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**Changes in weekly working hours, proportion of doctors with hours above the limitations of EWDT and time spent on direct patient care for doctors in Norway from 2016 to 2019: A study based on repeated surveys**

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**Original article****Changes in weekly working hours, proportion of doctors with hours above the limitations of  
EWDT and time spent on direct patient care for doctors in Norway from 2016 to 2019:  
A study based on repeated surveys****Rosta, J (1); Isaksson Rø, K (1).**

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## ABSTRACT

**Objectives** To compare the total weekly working hours, proportions with work hours above the limitations of EWDT and time spent on direct patient care in 2016 and 2019 for doctors working in different job positions in Norway.

**Design** Repeated postal surveys in 2016 and 2019.

**Setting** Norway.

**Participants** Representative samples of doctors; the response rates were 73.1% (1604/2195) in 2016 and 72.5% (1511/2084) in 2019.

**Main outcome measures** Self-reported weekly working hours, proportions with hours above the limitations of EWDT defined as >48h/week, and time spent on direct patient care.

**Analyses** Linear mixed models with estimated marginal means and proportions.

**Results** From 2016 to 2019, the weekly working hours increased significantly for male GPs (48.7 h to 50.9 h) and male hospital doctors in leading positions (48.2 h to 50.5 h), and significantly decreased for female specialists in private practice (48.6 h to 44.9 h). The proportion of time spent on direct patient care was noted to be similar between genders and over time. In 2019, it was higher for specialists in private practice (66.4%) and GPs (65.5%) than for doctors in other positions, such as senior hospital consultants (43.5%), speciality registrars (39.8%) and hospital doctors in leading positions (34.3%). Working >48 h/week increased significantly for both male and female GPs (m: 45.2% to 57.7% f: 27.8% to 47.0%) and hospital doctors in leading positions (m: 34.4% to 57.1%; f: 17.4% to 46.4%), while it significantly decreased for female speciality registrars (13.2% to 6.9%).

**Conclusions** Working hours increased significantly for GPs and hospital doctors in leading positions from 2016 to 2019, resulting in increased proportions with work hours above the EWDT. Regulating work hours can be a useful intervention for patient care and for doctors' wellbeing.

### Strengths and limitations of the study

The representative cohort with high response rates provided a solid basis for generalisation of the results to the practising doctors in Norway.

There were similarities in the survey methods and measurements at two points in time.

In terms of limitations, analyses were based on self-reported questionnaire data with the possibility of both over- and underestimation of working hours.

## BACKGROUND

Doctors' work hours are vital for the medical profession itself and thereby also for both the quality and quantity of patient care. Both the number of total work hours and the balance between time spent on direct patient care vs administrative tasks are related to doctors' and patients' wellbeing and health, in primary care as well as hospital settings.<sup>1-7</sup> Given this association, the European Union has introduced a working time directive (EWDT) limiting the overall average weekly working hours to 48. This is a measure "designed to protect the health and safety of workers and to improve health and safety at work".<sup>8,9</sup> For both treatment outcomes and for doctors' wellbeing, we therefore need longitudinal studies of total work hours and time spent on direct patient care. Total weekly work hours will also be one of several aspects that have an impact on the doctors' work-home balance.

Difficulties with recruitment and retainment of general practitioners (GPs) have been reported from several European countries. Increases in workload and longer work hours are understood as reasons for this.<sup>10-12</sup> In Norway, GPs have reported a growth in work demands<sup>13</sup> and long working weeks with a wide variety of tasks.<sup>14</sup> Several GPs explained that high workload affects their own quality of life as well as the ability to ensure good quality of patient care.<sup>15</sup> Moreover, hospital doctors confirmed an increasing workplace emphasis on production numbers and budget concerns and less emphasis on quality of care.<sup>16</sup> In a panel study with data from 2010 to 2017, both GPs and hospital doctors reported significant decrease of several aspects of job satisfaction, suggesting changes in working conditions.<sup>17</sup> Another panel study with data from 2010 to 2019 documented a significant increase in high levels of work stress for GPs and showed an increasing trend of stress for hospital doctors.<sup>18</sup> An important aspect of this was constant time pressure due to a heavy workload.<sup>18</sup>

A good balance between professional and private life is of increasing importance in modern society,<sup>19</sup> and this holds for doctors as well. Several studies,<sup>20-22</sup> including those from Norway, have documented that working hours in relation to work-home balance is now one of the most important topics when medical students and young doctors choose future speciality.<sup>23,24</sup> Among speciality registrars, a tendency is to think about their work as "a job", compared to senior hospital consultants who tended to

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2  
3 think about work as a “lifestyle”. This implies that there is an ongoing change in the profession  
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5 regarding expectations about responsibilities outside of work and having more predictable working  
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7 hours.<sup>25</sup> Furthermore, also more senior doctors, for example a group of surgeons in Norway, expressed  
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9 concern about work–home balance.<sup>16</sup>  
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13 The balance between time spent on direct patient care and administrative tasks has been discussed in  
14  
15 several studies. These showed that doctor satisfaction is largely associated with direct patient work  
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17 and the delivery of good quality patient care. Therefore, a satisfactory balance is important for the  
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19 experience of meaning in work.<sup>16 26 27</sup> In the period of 1994–2014 in Norway, the time spent on direct  
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21 patient care was applicable to all job categories. A reduction in this time was considerable among  
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23 hospital doctors (61% vs 46%), whereas the drop was marginal among GPs (73% vs 69%).<sup>1</sup>  
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28 Although previous studies with data from 1994 to 2016 have documented better work–home balance,  
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30 wellbeing and a higher percentage of doctors working within EWDT (between 45 h and 48 h) for  
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32 doctors in Norway than for their colleagues in several other European countries (between 50 h and 90  
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34 h),<sup>1 6 28</sup> Norwegian studies show worrying signs of long work hours, less time for direct patient care  
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36 and a demanding situation in terms of work–home balance.<sup>13 14 18 29</sup>  
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41 Hence, the objectives of this study are to explore and discuss the possible changes in total weekly  
42  
43 working hours, relate the number of work hours to the requirements in the EWDT and time spent on  
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45 direct patient care for Norwegian doctors working in different job positions (hospital doctors in  
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47 leading positions, senior hospital consultants, speciality registrars, general practitioners (GPs), private  
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49 practice specialists, doctors in academia, community medical officers and doctors in administration)  
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51 from 2016 to 2019.  
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## MATERIAL AND METHODS

### Working hours for doctors in Norway

In Norway, the vast majority of doctors work full time, but there is a possibility to work part time as well. All full-time employed hospital doctors have a contracted basic working week of 35.5 (for doctors with on-call duty at the hospital) to 37.5 h, almost always with a permanent 2.5 h extension. Theoretically, doctors can choose to terminate this extension, but that is extremely rare in practice. There is a possibility of extending the weekly working time up to 60 h, and the doctors usually follow the “traditional work hours” that the different departments and specialties have. The working pattern is usually day work with on-call duties.<sup>30</sup> In contrast to hospital doctors, private practice specialists and the majority of GPs are self-employed and have more influence on their own work schedule.<sup>31</sup> However, the introduction of the list-patient system in 2001 entailed a considerable standardisation of the working conditions of the GPs in which the main variable is the number of patients on their lists. The list patient system aimed to enhance access to GPs and continuity in the patient–doctor relationship and also affirmed that GPs act as gatekeepers for other specialist care. GPs’ responsibilities cover all general practitioner tasks for under somatic and mental health for the inhabitants on the list.<sup>32</sup>

### Participants and ethical approval

Since 1994, the Institute for Studies of the Medical Profession (LEFO) in Norway has, approximately every second year, surveyed a representative sample of 1500 to 2200 actively working doctors with postal questionnaires about their health, quality of life and working conditions. One of the most central and repeated measures has been self-reported weekly working hours. The sample represents an unbalanced cohort, as respondents who leave the panel due to retirement, death or voluntary withdrawal are replaced by younger doctors, while the sample’s representative nature is maintained at all times.<sup>1 28</sup> This article is based on the data collected from 2016 and 2019.

All participants signed informed written consent forms before the start of the survey. It was explained that participation was voluntary and that the data would be handled confidentially. An exemption from

a specific review of the individual surveys from the Regional Committee for Medical Research Ethics (IRB 0000 1870) was also obtained.

## Measurements

Dependent variables

### *Weekly working hours and time spent on direct patient care*

Similar questions on weekly working hours was asked in 2016 and 2019. The doctors were asked to specify the number of total working hours per week. They were then asked to specify the number of hours spent on various activities in a working week. The questions were worded as follows:

In an average working week, including shift work and any part-time job(s), approximately how many hours do you work?	Hours a week
Total number of hours per week	_ _
How many hours of your total working time do you spend on:	
Patient care (all direct contact with individual patients or their relatives, including phone calls, etc.)	_ _
In meetings (interdisciplinary team meetings, patient case meetings, guidance meetings, etc.)	_ _
Paper work/PC, phone calls, emailing, data-recording (patient records, certificates, discharge summaries, other documentation)	_ _
Professional updating	_ _
Other – write: .....	_ _

### *Work hours above the limitations in the European work time directive (EWDT)*

It is documented that workers with a work week >48 h had increased health complaints and more suboptimal work–home balance than workers with fewer working hours.<sup>33 34</sup> Therefore, the EU issued this directive “designed to protect the health and safety of workers and to improve health and safety at work”.<sup>8 9</sup> In this article, we examined the percentage of doctors working above 48 h a week on a regular basis.

## Independent Variables

*Main job positions* were categorised into the following groups:

- 1: Hospital doctors in leading positions (medical superintendent, head of department, chief senior consultant, head of the unit, senior consultant, head of section)
- 2: Senior hospital consultants
- 3: Speciality registrars
- 2: General practitioners (GPs)
- 3: Private practice specialists
- 4: Doctors in academia (professor, associate professor, research fellow, researcher)
- 5: Doctors in administrative positions (county medical officer, medical adviser, chief medical officer)
- 6: Community medical officers (district medical officer, senior district medical officer, nursing home medical officer, visiting medical officer, doctor at infant welfare clinic)
- 7: Interns in general practice or in hospitals
- 8: Other job positions

Other variables were *gender* and *age*.

## Inclusion and exclusion criteria

Responses from doctors that provided data on gender, age (<70 years), job positions and all items of the weekly hours questionnaire were included in the study.

## Analyses

The analyses were undertaken among doctors in the following job positions: hospital doctors in leading positions, senior hospital consultants, speciality registrars, GPs, specialists in private practice, doctors in academia, community medical officers and doctors in administration. First, changes in the distribution of doctors related to three categories of the total weekly working hours in 2016 and 2019 were described using Pearson's chi square tests: <37 h, 37–48 h and >48 h. Second, the changes in the total weekly working hours and time spent on direct patient care for doctors working full time were described. Full-time work was defined as 37 working hours or more per week.<sup>35</sup> Multivariable linear

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3 mixed models with a subject-specific random intercept were used in the analyses. The estimates of the  
4 means and tests of comparisons are based on statistical models for repeated measurements. The total  
5 working hours was the dependent variable and the job position and age (<50 years of age and  $\geq 50$   
6 years of age) were independent variables in the models. Women and men have primarily been  
7 analysed separately. Third, mixed models on the proportion of time spent on direct patient care (with  
8 fixed gender, age and job positions) for doctors in different job positions were described. Units with  
9 missing data were excluded. The data were analysed using IBM Statistical Product and Service  
10 Solution (SPSS) software, version 26.

### 21 22 **Patient and public involvement**

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24 This study is important for patients because healthy doctors take better care of their patients. However,  
25 in this survey, there was no access to direct patient involvement. No patients were involved in setting  
26 the research question or the outcome measures, nor were they involved in the design and  
27 implementation of the study. We also intend to publish the results in a more popular format to reach  
28 potential patients in society, outside the scientific community.

## 36 37 **RESULTS**

### 38 39 **Respondents**

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41 Table 1 presents the sample, respondents, response rates and the range of job positions for doctors for  
42 which we obtained data on gender, age (<70 years) and working hours. The response rates were 73.1%  
43 in 2016 and 72.5% in 2019. The number of responses with missing data was  $n = 123$  in 2016 and  $n =$   
44 160 in 2019. The distribution of the doctors and the proportion of females in different job positions  
45 was comparable over the study period. As the number of interns was very low in 2019, these data are  
46 not remarked on in the results section.

53  
54 Table 1

55  
56 In terms of age, gender and job positions, the distributions of our samples in 2016 and 2019 were  
57 comparable to the distributions found in the Statistics on all Members of the Norwegian Association,  
58 which includes 97% of all active doctors in Norway.<sup>17</sup>

## Full-time, part-time and proportion with work hours above the limitation of EWDT

### Full-time and part-time

Table 2 shows the distribution of total weekly working hours by doctors in 2016 and 2019: <37 h (part-time), 37–48 h and >48 h (above the limit of EWDT).

The majority of doctors worked full time ( $\geq 37$  h). A minority of female and male doctors worked part time but with clear differences across job positions. For example, no female or male doctors in leading hospital positions worked part time, whereas 30.3% of the female community medical officers did in 2019. There was a significant reduction in the proportion of part-time work for female senior hospital consultants from 13.2% in 2016 to 7.3% in 2019. Although not significant, the same tendency was found among both male hospital consultants and male and female speciality registrars.

Compared to males, female senior hospital consultants reported a significantly higher proportion of part time in 2016 (6.6% vs 13.2%) and 2019 (1.1% vs 7.3%), as did female community medical officers in 2019 (8.3% vs 30.3%).

### Proportion with hours above the limitations of EWDT (>48 h/week)

The proportion of doctors working >48 h a week increased significantly for male (m) and female (f) GPs (m: 45.2% to 57.7%; f: 27.8% to 47.0%) and hospital doctors in leading positions (m: 34.4% to 57.1%, f: 17.4% to 46.4%), and working 37–48 h decreased accordingly. On the other hand, female speciality registrars reported a significant decrease in working >48 h (13.2% to 6.9%) and a resulting significant increase in working 37–48 h (82.0% to 91.2%). No significant changes were found in other job positions.

Overall, the proportion of doctors working >48 h/week was higher in male doctors than female, with significant differences among GPs in 2016 (m: 45.2%; f: 27.8%), senior hospital doctors in 2016 (m: 29.3%; f: 18.0%) and 2019 (m: 33.3%; f: 18.1%), and speciality registrars in 2019 (m: 19.4%; f: 6.9%).

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3 In 2019, male and female GPs (m: 57.7%; f: 47.0%) and hospital doctors in leading positions (m:  
4 57.1%; f: 46.4%) had the highest proportion of >48 h/week, followed by doctors in academia (m: 38.2;  
5 6 57.1%; f: 46.4%), private practice specialists (m: 38.9%; f: 30.0%), doctors in an administrative position (m:  
7 8 38.8%; f: 12.5%), senior hospital doctors (m: 33.3%; f: 18.1%), community medical officers (m: 33.3%  
9 10 38.8%; f: 12.5%), senior hospital doctors (m: 33.3%; f: 18.1%), community medical officers (m: 33.3%  
11 12 f: 12.1%) and specialty registrars (m: 19.4%; f: 6.9%).  
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16 Table 2

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18 **Total weekly working hours in full-time**

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20 Table 3 shows the total weekly working hours and hours spent on direct patient care among doctors  
21 22 working full time ( $\geq 37$  h). From 2016 to 2019, the total weekly working hours increased significantly  
23 24 for male GPs (48.7 h to 50.9 h) and hospital doctors in leading positions (48.2 h to 50.5 h), while it  
25 26 significantly decreased for female specialists in private practice (48.6 h to 44.9 h), and it remained  
27 28 significantly unchanged for doctors in other job positions.  
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32 There were a few significant gender differences. In 2019, males doctors as senior hospital consultants  
33 34 (m: 47.8 h; f: 45.6 h) and speciality registrars (m: 46.6 h; f: 44.6 h) reported higher weekly working  
35 36 hours compared with females.  
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40 Compared to male and female GPs both in 2016 and 2019, most doctors in other job positions reported  
41 42 significantly fewer total weekly working hours.  
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47 **Total hours spent on direct patient care**

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49 There were no gender differences in the hours spent on direct patient care within job positions.  
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51 Compared to male and female GPs, doctors in other job positions reported significantly fewer hours  
52 53 spent in direct patient care, except private practice specialists, both in 2016 and 2019 (Table 3).  
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58 Table 3

### Proportion of time spent on direct patient care

Table 4 shows the changes in the proportion of time spent on direct patient care among doctors in different job positions working full time from 2016 to 2019. The figure includes both genders because there were no significant differences in time spent on direct patient care. There were no significant changes from 2016 to 2019. Both in 2016 and 2019, specialists in private practice and GPs had the highest proportion of time spent on direct patient care.

Table 4

## DISCUSSION

### Main findings

From 2016 to 2019, the weekly working hours increased significantly for male GPs (48.7 h to 50.9 h) and male hospital doctors in leading positions (48.2 h to 50.5 h) and significantly decreased for female specialists in private practice (48.6 h to 44.9 h). The proportion of time spent on direct patient care was similar between genders and did not change significantly. In 2019, it was higher for specialists in private practice (66.4%) and GPs (65.5%) than for doctors in other positions. The proportion of doctors working >48 h/week increased significantly for both genders among GPs (m: 45.2% to 57.7% f: 27.8% to 47.0%) and hospital doctors in leading positions (m: 34.4% to 57.1%; f: 17.4% to 46.4%), while it significantly decreased for female speciality registrars (13.2% to 6.9%). In all job positions, more male than female doctors reported working >48 h/week.

