

# **Women's sickness absence in contemporary Norway**

## **The impacts of class, motherhood, and pregnancy**

**Anja Maria Steinsland Ariansen**



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Department of Sociology

Faculty of Social Sciences

University of Bergen

## Abstract

It is well known that in many countries, women have higher levels of sickness absence than men. In spite of several attempts to explain this gender gap in Norway, it is not very well understood. This thesis contributes to this research field by investigating the impact of class, and class specific impacts of motherhood and pregnancy on Norwegian women's sickness absence.

Women's heightened level of sickness absence is important for several reasons. First, it may indicate that relative to men, women still face obstacles which should be prevented in order to facilitate gender equality in the labor market. This is in turn important for women's financial independence. Second, women's heightened sickness absence makes them more prone to accusations in the heated public debate about the costs of sickness absence. Third, any possible prospective retrenchments of sickness benefits will affect women to a larger degree than men. Such retrenchments are frequently addressed in the public debate.

However, women's heightened sickness absence should also be considered in the light of other characteristics of the Norwegian society. In particular, Norway has succeeded in combining high levels of female employment and fertility. In this context, it seems reasonable to question if the higher rates of sickness absence among women may be a precondition for preventing labor market exclusion of women during periods of strain and family obligations. If so, women's heightened sickness absence may reflect that women's experiences and life courses differ fundamentally from those of men's, and that gender equality in sickness absence may be neither realistic nor desirable.

In other words, a better understanding of the complex mechanisms behind women's sickness absence is important in order to ensure a sound development of sickness absence prevention policies. Although the political concerns associated with women's sickness absence make this

topic relevant for a wide audience, there is also a risk that the dominant perception of sickness absence in society too strongly influences the research questions and interpretations of findings in scientific research on this topic. In order to establish a more nuanced understanding of sickness absence than what is presented in the media, this thesis draws on sociological literature on class, gender, welfare, and the life course. This literature has also guided the empirical investigations.

Inspired by literature on gender and the life course, the theoretical starting point of this thesis is that Norwegian women's sickness absence must be considered in the light of the substantial social changes which have occurred in the Norwegian society since the 1970s. During this period, the social services have been substantially expanded, which has brought about creation of new occupations. Many of those have been female dominated. This development has brought about considerable sociological debate about the relationship between inequalities in contemporary welfare states and the class differentials of industrial societies. Also, it has been discussed whether the traditional class schemes accounts for the particular occupational structure among women. In this context, new and revised class schemes have been presented to better account for women's occupations.

Further, women's level of education and employment has grown sharply, while men spend increasingly more time on household chores and child care. Still, the extent of these changes varies across social classes. Part-time employment is still widespread among working class women, and working class couples have a more traditional division of domestic work than middle class couples do. In contrast, the gender roles have converged more strongly in the middle class, where long working hours has become common among both genders, and men contribute substantially to domestic work. Because middle class women pursue higher education and an occupational career, postponement of pregnancy has become increasingly common in this group.

In the light of these changes, it seems relevant to ask if women's sickness absence is influenced by the current class structure and its interplay with pregnancy and motherhood in the contemporary Norwegian society. Still, this question has received little attention in previous research.

This thesis contributes to filling this gap. Article 1 provides empirical analyses of The Norwegian Level of Living Survey, and revealed that although statistically significant class differentials in sickness absence were found, controlling for class did not lead to any substantial improvement of the model, regardless of which of the four different class scheme that was used. Articles 2-4 were based on the population registry "FD-Trygd". Article 2 investigated the impact of motherhood on sickness absence among married women. Although motherhood did not increase the risk of sickness absence neither in the middle class nor working class, it entailed prolonged spells in both groups, although the increase was particularly strong among working class women. Article 3 found that although sickness absence during pregnancy has increased since the early 90s, this development was not due to the fact that postponement of pregnancy has become increasingly common among highly educated women. Finally, Article 4 revealed that occupational class accounts for the increased sickness absence among pregnant women in their early twenties, but only among first-time pregnant women. Article 1, Article 3, and Article 4 have been published in peer reviewed journals.

To summarize, the empirical findings of the articles suggest that even though class does not have a strong direct impact on women's risk of sickness absence, the impact of both motherhood and pregnancy on women's sickness absence is highly class specific. Both motherhood and pregnancy entailed heightened sickness absence among working class women, while postponement of pregnancy – which particularly applied to middle class women - was not associated with higher sickness absence. This conclusion further supports

previous literature which has highlighted the need for combining class analyses with a life course perspective in order to fully account for the complex structure of inequality in contemporary welfare states. Further, the findings of the thesis indicate that future research should aim to illuminate both the risk of sickness absence and the number of sick days, as these are differently influenced by class and motherhood. However, the exact measure of women's class seems to be of secondary importance in sickness absence research.

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## 1. Introduction

In this thesis, I investigate how women's sickness absence in contemporary Norway is influenced by their class position and its interplay with motherhood and the timing of pregnancy. Several factors speak in favour of this scope.

Persistent or increasing gender differences in sickness absence have been documented in several European countries (Angelov et al., 2011: 6), and this is also the case in Norway. If anything, the gender gap in sickness absence has widened rather than narrowed over the last few decades, but the extent of this development is currently being debated (Ariansen and Mykletun, 2014; Kostøl and Telle, 2011; Mastekaasa, 2012c; Nossen and Thune, 2009).

Previous research has attempted to explain Norwegian women's increased sickness absence in terms of health (Smeby et al., 2009), gender-segregated labour markets (Mastekaasa, 1990; Mastekaasa and Dale-Olsen, 2000; Mastekaasa and Olsen, 1998), gender-specific attitudes (Mastekaasa, 2005), and the strain of combining work and family (Bratberg et al., 2002; Mastekaasa, 2000; Mastekaasa, 2012a), but the gender differences in sickness absence remain unexplained (Mykletun and Vaage, 2012).

However, a recent report suggests that women's greater sickness absence should be understood in terms of a wide range of factors, including biological, psychological and social differences between women and men (Ose et al., 2014). In most European countries, women suffer from more health complaints than men (Olsen and Dahl, 2007: 1627). In addition, women live longer than men, and scholars have suggested that gender differentials in health and life expectancy probably partly reflects biological factors, although the possible impact of gender-specific behaviours and self-reporting bias should also be considered (Oksuzyan et al., 2008). This emphasis on the multidimensionality of differences between women and men can be elaborated further by examining Fraser's feminist perspective, which suggests that

investigating gender equality simply by comparing men and women according to specific parameters fails to acknowledge that women's and men's life cycles and experiences differ fundamentally (Fraser, 1994: 597).

In line with this argument, one might ask whether Norwegian women's consistently higher sickness absence necessarily indicates that gender equality has yet to be achieved or, to the contrary, that such a difference reflects excessive gender equality in terms of rising female employment, political participation and educational attainment, which implies "treating women exactly like men according to male-defined standards, and that this necessarily disadvantages women" (Fraser, 1994: 598). This perspective implies that the comparison of women's and men's sickness absence exemplifies the evaluation of women according to a male standard and highlights the possibility that women's greater sickness absence reflects the fact that their situations and lives may differ substantially from those of men. Thus, to account for possible gender-specific explanations of differences in sickness absences, this theoretical viewpoint suggests the investigation of risk factors that are specific to women, and it has inspired this thesis.

Previous research on class, welfare and health inequality highlights the particularity of women's occupational structures (Annandale and Hunt, 2000: 9; Esping-Andersen, 1993; Esping-Andersen, 1999: 5; Messing et al., 2003; Oesch, 2006), suggesting that some measures of class are better suited than others for investigating women's sickness absence. Although it seems reasonable to assume that the impact of pregnancy and motherhood on sickness absence varies according to class, this has not been investigated. Gender and class are both central concepts in sociology, but the interplay between them has received little attention in previous sickness absence research.

In addition, advocates of theoretical approaches such as the life course perspective and the literature on welfare regimes and gender emphasize the need to consider the impact of pregnancy and motherhood when investigating gender differences (Boje and Leira, 2012; Smithson et al., 2013). Consistent with this, pregnancy and motherhood are considered to be highly relevant for understanding gender differences in sickness absence (Alexanderson et al., 1996; Bratberg et al., 2002; Mastekaasa, 2000; Sydsjo et al., 2003).

Over the past few decades, patterns of class, pregnancy and motherhood have been tightly interconnected in Norway, which emphasizes the need to understand how the interplay of these factors influences women's sickness absence. The occupational structure has changed because the development of the Norwegian welfare state has created new service sector occupations at various hierarchical levels (Esping-Andersen, 1993: 72). This development coincided with trends toward the postponement of pregnancy (Lappegård and Rønsen, 2005) and increased gender equality, especially in the middle class (Crompton and Lyonette, 2007; Ellingsaeter et al., 1997; Esping-Andersen, 2009; Kitterød and Lappegård, 2012). These patterns are interconnected because couples' educational and occupational pathways are linked to both gender equality in the household (Bernhardt et al., 2008) and the timing of pregnancy (Lappegård and Rønsen, 2005; Mills et al., 2011). Nevertheless, these changes have received little attention in previous research on women's sickness absence.

In this thesis, I first investigate whether the magnitude of differences in women's sickness absence in Norway varies substantially according to different class schemes. Then I examine whether (and, if so, how) occupational class interacts with recent patterns of motherhood and pregnancy in ways that shed light on women's sickness absence.

It seems reasonable to expect that working-class women in general have more sickness absence than middle-class women because of the latter group's more favourable working

conditions. However, the question of whether class differences in sickness absence vary substantially according to different class schemes is less clear.

Furthermore, it seems reasonable to expect that motherhood increases sickness absence more for working-class women than for middle-class women, partly because traditional gender roles are more common among working-class couples, and partly because working-class mothers have fewer accommodations at work.

Finally, the question of how class and pregnancy relate to sickness absence is also ambiguous. On the one hand, the postponement of pregnancy has become increasingly common among Western women in general, which could lead to more sickness absence during pregnancy because higher maternal age is associated with increased risks of adverse health outcomes. This trend is more pronounced among middle-class women than among working-class women, which, in turn, could lead to more sickness absence in the former relative to the latter group. On the other hand, middle-class women still occupy positions that are less physically demanding and that offer more employee flexibility than do working-class women, which could mean that increased sickness absence during pregnancy is more likely to be a working-class phenomenon.

The empirical investigations in this thesis consist of quantitative analyses of The Norwegian Level of Living Survey and the FD-Trygd. I used the class scheme of Erikson, Goldthorpe, and Portocarero (Erikson et al., 1979) to measure stratification in three of the four articles. Because of limitations in the data set, education was used as a proxy for class in the third article.

### **1.1. Socio-political background**

Mandatory sickness insurance for low-income workers was introduced in Norway in 1909. The insurance provided economic support during periods of sickness absence and covered

medical care for employees and their families. However, the insurance did not cover the cost of medicines, and the poorest group of workers were not covered (Seip, 1994: 198). In the intervening decades, the insurance was extended to an increasing number of occupations (Seip, 1994: 203-5).

Initially, the employee paid about 60% of the insurance premium, with the remaining 40% covered by the employer, the municipality and the state (Seip, 1994: 198). The insurance premiums and the payouts were assessed according to income, and because workers in the most privileged occupations had a lower risk of sickness, they received better terms for their insurance. Starting in 1938, the insurance scheme was gradually adjusted towards more equal economic distribution between the classes (Seip, 1994: 203). An increasing number of employees paid for their own insurance, and the insurance was made mandatory for all employees in 1953. The insurance was voluntary for self-employed workers until 1970 (Seip, 1994: 201-6).

In 1978, the sickness benefit became a public welfare benefit. Since then, earnings below a given amount have been fully compensated in cases of sickness absence, and brief sickness absences were allowed without a doctor's certification (Seip, 1994: 206). This amendment was based on the idea that all employees and their families should be protected against poverty during periods of illness, regardless of the employee's occupation (Hagelund, 2014: 37). However, paid employment was a precondition for the sickness benefit, and thus women who were not paid for their work in the household received no economic compensation during periods of illness (Seip, 1994: 201-6).

Since 1978, Norwegian employees have received full compensation for earnings up to a given amount<sup>1</sup> during periods of sickness absence (Hagelund, 2014: 13; Seip, 1994: 206). Currently, the employer covers the first 16 calendar days, with the remaining periods of up to one year covered by the National Insurance Scheme (NIS) (NOU, 2000: 217; OECD, 2013: 37). The public costs to cover sickness absence have increased substantially since the 1978 amendment. This is attributable partly to longer periods of sickness absence and partly to higher wages and employment rates (Hagelund, 2014: 45). The increasing public costs for sickness absence in Norway have coincided with increasing public costs associated with changing demographics. Ageing populations have brought about increased public costs for prolonged periods when people are collecting pensions and requiring health services in most Western welfare states (Cappelen, 2011: 100; Esping-Andersen, 2009: 147). These increasing public expenses have made the generous sickness benefit the centre of a heated, political debate for many years (Hagelund, 2014: 11; Hatland, 2011: 122). The view that the generous sickness benefit is associated with unnecessarily high sickness absence rates and substantial public costs has been supported by the OECD (OECD, 2007), but this issue is still subject to considerable public and political debate (Hagelund, 2014).

One of the most influential measures to reduce the costs of sickness absence in Norway has been a contract, the “Intentional agreement for a more inclusive work life” (AAD, 2001), which attempts to reduce sickness absence without reducing the sickness benefit. The contract was established in 2001 and has been renewed twice since then. It involves central organizations in the labour market, such as the Norwegian Confederation of Trade Unions

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<sup>1</sup> According to the National Insurance Act [Lov om folketrygd] § 8–10, the compensation for wage loss due to sickness absence has an upper limit equal to 6 basic units of the National Insurance in the current year. In 2014, this limit amounts to NOK 523,968, or about EUR 64,519. If the employee’s salary exceeds this value, the employer is allowed to cover the gap so that the employee still receives full compensation for his or her salary.

(LO), the Confederation of Norwegian Enterprise (NHO; an employers' organization), and the government. However, in 2006, the desired results failed to appear, and in spite of the agreement, the government initiated changes that would require employers to cover part of the sickness benefit for long periods. Following massive political opposition from the LO and the NHO, these changes were not implemented (Hagelund, 2014: 77).

Although the current government has not announced any imminent retrenchment of the sickness benefit, the costs of sickness absence are still subject to public debate, and recently these debates have emphasized women's sickness absence (Hustad, 2012; Isaksen, 2012; Mastekaasa, 2012b; Wergeland, 2011). In the public debates, gender differences in sickness absence have been seen partly as the result of gender differences in working conditions and in division of unpaid work. However, the possible impact of gender-specific norms has also been discussed, and women have been accused of having a lower threshold for sickness absence (Hagelund, 2014: 80).

## **1.2. Sickness absence – an interdisciplinary research field**

The distinction between illness, disease, and sickness is useful to highlight how sickness absence relates to other aspects of ill health. Illness refers to subjective health problems, whereas disease is assessed by medical personnel. Sickness, however, refers to how ill health of any kind affects social life, and sickness absence is one example of this (Wikman et al., 2005).

Previous studies have highlighted the close links between sickness absence and health and mortality (Kivimäki et al., 2003; Marmot et al., 1995), suggesting that sickness absence should be seen as a measure of health. However, later contributions have emphasized that sickness absence is influenced by several factors other than health, and these factors are easily overlooked if we focus exclusively on the health dimension (Wikman et al., 2005). This

consideration received further nuance in a recent report on gender differences in sickness absence in Norway, which maintains that gender differences in illness and disease should not be underestimated when investigating gender differences in sickness absence (Ose et al., 2014). In line with these considerations, sickness absence is not understood as a direct measure of health in this thesis; rather, it is seen as the result of several different factors, including health, social factors, and the interplay between them.

As early as 1962, Ås called for theories that could capture the complexity of sickness absence (Ås, 1962). Since then, different disciplines have developed different explanatory models, and medicine, psychology, economics, and sociology have made considerable contributions (Alexanderson et al., 2003)<sup>2</sup>. These explanatory models can be regarded as middle-range theories—that is, theories characterized by a limited scope that makes them well suited for deriving hypotheses for closer investigation (Merton, [1949] 2008: 448).

Previous medical research on women's sickness absence has focused on diagnoses that occur more frequently among women than among men, and researchers have discussed whether these patterns are due to social factors, biological factors, or gender specific ways of perceiving certain symptoms (Feeney et al., 1998: 97). Social inequalities in sickness absence is also an important topic in the medical approach to this subject (Alexanderson et al., 2003: 71-72). A recent study found that among Norwegian women, about 31–54% of the social inequalities in sickness absence was accounted for by the physical and psychosocial environments (Sterud and Johannessen, 2014).

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<sup>2</sup> Of course, this description of discipline-specific contributions to sickness absence research is somewhat simplified. In practice, research areas for the various disciplines overlap, and it can be difficult to locate a study in a particular discipline. One example is the study by Bratberg E., Dahl S.A. and Risa A.E. (2002) 'The double burden' - do combinations of career and family obligations increase sickness absence among women? *European Sociological Review* 18: 233-49. The article was written by a sociologist and two economists, and published in a sociological journal.



Psychological research on gender differences in sickness absence has revealed that psychological characteristics that are more common to women are associated with heightened sickness absence (Evans and Steptoe, 2002). A Norwegian study found that as compared to depression, anxiety was more strongly associated with sickness absence (Knudsen et al., 2013).

From an economic perspective, sickness absence is seen to be influenced by economic calculations (Alexanderson et al., 2003: 73). According to this view, patterns of sickness absence reflect the gains and costs associated with sickness absence for employees in different situations (Allebeck and Mastekaasa, 2004: 42). Consistent with the economic perspective, the OECD recommends a retrenchment of the Norwegian sickness benefit, because the generosity of the benefit is thought to inhibit labour market participation (OECD, 2007).

In contrast, a sociological approach often implies that sickness absence is influenced by characteristics of the society (Alexanderson et al., 2003: 72-3). Previous research from this perspective on sickness absence in Norway has focused on the impact of occupational characteristics on gender and class differences in sickness absence (Hansen and Ingebrigtsen, 2008; Mastekaasa and Dale-Olsen, 2000) and on the impact of family obligations on women's sickness absence (Mastekaasa, 2000; Mastekaasa, 2012a; Ugreninov, 2012).

Although sociological research tends to see sickness absence in the light of societal characteristics, economic perspectives tend to view it as substantially influenced by the individual's choice (Kolberg, 1991: 92-3). This suggests that sickness absence research in the social sciences has been dominated by what one might call a push-pull dichotomy. The push perspective ("*utstøttingsmodellen*") emphasizes the fact that employers downsize and impose high demands on workers to ensure the competitiveness of their firms in a capitalistic economy, and these actions may increase sickness absence. The pull perspective

(“*attraksjonsmodellen*”), in contrast, emphasizes that sickness absence is influenced by the employee’s rational calculations, which implies that a generous sickness benefit contributes to increased sickness absence (Kolberg, 1991: 91-3). The two perspectives have a strong emphasis on economic calculations in common, although the push perspective highlights the importance of the employers’ economic calculations, whereas the pull perspective sees the economic calculations of the employee as more decisive (Hansen, 1998: 81). However, these models have paid little attention to the particularities of women’s life courses relative to those of men’s life courses, which is required to investigate women’s sickness absence. To account for these differences, the following theoretical section starts with a short introduction to the central concepts of the life course perspective, which are useful for shedding light on patterns of pregnancy and motherhood in contemporary Norwegian society.

### **1.3. Motherhood and pregnancy in a life course perspective**

The life course approach considers creation of one’s own household, entry into the labour market, having children, and re-entering or exiting employment in later life, as highly relevant topics for welfare state arrangements (Anxo et al., 2010: 7). Traditionally, the life course approach has been associated with the idea that life course transitions are increasingly replacing social stratification as the key dimension of inequality (Kohli, 2009: 66). In this way, the life course approach differs from feminist perspectives, which often combine class and gender perspectives on parenthood (for examples, see Crompton, 2006a; Duncan, 2005; Duncan and Irwin, 2004; Hoffman and Youngblade, 1998; Stefansen and Farstad, 2010). However, several scholars have recently highlighted the need to combine the life course approach with more traditional stratification perspectives rather than seeing them as mutually exclusive approaches (Amato and Previti, 2003; Andres and Adamuti-Trache, 2008; Anxo et al., 2010: 5; Elo, 2009; Esping-Andersen, 2009; Kohli, 2007: 267; Macmillan, 2005: 10; Nilsen et al., 2012: 3; Palloni and Milesi, 2006; Pensola and Martikainen, 2004).

This development is echoed in the outline of this thesis, but whether women's sickness absence is primarily associated with certain vulnerable life phases such as motherhood and pregnancy and whether this implies that class is not particularly relevant—these are empirical questions. In the course of investigating these research questions, two theoretical concepts from the life course approach have been particularly useful: “Lives and historical time” and “The timing of life” (Elder, 1994: 5-6).

The term “Lives and historical time” refers to the fact that people's lives are influenced by previous and current historical circumstances, and they should be understood in the light of relevant social changes (Elder, 1994: 5). “The timing of life” suggests that the influence of any incident in an individual's life must be seen in the light of the individual's other experiences before and after the incident (Elder, 1994: 6). In this thesis, both of these terms are used to emphasize that recent social changes in educational expansion and female employment present women in contemporary Norway with challenges and opportunities during periods of family building that differ from those of previous generations of mothers.

In addition, “Lives and historical time” invokes awareness about the changing occupational structure, which is associated with the development of the welfare state. In the past few decades, the expansion of services by the Norwegian welfare state has led to the employment of an increasing number of women to provide these additional services (Birkelund and Petersen, 2010: 145). The changing characteristics of the positions that women occupy in the labour market may influence their sickness absence directly, or through interactions with pregnancy and motherhood. Increased female employment during the same period also implies that mothers are working longer hours (Kitterød and Rønsen, 2013: 19), which might increase work–family conflicts. However, men have also increased their participation in unpaid domestic work and child care to some extent (Kitterød and Rønsen, 2013: 19; Vaage, 2012: 5). In this context, it is also worth noting that the reversal of gender roles is greatest

among highly educated couples, which implies that less educated women are more likely to work part-time (Kitterød, 2005: 20).

“The timing of life” concept can help us to understand how the trend towards higher education often leads to the postponement of a woman’s first pregnancy, especially among highly educated women (Lappegård and Rønsen, 2005). This delay may be particularly relevant for sickness absence among pregnant women in more than one way. On the one hand, the postponement of pregnancy is associated with increased health risks (Dekker and Sibai, 2001; Dildy et al., 1996; Duckitt and Harrington, 2005). On the other hand, postponement of pregnancy is especially common among women with higher education (Lappegård and Rønsen, 2005), which might imply that these women also have less physically demanding occupations.

In research on women’s sickness absence, the life course approach to women’s life courses may fruitfully be supplemented with feminist literature on work and welfare, which highlights how women’s life courses relate to welfare arrangements, such as the Norwegian sickness benefit.

#### **1.4. Gender and welfare**

The distinction between biological and social differences between women and men is highlighted in gender research through use of the terms *sex* and *gender*, where *sex* refers to biological differences between women and men, and *gender* refers to the ways in which the sexes are socially presented and negotiated through patterns of behaviour (West and Zimmerman, 1987: 127). In health research, the distinction between sex and gender is traditionally associated with theories that highlight the importance of women’s roles in understanding their health (Annandale and Hunt, 2000: 28), a focus that is clearly closely related to the topic of this thesis. However, the sex–gender dichotomy is also associated with

the idea that health differences between women and men are mainly the result of the patriarchal suppression of women (Annandale and Hunt, 2000: 1-2). This position has been challenged by various perspectives that highlight the diversity within each gender and the interplay between biological and social conditions (Annandale and Hunt, 2000: 28). The understanding of women's sickness absence in this thesis is inspired by this opposing perspective in two ways. First, the general focus of the thesis is on the differences between women of different classes and different life situations. Second, the thesis includes specific examinations of how the sickness absence of pregnant women can be understood as the product of the interplay between social and biological factors. Although this thesis touches upon biological issues, the term *gender* is preferred over *sex*, because it reflects the main focus of the thesis, the social aspects of sickness absence. However, this terminology no longer implies that gender differences are the result of the patriarchal suppression of women.

To study the relationship between gender and welfare, we must understand the particularities of the Norwegian welfare state. In Norway, female employment grew rapidly from the 1960s until 2010 (Chafetz and Hagan, 1996; Vaage, 2012: 72). In 2013, 66.1% of all Norwegian women between 16 and 74 years old were employed, whereas the corresponding number for men was 71.2%<sup>3</sup> However, up to 39.8% of female employees worked part-time, but only 14.1% of males did so<sup>4</sup>. In addition, the Norwegian labour market has traditionally been characterized by strong gender segregation, which can be seen in two ways. First, women and men have tended to work in different occupations; and second, women have occupied higher-ranking positions less often than men (Birkelund and Petersen, 2010: 146-7). However,

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<sup>3</sup> Source: The online databank of Statistics Norway [<https://www.ssb.no/statistikkbanken/>]. Employment rate: «Tabell: 03781: Sysselsatte, etter kjønn og alder».

