi-item instrument.

2.2.2 Consideration of moving abroad

In Paper III, we used the question: ‘Have you considered moving and working abroad?’ as a dependent variable. Precoded responses were: 1) ‘No’; 2) ‘Yes, I have considered it, but for various reasons, it is not possible’; 3) ‘Yes, I have considered it’; and 4) ‘Yes, I am moving abroad in the next two years.’ Before the logistic regression, the variable was recoded into 1 = 0, and 2, 3, 4 = 1, to categorize those who had considered moving and those who had not. We also did a validation logistic regression where we recoded 1 and 2 as 0, and 3 and 4 as 1, to categorize those who had considered moving and were able to do so vs. those who were not able or had not considered it. Other studies have measured migration considerations with a single item, which validates this variable to some extent (235, 256), but the reliability of the data from this variable may be questioned because it uses only a single item.

2.3 Independent variables

2.3.1 Age and gender

In Paper I, age was measured as a continuous variable in years. In Papers II and III, age was categorized into nine groups: 1) 29 years and below; 2) 30–34 years; 3) 35–39 years; 4) 40–44 years; 5) 45–49 years; 6) 50–54 years; 7) 55–59 years; 8) 60–64 years; and 9) 65 years or more. This categorization was done to make it harder to identify individuals for the sake of

secrecy in the small population of Icelandic doctors. Gender was coded as 1 for women and 2 for men in all papers.

2.3.2 Weekly work hours

In Paper I, the number of work hours per week was measured as a continuous variable. We used the question: ‘How long is your contractual working time in hours each week in your main job?’ The difference between T1 and T2 was used to predict any reduction in work hours over the period.

In Papers II and III, the number of weekly work hours for the Icelandic doctors was estimated from the sum of three variables: working hours according to the ‘employment contract’ in the main position, working hours per week in extra ‘part-time jobs’, and all ‘overdue’ hours per month, divided by 30.5 and multiplied by 7. In Norway, the number of hours was elicited directly through the question: ‘In a regular working week, including all part-time jobs, how many hours do you work?’ Although we did not have exactly the same variables in the two countries, this method yielded the best available estimates for comparison. However, this is a weakness of our study, and comparisons of the weekly work hours should be made with caution.

2.3.3 Job position

A difference in job satisfaction between different job positions has been found; e.g., in the UK, hospital doctors were slightly more satisfied than general practitioners (201), while among Norwegian doctors, general practitioners were more satisfied than hospital doctors (106). Differences in job satisfaction between employed and self-employed workers (203), and between public and private physicians (204) have also been found. In Paper I, we categorized job positions into eight different categories: general practitioners, chief specialists in hospitals, senior house officers (SHO), research work/teaching, private practitioners, administration, public health officers, and other occupation/on leave. We then examined the job position data further to determine whether there was a difference between those who stayed in the same position (e.g., general practitioners at both time points) and those who changed positions from T1 to T2. To control for physicians who changed their position from SHO we created two so-called dummy variables, one for SHO (at T1) who changed position (to any other position at T2), and the other for those who changed position from any position

except SHO between T1 to T2, using those who remained in the same position at T1 and T2 as the reference category (or base).

In Papers II and III, the doctors were categorized into hospital doctors, general practitioners, private practice specialists, and others (doctors who work in health authorities, specialized institutions outside hospitals, or universities), with private practice specialists as the reference group. As mentioned, we used only specialist doctors in Paper III.

2.3.4 Work–home stress

The work–home stress variable measured in Papers I and II consisted of a sum score of three items: ‘I am stressed by the job interfering with my family life,’ ‘I am stressed by problems with balancing job and private life,’ and ‘I am stressed by the job interfering with my social life.’ The degree of stress was scored on a five-point scale from 1 (not at all) to 5 (very much). In the Norwegian sample of Paper I, Cronbach’s α was 0.83 and in Paper II, Cronbach’s α was 0.91 in the Icelandic sample. This variable is based on factor analyses of a modified version of Cooper’s job stress Questionnaire (194, 246), which has previously been validated (199). In Paper I, this variable was used to measure the difference between T1 and T2 (reduction or increase in work–home stress).

2.3.5 Job dissatisfaction

A reversed version of the Job Satisfaction Scale (10 questions, used as dependent variables in the first two papers) was used as an independent variable in Paper III. The variable was dichotomized; those on the median or more satisfied than the median were coded 0 and those less satisfied than the median were coded 1.

2.3.6 Influence of cost-containment initiatives on work

There are no studies that have used cost-containment initiatives as an independent variable in relation to job satisfaction or migration considerations. Therefore, we made this variable. The variable needs validation in future studies. We asked the Icelandic doctors in Papers II and III to respond to the following statement and exact wording: ‘I find that cost-containment initiatives (e.g., limited selection of devices and equipment) influence my work.’ Response alternatives were: 1) ‘strongly disagree’; 2) ‘disagree’; 3) ‘neither agree nor disagree’; 4) ‘agree’; and 5) ‘strongly agree’. In Paper III, the response categories were recoded into two

groups: strongly disagree, disagree, and neither agree nor disagree were coded 0, and agree and strongly agree were coded 1.

2.3.7 Worries about personal finances

According to Voydanoff, economic stress refers to aspects of economic life that are potential stressors for employees and their families, regarding employment and income (257). One such economic stressor is called economic strain. Voydanoff describes economic strain as perceived financial adequacy, financial concerns and worries, and adjustment to change in financial status (257). In Paper III, we asked the question: ‘How stressful are worries about personal finances for you?’ The response alternatives were: 1) ‘not stressful’; 2) ‘slightly stressful’; 3) ‘stressful’; 4) ‘quite stressful’; and 5) ‘very stressful’. This variable was translated from the NORDOC questionnaire. It has never been used as an independent variable in a scientific paper. There are no studies that we know of that have used such variable in relation to migration considerations and thus it needs validation in future studies.

2.3.8 Working abroad during vacations

In answer to our question in Paper III, ‘Do you work for other employers in vacations?’, respondents chose between: 1) ‘No’; 2) ‘Yes, in Iceland’; and 3) ‘Yes, abroad’. The first two of these were coded 0 and the last was coded 1. This variable also needs to be validated in future studies. This variable and the other two economic variables are single item variables so the reliability of the data from them may be questioned.

2.4 Statistical analyses

In Paper I, we tested differences in job satisfaction between the two time points in the means of continuous variables using a paired sample *t*-test. We used one-way ANOVA (post hoc = Tukey) to test any difference between physicians’ positions in job satisfaction. Blockwise linear multiple regression (forced entry) analyses were performed to test the effects of the predictor variables on job satisfaction. The predictors were entered in three blocks to study their relative impact, with age and gender in the first block, change in job position and change in working hours in the second block, and change in work–home stress in the third block. The relative impact of each block was tested by explained variance (adjusted R^2).

In Paper II, we tested differences in job satisfaction means between the two countries using Student’s *t*-test. ANOVA analyses were performed to control for age, gender, work hours, and

work position. We used multiple linear regressions with job satisfaction as the dependent variable among the Icelandic doctors to identify significant predictors (associations). Before we did regression analysis, we checked that our Norwegian and Icelandic data were normally distributed. The Job Satisfaction Scale ranges from extremely dissatisfied to extremely satisfied, which facilitates the normal distribution. We estimated the differences in satisfaction (sum score, and each of the 10 items) with effect sizes (Cohen's d : 0.02–0.49 = small effect; 0.50–0.79 = moderate effect; 0.80 and above = large effect) (258).

In Paper III, multiple logistic regression analysis was performed to study the predictor variables of migration considerations.

In all three papers, we chose a significance level of 5%, with 95% confidence intervals (CI) of the estimates. IBM SPSS Statistics version 18 (Paper I) and 20 (Papers II and III) was used for the statistical analyses.

2.5 Methodological considerations

2.5.1 Sampling procedures

It is known that it is hard to get doctors to answer to surveys (259). Several studies among doctors have very low response rates (around and below 30%), but nevertheless are published and cited by several papers in high-impact journals (214, 218, 260, 261). Comprehensive work was conducted in the beginning of the NORDOC survey period (in 1993/1994). When the NORDOC was launched, the Norwegian Medical Association and the researchers had meetings with all four universities and all classes that were included in the study, and the researchers met in person with the students in their lecture rooms. Students at each university were appointed as contact persons. In addition, there was a campaign in the *Journal of the Norwegian Medical Association*. At the five-year follow-up, the cohorts were sent a letter with a publication list of articles and theses produced since the preceding wave of the postal survey. All this may have developed high loyalty in the NORDOC cohorts because about 60–70% have responded (and filled out the quite comprehensive questionnaires of about 30 pages each).

In the beginning of the panel study, a representative sample of 2000 doctors was sent a letter inviting them to be a part of the panel. One thousand two-hundred seventy-two doctors (64%) returned the letter with written concern to participate. The panel has been expanded four times, where retired doctors are removed and young doctors added, keeping the representativeness with regard to age, gender and work situation. The panel now consists of

about 1600 doctors. The continuing high response rate in the panel is partly due to a lot of published papers from the sample, which are available to participants on a website made for the publications from the panel data. One year every participant received a Christmas card from the researchers. The questionnaires are printed and distributed by regular mail, with at least two reminders.

The high response rate (61%) in the Icelandic study was also achieved through hard work. The dr. philos. candidate stayed in Iceland for 9 months in relation to the Icelandic study (2009/2010). The study was prepared with a focus on getting as many doctors as possible to answer to the survey: 1) The questions: Researchers behind the study of Health and Organisation among University hospital Physicians in Europe were contacted because they struggled to get Icelandic hospital doctors to answer to their survey in 2004 (gained a response rate of 47.8%) (262). The doctors at that time thought the questions were too personal (e.g., too much focus on mental health), so we included only a limited amount of such questions in our study. It is known that perceived relevance of a survey is important to the response rate among doctors (263) and most of the questions in our survey focused on the doctors' working conditions, which we assumed were relevant for the doctors because of the economic crisis. 2) Length of the survey: It is known that short questionnaires increase response rates among doctors (259). Our questionnaire comprised 102 questions, and we emphasized that it would take no more than 20 minutes to answer the questionnaire. After the survey was sent out the first time, we realized that we probably should have shortened the questionnaire to get an even higher number of doctors to answer. 3) Cover letter: Personalized cover letters are associated with higher physician response (263). We sent letters with the survey to emphasize its importance. Representatives of the Icelandic Medical Association, the Association of the Landspítali Doctors, the Directorate of Health and the Department of Research and Occupational Health all approved and signed the cover letter.

Other measures to gain an increased response rate in the Icelandic survey were: 1) direct contact with the doctors, which is known to be related to improved physician response (263). Doctors were given information about the survey and previous findings from Norwegian and other relevant studies (along with some chocolate) on morning meetings at hospitals and primary care health clinics (around 15 clinics) and the largest private practice clinics in Reykjavik; 2) posters with a reminder to complete the survey were posted at various places at the hospital in Reykjavik and Akureyri (the second largest hospital in Iceland); 3) a television advertisement with a picture and text and a professional voice reminding the doctors to

complete the survey was screened immediately before the afternoon news, six times during two weeks 4) a website was produced, where various important people, including the director of the Icelandic Medical Association, wrote short articles, encouraging the doctors to complete the survey, and where we updated the response rate every day.

Our methods of encouraging the Icelandic doctors to complete the survey may have influenced the results in some way. For example, primary care clinics in rural areas did not achieve information meetings, but these primary care physicians completed the survey, and the data are representative for all doctors in Iceland, with minor exceptions. It should be mentioned that though we have high response rate compared to many studies on doctors (especially prospective studies), the response rate is not optimal and there are studies with considerably higher response rates. For instance, we do not know if the 39 % of the Icelandic doctors that have not answered the survey differ from the doctors in our study in ways that we have not accounted for.

2.5.2 Study design and bias – Strengths and limitations

2.5.2.1 All samples

The major strengths in our samples were the relatively high response rates for doctor samples. We also did several attrition analyses on the main variables (job satisfaction), which showed that the data were representative with regards to gender, age, and specialties to a large extent (see more detailed descriptions of each of the samples below). This strengthened the representativeness of our data and minimized the risk of selection bias. Nevertheless, the nonresponders may differ from the responders in both the outcome measures and the independent variable measures. For example, doctors who have high pressure at work (and/or at home) may not take the time to answer to such surveys, and doctors who feel satisfied and easygoing may not be interested in a survey focusing on distress and poor mental health. There may also be type II errors in our samples, i.e., false negative findings (e.g., no effect of gender), because the sample sizes were not large (compared to studies from the US (102)) and therefore reduced statistical power in the multiple regression analyses. However, our findings are consistent with those of larger studies, e.g., regarding gender and job satisfaction (102), which strengthens our findings.

There may be several confounders in our analysis. Despite our use of multiple regressions to control for these confounders, variables beyond our focus might have affected the

relationships between our predictors and outcomes. These include mental health variables. There is a relatively high level of burnout and depressive symptoms among doctors (214) that may have influenced their job perceptions. Another aspect of internal validity is reciprocal causation in our cross-sectional analysis. For example, in Paper II, the doctors who are less satisfied in their job in general might be more vulnerable for cost-containment at work and experience more stress relating to balancing work and home. Therefore, our findings should be replicated in prospective studies, and their *predictive validity* confirmed in order to identify any possible causation. In Paper I, reciprocal causation is less likely because of the prospective design. There are also limitations regarding application of our results in other countries (external validity). There are many similarities between the Nordic countries; they all have strong sociodemocratic traditions with mainly publicly financed health services. Our findings might be applicable to these countries to some extent, but as we see in our study, the doctors have different perceptions regarding such things as their working environment and salaries. In addition, the Nordic countries are quite different from other countries, where working hours are not as well regulated and the structure of the health-care systems may differ widely (28). For example, the lack of effect of number of working hours per week on the Norwegian and Icelandic doctors' job satisfaction would probably not be found in a country with less regulated and longer hours. This applies, for instance, to North America, where there are higher number of working hours per week in direct patient care among the doctors than in Norway (28). Our findings need replication from longitudinal and comparison studies in other countries. A limitation of the cross-national comparison study is that the Icelandic study was electronic and the comparable Norwegian study was by mail. But it has been shown that there is no difference in the quality of data or responses to the survey between the two survey methods (264), so it is unlikely this affected our results.

2.5.2.2 The NORDOC sample

The NORDOC study is one of the most cited studies among doctors, and the largest representative longitudinal study among doctors over such a long time. But one limitation is that the sample does not include doctors who work in Norway but who have graduated from other countries, which is currently a great part of the Norwegian doctor workforce. About 70% of the doctors who were licensed in Norway over the last year have had their undergraduate training abroad (most often in Europe). It should also be taken into account that the doctors in the cohort graduated some years ago, in 1993 and 1994. Doctors who have

graduated more recently might perceive their work situation differently when moving from early to mid-career. Also, five years, which we use in our paper (Paper I), is a long time window, and we may have missed important information in the years between the two time points. Our dependent variable in Paper I, change in job satisfaction, was calculated as job satisfaction total score at T2 minus job satisfaction total score at T1. This generates less reliable results than if we had controlled for baseline because there is a high correlation between job satisfaction at T1 and T2. Therefore, the reliability of the change score is rather low (265). Also, doctors with low job satisfaction at T1 are likely to have obtained higher job satisfaction at T2. If an independent variable is correlated with the lower job satisfaction at T1, it will likely have a negative relationship with the T2 minus T1 score (the regression is towards the mean of T2 minus T1) (266). But the fact that our independent variables also reflect a change between T1 and T2 strengthen the reliability of our results. In the Young Doctor Cohort (the sample we used), there was a gender bias at baseline, with fewer men (79%) than women (87%) responding ($p < 0.01$) (267). This might have affected our results, but the lack of gender difference in relation to dependent and independent variables minimizes the effect of this bias.

2.5.2.3 Panel study

This panel of doctors consists of doctors who have agreed by letter to participate in the panel study. This means that all the doctors that receive the survey at each time have already agreed to participate and therefore their motivation to participate is greater than average. This might explain the relatively high response rate and might have led to selection bias. The respondents are representative when it comes to gender, job, and specialties, but are slightly older than average (because newly graduated doctors are not included every year).

2.5.2.4 Icelandic sample: All doctors in Iceland in 2010

The Icelandic study that was sent out to all the doctors in March 2010 is a cross-sectional study. This means that we cannot make inferences about the causal effects of the statistically significant predictor variables. We have tried to minimize for confounding by controlling for relevant variables. Also, our sample represents 58% of all doctors working in Iceland (61% response rate among 96% of all doctors), and the specialists represent 55% of all specialist doctors working in Iceland. This means we lack responses from 42% of the doctors. With regard to selection bias, when comparing our data with the autumn 2010 data received from

the Icelandic Medical Association, there is a small overrepresentation of young doctors in our sample (see Table 2).

Table 2 Age distribution in our 2010 sample compared with all doctors in Iceland in 2010

Age	Our study spring 2010 (n = 622) %	All doctors in Iceland autumn 2010 (n = 1073) %
≤ 29	11	7
30–34	9	8
35–39	5	5
40–44	13	11
45–49	15	15
50–54	15	17
55–59	15	16
60–64	14	15
≥ 65	3	6

Younger doctors are known to be less satisfied in their jobs than older doctors (78, 106); therefore, this might have influenced our results to some extent, though the age difference is not that prominent. In addition, we controlled for age in all our analyses so our results are unlikely to have been affected by this small difference. In our sample, 37% were women, whereas the autumn 2010 data from the Icelandic Medical Association comprised 32% women among the doctors in Iceland. Women made up 30% of our sample of specialists in Paper III, although only 25% of the specialists working in the country in March 2010 were female. This means that there is a selection bias towards women in our sample. It is unlikely that this affected our results, as we found no gender difference in job satisfaction, and all Norwegian and most international studies have previously shown no gender differences when it comes to doctors' job satisfaction (102, 106). Studies that have shown gender differences (193-195) indicate that it is the women who are less satisfied than men. If the female doctors in Iceland were less satisfied than the male doctors it would be even more prominent in our data with the overrepresented female population. In relation to migration considerations, it is also unlikely that the overrepresentation of women in our sample affects the results, as few migration studies show gender differences (62, 233), and these diminish when controlled for other variables (62). As regards other selection bias, all specialties are well represented; there is no difference in the percentage of doctors in each specialty in our sample compared with all working doctors in Iceland at the time of the study.

