

# Work-home interface stress: an important predictor of emotional exhaustion 15 years into a medical career

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**Abstract:** The importance of work-home interface stress can vary throughout a medical career and between genders. We studied changes in work-home interface stress over 5 yr, and their prediction of emotional exhaustion (main dimension of burn-out), controlled for other variables. A nationwide doctor cohort (NORDOC; n=293) completed questionnaires at 10 and 15 yr after graduation. Changes over the period were examined and predictors of emotional exhaustion analyzed using linear regression. Levels of work-home interface stress declined, whereas emotional exhaustion stayed on the same level. Lack of reduction in work-home interface stress was an independent predictor of emotional exhaustion in year 15 ( $\beta=-0.21$ ,  $p=0.001$ ). Additional independent predictors were reduction in support from colleagues ( $\beta=0.11$ ,  $p=0.04$ ) and emotional exhaustion at baseline ( $\beta=0.62$ ,  $p<0.001$ ). Collegial support was a more important predictor for men than for women. In separate analyses, significant adjusted predictors were lack of reduction in work-home interface stress among women, and reduction of collegial support and lack of reduction in working hours among men. Thus, change in work-home interface stress is a key independent predictor of emotional exhaustion among doctors 15 yr after graduation. Some gender differences in predictors of emotional exhaustion were found.

**Key words:** Emotional exhaustion, Burn-out, Work-home interface stress, Colleague support, Predictors, Doctor career

## Introduction

The connections between work and home (non-working) life are increasingly realized to be of importance

in a society where dual-earner couples are common. In several countries, we see that work-home interface stress is closely associated with emotional exhaustion (the main dimension of burn-out) among doctors<sup>1-4</sup> and most likely in other professional groups as well. What is not known is whether work-home interface stress is equally important for both genders and in all phases of doctors' lives. Such knowledge could help in implementing adequate preven-

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tive measures. Consequently, it is necessary to study prospectively how work-home interference varies through different work and life phases of doctors, and to evaluate whether these changes predict emotional exhaustion.

To study these questions, we have followed a nationwide representative cohort of Norwegian doctors for 15 yr from the end of their medical studies (NORDOC)<sup>5</sup>. During the last 5 yr period, at 10–15 yr after graduation, many of the doctors in this cohort experienced the start of a new phase in their career, advancing from Senior House Officers, with temporary short-term job positions, to Chief Specialists with permanent positions<sup>6</sup>. In this phase, important variables that have been correlated previously with emotional exhaustion could be expected to decrease.

Already during the first 10 yr after leaving medical school there was a reduction in the job stress caused by perceived emotional pressure, time pressure and fear of complaints in the NORDOC cohort<sup>7</sup>. In the following 5 yr, as these doctors became specialists, a further decrease in these stress dimensions could be expected, as competence and confidence at work would continue to increase. Previous studies have shown associations between these job stress dimensions and emotional exhaustion<sup>8–10</sup>.

On the other hand, perceived work-home interface stress increased during the first 10 yr after graduation among the doctors in the NORDOC cohort and an increase in number of offspring predicted this stress<sup>7</sup>. Balancing tasks at work with obligations outside of work became increasingly difficult. In the next phase, 10–15 yr into the career, work-home interface stress could be expected to decrease, as the children grow older and fewer children are expected to be born. However, other obligations outside of work such as care of the elderly, sick parents or other responsibilities could increase, which makes it difficult to predict the development of work-home interface stress in this phase<sup>11</sup>. Higher levels of work-home interface stress have been reported among women doctors than among men<sup>1</sup>, and in a Norwegian study, work-home interface stress was associated with emotional exhaustion, especially among women doctors<sup>4</sup>. Among Norwegian male doctors, workload had a greater impact on emotional exhaustion than work-home interface stress. When studying the importance of work-home interface stress, it is thus important to study gender interactions in predictor effects, as well as to conduct separate gender analyses.

More working hours was associated both with work-home interface stress and with emotional exhaustion in a recent large study in the USA<sup>3</sup>. Among doctors in the NORDOC cohort, not only the numbers of working hours

was found to predict work-home interface stress, but a lack of reduction in working hours was found to increase work-home interface stress when the doctors had children<sup>7</sup>. Schaufeli *et al.* emphasized the importance of studying the amenable factors that have an impact on the variance in emotional exhaustion<sup>12</sup>, and this applies in particular to working long hours. In Norway, there is a legal right for all citizens to claim reduced working hours and to work part-time when one has young children<sup>13</sup>. Therefore, we wanted to examine whether and how changes at 10–15 yr after leaving medical school were associated with emotional exhaustion.

Social support was found partly to outweigh the increase of work-home interface stress that was found with an increasing number of offspring and a lack of reduction in working hours among Norwegian doctors<sup>7</sup>. Both spouse support and support from colleagues were important, especially among women doctors.

Although personality factors (neuroticism and conscientiousness) have been found to predict both emotional exhaustion and the experience of work-home interface stress<sup>7</sup>, in the present study we will focus upon contextual factors that might be targeted by organizational interventions, and have therefore excluded personality as a predictor of emotional exhaustion<sup>7</sup>.