<sup>4</sup> Source: The online databank of Statistics Norway [<https://www.ssb.no/statistikkbanken/>]. Part-time employment: «Tabell: 09790: Sysselsatte 15–74 år, etter kjønn, yrke og avtalt/vanlig arbeidstid».

a recent study concluded that these features have changed somewhat since the mid 1990s, primarily because women are increasingly entering areas traditionally dominated by men, including management (Ellingsaeter, 2013). Further, the gender segregated labour market does not fully account for the gender differences in sickness absence, because such differences occur even among employees who work in similar occupations (Mastekaasa and Olsen, 1998).

Similar to other Nordic countries, Norway has a high level of female employment (Sørbø, 2006). However, Norway has differed from the other Nordic countries for quite some time with respect to norms of motherhood and child care (Sümer, 2009: 52). Until recently, the number of kindergartens in Norway was limited, whereas mothers who stayed home to care for their children received public support (Sümer, 2009: 52). However, the government expanded the number of kindergartens over the last decade, and in 2010, almost nine out of 10 Norwegian children aged 1–5 years attended kindergarten (NOU, 2012: 100).

Egalitarian values are evident in Norway (Skarpenes and Sakslind, 2010), which is reflected by limited differences in income (Wilkinson and Pickett, 2010) and the high level of financial redistribution of the Norwegian welfare state (Esping-Andersen, 1990: 93; Kuhnle and Kildal, 2011: 19). Egalitarian values are relevant to processes of gender equality. In less egalitarian societies, such as the U.K. and the U.S., outsourcing domestic work as a way to reduce work–family conflict is acceptable, although it is mainly middle-class couples who can afford to do so (Lyonette and Crompton, 2014). In Norway, however, the outsourcing of domestic work has long been uncommon (Crompton and Lyonette, 2007; Kitterød, 2002), partly because such outsourcing is rather expensive (Lipsey and Swedenborg, 2010: 416). However, a recent study also indicates that such outsourcing has not been very legitimate in Norway because of social norms of egalitarianism, but these norms are now changing, and outsourcing is becoming more socially accepted (Sollund, 2010). Although domestic outsourcing has been

rather uncommon until recently, men have been doing more child care and domestic work in the past few decades, especially middle-class men (Crompton and Lyonette, 2007: 121; Kitterød and Rønsen, 2013: 4). However, less egalitarian countries have seen somewhat different trends. In the U.S. and the U.K., the outsourcing of domestic work has become very common in the middle class, but working-class men have shown the greatest increase in domestic work (Lyonette and Crompton, 2014; Sullivan, 2000; Usdansky, 2011).

A central concept in the literature on gender and welfare is *decommodification*, which refers to welfare arrangements that ensure the financial safety of the individual by providing him or her with welfare benefits if his or her income from the labour market is disrupted (Esping-Andersen, 1990: 41). Norway is one of several social democratic welfare states, which are characterized by a high level of decommodification, and the Norwegian sickness benefit is a typical example of this concept.

The concept of decommodification has been criticized for focusing solely on how state compensation of interrupted earnings affects class relations: it fails to recognize that such policies also impact gender differences, including the division of paid and unpaid work (Lewis, 1992; Orloff, 1993; Taylor-Gooby, 1991). According to Orloff, a gender-sensitive analysis of welfare states implies that women's economic independence from their husbands' earnings should garner as much attention as male workers' independence from the labour market (Orloff, 1993: 319). Sainsbury elaborated on these thoughts with her typology, "The Gender policy regimes" (Sainsbury, 1999: 78), wherein she categorized welfare states according to the accessibility and characteristics of provisions for women. The basic organizing principles were the extent to which welfare states provided economic independence for women, and whether this was done through benefits associated with traditional, unpaid labour or policies to increase women's paid work (Sainsbury, 1999: 78-80).

These considerations have implications for research on sickness absence in general and gender differences in particular, because they enhance awareness that access to the Norwegian sickness benefit is granted through participation in the labour market. In Norway, women still do more unpaid domestic work and less paid work than men do (Knudsen and Wærness, 2008; Vaage, 2012: 5). This gendered distribution of paid and unpaid work implies that women's access to the sickness benefit is more limited than men's. Furthermore, researchers working on women's sickness absence should keep in mind that although women's greater sickness absence increases their financial dependence on the welfare state, the Norwegian sickness benefit weakens women's financial dependence on a male partner through part-time employment or housewifery, which might otherwise be the alternative for women who cannot provide for themselves through the labour market.

We can fruitfully explore the complexity of gender equality processes further by examining Fraser's distinction between equality and difference, which refers to two fundamentally different feminist approaches to welfare and redistribution (Fraser, 1994). Equality characterizes an approach that strongly facilitates women's participation in traditionally male dominated arenas, whereas the difference approach ensures that the particularity of women's situations does not lead to economic marginalization. According to Fraser, both approaches have substantial weaknesses. The equality approach leads to the evaluation of women according to masculine standards because it ignores and devalues the particularity of women's life courses and behaviour, which are obstacles in male-dominated arenas. On the other hand, the difference approach leads to political and social marginalization, as women do not fully participate in society. Fraser advocates an approach that acknowledges the complexity of gender issues and focuses on changing men's behaviour to approximate more closely that of women rather than the opposite (Fraser, 1994: 611).



Of course, with respect to this thesis, Fraser's idea of changing men's behaviour to be more like women's behaviour has certain limitations, because men cannot become pregnant or give birth. However, Fraser's thoughts on equality and difference favour our developing an understanding of gender differences in sickness absence in which the focus on negative consequences (e.g., increased public costs and fewer career opportunities for women) is balanced with the knowledge that gender differences in sickness absence reflect women's and men's substantially different life courses, and that gender equality in sickness absence may be neither realistic nor desirable.

Feminist scholars have also emphasized that portraying the welfare state and the labour market as society's two main sources of welfare fails to recognize the importance of the family (Lewis, 1992; Wærness, 1975). This critique initiated a shift away from the "welfare state" concept to the more inclusive term "welfare regime" (O'Connor, 1996; Sainsbury, 1999), which highlights the family as an important source of welfare. In line with this critique, Esping-Andersen introduced the term *defamilialization* to characterize welfare states according to the extent to which they allow individuals to become economically independent of their families. One example of this is how the Scandinavian welfare states facilitate women's access to employment by offloading women from child care (Esping-Andersen, 1999: 45).

Although these feminist approaches undoubtedly have contributed to a more nuanced understanding of work and welfare, they have also been criticized for not fully accounting for agency. When asked directly, women are more likely to express a general family orientation, whereas men are more likely to express work orientations, and, according to Hakim, this implies that women are more likely than men to be satisfied with part-time employment and low-skilled occupations (Hakim, 1995). Feminist scholars counter this criticism by emphasizing that women's choices are situated in a larger context that does not allow them

simply to choose among the best possible alternatives. They are limited to those options that they consider to be realistic (Ginn et al., 1996). According to these scholars, the aim of social science is not to analyse which options women prefer; instead, social science should highlight the limitations of the alternatives that are available to women in order to expand their scope of action in the future.

This rather nuanced debate about agency and structure in the literature on gender, work, and welfare largely contrasts with the rather dichotomous understanding of action that dominates research on sickness absence. Women's sickness absence is frequently examined in the light of either pull or push factors (for examples, see e.g. Laaksonen et al., 2010; Larsson et al., 2006; Mastekaasa and Dale-Olsen, 2000; Sydsjo et al., 1997; Sydsjo et al., 1999), although it seems reasonable to assume that the more fine-grained factors that are thought to influence women's employment patterns probably are relevant for understanding women's sickness absence too. Although women's preferences may influence their sickness absence, these preferences must be viewed in light of the available options that women face both at work and in the private sphere.

Finally, feminist perspectives highlight the need to account for women's occupations in studies of welfare and women's health (Annandale and Hunt, 2000: 9; Esping-Andersen, 1999: 5; Messing et al., 2003), and this is relevant to investigations of women's sickness absence too. The occupational structure is changing in most Western countries, including Norway (Boje and Furåker, 2005; Ellingsaeter, 2013; Esping-Andersen, 1993), and this development has prompted a debate about whether the available class schemes adequately measure women's positions in the labour market (Esping-Andersen, 1993; Evans, 1996; Goldthorpe and Payne, 1986; Oesch, 2006; Wright, 2005). In contrast to this literature, previous research on women's sickness absence has largely ignored the class dimension. This is unfortunate, because patterns of employment and family building are strongly

interconnected, and they have changed rapidly in Norway over the past few decades, which raises the question of whether the risk factors for sickness absence that are associated with pregnancy and motherhood are increasingly class specific.

#### **1.4.1. Class differences**

Class is an ambiguous term in the sociological literature (Crompton, 2008: 15; Grusky, 2008; Grusky and Szelényi, 2011; Leiulfstrud et al., 2002: 3; Scott, 1996: 2; Wright, 2005). Marx used the class concept to highlight the ongoing conflicts of interest between the privileged elite and the underprivileged masses in society throughout history. In industrial societies, the central class division is between the owners of the means of production and the industrial workers (Marx, [1964] 2011). A central aspect of the Marxist concept of class is the argument that privileged owners take advantage of workers by paying them less than the value of their work (Marx, [1969] 2001: 103-4).

Weber's concept of class was inspired by the Marxist class concept, but it differed in several important respects. Weber distinguished between class, status, and party (Weber, [1946] 2001). Class denotes a group of individuals who have similar opportunities and constraints in the labour market and thereby face similar financial situations. Status refers to the lifestyles and relationships associated with different levels of social prestige, whereas parties are sources of political influence (Weber, [1946] 2001: 132-141).

Both the Marxist and the Weberian class concepts were developed in the industrial era, and social changes over the past few decades have led to sociological debates about the adequacy of class as a measure of stratification in contemporary societies. The first strand of this debate is concerned with whether inequalities in contemporary welfare states should be regarded as class divisions. In this debate, critics of the class concept have argued that categorizing people in contemporary societies according to class does not make much sense because empirical

analyses have revealed the lack of a coherent class identity and class-specific patterns of mobility, norms, and values (Kingston, 2000). Furthermore, the inequalities in post-industrial societies are said to be of a completely different kind than those of the industrial societies, and thus the term “class” should be used exclusively to denote social cleavages in the industrial era, whereas contemporary inequalities should be described by new concepts (Clark and Lipset, 1991). Consistent with this line of thought, Beck has characterized the concept of class as a “zombie”, to emphasize that it should be seen as a left-over from previous scholars, because it does not adequately grasp the risk structure of contemporary societies (Beck and Beck-Gernsheim, 2002: 30). On the other side of this debate, scholars have insisted that the concept of class is still relevant in contemporary societies. More specifically, scholars argue that the critics of the class concept are on weak empirical ground (Atkinson, 2007; Goldthorpe and Marshall, 1992). In support of this view, recent studies from the Nordic countries have highlighted the presence of class cleavages in recent times (Dahlgren and Lundgren, 2010; Faber et al., 2012).

In a second strand of the class debate, scholars accept the relevance of class for contemporary societies, but they still want to reform the class concept to account more adequately for current class divisions (Bourdieu, 1984; Esping-Andersen, 1993; Hansen, 2009; Oesch, 2006)<sup>5</sup>. In this latter discussion, the adequacy of class schemes for the classification of women’s occupations is a central topic (Annandale and Hunt, 2000; Evans, 1996; Goldthorpe, 1983; Marshall et al., 1995).

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<sup>5</sup> Bourdieu advocates a class concept that differs somewhat from the understanding of class used in this thesis. Bourdieu argues that the term “class” not only should imply a classification of occupations but also should take into account the multidimensionality of the social characteristics of the people in these classes and how they are positioned towards each other. For a further introduction to this approach, see Börjesson M. (2009) Om kunsten at konstruere sociale grupper [about the art of constructing social groups]. In: Hammerslev O, J.A. H and Willig I (eds) *Refleksiv sociologi i praksis*. København: Hans Reitzels Forlag, 101-19.

An important question is whether the individual or the household should be the unit of analysis. Supporters of “the conventional view” argue that women should be classified according to their husband’s occupation (Goldthorpe, 1983; Marshall et al., 1995), whereas others maintain that women’s employment and occupational achievements have a separate impact on the household that should not be overlooked (Hiller and Philliber, 1978; Leiulfstrud and Woodward, 1987; Ritter and Hargens, 1975). Yet others have suggested that different research questions require different approaches (Crompton, 2008: 79). In addition, female employment and the expansion of the service sector have brought concerns about whether class schemes originally developed for distinguishing male occupations in industrial countries adequately distinguish between female occupations. Accordingly, scholars have presented different revisions or reinventions of class schemes to account for the complexity of women’s occupations (Esping-Andersen, 1993; Goldthorpe and Payne, 1986; Oesch, 2006).

Scholars engaged in the third strand of contemporary class debate highlight the need for combining life course perspectives with those of class and gender, rather than considering them as mutually exclusive approaches (Amato and Previti, 2003; Andres and Adamuti-Trache, 2008; Anxo et al., 2010: 5; Elo, 2009; Esping-Andersen, 2009; Kohli, 2007: 267; Macmillan, 2005: 10; Nilsen et al., 2012: 3; Palloni and Milesi, 2006; Pensola and Martikainen, 2004).

Finally, the fourth strand of the class debate is specifically linked to the extent and causes of class differences in health in contemporary societies. This strand was largely inspired by the British “Black report”, which revealed that people with higher-ranking occupations had lower mortality rates than working-class people did (Black et al., 1988). The report suggested four possible explanations of these differences. First, class differences in health and mortality may simply reflect weaknesses of the measurement procedures. Second, they may result from the requirement of good health as a precondition for labour market success. Third, they may

reflect the fact that class differences in material standards have health consequences. Fourth, they may reflect the fact that people in the middle class have healthier habits and consumption patterns than do those in the working class (Macintyre, 1997).

The idea that adult morbidity should be assessed in light of childhood events was also discussed in the mid 1980s (Barker and Osmond, 1986). Since then, these thoughts have been developed into the life course perspective, which considers not only the impact of decisive events during childhood but also their correlation and interplay with later risk factors (Smith, 2003: xv). Lately, scholars have also become increasingly aware that not only material deprivation but also psychological strain is more common in lower social strata and that this may explain some of the class differences in health (Elstad, 1998).

The Black report was followed by investigations of the extent and characteristics of health inequalities (Arber, 1991; Bartley et al., 1996; Blane et al., 1993; Marmot et al., 1991). The issue has also received attention in Norway, but studies differ in their conclusions about the extent of class differences here. One study suggested that working-class affiliation was associated with more health problems and that the differences were considerable (Elstad, 1996). Similar class differences were reported in a later study, which also found that these differences remained stable over a decade (Dahl and Elstad, 2001). A third study found that class differences in health were smaller than expected (Krokstad and Westin, 2002), while a recent comparative study concluded that health inequalities were larger in Norway and Finland than in the other Nordic countries (Huijts et al., 2010).

As demonstrated above, the long-standing debates about class in sociology are manifold and complex, and the limited scope of this thesis prevents a thorough discussion of these complexities. Rather, this thesis is a modest attempt to provide an empirical investigation of different ways in which class might impact women's sickness absence in Norway.

Nevertheless, the findings still relate to the broader strands of the sociological debates about class in several ways. First, this thesis investigates whether class has a substantial impact on Norwegian women's sickness absence versus whether it should simply be regarded as a "zombie" in this context. Second, this thesis addresses the question of whether the magnitude of class differences in sickness absence depend on the measure of class utilized and whether the results differ between men and women. Finally, this thesis provides an empirical contribution to the literature on class, gender and the life course by investigating whether class is an important moderator of the impact of life events such as motherhood and pregnancy on women's sickness absence.

I used the class scheme of Erikson, Goldthorpe, and Portocarero (Erikson et al., 1979) as a measure of stratification in three of four articles in this thesis. The EGP class scheme is inspired by the Weberian concept of class (Breen, 2005: 42; Leiulfsrud et al., 2002: iii). Compared with class schemes in the Marxist tradition, the EGP scheme emphasizes the importance of occupations' positions in the labour market, and class conflict is not necessarily seen as following from conflicts of interest between the classes (Leiulfsrud et al., 2002: 4-6). In the first article, the EGP scheme was compared with other class schemes in the empirical analyses. The theoretical foundations of the other schemes are presented in detail in that paper.

Because of the limitations of the data set, education was used as a proxy for class in Article 3, which is about the impact of postponing pregnancy on sickness absence among pregnant women and women in general. Previous research has shown that women often postpone pregnancy until they have finished their education (Lappegård and Rønsen, 2005), which may mean that education is one aspect of class that is particularly closely linked with the timing of pregnancy and thus was well suited as a proxy for class in this article.

### **1.4.2. Class differences in motherhood and pregnancy**

As mentioned earlier, patterns of employment and family building are strongly interconnected and have changed rapidly in Norway over the past few decades. The postponement of pregnancy (Lappegård and Rønsen, 2005) and changing gender roles (Duvander et al., 2010; Kitterød and Rønsen, 2013; Lappegård, 2008; Skevik, 2006) are two of the features of the new family building. The timing of pregnancy differs substantially between socioeconomic groups, and the postponement of childbearing has become increasingly common among middle-class women (Lappegård and Rønsen, 2005; Mills et al., 2011). Similarly, the ideals and practices of motherhood vary across social classes (Crompton, 2006b: 185; Duncan, 2005; Duncan and Irwin, 2004; Ellingsaeter et al., 1997).

Relative to middle-class women, working-class women are more likely to undertake a more traditional mother's role (Crompton, 2006b: 185; Duncan, 2005; Duncan and Irwin, 2004; Ellingsaeter et al., 1997) and to perform a larger share of domestic work (Crompton and Lyonette, 2007: 121), both of which can make it difficult to manage outside employment. In contrast, the gender roles have converged more strongly in the middle class (Crompton and Lyonette, 2007; Esping-Andersen, 2009; Kitterød and Lappegård, 2012: 122), and middle-class women share both paid and unpaid work more equally with their partners (Crompton and Lyonette, 2007: 121; Esping-Andersen, 2009: 50; Kitterød and Lappegård, 2012).

However, scholars emphasize that the burden of work and family obligations for double-earner couples is a serious source of strain (Bonoli, 2006; Esping-Andersen, 2009: 54; Greenhaus et al., 1989; Higgins et al., 1992; Lewis, 2009: 1). Because highly educated women are more likely to work long hours (Kitterød, 2005: 20; Moland, 2013: 21), work–family conflicts may be more common for middle-class mothers than for working-class mothers. In addition, the postponement of pregnancy has become common among women with educational and occupational ambitions (Lappegård and Rønsen, 2005; Mills et al.,



2011), and this entails health risks (Dekker and Sibai, 2001; Dildy et al., 1996; Duckitt and Harrington, 2005).

The implications of these changes for class differences in women's sickness absence during pregnancy and motherhood are less clear. A traditional mother role and physically demanding working conditions may increase sickness absences for working-class mothers and pregnant women. On the other hand, longer working hours and the postponement of pregnancy may contribute to increased sickness absences for middle-class mothers and pregnant women. This thesis adds to the empirical literature by investigating whether greater sickness absence among Norwegian mothers and pregnant women is primarily a phenomenon of working-class women, or whether it reflects the effects of postponed pregnancies and work–family conflicts among middle-class women.

## **2. Methodology**

The empirical investigations in this thesis largely consist of deriving hypotheses from a theoretical framework and statistically testing them. This process reflects a deductive research strategy that attempts to explain social patterns by testing empirically the implications of possible explanations (Blaikie, 2007: 8). In practice, however, deriving hypotheses about sickness absence from sociological theories about gender, class, and welfare is not as straightforward as it may seem, because these theories are quite general and can generate a wide range of different and even contradictory hypotheses. Compared with more limited and empirically grounded explanatory models, researchers who use gender, class, and welfare theories in sickness absence research must actively consider which parts of the theories should be emphasized and which of the possible implications of the theories should be investigated. Adapting such general theories to women's sickness absence requires an exploratory research approach.

More specifically, in this thesis, I drew on general theories of gender, class and welfare to derive specific questions and hypotheses in light of relevant characteristics of the particular historical and social contexts in which Norwegian women's sickness absence was embedded. Thus, acquiring information about these contexts (by reading descriptive statistics, studies, and reports) was an important part of the preparation for each article. In this sense, the exploratory aspect of hypothesis generation from the general theories of gender, class, and welfare was largely inspired by the life course perspective, which emphasizes the need to pay attention to the particularities of the historical and geographical contexts of phenomena. In other words, the life course perspective not only inspired the theoretical concepts of this thesis but also inspired the research strategy.

My research strategy reflects certain ontological and epistemological premises—that is, assumptions about the characteristics of society and how one can develop knowledge about it (Blaikie, 2007: 13, 18). In this thesis, I take a “subtle realist” position (Blaikie, 2007: 17): I adhere to the idea that reality exists independently of our perception of it, but I assume that our understanding of reality is substantially influenced by social processes.

Given this stance, it seems reasonable to question how social processes have influenced the understanding of sickness absence that underpins this thesis. A fruitful starting point in this regard is the recent national evaluation of sociological research, which expressed concerns about the strong claim for the political relevance of sociological research because such a requirement hinders theoretical and methodological progress (NFR, 2010). Similar concerns have also been discussed with respect to Norwegian welfare research more generally (Nuland et al., 2009). These discussions seem highly relevant for this thesis, because public and political concerns about the frequency and costs of sickness absence have initiated several

research projects, including the cross-disciplinary research project<sup>6</sup> called “Health, work and society – multidisciplinary research on the causes of sickness absence and disability”, of which this thesis is a part. The project has created a network of researchers in the same field and has prompted conferences and meetings that have stimulated cross-disciplinary discussions about the possible causes of sickness absence. It is mainly funded by a government program that has a general aim to generate knowledge about the causes of sickness absence that can be used to develop prevention policies (NFR, 2007: 5).

The tight link between knowledge production and the government’s interests can be further explored through Foucault’s concept of governmentality. This term denotes a particular combination of mindset and bureaucratic practice through which power dynamics are expressed in modern societies that are characterized by the widespread idea that resource management and the improvement of people’s living conditions are central parts of the government’s responsibility (Lindgren, 2007: 338-9). Foucault highlights the strong and reciprocal association between the development of power and knowledge, in the sense that the production of knowledge is often based on registrations from public institutions, and it is used to develop these institutions further (Foucault, [1975] 2012: 216).

Foucault’s idea of governmentality is relevant for this thesis in several ways. First, the thesis is part of a larger process of knowledge production that was initiated by the government to facilitate political decision-making about sickness absence. Second, this thesis aims to increase awareness of the risk factors for sickness absence in Norway in a way that adheres to the idea that research should contribute to responsible and appropriate policy development in the area of work and welfare. Third, this thesis is based on empirical analyses of registry data that are partly based on the records from various public entities.

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<sup>6</sup> This cross-disciplinary research project mainly involves scholars from economics, psychology, medicine, and sociology.

Bourdieu's concept of reflexive sociology (Bourdieu, 1992) is a useful tool for reflecting upon the problematic aspects of the close association between knowledge production and power dynamics in society. Bourdieu emphasizes the tension between applied research and sociological ideals by claiming that a research object cannot be investigated without considering how the understanding of it relates to other aspects of the society. Uncritically adapting to already established academic concepts or understandings based on common sense will turn sociological research into a product of the social power structures that it is tasked to reveal by reproducing the dominant views of the object rather than critically revising and adjusting them (Bourdieu, 1992: 235-238).

Thus, rather than taking the government's point of view as a premise for this research, Bourdieu's position is that sociological inquiry is obliged to question this understanding and, in this case, to discuss how the specific understanding of sickness absence implicated in the funding aims of the program highlights specific concerns at the expense of others, and to question whether this understanding reflects certain power relations in the society.

Although Bourdieu's critique seems relevant, it is reasonable to question the extent to which the purpose of applied research is compatible with the reflexivity that Bourdieu recommends. Although applying Bourdieu's recommendations for reflexive sociology to the research object of sickness absence would enhance its sociological reflexivity, such an approach might require posing research questions that appear less relevant and less accessible to non-academic public audiences. This drawback evokes associations with the more general criticism of disciplinary research: that it is conducted in an "ivory tower". Of course, this term was not originally coined to criticize Bourdieu specifically; it refers to research that is rigorously conducted within the norms of the discipline to such an extent that it neglects its obligations to society. Luria and Luria advocate an approach that abandons the "ivory tower" by taking part in public discourses and providing research that contributes to sound societal

development (Luria and Luria, 1970). This view thus largely contrasts with Bourdieu's advocacy for reflexivity by emphasizing that the most reflexive sociology is not necessarily very useful, either for the client or for the society as a whole.