2.5.2.5 Landspítali University Hospital sample from 2003

When comparing a sample of Landspítali University Hospital doctors from 2003 with the hospital doctors in our 2010 Icelandic sample, we found there was no significant difference in the number of doctors within each specialty and that the age distribution was quite similar in the two samples (25% were 55 years or older in 2010 vs. 26% in 2003). This supports the validity of comparing these two samples over the seven years. Nevertheless, this comparison analysis is limited by not being a prospective cohort analysis. The respondents at the two time points might differ in many ways and we did not control for aspects such as gender or working hours in our analysis.

2.5.3 Reliability

Reliability refers to how precise and trustable the data are, and how much they could change if the observations were repeated. *Internal consistency reliability* is typically quantified by Cronbach's α . Coefficients over 0.70 indicate that more than 70% of the variance in an index is accounted for by the underlying phenomenon and is generally considered good enough. The Cronbach's α in our multi-item measures of job satisfaction and work-home interface stress was over 0.80, which means that the internal consistency in our sample data was quite good. This decreases the risk of making type II errors (false negative effect). On the other hand, the use of a single item as a dependent variable in Paper III (migration considerations) creates a reliability problem and a risk of type II error. The nonsignificant independent variables in Paper III (gender and job position) are far from significant, which diminishes (but does not exclude) this risk. *Intermethod reliability* refers to the extent to which results are the same when different methods or instruments are used. In Paper II, where we compared Icelandic and Norwegian doctors, the Icelandic doctors responded to a web-based survey while the Norwegian doctors completed a postal survey. Studies have shown that there is no difference in the quality of data or responses to surveys between the two methods (264), so it is unlikely that this has affected our results.

2.5.4 Validity

While reliability says something about precision of the data, validity is a measure of the accuracy of an instrument; whether an instrument measures what it is supposed to measure. There are different types of test validity; *content validity*, *criterion validity* and *construct*

validity. Content validity: The Job Satisfaction Scale covers both intrinsic and extrinsic aspects of job satisfaction and has, as we will discuss further, been validated in several studies among physicians around the world (31, 33, 106, 252-255). The migration consideration item and the cost-containment item were added by the authors and are therefore less valid. If other studies using similar measurements found similar results, this would strengthen the validity of the items. *Criterion validity:* Criterion validity refers to the instrument's correlation or overlap with other measures of the same phenomenon, either at present (concurrent validity), in the future (predictive validity), or in the past (retrospective validity). As regards predictive validity, the finding in Paper I, that those with changes in job positions predicted an increase in job satisfaction over five years, can be seen as validation of this predictor. This also applies to the reduction in work-home stress, which showed predictive validity with regards to increased job satisfaction. Our Job Satisfaction Scale results are similar to those of other studies that have used other measurements of doctors' job satisfaction, and will be considered in more detail in the discussion. These results indicate that the Job Satisfaction Scale has good content and criterion validity. Regarding migration consideration, no other studies have used exactly the same instrument as we used, which leads to low validity. But other studies have used measurements on intentions and considerations to migrate (62, 63, 136, 233, 235, 237), which validate our measure to some extent. *Construct validity:* Construct validity is related to the theoretical ideas behind the phenomenon under consideration. For example, this may apply to a defined and validated category such as 'clinical depression,' which has been validated by many studies and in many samples. Our measure of 'job satisfaction' approaches such a construct, as many studies in different populations have confirmed this construct to be relatively valid. However, there is no gold standard and a construct is usually validated towards a gold standard. Job satisfaction and life satisfaction are two different measurements of subjective well-being. A Norwegian study that used the Job Satisfaction Scale found that physicians were more satisfied in their jobs than nurses (92). On the other hand, another study among Norwegian physicians found that they were less satisfied with life than the general population (86). This indicates that job satisfaction and life satisfaction are two distinct constructs or domains, as supported by Heller et al. (10). A study on both job and life satisfaction among doctors from the same country compared with employees with similar university degree is needed.

3 SUMMARY OF RESULTS

3.1 Paper I

The impact of change in a doctor's job position: a five-year cohort study of job satisfaction among Norwegian doctors.

Objectives: This paper aimed to study the course of job satisfaction among doctors from their early career (tenth postgraduate year, T1) to their midcareer (fifteenth postgraduate year, T2). We also wanted to explore whether a change in a doctor's job position influenced their job satisfaction over a five-year period when controlled for individual and organizational factors.

Findings: The mean value of job satisfaction increased from 51.6 (SD = 9.0) to 53.4 (SD = 8.2) (paired *t*-test, $t = 3.8$, $p < 0.001$). General practitioners showed the highest levels of job satisfaction. Doctors who stayed in the same position (42%) over the five-year period experienced no change in job satisfaction. Doctors who changed position during the period (58%) experienced an increase in job satisfaction, from 49.5 (SD = 8.4) to 52.9 (SD = 7.5) (paired *t*-test, $t = 5.2$, $p < 0.001$). In a multiple regression model, the significant predictors of increase in job satisfaction were change in position from SHO to any other position (40% of all the doctors, $\beta = 2.83$, $p < 0.001$), any change in position (from any position except SHO, 18% of all the doctors) ($\beta = 4.18$, $p < 0.01$) and reduction in work-home interface stress ($\beta = 1.04$, $p < 0.001$), controlled for age, gender and work hours. The work-home interface stress reduced from 7.7 (SD = 3.1) at T1 to 6.9 (SD = 3.1) at T2 (the lowest possible response being 3 and the highest 15). There was a significant reduction in number of work hours over the years, from 43.3 hours per week in the tenth postgraduate year to 41.9 hours per week in the fifteenth postgraduate year, but this reduction did not predict an increase in job satisfaction.

Conclusion: An increase in job satisfaction over a five-year period among doctors in their mid-career was predicted by a change in job position and a reduction in work-home stress. This has implications with respect to career advice for young doctors. Doctors who are less satisfied with their jobs should change their position.

3.2 Paper II

Cross-national comparison of job satisfaction in doctors during economic recession.

Objectives: The aim of this study was to examine Icelandic doctors' job satisfaction during the recent economic crisis that started in 2008 1) by comparison with Norwegian doctors, 2) by comparison with available Icelandic data prior to the recession, 3) and to study the effect of cost-containment initiatives on job satisfaction when controlled for other variables.

Findings: In 2010, Icelandic doctors were less satisfied in their jobs than were Norwegian doctors (mean = 47.7 [sum score with a minimum 10 and maximum 70], SD = 10.9 vs. mean = 53.2, SD = 8.5; $t = 10.8$, $d = 0.56$, $p < 0.001$). Of the individual job satisfaction items, the largest differences were on satisfaction with rate of pay (Cohen's $d = 1.07$, large effect size, $p < 0.001$), satisfaction with opportunity to use own skills ($d = 0.58$, $p < 0.001$), and satisfaction with work hours ($d = 0.56$, $p < 0.001$). Icelandic doctors worked 46.9 hours per week and Norwegian doctors worked 43.5 hours per week ($t = 6.47$, $p < 0.001$). Norwegian doctors were also more satisfied with their working environment ($d = 0.42$, $p < 0.001$), recognition for good achievements ($d = 0.41$, $p < 0.001$), overall job situation ($d = 0.35$, $p < 0.001$), freedom to choose own methods of working ($d = 0.27$, $p < 0.001$), and colleagues ($d = 0.14$, $p < 0.01$). There was no difference between the two countries in the satisfaction with the responsibility given and variety at work. Icelandic University Hospital doctors were less satisfied during the recession (2010) (mean = 6.7 [on a scale from 1 to 10]; SD = 2.0), than prior to it (2003) (mean = 7.2, SD = 1.7; $t = 3.89$, $p < 0.001$). Seventy-seven percent of the Icelandic doctors felt that cost-control measures influenced their work. A multiple regression analysis found that this negatively affected their overall job satisfaction ($\beta = -1.37$, $p < 0.001$), and the effect remained after controlling for other factors. Other factors that were associated with higher job satisfaction were older age ($p < 0.05$), job position (semi-private practice physicians had higher job satisfaction than doctors in hospitals and general practice, $p < 0.001$) and work-home interface stress ($p < 0.001$). The mean work-home interface stress was 8.3 (SD = 3.1) (the lowest possible response being 3 and the highest 15) and there was a gender difference where women experienced more such stress (mean = 8.8, SD = 3.1) than the men did (mean = 8.1, SD = 3.0; $t = 2.91$, $p < 0.01$). There was no significant effect of the number of working hours on job satisfaction.

Conclusions: Doctors' job satisfaction was lower in Iceland than in Norway, and this may partly be due to the economic recession. This notion is supported by a historical sample of Icelandic doctors that reported significantly higher job satisfaction five years before the economic crisis.

3.3 Paper III

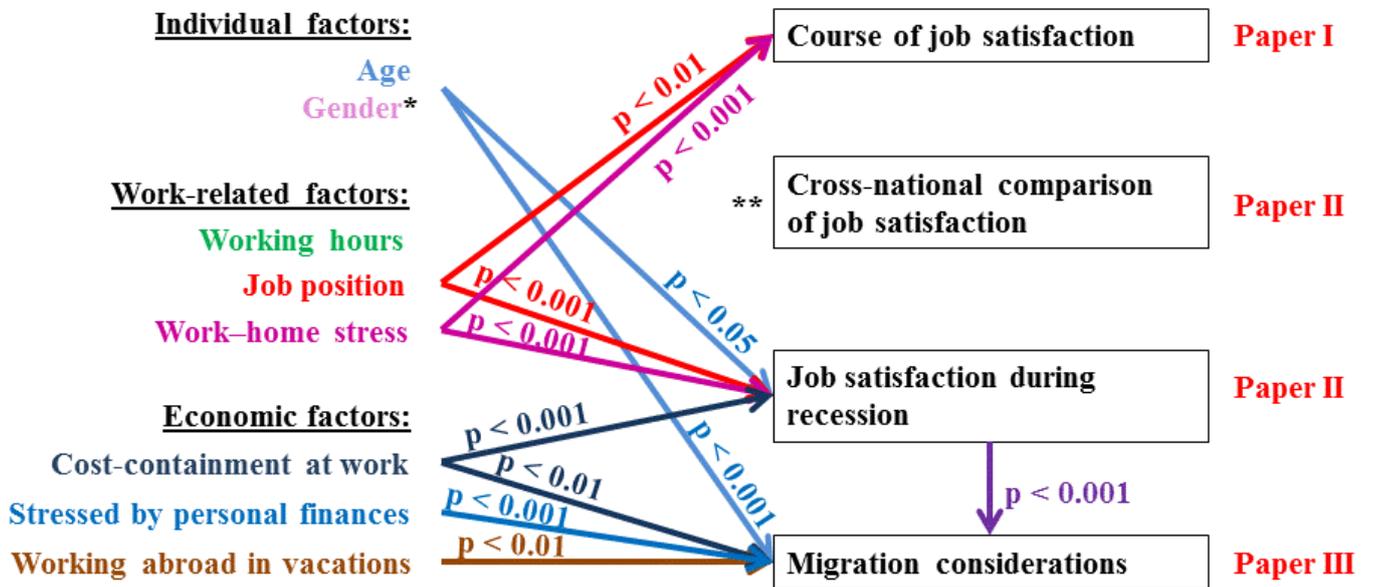
The impact of economic factors on migration considerations among Icelandic specialist doctors: a cross-sectional study.

Objectives: This paper aimed to study 1) how many specialist doctors in Iceland had considered migrating; and 2) whether economic factors at work (cost-control) and in private life (stressed by personal finances) were related to doctors' migration considerations, including when adjusted for other work-related factors.

Findings: Sixty-three percent of Iceland's specialist doctors had considered relocation abroad, 4% were moving in the next year or two, and 33% had not considered relocating. Specialist doctors who had considered moving reported lower levels of job satisfaction than did doctors who had not considered moving: 45.3 (10.8) vs. 51.8 (11.0); $t = -6.3$ ($p < 0.001$). Ten percent of the specialists had worked abroad during vacations ($n = 48$) and 90% of these specialists had considered moving abroad or were about to do so. Logistic regression analysis showed that, controlling for age, gender, job position, job satisfaction, and experience of working abroad during vacations, doctors' migration considerations were significantly affected by their experiences of cost-containment initiatives at work (odds ratio (OR) = 2.0 (95% confidence interval (CI) = 1.2 to 3.5), $p < 0.01$) and being stressed about personal finances (OR = 1.6 (95% CI = 1.3 to 2.1), $p < 0.001$). Age (OR = 0.7, $p < 0.001$), job dissatisfaction (OR = 2.9, $p < 0.001$), and having worked abroad during vacations (OR = 5.5, $p < 0.01$) were also related to migration considerations, whereas job position (general practitioner, hospital, private practice and other) was not.

Conclusions: Economic factors, both at work and in private life, seem to influence migration considerations among specialist doctors in Iceland. In addition, younger age and having worked abroad during vacations were of importance. In line with previous studies, job dissatisfaction was related to migration considerations. More studies are needed on the effect of economic recession on migration by doctors.

3.4 Research model with significant adjusted associations



*Gender was not significant in any analysis.

** In the cross-national comparison of job satisfaction we controlled for age, gender, working hours, and job position. In this paper (Paper II) we did multivariate analysis of predictors of job satisfaction among Icelandic doctors only.

4 DISCUSSION OF THE RESULTS

4.1 Summary of the main results

- a) The job satisfaction among Norwegian doctors increased over a five-year period from early to mid-career (Paper I).
- b) The job satisfaction among doctors working at Landspítali University Hospital was lower during the economic recession than before the recession (Paper II).
- c) Norwegian doctors had higher job satisfaction than Icelandic doctors, and this effect remained when relevant individual and organizational factors were controlled for. Among the individual job satisfaction items, the largest differences were satisfaction with the salaries, opportunities to use own skills and working hours (Paper II).
- d) Two-thirds of the Icelandic specialist doctors had considered moving and working abroad (Paper III).
- e) A change in job position among Norwegian doctors predicted an increase in job satisfaction, and this effect remained when relevant individual and organizational factors were controlled for (Paper I).
- f) Low work–home stress was associated with high job satisfaction among Norwegian and Icelandic doctors (Papers I and II). A decrease in work–home stress over a five-year period predicted an increase in job satisfaction over the same period among Norwegian doctors (Paper I).
- g) The majority of Icelandic doctors experienced that cost-containment initiatives (or cost-control) at work influenced their jobs (Papers II and III). Cost-containment at work was associated with job satisfaction and migration considerations among Icelandic doctors (Papers II and III). Stress related to personal finances was associated with migration considerations among Icelandic specialist doctors (Paper III).

4.2 Doctors' job satisfaction

4.2.1 The course of doctors' well-being through the career

Our study showed that the Norwegian doctors' job satisfaction increased from the tenth to the fifteenth postgraduate year. We also found that older doctors in Norway and Iceland were more satisfied than younger doctors, which is consistent with both longitudinal (78, 102, 106) and cross-sectional studies (31). This might be related to factors such as more secure and permanent jobs, higher perceived competence and autonomy and increased wages (268). A much cited paper by Clark et al. (1996) outlined several arguments of why older employees were more satisfied than younger employees (188). One argument was that older employees moved into jobs with more desirable characteristics where they experienced higher intrinsic job satisfaction. This is in line with the job characteristics model. It is likely that older and more experienced doctors experience higher task identity, task significance, skill variety and autonomy (four of the five characteristics in the model) than younger, less experienced doctors. These characteristics are according to the model related to high job satisfaction. Another argument by Clark et al was that older doctors had lowered their expectations with time because they had experienced that jobs had not met their original standard, and thus were experiencing a smaller gap between actual and ideal work, compared with young doctors with high expectations of the job. This is consistent with Locke's value percept theory of job satisfaction that a smaller gap between want and have is related to higher job satisfaction (35, 36). In line with our findings, a cross-sectional study from the US (2013) found that a group of mid-career doctors (11–20th postgraduate year) had higher career satisfaction than early career physicians (10 years or less since graduation), despite working more hours (269). Several papers have been published from the NORDOC Young Doctor Cohort sample (86, 196, 199, 270); they included mainly doctors during postgraduate training. The levels of doctors' life satisfaction were lowest at graduation, increased after their first postgraduate year, and stayed at the same levels thereafter (86). Stress relating to the doctors' work-home interference increased from graduation until the tenth postgraduate year (for both genders), whereas stress relating to emotional pressure, time pressure, and fear of complaints and criticism, decreased during the same period (199). The study also showed that the increase in stress relating to the work-home interference during the doctors' early career was mainly due to a lack of adaptive reduction in work hours and an increased number of children (199). This is supported by other studies that show that the experience of negative interaction between

work and home (and home and work) depends on one's life stage (i.e. having young children) (211). The Norwegian study also showed that the support of a spouse and colleagues protected against work-home stress (199). A study among US doctors had similar results; a high number of working hours was associated with high work-home stress (271). This is supported by studies among other occupations that have found that those who evaluate their work time schedule unfavorably report higher levels of work-home interference (211). In our study, the doctors' work-home interface stress decreased (for both women and men) from the tenth to the fifteenth postgraduate year. Therefore, it is likely that the reduction in work-home stress in our study is partly due to the decrease in working hours between the two time points and having older children at the fifteenth postgraduate year. In line with our findings, a study from the US found lower work-home conflict among mid-career doctors than early career doctors (269). Our study was conducted in 2003 and 2008. A recent study among US doctors at all career stages showed a decline in satisfaction with work-life balance and an increase in burnout between 2011-2014 (216). Future studies should explore whether this is a trend in other countries as well.

4.2.2 Cross-national comparison of doctors' job satisfaction

4.2.2.1 Norwegian vs. Icelandic doctors' job satisfaction

Icelandic doctors were less satisfied than Norwegian doctors with most aspects of the job. The largest effect size in the comparison of Iceland and Norway was related to satisfaction with the rate of pay, see table 3. The salaries of doctors increased very little in Iceland, whereas the cost of living increased almost tenfold in the year following the recession in 2008. In addition, doctors working at Landspítali University Hospital experienced a reduction in paid overtime when the recession began (227). Icelandic doctors are dependent on relatively high salaries because most of them complete their specialist training abroad, and they have large debts when they return to Iceland. In a longitudinal study, declining income was strongly associated with decline in satisfaction (105). In Paper III, we found that only 37% of the specialist doctors in Iceland were not experiencing stress caused by worries about their personal finances. Unfortunately, we do not have data on this variable among other occupational groups in Iceland, but it is likely that others have similar worries because research has shown that workers in today's society are more financially vulnerable to changes in the marketplace than ever before through increased reliance on market-based retirement funds, as well as other financial products (e.g., securitized home mortgages, student loans) (272). Icelandic doctors

were also clearly less satisfied than Norwegian doctors with their opportunities to use their skills. This might reflect that the Icelandic doctors were hampered by cost-cutting in their work. Also, the majority of the Icelandic doctors received their specialty training abroad and they might therefore experience less opportunity to use their acquired skills in a smaller health-care system with fewer resources than they were used to abroad.

