1. Relevance relative to the call for proposals

The aim of the current project is to investigate the interaction between exposure to objective stressors at work, employees’ subjective experience of the work environment, and sickness absence, in a large Norwegian health trust. Thus we focus on a core objective of the program; the interplay between work, the work environment, and health and sickness absence (page 3).

The project focuses on two potential stressors highlighted in the Norwegian Research Council’s Program for “Sickness absence, work and health”; work schedule (e.g. overtime, night shift and weekend shifts; page 6) and internal organizational change (page 9). Each stressor is to some extent regulated by managers, and their effect should therefore be of particular importance to managers interested in preventing negative health effects and increased absence.

An important contribution of the present project is to investigate how the employees’ experiences in the work environment mediates and/or moderates the relationship between the objective stressors and sickness absence. In line with the recommendation from the project plan (page 6) the project will focus on both positive and negative employee experiences, investigating both potential straining and health promoting experiences at work, such as job satisfaction and opportunity for growth.

The project represents a unique opportunity to combine records of the objective stressors, sickness absence and employee experiences from different sources, in a setting were we can compare exposure across units and over time. This allows us to investigate the relationship in a more profound way than in the current literature.

2. Aspects relating to the research project

2.1. Background and status of knowledge

The health and social sector suffers from Norway’s highest registered sickness absence, with both short and long term absence constantly above the national average (StatisticsNorway, n.d.-a). Several aspects of the working conditions in the sector are expected to be particularly straining, including stressors such as shift work outside of normal hours and a high frequency of organizational changes. The nature of patient care at a hospital requires staff around the clock, resulting in a high demand for manpower, also during night and weekend shifts. Political reforms, demographic changes and technological developments are among the factors which facilitates a high frequency of organizational change in Norwegian hospitals. In 2009, 23% of nurses reported experiencing an organizational change with a large impact on employees during the past 3 years, the highest proportion of any registered employee group in Norway (Aagestad et al., 2011; StatisticsNorway, n.d.-b).

Current literature supports that organizational change often leads to increased health problems and more frequent sickness absence (Westgaard & Winkel, 2011). Although the focus has often been on major episodic changes, there has also been support for negative effects from structural internal organizational changes such as merging and splitting of units (Bernstrøm & Kjekshus, accepted).

Similarly, empirical literature has supported that both the amount of hours worked, resting time between shifts and amount of irregular hours (e.g. night shifts and weekends) are related to employee health (Boggild & Knutsson, 1999; Geurts & Sonnentag, 2006; Puttonen, Harma, &
It is important to understand why these work factors affect employee health and sickness absence, and why some employees are affected more than others. More information on how the employees’ experiences of the work environment may mediate or moderate the relationship between the stressors and sickness absence might hold an important key to better answer these questions.

**Employee experience as a mediating factor.** The employees’ experiences acts as a mediating variable if the stressor causes alterations in the employees’ experiences of their work environment and those alterations affect employee health and sickness absence. Employees’ experiences are particularly relevant as a mediating variable between organizational change and health and sickness absence. Authors have argued that organizational change does not affect employee health and well-being directly (Robinson & Griffiths, 2005). In a qualitative study by Robinson and Griffiths (2005) employees reported negative changes to their work experience, such as increased workload and uncertainty, as the main source of stress during organizational change, not the change itself.

Studies have demonstrated that organizational change is often related to worsened employee experiences such as: increased demands, reduced control, and reduced justice (Kiefer, 2005; Robinson & Griffiths, 2005; Østhus, 2007), and that employee experiences is relevant for employee health during organizational change (Westgaard & Winkel, 2011). However, few studies have actually tested to what extent the changes in employees experiences can explain the reduced health and increased absence often observed after organizational change.

In line with motivational theories, studies on job change have indicated that the opportunities to learn and grow could also be an important mediating factor (Boswell, Shipp, Payne, & Culbertson, 2009) however such positive experiences have received less attention in studies of organizational change and other work stressors.

**Employee experience as a moderating factor.** The employees’ experiences acts as a moderating variable if the employees’ experiences of their work environment influences the strength or direction of the relationship between the stressor and sickness absence. While shift work, long hours, and organizational change have been related to negative health consequences and increased absence, the results are mixed (Boggild & Knutsson, 1999; Sparks et al., 1997; van der Hulst, 2003; Westgaard & Winkel, 2011). It is unlikely that all employees react to these stressors in a similar manner. More information on what moderates the relationship between the stressors and employee health outcomes is necessary to understand why some employees are affected more than others.