### Comparison with other studies

#### *Weekly working hours*

Data from our unbalanced cohort from the period of 1994–2014 showed stable total weekly working hours for most doctors working full time.<sup>1 28</sup> In hospitals, total work hours for speciality registrars (45 h) and for senior hospital consultants (46 h) did not differ significantly. Hospital doctors in leading positions (48 h) and GPs (48 h) had the longest working week. Female speciality registrars and senior hospital consultants worked significantly fewer hours (44 h) than their male colleagues (47 h), while no gender differences were found in other job positions.<sup>1 28</sup> The present study with data from 2016 to

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3 2019 documented a significant increase in weekly working hours for male GPs (48.7 h to 50.9 h) and  
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5 hospital doctors in leading positions (48.2 h to 50.6 h) and confirmed the highest total working hours  
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7 for both females and males among GPs and hospital doctors in leading positions. Female speciality  
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9 registrars and female senior hospital consultants worked significantly fewer hours than their male  
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11 counterparts.  
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15 Other studies also suggest an increase in working hours for GPs in Norway. The “Commonwealth  
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17 Fund” surveys of GPs in 10 countries in 2009<sup>36</sup> and in 11 countries in 2019<sup>37</sup> showed that GPs in  
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19 Norway to have the highest increase (40 h to 49 h), followed by GPs in Netherlands (44 h to 50 h),  
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21 Canada (42 h to 49 h), US (47 h to 51 h), France (49 h to 51 h) and Germany (51 h to 52 h). The  
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23 weekly working hours for GPs remained unchanged in Sweden (38 h), while it decreased in Great  
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25 Britain (41 h to 40 h), Australia (42 h to 38 h) and New Zealand (42 h to 38 h).<sup>37</sup> A cross-sectional  
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27 survey among GPs in Norway in 2018 documented long working weeks (55.6 h).<sup>14</sup> In Germany in  
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29 2018, GPs reported longer working weeks than specialists in private practice (52.3 h vs. 50.1 h).<sup>38</sup>  
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35 In comparison with our data from 2016 and 2019, doctors in other countries seem to have longer  
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37 weekly working hours. In the “Work-Life Profiles of Today’s Physician 2014” by AMA Insurance in  
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39 the US, 5% of doctors reported an average working week of >80 h, while 18% of doctors worked 61–  
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41 80 h and 62% of doctors worked 40–60 h.<sup>39</sup> A study among specialists and senior doctors in German  
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43 urology in 2016 showed that approximately 80% of the doctors had average weekly workhours beyond  
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45 50 h.<sup>40</sup> Another study among hospital doctors in Germany in 2019 documented long working weeks:  
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47 22% of them worked 60–80 h a week, 41% worked 49–59 h and 36% worked less than 49 h. An  
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49 average working week for full-time hospital doctors amounted to 57 h.<sup>41</sup> A survey among hospital  
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51 doctors in Austria from 2019 documented an average working week of 47 h, while hospital doctors in  
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53 leading positions had longer hours (51 h) than doctors in postgraduate training (49h).<sup>42</sup>  
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3 *Proportion with work hours above the limitations of EWDT (>48 h/week) and part-time work (<37*  
4 *h/week)*  
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7 The proportion of doctors who reported working >48 h/week (higher than the limitations in EWDT)  
8 was high among all job positions, with an increasing trend for GPs and hospital doctors in leading  
9 positions and a decreasing trend for speciality registrars. This is clearly higher than in most other  
10 professional groups in Norway. For example, in a national survey in 2019, a total of 5% of all  
11 employees as a whole worked more than 48 h per week,<sup>43</sup> whereas in our sample it varied between  
12 18.7% for speciality registrars and 52.8% for GPs in 2019 (Table 2). Compared to our data among  
13 hospital doctors in leading positions, senior hospital consultants and speciality registrars in 2019, the  
14 proportion of doctors with a working week above 48 h was higher among German hospital doctors in  
15 leading positions (76%), senior hospital consultants (43%), speciality registrars (71%) in 2019,<sup>41</sup> and  
16 Hungarian hospital doctors (58%) in 2020.<sup>44</sup> A working week above 50 h was reported by 48% of  
17 family doctors and 39% of specialists in private practice in Germany in 2018.<sup>38</sup>  
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33 As with other countries, a minority of the Norwegian doctors work part time. Contrary to our  
34 expectations, the present study documented a trend towards less part-time work in 2019 for specialists  
35 in private practice (m: 5.6%; f: 15.0%), doctors in academia (m: 8.8%; f: 2.9%), speciality registrars  
36 (f: 1.9%; m: 1.0%) and senior hospital consultants (f: 7.3%; m: 1.1%) (Table 2). This contradicts  
37 previous national studies in Norway based on data from the same unbalanced cohort of 1994–2014,  
38 which showed a trend towards more part-time work (<37 h/week) for specialists in private practice  
39 (14.8% to 25%), doctors in academia (3.9% to 12.5%), speciality registrars and senior hospital  
40 consultants (6.3% to 10.0%).<sup>28</sup>  
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52 Compared to doctors in our data from 2016 to 2019, the proportion of part timers was higher among  
53 populations with academics in Norway, but academics in general also showed a decreasing trend both  
54 for males (11.3% to 10.0%) and females (26.3% to 24.1%).<sup>45</sup> In contrast, hospital doctors in Germany  
55 showed an increase in part time work (<40 h/week) from 15% in 2013 to 26% in 2019.<sup>41</sup> Furthermore,  
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3 14% of US doctors in 2014<sup>39</sup> and 21% of family doctors and 26% of specialists in private practice in  
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5 Germany worked <40 h a week in 2018.<sup>38</sup>  
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### 9 *Time spent on direct patient care*

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11 A previous study with the same unbalanced cohort data from 1994 to 2014 documented a considerable  
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13 reduction in time spent on direct patient care for senior hospital consultants and speciality registrars  
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15 (61% to 46%) and a marginal drop for GPs (73% to 69%) and specialists in private practice (75% to  
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17 72%).<sup>1</sup> This trend has not continued, as we do not find significant differences from 2016 to 2019  
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19 (Table 4).  
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### 23 **Explanations of the results**

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25 Healthcare organisations are constantly subject to change in most Western countries. Moreover,  
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27 doctors in Norway, both in primary care and hospital settings, were faced with important  
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29 organisational reforms during the study period: “The Coordination Reform” implemented in 2012 was  
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31 intended as an open-ended progressive reform with the goals to give patients proper treatment – at the  
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33 right place and right time – by development of integrated patient pathways, improvement of the  
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35 collaboration between specialist (secondary) and municipal (primary) health care levels and other  
36  
37 preventive measures.<sup>46</sup> “The Free Choice of Hospital Reform” in 2015 gave patients the freedom to  
38  
39 choose their hospital.<sup>47</sup> “The Future Primary Care – Proximity and Comprehensiveness Reform” in  
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41 2015 was implemented to increase patient involvement, prevention, better collaboration between  
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43 multidisciplinary teams and decentralised services close to where patients live to reduce costs.<sup>48 49</sup>  
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50 The relationship between health care reforms and working conditions for doctors is complex, but  
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52 changes in weekly working hours and time spent on patient care for GPs and hospital doctors in  
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54 leading positions in our study are likely to be partly related to the reforms. “The Coordination  
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56 Reform” has lately been criticised by people working in primary care, since it leads to more out-of-  
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58 hospital care and pressure on GPs: increase in consultations, laboratory services for appointment  
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60 specialists, tasks related to preventive treatment, follow-up care of pregnant women or patients with

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3 chronic diseases and documentation.<sup>13</sup> A majority of GPs (86%) reported that they “completely  
4 disagree” that regular working hours were sufficient to carry out the work.<sup>13</sup> Other reports underlined  
5 increased work pressure due to increase in consultations<sup>50</sup> and documentations<sup>15</sup> and for more complex  
6 and time-consuming consultations<sup>51</sup> for GPs. The evaluative study of “The Regular General  
7 Practitioners Scheme” from 2019 confirmed a significant rise in workloads for GPs, which was related  
8 to increases in both new tasks and the volume of established tasks.<sup>52</sup>

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11 Long working hours is one of the important contributors to work stress and reduced job satisfaction.<sup>53</sup>  
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Long working hours is one of the important contributors to work stress and reduced job satisfaction.<sup>53</sup>  
<sup>54</sup> Panel studies in Norway documented a significant decrease in several aspects of job satisfaction for  
GPs and hospital doctors from 2010 to 2017 and a significant increase of work stress for GPs as well  
as increasing work stress for hospital doctors from 2010 to 2019. One of the important aspects of this  
was time pressure arising from a heavy workload.<sup>17 18</sup> Another study among hospital doctors  
documented workload related to increasing workplace emphasis on production numbers and budget  
concerns.<sup>16</sup> In a survey of hospital doctors’ working conditions in 2018, hospital doctors assigned high  
scores to items related to engagement at work, assessment of work as meaningful and co-operation  
with colleagues but scored items related to workload and professional autonomy lower.<sup>55</sup>

In the last few years, there have been worries about maintaining high-quality patient care. The  
introduction and use of electronic patient registration systems in several Western countries is  
described as taking a substantial amount of time from clinical tasks and increasing the risk of work  
stress and burnout for doctors.<sup>41 56-58</sup> A study among GPs in 2018 showed the potential negative effects  
of task shifting from hospital care specialists and other specialists to GPs on patient safety, such as the  
hazardous delay of necessary examinations or insufficient treatment due to lack of resources or risk of  
malpractice.<sup>59</sup> Other studies showed that inadequate communication between hospitals and primary  
care as well as competence problems in primary care can lead to inadequate patient care and frequent  
readmissions to hospitals for an increasing number of medically complex patients.<sup>60 61</sup> Several GPs in  
Norway explained that high workload affects their own quality of life as well as the ability to ensure

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2  
3 good quality of patient care.<sup>52</sup> A recent report shows that a part of the population do not have access to  
4 an allocated GP at present and that this will grow into a much larger problem in the years to come.<sup>62</sup>  
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9 These findings fit well with our data from 2010 to 2019, where doctors in several job positions  
10 reported long working weeks, with a significant increasing trend for male GPs and hospital doctors in  
11 leading positions. Working above 48 h/week (above the EWDT) increased significantly for both  
12 leading positions. Working above 48 h/week (above the EWDT) increased significantly for both  
13 genders among GPs and hospital doctors in leading positions. In 2019, the majority of male GPs  
14 (57.7%) and hospital doctors in leading positions (57.1%) and nearly half of the female GPs (47.0%)  
15 and hospital doctors in leading positions (46.4%) worked more than 48 h/week. Other job positions,  
16 such as specialists in private practice, doctors in academia and senior hospital doctors, had a fairly  
17 high proportion of those working over 48 h (Table 2). Interestingly, in 2019, both female (6.9%) and  
18 male (19.4%) speciality registrars, compared to other job positions, had the lowest proportion of a  
19 members working over 48 h/week. This may be due to ongoing societal changes called  
20 “downshifting”, implying that people choose to prioritise their quality of life by forgoing a higher  
21 income in exchange for a life with lower stress and more free time.<sup>19</sup> Many hospital doctors –  
22 particularly female doctors – try to reduce their working hours by choosing family-friendly specialities  
23 with less on-call or shift duties.<sup>23 63</sup> This indicates an ongoing change in the profession regarding  
24 expectations about responsibilities outside of work hours and having more predictable working  
25 hours.<sup>25</sup> Lesser work hours (promoting better work–home balance) seems to be an important predictor  
26 for the choice of future speciality among medical students and young doctors. However, the tendency  
27 to choose less part-time work, including among speciality registrars,<sup>23 24</sup> points in the opposite  
28 direction. Obligations to finish speciality training and temporary work contracts among young doctors  
29 make it difficult to work part time. Reduction of long work hours and increased possibility for part-  
30 time work can be one aspect of reducing work–home conflict and thus increasing doctors’ wellbeing  
31 and patient safety.<sup>6 7 64</sup>  
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58 Studies have also demonstrated that delivering high quality patient care and increasing the time spent  
59 on direct patient care result in more satisfied patients and doctors<sup>16 26 27</sup> and that doctors themselves  
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3 would like to spend more of their time on this work.<sup>65 66</sup> In the present study period between 2016 and  
4  
5 2019, the time spent on direct patient care did not change. However, in our cohort of Norwegian  
6  
7 doctors, it fell from 1994 to 2014<sup>1</sup> and even further by 2019 in the present study, for instance, for GPs  
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9 (73%, 69%, 66%), for senior hospital doctors and speciality registrars (62%, 44%, 42%), specialists in  
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11 private practice (75%, 72%, 66%). Long working weeks and a decreasing trend in time spent on direct  
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13 patient care suggest an increasing need for devotion of time to tasks like documenting, reporting and  
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15 encoding in the health sector. Considering all of these points, it is not only enough to measure the  
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17 number of hours worked (the quantity) but also important to study the content of the work (the  
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19 quality).

### 20 21 22 23 24 **Strengths and limitations**

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26 The study's main strength is the representative cohort that provides a solid basis for generalisation of  
27  
28 the results to practising doctors in Norway. The same cohort was followed up with over time. There  
29  
30 were similarities in survey methods and measurements at both points in time. The response rates were  
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32 fairly good: 73.1% in 2016 and 72.5% in 2019. They were higher than in some similar studies but do  
33  
34 not rule out the possibility of a non-response bias.<sup>28</sup> Analyses were based on self-reported  
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36 questionnaire data with the possibility of both over- and underestimation of the working hours.  
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38 However, as the same doctors answered at both points in time, the changes in work hours documented  
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40 in the study should be reliable.

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45 The doctors' self-reporting of hours spent on their various workday components may, of course, be  
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47 inaccurate. The level of working hour accuracy can probably be improved, but there has been built-in  
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49 quality control throughout, as each individual doctor had been asked to add up their own working hour  
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51 components to arrive at a total number of hours worked per week.

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56 A previous study documented variations in the interpretation of the concept of "direct patient care"  
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58 among doctors from different job positions.<sup>1</sup> To a greater degree than others, GPs and specialists  
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60 working in private practice referred to "only face-to-face contact with patients" when talking about

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3 patient care, while more doctors working in administration or management included “all work directly  
4 related to individual patients, including work on patient records, telephone calls and meetings” and  
5 “other”. However, the majority responded either “only face-to-face contact with patients” (47%) or  
6 “all direct contact with individual patients, including phone calls, emailing, etc.” (24%), which reflects  
7 our questionnaire’s definition of direct patient care.<sup>1</sup> In addition, since the same doctors were polled on  
8 each occasion largely, the reliability of changes over time in the data increases significantly, as each  
9 doctor thus becomes his or her own control person. Unfortunately, data on other and more specificized  
10 variables for doctors in different job positions that may have an effect on time spent, such as staffing  
11 levels, distribution of tasks and workday organisation, were not included.  
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### 24 **Policy implications**

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26 Variations in distribution of work time, proportion of doctors working >48 h/week and time spent on  
27 direct patient care across job positions call for more comparative analyses in the future. Several  
28 doctors reported reduced time spent on direct patient care. It is impossible to determine what  
29 constitutes the optimal proportion of time spent on direct patient care. However, more time spent in  
30 patient care is a quality indicator. It results in more satisfied doctors and patients.<sup>26</sup> Good patient care  
31 depends on individual and organisational factors, including quality improvement and evaluation.  
32 Reducing the proportion of doctors working >48 h/week among Norwegian doctors is important and  
33 has been found to improve both doctors’ health and quality of patient care.<sup>6 7 64</sup> The possibility to adapt  
34 the number of work hours to other life commitments (including the possibility of working part time) is  
35 important to maintain a good balance between professional and private life. This balance is an  
36 important factor for career decisions, such as staying in or leaving job positions.<sup>67 68</sup> Specific attention  
37 should be paid to male and female GPs. Low recruitment to primary care is a concurrent issue in  
38 Norway.<sup>51 69</sup> Improving the working conditions of doctors and ensuring optimal working hours may  
39 cause more doctors to choose or to remain in general practice.  
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## Conclusion

Compared to the stipulated work hours in Norway (35.5–37.5 h/week), doctors of both genders work long hours, and length has increased significantly for male GPs and hospital doctors in leading positions from 2016 to 2019. The proportion of time spent on direct patient care fell for some job positions over time. GPs and specialists in private practice spent about two-thirds of their time on direct patient care, while hospital doctors spend less than half of their time on it. In 2019, of the proportion of doctors with work hours above the limitations in EWDT was highest among GPs and hospital doctors in leading positions of both genders and lowest among speciality registrars. Since a long working week affects both the doctors' own well-being and the quality of patient care, regular assessments of working hours followed by analyses and appropriate actions are useful interventions.

## Declarations

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**Contributors** JR, and KIR designed the study. JR undertook the literature review, did the statistical analysis and wrote the first draft. KIR made critical revisions. All authors had full access to all of the data (including statistical reports and tables) and are jointly responsible for the integrity of the data and the accuracy of the data analysis.

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**Competing interest** None declared.

**Ethics approval** According to the Regional Committee for Medical Research Ethics, the study based on 'Norwegian Physician Survey - A biennial prospective questionnaire survey of a representative sample of Norwegian physicians' is exempt from review in Norway, cf. §§ 4 of The Act. The project can be implemented without the approval by the Regional Committee for Medical Research Ethics (IRB 0000 1870). In addition, approval for data protection of the biennial prospective survey among Norwegian doctors was obtained from the Norwegian Social Science Data Service (Reference 19521).

**Data sharing statement** The authors may be able to provide aggregated data on which the analysis is based, on request. No additional data are available.

**Patient consent** N/A

**STROBE Statement:** The authors confirm that they have followed the list of the STROBE Statement (BMJ 2007;335:806–808).

**Transparency declaration:** The lead author (JR) affirms that the manuscript is an honest, accurate and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.