Table 3 Difference (Cohen's d) in satisfaction between Icelandic and Norwegian doctors with intrinsic and extrinsic aspects of work, *p < 0.001, **p < 0.01**

Satisfaction with:	Intrinsic	Extrinsic	(Cohen's d)
1. Your rate of pay		☹	1.08***
2. Your opportunities to use your skills	☺		0.58***
3. Your working hours		☹	0.56***
4. Your work environment		☹	0.42***
5. The recognition you get for good achievements	☺		0.41***
6. Your overall job situation			0.35***
7. The freedom to choose your own methods of working	☺		0.27***
8. Your colleagues and fellow workers		☹	0.14**
9. The amount of responsibility you are given	☺		No diff.
10. Variety at work	☺		No diff.

In addition to the economic recession, there may be other reasons why Icelandic doctors had lower job satisfaction than Norwegian doctors. There is a more stable and diverse labor market for doctors in Norway because it has 15 times the population of Iceland (the population of Iceland is only 320,000). There are few specialist positions in Iceland and they are far more exposed to competition. In a number of specialties, there is only one potential place of employment, so if a doctor is not satisfied with his or her employer, coworkers, or the

working environment, it is necessary to adjust, change specialty or practice, or even to leave the country. In Paper III, we found that the job satisfaction of the Icelandic specialist doctors was closely related to their migration considerations. In Paper II, the Icelandic doctors of both sexes experienced higher work–home interface stress (mean = 8.3, SD = 3.1), compared with that reported by the Norwegian doctors in Paper I (7.7 (3.1) at T1, and 6.9 (3.1) at T2), $p < 0.001$. This reflects the different work environments among the doctors at the current observation time, and it might partly explain the lower job satisfaction found among Icelandic doctors compared with that found in Norwegian doctors.

That said, it is important to notice that Norwegian doctors also have experienced changes in health care during our observation period. In our first paper the first measurement of the Norwegian doctors' job satisfaction was in 2003, only one and two years after major health care reforms ('Fastlegeordningen' (2001), 'Fritt sykehusvalg' (2001) and 'Sykehusreformen' (2002)). Research has showed that the Norwegian doctors did not experience a decrease in job satisfaction during the period (273), but it might be that the group of young doctors in our study were more affected than doctors in general. A study showed that these reforms and more recent reforms have influenced the organization of the doctors' daily work (274). Following the reforms, doctors experienced less autonomy and restricted freedom of speech (275, 276). Analysis of the same Norwegian 2010 data as we used in our comparison study showed that 50-70 % of the doctors experienced stress related to continuing rearrangements in the health care (274). The Norwegian doctors also reported poorer care for the patients because of time pressure and because such a large part of the working time is spent with administration and documentation (248). Another study showed that Norwegian doctors and nurses experienced the health care reforms as a pressure to increase productivity, that is treatment of more patients during less time (277). This is supported by a study that showed that hours in direct patient care has decreased among Norwegian doctors, in particularly from 2000 to 2014 (274). We need more studies that focus on the effect of health care reforms on doctors' well-being and patient care.

4.2.2.2 Intrinsic and extrinsic aspects of doctors' job satisfaction

When examining the job satisfaction of doctors in detail, many similarities between countries become apparent. In a study where German hospital doctors were compared with Norwegian hospital doctors, the German doctors scored significantly lower on the same items of the Job Satisfaction Scale as the Icelandic doctors did in our comparison study (except regarding

colleagues) (31). Consistent with our study, one of the largest difference between the countries in the Norwegian–German study was also satisfaction with *rate of pay* and *working hours*, and the items that were not significant were *satisfaction with the amount of responsibility you are given* and *variety at work* as in our study. This is also in line with a study among British general practitioners where the lowest satisfaction was with the extrinsic elements *rate of pay* and *working hours* and the highest satisfaction with the intrinsic items: *responsibility, freedom and variety* (194). Similar findings (same items with the largest and smallest difference in satisfaction as our study) were found between Italian primary health-care physicians working in teams vs. solo practice physicians (253). Studies from Australia and the UK that have used the Job Satisfaction Scale among doctors have also shown that the doctors report lowest satisfaction with rate of pay and working hours, and highest satisfaction with amount of responsibility and variety at work (252, 255). Using other instruments, a study from Spain showed similar results: the doctors were most satisfied with the intrinsic aspect of work, such as patient communication, and least satisfied with extrinsic factors, such as the work environment (96). In Vietnam, doctors (and nurses) were most satisfied with factors such as self-capacity and competency and least satisfied with extrinsic factors such as salaries and working conditions (278). In the US, hospital doctors were most satisfied with the quality of care they provided and their relationship with colleagues and they were least satisfied with extrinsic elements such as compensation and availability of personal time (279). In a recent comparison study of factors related to job satisfaction, doctors from the US were found to be very satisfied with quality of care and professional autonomy, more than doctors from Norway and Canada, but they had somewhat lower overall job satisfaction than their colleagues from Norway and Canada (28). This might be because of dissatisfaction with extrinsic elements such as salaries, working hours, and working environment.

A literature review on job satisfaction among general practitioners by Van Ham et al. concluded that “aspects of job satisfaction concerning the content of the profession seem to increase job satisfaction, and aspects concerning employment conditions seem to decrease job satisfaction” (197). Our study and other studies we have referred to show that doctors in different job positions, not only general practitioners, are satisfied with intrinsic job elements but dissatisfied with extrinsic job elements. This shows that the medical profession is facing similar challenges around the world and that doctors, regardless of country of practice, share some intrinsic values. There are similar findings among other occupational groups. Herzberg found that employees were satisfied with intrinsic aspects of work and dissatisfied with

extrinsic aspects (280).

In the light of the Job characteristics model, doctors in general seem to experience *Skill variety* (jobs include tasks that require different skills and talents of the workers) (= satisfaction with *variety at work*) and *Autonomy* (employees have control and discretion for how to conduct their job) (= satisfaction with *Responsibility* and *Freedom to choose own methods of working*). One interesting finding in our study is the Icelandic doctors' lack of satisfaction with *opportunities to use own skills*. This differs from other studies among doctors, where there is generally high satisfaction with this element. Fewer opportunities to use skills might be because of the size of the country. But the economic recession might also have influenced the doctors' perceived opportunities to use own skills, for example because of cost-containment initiatives at work. This finding might also reflect that the doctors in Iceland experienced less autonomy at work compared with their Norwegian colleagues, as fewer opportunities for task control is suggested to be related to fewer opportunities for the use of own skills (281). This will be further discussed in relation to the DCM. According to the JCM *Task significance* is important and refers to the degree to which one's work is seen as important and significant. We have not measured this in our studies but this is likely a well preserved characteristic among doctors. *Task identity* refers to the degree to which one can see one's work from beginning to end. We have not measured this either, but it would be interesting to measure this among doctors in different career stages and doctors in different specialties and job positions. Do e.g. x-ray doctors experience less task identity than e.g. general practitioners that follow the same patients over time? In general, it is likely that doctors experience high task identity in their work with patients, compared with e.g. factory workers that only see one piece of a product. The fifth characteristic in the JCM is *Feedback* and refers to the degree to which the work itself provides feedback for how the employee is performing the job (144). One might imagine that doctors get good feedback on how they are performing as they often follow their patients for some time. The feedback can be in the form of patient satisfaction, laboratory or other technical answer or a response from other health care workers or supervisors. In our study, Icelandic doctors were less satisfied with *recognition for good achievements* than their Norwegian colleagues. A lack of satisfaction with recognition has been shown in other studies among doctors as well (31, 194).

It is important to acknowledge that in our studies we measure the doctors' *satisfaction* with different aspects of work whereas according to the JCM the characteristics are a part of the job and through experiencing meaning, responsibility and understanding the employees

develop a sense of job satisfaction based on these job characteristics. But our discussion has shown that it is likely that doctors' jobs in general contain important core characteristics as well as we have acknowledged some possible improvement potentials. This might explain doctors' overall relatively high job satisfaction despite recession and other changes in health care (30, 78-85). We will discuss job satisfaction and migration considerations among doctors during recession in the light of Warr's vitamin model later.

4.3 Migration considerations among Icelandic specialist doctors

In our study, two-thirds of Iceland's specialist doctors had considered moving abroad and 51% had considered moving and were able to do so. Emigration of specialist doctors that have returned to Iceland has never before been an issue (282). When young doctors return home after completing their specialist training in other countries, they usually stay. Therefore, the high proportion of specialists who considered migrating in our study is rather surprising. Intention to leave has been found to be an intervening variable between job satisfaction and actual turnover among nurses (283); therefore, it is likely to be affected by the similar individual and organizational factors. Some authors have reported that intentions data are only imperfectly correlated with future behavior (284, 285). On the other hand, studies have confirmed that migration intentions are indeed predictive of a subsequent move (286, 287), as are intentions to leave patient care (288). We lack studies that show the relationship between migration considerations and actual migration among doctors. There is evidence that the migration considerations among the Icelandic doctors were acted upon: unpublished data from the Icelandic Medical Association show that from 2005 to 2012, there was a significant increase in the emigration of Icelandic doctors. Mullan's emigration factor (289) was 23 in 2005 (318 emigrants and 1060 doctors working in Iceland) and 39 in 2012 (661 emigrants and 1049 doctors working in Iceland) ($p < 0.001$). This also reflects the concerns in the Icelandic society that young specialists with postgraduate training and work experience from abroad are not returning to Iceland (290, 291). More recent data from the Icelandic Medical Association shows that between February 2013 and March 2014, 81 doctors moved from Iceland and 49 moved to Iceland. The medical association and the director of health confirm that there is now one doctor per 295 inhabitants, but if the situation continues, there will be one doctor per 390 inhabitants in 10 years (292, 293). From a global perspective this is very good, but because of Iceland's small population, there are fewer doctors in each medical specialty. Hence, Iceland is particularly vulnerable to emigration of their specialists. For example, six oncologists who

had recently finished their specialty training abroad, wrote an article that was published in the main Icelandic newspaper (294), where they expressed their concerns that if the working conditions did not improve in Iceland, the country would be without oncologists in 2020. They had no plans for returning home (even though they wanted to because of family). In 2015, there were only seven oncologists in Iceland, and in 2008 there were 13 (294). When doctors migrate, they are likely to form networks overseas with colleagues with whom they keep in touch, and to whom they might advertise migration opportunities and provide assistance. This may promote further emigration. Evidence of the influence of social networks on migration by nurses is apparent in other studies (295).

In Europe, there has been emigration from less wealthy and more turbulent regions to richer ones over recent decades (135-138). In Germany, however, the emigration of German doctors is increasing and this is related to doctors' dissatisfaction with their salaries and work hours, among other things (31, 296). This is in line with our findings. We do not have data on migration considerations among Norwegian doctors. What we know is that Norway is a popular destination country for doctors migrating from other countries (135, 138, 140).

Later we will discuss the impact of economic factors on the migration considerations among the doctors. Here we want to analyze the role of age, gender and job position in relation to migration considerations among the Icelandic specialists. We found that younger specialists in Iceland were more prone to migration than older specialists (Paper III). This is in line with other studies, which show that younger doctors are more prone to migration than older doctors (62, 231, 234). Because young doctors represent the potential future of health-care services of a country, their perceptions about moving abroad have important implications for maintaining a high-quality health-care service in the years to come (297). There were no gender differences in whether the specialists had considered migration abroad (Paper III). Some studies have shown that male doctors are more prone to migration than female doctors (62, 233, 234). The lack of gender difference in our study reflects that both male and female doctors experience the situation in Iceland equally. As we will discuss, there were no gender differences in job satisfaction among the Icelandic doctors either (Paper II). There was no difference in migration considerations between hospital specialists, general practitioners, and private practice specialists. Differences between job positions in relation to migration have been found in few studies (63, 231). A study among Ghanaian doctors showed that house officers and medical officers were more likely to emigrate than residents, specialists and consultants (63). In Canada, specialists were more likely to move than family physicians

(231). The lack of such an effect in our study reflects that doctors in all job positions in Iceland were experiencing the same situation.

Now we want to analyze the association of work-related and economic factors with 1) doctors' job satisfaction and 2) doctors' migration considerations. The approach to job satisfaction is mainly in the spirit of positive psychology as we look at factors that can increase the satisfaction of doctors. The overall purpose of studying the factors' association with migration considerations among Icelandic specialist doctors was to identify factors that can increase retention of doctors during recession. The theoretical discussion of the economic variables in relation to job satisfaction and migration consideration has been gathered under the section 'The impact of economic recession on doctors: Warr's vitamin model'. These variables will also be discussed under the reflections on Demand-Control model and Effort-Reward Imbalance model.

4.4 The association of work-related and economic factors with Norwegian and Icelandic doctors' job satisfaction

As mentioned in the Introduction, there are a lot of known predictors and factors that have been associated with job satisfaction among doctors, although very few of them have been validated prospectively. A prospective design in epidemiology is of importance because it may infer causality by identifying predictors and possible risk factors. There are three variables that we believe have contributed to the literature concerning predictors/associated factors with doctors' job satisfaction. These are: *job position*, *work-home interface stress*, and *cost-containment initiatives*. Job position and work-home stress were validated prospectively, but cost-containment was studied only with a cross-sectional design. The positive effect of change in job position on job satisfaction (except in SHOs) was more unexpected than the effect of change in work-home stress. However, our study validated the effect of work-home stress prospectively, and is the first to show the effect of a change in work-home stress. It may not be surprising that cost-containment influenced doctors' job satisfaction, but this finding is nevertheless important because no other studies have shown this relationship before in a welfare country facing recession. In our multiple regression analysis, we did not include other factors, such as professional autonomy and details of practice venues (e.g., large/small centers), and this may be a weakness of our study (28). Before we discuss these three important variables we want to discuss the lack of effect of working hours on job satisfaction.

4.4.1 Working hours

In our cross-national study, Icelandic doctors worked 46.9 hours per week and were less satisfied with their working hours than Norwegian doctors, who worked 43.5 hours per week. German doctors have also been shown to be less satisfied than Norwegian doctors with their working hours (31, 113). In our longitudinal study of Norwegian doctors, there was a reduction in working hours from 43.3 hours per week in the tenth postgraduate year to 41.9 hours per week in the fifteenth postgraduate year. This is in line with a previous study that showed a reduction in working hours with advancement in career among young Norwegian doctors (199). In our studies, working hours per week and a reduction in number of working hours was not a significant predictor of job satisfaction among Norwegian and Icelandic doctors. This is likely due to highly regulated working hours in these countries. A cross-sectional study of oncologists from the US showed an effect on well-being when weekly working hours were above 60 (198), which is a threshold far exceeding the working hours reported by the doctors in our studies and in other studies on working hours among Norwegian doctors (298, 299). Also, a reduction of 1.4 working hours per week in our study might be a too small reduction to influence overall job satisfaction or the power of our sample is too small. It would be interesting to study the impact of a larger reduction in working hours on job satisfaction and in a larger sample. It would also be interesting to include the amount of patient contact during the working hours as studies have shown that more hours in direct patient care leads to more satisfied doctors (300, 301), and that doctors want to use more time in direct patient care (302). A concern is that hours in direct patient care in Norway seems to be decreasing (274, 303). Another concern is that in a cross-national comparison study Norwegian doctors agreed less than doctors from the US to the statement that ‘I have adequate time to spend with my patients during a typical patient visit’. In the same study the amount of hours in direct patient care (the only measurement of working hours in the study) did not affect the job satisfaction of the Norwegian doctors as they did in the analysis of Canadian and US doctors. This was explained by less working hours in general among Norwegian doctors. Further studies should include working hours, change in working hours and hours in direct patient care when studying doctors’ job satisfaction. Doctors’ working hours is important in relation to other outcomes as well. A Swedish study among general practitioners found that overtime that exceeded 7 hours a week (full-time work was 40 hours) was associated with impaired general and mental health (304). Another study showed that

German doctors worked longer hours than Norwegian doctors and where the German doctors had poorer self-rated health (305). One study found that when either or both spouses worked longer hours (> 45 hours per week), men and women reported high levels of work-family conflict (306). Another study showed that medical residents that had spouse who frequently worked overtime experienced higher level of work-home interference (307). In the light of the lack of effect of working hours (under 60 hours) on job satisfaction, this might imply that working hours affect the health of doctors and their experience of work-home stress before they influence their job satisfaction. This also indicates that the working hours of the doctors' spouses might be of importance. This should be further studied.

4.4.2. Job position

We found that the most satisfied doctors in Norway were general practitioners. This is in line with previous findings among Norwegian doctors (106). In Iceland, the most satisfied doctors were the private practitioners. This is in line with studies from other countries, which argue that this is because of more autonomy, among other factors, in private practice (203-205). The Norwegian general practitioners experience a high amount of autonomy and because of the new 'list-patient' reform they are, in a way, working as private practitioners (106, 202). This might explain their high job satisfaction. A prospective study from Finland showed that doctors who had changed job position to become public general practitioners experienced a decrease in job satisfaction, while the job satisfaction was stable among those who were general practitioners at both time points (208). This is the only other prospective study we know of that analyses the effect of change in job position on job satisfaction among doctors. We found a high and stable job satisfaction among general practitioners in Norway in our prospective study (Paper I). The decrease in job satisfaction by becoming a public general practitioner in Finland is not so surprising. In contrast to what is the case in Norway, the public sector in Finland has major difficulties in recruiting and retaining general practitioners (308). This is also a problem in other countries, such as the UK (309). The general practitioners in Iceland were also less satisfied than the private practitioners. In the light of the JCM the lack of satisfaction among the general practitioners in these countries might be because of lack of important characteristics in the job. The doctors likely experience less *autonomy* as e.g. the Norwegian general practitioners. An important question is whether the jobs of general practitioners in these countries also lack *task identity*, *task significance*, and *feedback*. These characteristics might be less prominent if the doctors only work as door

keepers and don't follow the patients over time, as Norwegian doctors do after the implementation of the patient list system.

We found no difference in job satisfaction between different specialties among hospital and private practice doctors in Norway or Iceland.