In this thesis, I take a stance between Bourdieu's position on the one hand, and Luria and Luria's position on the other. Specifically, I adopt Bourdieu's ideas by recognizing that sickness absence research is intertwined with power relations in the society. In line with this position, I have discussed how the socio-political context influenced the social construction of sickness absence among the general public, and I have mentioned how the funding of applied research relates to the understanding of sickness absence in this thesis. Furthermore, I have drawn on theories of gender, class and welfare to highlight the risk factors for women's sickness absence in contemporary Norwegian society that have not previously received sufficient attention; I have not simply reproduced the somewhat oversimplified push-pull dichotomy that has dominated previous research on sickness absence. I have outlined the project in this manner to make it as transparent as possible for the reader, in line with Bourdieu's idea that the research object should be understood in light of the social processes that constitute knowledge about it.

However, I adopt Luria and Luria's view in the sense that I agree that publicly funded sickness absence research has a social obligation that should be taken seriously and that focusing solely on sociological ideals of reflexivity does not necessarily ensure that research will be beneficial to society. For this reason, the articles based on this thesis emphasize the potential challenges associated with contemporary patterns of female employment and fertility. However, I have also drawn on Bourdieu's idea of reflexive sociology by questioning the assumption that women's greater sickness absence relative to men's should be viewed as problematic. Rather than reproducing the push-pull dichotomy of previous sickness absence research, I have also focused on within-group differences of women and, in

particular, how their sickness absence should be understood in light of the interplay between their occupational class and specific life events; namely, pregnancy and motherhood.

This middle position is similar to an approach to applied research that was presented in a recent debate about applied welfare research in Norway. In that debate, several scholars claimed that the association between politics and welfare research is not necessarily as tight as it may initially seem. Even though the government's interests influence the overarching funding program, they argued that scholars still have a substantial degree of autonomy over the development and conduct of the research projects (Christensen et al., 2009: 66-7). In line with this view, one might suggest that although the overall aims of the funding program for sickness absence research call for policy-oriented knowledge that can help to reduce sickness absence, this does not necessarily mean that scholars must achieve this goal at the expense of developing scientifically sound knowledge. In my case, this implies that although I believe that the knowledge presented here should be politically relevant, I also acknowledge that the social sciences have a public responsibility that goes beyond answering the client's question. That responsibility includes raising awareness about social groups that are particularly vulnerable to negative and unintended consequences of various political measures. In line with this position, I have highlighted issues that should be considered in the political decision-making processes about sickness absence, even if other research questions might be better suited to achieving the aim of the funding program.

## **2.1. Data and methods**

The empirical analyses in the first article of this thesis are based on The Norwegian Level of Living Survey; the analyses in articles 2–4 are based on the population registry FD-Trygd. I used different data sources for both methodological and practical reasons: the processing of applications for access to the survey data was quick and easy, but gaining access to the

registry data required considerably more time. Accordingly, I conducted analyses on the survey data while waiting for access to the registry. Once the registry data were accessible, I preferred these data because their characteristics allowed for empirical analyses that would be unsuitable with the survey data. A detailed description of these data sources will clarify the differences between them.

Data from the Norwegian Level of Living Survey (LKU) have the advantage of being easily accessible, in more ways than one. Not only is the application processing time short but also the study is relatively well documented. Compared with the population registry FD-Trygd, the LKU data require little preparation before statistical analyses can be conducted. In my case, preparing the LKU data for analyses was further simplified by the previous work carried out by my supervisor, Hans-Tore Hansen, who most kindly shared his files with me. The LKU data were used for the analyses in the first article, and considerable effort was required to implement the different class schemes that were compared in the analyses. However, this process was indeed made considerably easier because Oesch, Flemmen, and Andersen provided me with their manuals for categorizing occupations according to the class schemes they have developed.

In addition, unlike the registry, the survey includes measures for both short-term and long-term sickness absence, and it provides detailed information about each person's working conditions. Because the survey has been repeated in several waves, one can investigate changes over time via pooled cross-sectional analyses. The LKU also provides panel data with repeated surveys of the same individuals, which is useful for investigating causality. Although the LKU provides many opportunities for analysis, the population registry FD-Trygd has certain advantages that make it better suited for investigating the interplay between class/education and motherhood or pregnancy, which was the aim of articles 2–4. First, the registry contains information about all individuals in the population rather than a sample,

which is beneficial because the analyses in articles 2–4 require a larger number of pregnant women and working mothers in all classes/educational levels than would normally be captured by the survey. Second, the data are based on official recordings rather than responses to voluntary interviews, and thus the frequency of missing values is substantially lower than in most survey data. Third, because the variables are based on official recordings rather than self-reported information, the risk of self-reporting bias is also eliminated. In sum, these advantages suggest that the population registry is highly reliable, which means that an individual's value on each variable is likely to correspond to his or her true characteristics. In addition, the registry provides longitudinal data, which means that each individual is followed over time. These are the main reasons that the registry was preferred for the empirical analyses in the articles 2–4.

However, unlike the LKU, the population registry FD-Trygd was difficult to access, in more ways than one. As mentioned earlier, there is a lengthy application process. In addition, both the registry and its documentation reflect the fact that the data were collected by different public entities. The database consists of multiple files, the simple merging of which often requires substantial data management. Furthermore, documentation of the registry is spread among many different reports that contain some rather technical language. The data files are very large, as they contain records on the entire population, and it took a while to identify the very specific combination of operating system and software that is required to open and analyse files of this size. Finally, conducting analyses on the population registry required a vast amount of data preparation time. This process included identifying and deleting duplicate records, combining information on sick leave from various occurrences, deleting redundant information, merging files with each other, and reshaping the file from wide to long format to



make it compatible with other files<sup>7</sup>. The large amount of data was a challenge for the computer's capacity, and operations sometimes took quite some time.

Regression analyses were conducted for each of the four articles derived from this thesis. However, the specific regression models chosen depended upon methodological concerns and negotiations with reviewers and my co-authors. The empirical analyses in the first article were based on the survey data, and the variables for sickness absence were based on self-reported short-term and long-term absences. Accordingly, I did not have to worry about censoring of the dependent variable in these analyses. However, the dependent variable was ordinal, and thus a multinomial regression model was used. In the second article, I conducted analyses on sickness absence among men and non-pregnant women in the population registry. In these data, all periods of absence are left-censored for these groups; that is, each period is registered from calendar day 17 onwards. In this case, I followed Cameron and Trivedi's approach to left-censored data and used a probit regression model with a dichotomous dependent variable in addition to a linear regression model with a log-transformed dependent variable (Cameron and Trivedi, 2010: 554).

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7 The extensive data preparation that was required prior to statistical analysis constituted a methodological paradox. The amount of missing data and statistical analyses receive considerable attention during the peer review process, but this is not the case for data management. Although this management is described in the methods section, controlling and verifying all the details in this process would require peer review and publication of the syntax as well. Because of similar considerations, some scholars advocate an extension of the peer review process to include a thorough review of the data preparation and the statistical analyses to verify the procedures and to ensure that they are replicable [see Firebaugh G. (2007) Replication data sets and favored-hypothesis bias comment on jeremy freese (2007) and gary king (2007). *Sociological Methods & Research* 36: 200-9, Freese J. (2007) Replication standards for quantitative social science why not sociology? *Sociological Methods & Research* 36: 153-72.] However, such procedures are not yet part of the publication process. In the absence of such routines, my supervisor reviewed the syntax files, and I asked for advice from others whenever I was unsure about the programming. I did not include the syntax files developed for this thesis as an appendix because they were intended for my own use, and adapting them for a formal review process would require considerable additional work.

In articles 3 and 4, the choice of regression model was less straightforward, because separate registration practices are used for sickness absence among pregnant employees, who were the main focus of the analyses. For men and non-pregnant women, the employer covers the first 16 calendar days of the sick-leave period, and this was also the case for pregnant women until 2002. Since then, employers have been able to request reimbursement of expenses for pregnancy-related sickness absence, and in these cases, the absences are recorded in the population from day one. The particular rules and registration practices that apply to sickness absence during pregnancy were addressed in different ways in articles 3 and 4.

Article 3 presents changes in pregnant women's sickness absence from 1993 to 2007, which means that the registration practices changed in the middle of the observation period.

Analyses for this article had to conform to the norms of methodological simplicity that characterize the type of medical journals that we approached. My co-author and I agreed to run ordinary least squares regression models, in addition to describing the impact of the 2002 amendment in a separate graph.

In article 4, the analyses were only conducted on data from 2004 to 2008, because the central variable of interest (occupational class) was not registered prior to 2004. The limited time span means that no amendments were introduced during this period. However, some periods of sickness absence among pregnant women were still censored, and others were not. To account for this, we used a zero-inflated poisson regression model because it is particularly well suited for analysing count data in which the dependent variable is characterized by excessive zeros due to structural factors, in addition to the high frequency of zeros, which often occur naturally in count data.

### 3. Summaries of the articles

This section provides summaries of the four articles derived from this thesis. Each summary includes the title of the article, publication details, background to the study and information from the article.

#### 3.1. Article 1

Steinsland, A., Hansen, HT. (2010) Klasseforskjeller i sykefravær i Norge. En sammenligning av ulike klasseskjemaer [Class differences in sickness absence in Norway. A comparison of different class schemes]. *Sosiologisk Tidsskrift*, **18**, 355–377.

Prior to this study, class differences had received little attention in sickness absence research. Two exceptions were Hansen and Ingebrigtsen's (Hansen and Ingebrigtsen, 2008) study of class differences in sickness absence, and Krokstad and Westin's study of class differences in health and disability pensions among Norwegian men (Krokstad and Westin, 2002). Both of these studies employed the EGP class scheme as a measure of social class. However, changes in the labour market have sparked substantial sociological debate about the extent to which different class schemes correspond to the current labour market situation in general and whether they distinguish adequately between female-dominated occupations in particular (Evans, 1996; Goldthorpe, 1983; Leiulfstrud et al., 2002; Stanworth, 1984; Wright, 2005). In light of this discussion, the purpose of this first article was to complement previous studies on class differences in sickness absence by further investigating whether the impact of class on sickness absence varied according to class scheme, and to see whether the results differed between the genders.

The Norwegian Level of Living Surveys from 2000 and 2003 were utilized for the analyses. Class schemes developed by Erikson, Goldthorpe, and Portocarero (EGP), and Oesch, Hansen, and Esping-Andersen were compared using separate multinomial regression models

for women and men. Even though certain class differences were uncovered in each of the analyses, none of the class schemes satisfactorily improved the predictive probability of the model.

This result implies that, for both genders, class in and of itself only has a minor impact on the probability of taking a sickness absence. Furthermore, there were only marginal differences between the class schemes, which indicates that the magnitude of class differences in sickness absence is not particularly dependent on the class scheme utilized.

### 3.2. Article 2

Ariansen, AMS. Parenthood and sickness absence: Class and gender variations. A population registry analysis of married employees in Norway. *To be submitted.*

The question of whether the impact of parenthood on sickness absence varies according to class and gender has received little attention in previous research. The two studies (Mastekaasa, 2000; Ugreninov, 2012) that come closest to addressing this question used education rather than class to measure stratification, and they reached different conclusions. Although analyses of a random sample of all Norwegian employment relationships in the mid 1990s showed that motherhood and the risk of sickness absence did not vary with educational level (Mastekaasa, 2000: 1838), a recent investigation based on a survey sample concluded that motherhood was associated with an increased burden of domestic work among less educated women, which in turn increased the likelihood and duration of sickness absence in this group (Ugreninov, 2012: 117-9).

This purpose of this second article was to contribute to the literature on class and gender differences in the impact of parenthood on sickness absence. The investigation examined the three-way interaction between class, gender, and parenthood on sickness absence using a high-quality dataset that contains public records for all Norwegian employees from 2003 to

2007. Population-averaged probit and linear regressions were conducted on 4,059,891 annual observations distributed across 1,085,994 individuals.

The results showed that having children was not associated with an increased risk of sickness absence for middle-class or working-class women. However, among employees with at least one spell of long term sickness absence (>16 calendar days) motherhood led to more sick days in both classes, although the increase was substantially greater for working-class mothers. It seems somewhat contradictory that motherhood did not increase the risk of sickness absence, only the number of sick days, but we must consider this finding in light of health selection processes, which have been described in previous studies of women's sickness absence. Such processes indicate that, in contrast to less healthy women, healthier women are more likely to return to the labour market after becoming mothers (Mastekaasa, 2012a: 690).

Fatherhood was associated with an increased risk of sickness absence among working-class men. Among employees with at least one spell of long term sickness absence (>16 calendar days), fatherhood also entailed an increased number of sick days, but only in the working class. This implies that the gender differences in the impact of parenthood on the number of sick days were larger in the middle class than in the working class. This result was somewhat surprising, because norms of gender equality are generally considered to be stronger in middle-class couples relative to working-class couples.

With regard to this thesis, this second study revealed that motherhood has a different impact on the risk of sickness absence and the number of sick days; in particular, it tends to increase the number of sick days among working-class women.

### 3.3. Article 3

Ariansen, A.M.S., Mykletun, A. (2014) Does postponement of first pregnancy increase gender differences in sickness absence? A register based analysis of Norwegian employees in 1993–2007. *Plos One*, **9**, e93006.

Previous research has shown that the postponement of pregnancy is increasingly common among highly educated women (Lappegård and Rønsen, 2005; Mills et al., 2011), and this pattern coincides with increased sickness absence during pregnancy in Norway (Markussen and Røgeberg, 2012). Inspired by welfare literature highlighting the occurrence of new social risks in contemporary societies (Bonoli, 2006; Taylor-Gooby, 2004), we investigated whether the widespread postponement of pregnancy among highly educated women had implications for sickness absence during pregnancy and/or for gender differences in sickness absence.

Thus, the aim of the study was twofold. The first aim was to see whether the postponement of pregnancy is related to increased sickness absence and thus contributes to increased gender differences in sickness absence. The second aim was to estimate how much of the increased gender difference in sickness absence can be accounted for by increased sickness absence among pregnant women.

We employed registry data to analyse the sickness absence of all Norwegian employees from 1993 to 2007 with income equivalent to full-time work. The results showed that, after controlling for age, education, and income, pregnant women's sickness absence (age 20–44) increased 0.94 percentage points on average each year, compared with 0.29 percentage points for non-pregnant women and 0.14 for men. In pregnant women aged 20-24 years, sickness absence during pregnancy increased by 0.96 percentage points each calendar year, compared with 0.60 for women aged 30-34 years. Sickness absence during pregnancy accounted for 25% of the increased gender gap in sickness absence, controlling for changes in

education, income, and age. These findings imply that postponement of first pregnancy did not explain the increase in pregnant women's sickness absence from 1993 to 2007, as both the highest level and increase in sickness absence were seen in the younger women.

### 3.4. Article 4

Ariansen, A.M.S. (2014) Age, occupational class, and sickness absence during pregnancy: A retrospective analysis study of the Norwegian population registry. *BMJ Open*, **4**, 10.1136.

This study was inspired by the findings of the third article derived from this thesis, which revealed that the highest level and greatest increase in sickness absence during pregnancy was for Norwegian women in their early 20s (Ariansen and Mykletun, 2014). Accordingly, this article investigated whether the high level of sickness absence among younger pregnant women was due to the preponderance of working-class women in this group. The hypothesis that we tested postulated that young pregnant women had more sick days because this age group had a greater proportion of working-class women, who are more prone to sickness absence.

We used a zero-inflated Poisson regression to assess data from all employees in the Norwegian population registry who gave birth from 2004 to 2008, which amounted to 216,541 pregnancies among 180,483 women. Although the association between age and number of sick days was U-shaped, pregnant women in their early 20s had more sick days than those in their mid 40s. This was especially true for pregnant women who had previously given birth. In this group, 20-year-olds had 12.6 more sick days than 45-year-olds, but this difference fell to 6.3 more sick days after controlling for class. Among women undergoing their first pregnancy, 20-year-olds initially had 1.2 more sick days than 45-year-olds, but controlling for class changed the nature of this difference.

After controlling for class, 45-year-old first-time pregnant women had 2.9 more sick days than 20-year-olds with corresponding characteristics. These results reveal that the negative association between age and sickness absence was partly attributable to the fact that younger age groups have more working-class women, particularly among first-time mothers. This conclusion highlights the need to address the strong interplay between fertility patterns and class differences when investigating sickness absence among pregnant women.

#### **4. Summary**

The aim of this thesis was to investigate how, and the extent to which, women's sickness absence is influenced by class structure and its interplay with pregnancy and motherhood in contemporary Norwegian society. The four articles of this thesis shed light on different aspects of this question.

The first article found that controlling for class alone does not help to explain much of the sickness absence among women, regardless of the class scheme used. This result is consistent with a recent study that emphasizes that women's sickness absence should be seen as the outcome of several different risk factors rather than as the result of a few very influential variables (Ose et al., 2014).

One might question why I should continue investigating the impact of class on sickness absence when the first article concluded that controlling for class only led to a marginal improvement of the model's predictive ability. However, although controlling for class did not improve the model very much, this finding does not preclude the possibility that class interacts with life events such as pregnancy and motherhood in important ways, and this was largely confirmed by the work presented in the subsequent articles.

The second article found that the impact of motherhood on sickness absence varied according to class and that motherhood especially increased the number of sick days for working-class



women. The third article revealed that increased sickness absence during pregnancy does not follow from the postponement of pregnancy, which has become increasingly common, particularly among middle-class women. The fourth article found that among first time pregnant women, increased sickness absence in the younger age groups reflects a preponderance of women in working-class occupations. This was not the case for young pregnant women with previous deliveries.

In sum, the empirical analyses conducted for this thesis revealed that although class does not explain much of women's sickness absence by itself, the impact of motherhood and pregnancy on sickness absence varies substantially according to class. More specifically, working-class women were more prone to sickness absence during motherhood and pregnancy than were middle-class women. Motherhood was associated with an increased number of days of sickness absence for both working-class and middle-class women, but the increase was larger for the working-class women. Among pregnant women, heightened sickness absence was more strongly associated with young age rather than the trend of postponed pregnancies that is primarily associated with highly educated women. High levels of sickness absence among young pregnant women were partly due to a preponderance of working-class women in this group.

#### **4.1. Contributions to the research area**

The conclusions above provide useful additions to previous research on women's sickness absence in several areas.

First, feminist scholars have called for increased awareness of women's occupations in the investigation of health-related issues (Annandale and Hunt, 2000: 9; Messing et al., 2003), and several attempts have been made to provide an adequate categorization of women's occupations (Esping-Andersen, 1993; Evans, 1996; Goldthorpe and Payne, 1986; Oesch,

2006; Wright, 2005). However, there is no systematic comparison of different class schemes in previous research on women's sickness absence. The first article of this thesis adds such a comparison to the literature, and it indicates that the exact classification of women's occupations does not seem to be critical for the conclusion, as none of the class schemes improved the predictions of the regression model substantively.

Second, this thesis has contributed to a more nuanced understanding of sickness absence during motherhood and pregnancy by illuminating how this varies according to class. With a few exceptions, the possible moderating impact of class on the association between pregnancy and motherhood on sickness absence had received little attention prior to this study. This thesis reveals that both motherhood and pregnancy tend to increase sickness absence, particularly among working-class women. This conclusion contrasts somewhat with previous research on women's health and welfare, which focused on risk factors that more often affect middle-class women, such as work-family conflicts and the postponement of pregnancy. The analyses in this thesis indicate that these risk factors are of secondary importance relative to the risk factors for sickness absence that affect working-class women.

#### **4.2. Theoretical implications**

The above conclusions have several theoretical implications. First, the findings are more in line with previous research that emphasizes the ongoing disadvantages of working-class women than they are with the literature that highlights the risk factors associated with the rapidly changing gender roles, which particularly has occurred in the middle class.

Second, the results support the vast amount of literature that highlights the need for combining class analyses with a life course perspective. Although this thesis has shown that the impact of motherhood and pregnancy on sickness absence varies by class, the mechanisms of these patterns remain to be examined. There may be a wide range of explanatory factors for

the interaction between class and life events, including working conditions, the psychosocial working environment, norms and ideals, health inequality, health behaviour, social support and coping strategies. The relative importance of selection processes should also be examined. We might take a step towards identifying these mechanisms by investigating whether the challenges associated with class primarily affect family building or whether class moderates the impacts of a wider range of life events on sickness absence, such as divorce, the death of close relatives, and caring for frail relatives. Such investigations will help to illuminate whether class-specific challenges primarily affect parental obligations or whether they moderate the impacts of all kinds of difficulties on sickness absence. The findings of this thesis further suggest that women's sickness absence is not a direct reflection of biological differences between the sexes, as class-specific impacts of parenthood and pregnancy cannot be explained by biological differences between the sexes.

Third, this thesis provides empirical contributions to the sociological debate about the relevance of class in contemporary societies. The articles summarized here show that controlling for class does not substantially improve the prediction of sickness absence, regardless of the class scheme utilized. This finding is consistent with other research that suggests that women's sickness absence has several different causes rather than a few very important ones (Ose et al., 2014). However, the impact of motherhood and pregnancy on sickness absence varies substantially across classes. Thus, the findings reported here support previous research that suggests that the exact classification of women's occupations is of secondary importance compared with other issues related to gender and class (Marshall et al., 1995). However, class is highly relevant for understanding the impact of motherhood and pregnancy on sickness absence, which supports the strand of the class debate that argues that accounting for class differences is particularly useful when investigating the impacts of various life events.

Fourth, this thesis highlights the need to consider explanations other than the division of domestic work when investigating class differences for issues related to work–family conflicts. Previous literature on work–family conflict indicates that the gendered distribution of domestic work influences women’s opportunities in the labour market. However, the relationship between class and work–family conflict is often understood primarily in terms of the incompatibility between the traditional working-class woman’s role and women’s paid employment. The second article derived from this thesis revealed that parenthood increases sickness absence among Norwegian working-class men, even though middle-class men have been doing more unpaid domestic work. This indicates that characteristics other than the division of unpaid work should be considered when investigating the class-specific impact of parenthood on sickness absence and other issues related to work–family conflicts.

### **4.3. Future research**

The interpretations of the findings in this thesis have led to reflections about how sickness absence relates to processes of exclusion from the labour market, which includes housewifery, part-time employment, and health selection. In retrospect, it seems evident that sickness absence is linked to other dimensions of labour market exclusion that could have been incorporated into the analyses of this thesis. In my defence, I must emphasize that this weakness seems to characterize a wide range of sickness absence studies. Sickness absence is frequently analysed and discussed as a separate phenomenon rather than situated in a broader context and investigated through a systematic approach that integrates analyses of sickness absence with those of other types of economic dependency and labour market exclusion (Hensing and Alexanderson, 2004; Johansson and Lundberg, 2004; Nakata et al., 2004; North et al., 1993; Peter and Siegrist, 1997; Vingård et al., 2004; Virtanen et al., 2004). This tendency contrasts sharply with the literature on gender and welfare, which rarely investigates welfare benefits separately but strives to highlight the social implications of the total package

of policies of which such arrangements are a part (Sainsbury, 1999). Accordingly, it seems important to emphasize that future sociological research on women's sickness absence would benefit greatly from integrating analyses of sickness absence into a more systematic approach to women's work and welfare. A conceptual and empirical approach to integrating analyses of sickness absence with those of other types of economic dependency and labour market exclusion was recently developed by Nordic scholars (Bäckman et al., 2011).

Gender perspectives on welfare also highlight the multidimensional, complex and at times contradictory characteristics of gender equality processes (Fraser, 1994) rather than solely focusing on gender differences with respect to individual parameters such as sickness absence. In light of these achievements, future research could advantageously investigate how Norwegian women's greater sickness absence hinders and encourages gender equality.