## References

1. Rosta J, Aasland OG. Doctors' working hours and time spent on patient care in the period 1994 - 2014. *Tidsskrift for Den norske legeforsening* 2016;136(16):1355-9.
2. Angerer P, Weigl M. Physicians' psychosocial work conditions and quality of care: A literature review. *Professions and Professionalism* 2015;5(1):1-20.
3. Rathert C, Williams ES, Linhart H. Evidence for the Quadruple Aim: A Systematic Review of the Literature on Physician Burnout and Patient Outcomes. *Med Care* 2018;56(12):976-84.
4. Mangory KY, Ali LY, Rø KI, et al. Effect of burnout among physicians on observed adverse patient outcomes: a literature review. *BMC Health Serv Res* 2021;21(1):369.
5. Isaksson Rø K, Rosta J, Tyssen R, et al. Doctors Well-being, Quality of Patient Care and Organizational Change: Norwegian Experiences. In: Montgomery A, van der Doef M, Panagopoulou E, et al., eds. *Connecting Healthcare Worker Well-Being, Patient Safety and Organisational Change: The Triple Challenge*. Cham: Springer International Publishing 2020:91-114.
6. Rosta J, Aasland OG. Work hours and self rated health of hospital doctors in Norway and Germany. A comparative study on national samples. *BMC Health Services Research* 2011;11:40.
7. Rosta J, Gerber A. Excessive working hours and health complaints among hospital physicians: a study based on a national sample of hospital physicians in Germany. *German Medical Science* 2007;5:Doc09.
8. Maybury C. The European Working Time Directive: a decade on. *Lancet* 2014;384(9954):1562-3.
9. Rodriguez-Jareño MC, Demou E, Vargas-Prada S, et al. European Working Time Directive and doctors' health: a systematic review of the available epidemiological evidence. *BMJ Open* 2014;4(7):e004916.
10. Pedersen Fischer A, Busk Nørøxe K, Bro F, et al. Alment praktiserende lægers psykiske arbejdsmiljø og jobtilfredshed 2016 (General Practitioners' psychological work environment and job satisfaction 2016). Aarhus: Research Unit for General Practice, 2016.
11. Owen K, Hopkins T, Shortland T, et al. GP retention in the UK: a worsening crisis. Findings from a cross-sectional survey. *BMJ Open* 2019;9(2):e026048.
12. Zhou AY, Panagioti M, Galletta-Williams H, et al. Burnout in Primary Care Workforce. In: Montgomery A, van der Doef M, Panagopoulou E, et al., eds. *Connecting Healthcare Worker Well-Being, Patient Safety and Organisational Change: The Triple Challenge*. Cham: Springer International Publishing 2020:59-72.
13. Johnsen TM, Berge V, Høivik F, et al. Trønderopprørets fastlegeundersøkelse og helsemedarbeiderundersøkelse 2018 (Trønderopprør's investigation of regular GPs and co-workers, 2018). Available: <http://www.flo20.no/wp-content/uploads/2018/06/TOundersøkelse-2.pdf> (accessed 11 October 2022).
14. Morken T, Rebnord IK, Maartmann-Moe K, et al. Workload in Norwegian general practice 2018 - an observational study. *BMC health services research* 2019;19(1):434-34.
15. Ey & Vista Analyse. Evaluering av fastlegeordningen 2019 (Evaluation of the GP scheme 2019). Available: <https://www.regjeringen.no/contentassets/7cd212bf5f0642c1a5d0d480f0923e6d/evaluerin-g-av-fastlegeordningen---sluttrapport-fra-ey-og-vista-analyse.pdf> (accessed 11 October 2022).
16. Baathe F, Rosta J, Bringedal B, et al. How do doctors experience the interactions among professional fulfilment, organisational factors and quality of patient care? A qualitative study in a Norwegian hospital. *BMJ Open* 2019;9(5):e026971.
17. Rosta J, Aasland OG, Nylenna M. Changes in job satisfaction among doctors in Norway from 2010 to 2017: a study based on repeated surveys. *BMJ Open* 2019;9(9):e027891.
18. Rosta J, Båathe F, Aasland OG, et al. Changes in work stress among doctors in Norway from 2010 to 2019: a study based on repeated surveys. *BMJ Open* 2020;10(10):e037474.

19. Hamilton C. Downshifting in Britain A sea-change in the pursuit of happiness, 2003. Available: <http://www.tai.org.au/documents/downloads/DP58.pdf> (accessed 20 October 2021).
20. Diderichsen S. It's just a job: a new generation of physicians dealing with career and work ideals. Doctoral thesis. Umeå University, 2017.
21. Dyrbye LN, Freischlag J, Kaups KL, et al. Work-home conflicts have a substantial impact on career decisions that affect the adequacy of the surgical workforce. *Arch Surg* 2012;147(10):933-9.
22. Treister-Goltzman Y, Peleg R. Female Physicians and the Work-Family Conflict. *The Israel Medical Association Journal: IMAJ* 2016;18(5):261-6.
23. Johannessen K, Hagen T. Individual and hospital-specific factors influencing medical graduates' time to medical specialization. *Social Science and Medicine* 2013;97:170-75.
24. Fimland SK, Kjenås AS, Rø KI, et al. Medical students' attitudes and expectations for future working conditions. *Tidsskrift for Den norske legeforening* 2019;139(17).
25. Hertzberg T, Tyssen R, Skirbekk H, et al. Work-home balance in two cohorts of Norwegian doctors. *Tidsskrift for Den norske legeforening* 2019;139(19):915-20.
26. Bovier P, Perneger T. Predictors of work satisfaction among physicians. *European Journal of Public Health* 2003;13(4):299-305.
27. Friedberg M, Chen P, Van Busum K, et al. Factors Affecting Physician Professional Satisfaction and Their Implications for Patient Care, Health Systems, and Health Policy Santa Monica: RAND Corporation, 2013.
28. Rosta J, Aasland OG. Weekly working hours for Norwegian hospital doctors since 1994 with special attention to postgraduate training, work-home balance and the European Working Time Directive: a panel study. *BMJ Open* 2014;4(10).
29. Rosta J., Isaksson RK. Overlegenes arbeidsforhold og helse i perioden 2010-2019 (The senior doctors' working conditions and health in the period 2010-2019). *Overlegen* 2021(1):21-24.
30. Schroder-Aasen T. Arbeidstid (Working time), 2016. Available: <https://yngreleger.no/artikkel/arbeidstid> (accessed 11 October 2022).
31. Aasland OG, Rosta J. Fastlegenes arbeidstid 2000-08 (The working hours of general practitioners 2000-2008). *Tidsskrift for den norske legeforening* 2011;131(11):1076-80.
32. Lovdata. Forskrift om fastlegeordning i kommunene 2021 (Regulations on GP arrangements in the municipalities 2021). Available: <https://lovdata.no/dokument/SF/forskrift/2012-08-29-842> (accessed 11 October 2022).
33. Messenger J, Group. WC. Working time and the future of work 2018. Available: [https://www.ilo.org/global/topics/future-of-work/publications/research-papers/WCMS\\_649907/lang--en/index.htm](https://www.ilo.org/global/topics/future-of-work/publications/research-papers/WCMS_649907/lang--en/index.htm) (accessed 11 October 2022).
34. Eurofund. 6th European Working Condition Survey 2015. Available: <https://www.eurofound.europa.eu/surveys/data-visualisation/sixth-european-working-conditions-survey-2015> (accessed 11 October 2022).
35. Bø T, Håland I. Sysselsatte med ekstra lange arbeidsuker (Employees with extra long working weeks). *Økonomiske analyser* 2012;5:13-15.
36. Holmboe O, Bjertnæs ØA, Bukholm G, et al. Commonwealth Fund-undersøkelsen i 2009 blant allmennleger: Resultater fra en komparativ undersøkelse i 11 land. (Commonwealth Fund survey in 2009 among primary care physicians: results from a comparative survey in 11 countries). Rapport fra Kunnskapscenteret. Oslo: Nasjonalt kunnskapscenter for helsetjenesten, 2009.
37. Skudal KE, Holmboe O, Bjertnæs ØA, et al. Commonwealth Fund-undersøkelsen blant allmennleger i elleve land i 2019 (Commonwealth Fund survey of general practitioners in eleven countries in 2019). Oslo: FHI, 2019.
38. INFAS. Ärztemonitor 2018: Ergebnisse für Haus- und Fachärzte (Survey on doctors: GPs and specialits 2018). Available: [https://www.kbv.de/media/sp/infas\\_TabBand\\_Aerztemonitor2018\\_Aerzte\\_20180615.pdf](https://www.kbv.de/media/sp/infas_TabBand_Aerztemonitor2018_Aerzte_20180615.pdf) (accessed 11 October 2022) .

- 1  
2  
3 39. AMA Staff News Writer. How many hours are in the average physician workweek? 6 January  
4 2015. Available: [https://www.ama-assn.org/practice-management/physician-health/how-](https://www.ama-assn.org/practice-management/physician-health/how-many-hours-are-average-physician-workweek)  
5 [many-hours-are-average-physician-workweek](https://www.ama-assn.org/practice-management/physician-health/how-many-hours-are-average-physician-workweek) (accessed 11 October 2022).  
6  
7 40. Struck JP, Stahl L, Braun M, et al. The working time load of specialists and senior physicians in  
8 German urology-a critical assessment. *Der Urologe Ausg A* 2019;58(8):918-23.  
9  
10 41. IQME. Ergebnisbericht der Mitgliederbefragung 2019 (Report of member survey 2019. Available:  
11 [https://www.marburger-bund.de/sites/default/files/files/2020-01/Gesamtauswertung%20-](https://www.marburger-bund.de/sites/default/files/files/2020-01/Gesamtauswertung%20-%20MB-Monitor%202019-presse.pdf)  
12 [%20MB-Monitor%202019-presse.pdf](https://www.marburger-bund.de/sites/default/files/files/2020-01/Gesamtauswertung%20-%20MB-Monitor%202019-presse.pdf) (accessed 11 October 2022).  
13  
14 42. IMAS. Österreichische Spitalärztebefragung - Dialog 2019. PK-Unterlage: 15. Wien, 2019.  
15  
16 43. STAMI. Faktabok om arbeidsmiljø og helse (Factbook on working environment and health). Oslo:  
17 Statens arbeidsmiljøinstitutt, 2021.  
18  
19 44. Chamber H-HM. The medical community sticks together and does not accept the circumvention  
20 of the profession 2020. [https://mok.hu/hirek/mokhirek/az-orvostarsadalom-osszetart-es-](https://mok.hu/hirek/mokhirek/az-orvostarsadalom-osszetart-es-nem-fogadja-el-a-szakma-megkeruleset)  
21 [nem-fogadja-el-a-szakma-megkeruleset](https://mok.hu/hirek/mokhirek/az-orvostarsadalom-osszetart-es-nem-fogadja-el-a-szakma-megkeruleset) (accessed 11 October 2022).  
22  
23 45. SSB. Arbeidskraftundersøkelsen (The labor force survey), 2021. Available:  
24 <https://www.ssb.no/statbank/table/09790/tableViewLayout1/> (accessed 11 October 2022).  
25  
26 46. Norwegian Ministry of Health and Care Service. The Coordination Reform. Available:  
27 [https://www.regjeringen.no/contentassets/d4f0e16ad32e4bbd8d8ab5c21445a5dc/en-](https://www.regjeringen.no/contentassets/d4f0e16ad32e4bbd8d8ab5c21445a5dc/en-gb/pdfs/stm200820090047000en_pdfs.pdf)  
28 [gb/pdfs/stm200820090047000en\\_pdfs.pdf](https://www.regjeringen.no/contentassets/d4f0e16ad32e4bbd8d8ab5c21445a5dc/en-gb/pdfs/stm200820090047000en_pdfs.pdf) (assessed 11 October 2022).  
29  
30 47. Ringard Å, Saunes IS, Sagan A. The 2015 hospital treatment choice reform in Norway: Continuity  
31 or change? *Health Policy* 2016;120(4):350-55.  
32  
33 48. Norwegian Ministry of Health and Care Service. Fremtidens primærhelsetjeneste – nærhet og  
34 helhet (The future primary care – proximity and comprehensiveness). Oslo: Norwegian  
35 Ministry of Health and Care Services, 2015.  
36  
37 49. Rørtveit G. Future primary care in Norway: valid goals without clear strategies. *Scandinavian*  
38 *journal of primary health care* 2015;33(4):221-22.  
39  
40 50. Texmon I. Kortere pasientlister, lengre arbeidsdager? (Shorter patient lists, longer working  
41 days?). SSB Analyse 2018/14. Available: [https://www.ssb.no/helse/artikler-og-](https://www.ssb.no/helse/artikler-og-publikasjoner/kortere-pasientlister-lengre-arbeidsdager)  
42 [publikasjoner/kortere-pasientlister-lengre-arbeidsdager](https://www.ssb.no/helse/artikler-og-publikasjoner/kortere-pasientlister-lengre-arbeidsdager) (assessed 11 October 2022).  
43  
44 51. Theie M, Halvard Lind L, Haugland L, et al. Fastlegeordning i krise. Hva siger tallene? (GP scheme  
45 in crisis. What do the numbers say?): MENON-Publikation, 2018.  
46  
47 52. EY and Vista Analyse. Evaluering av fastlegeordningen 2019 (Evaluation of The Regular General  
48 Practitioners Scheme 2019). Available:  
49 <https://www.regjeringen.no/no/aktuelt/fastlegeordningen-er-evaluert/id2667485/> (assessed  
50 11 October 2022).  
51  
52 53. Epstein RM. Time, autonomy, and satisfaction. *J Gen Intern Med* 2000;15(7):517-8.  
53  
54 54. Tomioka K, Morita N, Saeki K, et al. Working hours, occupational stress and depression among  
55 physicians. *Occupational Medicine* 2011;61(3):163-70.  
56  
57 55. Ramboll. Spørreskjemaundersøkelse - sykehuslegers arbeidsforhold 2018 (Survey on hospital  
58 doctors working conditions 2018). Available:  
59 [https://www.dagensmedisin.no/contentassets/b79cfab99ba6437bb3ccf9efa9ad75aa/sporre-](https://www.dagensmedisin.no/contentassets/b79cfab99ba6437bb3ccf9efa9ad75aa/sporre-undersokelse-om-sykehuslegers-arbeidsforhold-2018.pdf)  
60 [undersokelse-om-sykehuslegers-arbeidsforhold-2018.pdf](https://www.dagensmedisin.no/contentassets/b79cfab99ba6437bb3ccf9efa9ad75aa/sporre-undersokelse-om-sykehuslegers-arbeidsforhold-2018.pdf) (assessed 11 October 2022).  
51  
52 56. Eschenroeder HC, Manzione LC, Adler-Milstein J, et al. Associations of physician burnout with  
53 organizational electronic health record support and after-hours charting. *Journal of the*  
54 *American Medical Informatics Association: JAMIA* 2021;28(5):960-66.  
55  
56 57. Sinsky C, Colligan L, Li L, et al. Allocation of Physician Time in Ambulatory Practice: A Time and  
57 Motion Study in 4 Specialties. *Ann Intern Med* 2016;165(11):753-60.  
58  
59 58. Arndt BG, Beasley JW, Watkinson MD, et al. Primary Care Physician Workload Assessment Using  
60 EHR Event Log Data and Time-Motion Observations. *Annals of family medicine*  
2017;15(5):419-26.

- 1  
2  
3 59. Malterud K, Aamland A, Fosse A. How can task shifting put patient safety at risk? A qualitative  
4 study of experiences among general practitioners in Norway. *Scandinavian Journal of Primary*  
5 *Health Care* 2020;1-9.
- 6 60. Glette MK, Kringeland T, Røise O, et al. Exploring physicians' decision-making in hospital  
7 readmission processes - a comparative case study. *BMC Health Serv Res* 2018;18(1):725.
- 8 61. Knutsen Glette M, Kringeland T, Røise O, et al. Hospital physicians' views on discharge and  
9 readmission processes: a qualitative study from Norway. *BMJ Open* 2019;9(8):e031297.
- 10 62. Eggen FW, Steen J.I, Gunstad IF. Legebarometeret (The doctor barometer). Oslo:  
11 Samfunnsøkonomisk analyse AS, 2021.
- 12 63. Johannessen K, Hagen T. Variations in labor supply between female and male hospital physicians:  
13 Results from a modern welfare state. *Health Policy* 2012;107(1):74-82.
- 14 64. Leineweber C, Baltzer M, Magnusson Hanson LL, et al. Work-family conflict and health in Swedish  
15 working women and men: a 2-year prospective analysis (the SLOSH study). *Eur J Public*  
16 *Health* 2013;23(4):710-6.
- 17 65. Røhme K, Kjekshus L. Når tiden telles - sykehuslegers tidsbruk og arbeidsoppgaver (When time  
18 counts - hospital doctors' time use and tasks). *Tidsskrift for Den norske legeforening*  
19 2001;121(12):1458-61.
- 20 66. Halvorsen P, Edwards A, Aaraas I, et al. What professional activities do general practitioners find  
21 most meaningful? Cross sectional survey of Norwegian general practitioners. *BMC Family*  
22 *Practice* 2013;Mar 23(14-41).
- 23 67. Scanlan JN, Still M. Relationships between burnout, turnover intention, job satisfaction, job  
24 demands and job resources for mental health personnel in an Australian mental health  
25 service. *BMC health services research* 2019;19(1):62-62.
- 26 68. Pettersson J, Börjesson J. I väntan på AT: en samhällsekonomisk studie, 2019. (Waiting for  
27 internship: a socio-economic study, 2019). Available:  
28 <https://sif.se/syif/app/uploads/2019/07/i-vantan-pa-at.pdf> (assessed 11 October 2022).
- 29 69. Birkeli CN, Rosta J, Aasland OG, et al. Why are doctors opting out of general practice? *Tidsskrift*  
30 *for Den norske legeforening*. 2020;140(5).
- 31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
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44  
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**Table 1** Sample, number of respondents, response rates and the makeup of job positions for which we have data on gender, working hours and age (<70 years) in 2016 and 2019

	2016	2019
Sample, n	2 195	2 084
Respondents, n	1 604	1 511
Response rate, %	73.1	72.5
Job positions, n (females %)		
All <sup>(a)</sup>	1 481 (53.2)	1 351 (53.5)
Speciality registrars	354 (70.6)	366 (71.9)
Senior hospital consultants	348 (48.0)	379 (50.9)
Hospital doctors in leading position	84 (27.4)	84 (33.3)
General practitioners	271 (42.2)	245 (46.9)
Specialists in private practice	58 (34.5)	56 (35.7)
Doctors in academia	61 (55.7)	68 (50.0)
Community medical officer	54 (55.6)	57 (57.9)
Doctors in administrative position	31 (29.0)	26 (30.8)
Interns in district or hospital <sup>(b)</sup>	167 (71.3)	18 (66.7)
Other job categories	52 (40.4)	52 (32.7)

(a) Number of respondents with no data on working time, or gender or age (or respondents above 70 years) were 123 in 2016 and 160 in 2019.

(b) As the number of interns was very low in 2019, these data are not commented in the results section.