In our first paper, the increase in job satisfaction over the five-year period only occurred among those who changed job position over this period, even when we controlled for changes in work hours and work-home interface stress over the same period. Because this is a prospective study, it indicates that there is true and independent prediction here, that a change in job really increases job satisfaction, and we are close to being able to infer about causality. Norwegian SHOs experience a heavier load of on-call work, less autonomy (310), and frequent career ambivalence (311) in their temporary positions compared with, e.g., established chief specialists. Therefore, it was not surprising, our finding of increased job satisfaction when moving from a SHO position in specialty training to another more established position (40% of all the doctors in the study). Job insecurity among the SHO may be relevant in explaining their lower satisfaction at the first time point, and they may have experienced greater satisfaction when they changed to more secure and permanent jobs (e.g., as chief specialists). This may also be related to the natural course of career progression over the years, such as higher perceived competence (196) and autonomy (28), increased wages (188), and reduced stress levels (201, 312) at the second time point (190). All these factors are in line with increased job satisfaction with higher age as discussed earlier. Interestingly, we found that all other physicians (other than SHO) who changed job position (18% of all the doctors in the study) also experienced an increase in job satisfaction, even when we controlled for work-home stress and work hours. To our knowledge, this is the first empirical study among doctors of all specialties to show the effect of change in job position on doctors' job satisfaction. A study among US radiologists found that those who indicated they were not satisfied were more likely to desire a career change than those who were satisfied (313). If we look at this in the light of person job-fit, the doctors at the second time point might have achieved a better 1) Demand-Abilities fit and 2) Need-Supplies fit. The gravitational hypothesis from 1972 (164, 165) predicts that individuals will gravitate toward jobs that best fit their ability level. This may be a good explanation for the higher satisfaction experienced by physicians who changed jobs in our study. The physicians who changed job position were less satisfied in their job at the first time point than their colleagues, but they were equally satisfied at the second time point after they moved to a new job. A possible explanation is that

the doctors have moved closer to their preferred job position at the second time point, where there is less discrepancy between what they want in a job and what they have in a job. According to Locke, this leads to higher job satisfaction (35, 36). A 1996 longitudinal study among students and young people in the workforce who later worked in different types of occupations supports the gravitational hypothesis (314). Other studies have shown that physicians whose work conditions fitted their preferred work situations and work hours experienced less burnout than their colleagues (315, 316). Previous reports among other occupational groups suggest there is a connection between change in job position and job satisfaction (317, 318), but our study is the first to our knowledge to show this in a nationwide representative sample of physicians.

Explicit career counseling and advice should be a focus of the medical associations and those who are concerned with and involved in doctors' well-being. Advice and counseling should include helping the physicians to find jobs where they can experience the most optimal fit early in their career. This is a challenging task in a frequently changing profession with both intrinsic and extrinsic stressors (97), but nevertheless very important. Understanding the physicians' background, personality characteristics and values, the teaching program they have followed in medical school, their role models, and other factors influencing their career path so far might help the advisers lead the physicians in the right direction (319, 320). In addition, more exposure to a variety of different specialties might help physicians find the position that best fits them at an earlier point in time (321). The importance of career counseling and advice has been emphasized by other authors (190, 203, 322-324), but the empirical foundation for giving such advice is strengthened by our study.

4.4.3 Work–home interface stress

The relationship between work–family conflict and job satisfaction has been widely studied in other occupational groups (14, 15, 325-330). The only longitudinal study we found was a study among middle-class dual-income couples. This study found an independent predictor effect of work interfering with family on job satisfaction, only among women (15). This was explained by gender role theory; that women are more likely to see family life as part of their social identity than do men. There are few studies on the relationship between work–home stress and job satisfaction among physicians (12, 13, 194). These studies are cross-sectional and show a relationship between work–home interface stress and job satisfaction. To our knowledge, there are no previous prospective studies on this relationship

among doctors. Longitudinal studies on the effect of work-home interface stress on burnout show the predictive validity of work-home stress (210, 331), and validate our findings to some extent, though we have a positive approach (decrease rather than increase in work-home stress and job satisfaction instead of burnout). In Paper I, we found an independent predictor effect of reduction in work-home interface stress on job satisfaction among the early and mid-career physicians in Norway. This is supported by Locke's value-percept model; the gap between valued work-home interference and perceived work-home interference was likely smaller at the second time point. As studies have shown, the work-home balance seems to be important for doctors. So, a reduction in this gap multiplied with its great importance is likely to result in higher satisfaction in the job. Interestingly, there were no gender differences in work-home stress and the independent predictor effect was equal for both genders. A previous study on work-home stress from earlier cohorts of the NORDOC sample also showed no gender differences in work-home stress among the young Norwegian doctors (199). Data among Norwegian doctors (all ages) from 2003 showed that women experienced more work-home balance stress than men (215), and this has also been found in other countries (332). We believe our findings reflect the relatively high level of gender equality among the younger generations in Norway. There is little differentiation in gender roles, and sharing of childcare and household chores among both partners is common, at least in highly educated populations such as medical doctors. In contrast, a strong impact of gender was found with respect to career choices and work-home balance in young Swiss medical doctors (333, 334). In Paper II, where all ages were included, we found a gender difference in experienced work-home stress among the doctors in Iceland, where women experienced more such stress than the men. There was no gender interaction in the relatively strong association between work-home interface stress and job satisfaction in Iceland (Paper II), and this means that there is no difference in the impact of this effect between men and women.

To our knowledge, our studies are the first to show a relationship between work-home stress and job satisfaction among Norwegian and Icelandic doctors. It is also the first prospective study on this relationship among doctors. The importance of work-home stress in relation to job satisfaction among doctors should be highlighted and studied further. Other dimensions of work and home balance, such as work to home or home to work facilitation (212), have not been studied by our inventory. It may hold true that active participation in family life, having a partner and children inspires the doctor to be more satisfied also with their work. But this should be further studied. In the past, doctors were expected to plan their

professional and domestic lives in line with William Osler's view of a medical career: 'heavy as are your responsibilities to those nearest and dearest, they are outweighed by the responsibilities to yourself, to the profession and to the public' (335). Today, luckily, there is an increasing focus on the balance between these responsibilities, but the doctors' responsibility to their profession is still very high (332). A recent paper showed that older doctors experienced their job more as a part of their identity and lifestyle where they talked about 'being doctor' whereas younger doctors saw their job more as a job and talked about 'working as a doctor' (336). But both younger and older doctors in the study agreed that professional dedication is the most important characteristic of a good doctor (336). This reflects that time has changed and that younger doctors have more responsibility in other domains of life as we have discussed. This also might partly explain the high work-home stress among young doctors, at least if professional dedication is measured in hours at work (336). The expectations and demands of the family life are high in today's society, and the presentation of the family has become important for many and available through the social media. The impact of this on the career and work-home stress among young doctors has not been much studied. As mentioned in the Introduction of this thesis, Heller et al. argue there are different domains of subjective well-being that are independent sources of satisfaction, such as job satisfaction (10). Through our studies and supportive literature, we have found that the balance between the domains is of great importance for satisfaction in the individual domains of well-being.

4.4.4 Cost-containment initiatives

As described in the Introduction, the economic recession in Iceland has led to several saving initiatives in the health-care system. A large proportion (77% of doctors, 75% of specialists) of the Icelandic doctors reported that cost-containment initiatives affected their work (Papers II and III). Our study showed that a high proportion of experienced cost-containment influence on work was related to lower job satisfaction, even when we controlled for other individual and organizational factors (Paper II). Other studies have linked financial constraints on doctors to reduced career satisfaction (221, 222), which supports our findings. A study among Swiss anesthesiologists showed no effect of cost-containment on job satisfaction (224). In fact, their satisfaction with quality of care increased over the study period, which likely reflects that the cost-containment did not affect their work (224). Studies have shown that doctors are quite willing to be cost conscious in clinical decisions, as long as

it does not require withholding beneficial care from their patients (337). More studies should focus on employers' job satisfaction during a recession (272). Our study is the first to cover an entire country and doctors from all specialties.

4.5 The association of economic factors with migration consideration among Icelandic specialists

There are many factors that are known to be related to migration and migration considerations, as mentioned in the Introduction. Our study and all studies on migration we know of are limited by being cross-sectional studies. However, to our knowledge, our study is the only one to explore the association of factors related to economic recession with migration considerations in doctors. These factors are: cost-containment initiatives, stress related to personal finances and working abroad during vacations. These factors might also be relevant for other countries that are facing economic recession. Before we discuss these factors we discuss the role of job dissatisfaction in relation to migration considerations.

4.5.2 Job dissatisfaction

We found that dissatisfaction in the job was independently associated with migration considerations, also after controlling for other relevant factors, among the Icelandic specialist doctors, which is consistent with some previous studies in other countries (62, 133, 225, 235, 236). As our Paper III shows; the doctors that had considered moving abroad were clearly less satisfied (mean = 45.3) than the doctors that had not considered it (mean = 51.8). A shortage of physicians may impose excessive burdens on many, who then quit, and this may spark a downward spiral that exacerbates the initial shortage, which in turn might lead to even more stress and heavier workloads for the remaining doctors (133). Our study and the other studies we found on doctors' job satisfaction and migration are cross-sectional (62, 133, 225, 235, 236). There is a need of longitudinal research and multivariate prediction models on this issue to determine whether there actually is a causal relationship or not. Other confounding factors that may impact upon both job perceptions and a wish to move abroad should also be included.

4.5.3 Cost-containment initiatives

With regard to migration, studies have shown that poor working conditions and a desire for greater access to enhanced technology, equipment, and health-care facilities can be important

(133, 139, 225, 235, 237). But most of these studies are about doctors' migration from less developed African and Eastern countries into more wealthy Western countries. To our knowledge, our study is the first to show a connection between cost-containment initiatives at work and considerations of migration from a Western country (Paper III). This is probably because countries with high emigration rates tend to have stable but depressed economies. One study showed that a decrease in a country's GDP was likely to increase emigration of doctors in developing countries (338). This supports our findings.

4.5.4 Stressed by personal finances

Sixty-three percent of the Icelandic specialist doctors were slightly to very stressed by worries about personal finances (Paper III). These doctors were more likely to have considered migration abroad, even after controlling for individual and organizational factors. A relatively recent review concluded that one of the most-cited factors for physicians' mobility is their financial motivations (136). Several studies have shown an association between doctors' and nurses' incomes and their motivation to migrate (237, 238, 339, 340). Icelandic doctors report low satisfaction with their rate of pay, which is much lower than Norwegian doctors (Paper II). Studies have shown that economic stressors are related to well-being and behavioral outcomes (272). Because many of the doctors are married, concerns about their partners' income and possibility of work may also influence the role of personal finances. Economic stress is likely to negatively influence well-being because it threatens the continuation of important psychological and social resources, including affiliation with others, income, self-esteem, social roles, status, and opportunities to use skills and information (341). Our indicator of economic strain, namely doctors' being stressed by worries about their private finances, was a significant predictor of whether they considered migration when controlling for job satisfaction. A study from Romania supports our finding; a cut in the doctors' salaries led to an increase in the number of doctors seeking work abroad (136). The opposite was observed in Poland, Lithuania, and Slovenia, where an increase in annual salary diminished the outflow of medical doctors (139). Our findings are unique in terms of referring to a stable and previously wealthy Western European country.

In October 2014, four years after our study, Icelandic doctors went on strike, mainly because of dissatisfaction with salaries (342, 343). This was the first time in history that Icelandic doctors were on strike (342). Finally, after a lot of cancelled surgeries and low staffing at hospitals and health-care centers, the doctors were introduced to a new contract

with a significant increase in the salaries and other benefits, which they signed in January 2015 (343). It remains to be studied whether this will decrease migration considerations among Icelandic doctors.

4.5.5 Working abroad during vacations

During vacations, 10% of the Icelandic specialist doctors worked abroad (Paper III). This is not surprising as doctors often get two to three times higher pay abroad than in Iceland (230). We found that the specialists who worked abroad during vacations were five times more likely to have considered permanent migration than those who had not worked abroad during vacations and this was also an independent factor associated with migration consideration in our statistical analyses.

There are probably other factors that affect the migration considerations among the specialists that we did not include in our study. For example, a desire for professional development may be hindered by the limited size and career prospects in the Icelandic health care, and has been associated with migration in other studies (133, 225, 240, 344). It is a well-known factor associated with the migration of African doctors to Western countries.

4.6 The impact of economic recession on doctors: Warr's vitamin model

Economic stress threatens virtually all the vitamins/resources in Warr's (1987) 'vitamin model' (281), which to a great extent builds on empirical evidence from studies on the "Job Satisfaction Scale" used in the present thesis (281). Nine 'vitamins' are necessary for psychological well-being: opportunity for control, opportunity for skill use, externally generated goals, variety, environmental clarity, availability of money, physical security, opportunity for interpersonal contact, and valued social position. Cost-containment initiatives affected the work of the majority of the Icelandic doctors (Paper II and III), which together with other aspects of the recession likely influenced their opportunity for control. As mentioned, the Icelandic doctors were clearly less satisfied than Norwegian doctors with their opportunity to use their skills (Paper II). The private economy was affected among the majority of the Icelandic population because of the inflation following the recession in 2008. As we have mentioned, the doctors have high loans after their postgraduate training overseas and our results in Papers II and III showed that many Icelandic doctors were dissatisfied and worried about personal finances. Environmental clarity, which concerns the degree to which a person can successfully anticipate what is likely to happen in his or her life space (345), might

be threatened because the effects of cost-containment affected the doctors' work. On the other hand, the Icelandic doctors were satisfied with the amount of responsibilities they had (Paper II), and doctors most often are the 'specialists' in their working environment, so this 'vitamin' is likely to be preserved among the doctors. Furthermore, the doctors' perception of variety at work was not affected (high satisfaction with the variety and no difference from Norwegian doctors, Paper II). There was a significant difference in satisfaction with colleagues across the two countries, but the effect size was small, and this aspect at their work seems to have been maintained despite the recession (Paper II). Also, the opportunity for interpersonal contact is present for most of the doctors in the form of numerous patient contacts during the work day. Despite changes in society (97), doctors still have a valued social position, so this 'vitamin' is likely to be preserved. A study in 2012 among patients that had been treated at the Acute Cardiac Unit at Landspítali University hospital in Reykjavik (485 patients with 57% response rate) showed that 61% of the patients agreed that there was a recession in Icelandic health care (346). Nevertheless, 91% of the patients agreed or strongly agreed that the doctors were very friendly and polite, and 88% of the patients were very satisfied with the health care they received (346).

Maybe it is because of the intrinsic 'vitamins' and other intrinsic characteristics discussed (JCM), that the doctors are still standing—i.e., still showing up at work and providing good care to their patients (346) despite cost-containment and lower satisfaction in the job—and many have not yet migrated, even though the majority had considered it. Studies have shown that of the major job satisfaction facets (such as pay, promotion opportunities and the work itself), satisfaction with the work itself is almost always the facet most strongly correlated with overall job satisfaction, as well as with important outcomes such as employee retention (142). Such findings indirectly validate the JCM. Our study shows that economic factors influence the migration considerations of doctors during recession. Further studies should explore whether such factors influence actual migration and explore the role of intrinsic job satisfaction in relation to migration and retention.

In the light of Locke's value-percept theory it is likely that for the Icelandic doctors the discrepancy is larger between value and percept regarding numerous work facets during the recession compared to before the recession. Our assumption that Icelandic doctors' job satisfaction was affected by the recession is strengthened by our finding that Icelandic doctors at Landspítali University Hospital had lower job satisfaction during the economic recession (2010) than before the recession (2003). This was not a cohort analysis, so it was not exactly

the same doctors who answered at the two time points. However, there were the same amount of respondents, the different specialties were equally represented, and the age distributions were similar at both time points, which strengthen the validity of our findings.

4.7 Reflections on the Demand-Control model

Workload and a lack of adequate resources have been shown to be important stressors for medical specialists (347). High strain is associated with lower job satisfaction (348, 349), also among doctors (350). The majority of the Icelandic doctors experienced that cost-containment influenced their work (Paper II and III). This might be seen as an increased demand among the doctors, supported by the effect on job satisfaction and migration considerations in our adjusted analysis (Paper II and Paper III). Icelandic doctors reported less satisfaction with opportunities to use own skills compared with Norwegian doctors. This might be a reflection of less skill discretion (less control). This is supported by a study that showed that opportunities for skill utilization mediated the relationship between job control in the DCM and job satisfaction (351). The study concluded that increase in perceived job control leads to the perception of greater opportunities for skill utilization (and development) and higher levels of intrinsic job satisfaction (351). Thus, increasing the Icelandic doctors' job control might be an effective way of increasing their satisfaction with their opportunities to use own skills and their overall satisfaction. As we have discussed, mid-career doctors might experience decreased demands and increased control compared with five years earlier (Paper I). In the light of the DCM this leads to less strain and higher job satisfaction. We found that the mid-career doctors experienced less work-home interference stress and higher job satisfaction (Paper I). These are only assumptions as we have not measured Demands and Control directly in our studies. We need studies on whether the assumedly lower overall job satisfaction among doctors during recession is related to higher demands and/or lower control and whether increase in job satisfaction between career stages is related to lower demands and/or increase in control. It would be interesting to study (and would strengthen our assumption) if the Icelandic doctors experienced higher strain than the Norwegian doctors. As discussed previously, it might seem as they experienced more stress related to work-home interference. One study showed that German doctors experienced higher strain and less satisfaction than Norwegian doctors (113). In general, German employees experience high strain in the job (High demands and low control) (171), so the findings in the study, and other findings of dissatisfied German doctors and high migration rates among German

doctors(305), might be a reflection of more emphasis on structure and leadership culture in that country. As discussed we found that Icelandic doctors were less satisfied during the recession than prior to it. Another retrospective comparison study (also limited by not being a cohort study) found that work-related stress was higher among employees of the Northern Ireland Civil Service during the economic recession than before it (352). A study showed that Norwegian doctors experienced less autonomy after the implementation of new health care reforms (275). This was also shown among Israeli doctors (353).

A study among Swedish general practitioners (GPs) showed that female and male GPs with high work demand and low control had lower well-being than the reference groups (304). An interesting finding in this study was that there was a stronger association between low control over work and low well-being (and impaired health) among male GPs compared with that among female GPs. This is in line with a study among English GPs where male GPs were found to be less satisfied in their job than their female colleagues and whose job satisfaction was most affected by demands of the job and patients' expectations (194). In our studies the male and female doctors experience the same amount of cost-containment and job satisfaction, supported by no gender differences in job satisfaction in other Norwegian studies (106), and studies from the US and Germany (31, 102). The gender difference in the experience of control and demands found in the Swedish and English studies calls for more studies on the subject. In the spirit of positive psychology; such studies might enlighten gender specific recourses in relation to high demands and job satisfaction among doctors.