On this basis, we wanted to examine the importance of change in work-home interface stress for emotional exhaustion 10–15 yr after graduation for the whole sample, and among men and women separately. We expected that changes in work-home interface stress would have importance for emotional exhaustion mainly among women doctors, and that women would have most benefit from social support. On this basis, we posed the following research questions:

1. What is the course of work-home interface stress 10–15 yr after graduation from medical school for the whole sample, and by gender?
2. How does change in work-home interface stress predict emotional exhaustion at 10–15 yr after graduation for the whole group and within each gender, also when controlled for other predictors?

## Subjects and Methods

### Sample

A nationwide 1 yr cohort of all Norwegian doctors was followed through the first 15 yr of their career, from their graduation at the end of their medical studies in 1993/94. They completed comprehensive questionnaires at different

time points<sup>7</sup>). We examined changes from the 10th (T1) to the 15th yr (T2) after leaving medical school (n=293).

We compared the present baseline sample (n=293) to the rest of the NORDOC participants in the 1993/94 sample (total n=522) and found no significant differences in gender, age or mental distress (measured using the Symptom Checklist SCL-5)<sup>14, 15</sup>.

### Measures

#### Dependent variable

*Emotional exhaustion* was assessed with eight items (Cronbach's  $\alpha=0.89$ ), using the exhaustion dimension of the Oldenburg Burnout Inventory (OLBI)<sup>16, 17</sup>. The OLBI is constructed with two independent scales—exhaustion and disengagement—and has been validated against the most utilized instrument for measuring burn-out, the Maslach Burnout Inventory<sup>17, 18</sup>. Emotional exhaustion has been considered the primary dimension of burn-out<sup>19</sup>, and has been used especially in studies measuring burn-out over time, as in the present study<sup>15, 20–22</sup>. The items were scored from 1 (totally disagree) to 5 (totally agree), as experienced during the preceding 2 wk. This scale has been validated in previous studies on Norwegian doctors<sup>4, 20</sup>.

#### Independent variables

*Age* was measured as a continuous variable.

*Gender* was coded as 1=woman and 2=man.

*Marital status* was dichotomized as married or cohabitant=1 and all other categories (unmarried, separated, divorced, or widowed/widowed)=0.

The *number of children* was coded as no children=0, one child=1, two children=2, and three or more children=3. The birth of a child during the study period was coded 0=no additional child, and 1=an additional child.

The *number of working hours per week* included the regular work schedule as well as self-imposed or imposed overtime. Part-time work was defined as less than 37.5 h/wk (37.5 h is considered full-time work in Norway). Change in working hours was dichotomized and coded 1 for reduction in working hours from T1 to T2 and 0 for no reduction or increase.

*Perceived job stress* was measured using a modified and validated version of Cooper's Job Stress Questionnaire<sup>21, 22</sup>. This instrument has been described in detail elsewhere<sup>7</sup> and was scored on a scale from 1 (not at all) to 5 (very much). The instrument consists of stress caused by four dimensions of perceived job stress, respectively caused by:

(1) Emotional demands, nine items, Cronbach's  $\alpha=0.83$ ;

(2) Time pressure, six items, Cronbach's  $\alpha=0.75$ ;

(3) Fear of complaints and criticism, seven items, Cronbach's  $\alpha=0.73$ ;

(4) Work-home interface stress, Cronbach's  $\alpha=0.83$ .

Work-home interface stress refers not only to family obligations, but also to other responsibilities outside of work for the individual doctor<sup>23</sup>. It was measured using the items: "I am stressed by the job interfering with my family life", "I am stressed by problems balancing my job and private life", and "I am stressed by the job interfering with my social life". Although other measures pertaining to the balance between work and home have also been measured in other studies, such as facilitation from the work-to-home situation or from home-to-work, work-to-home interface stress has been found to be the most important for levels of emotional exhaustion among Norwegian doctors<sup>4</sup>.

Change in the stress variables was calculated as T1–T2 levels.

*Collegial support* was assessed on a scale from 1 (not at all) to 7 (a very high degree) using two previously validated questions: "To what degree are you taken care of by your colleagues?" and "To what degree do you enjoy working with your colleagues?" Cronbach's  $\alpha=0.84$ . Change in support was calculated as T1–T2 levels<sup>7</sup>.

*Spouse support* was measured using four items on instrumental and emotional spouse support as well as the spouse's acceptance of the physician's work schedule, scored from 1 (not at all the case) to 5 (absolutely the case; Cronbach's  $\alpha=0.66$ ); e.g., "When the job situation is bad, I find comfort and support in my spouse" and "My spouse thinks I work too much" (scale reversed with 1\_not at all the case and 5\_absolutely the case)<sup>7</sup>. Change in support was calculated as T1–T2 levels.

*Job positions* were categorized into the following: (1) general practitioner/family medicine; (2) chief specialist in a hospital; (3) senior house officer/resident; and (4) other. Change in job position from T1 to T2 was scored 1=change, or 0=no change.

### Statistics

We used the software SPSS Statistics 22.

Comparisons between groups were assessed with Students' *t*-tests, and within groups with paired sample *t* tests. Proportions were reported in % with 95% confidence intervals (CI). Changes where the 95% CIs did not overlap were considered significant.

Potential predictors of emotional exhaustion at T2 were examined using linear regression analyses with a forced

entry strategy. Age, gender, the birth of a child during the 5 yr period, lack of reduction in working hours, change of job position, reduction in stress from emotional demands, reduction in stress from fear of criticism, reduction in stress from time pressure, and reduction in work-home interface stress were examined as predictors of level of emotional exhaustion at T2 controlled for level at T1. Predictors with  $p < 0.10$  were then included in a multivariate model (Block 1). The model was further tested to see how support from colleagues and from partner could be protective in relation to emotional exhaustion (Block 2). Finally, each significant predictor of change was tested as an interaction with gender. Separate analyses among men and women were then conducted in a similar way.