In addition, research on sickness absence is characterized by a push–pull dichotomy in which sickness absence is often understood as either a rational choice or as a direct reflection of structural factors (Hansen, 1998; Kolberg, 1991). In contrast, sociological debates on gender, work and welfare highlight the complexity of agency and structure with regard to women's employment and other processes of gender equality (Fraser, 1994; Ginn et al., 1996; Hakim, 1995; Orloff, 1993; Sainsbury, 1999). This contrast implies that previous sociological debates about women's labour market participation can be extended to the issue of women's sickness absence to counteract the somewhat simplified and dichotomous understanding of agency and structure that characterizes previous sickness absence research. Inspired by Ginn and colleagues (Ginn et al., 1996), it seems relevant to explore how women's sickness absence relates to a broader structure of constraints and opportunities, and the scope of action that women themselves perceive to have in different areas of life, such as career, family, health, economy, and gender equality. Investigating how women's sickness absence relates to their scopes of action in other areas in life may help us to overcome the push–pull dichotomy in

previous sickness absence research, which tends to explain sickness absence either as a result of rational choices or as primarily stemming from external factors. Future research should illuminate further whether periods of sickness absence are related to other types of marginalization. A mixed methods approach seems useful in this regard. A quantitative approach would be appropriate for investigating the dynamics between women's sickness absence and other types of marginalization in the Norwegian welfare state, including work–family conflicts, long-term labour market exclusion, part-time employment, and women's economic dependency on their partners. The dynamic between women's sickness absence, fertility patterns, and the general well-being of women and their families should also be considered. Rather than viewing women's sickness absence simply in terms of agency or structure, we should further explore women's own accounts of their sickness absences, with particular emphasis on whether they recognize limitations in the scope of action in other areas of life, including work, family, household economy, and gender equality.

#### **4.4. Policy implications**

Fraser's concepts of *equality* and *difference* can be used to help us to recognize that in order to achieve a well-functioning society, policies that enhance equality between the genders must be balanced with policies that acknowledge and meet gender-specific needs. In this context, it is important to emphasize that women's greater sickness absence may be related to gender issues in contradictory ways. On the one hand, women's greater sickness absence makes them more vulnerable to both public recrimination and future retrenchments. A higher tolerance for sickness absence among women may also hinder their careers and income prospects, and may foster the expectation that female employees should still perform the lion's share of domestic work and child care. However, a generous sickness benefit reduces the gender pay gap, and a higher tolerance for sickness absence among female than male employees may be a precondition for keeping vulnerable women employed. A generous welfare system helps to

keep women from being financially dependent on their partners, especially during strenuous life phases. Policy makers should beware of this complexity and should aim to ensure a balanced and responsible approach to this issue.

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**Parenthood and sickness absence: Class and gender variations**

**A population registry analysis of married employees in Norway during 2003–2007**

Anja M. S. Ariansen

Department of Sociology, University of Bergen, Norway

**Corresponding author:**

Anja M. S. Ariansen, Department of Sociology, University of Bergen

Rosenbergsgaten 39, 5015 Bergen, Norway.

Email: [anja.steinsland@sos.uib.no](mailto:anja.steinsland@sos.uib.no)



## **Abstract**

Previous research has paid little attention to the impact of parenthood on sickness absence across gender and class. This paper investigates the interaction of class, gender, and parenthood on sickness absence in Norway, a country well known for its high levels of fertility, gender equality, and egalitarian class structure. Population-averaged probit and linear regressions were conducted on public records of all Norwegian employees during 2003–2007 from population registries. The risk of long-term sickness absence (>16 calendar days) *did not* increase with children (aged 1–11 years) among middle class employees, regardless of gender. The risk of sickness absence *did* increase with children among working class men, but not among working class women. Among employees with at least one period of long-term sickness absence, the number of sick days increased with children among middle class women and working class employees of both genders, while it decreased with children among middle class men. The findings partly support the idea that the combination of work and family obligations increases sickness absence, but only among women and working class men.

## **Keywords**

Gender, parenthood, sickness absence, social class

## **Introduction**

This paper aimed to investigate whether the association between parenthood and sickness absence varies according to class and gender in Norway. Gender roles have changed substantially in Western countries over the past few decades, particularly among middle class couples (Ellingsaeter et al., 1997; Esping-Andersen, 2009; Kitterød and Lappegård, 2012; Kitterød and Rønsen, 2013), which may indicate that the impact of parenthood on sickness absence has become increasingly diverse. However, the implications of these changes are discussed. Some scholars emphasize the ongoing disadvantage of working class women (Gillies, 2005). Others highlight work–family conflict in two-income families as a major challenge in contemporary welfare states (Bonoli, 2006: 6; Lewis, 2009: 1) Because full-time employment is more common among highly educated women (Moland, 2013: 21), middle class couples may be more prone to work–family conflict.

Norway is often cited as a success of the Nordic model because of its relatively egalitarian gender and class structures, and high rates of fertility and employment (Sümer, 2009; Wilkinson and Pickett, 2010). Accordingly, as many as 81% of all Norwegian mothers were engaged in paid work in 2005 (Bø et al., 2008). In line with the Nordic model, the Norwegian welfare state produces substantial redistribution, a feature generally considered an expression of a high level of between-class solidarity (Baldwin, 1990: 43). Redistribution policies include a generous sickness benefit, which implies that the increasing rates of sickness absence are a considerable public costs in Norway (OECD, 2007; OECD, 2013). Reduction of sickness absence is thus one of the main goals of a contract between the government and umbrella organizations including unions and employers' organizations first established in 2001 and still applies (AAD, 2001). However, measures to reduce sickness absence must take into account employed parents' total workload, which is of particular interest because the

combination of fertility and employment contributes to ensure financial sustainability of the welfare state (Esping-Andersen, 2009). Because parenthood practices vary according to gender and class (Crompton, 2006a; Duncan, 2005; Duncan and Irwin, 2004; Plantin, 2007; Stefansen and Farstad, 2010), investigations of parenthood and sickness absence should be sensitive to variations across these social strata. This study accounts for this complexity by investigating the three-way interaction of gender, class, and parenthood on sickness absence. Occupational class was measured in terms of the class scheme of Erikson, Goldthorpe, and Portocarero (EGP), because this scheme facilitates international comparability (Cavelaars et al., 1998; Hansen and Ingebrigtsen, 2008; Krokstad and Westin, 2002) and is suited to measure health inequality (Bartley et al., 1996; Muntaner et al., 2010).

#### *Previous research*

Previous research on parenthood and sickness absence has focused mainly on how sickness absence is influenced by having children (Bratberg et al., 2002; Cunningham-Burley et al., 2006; Mastekaasa, 2000; Mastekaasa, 2012; Voss et al., 2004; Voss et al., 2008). The concept of role is frequently used in this research and refers to the basic assumption that employed parents are subject to different sets of resources and obligations in their roles as employees and their roles as parents and that the combination of these roles may entail beneficial or adverse effects on health or sickness absence. In general, family obligations have been considered more relevant for understanding women's health and sickness absence than that of men's (Arber, 1991; Mastekaasa, 2012; Voss et al., 2008). The idea that the combination of different roles may imply negative strain was introduced several decades ago (Goode, 1960) and has been further divided into the terms 'role conflict' and 'role overload'. Role conflict refers to situations where the obligations of one role are directly incompatible with the obligations of another role, while role overload refers to situations where the individual's total

capacity is insufficient compared to the sum of obligations attached to their different roles (Sieber, 1974: 567).

Overall, having children has little impact on women's sickness absence in Norway (Bratberg et al., 2002; Mastekaasa, 2000; Mastekaasa, 2012). However, class variation has not received much attention in previous research on parenthood and sickness absence. Two notable exceptions have used education instead of class as a measure of stratification. Mastekaasa (2000) analysed a 10% random sample of an employment registry containing records of all employment relationships in Norway in the mid-1990s. He concluded that the impact of motherhood on risk for sickness absence did not vary across educational levels (Mastekaasa, 2000: 1838). In a more recent survey investigation, Ugreninov (2012: 117–9) concluded that less-educated mothers tend to undertake a larger share of domestic work, which in turn increases sickness absence in this group. These differing conclusions may reflect that they used different data sources from different historical contexts or consisted of different samples. The current study adds to this literature by conducting analyses on updated registry data encompassing the entire Norwegian population and providing reliable estimates of the impact of parenthood on sickness absence in different occupational classes.

A previous study found that class differences in sickness absence in Norway were less pronounced than expected because working class employees had an increased risk of leaving the labour market when experiencing health problems (Dahl and Birkelund, 1999). Further, class differentials in sickness absence seem to be more pronounced among men than women (Christensen et al., 2008; Hansen and Ingebrigtsen, 2008; Kristensen et al., 2010). The employees' opportunity to decide for themselves when and where to work, the pace at which to work, and the order of work tasks contributes to reduced sickness absence (Hultin, 2011; Hultin et al., 2010; Johansson et al., 2012; Johansson and Lundberg, 2004). Such adjustment opportunities may prevent health complaints from leading to sickness absence, but are often

lacking in working class occupations (Johansson and Lundberg, 2009). Because adjustment opportunities might be particularly valuable for working parents, lack of such adjustment opportunities in working class occupations may inflate sickness absence among such parents. To the extent that working class mothers are more involved in childcare than working class fathers are, adjustment opportunities may be more decisive for sickness absence in the former group.

Ideals and practices of parenthood are also known to vary substantially between social classes (Crompton, 2006a; Duncan, 2005; Duncan and Irwin, 2004; Plantin, 2007; Stefansen and Farstad, 2010). Norwegian women tend to marry men who are equally or more highly educated (Birkelund and Heldal, 2003); although Norwegian parents have shifted away from traditional gender roles, this development is more often seen in middle class couples in particular (Ellingsaeter et al., 1997; Kitterød and Rønsen, 2013). Similar differentials are also found elsewhere (Christensen and Larsen, 2008; Crompton, 2006b; Esping-Andersen, 2009; Plantin, 2007). It seems reasonable to assume that middle class fathers' participation in childcare and domestic work reduces their partners' workload at home, which reduces work overload among middle class mothers. Class differentials in gender roles may thus imply that the double burden of work and family may be more relevant for understanding sickness absence among working class mothers than those of the middle class, which leads to the hypothesis that the number of children is associated with both a higher risk of sickness absence and more sick days among working class women, but not among those of the middle class.

This paper also addresses important questions about the impact of fatherhood on sickness absence. Contemporary research emphasizes that work–family conflict increasingly poses a challenge to male as well as female employees (Coltrane, 2009; Ranson, 2012: 741-742; Strazdins et al., 2013). Although Norwegian women carry a larger portion of domestic and

childcare work (Bernhardt et al., 2008; Knudsen and Wærness, 2008), fathers spend increasingly more time with their children (Hook and Wolfe, 2012; Sullivan et al., 2009) and more time doing household chores (Kitterød and Rønsen, 2013; Knudsen and Wærness, 2006). Further, previous research suggest that the “double burden” of work and family has only a limited impact on women’s sickness absence because it is modified by widespread part-time employment among female employees in Norway (Bratberg et al., 2002). Downscaling to part-time employment is still rare among Norwegian men (Næsheim, 2013); therefore, parenthood may be increasingly relevant for understanding men’s sickness absence.

Increased involvement in childcare applies to most fathers, although the sharpest increase applies to middle class fathers (Kitterød and Rønsen, 2013; Stefansen and Farstad, 2010), but the implications of sickness absence in this group is unclear. One review concluded that fatherhood confers positive health effects (Bartlett, 2004), which may imply that middle class men's greater involvement in their family life leads to role accumulation, and that sickness absence decreases with fatherhood among middle class men. On the other hand, middle class men’s stronger participation in childcare and domestic work may also lead to role overload, i.e. that sickness absence increases with children in this group.

Further, working class occupations are often characterized by compulsory attendance and regular working hours, which make them more difficult to reconcile with parental responsibility than with middle class jobs. If so, having children may increase sickness absence among working class men, rather than middle class men. In contrast, traditional gender roles in the working class may mean that such adjustment opportunities are primarily of importance for working mothers, but not working class fathers. The impact of children on men's sickness absence is thus potentially ambiguous. Thus, this paper examines the open questions of whether fatherhood increases the risk of sickness absence and/or the number of sick days, and whether this impact varies according to class.

## **Data, variables, and methods**

The analyses presented in this paper were conducted using data from the population registry “Forløpsdatabasen Trygd” (FD-trygd), which is well known for its high quality (Mykletun and Øverland, 2009). The data consist of information recorded by public entities such as the Norwegian Labour and Welfare Administration, the Norwegian Tax Administration, and Statistics Norway (Akselsen et al., 2010: 6). Accordingly, the data do not suffer from non-response, drop-out, or self-reporting bias. Further, the registry contains information about all individuals in the Norwegian population, which eliminates the statistical risk of type I and type II errors. Sickness absence, age, gender, marital status, childbirth, children in the household, occupational class, and weekly working hours were all used in the current analyses.

The Norwegian illness benefits are very generous; sick employees’ salaries are compensated for an entire calendar year (OECD, 2013: 37). The employer covers the first 16 calendar days of the sick leave and the National Insurance Scheme (NIS) covers the remaining duration. The population registry only contains information about days of sickness absence which are covered by NIS. This implies that shorter periods are not recorded, and longer periods of sickness absence are only recorded beginning with the 17<sup>th</sup> calendar day. The sickness absence excluded from the registry equals the period covered by the employer, which amounts to about 32.7% of the total sickness absence among women and 37% among men (Bjerkedal and Thune, 2003).

Separate rules apply to self-employed individuals; therefore, these were excluded from analyses. Separate rules also apply to pregnant employees, although these only differ slightly. However, previous research has emphasized that sickness absence seemingly associated with motherhood is often confounded by pregnancy (Rieck and Telle, 2013), which also emphasizes the need for excluding pregnant employees in this study. Accordingly, women

were excluded from the analyses during the calendar year in which they became pregnant or delivered, with pregnancy onset defined as 282 days prior to delivery. Since infants require extra care, men were also excluded each calendar year when a transition to fatherhood occurred, to ensure comparability with women. Employees who were fully or partly on parental leave during the current year were also removed from analyses.

### *Variables*

Two different dimensions of sickness absence were investigated in the analyses: *risk of sickness absence*, and *sick days*. Employees who had at least one sick day covered by NIS during a calendar year were assigned a dummy variable score = 1 for *risk of sickness absence*. Employees with no registered, compensated days of sickness absence were assigned a score = 0.

The value of the variable *sick days* amounted to the total number of the individual's work days that were covered by NIS during one calendar year. Although some exceptions can be made for patients with chronic conditions, 248 is the maximum number of work days covered for most employees. Less than 0.4% of the observations had values that exceeded the maximum possible compensated days of sickness absence; the values of these observations were replaced with a value = 248 in order to avoid bias due to registration errors. Individuals with no registered days of sickness absence had a value = 0 on the dependent variable.

Social class was measured in terms of the EGP class scheme, with the purpose of broadly differentiating between middle and working class occupations in the group of married employees. The EGP class scheme groups together occupations with similar "typical market and work situations" (Erikson et al., 1979: 419-20), so the scheme is well-suited to capture differences in adjustment opportunities between middle and working class occupations. In addition, EGP class scheme has two obvious advantages. First, it is suited for international



comparability (Cavelaars et al., 1998; Hansen and Ingebrigtsen, 2008; Krokstad and Westin, 2002). Second, it is suited to measure health inequality (Bartley et al., 1996; Muntaner et al., 2010), which may be closely related to sickness absence.

Goldthorpe's class scheme was developed for investigating relations of authority in the labour market, rather than gender relations (Leiulfsrud et al., 2005). Goldthorpe's initial approach has been criticized for under valuing the importance of women's own work and not distinguishing sufficiently between female-dominated occupations with and without career opportunities (Crompton, 2008; Evans, 1996; Goldthorpe, 1983; Heath and Britten, 1984; Stanworth, 1984). However, in the following analyses, women will be categorized on the basis of their own occupations and the purpose of the class scheme was to separate broadly between middle class and working class occupations; therefore, different career tracks among lower level occupations is less relevant.

The most detailed version of the EGP class scheme contains 11 different classes (Erikson and Goldthorpe, 1992: 38-9) but because the analyses here were already complicated by interactions between class, gender, and parenthood, a simplified version of the class scheme was used to make the results more comprehensible. The occupational codes recorded in the database were categorized into the EGP class scheme by means of a manual developed by Flemmen and Andersen (Flemmen and Andersen, 2009), that uses a four-category version of the class scheme (Breen, 2005). The self-employed category was omitted from these analyses; the remaining classes were: *service class*, *intermediate class*, and *manual class* (Breen, 2005; Leiulfsrud et al., 2005: 9). Service class and manual class in the EGP class scheme correspond to the more general terms *middle class* and *working class*, respectively (Leiulfsrud et al., 2005: 7), which are used more widely than the terms reviewed here. In order to avoid confusion when discussing the current results in the light of this past literature, the terms middle class and working class were preferred over service class and manual class. Further,

the analyses also include the *intermediate class*, which is more ambiguous than the two former classes. For example, the intermediate class includes supervisors and is sometimes regarded as part of the middle class while in other circumstances is considered working class (Leiulfstrud et al., 2005: 7). Previous research has highlighted that the ambiguous nature of such occupations may make the employees that occupy them particularly prone to sickness absence (Peter and Siegrist, 1997), which speaks in favour of separating this class from the other two. Accordingly, classes were categorised as middle class, intermediate class, and working class and included as a set of independent dummy variables in the following analyses. Working class constituted the baseline, while dummy variables were included for intermediate class and middle class.

Changing gender roles speaks in favour of investigating the impacts of parenthood on sickness absence in ways that also consider men's situations. However, previous research on sickness absence tends to measure parenthood solely in terms of children in the household (Bratberg et al., 2002; Cunningham-Burley et al., 2006; Mastekaasa, 2000; Ugreninov, 2012: 116; Voss et al., 2004; Voss et al., 2008) instead of distinguishing between the respondent's own children and his or her stepchildren. This practice does not take into account that increasingly unstable family patterns in Norway have brought about growing numbers of stepparents (Jensen and Clausen, 2003) and that children tend to stay with their mother rather than their father after family dissolution (Skevik, 2006). Mixing parents and stepparents by measuring parenthood solely in terms of children in the household has different implications for men and women because men live more often with their partner's children. Further, the obligations of stepfathers are more weakly defined than the obligations of fathers (Edwards et al., 1999; Fine, 1996), which possibly indicates that the impact of stepfatherhood is less prominent than that of fatherhood on sickness absence. Accordingly, the widespread mixing of stepfathers and fathers in previous research on sickness absence suggests that the impact of

fatherhood on sickness absence may be under-estimated in previous research on parenthood and sickness absence. This issue highlights the importance of measuring parenthood in a way that prevents confusing children with stepchildren and thereby assesses the impact of parenthood on sickness absence in a way that better accounts for the particularities of men's situations. The analyses presented here make use of recent improvements to the Norwegian registry data that allow for more adequate measures of parenthood than those utilized in previous research. The continuous variable, *children*, was constructed by combining registration of births and households. The variable exclusively measures the number of children aged 1–11 years whose birth parent lived in same household that year. Employees with no registered transitions to parenthood were assigned the value = 0 on this variable.

Although the database includes both married and cohabiting couples, as well as singles with and without children, only married couples were included in this study. Unlike married couples, cohabiting couples are not recorded in the registry if they do not have children or if only one of the partners is the children's parent. Because the difference between couples with and without children is important here, cohabiting couples were excluded from the analyses.

The variable *male* was coded 1 for men and 0 for women. To account for class-specific gender roles, Model 2 of both regression analyses also includes three way interactions by adding the variables *male* and *children*, *class* and *male*, and *children* and *class*, as well as the product of *class*, *male*, and *children*. This procedure follows Jaccard's methodological approach to three way interactions (Jaccard, 2001: 41).

All estimates were adjusted for the three variables *working hours*, *year*, and *age*. The variable *working hours* was controlled for because part-time employees often work fewer than 5 days a week, which accordingly limits their possible number of sick days. The value of this variable amounts to the individual's average number of contractual working hours. To avoid registration errors leading to influential outliers, the variable *working hours* was limited to a

maximum value of 40 hours, even though the actual number of contractual working hours may be higher for some employees. Further, the regression includes observations from the years 2003–2007. In the regression analyses, the control variable year consists of a set of dummy variables; therefore, it captures time trends as well as annual economic fluctuations, which may influence sickness absence during the observed period.

The individual's value on the continuous variable age equals his or her age during the current calendar year. The analysed data are limited to employees aged 20–67 years where the upper limit of this interval equals the formal retirement age.

About 1.99% of all registered employees were deleted because of missing values for age and gender. Of the remaining population, only married employees who also had a registered annual salary during at least one year of the observation period were included in the analyses. About 0.3% of the observations were excluded from analyses due to missing values on marital status, and another 0.2% were excluded because of missing value or less than one average weekly working hour for the variable working hours. Finally, 6.97% of the remaining observations were deleted because of missing value on the variable class. The study population consisted of 4,059,891 annual observations distributed across 1,085,994 individuals who met the inclusion criteria of valid registrations confirming their marriage, earnings, sex, age, occupation, and at least one weekly working hour during one or more year(s) during the observed period.

## **Methods**

As described earlier, periods of sickness absence are only recorded in the registry from the 17<sup>th</sup> calendar day and onwards, thus the number of *sick days* is left censored. The Tobit model is often preferred for censored data, but this model is sensitive to non-normality and heteroscedasticity. For this reason, I rather preferred a “two-part model” which is better suited

when the assumptions of normality and homoscedasticity are not met (Cameron and Trivedi, 2009: 538). This two-step approach estimates the probability of having at least one event and then estimates the number of events in the subgroup of observations with at least one event (Cameron and Trivedi, 2005: 546). In this study, the first step consisted of a probit regression, which estimates the risk of having at least one period of long-term sickness absence (>16 calendar days) and thus at least one day of absence covered and registered by the NIS. Only employees who had at least one period of long-term sickness absence were included in the second step of this two-part model, for which the number of sick days covered by the NIS was log transformed and included as the dependent variable in a linear regression to analyse the number of sick days among employees with long-term sickness absence.

Most employees had more than one year of observation during the analysis period, which speaks in favour of panel data analysis because it controls for dependency between observations that apply to the same individual. Unfortunately, fixed-effects models do not allow for assessing the impact of gender and other variables that remain constant over time (Petersen, 2004). While both random effects models and population-averaged models allow for including time constant variables, random effects models estimate how certain variables affect a specific outcome on the individual level, while population-averaged models estimate the average outcome change on the population level (Allison and Waterman, 2002: 65). Because this study aimed to investigate the impact of parenthood on sickness absence in the Norwegian population, the population-averaged model was preferred for both probit and linear regression models. In both regression models, the interpretation of the coefficients is difficult and further complicated by the product terms included to account for the three-way interactions between gender, class, and number of children. For simplicity, the results were transformed into graphs by means of the Stata margins command. The main findings of the regression analyses are thus presented as graphs illustrating the marginal effects of gender,

class, and children on sickness absence, holding the control variables constant at means values. The regression models are also provided as values (see the appendices).

The data utilized in this study capture the entire population rather than a sample, which has implications for significance testing. Significance testing is usually included in statistical analyses to consider the probability that the findings with a sample also apply to the population as a whole, although for population data it may serve other purposes (Hoem, 2008). Because significance testing does not serve the purpose of generalization to the population when the data contain the entire population, as is the case for this paper, significant testing was left out of the analyses.

## **Results**

Table 1 gives an overview of the population characteristics of married employees on which the subsequent analyses are based. About 24% of women and 16.4% of men had at least one day of sickness absence recorded. The average number of sick days covered by NIS was 14.9 for women and 9.9 for men. These numbers exclude sick days during the first 16 calendar days of all sick periods, which were covered by the employer. Both women and men had an average of 0.4 children aged 1–11 years. The working class included the highest percent of female employees, while almost half of all men belonged to the middle class. The average age was quite high, which reflected that the study population consisted exclusively of married employees, while cohabitation was most common among younger Norwegians (Noack, 2001). Women had shorter working hours than men did, although there was substantial variation. The observations were fairly equally distributed across the calendar years 2003–2007. As mentioned, pregnant women, parents of newborn infants, and employees on parental leave were excluded from analyses. As these groups were relatively young, this probably further raised the average age of the study population.

Table 1. Descriptive statistics for the total number of annual observations.

		Women		Men	
		Mean/Percent	St. Dev.	Mean/Percent	St. Dev.
Dependent variables	Risk for long term sickness absence <sup>1</sup> (Yes=1/No=0)	24.05	---	16.41	---
	Days of sickness absence <sup>2</sup>	14.9	40.8	9.9	33.6
Independent variables	Children	0.4	0.8	0.4	0.8
	Middle class	30.83	---	48.96	---
	Intermediate class	32.96	---	13.62	---
	Working class	36.20	---	37.42	---
Control variables	Age	47.3	9.5	48.2	9.5
	Working hours	29.0	10.3	35.1	7.7
	Year	2005.1	1.4	2005.1	1.4

A population-averaged probit regression with a dichotomous sickness absence variable as the dependent variable and three-way interaction between gender, class, and children was conducted. Figure 1, based on values from Appendix 1, Model 2, illustrates the association between number of children and risk of sickness absence among employees of both genders and all three classes, after adjustment for calendar year, age, and working hours.

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<sup>1</sup> > 16 calendar days.

<sup>2</sup> The number of sick days was counted from the 17<sup>th</sup> calendar day of the period.