We have not found studies on the DCM and migration. As discussed, job satisfaction is related to migration considerations in our study (Paper III) and in other studies (62, 133, 225, 235, 236). As discussed above, control is closely related to job satisfaction, and a study showed that this was mediated through opportunities of using own skills (351). Hence, it is possible that low perceived satisfaction with opportunities to use own skills among Icelandic specialists (Paper II) were related to their migration considerations. Regarding demands, a review showed that high demands were only moderately associated with intentions to leave the workplace (169). Williams' review of physicians' intentions to withdraw from practice concluded that the *combination* of job stress and dissatisfaction can be so powerful that some highly trained and committed professionals may quit while others cope by reducing their work hours, changing practice emphasis, or abandoning direct patient care (354). The effect of demands and control on migration needs to be further studied.

4.8 Reflections on the Effort-Reward Imbalance model

Studies have shown a relationship between ERI and stress, depressive symptoms, and perceived quality of care among doctors (113, 181-183). Only one study used effort and reward in a regression analysis on job satisfaction (113). This study showed that effort and reward accounted for a large part of the explained variance on job satisfaction. The study also showed that Norwegian and German private practice doctors experienced equal amount of effort but the Norwegian doctors experienced higher amount of rewards. The Norwegian doctors were more satisfied at work and experienced less stress than the German doctors (113).

As mentioned in the introduction, ‘status control’ is related to ‘effort’ in the ERI. Our finding that mid-career doctors were more satisfied than early career doctors might reflect that they had gained more status control, that is, more secure position or role. Also, the doctors that changed job position might have gained more status control in their new job. In relation to rewards in the ERI model, in general, mid-career doctors likely achieved higher pay (extrinsic reward) and higher esteem or approval (intrinsic reward) which might partly explain their higher job satisfaction (Paper I). The Icelandic doctors were clearly less satisfied with their rate of pay (extrinsic rewards) and they were also less satisfied with recognition and freedom (intrinsic reward) compared with their Norwegian colleagues (Paper II). Many of the Icelandic specialist doctors were even stressed by worries about private finances (Paper III). Thus, early career doctors and doctors during recession might be experiencing high effort and perceive they receive low rewards compared with other doctors. This might to some extent explain the lower job satisfaction among early career doctors (compared with mid-career doctors) and doctors during recession. Again these are only assumptions as we have not measured ‘effort’ and ‘reward’ in our studies. Further studies should investigate the role of ‘effort’ and ‘reward’ among doctors in early career and during economic recession. This again also emphasizes the importance of the chore characteristics in the medical profession, according to the JCM. Some of these resemble closely the intrinsic rewards in the ERI model (recognition and freedom).

The most worrying group of doctors during recession is likely to be the overcommitted doctors. According to ERI theory they have a great imbalance in effort and reward. Also, doctors that experience both strain (high demand, low control) and ERI are at high risk of burnout (355), and the overcommitted doctors have high intrinsic self-investments.

Schaufeli and Bakker (2004) suggest that to maintain performance stability under

demanding conditions employees need to invest mental effort (9). When confronted with high job demands, employees either adopt performance protection strategies which are associated with extra cost, or they accept reduction in performance with no increase in costs. As we have argued, the doctors seem to maintain high performance despite high demands. So supported by Schaufeli and Bakker it is likely that if the doctors' active coping response (by investing more energy) is sustained over a prolonged period it leads to depleting their energy resources. The threshold is of course different for individual doctors. For example, doctors with high need for control will spend high costs in terms of energy mobilization and job involvement, even under conditions of relatively low gain (167). We need studies with dispositional approaches inspired by POB to enlighten important recourses among doctors in early career and during recession.

There are no studies on ERI and migration among doctors. As discussed, the most cited factor related to migration is salaries/rate of pay (extrinsic reward). It is not known whether intrinsic rewards and effort, or an imbalance between effort and rewards is related to migration. Future studies on migration among doctors should include the ERI model.

4.9 Doctors' job satisfaction and engagement

As mentioned, we were inspired by the positive psychology movement when we were planning our research on doctors' job satisfaction. A limitation with our studies is that we have not looked specifically at work engagement among the doctors. As argued in the introduction we chose to measure job satisfaction because of its validation among doctors (among others). There are some indicators that the doctors in our studies experience engagement at work. The doctors in Norway and Iceland experienced high satisfaction with intrinsic elements of the job. Dedication refers to a cognitive and affective identification with one's work or one's job (356), and is part of work engagement together with vigor and absorption (356). An identification of Icelandic specialists with their work together with vigor (high level of mental resilience, willingness to invest effort in their work, and persistence even in the face of difficulties) might be the reason for the lower actual migration rates among the Icelandic specialists. In contrast to the known association of poorer Person-job fit (in terms of wanted and actual levels) and lower job satisfaction (163), there are indications that the motivated state of engagement is related to worse rather than better person-job fit (357). This is partly explained by raised engagement-related wants during worse person-job fit (357). It would be interesting to study this among doctors during recession and in low-income

countries. Further studies should also explore the relationship between engagement and migration among doctors in general and during recession in particular.

It has been shown that engagement provides high performance also when controlled for job satisfaction (43). Engagement and job satisfaction have similar effects on performance when measured separately (43), but put in the same model engagement adds around 20 % unique variance in performance (43). This indicates that engagement should be included in the studies on doctors' wellbeing at work.

4.8 Theoretical implications and suggestions for future research

The results of this thesis show that doctors' job satisfaction increases from early to mid-career, partly explained by a change in job position and a reduction in work-home stress. The results also show that doctors' job satisfaction is likely affected by the 2008 economic recession since economic factors are related to both doctors' job satisfaction and migration considerations. This thesis highlights the presence and importance of intrinsic job satisfaction among doctors. In relation to this finding, the theoretical discussion indicates that the Job characteristics model might be relevant in explaining doctors' job satisfaction. This can be seen as an indirect validation of the model as we also show, in our review on studies on doctors, that doctors in many countries (including Norway) experience high job satisfaction. Locke's Value-Percept theory might be relevant in explaining doctors' job satisfaction as well, in particularly during early career. Also, reflections on our results in the light of the Demand-Control model and Effort-Reward imbalance model lead to the assumption that these models might be important in the understanding of doctors' job satisfaction. Overall, there is a need of studies on doctors' job satisfaction that include validated theoretical perspectives. This thesis is inspired by positive psychology, and there are several suggestions for future research in the field, such as the inclusion of both job satisfaction and engagement in the study of doctors' well-being at work.

Specifically this thesis shows that we need more longitudinal studies on job satisfaction among doctors in general, and on doctors in their early career and during career shift in particular. Also, the relationship between work-home stress and job satisfaction among doctors of all ages should be further studied. We also need more studies that focus on recession and doctors' job satisfaction. In general, there is a need for more cross-national comparison studies on doctors' job satisfaction. Also, it would be beneficial if studies used similar instruments to measure doctors' job satisfaction; e.g., several studies have used the Job Satisfaction Scale used in our studies, but these are mainly from Europe. This is interesting because doctors around the world have much in common (intrinsic values of the profession and the human body and mind as subject) and similar measurements in different countries would give us a more holistic picture of doctors' job satisfaction around the world. More comparison studies that use similar inventories and measures would also make it possible to identify diversity and differences across countries and health systems.

Migration among Icelandic doctors should be studied further. In particular, it would be

interesting to study whether there are fewer doctors that consider migration now that doctors' salaries have been increased. Also, doctors working abroad should be included, with emphasis on the migration back to Iceland after specialization. We lack studies that show a causal relationship between job dissatisfaction and migration among doctors prospectively. This is highly relevant for health-care systems in low as well as high income countries. There is a need for more studies that focus on the relationship between economic factors, such as cost-containment, and doctors' job satisfaction and migration considerations. This is also relevant for wealthy countries where the health-care system is facing cost-cutting.

In particular it is alarming that younger doctors, the new generation of doctors, are less satisfied than older doctors (paper II, supported by the literature) and have been reported to be less satisfied than before (102), experience higher work-home stress and are more prone to migration (paper III) (231, 340). In the light of Locke's value-percept theory, it might seem as if the doctors are experiencing much discrepancy between what they want in a job, reflecting their values, and what they actually have in their job (35, 36).

In this thesis we have focused more on characteristics of the work itself than individual characteristics. This is because we have mainly used organizational factors in our papers. But individual factors are also very important. In POHP and in the Job Characteristics model there is a great focus on the employees' recourses and individual differences that we have not discussed (e.g. 'Growth need strength' in the JCM). Further studies on doctors' job satisfaction should include such factors as well.

4.9 Practical implications of main findings

Continuous progress in medicine and technology, globalization, competition between organizations, cost-containments as well as merges and reforms are among factors that are challenging for health care organizations, employers of doctors and doctors around the world. This thesis has emphasized some important factors that can contribute to increased job satisfaction and decreased migration among doctors.

We can clearly advise doctors who are dissatisfied at work to change job position. Also, career advice and counselling to help doctors find an optimal fit early in their career should be a focus of medical associations and those who are concerned with and involved in doctors' well-being. It should also be a high priority of the employers of doctors to apply measures that optimize their work–home balance (e.g., available and accessible kindergartens). The targets of increasing job satisfaction among doctors are mainly the extrinsic elements; rate of pay and working hours, but factors such as the opportunity to use own skills and recognition for good achievements are important parts of doctors' job satisfaction that seem to have improvement potential. Our discussion of the JCM indicates that in particular, *task identity*, *task significance* and *feedback*, should not be neglected among young doctors and doctors in some job positions. Increased focus on these characteristics in the job can possibly improve doctors' overall job satisfaction.

During recession and changes in health care there should be awareness that cost-containment that influences doctors' work can lead to decreased job satisfaction and migration considerations among doctors. Stakeholders should also be aware that doctors who are experiencing stress related to finances and doctors who work abroad during vacations are more prone to permanent migration.

It has been emphasized in other studies that it is important to doctors' wellness that they reflect on their own values (358). This thesis highlights some intrinsic values of job satisfaction as well as the value of good work–home balance, which seem to be shared among doctors around the world. Doctors should come together more, across specialties and across borders, to share their values and perceptions. This might help strengthen their professional identity during times of changes and challenges (74, 97, 98, 281, 359), and contribute to less discrepancy between values and perceptions (336, 360) which in turn might increase their overall job satisfaction.

REFERENCES

1. Bakker A, Derks D. Positive Occupational Health Psychology. In Occupational Health Psychology, editors Leka S and Houdmont J. Wiley-Blackwell, Oxford; 2010:194-224.
2. Cameron KS, Spreitzer GM. The Oxford handbook of positive organizational scholarship: Oxford University Press; 2011.
3. Houdmont J, Leka S. An introduction to occupational health psychology. In Occupational Health Psychology, editors Leka S and Houdmont J. Wiley-Blackwell, Oxford; 2010:1-30.
4. Seligman ME. The president's address. *Am Psychol.* 1999;54(8):559-62.
5. Peterson C. A primer in positive psychology: Oxford University Press; 2006.
6. Seligman ME, Csikszentmihalyi M. Positive psychology: An introduction. *Am Psychol.* 2000;55(1):5-14.
7. Compton WC. Introduction to Positive Psychology: Thomson Wadsworth; 2005.
8. Luthans F. Positive organizational behavior: Developing and managing psychological strengths. *The Academy of Management Executive.* 2002;16(1):57-72.
9. Schaufeli WB, Bakker AB. Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of organizational Behavior.* 2004;25(3):293-315.
10. Heller D, Watson D, Ilies R. The role of person versus situation in life satisfaction: a critical examination. *Psychol Bull.* 2004;130(4):574.
11. Judge TA, Watanabe S. Another look at the job satisfaction-life satisfaction relationship. *J Appl Psychol.* 1993;78(6):939.
12. Makin PJ, Rout U, Cooper CL. Job satisfaction and occupational stress among general practitioners—a pilot study. *J R Coll Gen Pract.* 1988;38(312):303-6.
13. Fuß I, Nübling M, Hasselhorn HM, Schwappach D, Rieger MA. Working conditions and work-family conflict in German hospital physicians: psychosocial and organisational predictors and consequences. *BMC Public Health.* 2008;8(1):353.
14. Ernst Kossek E, Ozeki C. Work-family conflict, policies, and the job-life satisfaction relationship: A review and directions for organizational behavior-human resources research. *J Appl Psychol.* 1998;83(2):139-49.

15. Grandey A, Cordeiro B, Crouter A. A longitudinal and multi-source test of the work–family conflict and job satisfaction relationship. *J Occup Organ Psychol*. 2005;78(3):305-23.
16. Allen TD, Herst DE, Bruck CS, Sutton M. Consequences associated with work-to-family conflict: a review and agenda for future research. *J Occup Health Psychol*. 2000;5(2):278.
17. Shockley KM, Singla N. Reconsidering work–family interactions and satisfaction: A meta-analysis. *Journal of Management*. 2011;37(3):861-86.
18. Hall DT, Las Heras M. A positive approach to careers. In *The Oxford Handbook of Positive Organizational Scholarship* Edited by Cameron K, Spreitzer GM, Oxford university press. 2012:508-9.
19. Cohrs JC, Abele AE, Dette DE. Integrating situational and dispositional determinants of job satisfaction: Findings from three samples of professionals. *J Psychol*. 2006;140(4):363-96.
20. Dormann C, Zapf D. Job satisfaction: A meta-analysis of stabilities. *Journal of Organizational Behavior*. 2001;22(5):483-504.
21. Judge TA, Heller D, Mount MK. Five-factor model of personality and job satisfaction: a meta-analysis. *J Appl Psychol*. 2002;87(3):530.
22. Tait M, Padgett MY, Baldwin TT. Job and life satisfaction: A reevaluation of the strength of the relationship and gender effects as a function of the date of the study. *J Appl Psychol*. 1989;74(3):502.
23. Judge TA, Thoresen CJ, Bono JE, Patton GK. The job satisfaction–job performance relationship: A qualitative and quantitative review. *Psychol Bull*. 2001;127(3):376.
24. Riketta M. The causal relation between job attitudes and performance: a meta-analysis of panel studies. *J Appl Psychol*. 2008;93(2):472.
25. Spector PE. *Job satisfaction: Application, assessment, causes, and consequences*: Sage publications; 1997.
26. Aronsson G, Blom V. Work conditions for workers with good long-term health. *International Journal of Workplace Health Management*. 2010;3(2):160-72.
27. Bowling NA. Is the job satisfaction–job performance relationship spurious? A meta-analytic examination. *J Vocat Behav*. 2007;71(2):167-85.

28. Tyssen R, Palmer KS, Solberg IB, Voltmer E, Frank E. Physicians' perceptions of quality of care, professional autonomy, and job satisfaction in Canada, Norway, and the United States. *BMC Health Serv Res.* 2013;13(1):516.
29. Zuger A. Dissatisfaction with medical practice. *N Engl J Med.* 2004;350(1):69-75.
30. Kuerer HM, Eberlein TJ, Pollock RE, Huschka M, Baile WF, Morrow M, et al. Career satisfaction, practice patterns and burnout among surgical oncologists: report on the quality of life of members of the Society of Surgical Oncology. *Ann Surg Oncol.* 2007;14(11):3043-53.
31. Rosta J, Nylenna M, Aasland OG. Job satisfaction among hospital doctors in Norway and Germany. A comparative study on national samples. *Scand J Public Health.* 2009;37(5):503-8.
32. Rout U, Rourt J. A comparative study on occupational stress, job satisfaction and mental health in British general practitioners and Canadian family physicians. *Psychol Health Med.* 1997;2(2):181-90.
33. Grant P. Physician job satisfaction in New Zealand versus the United Kingdom. *N Z Med J.* 2004;117(1204):U1123.
34. Bakker AB, Oerlemans W. Subjective well-being in organizations. *The Oxford handbook of positive organizational scholarship.* 2011:178-89.
35. Locke EA. What is job satisfaction? *Organizational behavior and human performance.* 1969;4(4):309-36.
36. Locke EA. The nature and causes of job satisfaction. *Handbook of industrial and organizational psychology.* 1976;1:1297-343.
37. Weiss HM. Deconstructing job satisfaction: Separating evaluations, beliefs and affective experiences. *Human resource management review.* 2002;12(2):173-94.
38. Weiss HM, Nicholas JP, Daus CS. An examination of the joint effects of affective experiences and job beliefs on job satisfaction and variations in affective experiences over time. *Organ Behav Hum Decis Process.* 1999;78(1):1-24.
39. Friedlander F. Job characteristics as satisfiers and dissatisfiers. *J Appl Psychol.* 1964;48(6):388.
40. Herzberg F, Mausner B, Snyderman BB. *The motivation to work:* Transaction publishers; 2011.
41. Russell JA, Carroll JM. On the bipolarity of positive and negative affect. *Psychol Bull.* 1999;125(1):3.

42. Warr P, Cook J, Wall T. Scales for the measurement of some work attitudes and aspects of psychological well-being. *J Occupational Psychol.* 1979;52(2):129-48.
43. Christian MS, Garza AS, Slaughter JE. Work engagement: A quantitative review and test of its relations with task and contextual performance. *Pers Psychol.* 2011;64(1):89-136.
44. Scheepers RA. Physicians' professional performance: An occupational health psychology perspective. PhD thesis. 2016.
45. Russell JA. A circumplex model of affect. *J Pers Soc Psychol.* 1980;39:1161-78.
46. Russell JA. Core affect and the psychological construction of emotion. *Psychol Rev.* 2003;110(1):145.
47. Posner J, Russell JA, Peterson BS. The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development, and psychopathology. *Dev Psychopathol.* 2005;17(03):715-34.
48. Faragher EB, Cass M, Cooper CL. The relationship between job satisfaction and health: a meta-analysis. *Occup Environ Med.* 2005;62(2):105-12.
49. DiMatteo MR, Sherbourne CD, Hays RD, Ordway L, Kravitz RL, McGlynn EA, et al. Physicians' characteristics influence patients' adherence to medical treatment: results from the Medical Outcomes Study. *Health Psychol.* 1993;12(2):93.
50. Grol R, Mokkink H, Smits A, Van Eijk J, Beek M, Mesker P, et al. Work satisfaction of general practitioners and the quality of patient care. *Fam Pract.* 1985;2(3):128-35.
51. Grembowski D, Paschane D, Diehr P, Katon W, Martin D, Patrick DL. Managed care, physician job satisfaction, and the quality of primary care. *J Gen Intern Med.* 2005;20(3):271-7.
52. Wallace JE, Lemaire JB, Ghali WA. Physician wellness: a missing quality indicator. *The Lancet.* 2009;374(9702):1714-21.
53. Mello MM, Studdert DM, DesRoches CM, Peugh J, Zapert K, Brennan TA, et al. Caring for patients in a malpractice crisis: physician satisfaction and quality of care. *Health Aff (Millwood).* 2004;23(4):42-53.
54. Wallace JE, Lemaire J. Physician well being and quality of patient care: an exploratory study of the missing link. *Psychol Health Med.* 2009;14(5):545-52.
55. Firth-Cozens J. Interventions to improve physicians' well-being and patient care. *Soc Sci Med.* 2001;52(2):215-22.