Correlations between predictor variables in the multiple regressions were below 0.55. Possible collinearity was controlled for (variance inflation factors  $< 2$  and normally distributed residuals). The level of significance was set at  $p < 0.05$ .

#### *Missing data*

Only respondents who had completed all eight items regarding emotional exhaustion at both assessment time points were included in the analyses. Some of the variables concerning work stress were not relevant to all respondents because of differences in working conditions (e.g., not working directly with patients, such as laboratory work, leadership, or research). The mean scores of the relevant items in the scales were used. Concerning work-home interface stress, only respondents who answered all three items were included. For parameters in which more items were missing than those described above, the number of cases used in the relevant analyses was reduced.

#### *Ethics*

The study was conducted according to the guidelines of the Regional Ethics Committee for Medical Research and was approved by the Norwegian Data Inspectorate (via the Norwegian Social Science Data Services).

## **Results**

Details of the survey at T1 and T2 are presented in Table 1. Fifty-seven per cent of the doctors were women, and the average age at T2 was 42 yr. Twenty-five per cent of the doctors experienced the birth of a child during the 5 yr period from T1 to T2. Overall, there was no change in working hours for those working full time ( $\geq 37.5$  h/wk), but 47% of female and 53% of male doctors in the sample

reported decreased numbers of working hours during the study period.

Job stress caused by emotional and time pressures and fear of litigation was reduced from T1 to T2, without significant gender differences. There were no significant differences in emotional exhaustion scores between T1 (2.42;  $SD=0.7$ ) and T2 (2.37;  $SD=0.7$ ) in the whole sample, or among men and women analysed separately.

#### *Course of work-home interface stress*

Work-home interface stress was reduced for the cohort as a whole from T1 to T2, and similarly among women and men analyzed separately.

#### *Predictors of emotional exhaustion at T2*

A lack of reduction in job stress caused by emotional demands, time pressure and work-home interface stress, and the lack of reduction in working hours were significant predictors of emotional exhaustion at T2 (controlled for the level at T1) for the whole sample (Table 2a). Lack of reduction in work-home interface stress (standardized  $\beta = -0.14$ ,  $p < 0.001$ ) and in stress from time pressure (standardized  $\beta = -0.21$ ,  $p = 0.02$ ) remained independent predictors of emotional exhaustion in the first multivariate model, in addition to emotional exhaustion at T1; (Block 1, Table 2a). In the final model, a reduction in support from colleagues was a significant predictor of emotional exhaustion at T2 (standardized  $\beta = 0.11$ ,  $p = 0.04$ ), in addition to a lack of reduction in work-home interface stress and level of emotional exhaustion at T1 (Block 2, Table 2a).

Interactions between gender and the multivariately significant predictor variables showed that there was a significant interaction between reduction in collegial support and gender on emotional exhaustion at T2, and that a reduction in such support was more important for men than for women ( $p = 0.04$ ). In order to study how this differed between genders, we conducted separate linear regressions for men and for women.

Among women, the birth of a child during the study period and lack of reduction in stress caused by emotional demands, time pressure and work-home interface stress were significant predictors of emotional exhaustion at T2, controlled for the level at T1 (Table 2b). Lack of reduction in work-home interface stress (standardized  $\beta = -0.21$ ,  $p = 0.004$ ) and in time pressure (standardized  $\beta = -0.20$ ,  $p = 0.01$ ), in addition to emotional exhaustion at T1, remained significant independent predictors in the multivariate model (Block 1, Table 2b). There was no influence of support from their partner or colleagues among women

**Table 1. Variables in the 10th (T1) and 15th (T2) year after graduation**

	T1	T2	Measure of change from T1 to T2*
	Mean (SD) or % (95%CI)	Mean (SD) or % (95%CI)	t (p)
Whole sample n=274–293			
Women n=157–168			
Men n=117–125			
Age (yr)	37.3 (2.7)	42.3 (2.7)	326.9 (<0.001)
Women (%)		57	
Have partner (%)	89 (85.4–92.5)	91 (87.7–94.3)	
<i>Number of children</i>			
None (%)	17 (12.7–21.3)	11 (7.4–14.6)	
One (%)	11 (7.4–14.6)	8 (4.9–11.1)	
Two (%)	40 (34.4–45.6)	35 (29.5–40.5)	
Three or more (%)	32 (26.6–37.3)	45 (39.2–50.7)	
Birth of a child during the study period (%)		25 (20.0–30.0)	
<i>Job position</i>			
General practitioners (%)	17 (12.7–21.3)	21 (16.3–25.7)	
Chief specialists* (%)			
-Whole sample	23 (18.2–27.8)	57 (51.3–62.7)	
-Women	19 (13.0–25.0)	57 (49.4–64.5)	
-Men	30 (22.0–38.0)	58 (49.3–66.6)	
Senior house officers* (%)	44 (38.3–49.7)	8 (4.9–11.1)	
Others (%)	14 (10.0–18.0)	13 (9.1–16.9)	
Percent changing from senior house officer to other position in the study period (%)			
-Whole sample		40 (34.4–45.6)	
-Women		46 (38.4–53.6)	
-Men		31 (22.9–39.1)	
Work hours T5 (for those who work full-time=37.5 h or more)			
-Whole sample n=197	48.2 (7.7)	50.2 (13.7)	1.92 (0.06)
-Women n=106	46.6 (6.4)	48.8 (13.3)	1.7 (0.09)
-Men n=91	50.1 (8.6)	51.8 (14.0)	ns
Reduction in work hours during the period (%)			
-Whole sample		50 (44.1–55.9)	
-Women		47 (39.2–54.8)	
-Men		53 (44.1–61.9)	
Emotional exhaustion	2.4 (0.7)	2.4 (0.7)	ns
Colleague support	4.9 (1.2)	4.8 (1.1)	ns
Support from partner	3.8 (0.6)	3.7 (0.7)	ns
<i>Job stress due to:</i>			
Fear of litigation/criticism	2.1 (0.7)	1.9 (0.6)	4.1 (<0.001)
Emotional pressure	1.9 (0.7)	1.8 (0.5)	3.8 (<0.001)
Time pressure	2.4 (0.8)	2.2 (0.7)	5.7 (<0.001)
Work-home interference	2.6 (1.0)	2.3 (1.0)	4.4 (<0.001)