Again the focus of positive, health promoting aspects of work is likely important. The employees’ work environment experience may provide resources making employees more capable of handling possibly straining situations (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). The resources may influence how the employee appraises the situation and how they cope with situations appraised as threatening (Lazarus & Folkman, 1984). For example it is possible that a potential stressor, such as high working hours, is appraised as an opportunity by employees with high motivation, satisfaction and control and more as a threat by employees with lower satisfaction and control. Similarly, if employees’ face an organizational change appraised as threatening, being encouraged to participate might be an important resource for the employees to influence the process in a less threatening direction.

During organizational change support, employee control, participation, and experienced justice are examples of work environment factors expected to make employees more capable of handling possibly straining situations (Westgaard & Winkel, 2011). For employees working long hours and shift-work scheduling control has received particular attention and support; studies have also indicated that self- and group efficacy, and a straining psychosocial work environment might be moderating variables (Hughes & Parkes, 2007; Jex &
This is in line with the potential moderating effect of positive work experiences, such as job satisfaction and opportunity for growth, as many employees choose to work long hours because they experience the extrinsic and intrinsic rewards as high (Brett & Stroh, 2003).

**Sickness absence and sickness presence.** The focus of the current project is on sickness absence as an important indicator of employee health. Particularly medically certified long-term absence is regarded as a valid measure of health (Kivimaki et al., 2003; Marmot, Feeney, Shipley, North, & Syme, 1995). However, to thoroughly understand how stressors and employee experiences influence sickness absence and employee health, it is important to also account for the potential of sickness presence. Sick leave is when employees go to work despite of illness. A high occurrence of sickness presence will weaken the relationship between health and sickness absence (Aronsson, Gustafsson, & Mellner, 2011). Additionally, refraining from taking shorter periods of sickness absence when needed is expected to be related to an increased risk of serious health problems in the future (Gustafsson & Marklund, 2011; Kivimaki et al., 2005).

Both organizational change and long work hours have in some studies been related to no change or a reduction in sickness absence, interpreted as a sign of sickness presence (Ala-Mursula et al., 2006; Heponiemi et al., 2010; Magee et al., 2011; Vahtera et al., 2004; Voss, Floderus, & Diderichsen, 2001). During organizational change reduced job security is expected to increase the risk of sickness presence, sickness presence is therefore regarded as a particular challenge among employees working on temporary contracts (Heponiemi et al., 2010; Vahtera et al., 2004). For the relationship between long work hours and sickness presence, a high commitment to the job is likely to influence some employees to work longer hours and refrain from being absent for minor health complaints (Hansen & Andersen, 2008; van der Hulst, 2003). In this way both organizational commitment and job security can act as a moderating variable by weakening the relationship between health and sickness absence. Because the interpretation of the moderating effect is then substantially different from the variables expected to moderate the relationship between the stressor and health, we believe they deserve particular attention.

**Group Agreement.** When investigating the impact of employee’s experiences of the work environment, it is also relevant to investigate the importance of group agreement of those experiences. By group agreement we refer to the extent that there is consensus within a work group about their rating of experiences (e.g. do all employees agree that the work demands in their unit are high, or do they experience their environment differently from one another) (LeBreton & Senter, 2008).

Current literature has indicated that norms and culture can be important for individuals’ likeliness of being absent from work (Dale-Olsen, Nilsen, & Schøne, 2011; Ichino & Maggi, 2000; Mastekaasa, 2005). The studies support that the act of being absent occurs in a social process. To better comprehend the relationship between stressors, employee experiences, and sickness absence, it is therefore relevant to investigate the importance of group agreement. High agreement about negative experiences in the work environment, might increase the legitimacy of the individuals own experiences, strengthen them, and increase the likeliness of increased absence.

2.2.2. Approaches, hypotheses and choice of method

2.2.1. Theoretical Approach and Research Questions

The main objective of the current project is to investigate the interaction between exposure to objective stressors (namely organizational change, long work hours and shift work) employees’ experiences of the work environment, and sickness absence. The analytical idea of this project is that an understanding of employee health and sickness absence should focus on the interaction between the objective stressors in the environment and the employees’ own experiences of that environment. This is in line with Lazarus & Folkman’s (1984) transactional model of stress, which
emphasizes the importance of including employees own perceptions in an explanation of how stressors influence employees. The analytical model is presented in figure 1.