In all three classes, women had a higher risk of sickness absence than men did. For both genders, the lowest risk of sickness absence was found in the middle class, while the highest risk applied to the working class. Furthermore, there was a three-way interaction between gender, class, and parenthood. Among women in the working class, the risk of sickness absence did not vary according to the number of children. In the intermediate class, the risk of sickness absence increased with the number of children, while it decreased among middle class women. Among men, the risk of sickness absence increased with the number of children in the working class, while the opposite pattern was found in the middle class and no association was found in the intermediate class.

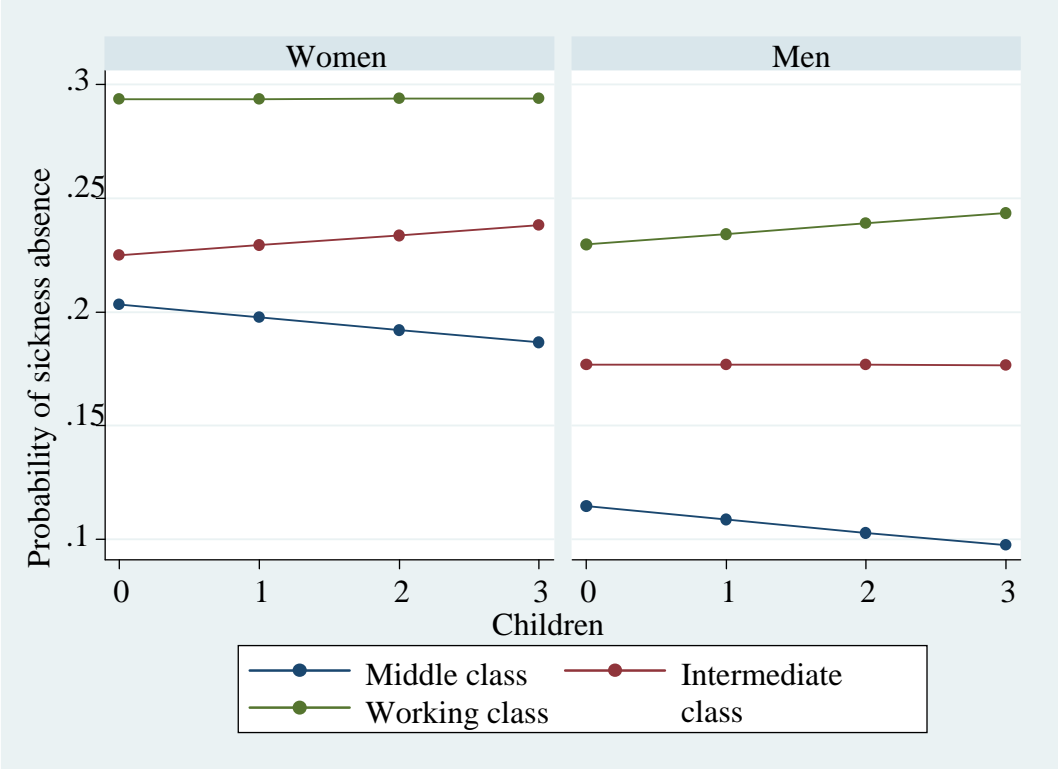


Figure 1. Risk of long-term sickness absence (>16 calendar days) among female and male employees in different classes with 0, 1, 2, or 3 children.

Figure 2, based on values from Appendix 2, Model 2, illustrates the results of a population-



averaged linear regression with natural logarithm of the value of sick days as the dependent variable. Only employees with at least one day of sickness absence were included and the graph illustrates a three-way interaction between gender, class, and number of children on sickness absence. The results were adjusted for calendar year, age, and working hours.

Among women, the number of sick days increased with number of children in all three classes, and the sharpest increase was found in the working class. Among men in the working class, the duration of sickness absence slightly increased with number of children. In contrast, duration of sickness absence sharply decreased with children in the two other classes. The number of sick days increased sharply with the number of children among working class women, in contrast to the strong reduction in number of sick days associated with fatherhood in the intermediate and middle classes.

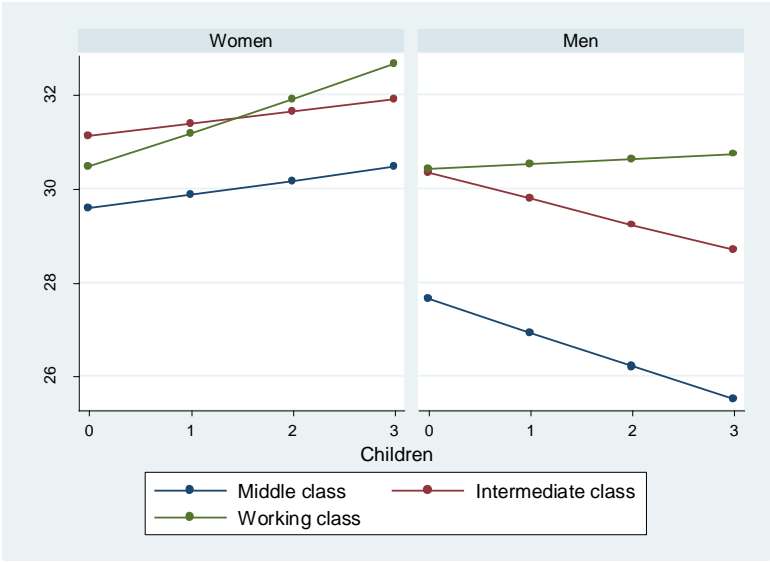


Figure 2. Number of sick days<sup>3</sup> among female and male employees with at least one spell of long term sickness absence. According to class and number of children.

<sup>3</sup> The number of sick days was counted from the 17<sup>th</sup> calendar day of the period.

## Discussion

The results revealed that the risk of long-term sickness absence (>16 calendar days) did not increase with children among either working class or middle class mothers. However, among employees with at least one period of long-term sickness absence, the number of sick days increased with children in both groups. Furthermore, fatherhood was primarily associated with a higher risk of long-term sickness absence in the working class and among male employees with at least one period of long-term sickness absence, the number of sick days increased with children in the working class but not in the middle class.

These results did not support the hypothesis that the risk of sickness absence and number of sick days would increase with number of children among working class women, but not middle class women. Rather, the risk of sickness absence did not increase with children among either working class or middle class mothers. Among employees with at least one period of long-term sickness absence, the number of sick days increased with children in both groups. Further, the number of children was associated with a higher risk and a longer duration of sickness absence among working class men, but not among middle class men.

In both the working class and the middle class, motherhood did not entail a higher frequency of sickness absence, but did entail a higher number of sick days among employees with long term sickness absence. This finding supports previous research suggesting that working mothers are characterized by selection, i.e. that women with health problems are more likely to exit the labour market when they transition to motherhood (Bratberg et al., 2002; Kitterød and Rønsen, 2011). In the intermediate class, motherhood was followed by both increased risk and a higher number of sick days among employees with long term sickness absence, which possibly indicated that the ambiguity of the occupations within this class pose extra challenges for working mothers.

In the working class, fatherhood was associated with an increased risk of sickness absence and also a higher number of sick days in the group of employees with at least one period of sickness absence. In contrast, both the risk of long-term sickness absence and the number of sick days among those who had at least one such period decreased with children among middle class men, although ideals of gender equality are considered to be more pronounced in the middle class than in the working class. Ignoring the class dimension easily leads to an under-estimation of the impact of fatherhood on sickness absence among working class employees, as the positive impact of fatherhood on sickness absence in the working class would then have been counteracted by the marginal and/or negative impact of fatherhood on risk and duration of sickness absence in the other classes. In previous research, the concept of role conflict has tended to ignore the issue of class. However, these new findings highlight the need to consider class differentials when investigating parenthood and sickness absence.

Among employees with long term sickness absence, the number of sick days increased more strongly with parenthood in the working class compared with the other classes. This was the case for both genders, and should be viewed in light of previous research that working class employees are more likely to leave the labour market when experiencing health problems (Dahl and Birkelund, 1999) and that less healthy women more often leave the labour market when becoming mothers (Bratberg et al., 2002). In light of these contributions, it seems relevant to question whether the increased number of sick days among working class parents of both genders should be understood in terms of similar processes of health selection.

However, previous research has also highlighted the impact of work characteristics for class differentials in sickness absence (Johansson and Lundberg, 2009), thus the increased number of sick days among workers of both genders may also reflect that working class employees lack the adjustment opportunities that facilitate return to work for parents with health complaints. The findings may thus indicate that the changing gender roles within the

middle class may be less of a problem for working parents compared to the lack of adjustment opportunities that working class parents experience in their occupations. This speaks in favour of strengthening the integration of the sociological concept of role conflict and perspectives highlighting class differentials in working conditions in future research. Such an integrative approach may contribute to an understanding of parents' sickness absence and similar issues related to work–family conflict that consider the dynamics between employees' opportunities and constraints both in the public and private spheres.

Among middle class employees of both genders, the risk of sickness absence decreased with number of children. However, the impact of children on the number of sick days among employees with at least one period of long-term sickness absence was strikingly different for the two genders. Having children was associated with a higher number of sick days among middle class women, but lower among middle class men. Regarding the number of sick days, gender differences were smaller in the working class than in the middle class. This is surprising given previous research suggesting that the middle class is characterized by stronger norms of gender equality in employment and domestic work. Thus, one would expect the gender difference in sickness absence to be smaller in the middle class than in the working class, rather than the opposite.

Patterns of gender inequality in earnings may be useful for understanding this result. Even though the middle class is characterized by smaller gender gaps in employment and household work, this is not the case for earnings. On the contrary, the largest gender pay gap is found at the top of the hierarchy (Arulampalam et al., 2007), which is a pattern also found in Norway (Korpi et al., 2013; Mandel and Semyonov, 2006; OECD, 2012). Considering that Norwegian women tend to marry men who have at least the same level of education as their own (Birkelund and Heldal, 2003), the large gender difference in duration of sickness absence among middle class parents may be influenced by this wage structure. In spite of middle class

parents' ideals of gender equality, it would be economically irrational to prioritize the spouses' careers equally strongly in times of work–family conflict, if the future household economy depends more strongly on the husband's career track than the wife's. This might explain why the interplay of class and gender in sickness absence seem to have more in common with the inequality structure of the wage distribution than that of employment or childcare work and possibly indicates that the current wage distribution poses a challenge for middle class women's careers in more ways than one.

The empirical analyses of this study are characterized by both strengths and limitations. Because the dataset was based on public records rather than survey-based participation, the results do not suffer from bias due to non-response, attrition, or self-reporting. Furthermore, the entire population was included, excluding risks of type I or type II errors. Finally, parenthood was measured in a way that takes into account that unstable family formations differ for men and women.

The study also has several weaknesses. First, periods of sickness absence were left censored, so that periods shorter than 17 calendar days were not included. This weakness may have inflated women's sickness absence compared to that of men's, considering that a previous study found that the proportion of the total sickness absence which was categorized as short-term sickness absence was about 4 percentage points higher among men than among women (Bjerkedal and Thune, 2003). Second, the study population consisted exclusively of married individuals and the possible impact of stepchildren or children outside the household were not investigated. Finally, the study does not reveal the extent to which the impact of children on sickness absence reflects causality or selection. Future research should aim to illuminate this and to investigate the extent to which similar patterns of sickness absence apply to single or cohabitating working parents. The possible impact of stepchildren or children with whom the parent does not live on sickness absence should also be investigated.

In spite of these limitations, this study revealed that the impact of parenthood on sickness absence in Norway varies substantially according to class and gender.

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## Appendix

Appendix 1. Population-averaged probit regression with risk of long-term sickness absence (>16 calendar days) as the dependent variable and three-way interaction between gender, class, and children. Adjusted for calendar year, age, and working hours.

	Model 1	Model 2
Middle class (Baseline: Working class)	-0.394	-0.287
Intermediate class	-0.218	-0.212
Men (Baseline: Women)	-0.284	-0.228
Children	0.001	0.001
Men × Children	-0.007	0.015
Middle class × Children		-0.020
Intermediate class × Children		0.014
Men × Middle class		-0.171
Men × Intermediate class		0.026
Men × Middle class × Children		-0.027
Men × Intermediate class × Children		-0.031
Constant	-1.131	-1.157
Observations	4 059 891	4 059 891
Individuals	1 085 994	1 085 994

Appendix 2. Population-averaged linear regression with natural logarithm of total sick days<sup>4</sup> as the dependent variable and three-way interaction between gender, class, and number of children. Adjusted for calendar year, age, and working hours. Only employees with at least one spell of long term sickness absence (>16 calendar days) included.

Count component	Model 1	Model 2
Middle class (Baseline: Working class)	-0.068	-0.029
Intermediate class	0.004	0.022
Men (Baseline: Women)	0.019	0.045
Children	0.015	0.023
Men × Children	-0.024	-0.020
Middle class × Children		-0.014
Intermediate class × Children		-0.015
Men × Middle class		-0.065
Men × Intermediate		-0.024
Men × Middle class × Children		-0.017
Men × Intermediate class × Children		-0.007
Constant	3.172	3.159
Observations	820 319	820 319
Individuals	447 084	447 084

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<sup>4</sup> The number of sick days was counted from the 17<sup>th</sup> calendar day of the period.

# Does Postponement of First Pregnancy Increase Gender Differences in Sickness Absence? A Register Based Analysis of Norwegian Employees in 1993–2007

Anja M. S. Ariansen<sup>1\*</sup>, Arnstein Mykletun<sup>2,3</sup>

**1** Department of Sociology, University of Bergen, Bergen, Norway, **2** Norwegian Institute of Public Health (FHI), Bergen, Norway, **3** University of New South Wales, School of Psychiatry, Sydney, Australia

## Abstract

**Background:** From 1970–2012, the average age at first delivery increased from 23.2–28.5 in Norway. Postponement of first pregnancy increases risks of medical complications both during and after pregnancy. Sickness absence during pregnancy has over the last two decades increased considerably more than in non-pregnant women. The aim of this paper is twofold: Firstly to investigate if postponement of pregnancy is related to increased sickness absence and thus contributing to the increased gender difference in sickness absence; and secondly, to estimate how much of the increased gender difference in sickness absence that can be accounted for by increased sickness absence amongst pregnant women.

**Methods:** We employed registry-data to analyse sickness absence among all Norwegian employees with income equivalent to full-time work in the period 1993–2007.

**Results:** After control for age, education, and income, pregnant women's sickness absence (age 20–44) increased on average 0.94 percentage points each year, compared to 0.29 in non-pregnant women and 0.14 in men. In pregnant women aged 20–24, sickness absence during pregnancy increased by 0.96 percent points per calendar year, compared to 0.60 in age-group 30–34. Sickness absence during pregnancy accounted for 25% of the increased gender gap in sickness absence, accounting for changes in education, income and age.

**Conclusions:** Postponement of first pregnancy does not explain the increase in pregnant women's sickness absence during the period 1993–2007 as both the highest level and increase in sickness absence is seen in the younger women. Reasons are poorly understood, but still important as it accounts for 25% of the increased gender gap in sickness absence.

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\* E-mail: Anja.Steinsland@sos.uib.no

## Introduction

Norway's high levels of fertility and female employment is often cited in support of the success story of the Nordic model [1]. The employment rate has recently reached 73% among women and 77% among men [2], and in 2008 the fertility rate was 1.96 [3]. However, high and growing levels of sickness absence is also part of this picture, and entails public costs [4]. To what extent increased sickness absence over the last two decades primarily applied to women in general is currently being debated [5], [6], while the recent increase in sickness absence among pregnant women is less controversial [7], [8]. In order to facilitate fertility as well as female employment, it is imperative to better understand causes of the increase in pregnancy related sickness absence, and also causes for sickness absence in general.

Norway is a social democratic welfare state [9], which provides generous health care services and pensions to reduce social

inequality [10]. Accordingly, sick listed employees get their wage fully compensated for a year, and high and growing levels of sickness absence entail substantial public expenses.

Previous research on pregnant women's sickness absence has investigated the impact of economic incentives [11–14], while the possible impact of higher age for pregnant women's increased absence has received less attention. The impact of higher age on pregnant women's sickness absence is only partly investigated, and the impact of pregnancy on the increasing gender differences is not examined. Moreover, increasing age among pregnant women applies to most western countries, not only Norway [15], [16].

Higher age among pregnant women follows from the educational expansion, which recently has occurred in European and North-American countries. Women increasingly take part in higher education or career start prior to first pregnancy, thus giving birth later in life, compared to women in previous

generations [15–17]. As the risk for adverse outcomes tends to intensify with increasing age [18], [19], delayed childbearing might entail growing levels of sickness absence among highly educated pregnant women.

Rieck et.al. [7] and Markussen et.al. [8] have recently found the increase in sickness absence during pregnancy to be strongest in younger women, but the level of sickness absence across age groups of pregnant women was not the focus of attention in their analyses. The strong demographic tendency of postponement of pregnancies implies that a relatively large proportion of more women now give birth at an age with a relatively higher risk of medical complications.

Pregnant women's increased sickness absence in Norway coincides with a discussion about to what extent gender differences in sickness absence are currently increasing and reasons for this eventual increase [5], [6]. The topic is also high on the political agenda, because gender equality largely is a shared political goal in Norway, which lately has resulted in increased levels of education, employment, and income among women [20], and men doing more household work [21].

As sickness absence might have negative side effects in terms of reduced income prospects, social exclusion and reduced career opportunities [22–24], women's higher rate of sickness absence represents an obstacle to gender equality in the labor market.

Thus several attempts have been made to explain the gender differences in sickness absence, both in Norway and elsewhere. Contributions in this regard broadly focus on explaining women's heightened sickness absence in terms of one or more of the 5 following approaches: 1) health differences, 2) pregnancy, 3) the double burden of work and family, 4) gender segregation in the labour market and 5) normative threshold for sickness absence.

Analyses from US suggest that biological differences accounts for some of the gender differences in sickness absence [25]. Several studies indicate that biological factors entail health differences between the sexes [26–28]. In spite of this, gender differences in sickness absence in Norway is so far not explained by health differences [29]. It is difficult to imagine biological changes accounting for the increased gender difference in sickness absence over the last 3 decades, as the biological differences between the sexes remains rather constant over such a short time period.

The impact of pregnancy on the gender differences in sickness absence is not previously assessed, but the impact is shown to be substantial in Sweden [30], [31]. Parenthood only has a limited impact on Norwegian women's sickness absence [32], [33].

Although the Norwegian labour market is highly segregated, this does not account for women's higher sickness absence [34]. However, occupational changes partly explains the why gender differences have increased, especially the increase that occurred during the 80ies [6]. A majority of women at the workplace seems to entail increased sickness absence, which possibly reflects gender specific attitudes to sickness absence [35], [36]. However, this does not explain much of the gender differences in Norway [36].

In spite of several efforts to solve the puzzle, gender differences in sickness absence in Norway remains largely unexplained. The impact of pregnancy is however not yet assessed in Norway, although pregnancy has had a considerable impact on gender differences in sickness absence in Sweden [30], [31]. The recent increase in pregnant women's sickness absence in Norway [8] further highlights the question of whether the increasing gender differences in sickness absence is mainly due to pregnancy, and whether the growing difference between the sexes is accounted for by the increase among pregnant women.

The first aim of this paper is to examine if pregnant women's increased sickness absence is partly explained by the growing

numbers of pregnant women aged 30 and above being more prone to sickness absence. The second aim of the paper is to examine if the increased gender differences in sickness absence is accounted for by increased sickness absence during pregnancy.

## Methods

Our analyses are carried out on the event history data base "FD-Trygd". This contains information about The Norwegian population, and each individual's job and family characteristics and his/her receipt of welfare benefits. The registrations are carried out by The Norwegian Labour and Welfare Administration, The Norwegian Tax Administration, and Ministry of Health and Care Services in cooperation with the national estimation agency Statistics Norway at the Ministry of Finance.

## Ethics

The Norwegian Data Protection Authority has approved utilisation of the registry data for purposes like this study. Informed consent was not required, because the data were made anonymous. According to Norwegian law, such projects are not subject to approval by the medical ethics committees.

## Data management

The data collection contains detailed information about every sick leave spell covered by the national insurance, as well as information about age, gender, annual salary and educational level, and also date of delivery when this occurred. Due to inadequate information on part-time employment and weekly working hours, part time employees and non-pregnant employees who were on parental leave part of the year were excluded from our analyses. Women were also excluded from the estimates for non-pregnant women the calendar year they became pregnant, as their possible number of sick days in a non-pregnant condition were then reduced. We used an income based inclusion criterion to exclude part-timers.

The full-time income inclusion criterion was based on income from annual salaries only. All employees were only included in the analysis for the years that he or she had exceeded the income inclusion criterion. Sickness absence was estimated for employees only; absence from any additional activities as self-employed was excluded from our analyses. The employees' sickness absence included all records regardless of diagnosis, including episodes where other people's disease was recorded as the cause of the employee's absence. In line with this any days of absence covered by the National Insurance through the pregnancy benefit arrangement were also included. Pregnancy benefit applies to cases where the pregnant woman's working conditions posed a risk to the fetus. Many sick spells (or pregnancy benefit spells) began in one calendar year and ended in the following. In these cases we divided the individual's total number of absence days between the two calendar years, according to the proportions of the spell which occurred prior to and after year end, respectively.

The lower cut-off for full-time income was subject to discussion, as there was no common statutory minimum wage for all employees in Norway during the observation period. Rather, the minimum wage varied with occupational and union membership throughout the period, as unions negotiated different minimum wages in various professions on behalf of their members. Gradually the minimum wage for union members was applied to all workers within specific sectors, in line with The Act on General Application from 1993. The inclusion criterion for our analyses was full-time income above 3.5 Basic Units of the National Insurance, which was adjusted according to the annual



increase of employees' salaries each year [37]. The inclusion criterion constituted a gross annual salary of NOK 229 267 before tax in 2007 (about EUR 30 826). This cut-off was about NOK 10000 below the average annual salary of the 10% lowest-paid full-time employed women in 2007, which was estimated by the online calculator of Statistics Norway [38].

Placing the cut-off somewhat below the average salary of these women was decided to ensure inclusion of the vast majority of full-time employed men and women in low-paid occupations in the analyses. Lowering the cut-off further implied including more high-paid part-time employees. However, the limit of 3.5 basic units allowed inclusion also of an unknown, but probably limited, proportion of high-income part-time employees. To ensure that the conclusion did not depend solely on the income inclusion criterion, all analyses were firstly based on the definition of full time employment based on 3.5 basic units cut-off, and then we repeated the main analyses with the higher cut-off of 4 basic units. The change in income limit did not change any of the main findings or conclusions, the most important change of findings being that the proportion of the increased gender gap in sickness absence accounted for by sickness absence during pregnancy increased from 2.5% to 26.6%. In the balance between including too many high-salary part-time employees versus excluding low-income full-time employees, we decided to keep the >3.5 basic unit definition of full-time income, an inclusion criterion for all analyses in this paper. Each individual was only included in the estimates for the years that his or her gross salary exceeded the income cut-off.

## Definitions

In the following analyses births were not registered before 1992. To identify first-time pregnancies we combined household registers from 1992 with birth registers from 1992 and onwards. Only women without children in the household in 1992 and without previous registered births from 1992 onwards were categorised as first-time mothers. If the youngest child registered in the women's household in 1992 were less than 18 years younger than the woman herself we regarded this as a younger sibling rather than offspring. Accordingly the first registered pregnancy of these women from 1992 onwards was also categorised as first-time pregnancy.

The duration of pregnancy obviously varies [39]. In our analyses pregnancy was defined as a period starting from 282 days prior to delivery and until the pregnant women gave birth. This definition equals expected gestational age, which starts the first day of last pregnancy prior to conception and ends the day of delivery, and accordingly extends the average period from conception to birth with 16 days. Defining pregnancy in terms of gestational age suited two purposes in our analyses. Firstly, health professionals in the Norwegian health care system communicating with pregnant women or women who are planning to get pregnant frequently refer to the first day of the last menstrual period before conception as the first day of pregnancy. Thus this measure covers the entire period that many women perceived themselves as undergoing pregnancy, even though it is not medically confirmed yet. To the extent that this perception change their sickness absence, we consider them categorized as pregnant at that time, rather than not. Secondly this definition captures sickness absence among pregnant women who give birth after term as well. In sum, pregnancy possibly influences sickness absence for many women for a period which somehow exceeds the expected period between conception and birth with a few days, and our assessment of pregnancy is suited to capture this. All days of sick leave that occurred from the defined pregnancy start until the woman gave

birth or goes on maternity leave was categorised as sickness absence during pregnancy, regardless of diagnosis.

Educational level was categorized in terms of primary school (completed primary school or lower), secondary school (completed secondary school) and higher education (completed bachelor or higher degree). Although job category could be relevant as well, information about occupation is only accessible from 2003 and onwards, and was thus not available for the analyses.