\*paired t-test

(Block 2, Table 2b).

Among men, lack of reduction in working hours, lack of reduction in stress from emotional demands, time pressure, fear of criticism and litigation, and work-home interface stress were significant predictors of emotional exhaustion at T2, controlled for the level at T1 (Table 2c). Lack of reduction in work-home interface stress (standardized

$\beta=-0.20, p=0.02$ ) and lack of reduction in working hours (standardized  $\beta=-0.17, p=0.02$ ), in addition to emotional exhaustion at T1, were independent predictors in the multivariate model (Block 1, Table 2c). Reduction in collegial support (standardized  $\beta=0.23, p=0.001$ ) absorbed the effect of work-home interface stress, and the lack of reduction in emotional demands became nearly significant among men



**Table 2a. Predictors of emotional exhaustion at T2 in the whole sample. Linear regressions with standardized and unstandardized betas and exact *p*-values**

Variables	Univariate <sup>a</sup>		Multivariate Block 1		Multivariate Block 2	
	$\beta^*$	$b^{**}$ ( <i>p</i> -value)	$\beta^*$	$b^{**}$ ( <i>p</i> -value)	$\beta^*$	$b^{**}$ ( <i>p</i> -value)
Emotional exhaustion (T1)	<b>0.55</b>	<b>0.54 (&lt;0.001)</b>	<b>0.62</b>	<b>0.61 (&lt;0.001)</b>	<b>0.62</b>	<b>0.62 (&lt;0.001)</b>
Gender	-0.02	-0.03 (0.66)	-0.04	-0.06 (0.42)	-0.04	-0.06 (0.40)
Age	0.01	0.00 (0.78)	0.03	0.01 (0.50)	0.03	0.01 (0.59)
Birth of a child from T1 to T2	-0.08	-0.13 (0.11)				
Change in work hours, T1 to T2	-0.06	-0.00 (0.24)				
Reduction in work hours	<b>-0.13</b>	<b>-0.19 (0.01)</b>	-0.06	-0.08 (0.25)	-0.04	-0.06 (0.40)
Change of job position	0.06	0.09 (0.23)				
Reduction in job stress from T1 to T2						
-Fear of litigation and criticism	-0.05	-0.05 (0.34)				
-Emotional demands	<b>-0.22</b>	<b>-0.29 (&lt;0.001)</b>	-0.08	-0.11 (0.13)	-0.08	-0.10 (0.19)
-Time pressure	<b>-0.27</b>	<b>-0.28 (&lt;0.001)</b>	<b>-0.14</b>	<b>-0.14 (0.02)</b>	-0.11	-0.12 (0.09)
-Work-home interface stress	<b>-0.31</b>	<b>-0.23 (&lt;0.001)</b>	<b>-0.21</b>	<b>-0.15 (&lt;0.001)</b>	<b>-0.21</b>	<b>-0.15 (0.001)</b>
Reduction in support from partner	0.00	0.01 (0.94)			0.04	0.05 (0.41)
Reduction in support from colleagues	<b>0.16</b>	<b>0.09 (0.002)</b>			<b>0.11</b>	<b>0.06 (0.04)</b>
Adjusted R <sup>2</sup>			40%		38%	

<sup>a</sup>Effect of this predictor on emotional exhaustion at T2, controlled for the level of emotional exhaustion at T1.  $\beta^*$ : Standardized Beta,  $b^{**}$ : Unstandardized Beta. Bold numbers indicate statistically significant coefficients (Univariate  $p < 0.10$ , Multivariate  $p < 0.05$ ).