1 **Table 2** **Distribution of total weekly working hours by doctors working in different job positions in 2016 and 2019**

		2016				2019			
		n	%			n	%		
			<37 hours	37-48 hours	>48 hours		<37 hours	37-48 hours	>48 hours
Hospital doctors in leading position	males	61	1.6	<b>63.9</b>	<b>34.4</b>	56	0.0	<b>42.9 (b)</b>	<b>57.1 (c)</b>
	females	23	0.0	<b>82.6</b>	<b>17.4</b>	28	0.0	<b>53.6 (b)</b>	<b>46.4 (c)</b>
Senior hospital consultants	males	181	<b>6.6*</b>	64.1	<b>29.3*</b>	186	<b>1.1* (a)</b>	65.6	<b>33.3*</b>
	females	167	<b>13.2*</b>	68.9	<b>18.0*</b>	193	<b>7.3*</b>	74.6	<b>18.1*</b>
Speciality registrars	males	104	5.8	76.0	18.3	103	1.0	<b>79.6*</b>	<b>19.4*</b>
	females	250	4.8	<b>82.0</b>	<b>13.2</b>	262	1.9	<b>91.2* (b)</b>	<b>6.9* (c)</b>
General practitioners	males	157	6.4	<b>48.4*</b>	<b>45.2*</b>	130	6.2	<b>36.2 (b)</b>	<b>57.7 (c)</b>
	females	115	10.4	<b>61.7*</b>	<b>27.8*</b>	115	11.3	<b>41.7 (b)</b>	<b>47.0 (c)</b>
Specialists in private practice	males	38	7.9	57.9	34.2	36	5.6	55.6	38.9
	females	20	25.0	55.0	20.0	20	15.0	55.0	30.0
Doctors in academia	males	27	18.5	59.3	22.2	34	8.8	52.9	38.2
	females	34	8.8	64.7	26.5	34	2.9	52.9	44.1
Community medical officer	males	24	20.8	50.0	29.2	24	<b>8.3*</b>	58.3	33.3
	females	30	26.7	60.0	13.3	33	<b>30.3*</b>	57.6	12.1
Doctors in administrative position	males	22	31.8	<b>45.5*</b>	22.7	18	11.1	50.0	38.9
	females	9	0.0	<b>88.9*</b>	11.1	8	25.0	62.5	12.5

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3 \* Differences in proportions between male and female doctors significant at the <0.05 level using Pearson's chi-square test.

4 (a) Changes in proportion of working <37 hours from 2016 to 2018-2019 are significant at the <0.05 level using Pearson's chi-square test.

5 (b) Changes in proportion of working 37-48 hours from 2016 to 2018-2019 are significant at the <0.05 level Pearson's chi-square test.

6 (c) Changes in proportion of working >48 hours from 2016 to 2018-2019 are significant at the <0.05 level Pearson's chi-square test.

**Table 3** Linear mixed models with estimated marginal means of total weekly working hours and time spent on direct patient care in hours among doctors working full-time. Separate analyses for gender.

	Males				Females			
	Total weekly working hours		Direct patient care		Total weekly working hours		Direct patient care	
	2016	2019	2016	2019	2016	2019	2016	2019
General practitioners	48.7	50.9 (a)	32.8	33.1	48.3	49.3	33.1	32.0 (a)
Hospital doctors in leading position	48.2	50.6 (a)	16.3 (b)	16.6 (b)	45.8	47.3	13.0 (b)	18.3 (b)
Senior hospital consultants	46.5 (b)	47.8* (b)	20.5 (b)	21.5 (b)	45.4 (b)	45.6* (b)	18.6 (b)	18.9 (b)
Speciality registrars	44.9 (b)	46.6* (b)	17.7 (b)	18.3 (b)	44.4 (b)	43.6* (b)	17.3 (b)	16.6 (b)
Specialists in private practice	47.8	47.3 (b)	33.6	30.8	48.6	44.9 (a) (b)	32.4	30.9
Doctors in academia	44.7 (b)	47.8 (b)	6.8 (b)	7.4 (b)	44.9 (b)	46.7 (b)	5.7 (b)	4.2 (b)
Community medical officer	46.5	50.0	19.3 (b)	19.9 (b)	42.7 (b)	44.5 (b)	16.9 (b)	17.9 (b)
Doctors in administrative position	46.1	47.8 (b)	3.6 (b)	2.6 (b)	42.7 (b)	43.3 (b)	5.4 (b)	3.6 (b)

\* Differences in estimated marginal means between male and female doctors are significant at the <0.05 level

(a) Changes in estimated marginal means from 2016 to 2019 are significant at the <0.05 level.

(b) Differences in estimated marginal means across job positions with GP as reference are significant at the <0.05 level.

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3 **Table 4 Mixed model on proportion of time spent on direct patient care (with fixed gender, age and job position) by doctors in different job**  
4 **positions**  
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	<b>2016</b> (%)	<b>2019</b> (%)	<b>Mean difference</b>	<b>P-Value</b>
Specialists in private practice	70.4	66.4	-4.0	0.176
General practitioners	68.5	65.8	-2.7	0.050
Senior hospital consultants	43.1	43.5	0.4	0.707
Community medical officer	40.1	38.1	-2.0	0.535
Speciality registrars	40.0	39.8	-0.2	0.909
Hospital doctors in leading position	32.2	34.3	2.1	0.363
Doctors in academia	13.8	11.7	-2.1	0.486
Doctors in administrative position	6.2	5.0	-1.2	0.787

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**STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology\***  
**Checklist for cohort, case-control, and cross-sectional studies (combined)**

**"Changes in weekly working hours, proportion of doctors with hours above the limitations of EWDT and time spent on direct patient care for doctors in Norway from 2016 to 2019:A study based on repeated surveys"**  
**Rosta J, Isaksson Rø K.**

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study’s design with a commonly used term in the title or the abstract	1-2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any pre-specified hypotheses	5
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	6
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	8
Study size	10	Explain how the study size was arrived at	9 and Table 1
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7-8
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	8

		(b) Describe any methods used to examine subgroups and interactions	8
		(c) Explain how missing data were addressed	8 and Table 1
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9 and Table 1
		(b) Give reasons for non-participation at each stage	9 and Table 1
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	9 and Table 1
		(b) Indicate number of participants with missing data for each variable of interest	9 and Table 1
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	N/A
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	N/A
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	N/A
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	10-12, Table 2-4
		(b) Report category boundaries when continuous variables were categorized	10-11, Table 2
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	18-19
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15-18
Generalisability	21	Discuss the generalisability (external validity) of the study results	12-15
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

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# BMJ Open

**Changes in weekly working hours, proportion of doctors with hours above the limitations of EUs working time directive (EWDT) and time spent on direct patient care for doctors in Norway from 2016 to 2019: A study based on repeated surveys**

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7 **Changes in weekly working hours, proportion of doctors with hours above the limitations of EUs**  
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9 **working time directive (EWDT) and time spent on direct patient care**  
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11 **for doctors in Norway from 2016 to 2019:**  
12  
13 **A study based on repeated surveys**  
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## 1 ABSTRACT

2 **Objectives** To compare the total weekly working hours, proportions with work hours above the  
3 limitations of EWDT and time spent on direct patient care in 2016 and 2019 for doctors working in  
4 different job positions in Norway.

5 **Design** Repeated postal surveys in 2016 and 2019.

6 **Setting** Norway.

7 **Participants** Representative samples of doctors; the response rates were 73.1% (1604/2195) in 2016  
8 and 72.5% (1511/2084) in 2019.

9 **Main outcome measures** Self-reported weekly working hours, proportions with hours above the  
10 limitations of EWDT defined as >48h/week, and time spent on direct patient care.

11 **Analyses** Linear mixed models with estimated marginal means and proportions.

12 **Results** From 2016 to 2019, the weekly working hours increased significantly for male GPs (48.7 h to  
13 50.9 h) and male hospital doctors in leading positions (48.2 h to 50.5 h), and significantly decreased  
14 for female specialists in private practice (48.6 h to 44.9 h). The proportion of time spent on direct  
15 patient care was noted to be similar between genders and over time. In 2019, it was higher for  
16 specialists in private practice (66.4%) and GPs (65.5%) than for doctors in other positions, such as  
17 senior hospital consultants (43.5%), speciality registrars (39.8%) and hospital doctors in leading  
18 positions (34.3%). Working >48 h/week increased significantly for both male and female GPs (m:  
19 45.2% to 57.7% f: 27.8% to 47.0%) and hospital doctors in leading positions (m: 34.4% to 57.1%; f:  
20 17.4% to 46.4%), while it significantly decreased for female speciality registrars (13.2% to 6.9%).

21 **Conclusions** Working hours increased significantly for GPs and hospital doctors in leading positions  
22 from 2016 to 2019, resulting in increased proportions of doctors with work hours above the EWDT.  
23 As work hours above the EWDT can be harmful for health personnel and for safety at work, initiatives  
24 to reduce long working weeks are needed.

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3 **1 Strengths and limitations of the study**  
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7 3 The representative cohort with high response rates provided a solid basis for generalisation of the  
8  
9 4 results to the practising doctors in Norway.  
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13 6 There were similarities in the survey methods and measurements at two points in time.  
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18 8 In terms of limitations, analyses were based on self-reported questionnaire data with the possibility of  
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20 9 both over- and underestimation of working hours.  
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## 1 BACKGROUND

2 Doctors' work hours are vital for the medical profession itself and thereby also for both the quality and  
3 quantity of patient care. Both the number of total work hours and the balance between time spent on  
4 direct patient care vs administrative tasks are related to doctors' and patients' wellbeing and health, in  
5 primary care as well as hospital settings.<sup>1-7</sup> Given this association, the European Union has introduced  
6 a working time directive (EWD) limiting the overall average weekly working hours to 48. This is a  
7 measure "designed to protect the health and safety of workers and to improve health and safety at  
8 work".<sup>8,9</sup> For both treatment outcomes and for doctors' wellbeing, we therefore need longitudinal  
9 studies of total work hours and time spent on direct patient care.

11 Difficulties with recruitment and retainment of general practitioners (GPs) have been reported from  
12 several European countries. Increases in workload and longer work hours are understood as reasons  
13 for this.<sup>10-12</sup> In Norway, GPs have reported a growth in work demands<sup>13</sup> and long working weeks with  
14 a wide variety of tasks.<sup>14</sup> Several GPs explained that high workload affects their own quality of life as  
15 well as the ability to ensure good quality of patient care.<sup>15</sup> Moreover, hospital doctors confirmed an  
16 increasing workplace emphasis on production numbers and budget concerns and less emphasis on  
17 quality of care.<sup>16</sup> In a panel study with data from 2010 to 2017, both GPs and hospital doctors reported  
18 significant decrease of several aspects of job satisfaction like "work hours", "recognition for good  
19 work", "rate of pay" and "freedom to choose methods", suggesting changes in working conditions.<sup>17</sup>  
20 Another panel study with data from 2010 to 2019 documented a significant increase in high levels of  
21 work stress for GPs and showed an increasing trend of stress for hospital doctors.<sup>18</sup> An important  
22 aspect of this was constant time pressure due to a heavy workload.<sup>18</sup>

24 In Norway, the vast majority of doctors work full-time, but part-time work is possible as well. All full-  
25 time employed hospital doctors have a contracted basic working week of 35.5 (for doctors with on-call  
26 duty at the hospital) to 37.5 h, usually with an additional 2.5 h extension. Theoretically, doctors can  
27 choose to terminate this extension, but that is extremely rare in practice. Doctors can extend their  
28 weekly working hours up to 60 h The working pattern is usually day work with on-call duties.<sup>19</sup> In

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2  
3 1 contrast to hospital doctors, private practice specialists and the majority of GPs are self-employed and  
4  
5 2 have more influence on their own work schedule.<sup>20</sup> However, the introduction of the list-patient  
6  
7 3 system in 2001 entailed a considerable standardisation of the working conditions of the GPs in which  
8  
9 4 the main variable is the number of patients on their lists. All inhabitant in Norway can voluntarily sign  
10  
11 5 in on to the list of a GP of their choice. The list patient system aimed to enhance access to GPs and  
12  
13 6 continuity in the patient–doctor relationship and also affirmed that GPs act as gatekeepers for other  
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15 7 specialist care. GPs’ responsibilities cover all general practitioner tasks for somatic and mental health  
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17 8 for the inhabitants on the list.<sup>21</sup>

19  
20 9  
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22 10 A good balance between professional and private life is of increasing importance in modern society,<sup>22</sup>  
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24 11 and this holds for doctors as well. Several studies,<sup>23–25</sup> including those from Norway, have documented  
25  
26 12 that working hours in relation to work–home balance is now one of the most important topics when  
27  
28 13 medical students and young doctors choose future speciality.<sup>26 27</sup> Among speciality registrars, a  
29  
30 14 tendency is to think about their work as “a job”, compared to senior hospital consultants who tended to  
31  
32 15 think about work as a “lifestyle”. This implies that there is an ongoing change in the profession  
33  
34 16 regarding expectations about responsibilities outside of work and having more predictable working  
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36 17 hours.<sup>28</sup> Furthermore, also more senior doctors, for example a group of surgeons in Norway, expressed  
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38 18 concern about work–home balance.<sup>16</sup>

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41 19  
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43 20 The balance between time spent on direct patient care and administrative tasks has been discussed in  
44  
45 21 several studies. These showed that doctor satisfaction is largely associated with direct patient work  
46  
47 22 and the delivery of good quality patient care. Therefore, a satisfactory balance is important for the  
48  
49 23 experience of meaning in work.<sup>16 29 30</sup> From 1994 to 2014 the proportion of work hours doctors spent  
50  
51 24 on direct patient care was reduced considerably for hospital doctors (61% vs 46%), whereas the drop  
52  
53 25 was marginal among GPs (73% vs 69%).<sup>1</sup>

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55 26  
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57 27 Although previous studies with data from 1994 to 2016 have documented better work–home balance,  
58  
59 28 wellbeing and a higher percentage of doctors working within EWDT (between 45 h and 48 h) for

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3 1 doctors in Norway than for their colleagues in several other European countries (between 50 h and 90  
4 h),<sup>1 6 31</sup> Norwegian studies show worrying signs of long work hours, less time for direct patient care  
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7 3 and a demanding situation in terms of work–home balance.<sup>13 14 18 32</sup>  
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11 5 Hence, the objectives of this study are to explore and discuss the possible changes in total weekly  
12  
13 6 working hours, relate the number of work hours to the requirements in the EWDT and time spent on  
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15 7 direct patient care for Norwegian doctors working in different job positions (hospital doctors in  
16  
17 8 leading positions, senior hospital consultants, speciality registrars, general practitioners (GPs), private  
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19 9 practice specialists, doctors in academia, community medical officers and doctors in administration)  
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21 10 from 2016 to 2019.  
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## 26 12 **MATERIAL AND METHODS**

### 28 13 **Design and participants**

29  
30 14 Since 1994, the Institute for Studies of the Medical Profession (LEFO) has, approximately every  
31  
32 15 second year, surveyed a representative sample of actively working doctors in Norway with postal  
33  
34 16 questionnaires about their health, quality of life and working conditions. One of the most central and  
35  
36 17 repeated measures has been self-reported weekly working hours.  
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39  
40 19 The original panel was based on an invitation to 2,000 active Norwegian doctors, randomly selected in  
41  
42 20 1993 from the master file of the Norwegian Medical Association, which includes almost all doctors in  
43  
44 21 Norway. The 1,272 doctors who agreed to participate were representative of the total doctor work  
45  
46 22 force in terms of age, sex, specialty and job position. The sample represents an unbalanced cohort, as  
47  
48 23 respondents who leave the panel due to retirement, death or voluntary withdrawal are replaced by  
49  
50 24 randomly selected younger doctors, while the sample's representative nature is maintained at all  
51  
52 25 times..<sup>1 31</sup> This article is based on the data collected from the same sample in 2016 and 2019. Both  
53  
54 26 samples were nearly identical with the exception of n=111 doctors in 2019 that left the panel due to  
55  
56 27 retirement, death or voluntary withdrawal.  
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## 1 **Ethical approval**

2 All participants signed informed written consent forms before the start of the survey. It was explained  
3 that participation was voluntary and that the data would be handled confidentially. An exemption from  
4 a specific review of the individual surveys from the Regional Committee for Medical Research Ethics  
5 (IRB 0000 1870) was also obtained.

## 7 **Measurements**

8 Dependent variables

9 *Weekly working hours and time spent on direct patient care*

10 The items on working hours were the same in 2016 and 2019. The doctors were asked to specify the  
11 number of total working hours per week. They were then asked to specify the number of hours spent  
12 on various activities in a working week. The questions were worded as follows:

13 *In an average working week, including on-call and any part-time job(s), approximately how many*  
14 *hours do you work?*

15 -Total number of hours per week:

16 *How many hours of your total working time do you spend on*

17 -Patient care (all direct contact with individual patients or their relatives, including phone calls, etc.):

18 - In meetings (interdisciplinary team meetings, patient case meetings, guidance meetings, etc.):

19 -Paper work/PC, phone calls, emailing, data-recording (patient records, certificates, discharge  
20 summaries, other documentation):

21 -Professional updating:

22 -Other – write:

24 *Work hours above the limitations in the European work time directive (EWDT)*

25 It is documented that workers with a work week >48 h have increased health complaints and more  
26 suboptimal work–home balance than workers with fewer working hours.<sup>33 34</sup> Therefore, the EU issued  
27 this directive “designed to protect the health and safety of workers and to improve health and safety at

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3 1 work".<sup>8,9</sup> In this article, we examined the percentage of doctors working above 48 h a week on a  
4  
5 2 regular basis.

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9 4 **Independent Variables**

10 5 *Main job positions* were categorised into the following groups:

11 6 1: Hospital doctors in leading positions (medical superintendent, head of department, chief senior  
12 7 consultant, head of the unit, senior consultant, head of section)

13 8 2: Senior hospital consultants

14 9 3: Speciality registrars

15 10 2: General practitioners (GPs)

16 11 3: Private practice specialists

17 12 4: Doctors in academia (professor, associate professor, research fellow, researcher)

18 13 5: Doctors in administrative positions (county medical officer, medical adviser, chief medical officer)

19 14 6: Community medical officers (district medical officer, senior district medical officer, nursing home  
20 15 medical officer, visiting medical officer, doctor at infant welfare clinic)

21 16 7: Interns in general practice or in hospitals

22 17 8: Other job positions

23 18 Other variables were *gender* and *age*.