Current literature supports the relationship between the stressors and sickness absence, and between employee experience and sickness absence. A more unique and important contribution of the present study is the combination of objective stressors, employee experiences and sickness absence in the same project. The stressors, experiences and absence are all measured independently of each other, and in a longitudinal design. By investigating the interaction between the objective stressors, employee experiences and sickness absence over time the project aims to provide a better understanding of a complex relationship.

Several aspects of the employee experience are likely to be relevant to understand the relationship between stressors and sickness absence. In the present project we focus on job demands, control, participation, role clarity, role conflict and organizational justice. These are central variables in strain theories such as the demand-control model (Karasek, 1979; Karasek & Theorell, 1990), and job demand resource model (Bakker & Demerouti, 2007; Demerouti et al., 2001). In line with Schaufeli, Bakker, and Van Rhenen (2009) we agree that to further our understanding of occupational health, research needs to also include positive emotions and experiences in addition to the focus on stress and strain. We have therefore also included measures of job motivation, job satisfaction, and opportunity for growth.

Finally, to further understand the effect of the stressors and employees’ experiences on sickness absence we include organizational commitment and job security as attendance motivators. This is in line with absence theories, such as Steers and Rhodes (1978) Major Influences on Employee Attendance, which argues that an employee’s likelihood of attending work will be influenced by both the employee’s motivation to attend, and the employee’s ability to attend.

Based on these arguments we approach the projects research aim by focusing on the following research questions:

1a. How does internal organizational changes affect sickness absence?
1b. Does employee experiences of the work environment moderate or mediate this relationship?

2a. How does shift work affect sickness absence?
2b. Does employee experiences of the work environment moderate this relationship?

3a. How does work hours affect sickness absence?
3b. Does employee experiences of the work environment moderate this relationship?

Figure 1: Proposed causal pathway
4. How does the use of temporary contracts and organizational commitment influence the relationship between stressors and sickness absence?

5. How does group agreement about the employees’ experience of the work environment influence the relationship between stressors, work environment and sickness absence?

The PhD scholar will focus on internal organizational change as the stressor, replying to research question 1, as well as 4 and 5 with emphasis on organizational change as the stressor. UiO will have the main responsibility for research question 2. WRI will be responsible for research question 3, and question 4 and 5 with emphasis on work hours and shift as the objective stressor. However, collaboration between the participants, and with the advisory board, will be central for all research questions.

2.2.2. Data and method

An important contribution of the proposed project is the opportunity to combine records of the stressors, sickness absence and employee experiences from different sources, in a setting were we can compare exposure across units and over time. The ability to separate the objective stressor from the employees experience and sickness absence using different measures has been highlighted as an ideal, but often not possible, way of investigating stress in organization (Kristensen, 1996). We thereby reduce challenges such as same source bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We aim to utilize data from different organizational sources at Oslo University Hospital in 2011, 2012, 2013 and 2014. Oslo University Hospital is Norway’s largest health trust with more than 20 000 employees across 4 geographical locations. Below we have specified how the variables in this study will be measured.

Internal organizational change. The internal organizational change focused on in the present project is merging of units. Data will be collected from the yearly work environment survey. When the survey is conducted the employee answers are registered to the respective unit in the hospital structure. To be able to present each units history, the units are also matched across time by hospital administrators. The database does therefore provide an objective registry of units across time, also when they are merged.

Work hours and shifts. All hours worked, and what kind of shifts (i.e. night shifts, weekends, etc.) are registered for each employee. The register is used to calculate employees’ salaries, and should therefore be expected to be complete for all employees who receive compensation for overtime and shift work outside normal work hours.

Employee experiences. Employee experiences is measured using self-report. The data is gathered from the employee survey executed yearly by the health trust. Each variable is measured on a 5-point likert scale from “very rarely or never/completely disagree” to “very often or always/completely agree”. The items for control, role clarity, role conflict and organizational commitment are from QPS Nordic (Skogstad et al., 2001). The measure for participation has been developed from the leadership variable in QPS Nordic (e.g. are you encouraged to participate in important decisions?). The regional health trust has developed and tested the items for job demand (e.g. is your work pace straining?), organizational justice (e.g. my immediate supervisor act impartially and fairly when hiring and allocating tasks), job motivation (e.g. my work tasks engage me), job satisfaction (e.g. are you looking forward to go to work), and opportunity for growth (e.g. is it facilitated for the development of your skills).