**Table 2b. Predictors of emotional exhaustion at T2 in female doctors. Linear regressions with standardized and unstandardized betas and *p*-values**

Variables	Univariate <sup>a</sup>		Multivariate Block 1		Multivariate Block 2	
	$\beta^*$	$b^{**}$ ( <i>p</i> -value)	$\beta^*$	$b^{**}$ ( <i>p</i> -value)	$\beta^*$	$b^{**}$ ( <i>p</i> -value)
Emotional exhaustion (T1)	<b>0.52</b>	<b>0.49 (&lt;0.001)</b>	<b>0.62</b>	<b>0.58 (&lt;0.001)</b>	<b>0.61</b>	<b>0.58 (&lt;0.001)</b>
Age	0.01	0.00 (0.94)	0.02	0.01 (0.74)	-0.00	0.00 (0.98)
Birth of a child from T1 to T2	<b>-0.12</b>	<b>-0.20 (0.06)</b>	-0.08	-0.13 (0.22)	-0.05	-0.09 (0.46)
Change in work hours, T1 to T2	-0.06	-0.00 (0.42)				
Reduction in work hours	-0.08	-0.12 (0.25)				
Change of job position	0.10	0.15 (0.14)				
Reduction in job stress from T1 to T2						
-Fear of litigation and criticism	0.01	0.01 (0.86)				
-Emotional demands	<b>-0.23</b>	<b>-0.28 (0.001)</b>	-0.05	-0.06 (0.48)	-0.04	-0.06 (0.60)
-Time pressure	<b>-0.31</b>	<b>-0.32 (&lt;0.001)</b>	<b>-0.20</b>	<b>-0.21 (0.01)</b>	-0.16	-0.18 (0.08)
-Work-home interface stress	<b>-0.31</b>	<b>-0.22 (&lt;0.001)</b>	<b>-0.21</b>	<b>-0.15 (0.004)</b>	<b>-0.21</b>	<b>-0.14 (0.01)</b>
Reduction in support from partner	0.11	0.12 (0.13)			0.12	0.13 (0.10)
Reduction in support from colleagues	0.07	0.03 (0.33)			0.02	0.01 (0.80)
Adjusted R <sup>2</sup>			39%		34%	

<sup>a</sup>Effect of this predictor on emotional exhaustion at T2, controlled for the level of emotional exhaustion at T1.  $\beta^*$ : Standardized Beta,  $b^{**}$ : Unstandardized Beta. Bold numbers indicate statistically significant coefficients (Univariate  $p < 0.10$ , Multivariate  $p < 0.05$ ).

(standardized  $\beta = 0.16$ ,  $p = 0.50$ ; Block 2, Table 2c).

## Discussion

The major findings of this study were that the levels

of work-home interface stress decreased over the years, whereas—surprisingly—emotional exhaustion remained at the same level. Lack of reduction in work-home interface stress was an independent predictor of emotional exhaustion at T2. In addition, reduction in collegial support and

**Table 2c. Predictors of emotional exhaustion at T2 in male doctors. Linear regressions with standardized and unstandardized betas and *p*-values**

Variables	Univariate <sup>a</sup>		Multivariate Block 1		Multivariate Block 2	
	$\beta^*$	$b^{**}$ ( <i>p</i> -value)	$\beta^*$	$b^{**}$ ( <i>p</i> -value)	$\beta^*$	$b^{**}$ ( <i>p</i> -value)
Emotional exhaustion (T1)	<b>0.60</b>	<b>0.65 (&lt;0.001)</b>	<b>0.65</b>	<b>0.71 (&lt;0.001)</b>	<b>0.71</b>	<b>0.76 (&lt;0.001)</b>
Age	0.03	0.01 (0.69)	0.04	0.01 (0.61)	0.06	0.02 (0.41)
Birth of a child from T1 to T2	-0.02	-0.03 (0.78)				
Change in work hours, T1 to T2	-0.06	-0.00 (0.43)				
Reduction in work hours	<b>-0.20</b>	<b>-0.29 (0.006)</b>	<b>-0.17</b>	<b>-0.25 (0.02)</b>	<b>-0.16</b>	<b>-0.23 (0.02)</b>
Change of job position	-0.01	-0.02 (0.85)				
Reduction in job stress from T1 to T2						
-Fear of litigation and criticism	-0.13	-0.15 (0.07)	0.11	-0.13 (0.20)	0.09	0.10 (0.31)
-Emotional demands	<b>-0.21</b>	<b>-0.30 (0.003)</b>	-0.15	-0.21 (0.07)	-0.16	-0.22 (0.05)
-Time pressure	<b>-0.23</b>	<b>-0.23 (0.002)</b>	-0.09	-0.09 (0.31)	-0.12	-0.12 (0.20)
-Work-home interface stress	<b>-0.30</b>	<b>-0.22 (&lt;0.001)</b>	<b>-0.20</b>	<b>-0.15 (0.02)</b>	-0.11	-0.08 (0.20)
Reduction in support from partner	<b>-0.16</b>	<b>-0.21 (0.03)</b>			-0.10	-0.12 (0.16)
Reduction in support from colleagues	<b>0.29</b>	<b>0.18 (&lt;0.001)</b>			<b>0.23</b>	<b>0.14 (0.001)</b>
Adjusted R <sup>2</sup>			45%		51%	

<sup>a</sup>Effect of this predictor on emotional exhaustion at T2, controlled for the level of emotional exhaustion at T1.  $\beta^*$ : Standardized Beta,  $b^{**}$ : Unstandardized Beta. Bold numbers indicate statistically significant coefficients (Univariate  $p < 0.10$ , Multivariate  $p < 0.05$ ).

emotional exhaustion at T1 were both significant independent predictors. The protective effect of such support was most important for male doctors. When each gender was analyzed separately, we found that, among women, lack of reduction in work-home interface stress was the only significant adjusted predictor, whereas among men a lack of reduction in working hours and a reduction in collegial support were both significant adjusted predictors.