56. Williams ES, Manwell LB, Konrad TR, Linzer M. The relationship of organizational culture, stress, satisfaction, and burnout with physician-reported error and suboptimal patient care: results from the MEMO study. *Health Care Manage Rev.* 2007;32(3):203-12.
57. Phillips RL, Green LA. Does career dissatisfaction affect the ability of family physicians to deliver high-quality patient care? *Primary care.* 2002;51:223-8.
58. Scheepers RA, Boerebach BC, Arah OA, Heineman MJ, Lombarts KM. A systematic review of the impact of physicians' occupational well-being on the quality of patient care. *Int J Behav Med.* 2015;22(6):683-98.
59. Haas JS, Cook EF, Puopolo AL, Burstin HR, Cleary PD, Brennan TA. Is the professional satisfaction of general internists associated with patient satisfaction? *J Gen Intern Med.* 2000;15(2):122-8.
60. Linn LS, Brook RH, Clark VA, Davies AR, Fink A, Kosecoff J. Physician and patient satisfaction as factors related to the organization of internal medicine group practices. *Med Care.* 1985;23(10):1171-8.
61. Landon BE, Reschovsky JD, Pham HH, Blumenthal D. Leaving medicine: the consequences of physician dissatisfaction. *Med Care.* 2006;44(3):234-42.
62. Vanasse A, Scott S, Courteau J, Orzanco MG. Canadian family physicians' intentions to migrate: associated factors. *Can Fam Physician.* 2009;55(4):396-7.
63. Opoku ST, Apenteng BA. Seeking greener pastures? The relationship between career satisfaction and the intention to emigrate: a survey of Ghanaian physicians. *Int Health.* 2014;6(3):208-12.
64. Lichtenstein RL. The job satisfaction and retention of physicians in organized settings: a literature review. *Med Care Res Rev.* 1984;41(3):139-79.
65. Sibbald B, Bojke C, Gravelle H. National survey of job satisfaction and retirement intentions among general practitioners in England. *BMJ.* 2003;326(7379):22.
66. Pathman DE, Konrad TR, Williams ES, Scheckler WE, Linzer M, Douglas J. Physician job satisfaction, job dissatisfaction, and physician turnover. *J Fam Pract.* 2002;51(7):593.
67. Zhang Y, Feng X. The relationship between job satisfaction, burnout, and turnover intention among physicians from urban state-owned medical institutions in Hubei, China: a cross-sectional study. *BMC Health Serv Res.* 2011;11(1):235.
68. Govardhan L, Pinelli V, Schnatz PF. Burnout, depression and job satisfaction in obstetrics and gynecology residents. *Conn Med.* 2012;76(7):389-95.

69. Soler JK, Yaman H, Esteva M, Dobbs F, Asenova RS, Katić M, et al. Burnout in European family doctors: the EGPRN study. *Fam Pract.* 2008;25(4):245-65.
70. Visser MR, Smets EM, Oort FJ, de Haes HC. Stress, satisfaction and burnout among Dutch medical specialists. *Can Med Assoc J.* 2003;168(3):271-5.
71. Weng HC, Hung CM, Liu YT, Cheng YJ, Yen CY, Chang CC, et al. Associations between emotional intelligence and doctor burnout, job satisfaction and patient satisfaction. *Med Educ.* 2011;45(8):835-42.
72. Aasland OG, Olff M, Falkum E, Schweder T, Ursin H. Health complaints and job stress in Norwegian physicians: the use of an overlapping questionnaire design. *Soc Sci Med.* 1997;45(11):1615-29.
73. Mangelsdorff D, Hubbart JA. Army physicians' attitudes toward military medicine. *Mil Med.* 1976;141(11):784-9.
74. Edwards N, Kornacki MJ, Silversin J. Unhappy doctors: what are the causes and what can be done? *Br Med J.* 2002;324(7341):835.
75. Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med.* 2002;136(5):358-67.
76. Murray A, Montgomery JE, Chang H, Rogers WH, Inui T, Safran DG. Doctor discontent. A comparison of physician satisfaction in different delivery system settings, 1986 and 1997. *J Gen Intern Med.* 2001;16(7):452-9.
77. Arie S. Why are Dutch GPs so much happier? *BMJ.* 2015;351:h6870.
78. Nylenna M, Gulbrandsen P, Førde R, Aasland OG. Unhappy doctors? A longitudinal study of life and job satisfaction among Norwegian doctors 1994–2002. *BMC Health Serv Res.* 2005;5(1):44.
79. Hebbard PC, Wirtzfeld DA. Practice patterns and career satisfaction of Canadian female general surgeons. *Am J Surg.* 2009;197(6):721-7.
80. Cydulka RK, Korte R. Career satisfaction in emergency medicine: the ABEM Longitudinal Study of Emergency Physicians. *Ann Emerg Med.* 2008;51(6):714-22. .
81. Farley FA, Kramer J, Watkins-Castillo S. Work satisfaction and retirement plans of orthopaedic surgeons 50 years of age and older. *Clin Orthop Relat Res.* 2008;466(1):231-8.
82. Harris M, Proudfoot J, Jayasinghe U, Holton C, Powell Davies G, Amoroso C, et al. Job satisfaction of staff and the team environment in Australian general practice. *Med J Aust.* 2007;186(11):570-3.

83. Olesen F. Alment praktiserende lægers jobtilfredshed. *Ugeskr Læger*. 2007;169:26-32.
84. Hoff T, Young G, Xiang E, Raver E. Understanding US physician satisfaction: State of the evidence and future directions. *Journal of healthcare management/American College of Healthcare Executives*. 2014;60(6):409-27.
85. Surman G, Lambert TW, Goldacre M. Doctors' enjoyment of their work and satisfaction with time available for leisure: UK time trend questionnaire-based study. *Postgrad Med J*. 2016;92(1086):194-200.
86. Tyssen R, Hem E, Gude T, Grønvold NT, Ekeberg Ø, Vaglum P. Lower life satisfaction in physicians compared with a general population sample. *Soc Psychiatry Psychiatr Epidemiol*. 2009;44(1):47-54.
87. Hem E, Haldorsen T, Aasland OG, Tyssen R, Vaglum P, Ekeberg Ø. Suicide rates according to education with a particular focus on physicians in Norway 1960–2000. *Psychol Med*. 2005;35(06):873-80.
88. Schernhammer ES, Colditz GA. Suicide rates among physicians: a quantitative and gender assessment (meta-analysis). *Am J Psychiatry*. 2004;161(12):2295-302.
89. Fink-Miller EL. Provocative work experiences predict the acquired capability for suicide in physicians. *Psychiatry Res*. 2015;229(1-2):143-7.
90. Wall TD, Bolden R, Borrill C, Carter A, Golya D, Hardy G, et al. Minor psychiatric disorder in NHS trust staff: occupational and gender differences. *The British Journal of Psychiatry*. 1997;171(6):519-23.
91. Falkum E, Gjerberg E, Hofoss D, Aasland O. [Time stress among Norwegian physicians]. *Tidsskr Nor Laegeforen*. 1997;117(7):954-9.
92. Myhren H, Ekeberg Ø, Stokland O. Job satisfaction and burnout among intensive care unit nurses and physicians. *Crit Care Res Pract*. 2013;2013:786176.
93. Kvist T, Mäntynen R, Vehviläinen-Julkunen K. Does Finnish hospital staff job satisfaction vary across occupational groups? *BMC Health Serv Res*. 2013;13(1):376.
94. Casarett DJ, Spence C, Haskins M, Teno J. One big happy family? Interdisciplinary variation in job satisfaction among hospice providers. *J Palliat Med*. 2011;14(8):913-7.
95. Jönsson S. Psychosocial work environment and prediction of job satisfaction among Swedish registered nurses and physicians—a follow-up study. *Scand J Caring Sci*. 2012;26(2):236-44.

96. Casellas F, Ginard D, Vera I, Torrejón A. Satisfaction of health care professionals managing patients with inflammatory bowel disease. *J Crohns Colitis*. 2013;7(7):249-55.
97. Arnetz BB. Psychosocial challenges facing physicians of today. *Soc Sci Med*. 2001;52(2):203-13.
98. Kassirer JP. Doctor discontent. *N Engl J Med*. 1998;339(21):1543-5.
99. Baron RJ. Professional self-regulation in a changing world: old problems need new approaches. *JAMA*. 2015;313(18):1807-8.
100. Tipping MD, Forth VE, Magill DB, Englert K, Williams MV. Systematic review of time studies evaluating physicians in the hospital setting. *J Hosp Med*. 2010;5(6):353-9.
101. Sitzia J, Wood N. Patient satisfaction: a review of issues and concepts. *Soc Sci Med*. 1997;45(12):1829-43.
102. Scheurer D, McKean S, Miller J, Wetterneck T. US physician satisfaction: a systematic review. *J Hosp Med*. 2009;4(9):560-8.
103. Perneger TV, Deom M, Cullati S, Bovier PA. Growing discontent of Swiss doctors, 1998–2007. *Eur J Public Health*. 2012;22(4):478-83.
104. Sibbald B, Enzer I, Cooper C, Rout U, Sutherland V. GP job satisfaction in 1987, 1990 and 1998: lessons for the future? *Fam Pract*. 2000;17(5):364-71.
105. Landon BE, Reschovsky J, Blumenthal D. Changes in career satisfaction among primary care and specialist physicians, 1997-2001. *JAMA*. 2003;289(4):442-9.
106. Aasland OG, Rosta J, Nylenna M. Health care reforms and job satisfaction among doctors in Norway. *Scand J Public Health*. 2010;38(3):253-8.
107. Gothe H, Köster AD, Storz P, Nolting HD, Häussler B. Job satisfaction among doctors. *Dtsch Arztebl*. 2007;104(20):1394-9.
108. Siegrist J, Shackelton R, Link C, Marceau L, von dem Knesebeck O, McKinlay J. Work stress of primary care physicians in the US, UK and German health care systems. *Soc Sci Med*. 2010;71(2):298-304.
109. Schoen C, Osborn R, Squires D, Doty M, Rasmussen P, Pierson R, et al. A survey of primary care doctors in ten countries shows progress in use of health information technology, less in other areas. *Health Aff (Millwood)*. 2012;31(12):2805-16.

110. Backman G, Hunt P, Khosla R, Jaramillo-Strouss C, Fikre BM, Rumble C, et al. Health systems and the right to health: an assessment of 194 countries. *The Lancet*. 2008;372(9655):2047-85.
111. Scanlan A, Zyzanski SJ, Flocke SA, Stange KC, Grava-Gubins I. A comparison of US and Canadian family physician attitudes toward their respective health-care systems. *Med Care*. 1996;34(8):837-44.
112. Mache S, Vitzthum K, Klapp BF, Groneberg DA. Stress, health and satisfaction of Australian and German doctors--a comparative study. *World Hosp Health Serv*. 2012;48(1):21-7.
113. Voltmer E, Rosta J, Siegrist J, Aasland OG. Job stress and job satisfaction of physicians in private practice: comparison of German and Norwegian physicians. *Int Arch Occup Environ Health*. 2012;85(7):819-28.
114. Koch K, Miksch A, Schürmann C, Joos S, Sawicki PT. The German health care system in international comparison: the primary care physicians' perspective. *Dtsch Arztebl Int*. 2011;108(15):255-61.
115. Karanikolos M, Mladovsky P, Cylus J, Thomson S, Basu S, Stuckler D, et al. Financial crisis, austerity, and health in Europe. *The Lancet*. 2013;381(9874):1323-31.
116. Olafsdottir H. Current concerns in Icelandic psychiatry; nation in crisis. *Nord J Psychiatry*. 2009;63(2):188-9.
117. Björnsdóttir K, Nelson S. Health and vulnerability in a time of economic uncertainty. *Nurs Inq*. 2010;17(1):1.
118. Jónsson S. [Health care system at a crossroads]. *Laeknabladid*. 2011;97(4):211.
119. Rechel B, Dubois CA, McKee M. The health care workforce in Europe: learning from experience. World Health Organization; 2006.
120. Magnussen J, Vrangbæk K, Saltman R. Nordic health care systems: Recent reforms and current policy challenges: McGraw-Hill International; 2009.
121. Mackenbach JP, McKee M. A comparative analysis of health policy performance in 43 European countries. *Eur J Public Health*. 2013;23(2):195-201.
122. Statistics Iceland <http://www.statice.is/>.
123. Mundal A. Vekst i antall leger. Samfunnsspeilet 2011/2, Statistics Norway. <http://www.ssb.no/helse/artikler-og-publikasjoner/vekst-i-antall-leger>.

124. Stig K, Lütz I. Financing of Health Care in the Nordic Countries. NOMESCO Nordic Medico Statistical Committee. 2012;99.
125. The World Bank, World Health Organization, National Health Account database. <http://data.worldbank.org/indicator/SH.XPD.PCAP.PP.KD>.
126. Anand S, Bärnighausen T. Human resources and health outcomes: cross-country econometric study. *The Lancet*. 2004;364(9445):1603-9.
127. Pang T, Lansang MA, Haines A. Brain drain and health professionals. *Br Med J*. 2002;324(7336):499-500.
128. Aluwihare AP. Physician migration: donor country impact. *J Contin Educ Health Prof*. 2005;25(1):15-21.
129. Kollar E, Buyx A. Ethics and policy of medical brain drain: a review. *Swiss Med Wkly*. 2013;143:w13845.
130. Tankwanchi ABS, Özden Ç, Vermund SH. Physician emigration from sub-Saharan Africa to the United States: analysis of the 2011 AMA physician masterfile. *PLoS Med*. 2013;10(9):e1001513.
131. Mills EJ, Kanters S, Hagopian A, Bansback N, Nachega J, Alberton M, et al. The financial cost of doctors emigrating from sub-Saharan Africa: human capital analysis. *BMJ*. 2011;343.
132. Naicker S, Eastwood J, Plange-Rhule J, Tutt R. Shortage of healthcare workers in sub-Saharan Africa: a nephrological perspective. *Clin Nephrol*. 2010;74:129-33.
133. Oberoi SS, Lin V. Brain drain of doctors from southern Africa: brain gain for Australia. *Aust Health Rev*. 2006;30(1):25-33.
134. Martineau T, Decker K, Bundred P. "Brain drain" of health professionals: from rhetoric to responsible action. *Health Policy*. 2004;70(1):1-10.
135. García-Pérez MA, Amaya C, Otero Á. Physicians' migration in Europe: an overview of the current situation. *BMC Health Serv Res*. 2007;7(1):201.
136. Costigliola V. Mobility of medical doctors in cross-border healthcare. *The EPMA journal*. 2011;2(4):333-9.
137. Williams AM, Baláž V. International return mobility, learning and knowledge transfer: a case study of Slovak doctors. *Soc Sci Med*. 2008;67(11):1924-33.

138. Dussault G, Fronteira I, Cabral J. Migration of health personnel in the WHO European Region. Instituto de Higiene e Medicina Tropical/World Health Organisation, Lisbon/Copenhagen. 2009.
139. Wismar M, Maier CB, Glinos IA, Dussault G, Figueras J. Health professional mobility and health systems. Evidence from 17 European countries. World Health Organization Geneva. 2011;23.
140. Den norske legestatistikken. Den norske legeforening: <http://legeforeningen.no/Emner/Andre-emner/Legestatistikk/>.
141. Judge TA, Parker S, Colbert AE, Heller D, Ilies R. Job satisfaction: A cross-cultural review. Handbook of industrial, work and organizational psychology. 2001;2:25-52.
142. Judge TA, Klinger R. Job satisfaction: Subjective well-being at work. The science of subjective well-being. 2008:393-413.
143. Buchanan DA. The development of job design theories and techniques, Saxon House, Aldershot 1979.
144. Hackman JR, Oldham GR. Motivation through the design of work: Test of a theory. Organizational behavior and human performance. 1976;16(2):250-79.
145. Oldham GR, Hackman JR. Not what it was and not what it will be: The future of job design research. Journal of organizational behavior. 2010;31(2-3):463-79.
146. Hackman JR, Lawler EE. Employee reactions to job characteristics. J Appl Psychol. 1971;55(3):259.
147. Hackman JR, Oldham GR. Work redesign. Reading, MA: Addison- Wesley. 1980.
148. Hackman JR, Oldham GR. Development of the job diagnostic survey. J Appl Psychol. 1975;60(2):159.
149. Jacobs CJ. Once more: testing the job characteristics model: Stellenbosch: Stellenbosch University; 2014.
150. Demerouti E, Bakker AB, Nachreiner F, Schaufeli WB. The job demands-resources model of burnout. J Appl Psychol. 2001;86(3):499.
151. Boonzaier B, Ficker B, Rust B. A review of research on the Job Characteristics Model and the attendant job diagnostic survey. South African journal of business management. 2001;32(1):11-35.