24 19

25 20 **Inclusion and exclusion criteria**

26 21 Responses from doctors that provided data on gender, age (<70 years), job positions and all items of  
27 22 the weekly hours questionnaire were included in the study. Doctors  $\geq 70$  year were excluded to  
28 23 maintain the sample's representativity of practising doctors in Norway. The "Statistics on all Members  
29 24 of the Norwegian Medical Association" include doctors under 70 years as it is assumed that the  
30 25 common retirement age is just under 70 years.<sup>35</sup>

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## 1 **Analyses**

2 The analyses were undertaken among doctors in the following job positions: hospital doctors in  
3 leading positions, senior hospital consultants, speciality registrars, GPs, specialists in private practice,  
4 doctors in academia, community medical officers and doctors in administration. First, changes in the  
5 distribution of doctors related to three categories of the total weekly working hours in 2016 and 2019  
6 were described using Pearson's chi square tests: <37 h, 37–48 h and >48 h. Second, the changes in the  
7 total weekly working hours and time spent on direct patient care for doctors working full-time were  
8 described. Full-time work was defined as 37 working hours or more per week.<sup>36</sup> Multivariable linear  
9 mixed models with a subject-specific random intercept were used in the analyses. The estimates of the  
10 means and tests of comparisons are based on statistical models for repeated measurements. The total  
11 working hours was the dependent variable and the job position and age (<50 years of age and ≥50  
12 years of age) were independent variables in the models. Women and men have primarily been  
13 analysed separately. Third, mixed models on the proportion of time spent on direct patient care (with  
14 fixed gender, age and job positions) for doctors in different job positions were described. Units with  
15 missing data were excluded. The data were analysed using IBM Statistical Product and Service  
16 Solution (SPSS) software, version 26.

## 18 **Patient and public involvement**

19 This study is important for patients because healthy doctors take better care of their patients. However,  
20 in this survey, there was no access to direct patient involvement. No patients were involved in setting  
21 the research question or the outcome measures, nor were they involved in the design and  
22 implementation of the study.

## 24 **RESULTS**

### 25 **Respondents**

26 Table 1 presents the sample, respondents, response rates and the range of job positions for doctors for  
27 which we obtained data on gender, age (<70 years) and working hours. The samples in 2016 and 2019  
28 were nearly identical with the exception of n=111 doctors in 2019 that left the panel due to retirement,

1 death or voluntary withdrawal. The response rates were 73.1% in 2016 and 72.5% in 2019. The  
2 number of responses with missing data was  $n = 123$  in 2016 and  $n = 160$  in 2019. The majority of  
3 doctors did fill in both questionnaires  $n=1189$  of 1481 (80%) in 2016 and 1189 of 1351 (88%) in 2019.  
4 The distribution of the doctors and the proportion of females in different job positions was comparable  
5 over the study period. As the number of interns was very low in 2019, these data are not remarked on  
6 in the results section.

#### 7 Table 1

8 In terms of age, gender and job positions, the distributions of our samples in 2016 and 2019 were  
9 comparable to the distributions found in the Statistics on all Members of the Norwegian Association,  
10 which includes 97% of all active doctors in Norway.<sup>17</sup>

### 12 **Full-time, part-time and proportion with work hours above the limitation of EWDT**

#### 13 *Full-time and part-time*

14 Table 2 shows the distribution of total weekly working hours by doctors in 2016 and 2019: <37 h  
15 (part-time), 37–48 h and >48 h (above the limit of EWDT).

16  
17 The majority of doctors worked full-time ( $\geq 37$  h). A minority of female and male doctors worked part-  
18 time but with clear differences across job positions. For example, no female or male doctors in leading  
19 hospital positions worked part-time, whereas 30.3% of the female community medical officers did in  
20 2019. There was a significant reduction in the proportion of part-time work for female senior hospital  
21 consultants from 13.2% in 2016 to 7.3% in 2019. Although not significant, the same tendency was  
22 found among both male hospital consultants and male and female speciality registrars.

23  
24 Compared to males, female senior hospital consultants reported a significantly higher proportion of  
25 part-time in 2016 (6.6% vs 13.2%) and 2019 (1.1% vs 7.3%), as did female community medical  
26 officers in 2019 (8.3% vs 30.3%).

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3 1 *Proportion with hours above the limitations of EWDT (>48 h/week)*  
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5 2 The proportion of doctors working >48 h a week increased significantly for male (m) and female (f)  
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7 3 GPs (m: 45.2% to 57.7%; f: 27.8% to 47.0%) and hospital doctors in leading positions (m: 34.4% to  
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9 4 57.1%, f: 17.4% to 46.4%), and working 37–48 h decreased accordingly. On the other hand, female  
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11 5 speciality registrars reported a significant decrease in working >48 h (13.2% to 6.9%) and a resulting  
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13 6 significant increase in working 37–48 h (82.0% to 91.2%). No significant changes were found in other  
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15 7 job positions.  
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20 9 Overall, the proportion of doctors working >48 h/week was higher in male doctors than female, with  
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22 10 significant differences among GPs in 2016 (m: 45.2%; f: 27.8%), senior hospital doctors in 2016 (m:  
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24 11 29.3%; f: 18.0%) and 2019 (m: 33.3%; f: 18.1%), and speciality registrars in 2019 (m: 19.4%; f:  
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26 12 6.9%).  
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31 14 In 2019, male and female GPs (m: 57.7%; f: 47.0%) and hospital doctors in leading positions (m:  
32  
33 15 57.1%; f: 46.4%) had the highest proportion of >48 h/week, followed by doctors in academia (m: 38.2;  
34  
35 16 f: 44.1%), private practice specialists (m: 38.9%; f: 30.0%), doctors in an administrative position (m:  
36  
37 17 38.8%; f: 12.5%), senior hospital doctors (m: 33.3%; f: 18.1%), community medical officers (m: 33.3%  
38  
39 18 f: 12.1%) and specialty registrars (m: 19.4%; f: 6.9%).  
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43 20 Table 2  
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45 21 **Total weekly working hours in full-time**  
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47 22 Table 3 shows the total weekly working hours and hours spent on direct patient care among doctors  
48  
49 23 working full-time ( $\geq 37$  h). From 2016 to 2019, the total weekly working hours increased significantly  
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51 24 for male GPs (48.7 h to 50.9 h) and hospital doctors in leading positions (48.2 h to 50.5 h), while it  
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53 25 significantly decreased for female specialists in private practice (48.6 h to 44.9 h), and it remained  
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55 26 significantly unchanged for doctors in other job positions.  
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3 1 There were a few significant gender differences. In 2019, males doctors as senior hospital consultants  
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5 2 (m: 47.8 h; f: 45.6 h) and speciality registrars (m: 46.6 h; f: 44.6 h) reported higher weekly working  
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7 3 hours compared with females.  
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9 4

10 5 Compared to male and female GPs both in 2016 and 2019, most doctors in other job positions reported  
11  
12 6 significantly fewer total weekly working hours.  
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### 18 8 **Total hours spent on direct patient care**

19 9 There were no gender differences in the hours spent on direct patient care within job positions.  
20  
21  
22 10 Compared to male and female GPs, doctors in other job positions reported significantly fewer hours  
23  
24 11 spent in direct patient care, except private practice specialists, both in 2016 and 2019 (Table 3).  
25  
26 12

28 13 Table 3

### 32 15 **Proportion of time spent on direct patient care**

33  
34 16 Table 4 shows the changes in the proportion of time spent on direct patient care among doctors in  
35  
36 17 different job positions working full-time from 2016 to 2019. The figure includes both genders because  
37  
38 18 there were no significant differences in time spent on direct patient care. There were no significant  
39  
40 19 changes from 2016 to 2019. Both in 2016 and 2019, specialists in private practice and GPs had the  
41  
42 20 highest proportion of time spent on direct patient care.  
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44 21

47 22 Table 4

## 49 23 **DISCUSSION**

### 51 24 **Main findings**

52  
53 25 From 2016 to 2019, the weekly working hours increased significantly for male GPs (48.7 h to 50.9 h)  
54  
55 26 and male hospital doctors in leading positions (48.2 h to 50.5 h) and significantly decreased for female  
56  
57 27 specialists in private practice (48.6 h to 44.9 h). The proportion of time spent on direct patient care  
58  
59 28 was similar between genders and did not change significantly. In 2019, it was higher for specialists in

1 private practice (66.4%) and GPs (65.5%) than for doctors in other positions. The proportion of  
2 doctors working >48 h/week increased significantly for both genders among GPs (m: 45.2% to 57.7%  
3 f: 27.8% to 47.0%) and hospital doctors in leading positions (m: 34.4% to 57.1%; f: 17.4% to 46.4%),  
4 while it significantly decreased for female speciality registrars (13.2% to 6.9%). In all job positions,  
5 more male than female doctors reported working >48 h/week.

## 8 **Comparison with other studies**

### 9 *Weekly working hours*

10 Whereas the present study found an increase in weekly work hours for male GPs and hospital doctors  
11 in leading positions and a decrease for female specialists in private practice, data from the same cohort  
12 for the period of 1994–2014 showed stable total weekly working hours for most doctors working full-  
13 time.<sup>1 31</sup> Both female and male GPs were among those with highest total working hours.

14  
15 Other studies also suggest an increase in working hours for GPs in Norway. The “Commonwealth  
16 Fund” surveys of GPs in 10 countries in 2009<sup>37</sup> and in 11 countries in 2019<sup>38</sup> showed that GPs in  
17 Norway have the highest increase (40 h to 49 h), followed by GPs in Netherlands (44 h to 50 h),  
18 Canada (42 h to 49 h), US (47 h to 51 h), France (49 h to 51 h) and Germany (51 h to 52 h). The  
19 weekly working hours for GPs remained unchanged in Sweden (38 h), while it decreased in Great  
20 Britain (41 h to 40 h), Australia (42 h to 38 h) and New Zealand (42 h to 38 h).<sup>38</sup> A cross-sectional  
21 survey among GPs in Norway in 2018 documented long working weeks (55.6 h).<sup>14</sup> In Germany in  
22 2018, GPs reported longer working weeks than specialists in private practice (52.3 h vs. 50.1 h).<sup>39</sup>

23  
24 In comparison with our data from 2016 and 2019, doctors in other countries seem to have longer  
25 weekly working hours. In the “Work-Life Profiles of Today’s Physician 2014” by AMA Insurance in  
26 the US, 5% of doctors reported an average working week of >80 h, while 18% of doctors worked 61–  
27 80 h and 62% of doctors worked 40–60 h.<sup>40</sup> A study among specialists and senior doctors in German  
28 urology in 2016 showed that approximately 80% of the doctors had average weekly workhours beyond

1  
2  
3 1 50 h.<sup>41</sup> Another study among hospital doctors in Germany in 2019 documented long working weeks:  
4  
5 2 22% of them worked 60–80 h a week, 41% worked 49–59 h and 36% worked less than 49 h. An  
6  
7 3 average working week for full-time hospital doctors amounted to 57 h.<sup>42</sup> A survey among hospital  
8  
9 4 doctors in Austria from 2019 documented an average working week of 47 h, while hospital doctors in  
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11 5 leading positions had longer hours (51 h) than doctors in postgraduate training (49 h).<sup>43</sup>  
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15  
16 7 *Proportion of doctors with work hours above the limitations of EWDT (>48 h/week) and part-time*  
17  
18 8 *work (<37 h/week)*

19  
20 9 The proportion of doctors who reported working >48 h/week (higher than the limitations in EWDT)  
21  
22 10 was high among all job positions, with an increasing trend for GPs and hospital doctors in leading  
23  
24 11 positions and a decreasing trend for speciality registrars. This is clearly higher than in most other  
25  
26 12 professional groups in Norway. For example, in a national survey in 2019, a total of 5% of all  
27  
28 13 employees as a whole worked more than 48 h per week,<sup>44</sup> whereas in our sample it varied between  
29  
30 14 18.7% for speciality registrars and 52.8% for GPs in 2019 (Table 2). Compared to our data among  
31  
32 15 hospital doctors in leading positions, senior hospital consultants and speciality registrars in 2019, the  
33  
34 16 proportion of doctors with a working week above 48 h was higher among German hospital doctors in  
35  
36 17 leading positions (76%), senior hospital consultants (43%), speciality registrars (71%) in 2019,<sup>42</sup> and  
37  
38 18 Hungarian hospital doctors (58%) in 2020.<sup>45</sup> A working week above 50 h was reported by 48% of  
39  
40 19 family doctors and 39% of specialists in private practice in Germany in 2018.<sup>39</sup>  
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45 21 As in other countries, a minority of the Norwegian doctors work part-time. Contrary to our  
46  
47 22 expectations, the present study documented a trend towards less part-time work in 2019. Especially  
48  
49 23 among speciality registrars, who are most likely to have small children, this was surprising (Table 2).  
50  
51 24 This contradicts previous national studies in Norway based on data from the same unbalanced cohort  
52  
53 25 of 1994–2014, which showed a trend towards more part-time work (<37 h/week) for speciality  
54  
55 26 registrars and senior hospital consultants (6.3% to 10.0%), specialists in private practice (14.8% to  
56  
57 27 25%) and doctors in academia (3.9% to 12.5%),<sup>31</sup>  
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3 1 Compared to doctors in our data from 2016 to 2019, the proportion of part-timers was higher among  
4  
5 2 populations with academics in Norway, but academics in general also showed a decreasing trend both  
6  
7 3 for males (11.3% to 10.0%) and females (26.3% to 24.1%).<sup>46</sup> In contrast, hospital doctors in Germany  
8  
9 4 showed an increase in part-time work (<40 h/week) from 15% in 2013 to 26% in 2019.<sup>42</sup> Furthermore,  
10  
11 5 14% of US doctors in 2014<sup>40</sup> and 21% of family doctors and 26% of specialists in private practice in  
12  
13 6 Germany worked <40 h a week in 2018.<sup>39</sup>  
14  
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### 8 *Time spent on direct patient care*

19  
20 9 A previous study with the same unbalanced cohort data from 1994 to 2014 documented a considerable  
21  
22 10 reduction in time spent on direct patient care for senior hospital consultants and speciality registrars  
23  
24 11 (61% to 46%) and a marginal drop for GPs (73% to 69%) and specialists in private practice (75% to  
25  
26 12 72%).<sup>1</sup> This trend has not continued, as we do not find significant differences from 2016 to 2019  
27  
28 13 (Table 4).  
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### 15 **Explanations of the results**

34  
35 16 Healthcare organisations are constantly subject to change in most Western countries. The relationship  
36  
37 17 between health care reforms and working conditions for doctors is complex, but several studies have  
38  
39 18 documented an increase in out-of-hospital care and pressure on GPs after the so-called "Co-ordination  
40  
41 19 reform" implemented in 2012<sup>47</sup>. The reform has been criticized for leading to: increase in  
42  
43 20 consultations, ordering laboratory services for appointment specialists, increase in tasks related to  
44  
45 21 preventive treatment, more follow-up care of pregnant women or patients with chronic diseases.<sup>13</sup>  
46  
47 22 Other reports confirmed this increased work pressure due to increase in consultations<sup>48</sup> and  
48  
49 23 documentation<sup>49</sup> and for more complex and time-consuming consultations<sup>50</sup> for GPs. The evaluative  
50  
51 24 study of "The Regular General Practitioners Scheme" from 2019 confirmed a significant rise in  
52  
53 25 workloads for GPs, which was related to increase in both new tasks and the volume of established  
54  
55 26 tasks.<sup>49</sup>  
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60 28 A majority of GPs (86%) reported that they "completely disagree" that regular working hours were

1 sufficient to carry out this increase in work tasks<sup>13</sup> It is therefore likely that the increase this study  
2 documents in weekly working hours and time spent on patient care for GPs is related to this and the  
3 following reform of 2015 called “The Future Primary Care – Proximity and Comprehensiveness  
4 Reform”<sup>51 52</sup> which additionally emphasized decentralised services close to where patients live to  
5 reduce costs, increasing the GPs responsibility. Before 2014 GPs reported high, but stable total weekly  
6 working hours of 48 hrs from 1994-2014.<sup>1 31</sup>

7  
8 Long working hours is one of the important contributors to work stress and reduced job satisfaction.<sup>53</sup>  
9 <sup>54</sup> Panel studies in Norway documented a significant decrease in several aspects of job satisfaction for  
10 GPs and hospital doctors from 2010 to 2017 and a significant increase of work stress for GPs as well  
11 as increasing work stress for hospital doctors from 2010 to 2019. One of the important aspects of this  
12 was time pressure arising from a heavy workload.<sup>17 18</sup> Another study among hospital doctors  
13 documented workload related to increasing workplace emphasis on production numbers and budget  
14 concerns.<sup>16</sup> In a survey of hospital doctors’ working conditions in 2018, hospital doctors assigned high  
15 scores to items related to engagement at work, assessment of work as meaningful and co-operation  
16 with colleagues but scored items related to workload and professional autonomy lower.<sup>55</sup>

17  
18 In the last few years, there have been worries about maintaining high-quality patient care. The  
19 introduction and use of electronic patient registration systems in several Western countries is  
20 described as taking a substantial amount of time from clinical tasks and increasing the risk of work  
21 stress and burnout for doctors.<sup>42 56-58</sup> A study among GPs in 2018 showed the potential negative effects  
22 of task shifting from hospital care specialists and other specialists to GPs on patient safety, such as the  
23 hazardous delay of necessary examinations or insufficient treatment due to lack of resources or risk of  
24 malpractice.<sup>59</sup> Other studies showed that inadequate communication between hospitals and primary  
25 care as well as competence problems in primary care can lead to inadequate patient care and frequent  
26 readmissions to hospitals for an increasing number of medically complex patients.<sup>60 61</sup> Several GPs in  
27 Norway explained that high workload affects their own quality of life as well as the ability to ensure