#### *Work-home interface stress*

In accordance with our expectations, work-home interface stress was found to decrease in the cohort as a whole during the 10–15 yr after graduation. There were no differences in levels or change in the work-home interface between the genders. Several studies, internationally and in Norway, have found more stress caused by work-home interference among women doctors than among men<sup>1, 2, 24</sup>). Therefore, it is interesting to note that we found little gender difference in this relatively young and homogenous group in terms of age. As gender differences in stress caused by work-home interference have been found to rely more on societal expectation and behavioural norms than on biological differences between the genders, a gradual narrowing of the gender gap could be expected over time as societal norms change<sup>25</sup>). In Norway, for example, the father must now plan to take at least 10 wk of the 12 months of paid parental child care leave during the

first year after birth, or the family might lose this welfare support<sup>13</sup>).

#### *Work-home interface stress and change in emotional exhaustion*

We had expected a reduction in emotional exhaustion from T1 to T2, as several of the stressful circumstances known from other studies to influence emotional exhaustion were reduced. However, we found that a lack of reduction in work-home interface stress was the most important predictor of emotional exhaustion. Surprisingly, we found that this had a similar effect in both genders, because there was no significant interaction with gender in this predictor variable. Previous studies have found such an association but primarily among women doctors<sup>2, 4</sup>). Before adjusting for collegial support among the men, we found that work-home interface stress was the most important work-related stress factor. The importance of this factor among men in this phase of their career is consistent with the results presented above, suggesting a change towards men and women sharing home responsibilities in Norway. Whereas a recent American study<sup>3</sup>) found that male doctors usually resolved work-home interference to the advantage of the work place, our study showed that a large proportion of the men (53%) reduced their working hours. A study of another sample of Norwegian doctors found a strong association between work-home interface

stress and emotional exhaustion among women, whereas among men the association between workload and emotional exhaustion was stronger<sup>4</sup>). To some extent our study is consistent with that one, because work-home stress was most important among women, but a lack of reduction in working hours was more important among the men. In Norway, men who work full-time report higher levels of weekly working hours than do women<sup>26, 27</sup>), so a reduction in working hours might have a greater effect on emotional exhaustion among men than among women. In addition, we found an almost significant effect ( $p=0.05$ ) of emotionally demanding patient-related work among the men in the fully adjusted predictor model.

To a certain degree, collegial support has been found previously to protect against stress from work-home interference earlier in a doctor's career, especially among women<sup>7</sup>). In the present study we found that collegial support seemed to absorb the predictor effect of time pressure on emotional exhaustion in the whole cohort, and also the predictor effect of work-home interference among the men. It remains less common for male than for female doctors to make work adjustments to accommodate their family needs, also in Norway, and the present study emphasizes the importance both for medical leaders and colleagues to support such choices to increase men's tolerance of work-home interface stress.

Among women, lack of reduction in stress from time pressure was independently associated with change in emotional exhaustion. Time pressure among Norwegian doctors is influenced by the experience of control over the planning and organizing of work<sup>28</sup>). The change in work position from senior house officer to chief specialist will contribute to this<sup>6</sup>), and in the present study more women than men experienced a change in work position.

High levels of emotional exhaustion have been found to correlate with poor work functioning and high distress levels also among Norwegian doctors<sup>15, 29</sup>). After an intervention addressing work-related stress, including that from the work-home interference, a sustained reduction of emotional exhaustion was found up to 3 yr later<sup>30</sup>). In this study, we found some factors amenable to change 10–15 yr after medical school that have an impact on emotional exhaustion, and could be important preventive measures in relation to burn-out.

Summing up, this study found that—in terms of prevention—both genders need to alleviate work-home interface stress in order to counteract emotional exhaustion. It seems that female doctors still need more help to reduce the home part of such stress, whereas male doctors might

be helped by workplace interventions, such as reduced working hours and more support from colleagues. However, predictors of work-home interface stress at this stage of a career should be more studied. Qualitative studies could explore doctors' perceptions of these associations in more depth, especially regarding which factors are most important for women to reduce work-home interface stress.

#### *Strengths and weaknesses*

The participants in the present study were a sample of a nationwide year cohort of doctors. The relatively high retention rate of 56% over the 15 yr follow-up period, and finding no significant differences when testing for a non-response bias on certain important variables, indicate that the sample is indeed representative for Norwegian doctors at 10 and 15 yr after graduation. In other studies of doctors, response rates were often low; several US studies reported response rates below 40%, even using cross-sectional sampling<sup>31</sup>). Other strengths are the 5 yr follow-up period and the use of instruments previously validated among Norwegian doctors.

Using only one dimension of the Oldenburg Burnout Inventory could represent a limitation of this study<sup>32</sup>). However, emotional exhaustion has been viewed as the primary dimension of burn-out<sup>19</sup>), and has been used especially where change over time has been studied, as here<sup>15, 33–35</sup>). Given that there was limited explained variance in the predictor models (Adjusted  $R^2$  between 34% and 51%), other factors might have been of importance. Previous research has shown that the personality trait of neuroticism can predict emotional exhaustion<sup>10, 36, 37</sup>). Coping strategies, especially emotion-focused coping, has been associated with job stress and burn-out<sup>36, 38</sup>). Work-related factors such as a lack of clarity in role understanding or role definition are also found to increase the risk for the development of emotional exhaustion<sup>32, 39</sup>).