## Statistical analyses

In each of the analyses presented sickness absence was measured as a rate; the number of number of sick days actually covered by the National Insurance insurance the current year is divided on maximum possible sick leave days covered by the national insurance over the same time span. We regarded this estimate as more accurate than estimates based on the individual's contracted working hours as information about the latter is characterized by altered registration practices during the observation period. Each spell was limited to the maximum number of days officially compensated by the national insurance the current year, to avoid outliers due to registration errors.

Descriptive statistics are presented in Tables 1 and 2, while the main findings are presented in graphs. Regression analyses were included in order to estimate regression coefficients, adjust for potential confounding factors, and examine curve-linearity and interactions. As the analyses are based on the entire population and not a sample thereof, it is not relevant to rely on p-values for interpretations related to whether observed trends, associations and interactions are type 1 errors or also present in the general population. However, regression models were applied for purposes of quantification of trends, shapes of associations and interactions. Ordinary least square regression was preferred as the dependent variable of sickness absence is continuous.

The regression analysis presented in Table 3 served to estimate the annual increased in sickness absence among pregnant women, and adjust this estimate for interactions of age and education. In the regression model, year was included as a continuous variable with year as unit. The estimates were also adjusted for income, which is a continuous variable whose value equals the employees earnings measured in number of basic units the current year. One basic unit amounted to about EUR 8 807 in 2007.

Further, education was included in the regression models a set of dummy variables, with primary school as the baseline category, and separate dummies for secondary school and higher education. In the regression analyses, the variable age is a continuous variable, its value equals the current calendar year minus the respondent's year of birth.

Age squared was also included to examine possible curved associations with age. Because the impact of age on sickness absence may differ between pregnant women in different educational groups, the products of age and each of the education dummies were included as interaction terms.

Finally, a three way interaction between calendar year, age and educational level was included to account for the possibility that the interaction between age and educational level vary over time. A three way interaction may be solved by including the two way products of all three variables as separate variables, in addition to the product of all three of them [40]. Thus year by age, age by education, and year by education, as well as the three way interaction term year by age by education was included in the regression model.

The regression analysis presented in Table 4 was conducted to estimate the percentage of the increased gender difference in sickness absence which applied to pregnant women. Here, the

**Table 1.** Descriptive statistics of study population.

	1993				2007			
	Men	Non-pregnant women	Pregnant women	Total	Men	Non-pregnant women	Pregnant women	Total
Frequency	481965	262648	25214	769827	507715	320534	31846	860095
Percentage (%)	62.61	34.12	3.28	100	59.03	37.27	3.70	100
Any sickness absence <sup>1</sup> (% Yes)	10.0	14.2	58.1	13.1	13.4	21.4	67.6	18.5
Sickness absence percentage (%)	1.7	2.4	17.6	2.4	2.9	4.9	25.7	4.5
Age (mean)	33.7	34.4	29.8	33.8	34.1	35.4	31.6	34.5
Earnings (# Basic units <sup>2</sup> )	6.66	5.16	4.85	6.09	7.00	5.48	5.15	6.37
Education (% Higher)	26.58	34.32	41.98	29.73	31.08	49.36	66.23	39.31

<sup>1</sup>Both the percentage of employees with any sickness absence at all and the annual sickness absence percentage of sickness absence are based on registrations which are normally counted from day 17 of the spell. More details about the variables are found in the Methods section.

<sup>2</sup>One basic unit of income amounted to about EUR 8807 in 2007.  
doi:10.1371/journal.pone.0093006.t001

dependent variable consisted of average sickness absence percentage and the regression analysis includes pregnant women, non-pregnant women, and men. When estimating the impact of pregnancy on the gender differentials in sickness absence, it was required to take into account that each pregnant woman was working less than a full time equivalent in pregnant condition. Therefore all individuals were weighted in the regression to account not only for their average level of sickness absence, but also the proportion of a working year that they were employed.

The coding of the variables in the regression model presented in Table 4 equals that of the corresponding variables in Table 3. In addition, the variables gender and pregnancy were included in the regression model in Table 4. The variable gender was coded 1 for

women and 0 for men, while the variable pregnancy was coded 1 for pregnant women and 0 for non-pregnant women and men.

Estimation of the impact of pregnancy on the increased gender differences in sickness absence was based on regression coefficients. We estimated the increased gender differences by including the variables gender, year, and the interaction of gender by year. The regression coefficient of the interaction term provides an estimate of the average annual increase of the gender differences in sickness absence percentage. The impact of pregnancy was estimated to equal the percentage reduction in the value of the interaction term when pregnancy and the annual increase in sickness absence among pregnant women was controlled for, the latter by means of an additional interaction term: pregnancy by year. The estimate was further adjusted for the interaction of

**Table 2.** Percentage points of sickness absence among first-time pregnant women.

	20–24		25–29		30–34		35–39		40–44	
	N	%	N	%	N	%	N	%	N	%
1993	2091	16.73	6393	51.14	3070	24.56	816	6.53	131	1.05
1994	1874	14.69	6473	50.74	3336	26.15	923	7.23	152	1.19
1995	1854	14.49	6377	49.83	3452	26.97	959	7.49	156	1.22
1996	1796	13.8	6476	49.77	3610	27.74	980	7.53	151	1.16
1997	1635	12.57	6321	48.61	3827	29.43	1044	8.03	176	1.35
1998	1528	11.59	6300	47.79	4062	30.81	1129	8.56	164	1.24
1999	1771	12.44	6730	47.27	4388	30.82	1176	8.26	173	1.22
2000	1663	11.65	6661	46.66	4509	31.58	1260	8.83	183	1.28
2001	1582	11.38	6299	45.3	4554	32.75	1292	9.29	177	1.27
2002	1471	10.77	5977	43.77	4758	34.84	1255	9.19	194	1.42
2003	1365	9.82	5869	42.24	5009	36.05	1453	10.46	198	1.43
2004	1261	9.09	5712	41.2	5094	36.74	1562	11.27	236	1.7
2005	1108	8.44	5202	39.61	5058	38.52	1513	11.52	251	1.91
2006	1151	8.57	5356	39.86	4986	37.11	1686	12.55	258	1.92
2007	1259	9.4	5169	38.59	4924	36.76	1713	12.79	330	2.46

According to age group.  
doi:10.1371/journal.pone.0093006.t002

**Table 3.** Linear regression model with percentage points of sickness absence as the dependent variable.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Year	0.64		0.94	0.94	0.93	1.70
Age		-0.52	-0.24	-3.93	-3.48	19.28
Income(# Basic units)			-1.39	-1.37	-1.42	-1.42
Secondary school			-7.01	-6.70	-6.18	-882.42
Higher education			-13.47	-12.62	-22.01	-1,203.57
Age x Age				0.06	0.05	0.05
Secondary school x Age					-0.02	37.83
Higher education x Age					0.32	89.84
Year x Age						-0.01
Secondary school x Year						0.44
Higher education x Year						0.59
Secondary school x Year x Age						-0.02
Higher education x Year x Age						-0.04
Constant	-1,261	35.28	-1,839	-1,774	-1,775	-3,308
Observations	188447	188447	188447	188447	188447	188447
R-squared	0.01	0.01	0.07	0.07	0.07	0.08

Only first-time pregnant women included.  
doi:10.1371/journal.pone.0093006.t003

pregnancy by age to account for the specific age effect among pregnant women. The percentage of the value of the coefficient of gender by year which remained after control for the annually increased sickness absence among pregnant women and pregnancy by age equaled the percentage of the increased gender difference which applies to non-pregnant women.

Statistical generalization in terms of confidence intervals and significance testing was left out of the following analyses. This is due to characteristics of the data employed, which is the entire Norwegian population rather than a sample thereof.

Pregnant women's sickness absence increased over the period 1993–2007, merely interrupted by short breaks occurring alongside the implementation of a reform in 2004. This change in

**Table 4.** Linear regression model with percentage of sickness absence as the dependent variable.

	Without control variables		With control variables		
	Model 1	Model 2	Model 3	Model 4	Model 5
Year	0.11	0.11	0.14	0.15	0.14
Gender	-264.30	-188.26	-297.04	-290.89	-218.81
Income (# Basic Units)			-0.27	-0.28	-0.27
Secondary school			-1.60	-3.13	-3.03
Higher education			-2.65	-6.06	-7.48
Age			0.03	0.68	0.49
Age x Age				-0.01	-0.01
Secondary school x Age				0.04	0.04
Higher education x Age				0.09	0.13
Gender x Year	0.13	0.09	0.15	0.15	0.11
Pregnancy		-1,087.72			-1,185.80
Pregnancy x Year		0.55			0.61
Pregnancy x Age					-0.40
Constant	-225.32	-225.32	-282.37	-295.71	-291.92
Observations	11452043	11452043	11452043	11452043	11452043
R-squared	0.01	0.06	0.03	0.03	0.08

The coefficients of Woman x Year indicates the annual increase in gender differences in sickness absence before and after control for the annual increase in sickness absence among Pregnant women. With and without control for education, income, age squared, and interactions between education and age, and pregnancy and age.  
doi:10.1371/journal.pone.0093006.t004

sickness absence policy instructed the general practitioners to promote the use of graded rather than full time sickness absence in patients who could work part time, unless they had strong medical reasons to do otherwise. It also involved activity requirements for the employee on sickness benefit. This reform was followed by a decrease in total sickness absence of more than 20 percent [41]. It is since then been documented a strong effect of the general practitioners' general preference for graded sickness absence upon the individuals' total long-term sickness absence and risk of exclusion from working life [42]. This effect is present both in men and women, but is not analyzed in pregnant women particularly. However, the reform is unlikely to have caused any bias for the aim of this particular study.

In 1993, the regulations was enjoined by explicit statements that certification of sickness absence should be based on medical grounds – not the employees' social or financial needs. This entailed a short decrease in pregnant women's sickness absence the following year. Until 1998, the employer covered the first 14 days, while the national insurance covered the rest of the remaining period up till 365 days. However, from 1998 onwards, the employers' period was extended with two days, and the period covered by the national insurance was correspondingly shortened. We have accounted for this in the analyses. Until 1999, sickness absence for government employees was not included in the registry, but due to an amendment sickness absence for this group was gradually included in the registry from 2000 and onwards. Due to incomplete registration of state employment, we were unfortunately unable to exclude all state employees from the analyses. Instead, we chose to ignore days of sickness absence compensated to state employees from 2000 and onwards. Although this implies that the total level of sickness absence is slightly underestimated during the entire period, it also ensures that the years prior to 2000 are comparable to those after.

Since 2002, the national insurance has refunded the employers expenses if the sick listed employee is suffering from pregnancy related conditions and if such a refund is applied for. As our estimates based on the public expenditure arising from this scheme suggest that the impact of this is marginal, we have not separated between sickness absence within and without this amendment in the further analyses.

As shown by the chart titles, some of the following graphs and tables show analyses based solely on employees in childbearing age, which means that employees aged 45 years or older were excluded from the analysis. In all regression models, sickness absence percentage is the dependent variable. This implies an interpretation of coefficients where a value of 0.1 indicates that on average the sickness absence increased 0.1 percentage points by one unit increase on the variable.

## Results

The study population includes a total number of 11452 043 annual observations, distributed by 1743 616 unique individuals. Table 1 provides demographic characteristics of the study population at the first and the last year of observation. For simplicity, data for 1993 and 2007 only were included in the table. During the observed period, a growing number of first-time pregnant women were aged 30+ (Table 2).

The average level of sickness absence among full-time employed pregnant women has increased during the observed period (Figure 1). Refunding of the employers' expenses to pregnant women's sickness absence since 2002 had only a marginal impact on the total average.

The proportion of women with full-time income grew rapidly through the period, especially among those aged 35–44 (Figure 2). In the early nineties, the level of full-time employment was much lower among pregnant (A) and non-pregnant women (B), compared to men (C). During the following years, the proportion of full-timers grew particularly rapidly among pregnant women, and at the end of the period, full-time income was even more common among pregnant than non-pregnant women (Figure 2).

The average age at first child birth increased steadily and strongly throughout the period (Figure 3). In 1993, both the youngest (20–24) and the oldest (40–44) age group of pregnant women had 21% sickness absence, higher levels than any other age group (Figure 4). Since then, there has been a stronger increase in sickness absence in the youngest age group than in any other age group, whereas the oldest group of pregnant women has only had a weak increase in sickness absence (Table 2).

Further stratifying for education (Figure 5), the highest level of sickness absence and the strongest increase was found in younger pregnant women with primary school only (A) or secondary school (B). In these educational groups, the differences between age groups were also the strongest, with stronger increase in younger than older women. In the highest educational group of pregnant women (C), there was less increase in sickness absence, the level of absence was lower, and there was only little variation between age groups. This interaction between educational level and age for time-trends in sickness absence is presented through regression coefficients in Table 3. The regression is also illustrated in Figure 6, indicating U-shaped associations between age and sickness absence in the start of the observation period (A), whereas at the end of the observation period, there was less of this U-shape (B).

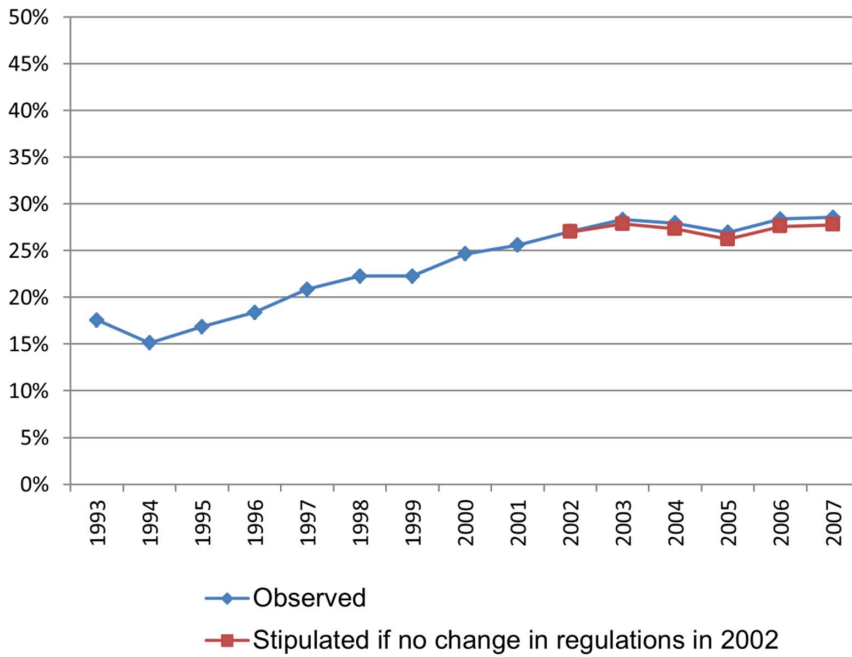
Generally, sickness absence in pregnant women was related to younger (20–24) and older (40–44) age throughout the period, and also lower educational level, (though there were quite few first-time pregnant women aged 40–44 at the start of the observation period). However, the effect of these factors changes over time. Educational level became more defining for sickness absence in pregnant women at the end of the observation period than in the beginning, whereas the effect of age on sickness absence was reduced throughout the period (Figure 6).

According to the multivariate regression (Table 3), pregnant women's sickness absence increased on average 0.64 percent points annually throughout the period (Model 1), which would have been a stronger increase of 0.94 percentage points per year if it was not for increased age at first pregnancy, increased educational level and changes in salary (Model 3).

The total proportion of pregnant full-time employees was relatively stable throughout the period, but the educational level within this group increased (Figure 7). The increased sickness absence applied to pregnant women of all educational levels (Figure 8). The overall level of sickness absence was highest among employees with primary school only (A), both for men, pregnant, and non-pregnant women. The overall level of sickness absence was substantially lower among employees with higher education (C).

The majority of women's increased sickness absence applied to non-pregnant women (Figure 9). The increased gender gap in sickness absence – expressed by the growing distance between the blue line and the top of the columns – applied to all educational levels (Figure 10). This implies that the increased gender gap in sickness absence was not accounted for by pregnant women, regardless of education.

The proportion of the increased gender difference in sickness absence accounted for by absence during pregnancy was estimated applying linear regression models (Table 4). Adjusted for

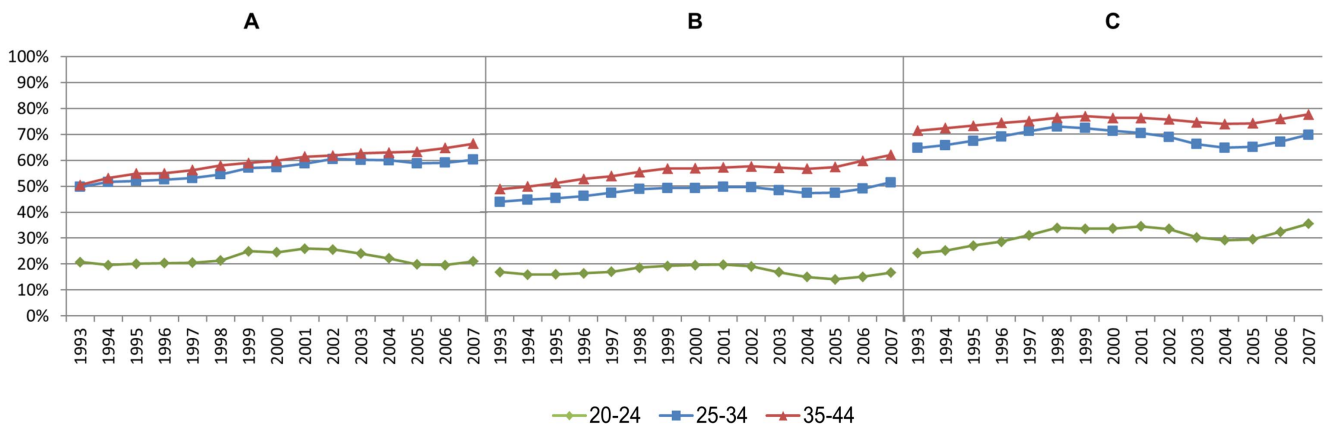


**Figure 1. Trend in sickness absence among pregnant women.** Sickness absence percent. doi:10.1371/journal.pone.0093006.g001

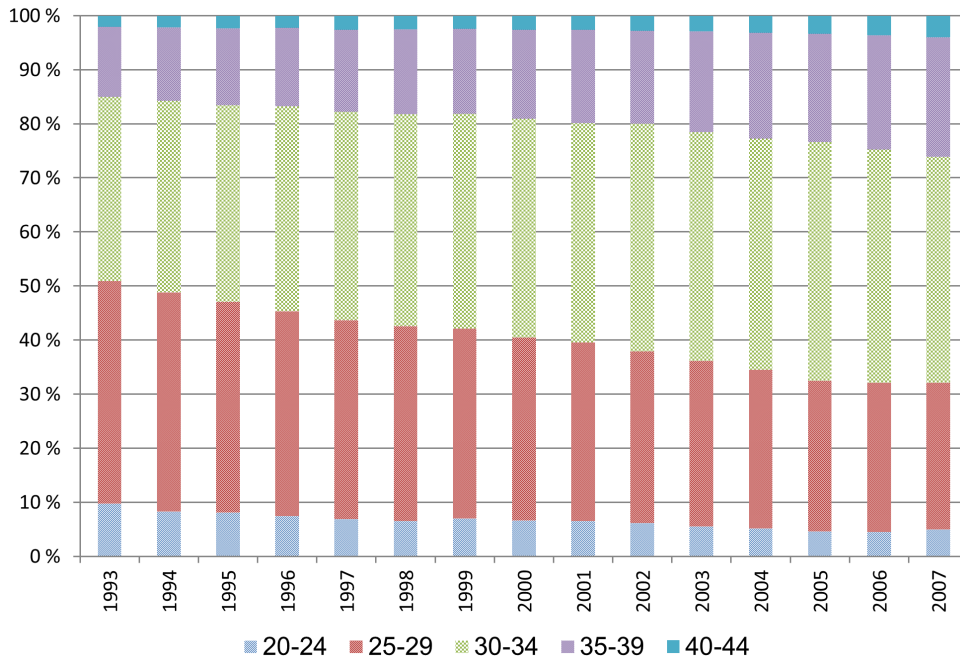
covariates in Model 4, the coefficient of gender indicates that the gender difference in sickness absence increased by 0.15 percentage points each year during the observed period. In Model 5, the value of this coefficient was reduced to 0.11 by control for pregnancy, pregnancy by year, and pregnancy by age. When all decimals were included, controlling for pregnant women's sickness absence led to a 24.98% reduction of the coefficient of gender by year in Model 4. Accordingly, the remaining 75.26% of the increased gender differences applied to non-pregnant women. When heightening the income inclusion criterion to 4 basic units, controlling for pregnancy, pregnancy by year, and pregnancy by age led to a 26.64% reduction of the increased gender differences in sickness absence, when all other control variables were included (results not shown in table).

**Discussion**

There was a U-shaped association between age and sickness absence in pregnant women, with considerably more absence (and also far more cases) in the youngest (20–24) than the oldest (40–44) pregnant women. Pregnant women aged 20–24 had the highest rate of sick leave during the entire observational period and also the strongest increase in sickness absence. Consequently, pregnant women's increased sickness absence was not due to higher age at first pregnancy. Sickness absence increased substantially more among pregnant than non-pregnant women, but due to short duration of pregnancy compared to non-pregnancy during employment, pregnancy related absence accounted for no more than 25% of the increased gender difference in sickness absence. These associations are observations of macro-level time trends, and cannot warrant conclusions regarding causality beyond selection effects, i.e. in that postponement of pregnancy would



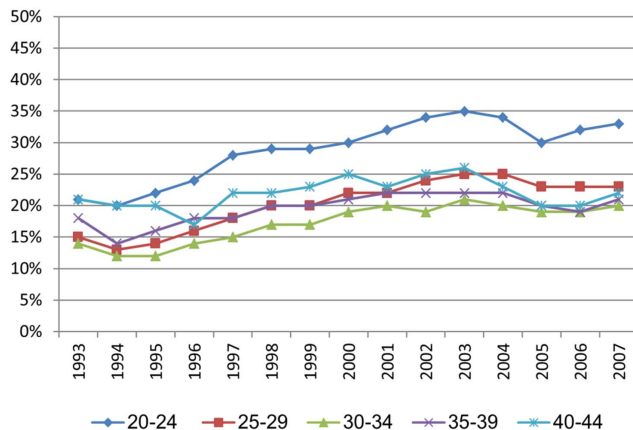
**Figure 2. Proportion of the population in fulltime employment.** Pregnant women (A), non-pregnant women (B), and men (C). doi:10.1371/journal.pone.0093006.g002



**Figure 3. Increased age of pregnant full-time employees.**  
doi:10.1371/journal.pone.0093006.g003

not have increased sickness absence on an individual level. Sickness absence in pregnant women was also related to low educational level. However, the relative effects of age versus educational level changed over time. Educational level became more defining for sickness absence in pregnant women during the observation period, whereas the effect of age on sickness absence was reduced.

Recent investigations differ in their conclusions on whether gender differences in sickness absence in Norway are increasing [5], [6]. Further, pregnancy has previously had a substantial impact on gender differentials in sickness absence in Sweden in the mid 80ies [30]. This study confirms that this was also the case for Norway in the beginning of the 90ies, but also that a majority of the increased sickness absence in the following decade applied to non-pregnant women. Whether a similar development occurred in Sweden during these years remains a question for future research.