1  
2  
3 1 good quality of patient care.<sup>49</sup> A recent report shows that a part of the population do not have access to  
4  
5 2 an allocated GP at present and that this will grow into a much larger problem in the years to come.<sup>62</sup>  
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7 3  
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9 4 These findings fit well with our data from 2010 to 2019, where doctors in several job positions  
10  
11 5 reported long working weeks, with a significant increasing trend for male GPs and hospital doctors in  
12  
13 6 leading positions. Working above 48 h/week (above the EWDT) increased significantly – for both  
14  
15 7 genders to about half of the GPs and of hospital doctors in leading positions in 2019. (Table 2).  
16  
17 8 Interestingly, in 2019, both female (6.9%) and male (19.4%) speciality registrars, compared to other  
18  
19 9 job positions, had the lowest proportion of a members working over 48 h/week. This may be due to  
20  
21 10 ongoing societal changes called “downshifting”, implying that people choose to prioritise other  
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23 11 qualities in life by forgoing a higher income in exchange for a life with lower stress and more free  
24  
25 12 time.<sup>22</sup> Many hospital doctors – particularly female doctors – try to reduce their working hours by  
26  
27 13 choosing family-friendly specialities with less on-call or shift duties.<sup>26 63</sup> This indicates an ongoing  
28  
29 14 change in the profession regarding expectations about responsibilities outside of work hours and  
30  
31 15 having more predictable working hours.<sup>28</sup> Lesser work hours (promoting better work–home balance)  
32  
33 16 seems to be an important predictor for the choice of future speciality among medical students and  
34  
35 17 young doctors.<sup>23</sup> However, the tendency to choose less part-time work, including among speciality  
36  
37 18 registrars,<sup>26 27</sup> points in the opposite direction. Obligations to finish speciality training and temporary  
38  
39 19 work contracts among young doctors make it difficult to work part-time. Reduction of long work  
40  
41 20 hours and increased possibility for part-time work can be one aspect of reducing work–home conflict  
42  
43 21 and thus increasing doctors’ wellbeing and patient safety.<sup>6 7 64</sup>  
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45 22  
46  
47 23 Studies have also demonstrated that delivering high quality patient care and increasing the time spent  
48  
49 24 on direct patient care result in more satisfied patients and doctors<sup>16 29 30</sup> and that doctors themselves  
50  
51 25 would like to spend more of their time on this work.<sup>65 66</sup> In the present study period between 2016 and  
52  
53 26 2019, the time spent on direct patient care did not change. However, in our cohort of Norwegian  
54  
55 27 doctors, it fell from 1994 to 2014<sup>1</sup> and even further by 2019 in the present study, for instance, for GPs  
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57 28 (73%, 69%, 66%)and for senior hospital doctors and speciality registrars (62%, 44%, 42%). Long  
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3 1 working weeks and a decreasing trend in time spent on direct patient care suggest an increasing need  
4  
5 2 for devotion of time to tasks like documenting, reporting and encoding in the health sector.  
6  
7 3 Considering all of these points, it is not only enough to measure the number of hours worked (the  
8  
9 4 quantity) but also important to study the content of the work (the quality).  
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12 5

## 13 6 **Strengths and limitations**

15 7 The study's main strength is the representative cohort that provides a solid basis for generalisation of  
16  
17 8 the results to practising doctors in Norway. The same cohort was followed up with over time. There  
18  
19 9 were similarities in survey methods and measurements at both points in time. The response rates were  
20  
21 10 fairly good: 73.1% in 2016 and 72.5% in 2019. They were higher than in some similar studies but do  
22  
23 11 not rule out the possibility of a non-response bias.<sup>31</sup> Analyses were based on self-reported  
24  
25 12 questionnaire data with the possibility of both over- and underestimation of the working hours.  
26  
27 13 However, as the majority of doctors answered at both points in time (see Respondents), the changes in  
28  
29 14 work hours documented in the study should be reliable.  
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34 16 The doctors' self-reporting of hours spent on their various workday components may, of course, be  
35  
36 17 inaccurate. The level of working hour accuracy can probably be improved, but there has been built-in  
37  
38 18 quality control throughout, as each individual doctor had been asked to add up their own working hour  
39  
40 19 components to arrive at a total number of hours worked per week.  
41  
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44  
45 21 A previous study documented variations in the interpretation of the concept of "direct patient care"  
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47 22 among doctors from different job positions.<sup>1</sup> To a greater degree than others, GPs and specialists  
48  
49 23 working in private practice referred to "only face-to-face contact with patients" when talking about  
50  
51 24 patient care, while more doctors working in administration or management included "all work directly  
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53 25 related to individual patients, including work on patient records, telephone calls and meetings" and  
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55 26 "other". However, the majority responded either "only face-to-face contact with patients" (47%) or  
56  
57 27 "all direct contact with individual patients, including phone calls, emailing, etc." (24%), which reflects  
58  
59 28 our questionnaire's definition of direct patient care.<sup>1</sup> In addition, since the same doctors were polled on

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2  
3 1 each occasion largely, the reliability of changes over time in the data increases significantly and could  
4  
5 2 be assessed as repeated measurements. Unfortunately, data on other and more specific variables  
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7 3 for doctors in different job positions that may have an effect on time spent, such as staffing levels,  
8  
9 4 distribution of tasks and workday organisation, were not included.  
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## 13 6 **Policy implications**

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15 7 Variations in distribution of work time, proportion of doctors working >48 h/week and time spent on  
16  
17 8 direct patient care across job positions call for more comparative analyses in the future. Several  
18  
19 9 doctors reported reduced time spent on direct patient care. It is impossible to determine what  
20  
21 10 constitutes the optimal proportion of time spent on direct patient care. However, more time spent in  
22  
23 11 patient care is a quality indicator. It results in more satisfied doctors and patients.<sup>29</sup> Good patient care  
24  
25 12 depends on individual and organisational factors, including quality improvement and evaluation.  
26  
27 13 Reducing the proportion of doctors working >48 h/week among Norwegian doctors is important and  
28  
29 14 has been found to improve both doctors' health and quality of patient care.<sup>67 64</sup> The possibility to adapt  
30  
31 15 the number of work hours to other life commitments (including the possibility of working part-time) is  
32  
33 16 important to maintain a good balance between professional and private life. This balance is an  
34  
35 17 important factor for career decisions, such as staying in or leaving job positions.<sup>67 68</sup> Specific attention  
36  
37 18 should be paid to male and female GPs. Low recruitment to primary care is a concurrent issue in  
38  
39 19 Norway.<sup>50 69</sup> Improving the working conditions of doctors and ensuring optimal working hours may  
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41 20 cause more doctors to choose or to remain in general practice.  
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## 61 22 **Conclusion**

62 23 Compared to the stipulated work hours in Norway, doctors of both genders work long hours, and  
63 24 length has increased significantly for male GPs and hospital doctors in leading positions from 2016 to  
64 25 2019. The proportion of time spent on direct patient care fell for some job positions over time. GPs  
65 26 and specialists in private practice spent about two-thirds of their time on direct patient care, while  
66 27 hospital doctors spend less than half of their time on it. In 2019, of the proportion of doctors with work  
67 28 hours above the limitations in EWDT was highest among GPs and hospital doctors in leading



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- 1 positions of both genders and lowest among speciality registrars. Since a long working week affects
- 2 both the doctors' own well-being and the quality of patient care, regular assessments of working hours
- 3 followed by analyses and appropriate actions are useful interventions.

For peer review only

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2  
3 **1 Declarations**

4  
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7  
8  
9

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11 analysis and wrote the first draft. KIR made critical revisions. All authors had full access to all of the  
12 data (including statistical reports and tables) and are jointly responsible for the integrity of the data and  
13 the accuracy of the data analysis.  
14  
15  
16  
17

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20  
21  
22

23 **5 Competing interest** None declared.  
24  
25

26 **6 Ethics approval** According to the Regional Committee for Medical Research Ethics, the study based  
27 on 'Norwegian Physician Survey - A biennial prospective questionnaire survey of a representative  
28 sample of Norwegian physicians' is exempt from review in Norway, cf. §§ 4 of The Act. The project  
29 can be implemented without the approval by the Regional Committee for Medical Research Ethics  
30 (IRB 0000 1870). In addition, approval for data protection of the biennial prospective survey among  
31 Norwegian doctors was obtained from the Norwegian Social Science Data Service (Reference 19521).  
32  
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37 **7 Data sharing statement** The authors may be able to provide aggregated data on which the analysis is  
38 based, on request. No additional data are available.  
39  
40  
41

42 **8 Patient consent** N/A  
43  
44

45 **9 STROBE Statement:** The authors confirm that they have followed the list of the STROBE Statement  
46 (BMJ 2007;335:806–808).  
47  
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49

50 **10 Transparency declaration:** The lead author (JR) affirms that the manuscript is an honest, accurate  
51 and transparent account of the study being reported; that no important aspects of the study have been  
52 omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been  
53 explained.  
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## 1 References

1. Rosta J, Aasland OG. Doctors' working hours and time spent on patient care in the period 1994 - 2014. *Tidsskrift for Den norske legeforsening* 2016;136(16):1355-9.
2. Angerer P, Weigl M. Physicians' psychosocial work conditions and quality of care: A literature review. *Professions and Professionalism* 2015;5(1):1-20.
3. Rathert C, Williams ES, Linhart H. Evidence for the Quadruple Aim: A Systematic Review of the Literature on Physician Burnout and Patient Outcomes. *Med Care* 2018;56(12):976-84.
4. Mangory KY, Ali LY, Isaksson Rø K, et al. Effect of burnout among physicians on observed adverse patient outcomes: a literature review. *Health Services Research* 2021;21(1):369.
5. Isaksson Rø K, Rosta J, Tyssen R, et al. Doctors Well-being, Quality of Patient Care and Organizational Change: Norwegian Experiences. In: Montgomery A, van der Doef M, Panagopoulou E, et al., eds. *Connecting Healthcare Worker Well-Being, Patient Safety and Organisational Change: The Triple Challenge*. Cham: Springer International Publishing 2020:91-114.
6. Rosta J, Aasland OG. Work hours and self rated health of hospital doctors in Norway and Germany. A comparative study on national samples. *BMC Health Services Research* 2011;11:40.
7. Rosta J, Gerber A. Excessive working hours and health complaints among hospital physicians: a study based on a national sample of hospital physicians in Germany. *German Medical Science* 2007;5DOC09.
8. Maybury C. The European Working Time Directive: a decade on. *Lancet* 2014;384(9954):1562-3.
9. Rodriguez-Jareño MC, Demou E, Vargas-Prada S, et al. European Working Time Directive and doctors' health: a systematic review of the available epidemiological evidence. *BMJ Open* 2014;4(7):e004916.
10. Pedersen Fischer A, Busk Nørøxe K, Bro F, et al. Alment praktiserende lægers psykiske arbejdsmiljø og jobtilfredshed 2016 (General Practitioners' psychological work environment and job satisfaction 2016). Aarhus: Research Unit for General Practice, 2016.
11. Owen K, Hopkins T, Shortland T, et al. GP retention in the UK: a worsening crisis. Findings from a cross-sectional survey. *BMJ Open* 2019;9(2):e026048.
12. Zhou AY, Panagioti M, Galletta-Williams H, et al. Burnout in Primary Care Workforce. In: Montgomery A, van der Doef M, Panagopoulou E, et al., eds. *Connecting Healthcare Worker Well-Being, Patient Safety and Organisational Change: The Triple Challenge*. Cham: Springer International Publishing 2020:59-72.
13. Johnsen TM, Berge V, Høivik F, et al. Trønderopprørets fastlegeundersøkelse og helsemedarbeiderundersøkelse 2018 (Trønderopprør's investigation of regular GPs and co-workers 2018). Available: <http://www.flo20.no/wp-content/uploads/2018/06/TOundersøkelse-2.pdf> (accessed 11 October 2022).
14. Morken T, Rebnord IK, Maartmann-Moe K, et al. Workload in Norwegian general practice 2018 - an observational study. *BMC Health Services Research* 2019;19(1):434-34.
15. Ey & Vista Analyse. Evaluering av fastlegeordningen 2019 (Evaluation of the GP scheme 2019). Available: <https://www.regjeringen.no/contentassets/7cd212bf5f0642c1a5d0d480f0923e6d/evaluerin-g-av-fastlegeordningen---sluttrapport-fra-ey-og-vista-analyse.pdf> (accessed 11 October 2022).
16. Baathe F, Rosta J, Bringedal B, et al. How do doctors experience the interactions among professional fulfilment, organisational factors and quality of patient care? A qualitative study in a Norwegian hospital. *BMJ Open* 2019;9(5):e02
17. Rosta J, Aasland OG, Nylenna M. Changes in job satisfaction among doctors in Norway from 2010 to 2017: a study based on repeated surveys. *BMJ Open* 2019;9(9):e027891.
18. Rosta J, Båathe F, Aasland OG, et al. Changes in work stress among doctors in Norway from 2010 to 2019: a study based on repeated surveys. *BMJ Open* 2020;10(10):e037474.

19. Schroder-Aasen T. Arbeidstid (Working time), 2016. Available: <https://yngreleger.no/artikkel/arbeidstid> (accessed 11 October 2022).
20. Aasland OG, Rosta J. Fastlegenes arbeidstid 2000-08 (The working hours of general practitioners 2000-2008). *Tidsskrift for Den norske legeforening* 2011;131(11):1076-80.
21. Lovdata. Forskrift om fastlegeordning i kommunene 2021 (Regulations on GP arrangements in the municipalities 2021). Available: <https://lovdata.no/dokument/SF/forskrift/2012-08-29-842> (accessed 11 October 2022).
22. Hamilton C. Downshifting in Britain A sea-change in the pursuit of happiness, 2003. Available: <http://www.tai.org.au/documents/downloads/DP58.pdf> (accessed 20 October 2021).
23. Diderichsen S. It's just a job: a new generation of physicians dealing with career and work ideals. Doctoral thesis. Umeå University, 2017.
24. Dyrbye LN, Freischlag J, Kaups KL, et al. Work-home conflicts have a substantial impact on career decisions that affect the adequacy of the surgical workforce. *Arch Surg* 2012;147(10):933-9.
25. Treister-Goltzman Y, Peleg R. Female Physicians and the Work-Family Conflict. *The Israel Medical Association Journal: IMAJ* 2016;18(5):261-6.
26. Johannessen K, Hagen T. Individual and hospital-specific factors influencing medical graduates' time to medical specialization. *Social Science and Medicine* 2013;97:170-75.
27. Fimland SK, Kjenås AS, Isaksson Rø K, et al. Medical students' attitudes and expectations for future working conditions. *Tidsskrift for Den norske legeforening* 2019;139(17):1660-64.
28. Hertzberg T, Tyssen R, Skirbekk H, et al. Work-home balance in two cohorts of Norwegian doctors. *Tidsskrift for Den norske legeforening* 2019;139(19):915-20.
29. Bovier P, Perneger T. Predictors of work satisfaction among physicians. *European Journal of Public Health* 2003;13(4):299-305.
30. Friedberg M, Chen P, Van Busum K, et al. Factors Affecting Physician Professional Satisfaction and Their Implications for Patient Care, Health Systems, and Health Policy Santa Monica: RAND Corporation, 2013.
31. Rosta J, Aasland OG. Weekly working hours for Norwegian hospital doctors since 1994 with special attention to postgraduate training, work-home balance and the European Working Time Directive: a panel study. *BMJ Open* 2014;4(10).
32. Rosta J, Isaksson Rø K. Overlegenes arbeidsforhold og helse i perioden 2010-2019 (The senior doctors' working conditions and health in the period 2010-2019). *Overlegen* 2021(1):21-24.
33. Messenger J, Group. WC. Working time and the future of work 2018. Available: [https://www.ilo.org/global/topics/future-of-work/publications/research-papers/WCMS\\_649907/lang--en/index.htm](https://www.ilo.org/global/topics/future-of-work/publications/research-papers/WCMS_649907/lang--en/index.htm) (accessed 11 October 2022).
34. Eurofund. 6th European Working Condition Survey 2015. Available: <https://www.eurofound.europa.eu/surveys/european-working-conditions-surveys/sixth-european-working-conditions-survey-2015> (accessed 13 March 2023).
35. DNLF. Yrkesaktive leger under 70 år – 2018 (Practicing doctors in Norway <70 years – 2018). Available: <https://www.legeforeningen.no/om-oss/legestatistikk/yrkesaktive-leger-i-norge/> (accessed 11 March 2023).
36. Bø T, Håland I. Sysselsatte med ekstra lange arbeidsuker (Employees with extra long working weeks). *Økonomiske analyser* 2012;5:13-15.
37. Holmboe O, Bjertnæs ØA, Bukholm G, et al. Commonwealth Fund-undersøkelsen i 2009 blant allmennleger: Resultater fra en komparativ undersøkelse i 11 land. (Commonwealth Fund survey in 2009 among primary care physicians: results from a comparative survey in 11 countries). Oslo: Nasjonalt kunnskapssenter for helsetjenesten, 2009.
38. Skudal KE, Holmboe O, Bjertnæs ØA, et al. Commonwealth Fund-undersøkelsen blant allmennleger i elleve land i 2019 (Commonwealth Fund survey of general practitioners in eleven countries in 2019). Oslo: FHI, 2019.
39. INFAS. Ärztemonitor 2018: Ergebnisse für Haus- und Fachärzte (Survey on doctors: GPs and specialits 2018). Available:

- 1  
2  
3 1 [https://www.kbv.de/media/sp/infas\\_TabBand\\_AerzteMonitor2018\\_Aerzte\\_20180615.pdf](https://www.kbv.de/media/sp/infas_TabBand_AerzteMonitor2018_Aerzte_20180615.pdf)  
4 2 (accessed 11 October 2022).  
5 3  
6 4 40. AMA Staff News Writer. How many hours are in the average physician workweek? 6 January  
7 4 2015. Available: [https://www.ama-assn.org/practice-management/physician-health/how-](https://www.ama-assn.org/practice-management/physician-health/how-many-hours-are-average-physician-workweek)  
8 5 many-hours-are-average-physician-workweek (accessed 11 October 2022).  
9 6 41. Struck JP, Stahl L, Braun M, et al. The working time load of specialists and senior physicians in  
10 7 German urology - a critical assessment. *Der Urologe* 2019;58(8):918-23.  
11 8 42. IQME. Ergebnisbericht der Mitgliederbefragung 2019 (Report of member survey 2019). Available:  
12 9 [https://www.marburger-bund.de/sites/default/files/files/2020-01/Gesamtauswertung%20-](https://www.marburger-bund.de/sites/default/files/files/2020-01/Gesamtauswertung%20-%20MB-Monitor%202019-presse.pdf)  
13 10 %20MB-Monitor%202019-presse.pdf (accessed 11 October 2022).  
14 11 43. IMAS. Österreichische Spitalärztebefragung 2019 (Austrian hospital physician survey 2019). PK-  
15 12 Unterlage: Wien.  
16 13 44. STAMI-Rapport. Faktabbok om arbeidsmiljø helse (Factbook on working environment and  
17 14 health). Oslo: Statens arbeidsmiljøinstitutt, 2021.  
18 15 45. Chamber H-HM. The medical community sticks together and does not accept the circumvention  
19 16 of the profession 2020. [https://mok.hu/hirek/mokhirek/az-orvostarsadalom-osszetart-es-](https://mok.hu/hirek/mokhirek/az-orvostarsadalom-osszetart-es-nem-fogadja-el-a-szakma-megkeruleset)  
20 17 nem-fogadja-el-a-szakma-megkeruleset (accessed 11 October 2022).  
21 18 46. SSB. Arbeidskraftundersøkelsen (The labor force survey), 2021. Available:  
22 19 <https://www.ssb.no/statbank/table/09790/tableViewLayout1/> (accessed 11 October 2022).  
23 20 47. Norwegian Ministry of Health and Care Service. The Coordination Reform. Available:  
24 21 [https://www.regjeringen.no/contentassets/d4f0e16ad32e4bbd8d8ab5c21445a5dc/en-](https://www.regjeringen.no/contentassets/d4f0e16ad32e4bbd8d8ab5c21445a5dc/en-gb/pdfs/stm200820090047000en_pdfs.pdf)  
25 22 gb/pdfs/stm200820090047000en\_pdfs.pdf (accessed 11 October 2022).  
26 23 48. Texmon I. Kortere pasientlister, lengre arbeidsdager? (Shorter patient lists, longer working  
27 24 days?). SSB Analyse 2018/14. Available: [https://www.ssb.no/helse/artikler-og-](https://www.ssb.no/helse/artikler-og-publikasjoner/kortere-pasientlister-lengre-arbeidsdager)  
28 25 publikasjoner/kortere-pasientlister-lengre-arbeidsdager (accessed 11 October 2022).  
29 26 49. EY and Vista Analyse. Evaluering av fastlegeordningen 2019 (Evaluation of The Regular General  
30 27 Practitioners Scheme 2019). Available:  
31 28 <https://www.regjeringen.no/no/aktuelt/fastlegeordningen-er-evaluert/id2667485/> (accessed  
32 29 11 October 2022).  
33 30 50. Theie M, Halvard Lind L, Haugland L, et al. Fastlegeordning i krise. Hva siger tallene? (GP scheme  
34 31 in crisis. What do the numbers say?): Oslo: MENON-Publikation, 2018.  
35 32 51. Norwegian Ministry of Health and Care Service. Fremtidens primærhelsetjeneste – nærhet og  
36 33 helhet (The future primary care – proximity and comprehensiveness). Oslo: Norwegian  
37 34 Ministry of Health and Care Services, 2015.  
38 35 52. Rørtveit G. Future primary care in Norway: valid goals without clear strategies. *Scandinavian*  
39 36 *Journal of Primary Health Care* 2015;33(4):221-22.  
40 37 53. Epstein RM. Time, autonomy, and satisfaction. *J Gen Intern Med* 2000;15(7):517-8.  
41 38 54. Tomioka K, Morita N, Saeki K, et al. Working hours, occupational stress and depression among  
42 39 physicians. *Occupational Medicine* 2011;61(3):163-70.  
43 40 55. Ramboll. Spørreskjemaundersøkelse - sykehuslegers arbeidsforhold 2018 (Survey on hospital  
44 41 doctors working conditions 2018). Available:  
45 42 [https://www.dagensmedisin.no/contentassets/b79cfab99ba6437bb3ccf9efa9ad75aa/sporre-](https://www.dagensmedisin.no/contentassets/b79cfab99ba6437bb3ccf9efa9ad75aa/sporre-undersokelse-om-sykehuslegers-arbeidsforhold-2018.pdf)  
46 43 undersokelse-om-sykehuslegers-arbeidsforhold-2018.pdf (accessed 11 October 2022).  
47 44 56. Eschenroeder HC, Manzione LC, Adler-Milstein J, et al. Associations of physician burnout with  
48 45 organizational electronic health record support and after-hours charting. *Journal of the*  
49 46 *American Medical Informatics Association: JAMIA* 2021;28(5):960-66.  
50 47 57. Sinsky C, Colligan L, Li L, et al. Allocation of Physician Time in Ambulatory Practice: A Time and  
51 48 Motion Study in 4 Specialties. *Annals of Internal Medicine* 2016;165(11):753-60.  
52 49 58. Arndt BG, Beasley JW, Watkinson MD, et al. Tethered to the EHR: Primary Care Physician  
53 50 Workload Assessment Using EHR Event Log Data and Time-Motion Observations. *Annals of*  
54 51 *Family Medicine* 2017;15(5):419-26.  
55  
56  
57  
58  
59  
60

- 1  
2  
3 1 59. Malterud K, Aamland A, Fosse A. How can task shifting put patient safety at risk? A qualitative  
4 2 study of experiences among general practitioners in Norway. *Scandinavian Journal of Primary*  
5 3 *Health Care* 2020;38(1):24-32.  
6 4 60. Glette MK, Kringeland T, Røise O, et al. Exploring physicians' decision-making in hospital  
7 5 readmission processes - a comparative case study. *BMC Health Services Research*  
8 6 2018;18(1):725.  
9 7 61. Knutsen Glette M, Kringeland T, Røise O, et al. Hospital physicians' views on discharge and  
10 8 readmission processes: a qualitative study from Norway. *BMJ Open* 2019;9(8):e031297.  
11 9 62. Eggen FW, Steen JI, Gunstad IF. Legebarometeret (The doctor barometer). Oslo:  
12 10 Samfunnsøkonomisk analyse AS, 2021.  
13 11 63. Johannessen K, Hagen T. Variations in labor supply between female and male hospital physicians:  
14 12 Results from a modern welfare state. *Health Policy* 2012;107(1):74-82.  
15 13 64. Leineweber C, Baltzer M, Magnusson Hanson LL, et al. Work-family conflict and health in Swedish  
16 14 working women and men: a 2-year prospective analysis (the SLOSH study). *European Journal*  
17 15 *of Public Health* 2013;23(4):710-6.  
18 16 65. Røhme K, Kjekshus L. Når tiden telles - sykehuslegers tidsbruk og arbeidsoppgaver (When time  
19 17 counts - hospital doctors' time use and tasks). *Tidsskrift for Den norske legeforening*  
20 18 2001;121(12):1458-61.  
21 19 66. Halvorsen P, Edwards A, Aaraas I, et al. What professional activities do general practitioners find  
22 20 most meaningful? Cross sectional survey of Norwegian general practitioners. *BMC Family*  
23 21 *Practice* 2013;Mar 23(14-41)  
24 22 67. Scanlan JN, Still M. Relationships between burnout, turnover intention, job satisfaction, job  
25 23 demands and job resources for mental health personnel in an Australian mental health  
26 24 service. *BMC Health Services Research* 2019;19(1):62-62.  
27 25 68. Pettersson J, Börjesson J. I väntan på AT: en samhällsekonomisk studie, 2019. (Waiting for  
28 26 internship: a socio-economic study, 2019). Available:  
29 27 <https://sif.se/syif/app/uploads/2019/07/i-vantan-pa-at.pdf> (assessed 11 October 2022).  
30 28 69. Birkeli CN, Rosta J, Aasland OG, et al. Why are doctors opting out of general practice? *Tidsskrift*  
31 29 *for Den norske legeforening* 2020;140(5).  
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**Table 1** Sample, number of respondents, response rates and the makeup of job positions for which we have data on gender, working hours and age (<70 years) in 2016 and 2019

	2016	2019
Sample, n	2 195	2 084
Respondents, n	1 604	1 511
Response rate, %	73.1	72.5
Job positions, n (females %)		
All <sup>(a)</sup>	1 481 (53.2)	1 351 (53.5)
Hospital doctors in leading position	84 (27.4)	84 (33.3)
Senior hospital consultants	348 (48.0)	379 (50.9)
Speciality registrars	354 (70.6)	366 (71.9)
General practitioners	271 (42.2)	245 (46.9)
Specialists in private practice	58 (34.5)	56 (35.7)
Doctors in academia	61 (55.7)	68 (50.0)
Community medical officer	54 (55.6)	57 (57.9)
Doctors in administrative position	31 (29.0)	26 (30.8)
Interns in district or hospital <sup>(b)</sup>	167 (71.3)	18 (66.7)
Other job categories	52 (40.4)	52 (32.7)

(a) Number of respondents with no data on working time, or gender or age (or respondents  $\geq 70$  years) were 123 in 2016 and 160 in 2019.

(b) As the number of interns was very low in 2019, these data are not commented in the results section.

1 **Table 2** Distribution of total weekly working hours by doctors working in different job positions in 2016 and 2019

	2016				2019			
	n	%			n	%		
		<37 hours	37-48 hours	>48 hours		<37 hours	37-48 hours	>48 hours
<b>Hospital doctors in leading position</b>								
males	61	1.7	<b>63.9</b>	<b>34.4</b>	56	0.0	<b>42.9 (b)</b>	<b>57.1 (c)</b>
females	23	0.0	<b>82.6</b>	<b>17.4</b>	28	0.0	<b>53.6 (b)</b>	<b>46.4 (c)</b>
<b>Senior hospital consultants</b>								
males	181	<b>6.6*</b>	64.1	<b>29.3*</b>	186	<b>1.1* (a)</b>	65.6	<b>33.3*</b>
females	167	<b>13.2*</b>	68.8	<b>18.0*</b>	193	<b>7.3*</b>	74.6	<b>18.1*</b>
<b>Speciality registrars</b>								
males	104	5.7	76.0	18.3	103	1.0	<b>79.6*</b>	<b>19.4*</b>
females	250	4.8	<b>82.0</b>	<b>13.2</b>	262	1.9	<b>91.2* (b)</b>	<b>6.9* (c)</b>
<b>General practitioners</b>								
males	157	6.4	<b>48.4*</b>	<b>45.2*</b>	130	6.2	<b>36.1 (b)</b>	<b>57.7 (c)</b>
females	115	10.4	<b>61.8*</b>	<b>27.8*</b>	115	11.3	<b>41.7 (b)</b>	<b>47.0 (c)</b>
<b>Specialists in private practice</b>								
males	38	7.9	57.9	34.2	36	5.6	55.5	38.9
females	20	25.0	55.0	20.0	20	15.0	55.0	30.0
<b>Doctors in academia</b>								
males	27	18.5	59.3	22.2	34	8.8	52.9	38.3
females	34	8.8	64.7	26.5	34	2.9	52.9	44.2
<b>Community medical officer</b>								
males	24	20.8	50.0	29.2	24	<b>8.3*</b>	58.3	33.4
females	30	26.7	60.0	13.3	33	<b>30.3*</b>	57.6	12.1
<b>Doctors in administrative position</b>								
males	22	31.8	<b>45.5*</b>	22.7	18	11.1	50.0	38.9
females	9	0.0	<b>88.9*</b>	11.1	8	25.0	62.5	12.5

\* Differences in proportions between male and female doctors significant at the <0.05 level using Pearson's chi-square test.

(a) Changes in proportion of working <37 hours from 2016 to 2018-2019 are significant at the <0.05 level using Pearson's chi-square test.

(b) Changes in proportion of working 37-48 hours from 2016 to 2018-2019 are significant at the <0.05 level Pearson's chi-square test.

(c) Changes in proportion of working >48 hours from 2016 to 2018-2019 are significant at the <0.05 level Pearson's chi-square test.



**Table 3** Linear mixed models with estimated marginal means of total weekly working hours and time spent on direct patient care in hours among doctors working full-time. Separate analyses for gender.

	Males				Females			
	Total weekly working hours		Direct patient care		Total weekly working hours		Direct patient care	
	2016	2019	2016	2019	2016	2019	2016	2019
General practitioners	48.7	50.9 (a)	32.8	33.1	48.3	49.3	33.1	32.0 (a)
Hospital doctors in leading position	48.2	50.6 (a)	16.3 (b)	16.6 (b)	45.8	47.3	13.0 (b)	18.3 (b)
Senior hospital consultants	46.5 (b)	47.8* (b)	20.5 (b)	21.5 (b)	45.4 (b)	45.6* (b)	18.6 (b)	18.9 (b)
Speciality registrars	44.9 (b)	46.6* (b)	17.7 (b)	18.3 (b)	44.4 (b)	43.6* (b)	17.3 (b)	16.6 (b)
Specialists in private practice	47.8	47.3 (b)	33.6	30.8	48.6	44.9 (a) (b)	32.4	30.9
Doctors in academia	44.7 (b)	47.8 (b)	6.8 (b)	7.4 (b)	44.9 (b)	46.7 (b)	5.7 (b)	4.2 (b)
Community medical officer	46.5	50.0	19.3 (b)	19.9 (b)	42.7 (b)	44.5 (b)	16.9 (b)	17.9 (b)
Doctors in administrative position	46.1	47.8 (b)	3.6 (b)	2.6 (b)	42.7 (b)	43.3 (b)	5.4 (b)	3.6 (b)

\* Differences in estimated marginal means between male and female doctors are significant at the <0.05 level

(a) Changes in estimated marginal means from 2016 to 2019 are significant at the <0.05 level.

(b) Differences in estimated marginal means across job positions with GP as reference are significant at the <0.05 level.

**Table 4 Mixed model on proportion of time spent on direct patient care (with fixed gender, age and job position) by doctors in different job positions**

	<b>2016</b> (%)	<b>2019</b> (%)	<b>Mean difference</b>	<b>P-Value</b>
Specialists in private practice	70.4	66.4	-4.0	0.176
General practitioners	68.5	65.8	-2.7	0.050
Senior hospital consultants	43.1	43.5	0.4	0.707
Community medical officer	40.1	38.1	-2.0	0.535
Speciality registrars	40.0	39.8	-0.2	0.909
Hospital doctors in leading position	32.2	34.3	2.1	0.363
Doctors in academia	13.8	11.7	-2.1	0.486
Doctors in administrative position	6.2	5.0	-1.2	0.787

**STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology\***  
**Checklist for cohort, case-control, and cross-sectional studies (combined)**

**"Changes in weekly working hours, proportion of doctors with hours above the limitations of EUs working time directive (EWD) and time spent on direct patient care for doctors in Norway from 2016 to 2019: A study based on repeated surveys"**

**Rosta J, Isaksson Rø K.**

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any pre-specified hypotheses	6
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	6
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	8
Study size	10	Explain how the study size was arrived at	6 and Table 1
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	9
		(b) Describe any methods used to examine subgroups and interactions	9

		(c) Explain how missing data were addressed	9 and Table 1
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	9-10 and Table 1 9-10 and Table 1 N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	9-10 and Table 1 9-10 and Table 1 N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	N/A N/A N/A
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	10-12, Table 2-4 10-12, Table 2 and 4 N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	12-13
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	18-19
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15-18
Generalisability	21	Discuss the generalisability (external validity) of the study results	13-15
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).

# BMJ Open

**Changes in weekly working hours, proportion of doctors with hours above the limitations of EUs working time directive (EWDT) and time spent on direct patient care for doctors in Norway from 2016 to 2019: A study based on repeated surveys**

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## 1 ABSTRACT

2 **Objectives** To compare the total weekly working hours, proportions with work hours above the  
3 limitations of EWDT and time spent on direct patient care in 2016 and 2019 for doctors working in  
4 different job positions in Norway.

5 **Design** Repeated postal surveys in 2016 and 2019.

6 **Setting** Norway.

7 **Participants** Representative samples of doctors; the response rates were 73.1% (1604/2195) in 2016  
8 and 72.5% (1511/2084) in 2019.

9 **Main outcome measures** Self-reported weekly working hours, proportions with hours above the  
10 limitations of EWDT defined as >48h/week, and time spent on direct patient care.

11 **Analyses** Linear mixed models with estimated marginal means and proportions.

12 **Results** From 2016 to 2019, the weekly working hours increased significantly for male GPs (48.7 h to  
13 50.9 h) and male hospital doctors in leading positions (48.2 h to 50.5 h), and significantly decreased  
14 for female specialists in private practice (48.6 h to 44.9 h). The proportion of time spent on direct  
15 patient care was noted to be similar between genders and over time. In 2019, it was higher for  
16 specialists in private practice (66.4%) and GPs (65.5%) than for doctors in other positions, such as  
17 senior hospital consultants (43.5%), speciality registrars (39.8%) and hospital doctors in leading  
18 positions (34.3%). Working >48 h/week increased significantly for both male and female GPs (m:  
19 45.2% to 57.7% f: 27.8% to 47.0%) and hospital doctors in leading positions (m: 34.4% to 57.1%; f:  
20 17.4% to 46.4%), while it significantly decreased for female speciality registrars (13.2% to 6.9%).

21 **Conclusions** Working hours increased significantly for GPs and hospital doctors in leading positions  
22 from 2016 to 2019, resulting in increased proportions of doctors with work hours above the EWDT.  
23 As work hours above the EWDT can be harmful for health personnel and for safety at work, initiatives  
24 to reduce long working weeks are needed.



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3 **1 Strengths and limitations of the study**  
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7 3 The representative cohort with high response rates provided a solid basis for generalisation of the  
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9 4 results to the practising doctors in Norway.  
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13 6 There were similarities in the survey methods and measurements at two points in time.  
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18 8 In terms of limitations, analyses were based on self-reported questionnaire data with the possibility of  
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20 9 both over- and underestimation of working hours.  
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## 1 BACKGROUND

2 Doctors' work hours are vital for the medical profession itself and thereby also for both the quality and  
3 quantity of patient care. Both the number of total work hours and the balance between time spent on  
4 direct patient care vs administrative tasks are related to doctors' and patients' wellbeing and health, in  
5 primary care as well as hospital settings.<sup>1-7</sup> Given this association, the European Union has introduced  
6 a working time directive (EWD) limiting the overall average weekly working hours to 48. This is a  
7 measure "designed to protect the health and safety of workers and to improve health and safety at  
8 work".<sup>8,9</sup> For both treatment outcomes and for doctors' wellbeing, we therefore need longitudinal  
9 studies of total work hours and time spent on direct patient care.