When dividing the sample by gender, the sample size might have been too small to detect certain significant effects (type II errors or false negative findings). Moreover, self-reporting instruments are less reliable and valid than observational measures.

Finally, since work conditions for doctors vary between countries the present conclusions can have somewhat limited generalizability, as discussed above.

## **Conclusions**

There was a general reduction in work-home interface stress among doctors 10–15 yr into their career, seemingly



arising both from the family welfare system of this country and from a self-chosen reduction in working hours, but this should be studied further. Despite a reduction in work-home stress, emotional exhaustion remained at the same level over the period studied. Emotional exhaustion by year 15 of the career was predicted by a lack of reduction in work-home interface stress to the same degree in both male and female doctors. Among the women it seemed that such stress was the most important predictor. Among men, a lack of reduction in working hours predicted emotional exhaustion, while more support from colleagues seemed to absorb the predictive effect of work-home interface stress. These findings are of importance both for the individual doctors and their work places in order to implement empirically founded and effective interventions.

## References

- 1) Fuss I, Nübling M, Hasselhorn HM, Schwappach D, Rieger MA (2008) Working conditions and Work-Family Conflict in German hospital physicians: psychosocial and organisational predictors and consequences. *BMC Public Health* **8**, 353. [[Medline](#)] [[CrossRef](#)]
- 2) Montgomery AJ, Panagopolou E, Benos A (2006) Work-family interference as a mediator between job demands and job burnout among doctors. *Stress Health* **22**, 203–12. [[CrossRef](#)]
- 3) Dyrbye LN, Sotile W, Boone S, West CP, Tan L, Satele D, Sloan J, Oreskovich M, Shanafelt T (2014) A survey of U.S. physicians and their partners regarding the impact of work-home conflict. *J Gen Intern Med* **29**, 155–61. [[Medline](#)] [[CrossRef](#)]
- 4) Langballe EM, Innstrand ST, Aasland OG, Falkum E (2011) The predictive value of individual factors, work-related factors, and work-home interaction on burnout in female and male physicians: a longitudinal study. *Stress Health* **27**, 73–87. [[CrossRef](#)]
- 5) Tyssen R, Vaglum P, Grønvoold NT, Ekeberg Ø (2005) The relative importance of individual and organizational factors for the prevention of job stress during internship: a nationwide and prospective study. *Med Teach* **27**, 726–31. [[Medline](#)] [[CrossRef](#)]
- 6) Solberg IB, Rø KI, Aasland O, Gude T, Moum T, Vaglum P, Tyssen R (2012) The impact of change in a doctor's job position: a five-year cohort study of job satisfaction among Norwegian doctors. *BMC Health Serv Res* **12**, 41. [[Medline](#)] [[CrossRef](#)]
- 7) Røvik JO, Tyssen R, Hem E, Gude T, Ekeberg O, Moum T, Vaglum P (2007) Job stress in young physicians with an emphasis on the work-home interface: a nine-year, nationwide and longitudinal study of its course and predictors. *Ind Health* **45**, 662–71. [[Medline](#)] [[CrossRef](#)]
- 8) Linzer M, Visser MR, Oort FJ, Smets EM, McMurray JE, de Haes HC, Society of General Internal Medicine (SGIM) Career Satisfaction Study Group (CSSG) (2001) Predicting and preventing physician burnout: results from the United States and the Netherlands. *Am J Med* **111**, 170–5. [[Medline](#)] [[CrossRef](#)]
- 9) Visser MR, Smets EM, Oort FJ, De Haes HC (2003) Stress, satisfaction and burnout among Dutch medical specialists. *CMAJ* **168**, 271–5. [[Medline](#)]
- 10) McManus IC, Winder BC, Gordon D (2002) The causal links between stress and burnout in a longitudinal study of UK doctors. *Lancet* **359**, 2089–90. [[Medline](#)] [[CrossRef](#)]
- 11) Gawande A (2014) *Being mortal: medicine and what matters in the end*, Metropolitan Books / Henry Holt & Co., New York.
- 12) Schaufeli WB, Maassen GH, Bakker AB, Sixma HJ (2011) Stability and change in burnout: a 10-year follow-up study among primary care physicians. *J Occup Organ Psychol* **84**, 248–67. [[CrossRef](#)]
- 13) National Insurance Act [Lov om folketrygd] (2014) LOV-1997-02-28-19 with changes in 2014: LOVdata (in Norwegian).
- 14) Tambs K, Moum T (1993) How well can a few questionnaire items indicate anxiety and depression? *Acta Psychiatr Scand* **87**, 364–7. [[Medline](#)] [[CrossRef](#)]
- 15) Isaksson Rø K, Gude T, Tyssen R, Aasland O (2008) Counselling for burnout in Norwegian doctors: one year cohort study. *BMJ* **337**, a2004.
- 16) Demerouti E, Bakker A, editors. (2008) *The Oldenburg Burnout Inventory: a good alternative to measure burnout and engagement in Halbesleben JRB (Ed.), Handbook of stress and burnout in health care* Nova Science, Happaugue.
- 17) Halbesleben JRB, Demerouti E (2005) The construct validity of an alternative measure of burnout: investigating the English translation of the Oldenburg Burnout Inventory. *Work Stress* **19**, 208–20. [[CrossRef](#)]
- 18) Maslach C, Jackson SE (1981) The measurement of experienced burnout. *J Occup Behav* **2**, 99–113. [[CrossRef](#)]
- 19) Schaufeli WB, Buunk BP (2003) Burnout: an overview of 25 years of research and theorizing. In: *The handbook of work and health psychology*, 2nd Ed., Schabracq MJ, Winnubst AM, Cooper CL (Eds.), 383–425, John Wiley & Sons, Chichester.
- 20) Langballe EM, Innstrand ST, Hagtvat KA, Falkum E, Gjerløw Aasland O (2009) The relationship between burnout and musculoskeletal pain in seven Norwegian occupational groups. *Work* **32**, 179–88. [[Medline](#)]
- 21) Cooper CL, Rout U, Faragher B (1989) Mental health, job satisfaction, and job stress among general practitioners. *BMJ* **298**, 366–70. [[Medline](#)] [[CrossRef](#)]
- 22) Tyssen R, Vaglum P, Grønvoold NT, Ekeberg O (2000) The impact of job stress and working conditions on mental health problems among junior house officers. A nationwide Norwegian prospective cohort study. *Med Educ* **34**, 374–84. [[Medline](#)] [[CrossRef](#)]
- 23) Nübling M, Stöbel U, Hasselhorn HM, Michaelis M,