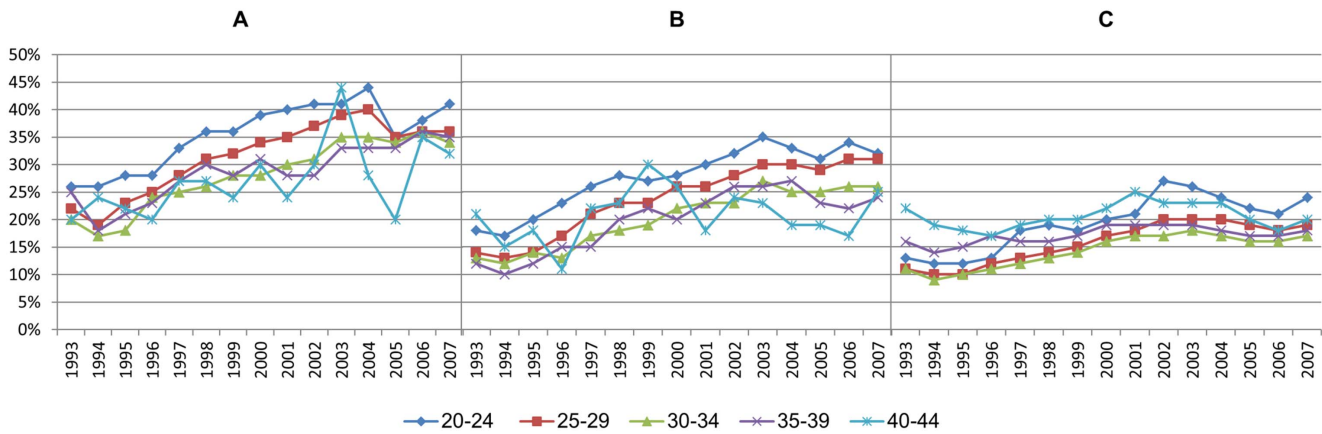


**Figure 4. Sickness absence among first-time pregnant women in different age groups.**  
doi:10.1371/journal.pone.0093006.g004

Lately higher age among pregnant women has become more common in western countries [15], [16], and in Norway this development has coincided with increased sickness absence among pregnant women. Surprisingly young pregnant women have had the sharpest increase in sickness absence in Norway [7], [8], which is contrary to the prediction that postponement of pregnancies give higher rates of complications and thus also sickness absence. In this paper we have firstly examined if the growing number of pregnant women aged 30 and more still heighten the sickness absence rates through higher overall levels of sickness absence. This is not the case, as younger pregnant women had the highest overall level of sickness absence. Secondly we have examined if pregnant women's increased sickness absence explained the increased gender differentials in sickness absence in Norway from 1993–2007. This is not the case either as most of the increased sickness absence in Norway applied to non-pregnant women. Neither of these questions has previously been addressed.

### Strengths and limitations

The data employed in the analyses have obvious advantages in terms of eliminating the risk for type I and type II error, as well as non-response and self-reporting bias. However, these data also have certain limitations. The register only contains information about sick leave spells covered by the national insurance, leaving spells of shorter duration than 14–16 days out of the register. Special arrangements are made for sickness absence due to certain chronic conditions, in which case the whole spell is covered by national insurance and thereby included in the registry. The previously mentioned amendment from 2002 extended this rule to also apply for pregnancy related sickness absence if this is applied for by the employer, meaning that an additional proportion of pregnancy related sickness absence is included in the registry from 2002 onwards. This represents a potential source of error in terms of overestimating sickness absence during pregnancy after 2002, but our estimates based on the expenditures following from this amendment indicate that the overall impact on the level of sickness



**Figure 5. Sickness absence among first-time pregnant women in different age groups.** Stratified by educational level: Primary school (A), secondary school (B), and higher education (C). doi:10.1371/journal.pone.0093006.g005

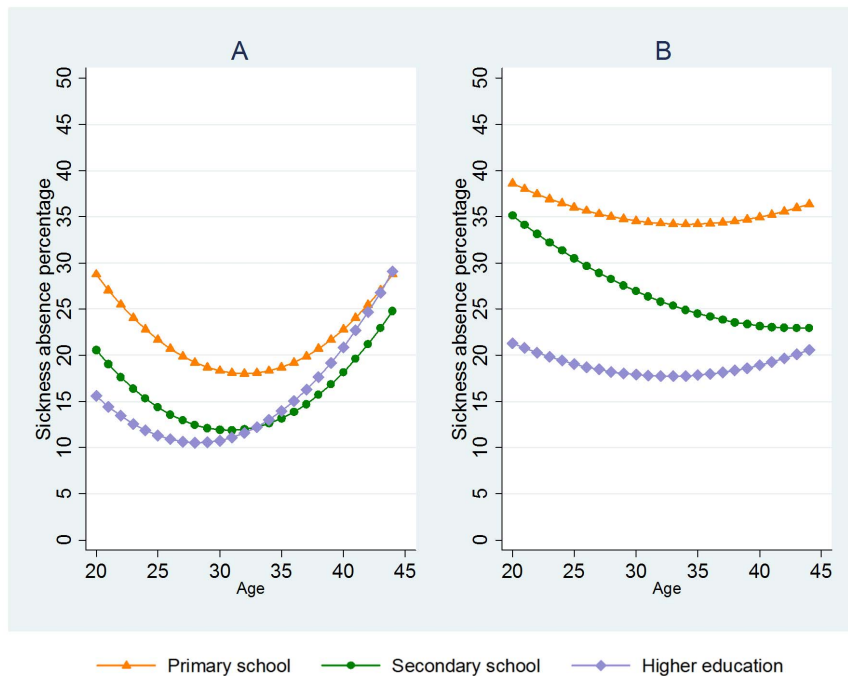
absence during pregnancy was small. However, it is not possible to measure whether the impact differs according to the employees' age or education.

Our income based definition of full-time employment also entails some weaknesses. Some full-time working individuals with low income were probably excluded from the analyses, and some part-time employees with high hourly payment were probably included in the analyses. Among these individuals sickness absence will be underestimated. Rising levels of female full-time employment during the observation period probably make the unintentional inclusion of part timers more pronounced in the initial part of the observation period than in the end. If women's sickness absence was somewhat underestimated in the initial part of the observation, this could also have led to an overestimation of the

increased gender differences in sickness absence. Income inequalities in Norway are relatively small [43], especially among women [44], which reduces this problem. Still future research could aim at investigate this potential weakness.

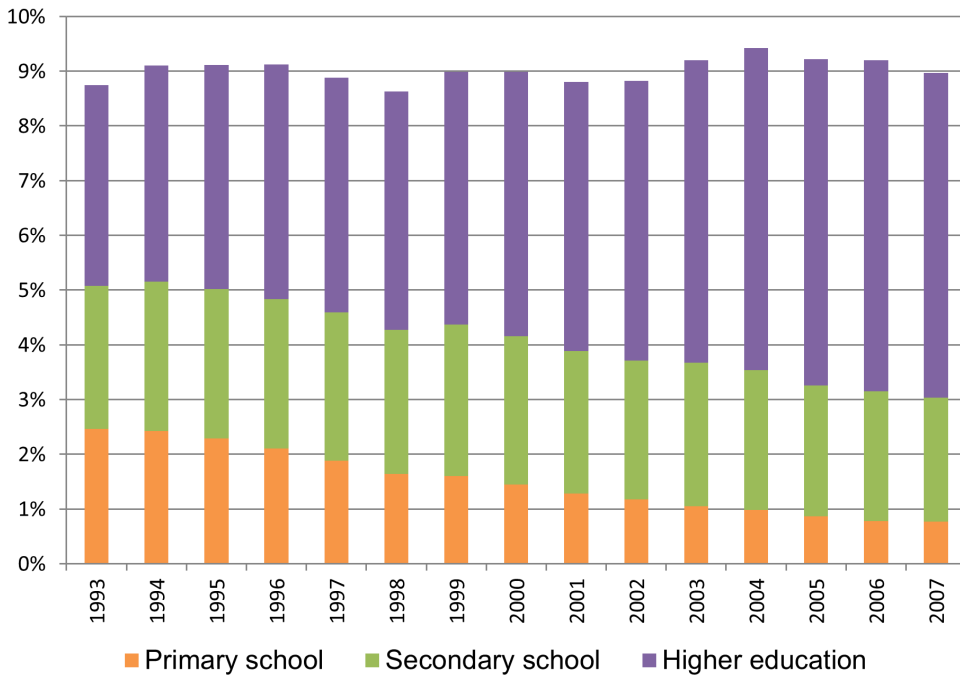
Among Norwegian men the income inequalities are larger, but part-time employment is rare; 90% of the employed males had a full-time position in 2002 [45]. This limits the problem of misclassification among men as well.

It is also worth mentioning that a combination of household registers and birth registers were used to identify first time pregnancies, as births were not registered before 1992. This is potentially problematic as women might also live with their partner's children, or the child might live with the father of the child after family dissolution. However, in spite of high levels of



**Figure 6. Marginal effects of age and education on sickness absence among first-time pregnant women.** Linear regression of the two first and last years of the observed period: 1993–1994 (A), and 2006–2007 (B). doi:10.1371/journal.pone.0093006.g006





**Figure 7. The proportion of full-time employed women aged 20–44 undergoing pregnancy each year is rather stable.** The educational level is increasing. doi:10.1371/journal.pone.0093006.g007

gender equality on other areas, children tend to stay with their mother after parental break up in Norway [46], [47], which implies that the risk of misclassification of births is marginal.

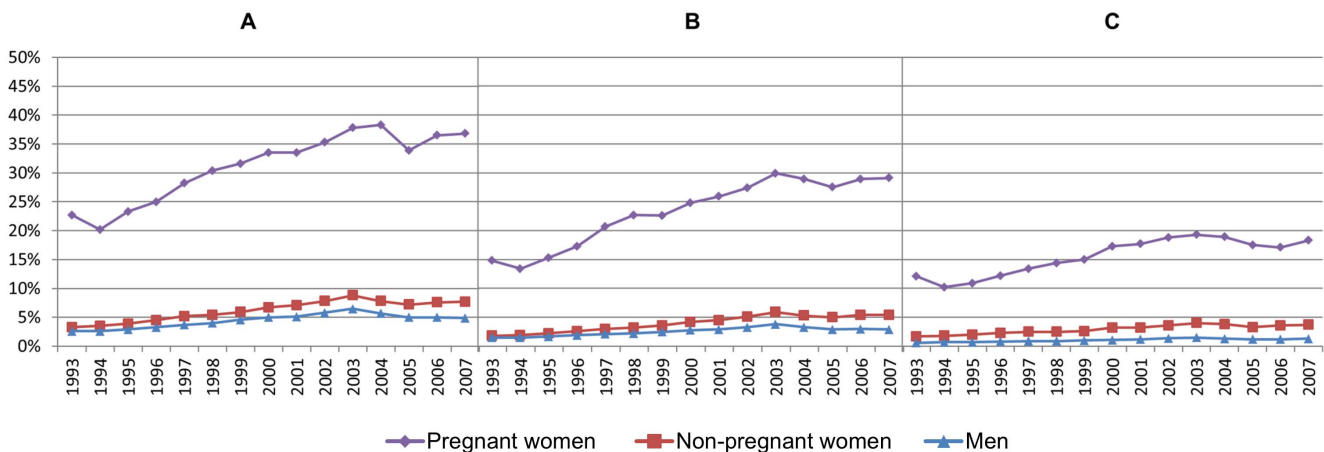
Further, women were defined as first time mothers even if they previously had lived with children who were less than 18 years younger than themselves, because these children were regarded as siblings rather than offsprings. This procedure has caused misclassifications in women giving birth younger than 18. However, only 6% of the first-time deliveries in 2004 applied to teenage mothers (including giving birth at 18 and 19), and the frequency of teenage births has decreased substantially since the 70ies [48]. The decreasing number of teenage mothers suggests that the increase in sickness absence among first-time mothers is not due to this misclassification. Further, teenage mothers more

often suffer from unemployment and low earnings than older mothers [48], thus some of these misclassified cases are excluded to criterion on full-time income.

**Implications**

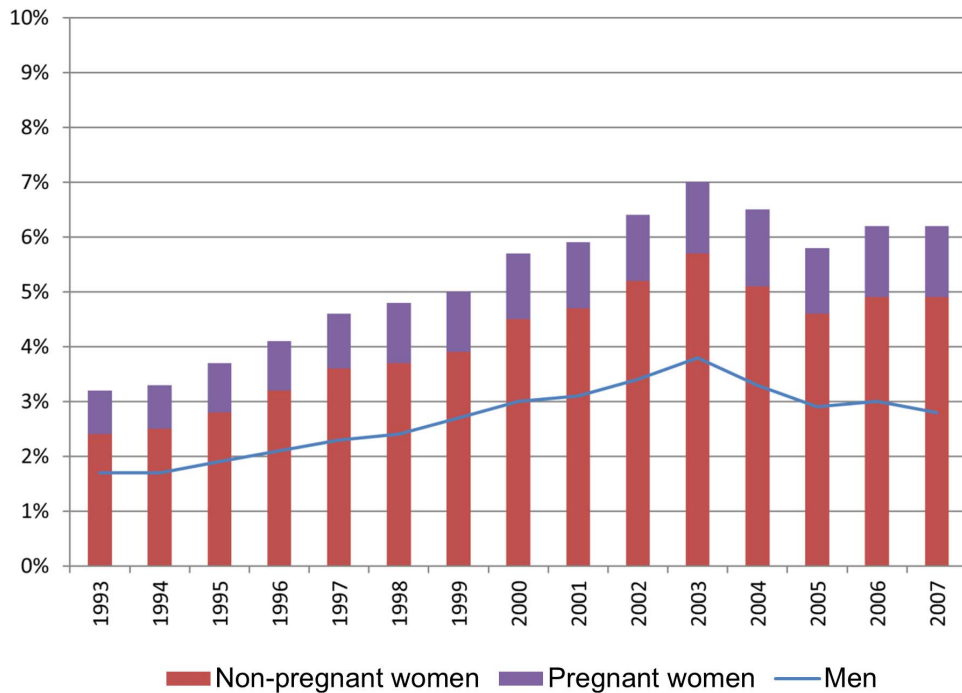
High and growing levels of sickness absence among pregnant and non-pregnant women entail public expenses and challenges gender equality on the labor market.

In spite of efforts to explain Norwegian women's heightened sickness absence in terms of women's health, pregnancy, double burden of work and family, occupation or norms, the gender differences in sickness absence in Norway largely remains unexplained. Women's heightened sickness absence implies that



**Figure 8. Average percentage of sickness absence among men, pregnant and non-pregnant women.** Full-time employees, age 20–44. First-time pregnancies only. Stratified by educational level: Primary school (A), secondary school (B), and higher education (C). doi:10.1371/journal.pone.0093006.g008





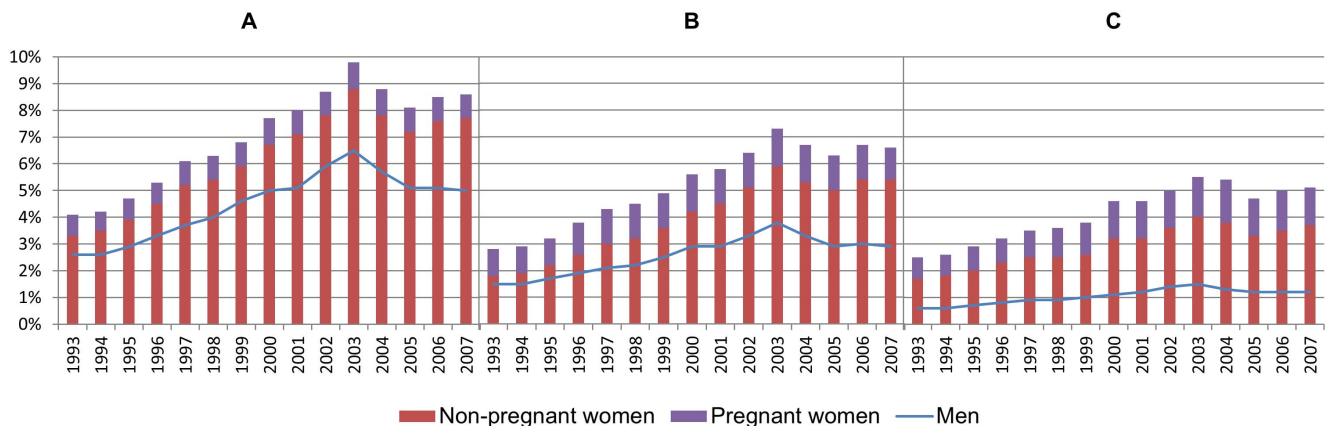
**Figure 9. The increased gender differences in sickness absence.** 24.98% of the total increase is attributable to sickness absence during pregnancy. Employees in full time employment, age 20–44. doi:10.1371/journal.pone.0093006.g009

retrenchment of the sickness benefit will increase the gender pay gap. This backdrop requires cautiousness in policy making.

The sharp increase in sickness absence among pregnant women is striking, especially among the youngest women. Future research should aim at illuminating whether these women somehow are subjected to negative selection. Ongoing initiatives in Norway involve midwives supervising pregnant workers at their workplace. Hopefully this can help reducing sickness absence among pregnant women in a way that meet their needs.

Previous research on health differences, double burden of work and family, labour market segregation and gender specific attitudes have so far not explained the (increasing) gender differences in sickness absence in Norway. Our analyses suggest that the impact of pregnancy on women's sickness absence is still

limited, even though sickness absence among pregnant women has increased substantially. The possible impact of growing tension in combining employment and motherhood, medicalization of (pregnancy related) symptoms, or lowered threshold for welfare dependency is not yet established. The relation between gender equality in the society at large and gender differences in sickness absence is a hot topic due to its ambiguity. On the one hand gender differences in sickness absence represent an obstacle to gender equality in the labour market, on the other hand a generous sickness benefit may be a necessary prerequisite for women in combining work and family building. Future research should beware similar ambiguities in other countries characterized by processes of gender equality enhancing policies. A stepwise,



**Figure 10. The gender gap in sickness absence among full-time employees.** Age 20–44. Stratified by educational level: Primary school (A), secondary school (B), and higher education (C). doi:10.1371/journal.pone.0093006.g010

thorough knowledge production is required to ensure that debates about gender inequality are being as evidence based as possible.

## Conclusion

The increase in sickness absence during pregnancy is substantial, but it is not due to higher age among pregnant women. Further, the expansion of the gender gap is mainly due to increasing frequency of sickness absence among non-pregnant women, and about 24.98% of the expansion applies to pregnant women. To conclude, the widening gender gap in sickness absence is not caused by the increasing number of older, pregnant women. The gender gap in sickness absence, the increase in this gap, and the remarkably strong increase in sickness absence in pregnant

women (in particular in young women and women with lower education) is generally poorly understood, and needs to be addressed in future studies applying different theoretical viewpoints and methods.

## Acknowledgments

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## Author Contributions

Analyzed the data: AMSA AM. Wrote the paper: AMSA AM. Designed the study: AMSA AM. Read and approved the final manuscript: AMSA AM.

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# BMJ Open Age, occupational class and sickness absence during pregnancy: a retrospective analysis study of the Norwegian population registry

Anja M S Ariansen

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## ABSTRACT

**Objective:** Western women increasingly delay having children to advance their career, and pregnancy is considered to be riskier among older women. In Norway, this development surprisingly coincides with increased sickness absence among young pregnant women, rather than their older counterparts. This paper tests the hypothesis that young pregnant women have a higher number of sick days because this age group includes a higher proportion of working class women, who are more prone to sickness absence.

**Design:** A zero-inflated Poisson regression was conducted on the Norwegian population registry.

**Participants:** All pregnant employees giving birth in 2004–2008 were included in the study. A total number of 216 541 pregnancies were observed among 180 483 women.

**Outcome measure:** Number of sick days.

**Results:** Although the association between age and number of sick days was U-shaped, pregnant women in their early 20s had a higher number of sick days than those in their mid-40s. This was particularly the case for pregnant women with previous births. In this group, 20-year-olds had 12.6 more sick days than 45-year-olds; this age difference was reduced to 6.3 after control for class. Among women undergoing their first pregnancy, 20-year-olds initially had 1.2 more sick days than 45-year-olds, but control for class altered this age difference. After control for class, 45-year-old first-time pregnant women had 2.9 more sick days than 20-year-olds with corresponding characteristics.

**Conclusions:** The negative association between age and sickness absence was partly due to younger age groups including more working class women, who were more prone to sickness absence. Young pregnant women's needs for job adjustments should not be underestimated.

## OBJECTIVE

Western women increasingly delay having children to advance their career,<sup>1</sup> and pregnancy is normally regarded as being riskier among older women.<sup>2</sup> In Norway, this

## Strengths and limitations of this study

- Retrospective analyses of a population registry reveal that heightened sickness absence among young pregnant women in Norway is partly due to a preponderance of working class women in this age group.
- The data employed include information about all employees giving birth in 2004–2008; thus, the risks of type I and II errors are eliminated.
- The data consist of official recordings, which make sure that the estimates do not suffer from bias due to self-reporting or non-response.
- Because some absence spells are left censored, zero-inflated Poisson regression has been conducted.
- Although occupational class has a major impact on sickness absence among pregnant women in this study, the data do not allow for assessing the relative contribution of working conditions.
- Age differentials among pregnant women with previous deliveries remain largely unexplained.

development coincides with increased sickness absence during pregnancy. Somewhat surprisingly, the increased sickness absence primarily applies to young pregnant women rather than their older counterparts.<sup>3 4</sup>

Previous research has revealed that sickness absence during pregnancy is influenced by the pregnant women's workplace, through adjustments and social interaction with colleagues.<sup>5 6</sup> This paper broadens the scope of this literature by emphasising how the women's workplace is also influenced by recent shifts in fertility and employment patterns. Age during pregnancy has become increasingly linked to socioeconomic factors such as education and occupation.<sup>1</sup> The aim of this paper is to examine whether the heightened sickness absence among young pregnant women in Norway is due to a preponderance of working class women in this group.



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Department of Sociology,  
University of Bergen,  
Bergen, Norway

## Correspondence to

Anja M S Ariansen;  
[anja.steinsland@sos.uib.no](mailto:anja.steinsland@sos.uib.no)



## BACKGROUND AND SIGNIFICANCE

Because the Norwegian sickness benefit is very generous, growing levels of sickness absence have created concerns about future public costs.<sup>7</sup> In this context, more frequent sickness absence among young pregnant women may easily be seen as a reflection of unsustainable welfare consumption in younger generations. Such speculation is problematic, because pregnant women may respond to others' negative views on them with risky behaviour.<sup>8</sup>

The need to investigate sickness absence during pregnancy is further enhanced by studies suggesting that employers' or colleagues' negative expectations of the work performance or sickness absence of pregnant employees may challenge these women's career opportunities,<sup>5 9–12</sup> even when the empirical basis for these assumptions is lacking.<sup>13–15</sup> These issues highlight the importance of ensuring that heightened sickness absence among young pregnant women is addressed through empirical investigation and evidence-based policies rather than unsound generalisations and discrimination.

Sickness absence during pregnancy has increased substantially over the past two decades in Norway, and the relative increase and total level of sickness absence is highest among younger women.<sup>3 4 16</sup> However, the impact of the occupational class on this age difference is unknown. Previous research on sickness absence during pregnancy has rarely focused on the impact of pregnant women's age and their class affiliation, except from three studies of Swedish data from the 1980s, which reached different conclusions. The first study concluded that sickness absence during pregnancy in Sweden in the late 1980s was characterised by class differentials, but only marginal age differentials.<sup>17</sup> However, the other two studies highlighted that a preceding increase in sickness absence during pregnancy applied particularly to young women,<sup>18</sup> and that young age during pregnancy was associated with a higher frequency of sickness absence.<sup>19</sup> These findings indicate that high and increasing levels of sickness absence among young pregnant women do not constitute a strictly Norwegian phenomenon.

Although the tight link between pregnant women's age and their class position has not received much attention in previous research on sickness absence, the issue has been highlighted in demographic research. 'The second demographic transition' refers to growing female employment, postponement of pregnancy and decreasing birth rates which have occurred in western countries.<sup>20</sup> However, these trends primarily characterise women with higher education and privileged class positions.<sup>21 22</sup> In Norway, a postponed first birth is often followed by a shorter duration between the first and second births.<sup>23</sup> This leads to the expectation that class differentials in the timing of pregnancy are larger in the group of first-time pregnant women than among those with previous births.

As increased sickness absence among young pregnant women in Norway coincides with growing class

differentials in timing of pregnancy, it seems relevant to question whether age differentials in sickness absence during pregnancy may be confounded by class. This concern is substantiated by a wide range of studies which emphasise the impact of occupational characteristics on pregnant women's health problems or sickness absence. Shift work and physical strain in terms of lifting or standing is associated with preterm birth.<sup>24 25</sup> Heavy lifting, as well as exposure to certain chemicals, increases the risk for miscarriage and decreases birth weight.<sup>26–28</sup> Physical strain increases sickness absence,<sup>29 30</sup> while the opportunity for job adjustments reduces sickness absence.<sup>6 31</sup> Moreover, pregnant employees express that they strive to meet those standards of bodily control and appearance that are expected at their workplace.<sup>5 32</sup> These accounts highlight the need for adjustments, such as breaks and permission to work from home, which are more common in higher ranking occupations.<sup>33</sup> Class is also related to sickness absence and pregnancy through norms and values. Sickness absence may be regarded as more legitimate in a 'working class culture'.<sup>34</sup> Working class occupations are also more gender segregated,<sup>35</sup> and female-dominated workplaces have somewhat higher levels of sickness absence in Norway, possibly because of gender-specific norms.<sup>36</sup> Working-class women are more likely to express family-oriented values, while middle-class women more often are characterised by occupational dedication.<sup>37</sup> However, housewives tend to have more health problems than employed women.<sup>38</sup> To the extent that early pregnancy indicates future housewifery, this could thus be a choice born of necessity rather than a preference for women with health problems.