152. Fried Y, Ferris GR. The validity of the job characteristics model: A review and meta-analysis. *Pers Psychol.* 1987;40(2):287-322.
153. Loher BT, Noe RA, Moeller NL, Fitzgerald MP. A meta-analysis of the relation of job characteristics to job satisfaction. *J Appl Psychol.* 1985;70(2):280.
154. Cai C, Zhou Z, Yeh H, Hu J. Empowerment and its effects on clinical nurses in central China. *Int Nurs Rev.* 2011;58(1):138-44.
155. Faraji O, Pourreza A, Hosseini M, Arab M, Akbari F. Role and effect of the job characteristic model (JCM) on job satisfaction. *Journal of School of Public Health and Institute of Public Health Research.* 2008;6(2):31-8.
156. DeVaro J, Li R, Brookshire D. Analysing the job characteristics model: New support from a cross-section of establishments. *The International Journal of Human Resource Management.* 2007;18(6):986-1003.
157. Wrzesniewski A, Dutton JE. Crafting a job: Revisioning employees as active crafters of their work. *Acad Manage Rev.* 2001;26(2):179-201.
158. Tims M, Derks D, Bakker AB. Job crafting and its relationships with person–job fit and meaningfulness: A three-wave study. *J Vocat Behav.* 2016;92:44-53.
159. Bakker AB, Demerouti E. *Job Demands–Resources Theory: Taking Stock and Looking Forward.* 2016.
160. Tims M, Bakker AB. Job crafting: Towards a new model of individual job redesign. *SA Journal of Industrial Psychology.* 2010;36(2):1-9.
161. Edwards JR. 4 Person–Environment Fit in Organizations: An Assessment of Theoretical Progress. *Academy of Management Annals.* 2008;2(1):167-230.
162. Rice RW, Gentile DA, McFarlin DB. Facet importance and job satisfaction. *J Appl Psychol.* 1991;76(1):31.
163. Kristof-Brown AL, Zimmerman RD, Johnson EC. Consequences of individuals' fit at work: A meta-analysis of person-job, person-organization, person-group, and person-supervisor fit. *Pers Psychol.* 2005;58(2):281-342.
164. McCormick EJ, DeNisi AS, Shaw JB. Use of the position analysis questionnaire for establishing the job component validity of tests. *J Appl Psychol.* 1979;64(1):51-6.
165. McCormick EJ, Jeanneret PR, Mecham RC. A study of job characteristics and job dimensions as based on the Position Analysis Questionnaire (PAQ). *J Appl Psychol.* 1972;56(4):347-68.

166. Karasek R, Theorell T. Healthy work: stress, productivity, and the reconstruction of working life: New York: Basic books; 1990.
167. Siegrist J. Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol.* 1996;1(1):27.
168. Borg V. Sund i arbejds-positive faktorer i arbejds [Healthy organisations-positive factors at work]. Copenhagen: The National Research Centre for Working Environment. 2007.
169. Podsakoff NP, LePine JA, LePine MA. Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: a meta-analysis. *J Appl Psychol.* 2007;92(2):438.
170. Statistics Norway (www.ssb.no/en) LKU 2013.
171. Eurofound (2012), Fifth European Working Conditions Survey, Publications Office of the European Union, Luxembourg.
https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1182_en.pdf.
172. Bean CG, Winefield HR, Sargent C, Hutchinson AD. Differential associations of job control components with both waist circumference and body mass index. *Soc Sci Med.* 2015;143:1-8.
173. Johnson JV, Hall EM. Job strain, work place social support, and cardiovascular disease: a cross-sectional study of a random sample of the Swedish working population. *Am J Public Health.* 1988;78(10):1336-42.
174. Bakker AB, Demerouti E. The job demands-resources model: State of the art. *Journal of managerial psychology.* 2007;22(3):309-28.
175. Landsbergis PA, Schnall PL, Belkić KL, Baker D, Schwartz JE, Pickering TG. The workplace and cardiovascular disease: relevance and potential role for occupational health psychology. 2003.
176. Siegrist J, Starke D, Chandola T, Godin I, Marmot M, Niedhammer I, et al. The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med.* 2004;58(8):1483-99.
177. Hämmig O, Brauchli R, Bauer GF. Effort-reward and work-life imbalance, general stress and burnout among employees of a large public hospital in Switzerland. *Swiss Med Wkly.* 2012;142(0):135-47.

178. de Jonge J, Bosma H, Peter R, Siegrist J. Job strain, effort-reward imbalance and employee well-being: a large-scale cross-sectional study. *Soc Sci Med*. 2000;50(9):1317-27.
179. Bakker AB, Killmer CH, Siegrist J, Schaufeli WB. Effort–reward imbalance and burnout among nurses. *J Adv Nurs*. 2000;31(4):884-91.
180. Marmot M, Siegrist J, Theorell T, Feeney A. Health and the psychosocial environment at work. *Social determinants of health*. 1999:105-31.
181. Li J, Weigl M, Glaser J, Petru R, Siegrist J, Angerer P. Changes in psychosocial work environment and depressive symptoms: a prospective study in junior physicians. *Am J Ind Med*. 2013;56(12):1414-22.
182. Klein J, Frie KG, Blum K, von dem Knesebeck O. Psychosocial stress at work and perceived quality of care among clinicians in surgery. *BMC Health Serv Res*. 2011;11(1):109.
183. Loerbroks A, Weigl M, Li J, Angerer P. Effort-reward imbalance and perceived quality of patient care: a cross-sectional study among physicians in Germany. *BMC Public Health*. 2016;16(1):342.
184. Hoff T, Whitcomb WF, Nelson JR. Thriving and surviving in a new medical career: the case of hospitalist physicians. *J Health Soc Behav*. 2002;43(1):72.
185. Jansson von Vultée P, Axelsson R, Arnetz B. The impact of organisational settings on physician wellbeing. *Int J Health Care Qual Assur*. 2007;20(6):506-15.
186. McManus I, Keeling A, Paice E. Stress, burnout and doctors' attitudes to work are determined by personality and learning style: a twelve year longitudinal study of UK medical graduates. *BMC Med*. 2004;2(1):1.
187. Joyce CM, Schurer S, Scott A, Humphreys J, Kalb G. Australian doctors' satisfaction with their work: results from the MABEL longitudinal survey of doctors. *Med J Aust*. 2011;194(1):30-3.
188. Clark A, Oswald A, Warr P. Is job satisfaction U-shaped in age? *J Occup Organ Psychol*. 1996;69(1):57-81.
189. Whalley D, Bojke C, Gravelle H, Sibbald B. GP job satisfaction in view of contract reform: a national survey. *Br J Gen Pract*. 2006;56(523):87-92.
190. Sverke M, Hellgren J, Näswall K. No security: a meta-analysis and review of job insecurity and its consequences. *J Occup Health Psychol*. 2002;7(3):242-64.
191. McMurray JE, Linzer M, Konrad TR, Douglas J, Shugerman R, Nelson K. The work lives of women physicians. *J Gen Intern Med*. 2000;15(6):372-80.

192. Rizvi R, Raymer L, Kunik M, Fisher J. Facets of career satisfaction for women physicians in the United States: A systematic review. *Women Health*. 2012;52(4):403-21.
193. Fielding R, Li J, Tang Y. Health care utilization as a function of subjective health status, job satisfaction and gender among health care workers in Guangzhou, Southern China. *Soc Sci Med*. 1995;41(8):1103-10.
194. Cooper CL, Rout U, Faragher B. Mental health, job satisfaction, and job stress among general practitioners. *BMJ*. 1989;298(6670):366-70.
195. Magnavita N. Is there a gender gap in Italian radiology? A cross-sectional study. *Eur J Radiol*. 2013;82(9):e502-7.
196. Finset KB, Gude T, Hem E, Tyssen R, Ekeberg O, Vaglum P. Which young physicians are satisfied with their work? A prospective nationwide study in Norway. *BMC Med Educ*. 2005;5(1):19.
197. Van Ham I, Verhoeven AA, Groenier KH, Groothoff JW, De Haan J. Job satisfaction among general practitioners: a systematic literature review. *Eur J Gen Pract*. 2006;12(4):174-80.
198. Shanafelt TD, Novotny P, Johnson ME, Zhao X, Steensma DP, Lacy MQ, et al. The well-being and personal wellness promotion strategies of medical oncologists in the North Central Cancer Treatment Group. *Oncology*. 2005;68(1):23-32.
199. Røvik JO, Tyssen R, Hem E, Gude T, Ekeberg Ø, Moum T, et al. Job stress in young physicians with an emphasis on the work-home interface: a nine-year, nationwide and longitudinal study of its course and predictors. *Ind Health*. 2007;45(5):662-71.
200. Williams ES, Konrad TR, Linzer M, McMurray J, Pathman DE, Gerrity M, et al. Physician, practice, and patient characteristics related to primary care physician physical and mental health: results from the Physician Worklife Study. *Health Serv Res*. 2002;37(1):121-43.
201. Davidson JM, MacDonald R, Lambert TW, Goldacre MJ, Parkhouse J. UK senior doctors' career destinations, job satisfaction, and future intentions: questionnaire survey. *BMJ*. 2002;325(7366):685-6.
202. Nylenna M, Gulbrandsen P, Førde R, Aasland OG. Job satisfaction among Norwegian general practitioners. *Scand J Prim Health Care*. 2005;23(4):198-202.
203. Nixon RL, Jaramillo F. Impact of practice arrangements on physicians' satisfaction. *Hosp Top*. 2003;81(4):19-25.

204. Heponiemi T, Kuusio H, Sinervo T, Elovainio M. Job attitudes and well-being among public vs. private physicians: organizational justice and job control as mediators. *Eur J Public Health*. 2011;21(4):520-5.
205. Ashton T, Brown PM, Sopina E, Cameron L, Tenbensen T, Windsor J. Sources of satisfaction and dissatisfaction among specialists within the public and private health sectors. *N Z Med J*. 2013;126:9-19.
206. Leigh JP, Kravitz RL, Schembri M, Samuels SJ, Mobley S. Physician career satisfaction across specialties. *Arch Intern Med*. 2002;162(14):1577-84.
207. Heponiemi T, Aalto AM, Puttonen S, Vänskä J, Elovainio M. Work-Related Stress, Job Resources, and Well-Being Among Psychiatrists and Other Medical Specialists in Finland. *Psychiatr Serv* 2014;65(6):796-801.
208. Heponiemi T, Manderbacka K, Vänskä J, Elovainio M. Can organizational justice help the retention of general practitioners? *Health Policy*. 2013;110(1):22-8.
209. Rovik JO, Tyssen R, Hem E, Gude T, Ekeberg O, Moum T, et al. Job stress in young physicians with an emphasis on the work-home interface: a nine-year, nationwide and longitudinal study of its course and predictors. *Ind Health*. 2007;45(5):662-71.
210. Hertzberg TK, Rø KI, Vaglum PJW, Moum T, Røvik JO, Gude T, et al. Work-home interface stress: an important predictor of emotional exhaustion 15 years into a medical career. *Ind Health*. 2015.
211. Geurts SA, Demerouti E. Work/non-work interface: A review of theories and findings. *The handbook of work and health psychology*. 2003;2:279-312.
212. Frone M. Work-family balance. In *Handbook of occupational health psychology* by Quick JC and Tetrick LE. Washington, DC: American Psychological Association, 2003, p. 143-162.
213. Knecht M, Bauer G, Klaghofer R, Buddeberg-Fischer B, Stamm M, Hämmig O. Work-life conflict and health among Swiss physicians – in comparison with other university graduates and with the general Swiss working population. *Swiss Med Wkly*. 2010;140:w13063.
214. Shanafelt TD, Boone S, Tan L, Dyrbye LN, Sotile W, Satele D, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med*. 2012;172(18):1377-85.
215. Innstrand ST, Langballe EM, Falkum E, Espnes GA, Aasland OG. Gender-specific perceptions of four dimensions of the work/family interaction. *J Career Ass*. 2009;17(4):402-16.

216. Shanafelt TD, Hasan O, Dyrbye LN, Sinsky C, Satele D, Sloan J, et al., editors. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. *Mayo Clin Proc*; 2015: Elsevier.
217. Langballe EM, Innstrand ST, Aasland OG, Falkum E. The predictive value of individual factors, work-related factors, and work-home interaction on burnout in female and male physicians: a longitudinal study. *Stress Health*. 2011;27(1):73-87.
218. Dyrbye LN, Shanafelt TD, Balch CM, Satele D, Sloan J, Freischlag J. Relationship between work-home conflicts and burnout among American surgeons: a comparison by sex. *Arch Surg*. 2011;146(2):211-7.
219. Ohta H, Wada K, Kawashima M, Arimatsu M, Higashi T, Yoshikawa T, et al. Work-family conflict and prolonged fatigue among Japanese married male physicians. *Int Arch Occup Environ Health*. 2011;84(8):937-42.
220. Kossek EE, Ozeki C. Work-family conflict, policies, and the job-life satisfaction relationship: A review and directions for organizational behavior-human resources research. American Psychological Association; 1998.
221. Hadley J, Mitchell JM, Sulmasy DP, Bloche MG. Perceived financial incentives, HMO market penetration, and physicians' practice styles and satisfaction. *Health Serv Res*. 1999;34(1):307-21.
222. Hadley J, Mitchell JM. The growth of managed care and changes in physicians' incomes, autonomy, and satisfaction, 1991-1997. *Int J Health Care Finance Econ*. 2002;2(1):37-50.
223. Lewis JM, Marjoribanks T. The impact of financial constraints and incentives on professional autonomy. *Int J Health Plann Manage*. 2003;18(1):49-61.
224. Mamie C, Clergue F, Zocatelli D, Haller G. Swiss healthcare cost containment policies and their impact on anaesthetists' density and satisfaction. *Swiss Med Wkly*. 2011;141:w13251.
225. Oman KM, Moulds R, Usher K. Professional satisfaction and dissatisfaction among Fiji specialist trainees: what are the implications for preventing migration? *Qual Health Res*. 2009;19(9):1246-58.
226. Mazurenko O, Menachemi N. Environmental market factors associated with physician career satisfaction. *J Healthc Manag*. 2011;57(5):307-24.
227. Thomson S, Osborn R, Squires D, Jun M. International profiles of health care systems, 2012. *The Commonwealth fund*. 2012;25.

228. Lee ES. A theory of migration. *Demography*. 1966;3(1):47-57.
229. Brettell CB, Hollifield JF. *Migration theory: Talking across disciplines*: Routledge; 2014.
230. Commuting: Iceland's challenge and opportunity. *Nordic Labour Journal* 2012. <http://www.nordiclaborjournal.org/i-fokus/in-focus-2012/when-commuting-becomes-an-obstacle-race/article.2012-04-13.6268727380>.
231. Basu K, Rajbhandary S. Interprovincial migration of physicians in Canada: What are the determinants? *Health Policy*. 2006;76(2):186-93.
232. Clemens MA. Skill flow: A fundamental reconsideration of skilled-worker mobility and development. Center for Global Development, Working Paper Number 180. 2009:1–47.
233. Deressa W, Azazh A. Attitudes of undergraduate medical students of Addis Ababa University towards medical practice and migration, Ethiopia. *BMC Med Educ*. 2012;12(1):68.
234. Matsumoto M, Inoue K, Kashima S, Takeuchi K, Inoue MMK. Characteristics of physicians, their migration patterns and distance: a longitudinal study in Hiroshima, Japan. *Rural and remote health*. 2012;12(2):2027.
235. Moss PJ, Lambert TW, Goldacre MJ, Lee P. Reasons for considering leaving UK medicine: questionnaire study of junior doctors' comments. *BMJ*. 2004;329(7477):1263.
236. Davidson JM, Lambert TW, Goldacre MJ, Parkhouse J. UK senior doctors' career destinations, job satisfaction, and future intentions: questionnaire survey. *BMJ*. 2002;325(7366):685-6.
237. Astor A, Akhtar T, Matallana MA, Muthuswamy V, Olowu FA, Tallo V, et al. Physician migration: views from professionals in Colombia, Nigeria, India, Pakistan and the Philippines. *Soc Sci Med*. 2005;61(12):2492-500.
238. Brown RP, Connell J. The migration of doctors and nurses from South Pacific Island Nations. *Soc Sci Med*. 2004;58(11):2193-210.
239. Ricketts TC. The migration of surgeons. *Ann Surg*. 2010;251(2):363-7.
240. Benamer HT, Bredan A, Bakoush O. The Libyan doctors' brain drain: an exploratory study. *BMC Res Notes*. 2009;2(1):242.
241. Hagopian A, Ofosu A, Fatusi A, Biritwum R, Essel A, Hart LG, et al. The flight of physicians from West Africa: views of African physicians and implications for policy. *Soc Sci Med*. 2005;61(8):1750-60.

242. Okeke EN. Do higher salaries lower physician migration? *Health Policy Plan.* 2014;29(5):603-14.
243. Frjáls verslun (journal in paper edition only): August 2009 (the salaries in 2008 of about 200 doctors) and August 2010 (the salaries in 2009 of the same doctors). Reykjavík, Iceland: Heimur hf, 2009.
244. Buchan J. International rescue? The dynamics and policy implications of the international recruitment of nurses to the UK. *J Health Serv Res Policy.* 2004;9(1):10-6.
245. Buchan J. The impact of global nursing migration on health services delivery. *Policy Polit Nurs Pract.* 2006;7(3):16-25.
246. Tyssen R, Vaglum P, Grønvold NT, Ekeberg Ø. The impact of job stress and working conditions on mental health problems among junior house officers. A nationwide Norwegian prospective cohort study. *Med Educ.* 2000;34(5):374-84.
247. Grotmol KS, Gude T, Moum T, Vaglum P, Tyssen R. Risk factors at medical school for later severe depression: a 15-year longitudinal, nationwide study (NORDOC). *J Affect Disord.* 2013;146(1):106-11.
248. Førde R, Aasland O. [Moral distress and professional freedom of speech among doctors]. *Tidsskr Nor Laegeforen.* 2013;133(12-13):1310-4.
249. Rosta J, Aasland OG. Changes in the lifetime prevalence of suicidal feelings and thoughts among Norwegian doctors from 2000 to 2010: a longitudinal study based on national samples. *BMC Psychiatry.* 2013;13(1):322.
250. Aasland OG. 20 years of doctor research. *Public Service Review: European Science and Technology* 2012;15:206-7.
251. Tómasson K, Friðriksdóttir H, Ásgeirsdóttir ÁG, Hjaltason H, Blöndal Þ, Sigurðardóttir Ó. [Research on doctors work and working environment]. *Vinnueftirlitið* 2003.
252. Hills D, Joyce C, Humphreys J. Validation of a job satisfaction Scale in the Australian Clinical medical Workforce. *Eval Health Prof.* 2011;35(1):47-76.
253. Mazzaglia G, Lapi F, Silvestri C, Roti L, Giustini SE, Buiatti E. Association between satisfaction and stress with aspects of job and practice management among primary care physicians. *Qual Prim Care.* 2009;17(3):215-23.
254. Dowell AC, Westcott T, McLeod DK, Hamilton S. A survey of job satisfaction, sources of stress and psychological symptoms among New Zealand health professionals. *N Z Med J.* 2001;114(1145):540-3.