- Hofmann F (2006) Measuring psychological stress and strain at work—Evaluation of the COPSOQ Questionnaire in Germany. *Psychosom Med* **3**, Doc05. [[Medline](#)]
- 24) Dyrbye LN, Shanafelt TD, Balch CM, Satele D, Sloan J, Freischlag J (2011) Relationship between work-home conflicts and burnout among American surgeons: a comparison by sex. *Arch Surg* **146**, 211–7. [[Medline](#)] [[CrossRef](#)]
- 25) Duxbury LE, Higgins CA (1991) Gender differences in work–family conflict. *J Appl Psychol* **76**, 60. [[CrossRef](#)]
- 26) Aasland O, Rosta J (2011) Hvordan har overlegene det? [How are the consultants?] *Overlegen* **1**, 47–55 (in Norwegian).
- 27) Aasland OG, Rosta J (2013) Norske leger i spesialisering—hvordan har de det? [Norwegian future consultants—how are they?] *Forum for yngre leger* **2**, 21–23 (in Norwegian).
- 28) Falkum E, Gjerberg E, Hofoss D, Aasland OG (1997) Tidspress blant norske leger [Time stress among Norwegian physicians]. *Tidsskr Nor Laegeforen* **117**, 954–9 (in Norwegian). [[Medline](#)]
- 29) Rø KE, Gude T, Aasland OG (2007) Does a self-referral counselling program reach doctors in need of help? A comparison with the general Norwegian doctor workforce. *BMC Public Health* **7**, 36. [[Medline](#)] [[CrossRef](#)]
- 30) Isaksson Ro KE, Tyssen R, Gude T, Aasland OG (2012) Will sick leave after a counselling intervention prevent later burnout? A 3-year follow-up study of Norwegian doctors. *Scand J Public Health* **40**, 278–85. [[Medline](#)] [[CrossRef](#)]
- 31) Shanafelt TD, Boone S, Tan L, Dyrbye LN, Sotile W, Satele D, West CP, Sloan J, Oreskovich MR (2012) Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med* **172**, 1377–85. [[Medline](#)] [[CrossRef](#)]
- 32) Schaufeli WB, Bakker AB, Frank MMA, Van der Heijden BI, Prins JT (2009) Workaholism, burnout and well-being among junior doctors: the mediating role of role conflict. *Work Stress* **23**, 155–72. [[CrossRef](#)]
- 33) Krasner MS, Epstein RM, Beckman H, Suchman AL, Chapman B, Mooney CJ, Quill TE (2009) Association of an educational program in mindful communication with burnout, empathy, and attitudes among primary care physicians. *JAMA* **302**, 1284–93. [[Medline](#)] [[CrossRef](#)]
- 34) Dunn PM, Arnetz BB, Christensen JF, Homer L (2007) Meeting the imperative to improve physician well-being: assessment of an innovative program. *J Gen Intern Med* **22**, 1544–52. [[Medline](#)] [[CrossRef](#)]
- 35) Isaksson Ro KE, Tyssen R, Hoffart A, Sexton H, Aasland OG, Gude T (2010) A three-year cohort study of the relationships between coping, job stress and burnout after a counselling intervention for help-seeking physicians. *BMC Public Health* **10**, 213. [[Medline](#)] [[CrossRef](#)]
- 36) Deary IJ, Blenkin H, Agius RM, Endler NS, Zealley H, Wood R (1996) Models of job-related stress and personal achievement among consultant doctors. *Br J Psychol* **87**, 3–29. [[Medline](#)] [[CrossRef](#)]
- 37) McCranie EW, Brandsma JM (1988) Personality antecedents of burnout among middle-aged physicians. *Behav Med* **14**, 30–6. [[Medline](#)] [[CrossRef](#)]
- 38) Sharma A, Sharp DM, Walker LG, Monson JR (2008) Stress and burnout among colorectal surgeons and colorectal nurse specialists working in the National Health Service. *Colorectal Dis* **10**, 397–406. [[Medline](#)] [[CrossRef](#)]
- 39) Peiró JM, González-Romá V, Tordera N, Mañas MA (2001) Does role stress predict burnout over time among health care professionals? *Psychol Health* **16**, 511–25. [[Medline](#)] [[CrossRef](#)]