To summarise, women's age at first pregnancy varies according to occupational class, and occupational class may influence sickness absence during pregnancy in several ways. This leads to the following hypotheses:

H1: The negative association between age and sickness absence among pregnant women is more pronounced among pregnant women undergoing their first pregnancies than among pregnant women who have previously given birth.

H2: The negative association between age and sickness absence levels out when occupational class is controlled for among first-time pregnant women and those who have previously given birth.

## MATERIALS AND METHODS

The following analyses are based on data collected by the Norwegian Labour and Welfare Administration, the Norwegian Tax Administration and the Ministry of Health and Care Services. The national agency Statistics Norway of the Ministry of Finance has adapted the data for research. The collected data include information about each individual of the entire Norwegian population. Use of population data from public records ensures that our estimates are not biased

by non-response or self-reporting. Furthermore, the risk of type I or type II errors is eliminated because the analyses are based on data from the population rather than from a random sample.

The data contain all women in the Norwegian population giving birth during the years 2004–2008. After deleting 2537 deliveries with unknown mothers, a total number of 286 104 deliveries were registered during the observed period. Further, 30 registered deliveries were excluded due to a missing value on the variable *Age*. Because the aim of the paper is to address the occupational challenges among young pregnant women rather than the particular difficulties associated with teenage pregnancies, 1473 teenage pregnancies were excluded from the analyses. Subsequently, the age span of the study population varied from 20 to 54, although less than 2% of the women were older than 40 in the year of delivery. Finally, 168 women were excluded due to lack of registration of the woman's marital status.

Of the remaining pregnancies, a total number of 216 541 met the inclusion criteria that the pregnant woman had registered earnings in the year of delivery, and had worked at least 1 h/week on average during the employed period of pregnancy. Of these, 16 286 had missing values on the variable *Occupational class*. A separate dummy variable for these observations was added to the set of dummy variables which the occupational class consists of. About 0.6% of the registered sickness absence spells were excluded from the analyses due to missing values on the variable *Compensated sick days*. As some women underwent more than one of the registered pregnancies, a total number of 180 483 individuals are included in the analyses. Pregnancies that apply to the same woman are treated as different observations in the analysis; thus, the total number of observations is 216 541.

The generous sickness benefit provisions in Norway ensure that most employees listed as sick receive full-wage compensation for an entire calendar year. The payout has an upper limit which in 2008 amounted to NOK414 648, or about €52 799. Separate rules for sickness absence apply to the self-employed, which makes comparison with employees difficult. For this reason, self-employed women were excluded from our analyses.

The registry only provides consistent recording of all spells of sickness absence from the 17th calendar day, while recording of spells prior to this day depends on the woman's diagnosis and her employer's request for reimbursement. Each woman's value of the dependent variable *Sick days* equals the total number of sick days for which she received the National Insurance sickness benefit in the 282 days preceding birth. The variable also includes spells of absence covered by the pregnancy benefit, which are certified by physicians if they consider the pregnant woman's tasks or working environment to threaten the fetus. In order to prevent registration errors from turning into influential outliers, the variable *Sick days* was limited to an upper value of 192. This

number amounts to 68% of the total number of calendar days of the total pregnancy period of 282 days, and is equivalent to the maximum percentage of calendar days compensated by the National Insurance for non-pregnant employees during 1 year.

A pregnancy period of 282 days is equal to the expected gestational age, which is counted from the first day of the last menstrual period prior to conception, and extends the period from conception to birth by 14 days. Norwegian health professionals frequently refer to gestational age as a measure of pregnancy duration when consulting women who are or plan to become pregnant, possibly increasing their awareness of symptoms even prior to conception. Because this awareness may influence sickness absence behaviour, the categorisation of sickness absence during pregnancy was based on expected gestational age.

The occupational codes in the registry data were grouped according to the class scheme of Erikson, Goldthorpe and Portocarero (EGP),<sup>39</sup> by means of a detailed manual provided by Flemmen.<sup>40</sup> Utilisation of the EGP class scheme ensures international comparability,<sup>41 42</sup> and the class scheme has shown a consistent association with health inequality,<sup>43 44</sup> which makes it suitable when investigating sickness absence. As mentioned earlier, self-employed women were excluded from the study population, and accordingly the class of self-employed was omitted from the analyses.

The variable *Previous deliveries* indicates whether a woman is registered as having given birth since 1 January 1992. The variable *Age* equals the age of the pregnant woman in the year of delivery. The variable *Age squared* was added to account for the possibility of a curved association between age and sickness absence.

Previous research indicates that the association between pregnant women's age and their occupation may be more pronounced during first pregnancy than subsequent ones.<sup>45</sup> The product of the variables *Age* and *Previous deliveries* is included in the regression analyses to account for such interactions.

All estimates are adjusted for possible confounders in terms of calendar year, weekly working hours, timing of transition to parental leave and marital status, but for simplicity these control variables were left out of the analysis.

Thus, the following variables are included in the Results section:

- ▶ *Sick days*: Continuous dependent variable, the natural logarithm of the pregnant woman's number of sick days covered by the National Insurance scheme.
- ▶ *Age*: Continuous independent variable. The age of the pregnant woman.
- ▶ *Age squared*: Continuous independent variable. The squared age of the pregnant woman.
- ▶ *Occupational class*: Dummy set of independent variables. Reference group: *I Higher professionals*. Other categories: *II Lower professionals, IIIa Higher routine, IIIb Lower routine, V Technicians, VI Skilled, VII Semiskilled and unskilled, VIII Agricultural, Missing*.





- ▶ *Previous deliveries*: Independent dummy variable. Women with previous deliveries take the value of 1. Women who undergo their first pregnancy take the value of 0.
- ▶ *Age×Previous deliveries*: Independent interaction variable equalling the value of *Age* multiplied by the value of *Previous deliveries*.
- ▶ *Year*: Dummy set of control variables. Reference group: *Women giving birth in 2004*. Other categories: *Year 2005, Year 2006, Year 2007, Year 2008*.
- ▶ *Working hours*: Continuous control variable. Average number of hours of paid work per week.
- ▶ *Leave*: Continuous control variable. Total number of days between pregnancy onset and either transition to parental leave or date of delivery.
- ▶ *Marital status*: Dummy set of independent variables. Reference group: *Unmarried*. Other categories: *Married, Divorced, Widowed*.

## METHODS

The dependent variable in the following analyses can be characterised as count data, because it represents the total number of sick days and thus only contains positive integer values. The large proportion of women with the value of 0 on this variable indicates that the distribution may be characterised by an inflated zero, which means that the value of the variable and the likelihood of this value being 0 is influenced by external factors.<sup>46</sup> For example, the value of 0 sick days can be influenced by working hours in two different ways. Because part-time employees have a lower maximum number of sick days than do full-time employees, a larger proportion of part-timers probably have no actual sick days. However, they are probably also more likely to have shorter spells, which in turn are more likely to be left censored, and take the value of 0 for this reason. This also applies to women with early transition to maternity leave. To account for the excess of zero sick days among women with few working hours and/or early transition to maternity leave, a zero-inflated Poisson regression model was conducted. This choice of model was supported by a significant Vuong test, which indicates that the zip model fits the data better than the standard Poisson model.

The zip model consists of two components, because the predicted value of *Sick days* is combined with a prediction of the probability of achieving a value of 0. In the count component, each regression coefficient reveals changes in the log of the expected value of the number of sick days produced by a one-unit increase in a given variable when other independent variables are held constant. Because the substantial meaning of the coefficients is not readily apparent, marginal plots will be provided for the core findings.

In an excess zero component, the variables *Working hours* and *Leave* are used as predictors of values exceeding zero in all four regression models. This indicates that the inflation of 0 sick days is partly due to the

inclusion of employees with few contracted working hours and/or early transition to parental leave, which reduces the possible number of sick days. In analyses of samples drawn from a population, the purpose of significance testing regression coefficients is to assess the likelihood that the estimates that apply to the sample also apply to the population as a whole. For analyses based on a population rather than a sample drawn from it, this condition is already satisfied. For this reason, significance testing is left out of the following regression models.

## RESULTS

Descriptive statistics of the study population are listed in [table 1](#), and confirm that higher and lower professionals are characterised by fewer sick days, higher age and a higher number of working hours than skilled and unskilled workers.

The distribution of *Sick days* is characterised by an inflated zero ([figure 1](#)). Investigation of the association between age and sickness absence among full-time employees indicates that the association is curved rather than linear ([figure 2](#)).

[Table 2](#) shows a zero-inflated Poisson regression, which includes two components. The *Count component* is a prediction of *Sick days*, and models 1–4 show the varying associations that follow from different sets of independent variables. The *Excess zero component* predicts the probability of taking no sick days after control for *Working hours* and *Leave*, and remains unchanged in all four models. The count component of model 1 shows the unadjusted association between *Age* and *Sick days*, while models 2–4 are adjusted for confounders.

Model 1 reveals a positive coefficient for *Age squared*, which confirms the U-shaped association between age and sickness absence revealed in [figure 2](#). The coefficient is still positive after control for *Year*, *Working hours*, *Leave* and *Marital status* in model 2.

In model 3, the variable *Previous deliveries* and the product of *Age* and *Previous deliveries* are included to investigate whether the associations between age and sickness absence differ between women with and without previous births. Since the interpretation of the interaction coefficients is complicated, the interaction effect is illustrated in [figure 3](#).

The values of the coefficients change by control for occupational class in model 4. The implications of this change are also illustrated in [figure 3](#). All the occupational classes have positive coefficients, indicating that each class has a higher number of sick days than the baseline category, which is *I Higher professionals*.

Cragg and Uhler's<sup>47</sup> R<sup>2</sup>, also referred to as Nagelkerke's R<sup>2</sup>, is a measure of model fit that varies between 0 and 1. High values indicate a better prediction of counts in the current model than in the intercept model, which equals a model without independent variables. In model 1, the value of Cragg and Uhler's R<sup>2</sup>

**Table 1** Descriptive statistics of the study population (according to occupational class)

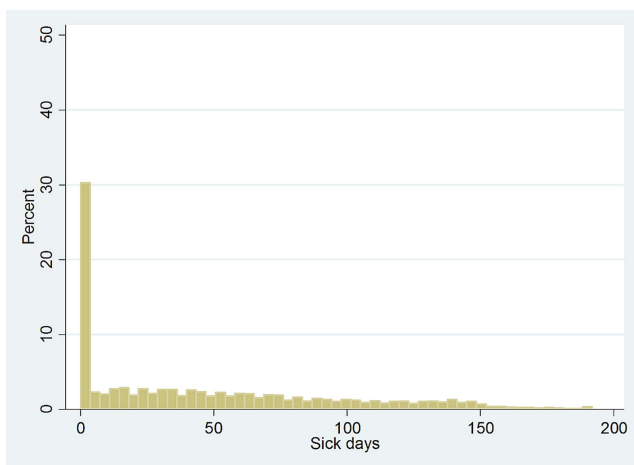
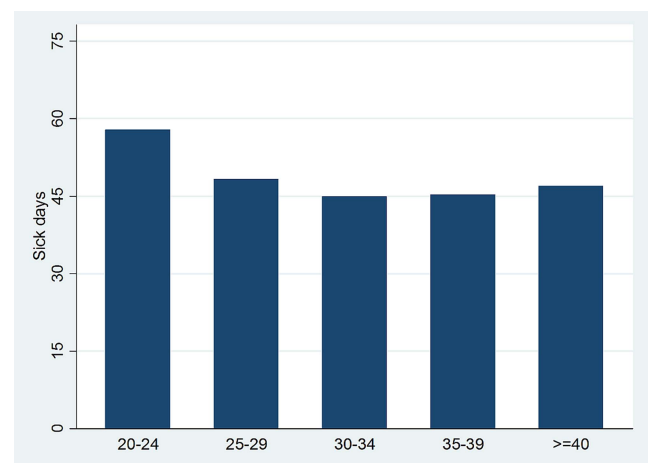
	Sick days		Age		Working hours		Leave		Married Per cent	Previous deliveries Per cent
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
I Higher professionals	34.2	43.5	33.3	3.9	34.3	7.6	263.2	10.3	55.8	55.5
II Lower professionals	39.8	45.5	32.5	3.9	33.8	7.6	263.2	10.2	50.7	53.6
IIIa Higher routine	50.4	48.8	30.1	4.6	29.0	10.4	264.1	10.8	42.8	55.0
IIIb Lower routine	54.6	50.0	29.0	5.0	25.9	11.6	264.8	11.1	35.5	53.0
V Technicians	43.8	47.7	32.1	4.4	33.0	8.0	264.5	10.8	41.6	60.5
VI Skilled	51.4	49.6	28.8	4.9	29.1	10.6	263.8	10.7	32.9	52.0
VII Semiskilled and unskilled	51.9	52.1	29.1	5.2	22.7	12.8	266.4	12.3	41.7	51.2
VIIIb Agricultural	37.6	47.0	28.3	4.9	24.9	12.9	265.9	12.0	35.2	51.1
Missing	41.6	46.6	30.8	4.7	29.2	11.1	264.0	11.0	48.1	55.5
Total	46.8	48.5	30.6	4.8	29.5	10.8	264.1	10.9	44.4	54.0

is 0.023, which implies that controlling only for *Age* and *Age squared* brings about a limited improvement of prediction of the number of sick days. In models 2 and 3, the values of Cragg and Uhler's R<sup>2</sup> have increased to 0.179 and 0.290, which suggest that the prediction of sick days is substantially improved after controlling for the confounders, and further improved by control for previous births and the interactions of age and previous births. By control for occupational class in model 4, the value increases to 0.462; thus, prediction of sick days is considerably improved when occupational class is included in the model.

Figure 3 displays the various associations between age and number of sick days in the preceding regression models. As the graph for model 1 indicates, the youngest and oldest women have the highest numbers of sick days. Before control for any covariates, the numbers of sick days among pregnant women aged 20, 30 and 45 are 48.9, 46.8 and 48.1, respectively. After control for calendar year, working hours, leave and marital status, the corresponding numbers are 49.9, 46.9 and 46.2, as revealed in the second graph, model 2.

The interaction of previous deliveries and age is illustrated in the third graph, model 3. Young pregnant women with previous deliveries are characterised by a considerably higher number of sick days than equally aged women who are undergoing their first pregnancy. Pregnant women with previous births at the ages of 20, 30 and 45 have 60.3, 49.2 and 47.7 sick days, respectively. Among first-time pregnant women, the corresponding numbers are 49.1, 43.5 and 47.9.

Finally, the last graph shows that among pregnant women with previous births, the association between age and sick days is somewhat weakened after control for occupational class. However, 20-year-old women in this group still have 55.1 sick days, which is a substantially higher number than the 48.5 and 48.8 sick days which apply to the 30-year-olds and 45-year-olds. In contrast, control for class alters the association between age and sickness absence among women undergoing their first pregnancy. In this group, 30-year-olds still have the lowest number of sick days, 43.4, but 20-year-olds now have a value of 45.8, which is considerably lower than the value of 48.7, which applies to 45-year-olds.

**Figure 1** Distribution of days of sickness absence in the study population.**Figure 2** Days of sickness absence in different age groups. Only full-time employees included ( $\geq 37$  weekly working hours).

**Table 2** Zero-inflated Poisson regression with number of sick days as the dependent variable

	Model 1	Model 2	Model 3	Model 4
<b>Count component</b>				
Age	-0.016	-0.017	-0.049	-0.031
Age squared	0.0002	0.0002	0.0007	0.0005
Previous deliveries			0.374	0.330
Previous deliveries $\times$ age			-0.008	-0.007
II Lower professionals				0.056
IIIa Higher routine				0.185
IIIb Lower routine				0.240
V Technicians				0.069
VI Skilled				0.212
VIIa Semiskilled and unskilled				0.285
VIIb Agricultural				0.200
Missing				0.107
Constant	4.448	3.350	3.749	3.231
<b>Excess zero component</b>				
Constant	-1.341	-1.341	-1.341	-1.341
Observations	216 541	216 541	216 541	216 541
Cragg and Uhler's	0.023	0.179	0.290	0.462

The coefficients in the count component are adjusted for *Working hours, Leave, Year and Marital status* in models 2–4. The coefficients of the excess zero component are adjusted for *Working hours and Leave* in all four models.

## DISCUSSION

The preceding analyses have shown that among pregnant women with previous births, young employees still have higher number of sick days after control for class, although the association between age and sick days is slightly weakened. However, among women undergoing their first pregnancy, young pregnant women no longer have the highest level of sick days after control for class. This indicates that the high number of sick days among young first-time pregnant women is due to a preponderance of working class women in this group, who are more prone to sickness absence. In younger age groups, women with previous deliveries have a higher number of sick days than do first-time pregnant women, but the difference decreases with age and levels out in the mid-40s. Regardless of previous pregnancies, pregnant women in their early 30s have the lowest number of sick days, and this pattern remains largely unchanged after control for class.

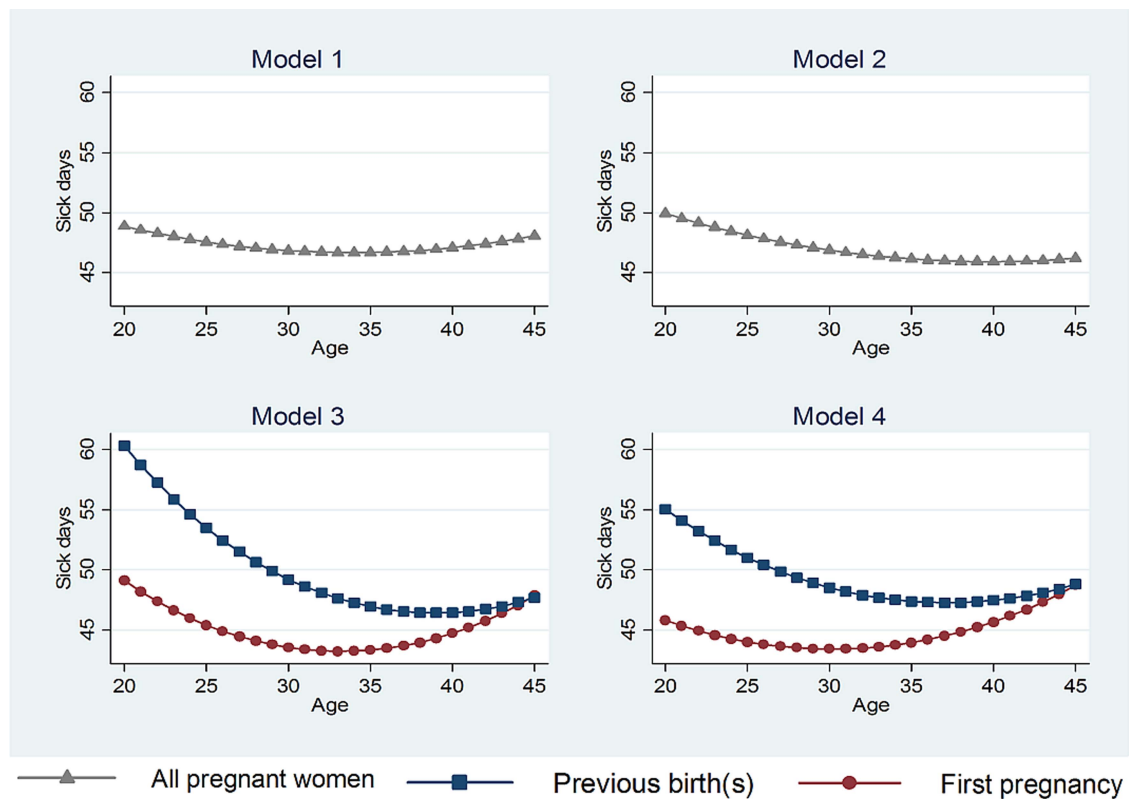
Using data from the Norwegian population registry eliminates risks of type I and II errors, thereby representing a strength of the study. Because the data are recorded by public entities, the empirical analyses do not suffer from non-response or self-reporting bias. Still, the registry has certain weaknesses. First, the registration of births first started in 1992, which implies that the few number of women who gave birth prior to this year and had their next delivery during the observation period are misclassified as women undergoing their first pregnancy. However, this weakness only applies to women who gave birth prior to 1992 and then had a birth interval of at least 12 years of duration, which is rare. Thus, any bias resulting from these misclassifications is limited. Second, only days of sickness absence covered by the

National Insurance are included in the registry. For employees who do not suffer from pregnancy-related conditions, this excludes the first 16 calendar days of the spell. Since 2002, employers can request reimbursement from National Insurance for expenditure on sickness absence among pregnant employees suffering periods of illness with a pregnancy-related diagnosis. In these cases, spells are registered from day 1. This implies that the first 16 days are left censored for some spells, while other spells are complete. Although censoring may vary according to employer characteristics, such variation does not explain the high and increasing levels of sickness absence among young pregnant women, because this trend started before the amendment in 2002.<sup>16</sup>

The impact of excluding short-term sickness absence is also limited, because only 32% of Norwegian women's sickness absence is covered by the employer,<sup>48</sup> and the figure is probably lower for pregnant employees, considering the separate rules of employer reimbursement which apply to absence spells caused by pregnancy-related diagnoses. High numbers of zeros often occur naturally in count data, which the variables of sickness absence are examples of.<sup>46</sup> However, the censoring described above has contributed to heighten the numbers of zero in these variables even further. Zero-inflated Poisson regression was conducted to account for the excess zero in the distribution of sick days.

Controlling for occupational class implies a weakening of the negative association between age and sickness absence among women undergoing their first pregnancy and among those who have previously given birth. This indicates that the initial association between age and sickness absence during pregnancy is partly due to aspects of occupational class which these two groups





**Figure 3** Marginal effect of age in models 1–4 in the regression analysis.

have in common, such as physical and social working environment. However, occupational class only explains a small proportion of the heightened number of sick days among young pregnant women who have previously delivered. In this group, higher numbers of sick days apply to young pregnant women even after control for occupational class. Unfortunately, the data set does not allow for a more detailed analysis of this group, but previous research may hint at possible explanations.

Early transition to second or third births may reflect weaker employment orientation, especially since Norwegian women less frequently return to full-time employment after second or third births.<sup>49</sup> Accordingly, the association between high number of sick days and early transition to second or third births that we find in our analyses may indicate that the threshold for sickness absence is lower for women whose future prospects are oriented towards family building rather than employment. However, the well-known association between homemaking and health problems implies that the apparent family orientation indicated by early transition to second or third births may reflect health problems rather than preferences. It is also worth noticing that early transition to second or third birth occurs much less frequently in Norway today than just a few decades ago. Sickness absence among women who undertake such transitions should thus be regarded in the light of the possible atypical situation of these women, because they may be affiliated with ethnic or religious groups

that influence their sickness absence. Regardless of class and previous pregnancies, pregnant employees in their early 30s are least prone to sickness absence. This may reflect a stronger work orientation in the group of women who postpone pregnancies to their 30s, as compared with younger mothers. Pregnant employees' *'Strategies of Secrecy, Silence and Supra-performance'*<sup>5</sup> may shed light on this picture. In short, pregnant employees explain how they strive to adapt to workplace norms of occupational performance by delaying the announcement of their pregnancy, avoiding discussing it and compensating through increased flexibility and longer working hours, to demonstrate to their employer that the pregnancy does not make them less predictable or reliable as employees. Keeping sickness absence at an absolute minimum is also part of these strategies. Although these strategies seem quite hazardous, they also seem to reflect an important implicit assumption: the women do not want their pregnancy to jeopardise their occupational attachment. Women who postpone pregnancy to their early 30s may be characterised by a general orientation towards future employment, which also influences their number of sick days during pregnancy. From the late 30s, the number of sick days during pregnancy increases with age, possibly due to the increased biological challenges.

It is also worth noticing that young women with previous deliveries are more prone to sickness absence than first-time pregnant women, although the difference

between these groups decreases with age. In other words, childcare seems to inflate sickness absence more strongly among younger than among older pregnant women, which might indicate that early transition to motherhood is associated with rather traditional gender roles, while women who postpone pregnancy have partners who spend more time caring for children.

Future research on sickness absence should aim to investigate the relative importance of working conditions, social environment, motivation and health complaints for sickness absence during pregnancy. One should also investigate whether other risk factors for sickness absence apply to pregnant women, as compared with non-pregnant women and men. The causes and consequences of sickness absence among young pregnant women with previous deliveries may be of particular interest, as they are particularly prone to absence and possibly also future labour market exclusion.

## CONCLUSION

Young pregnant women have a higher frequency of sickness absence than do their older counterparts. Contrary to expectations, the age differentials in sickness absence are stronger among pregnant women with previous deliveries than among those undergoing their first pregnancy. Occupational class largely accounts for the age differentials, but only among first-time pregnant women.

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Anja M S Ariansen

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