Job security. The level of job security is in the present project operationalized as the use of temporary contracts in work units.

Sickness absence. Sickness absence is registered continuously by the health trust from day one of each absence spell. These objective records should therefore be regarded as accurate and complete compared to alternative measures such as self-reported absence. Self-certified and short-
long-term absence may be influenced by other factors than long-term absence (Kivimaki et al., 2003). The ability to separate absence with varying length will be an advantage. Analyses will therefore be conducted separately for number of short spells of absence (<4 days), medium spells (4-16 days) and long spells of absence (16+ days). Time before returning to work for those absent will be considered as an additional outcome measure.

**Unit of analyses.** Because several of the data sources are recorded at a group level, and this is how the data can be identified across time, the majority of the analyses will be done at an aggregated level. The data will then consist of approximately 1000 to 1400 units with on average 15-20 employees. Data will be aggregated to the work unit using averages (e.g. the average number of hours worked per employee, the average degree of job demands reported, etc.). Aggregating the data will necessarily imply a loss of information. However, such aggregated information might provide particularly interesting information for management practitioners and policy makers, focusing on group values rather than individual differences (Harter, Schmidt, & Hayes, 2002). For example group measures of work time will to a greater extent reflect organizational and group characteristics, such as overall work requirements, while individual measures might to a greater extent reflect choice or other individual characteristics, such as who is most fit to handle the extra hours (Bliese & Halverson, 1996). Measures will be taken to evaluate to what extent the different constructs are suitable for aggregation.

**Method of analyses.** The data is longitudinal in nature (i.e. the same units are measured repeatedly over time). To take the most advantage of such data, as well as control for the dependency inherent in such data, designs for clustered and panel data will be used. Particularly fixed effects analyses and random effects analyses will be considered (Rabe-Hesketh & Skrondal, 2008). Fixed effects methods focuses on within-unit variation, and thus control for all stable differences between units. The method is therefore well suited for situations where comparisons across units are less than ideal. Random effects also includes between-unit variation, and can be more suited when studying variables with less variation within units, as well as if dependence at multiple levels is expected.

Moderators are tested for by testing for significant interaction when executing the regressions. Mediators are tested for by testing if the hypothesized mediator is significantly related to both the dependent and independent variable, and if the inclusion of the expected mediator reduces or removes the significant relationship between the dependent and the independent variable (Baron & Kenny, 1986).

**Causality.** An important question in the current project is the question of causality. We need to be careful in drawing causal inferences from correlations. Utilizing the longitudinal data will be central in eliminating alternative explanations (e.g. using fixed effects to exclude stable confounding variables; using lags in time to determine which variable precedes which in time). Additionally a theoretical framework is essential to formulate a priori hypotheses and to secure a logical reasoning behind the proposed casual pathway (Pedhazur & Schmelkin, 1991). Nonetheless, caution will be taken when interpreting the findings; even though we might find support for an expected causal pathway, we cannot eliminate all alternative explanations.

### 2.3. The project plan, project management, organisation and cooperation

The project is interdisciplinary and a collaboration between relevant experts from the fields of psychology, political science, health science and sociology will be an essential part of the project. The project group will consist of two researchers, from the University of Oslo (UiO) and the Work Research Institute (WRI) at Oslo and Akershus University College of Applied Science, as well as one PhD position.

The PhD position will be supervised from, and enrolled in the PhD program at, the Medical faculty at UiO. The Institute for Health Management and Health Economics at the Medical faculty at Oslo University is a multidisciplinary university milieu providing both research and study programs within the fields of health policy, health economics, and health management.
The project will be headed by Lars Erik Kjekshus (UiO), associate professor at the Department of Health Management and Health Economics, Institute of Health and Society, and the leader of the research group Health Organisation, Management, and Ethics. Kjekshus is also the leader of HR-development at Oslo University Hospital. He has a background in political science and quantitative and qualitative research on effects of organizing in healthcare organizations. He has published several articles on health policy, mergers, leadership and organizing health care, and on sickness absence in Norwegian hospitals. Kjekshus has successfully supervised two PhD scholars and multiple master students. Kjekshus is also a board member of the Nordic Network for Healthcare Management Research (NOHR).