255. Mathers N, Jones N, Hannay D. Heartsink patients: a study of their general practitioners. *Br J Gen Pract.* 1995;45(395):293-6.
256. Hnilicová H, Vavrecková J, Dobiášová K. [Migration trends of Czech physicians]. *Cas Lek Cesk.* 2007;147(1):49-54.
257. Probst TM. Economic stressors. In *Handbook of work stress*. Edited by Barling J, Kelloway EK, Frone MR. Thousand Oaks, CA: Sage. 2005:267–97.
258. Cohen J. *Statistical power analysis for the behavioral sciences*. Second ed. Hillsdale NJ: Laurence Earlbaum Associates. 1988.
259. Kellerman SE, Herold J. Physician response to surveys: A review of the literature. *Am J Prev Med.* 2001;20(1):61-7.
260. Hinami K, Whelan CT, Miller JA, Wolosin RJ, Wetterneck TB. Job characteristics, satisfaction, and burnout across hospitalist practice models. *J Hosp Med.* 2012;7(5):402-10.
261. Shanafelt T, Balch C, Bechamps G, Russell T, Dyrbye L, Satele D, et al. Burnout and career satisfaction among American surgeons. *Ann Surg.* 2009;250(3):463-71.
262. Andersen GR, Aasland OG, Fridner A, Lövseth LT. Harassment among university hospital physicians in four European cities. Results from a cross-sectional study in Norway, Sweden, Iceland and Italy (the HOUPE study). *Work.* 2009;37(1):99-110.
263. VanGeest JB, Johnson TP, Welch VL. Methodologies for improving response rates in surveys of physicians a systematic review. *Eval Health Prof.* 2007;30(4):303-21.
264. Akl EA, Maroun N, Klocke RA, Montori V, Schünemann HJ. Electronic mail was not better than postal mail for surveying residents and faculty. *J Clin Epidemiol.* 2005;58(4):425-9.
265. Kessler RC. The use of change scores as criteria in longitudinal survey research. *Quality & Quantity.* 1977;11(1):43-66.
266. Markus G. *Models for the analysis of panel data*. Beverly Hills: Sage. 1980.
267. Tyssen R. *Mental health problems among medical students and young physicians*, thesis. University of Oslo. 2001.
268. Sverke M, Hellgren J, Naswall K. No security: a meta-analysis and review of job insecurity and its consequences. *J Occup Health Psychol.* 2002;7(3):242-64.
269. Dyrbye LN, Varkey P, Boone SL, Satele DV, Sloan JA, Shanafelt TD, editors. *Physician satisfaction and burnout at different career stages*. Mayo Clin Proc; 2013: Elsevier.

270. Tyssen R. Health problems and the use of health services among physicians: a review article with particular emphasis on Norwegian studies. *Ind Health*. 2007;45(5):599-610.
271. Dyrbye LN, Sotile W, Boone S, West CP, Tan L, Satele D, et al. A Survey of US Physicians and Their Partners Regarding the Impact of Work–Home Conflict. *J Gen Intern Med*. 2014;29(1):155-61.
272. Shoss MK, Probst TM. Multilevel outcomes of economic stress: an agenda for future research. In *The role of the Economic Crisis on Occupational Stress and Well Being. Research in Occupational Stress and Well Being*. Edited by Perrewé PL, Halbesleben JRB, Rosen CC. Emerald Group Publishing Limited. 2012;10:43-86.
273. Aasland OG, Rosta J, Nylenna M. Healthcare reforms and job satisfaction among doctors in Norway. *Scandinavian journal of public health*. 2010;38(3):253-8.
274. Rosta J, Aasland O. Legers arbeidstid og tid til pasientarbeid i perioden 1994-2014. *Tidsskr Nor Lægeforen*. 16(136):1355-9.
275. Aasland O, Hagen TP, PE M. Sykehuslegenes syn på sykehusreformen. *Tidsskr Nor Lægeforen*. 2007;127:2218-21.
276. Aasland O, Førde R. Legers faglige ytringsfrihet. *Tidsskr Nor Lægeforen*. 2008;128:1838-40.
277. Fjeldbraaten EM. Mellom idealer og praksis: En casestudie av leger og sykepleiere i møte med reformer i spesialisthelsetjenesten. Kristiansand: E.M. Fjeldbraaten, 2010.
278. Tran BX, Van Minh H, Hinh ND. Factors associated with job satisfaction among commune health workers: implications for human resource policies. *Glob Health Action*. 2013;6:1-6.
279. Hinami K, Whelan CT, Wolosin RJ, Miller JA, Wetterneck TB. Worklife and satisfaction of hospitalists: toward flourishing careers. *J Gen Intern Med*. 2012;27(1):28-36.
280. Herzberg FI. *Work and the nature of man*. Cleveland, OH: World Book. 1966.
281. Warr P. *Work, unemployment and mental health*. Oxford, UK: Oxford University Press, 1989.
282. Unpublished reports from the Icelandic Medical Association and the Directorate of Health. 2014.
283. Price JL, Mueller CW. A causal model of turnover for nurses. *Acad Manage J*. 1981;24(3):543-65.

284. Manski CF. The use of intentions data to predict behavior: A best-case analysis. *J Amer Statist Assoc.* 1990;85(412):934-40.
285. Bertrand M, Mullainathan S. Do people mean what they say? Implications for subjective survey data. *Am Econ Rev.* 2001;91(2):67-72.
286. Gordon I, Molho I. Duration dependence in migration behaviour: cumulative inertia versus stochastic change. *Environ Plan A.* 1995;27(12):1961-75.
287. Böheim R, Taylor MP. Tied down or room to move? Investigating the relationships between housing tenure, employment status and residential mobility in Britain. *Scot J Polit Econ.* 2002;49(4):369-92.
288. Hann M, Reeves D, Sibbald B. Relationships between job satisfaction, intentions to leave family practice and actually leaving among family physicians in England. *Eur J Public Health.* 2011;21(4):499-503.
289. Mullan F. The metrics of the physician brain drain. *N Engl J Med.* 2005;353(17):1810-8.
290. Shortage in MDs Looming. Iceland review online 2010, June 21. <http://icelandreview.com/news/2010/06/21/shortage-mds-looming>.
291. Imminent collapse in Iceland's Healthcare System. Iceland review online 2011, July 18. <http://icelandreview.com/news/2011/07/18/imminent-collapse-icelands-healthcare-system>.
292. 66 lækna flytja burt árlega. *Fréttablaðið.* 22. September 2014, <http://www.visir.is/ExternalData/pdf/fbl/140922.pdf>.
293. Læknaskortur er viðvarandi. *Fréttablaðið.* 23. September 2014, <http://www.visir.is/laeknaskortur-er-vidvarandi/article/2014709239971>.
294. Ólason SK. Segja Ísland stefna í að verða krabbameinslæknalaust. 25. September 2014, <http://www.visir.is/segja-island-stefna-i-ad-verda-krabbameinslaeknalaust/article/2014140929374>.
295. Stilwell B, Diallo K, Zurn P, Vujcic M, Adams O, Dal Poz M. Migration of health-care workers from developing countries: strategic approaches to its management. *Bull World Health Organ.* 2004;82(8):595-600.
296. Kopetsch T. The migration of doctors to and from Germany. *J Public Health.* 2009;17(1):33-9.

297. Stilwell B, Diallo K, Zurn P, Dal Poz MR, Adams O, Buchan J. Developing evidence-based ethical policies on the migration of health workers: conceptual and practical challenges. *Hum Resour Health*. 2003;1(1):8.
298. Aasland O, Rosta J. The working hours of general practitioners 2000-2008. *Tidsskr Nor Laegeforen*. 2011;131(11):1076-80.
299. Rosta J, Aasland OG. Weekly working hours for Norwegian hospital doctors since 1994 with special attention to postgraduate training, work-home balance and the European working time directive: a panel study. *BMJ open*. 2014;4(10):e005704.
300. Dugdale DC, Epstein R, Pantilat SZ. Time and the patient-physician relationship. *J Gen Intern Med*. 1999;14(S1):34-40.
301. Bovier PA, Perneger TV. Predictors of work satisfaction among physicians. *The European Journal of Public Health*. 2003;13(4):299-305.
302. Halvorsen PA, Edwards A, Aaraas IJ, Aasland OG, Kristiansen IS. What professional activities do general practitioners find most meaningful? Cross sectional survey of Norwegian general practitioners. *BMC Fam Pract*. 2013;14(1):1.
303. Aasland O, Rosta J. Hvordan har overlegene det. *Overlegen*. 2011;1:47-55.
304. Sundquist J, Johansson S-E. High demand, low control, and impaired general health: working conditions in a sample of Swedish general practitioners. *Scandinavian journal of public health*. 2000;28(2):123-31.
305. Rosta J, Aasland OG. Work hours and self rated health of hospital doctors in Norway and Germany. A comparative study on national samples. *BMC Health Serv Res*. 2011;11:40.
306. Moen P, Yu Y. Effective work/life strategies: Working couples, work conditions, gender, and life quality. *Soc Probl*. 2000;47(3):291-326.
307. Geurts S, Rutte C, Peeters M. Antecedents and consequences of work-home interference among medical residents. *Soc Sci Med*. 1999;48(9):1135-48.
308. Sumanen M, Aine T, Halila H, Heikkilä T, Hyppölä H, Kujala S, et al. Where have all the GPs gone-where will they go? Study of Finnish GPs. *BMC Fam Pract*. 2012;13(1):121.
309. Lambert T, Goldacre R, Smith F, Goldacre MJ. Reasons why doctors choose or reject careers in general practice: national surveys. *Br J Gen Pract*. 2012;62(605):851-8.
310. Falkum E. Norwegian doctors today: Psychosocial work-environment and job satisfaction. In: Larsen Ø, editor. *The Shaping of a Profession: Physicians in Norway, Past and Present*. Canton, MA, USA, Science History Publications. 1996:481-90.

311. Aasland OG, Rovik JO, Wiers-Jenssen J. [Motives for choice of specialty during and after medical school]. *Tidsskr Nor Laegeforen*. 2008;128(16):1833-7.
312. Hsu K, Marshall V. Prevalence of Depression and Distress in a Large Sample of Canadian residents, interns, and fellows. *Am J Psychiatry*. 1987;144(12):1561-6.
313. Chan WC, Sunshine JH, Owen JB, Shaffer KA. US radiologists' satisfaction in their profession. *Radiology*. 1995;194(3):649-56.
314. Wilk SL, Sackett PR. Longitudinal analysis of ability-job complexity fit and job change. *Pers Psychol*. 1996;49(4):937-67.
315. Barnett RC, Gareis KC, Brennan RT. Fit as a mediator of the relationship between work hours and burnout. *J Occup Health Psychol*. 1999;4(4):307-17.
316. Carr PL, Gareis KC, Barnett RC. Characteristics and outcomes for women physicians who work reduced hours. *J Womens Health*. 2003;12(4):399-405.
317. Swaen GM, Kant I, van Amelsvoort LG, Beurskens AJ. Job mobility, its determinants, and its effects: longitudinal data from the Maastricht Cohort Study. *J Occup Health Psychol*. 2002;7(2):121-9.
318. Velde ME, Feij JA. Change of work perceptions and work outcomes as a result of voluntary and involuntary job change. *J Occup Organ Psychol*. 1995;68(4):273-90.
319. Ward AM, Kamien M, Lopez DG. Medical career choice and practice location: early factors predicting course completion, career choice and practice location. *Med Educ*. 2004;38(3):239-48.
320. Garibaldi RA, Popkave C, Bylsma W. Career plans for trainees in internal medicine residency programs. *Acad Med*. 2005;80(5):507-12.
321. Goldacre MJ, Turner G, Fazel S, Lambert T. Career choices for psychiatry: national surveys of graduates of 1974-2000 from UK medical schools. *Br J Psychiatry*. 2005;186(2):158-64.
322. Shanafelt TD, West CP, Poland GA, LaRusso NF, Menaker R, Bahn RS. Principles to promote physician satisfaction and work-life balance. *Minn Med*. 2008;91(12):41-3.
323. Kanter SL. Career guidance and the quality of the dialogue. *Acad Med*. 2011;86(2):149-50.
324. Davison I, Burke S, Bullock A, Brown C, Campbell C, Field S. Evaluation of a pilot careers advice service for junior doctors. *Med Teach*. 2006;28(6):561-3.

325. Higgins CA, Duxbury LE, Irving RH. Work-family conflict in the dual-career family. *Organ Behav Hum Decis Process*. 1992;51(1):51-75.
326. Rode JC, Rehg MT, Near JP, Underhill JR. The effect of work/family conflict on intention to quit: The mediating roles of job and life satisfaction. *Appl Res Qual Life*. 2007;2(2):65-82.
327. Bruck CS, Allen TD, Spector PE. The relation between work–family conflict and job satisfaction: A finer-grained analysis. *J Vocat Behav*. 2002;60(3):336-53.
328. Boles JS. Influences of work-family conflict on job satisfaction, life satisfaction and quitting intentions among business owners: the case of family-operated businesses. *Family Business Review*. 1996;9(1):61-74.
329. Karatepe OM, Kilic H. Relationships of supervisor support and conflicts in the work–family interface with the selected job outcomes of frontline employees. *Tour Manage*. 2007;28(1):238-52.
330. Yildirim D, Ayca Z. Nurses' work demands and work–family conflict: A questionnaire survey. *Int J Nurs Stud*. 2008;45(9):1366-78.
331. Langballe EM, Innstrand ST, Aasland OG, Falkum E. The predictive value of individual factors, work-related factors, and work–home interaction on burnout in female and male physicians: a longitudinal study. *Stress and Health*. 2011;27(1):73-87.
332. Dumelow C, Littlejohns P, Griffiths S. Relation between a career and family life for English hospital consultants: qualitative, semistructured interview study. *BMJ*. 2000;320(7247):1437-40.
333. Buddeberg-Fischer B, Stamm M, Klaghofer R. Career paths in physicians' postgraduate training - an eight-year follow-up study. *Swiss Med Wkly*. 2010;140:w13056.
334. Buddeberg-Fischer B, Stamm M, Buddeberg C, Bauer G, Hämmig O, Knecht M, et al. The impact of gender and parenthood on physicians' careers-professional and personal situation seven years after graduation. *BMC Health Serv Res*. 2010;10(1):40.
335. Verney RE. *The student life—the philosophy of Sir William Osler*. London: Livingstone; 1957.
336. Hertzberg TK, H S, R T, Aasland O, Rø KI. [The good doctor - strong and persevering]. *Tidsskr Nor Laegeforen*. 2016;136(19):1631-4.
337. Strech D, Persad G, Marckmann G, Danis M. Are physicians willing to ration health care? Conflicting findings in a systematic review of survey research. *Health Policy*. 2009;90(2):113-24.

338. Okeke EN. Brain drain: Do economic conditions “push” doctors out of developing countries? *Soc Sci Med*. 2013;98:169-78.
339. Mejia A. Migration of physicians and nurses: a world wide picture. *Int J Epidemiol*. 1978;7(3):207-15.
340. Benarroch M, Grant H. The interprovincial migration of Canadian physicians: does income matter? *Appl Econ*. 2004;36(20):2335-45.
341. Hobfoll SE. Conservation of resources: A new attempt at conceptualizing stress. *Am Psychol*. 1989;44(3):513-24.
342. Læknar í verkfall. *Laeknabladid*. 2014;11(100).
343. „Ekkert fordæmi fyrir verkfalli íslenskra lækna" - segir Sólveig Jóhannsdóttir framkvæmdastjóri Læknafélags Íslands. *Laeknabladid*. 2015;2(101).
344. Leone C, Conceição C, Dussault G. Trends of cross-border mobility of physicians and nurses between Portugal and Spain. *Hum Resour Health*. 2013;11(1):36.
345. Warr P. *Work, happiness, and unhappiness*: Psychology Press; 2011.
346. Snorradóttir MH, Arnar DO, Olafsson RF, Pálsson R, Indridason OS. [Patient satisfaction with care and interaction with staff in the Acute Cardiac Unit at Landspítali - The National University Hospital of Iceland]. *Laeknabladid*. 2014;100(7):385-90.
347. Ramirez A, Graham J, Richards M, Gregory W, Cull A. Mental health of hospital consultants: the effects of stress and satisfaction at work. *The Lancet*. 1996;347(9003):724-8.
348. Landsbergis PA, Schnall PL, Deitz D, Friedman R, Pickering T. The patterning of psychological attributes and distress by “job strain” and social support in a sample of working men. *J Behav Med*. 1992;15(4):379-405.
349. Munro L, Rodwell J, Harding L. Assessing occupational stress in psychiatric nurses using the full job strain model: the value of social support to nurses. *Int J Nurs Stud*. 1998;35(6):339-45.
350. Williams ES, Rondeau KV, Xiao Q, Francescutti LH. Heavy physician workloads: impact on physician attitudes and outcomes. *Health Serv Manage Res*. 2007;20(4):261-9.
351. Morrison D, Cordery J, Girardi A, Payne R. Job design, opportunities for skill utilization, and intrinsic job satisfaction *European journal of work and organizational psychology*. 2005;14(1):59-79.

352. Houdmont J, Kerr R, Addley K. Psychosocial factors and economic recession: the Stormont Study. *Occup Med.* 2012;62(2):98-104.
353. Gross R, Tabenkin H, Brammli-Greenberg S. Factors affecting primary care physicians' perceptions of health system reform in Israel: professional autonomy versus organizational affiliation. *Soc Sci Med.* 2007;64(7):1450-62.
354. Williams ES, Konrad TR, Scheckler WE, Pathman DE, Linzer M, McMurray JE, et al. Understanding physicians' intentions to withdraw from practice: the role of job satisfaction, job stress, mental and physical health. *Health Care Manage Rev.* 2001;26(1):7-19.
355. Klein J, Grosse FK, Blum K, Siegrist J, dem Knesebeck O. [Effort-reward imbalance, job strain and burnout among clinicians in surgery]. *Psychother Psychosom Med Psychol.* 2009;60(9-10):374-9.
356. Schaufeli WB, Salanova M, González-Romá V, Bakker AB. The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness studies.* 2002;3(1):71-92.
357. Warr P, Inceoglu I. Job engagement, job satisfaction, and contrasting associations with person–job fit. *J Occup Health Psychol.* 2012;17(2):129.
358. Shanafelt TD, Sloan JA, Habermann TM. The well-being of physicians. *Am J Med.* 2003;114(6):513-9.
359. Mechanic D. Physician discontent: challenges and opportunities. *JAMA.* 2003;290(7):941-6.
360. Hertzberg TK, Skirbekk H, Tyssen R, Aasland OG, Rø K. [The hospital doctor of today-still continuously on duty]. *Tidsskr Nor Laegeforen.* 2016;136(19):1635.