Researcher Vilde Bernstrøm (WRI) has a background in Organizational Psychology, and a PhD on the effect of organizational change on sickness absence in Norwegian hospitals. She has experience from working with sickness absence registries, employee surveys, and longitudinal data. She is also an editor at the Scandinavian Journal of Organizational Psychology.

The project will be organized with an advisory board consisting of international and interdisciplinary experts within the field. Professor Annika Härenstam at the University Gothenburg, Associate professor Eva Bejerot at Stockholm University, Assistant professor Inge Houkes at Maastricht University, Professor Per Øystein Saksvik at the Norwegian University of Science and Technology, Associate Professor Thomas Lorentzen at the University of Bergen, and Professor Espen Dahl at Oslo and Akershus University College will participate in the advisory board. The Board will actively participate in improving the quality of the project. It will participate in project meetings and comment on the project at least once a year. Additionally members of the Board will participate as co-authors on one or more of the papers.

2.4. Budget
The budget is presented in the grant application form.

3. Key perspectives and compliance with strategic documents

3.1. Compliance with strategic documents

The project is in compliance with the strategies of both involved institutions.

At the Department of Health Management and Health Economics, Institute of Health and Society, the effect of hospital organization and management is a core research focus, and the Institute is planning an increased focus on public health.

The Work Research Institute (WRI) conducts research pertaining to different dimensions of peoples working life, industrial relations, work organizations and cultures, and different changes and challenges related to the labor market and in the labor market policy. Studies focusing on the effect of working conditions and the work environment on sickness absence will complement and further develop this research. The project will contribute to WRIs ambitions to become a leading working life research institution in Europe.

3.2. Relevance and benefit to society

The project focuses on stressors that are to a great extent regulated by managers. Better knowledge of how they affect sickness absence, why they affect sickness absence, and why they affect some employees and not others could be important to make more informed decisions. Particularly decisions relating to what to expose employees to, and how to best target stress preventive measures when employees are exposed to stressors. For managers to be able to take more informed decisions with respect to employee health and sickness absence would be beneficial for the organization, the employees and society as a whole.

3.3. Environmental impact
The project does not raise any environmental issues.

3.4. Ethical perspectives
The project will entirely rely on data from hospital records (e.g. from employee surveys to sickness absence records). Ethical considerations concern particularly the handling and use of these data. Ensuring anonymity will be essential. Handling and analysing data in aggregated form and ensuring adequate unit size will be instrumental in this respect.

The data will be made available to us by the hospital, however the appropriate ethical approvals will need to be granted before handling the data (e.g. from the Norwegian Data Protection).

3.5. Gender issues (Recruitment of women, gender balance and gender perspectives)
The project group and the expert group are balanced in terms of gender, and maintenance of gender balance and recruitment of women will be taken into consideration when recruiting for the PhD position. Because we focus on a female dominated sector with great variation in gender distribution between units the role of gender will be one of several relevant factors that will be discussed in relation to the study findings.

4. Dissemination and communication of results

4.1 Dissemination plan
The results of the proposed research will be disseminated to reach four different target group; fellow researchers, managers and policymakers in general, health care managers, and students.

1. The results will be disseminated to fellow researchers through participation with oral or poster presentations at international conferences and through publications in minimum 8 international peer reviewed journals. Open access journals will be given preference to make the findings more accessible.

2. The results will be disseminated to managers and policymakers through publications in popular science platforms, such as forskning.no, contact with media, and presentation at AFI-forum, WRI’s own seminar arrangement designed to present recent research from WRI to external researchers, policy makers and user groups.

3. To reach health care managers the findings and practical implications of the project will be published in a digital pamphlet (power-point format) to be distributed to all health trust, additionally the health trusts in the region will be offered an oral presentation.

4. Finally, relevant findings will be included in education given at Institute for Health Management and Health Economy as part of health management and leadership classes.

4.2 Communication with users
The most central user group of the current project is managers and health care managers in particular. Via the project manager’s involvement at Oslo University Hospital the project will secure strong ties to the largest health trust in the region, which will be central in facilitating a two-way communication through meetings and more active collaboration throughout the project.

5. References


Bernstrom, V. H., & Kjekshus, L. E. (accepted). The Effects of Organizational Change Types and Frequencies on Long-term Sickness Absence in Norwegian Hospitals. *Journal of Nursing Management*


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