11 Difficulties with recruitment and retainment of general practitioners (GPs) have been reported from  
12 several European countries. Increases in workload and longer work hours are understood as reasons  
13 for this.<sup>10-12</sup> In Norway, GPs have reported a growth in work demands<sup>13</sup> and long working weeks with  
14 a wide variety of tasks.<sup>14</sup> Several GPs explained that high workload affects their own quality of life as  
15 well as the ability to ensure good quality of patient care.<sup>15</sup> Moreover, hospital doctors confirmed an  
16 increasing workplace emphasis on production numbers and budget concerns and less emphasis on  
17 quality of care.<sup>16</sup> In a panel study with data from 2010 to 2017, both GPs and hospital doctors reported  
18 significant decrease of several aspects of job satisfaction like "work hours", "recognition for good  
19 work", "rate of pay" and "freedom to choose methods", suggesting changes in working conditions.<sup>17</sup>  
20 Another panel study with data from 2010 to 2019 documented a significant increase in high levels of  
21 work stress for GPs and showed an increasing trend of stress for hospital doctors.<sup>18</sup> An important  
22 aspect of this was constant time pressure due to a heavy workload.<sup>18</sup>

24 In Norway, the vast majority of doctors work full-time, but part-time work is possible as well. All full-  
25 time employed hospital doctors have a contracted basic working week of 35.5 (for doctors with on-call  
26 duty at the hospital) to 37.5 h, usually with an additional 2.5 h extension. Theoretically, doctors can  
27 choose to terminate this extension, but that is extremely rare in practice. Doctors can extend their  
28 weekly working hours up to 60 h The working pattern is usually day work with on-call duties.<sup>19</sup> In

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3 1 contrast to hospital doctors, private practice specialists and the majority of GPs are self-employed and  
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5 2 have more influence on their own work schedule.<sup>20</sup> However, the introduction of the list-patient  
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7 3 system in 2001 entailed a considerable standardisation of the working conditions of the GPs in which  
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9 4 the main variable is the number of patients on their lists. All inhabitant in Norway can voluntarily sign  
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11 5 in on to the list of a GP of their choice. The list patient system aimed to enhance access to GPs and  
12  
13 6 continuity in the patient–doctor relationship and also affirmed that GPs act as gatekeepers for other  
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15 7 specialist care. GPs’ responsibilities cover all general practitioner tasks for somatic and mental health  
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17 8 for the inhabitants on the list.<sup>21</sup>

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22 10 A good balance between professional and private life is of increasing importance in modern society,<sup>22</sup>  
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24 11 and this holds for doctors as well. Several studies,<sup>23–25</sup> including those from Norway, have documented  
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26 12 that working hours in relation to work–home balance is now one of the most important topics when  
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28 13 medical students and young doctors choose future speciality.<sup>26 27</sup> Among speciality registrars, a  
29  
30 14 tendency is to think about their work as “a job”, compared to senior hospital consultants who tended to  
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32 15 think about work as a “lifestyle”. This implies that there is an ongoing change in the profession  
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34 16 regarding expectations about responsibilities outside of work and having more predictable working  
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36 17 hours.<sup>28</sup> Furthermore, also more senior doctors, for example a group of surgeons in Norway, expressed  
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38 18 concern about work–home balance.<sup>16</sup>

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43 20 The balance between time spent on direct patient care and administrative tasks has been discussed in  
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45 21 several studies. These showed that doctor satisfaction is largely associated with direct patient work  
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47 22 and the delivery of good quality patient care. Therefore, a satisfactory balance is important for the  
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49 23 experience of meaning in work.<sup>16 29 30</sup> From 1994 to 2014 the proportion of work hours doctors spent  
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51 24 on direct patient care was reduced considerably for hospital doctors (61% vs 46%), whereas the drop  
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53 25 was marginal among GPs (73% vs 69%).<sup>1</sup>

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57 27 Although previous studies with data from 1994 to 2016 have documented better work–home balance,  
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59 28 wellbeing and a higher percentage of doctors working within EWDT (between 45 h and 48 h) for

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3 1 doctors in Norway than for their colleagues in several other European countries (between 50 h and 90  
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5 2 h),<sup>1 6 31</sup> Norwegian studies show worrying signs of long work hours, less time for direct patient care  
6  
7 3 and a demanding situation in terms of work–home balance.<sup>13 14 18 32</sup>  
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11 5 Hence, the objectives of this study are to explore and discuss the possible changes in total weekly  
12  
13 6 working hours, relate the number of work hours to the requirements in the EWDT and time spent on  
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15 7 direct patient care for Norwegian doctors working in different job positions (hospital doctors in  
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17 8 leading positions, senior hospital consultants, speciality registrars, general practitioners (GPs), private  
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19 9 practice specialists, doctors in academia, community medical officers and doctors in administration)  
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21 10 from 2016 to 2019.  
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## 26 12 **MATERIAL AND METHODS**

### 28 13 **Design and participants**

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30 14 Since 1994, the Institute for Studies of the Medical Profession (LEFO) has, approximately every  
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32 15 second year, surveyed a representative sample of actively working doctors in Norway with postal  
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34 16 questionnaires about their health, quality of life and working conditions. One of the most central and  
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36 17 repeated measures has been self-reported weekly working hours.  
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41 19 The original panel was based on an invitation to 2,000 active Norwegian doctors, randomly selected in  
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43 20 1993 from the master file of the Norwegian Medical Association, which includes almost all doctors in  
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45 21 Norway. The 1,272 doctors who agreed to participate were representative of the total doctor work  
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47 22 force in terms of age, sex, specialty and job position. The sample represents an unbalanced cohort, as  
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49 23 respondents who leave the panel due to retirement, death or voluntary withdrawal are replaced by  
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51 24 randomly selected younger doctors, while the sample's representative nature is maintained at all  
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53 25 times..<sup>1 31</sup> This article is based on the data collected from the same sample in 2016 and 2019. Both  
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55 26 samples were nearly identical with the exception of n=111 doctors in 2019 that left the panel due to  
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57 27 retirement, death or voluntary withdrawal.  
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## 1 **Ethical approval**

2 All participants signed informed written consent forms before the start of the survey. It was explained  
3 that participation was voluntary and that the data would be handled confidentially. An exemption from  
4 a specific review of the individual surveys from the Regional Committee for Medical Research Ethics  
5 (IRB 0000 1870) was also obtained.

## 7 **Measurements**

8 Dependent variables

9 *Weekly working hours and time spent on direct patient care*

10 The items on working hours were the same in 2016 and 2019. The doctors were asked to specify the  
11 number of total working hours per week. They were then asked to specify the number of hours spent  
12 on various activities in a working week. The questions were worded as follows:

13 *In an average working week, including on-call and any part-time job(s), approximately how many*  
14 *hours do you work?*

15 -Total number of hours per week:

16 *How many hours of your total working time do you spend on*

17 -Patient care (all direct contact with individual patients or their relatives, including phone calls, etc.):

18 - In meetings (interdisciplinary team meetings, patient case meetings, guidance meetings, etc.):

19 -Paper work/PC, phone calls, emailing, data-recording (patient records, certificates, discharge  
20 summaries, other documentation):

21 -Professional updating:

22 -Other – write:

24 *Work hours above the limitations in the European work time directive (EWDT)*

25 It is documented that workers with a work week >48 h have increased health complaints and more  
26 suboptimal work–home balance than workers with fewer working hours.<sup>33 34</sup> Therefore, the EU issued  
27 this directive “designed to protect the health and safety of workers and to improve health and safety at

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3 1 work".<sup>8,9</sup> In this article, we examined the percentage of doctors working above 48 h a week on a  
4  
5 2 regular basis.

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9 4 **Independent Variables**

10 5 *Main job positions* were categorised into the following groups:

11 6 1: Hospital doctors in leading positions (medical superintendent, head of department, chief senior  
12 7 consultant, head of the unit, senior consultant, head of section)

13 8 2: Senior hospital consultants

14 9 3: Speciality registrars

15 10 2: General practitioners (GPs)

16 11 3: Private practice specialists

17 12 4: Doctors in academia (professor, associate professor, research fellow, researcher)

18 13 5: Doctors in administrative positions (county medical officer, medical adviser, chief medical officer)

19 14 6: Community medical officers (district medical officer, senior district medical officer, nursing home  
20 15 medical officer, visiting medical officer, doctor at infant welfare clinic)

21 16 7: Interns in general practice or in hospitals

22 17 8: Other job positions

23 18 Other variables were *gender* and *age*.

24 19

25 20 **Inclusion and exclusion criteria**

26 21 Responses from doctors that provided data on gender, age (<70 years), job positions and all items of  
27 22 the weekly hours questionnaire were included in the study. Doctors  $\geq 70$  year were excluded to  
28 23 maintain the sample's representativity of practising doctors in Norway. The "Statistics on all Members  
29 24 of the Norwegian Medical Association" include doctors under 70 years as it is assumed that the  
30 25 common retirement age is just under 70 years.<sup>35</sup>

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## 1 **Analyses**

2 The analyses were undertaken among doctors in the following job positions: hospital doctors in  
3 leading positions, senior hospital consultants, speciality registrars, GPs, specialists in private practice,  
4 doctors in academia, community medical officers and doctors in administration. First, changes in the  
5 distribution of doctors related to three categories of the total weekly working hours in 2016 and 2019  
6 were described using Pearson's chi square tests: <37 h, 37–48 h and >48 h. Second, the changes in the  
7 total weekly working hours and time spent on direct patient care for doctors working full-time were  
8 described. Full-time work was defined as 37 working hours or more per week.<sup>36</sup> Multivariable linear  
9 mixed models with a subject-specific random intercept were used in the analyses. The estimates of the  
10 means and tests of comparisons are based on statistical models for repeated measurements. The total  
11 working hours was the dependent variable and the job position and age (<50 years of age and ≥50  
12 years of age) were independent variables in the models. Women and men have primarily been  
13 analysed separately. Third, mixed models on the proportion of time spent on direct patient care (with  
14 fixed gender, age and job positions) for doctors in different job positions were described. Units with  
15 missing data were excluded. The data were analysed using IBM Statistical Product and Service  
16 Solution (SPSS) software, version 26.

## 18 **Patient and public involvement**

19 This study is important for patients because healthy doctors take better care of their patients. However,  
20 in this survey, there was no access to direct patient involvement. No patients were involved in setting  
21 the research question or the outcome measures, nor were they involved in the design and  
22 implementation of the study.

## 24 **RESULTS**

### 25 **Respondents**

26 Table 1 presents the sample, respondents, response rates and the range of job positions for doctors for  
27 which we obtained data on gender, age (<70 years) and working hours. The samples in 2016 and 2019  
28 were nearly identical with the exception of n=111 doctors in 2019 that left the panel due to retirement,

1 death or voluntary withdrawal. The response rates were 73.1% in 2016 and 72.5% in 2019. The  
2 number of responses with missing data was  $n = 123$  in 2016 and  $n = 160$  in 2019. The majority of  
3 doctors did fill in both questionnaires  $n=1189$  of 1481 (80%) in 2016 and 1189 of 1351 (88%) in 2019.  
4 The distribution of the doctors and the proportion of females in different job positions was comparable  
5 over the study period. As the number of interns was very low in 2019, these data are not remarked on  
6 in the results section.

#### 7 Table 1

8 In terms of age, gender and job positions, the distributions of our samples in 2016 and 2019 were  
9 comparable to the distributions found in the Statistics on all Members of the Norwegian Association,  
10 which includes 97% of all active doctors in Norway.<sup>17</sup>

### 12 **Full-time, part-time and proportion with work hours above the limitation of EWDT**

#### 13 *Full-time and part-time*

14 Table 2 shows the distribution of total weekly working hours by doctors in 2016 and 2019: <37 h  
15 (part-time), 37–48 h and >48 h (above the limit of EWDT).

16  
17 The majority of doctors worked full-time ( $\geq 37$  h). A minority of female and male doctors worked part-  
18 time but with clear differences across job positions. For example, no female or male doctors in leading  
19 hospital positions worked part-time, whereas 30.3% of the female community medical officers did in  
20 2019. There was a significant reduction in the proportion of part-time work for female senior hospital  
21 consultants from 13.2% in 2016 to 7.3% in 2019. Although not significant, the same tendency was  
22 found among both male hospital consultants and male and female speciality registrars.

23  
24 Compared to males, female senior hospital consultants reported a significantly higher proportion of  
25 part-time in 2016 (6.6% vs 13.2%) and 2019 (1.1% vs 7.3%), as did female community medical  
26 officers in 2019 (8.3% vs 30.3%).



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3 1 *Proportion with hours above the limitations of EWDT (>48 h/week)*

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5 2 The proportion of doctors working >48 h a week increased significantly for male (m) and female (f)  
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7 3 GPs (m: 45.2% to 57.7%; f: 27.8% to 47.0%) and hospital doctors in leading positions (m: 34.4% to  
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9 4 57.1%, f: 17.4% to 46.4%), and working 37–48 h decreased accordingly. On the other hand, female  
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11 5 speciality registrars reported a significant decrease in working >48 h (13.2% to 6.9%) and a resulting  
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13 6 significant increase in working 37–48 h (82.0% to 91.2%). No significant changes were found in other  
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15 7 job positions.  
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20 9 Overall, the proportion of doctors working >48 h/week was higher in male doctors than female, with  
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22 10 significant differences among GPs in 2016 (m: 45.2%; f: 27.8%), senior hospital doctors in 2016 (m:  
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24 11 29.3%; f: 18.0%) and 2019 (m: 33.3%; f: 18.1%), and speciality registrars in 2019 (m: 19.4%; f:  
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26 12 6.9%).  
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31 14 In 2019, male and female GPs (m: 57.7%; f: 47.0%) and hospital doctors in leading positions (m:  
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33 15 57.1%; f: 46.4%) had the highest proportion of >48 h/week, followed by doctors in academia (m: 38.2;  
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35 16 f: 44.1%), private practice specialists (m: 38.9%; f: 30.0%), doctors in an administrative position (m:  
36  
37 17 38.8%; f: 12.5%), senior hospital doctors (m: 33.3%; f: 18.1%), community medical officers (m: 33.3%  
38  
39 18 f: 12.1%) and specialty registrars (m: 19.4%; f: 6.9%).  
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43 20 Table 2

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45 21 **Total weekly working hours in full-time**

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47 22 Table 3 shows the total weekly working hours and hours spent on direct patient care among doctors  
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49 23 working full-time ( $\geq 37$  h). From 2016 to 2019, the total weekly working hours increased significantly  
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51 24 for male GPs (48.7 h to 50.9 h) and hospital doctors in leading positions (48.2 h to 50.5 h), while it  
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53 25 significantly decreased for female specialists in private practice (48.6 h to 44.9 h), and it remained  
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55 26 significantly unchanged for doctors in other job positions.  
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3 1 There were a few significant gender differences. In 2019, males doctors as senior hospital consultants  
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5 2 (m: 47.8 h; f: 45.6 h) and speciality registrars (m: 46.6 h; f: 44.6 h) reported higher weekly working  
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7 3 hours compared with females.  
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10 4  
11 5 Compared to male and female GPs both in 2016 and 2019, most doctors in other job positions reported  
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13 6 significantly fewer total weekly working hours.  
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### 17 8 **Total hours spent on direct patient care**

18 9 There were no gender differences in the hours spent on direct patient care within job positions.  
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20 10 Compared to male and female GPs, doctors in other job positions reported significantly fewer hours  
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22 11 spent in direct patient care, except private practice specialists, both in 2016 and 2019 (Table 3).  
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28 13 Table 3  
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### 31 15 **Proportion of time spent on direct patient care**

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33 16 Table 4 shows the changes in the proportion of time spent on direct patient care among doctors in  
34  
35 17 different job positions working full-time from 2016 to 2019. The figure includes both genders because  
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37 18 there were no significant differences in time spent on direct patient care. There were no significant  
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39 19 changes from 2016 to 2019. Both in 2016 and 2019, specialists in private practice and GPs had the  
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41 20 highest proportion of time spent on direct patient care.  
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47 22 Table 4  
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## 49 23 **DISCUSSION**

### 50 24 **Main findings**

51  
52 25 From 2016 to 2019, the weekly working hours increased significantly for male GPs (48.7 h to 50.9 h)  
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54 26 and male hospital doctors in leading positions (48.2 h to 50.5 h) and significantly decreased for female  
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56 27 specialists in private practice (48.6 h to 44.9 h). The proportion of time spent on direct patient care  
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58 28 was similar between genders and did not change significantly. In 2019, it was higher for specialists in  
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1 private practice (66.4%) and GPs (65.5%) than for doctors in other positions. The proportion of  
2 doctors working >48 h/week increased significantly for both genders among GPs (m: 45.2% to 57.7%  
3 f: 27.8% to 47.0%) and hospital doctors in leading positions (m: 34.4% to 57.1%; f: 17.4% to 46.4%),  
4 while it significantly decreased for female speciality registrars (13.2% to 6.9%). In all job positions,  
5 more male than female doctors reported working >48 h/week.

## 6 7 8 **Comparison with other studies**

### 9 *Weekly working hours*

10 Whereas the present study found an increase in weekly work hours for male GPs and hospital doctors  
11 in leading positions and a decrease for female specialists in private practice, data from the same cohort  
12 for the period of 1994–2014 showed stable total weekly working hours for most doctors working full-  
13 time.<sup>1 31</sup> Both female and male GPs were among those with highest total working hours.

14  
15 Other studies also suggest an increase in working hours for GPs in Norway. The “Commonwealth  
16 Fund” surveys of GPs in 10 countries in 2009<sup>37</sup> and in 11 countries in 2019<sup>38</sup> showed that GPs in  
17 Norway have the highest increase (40 h to 49 h), followed by GPs in Netherlands (44 h to 50 h),  
18 Canada (42 h to 49 h), US (47 h to 51 h), France (49 h to 51 h) and Germany (51 h to 52 h). The  
19 weekly working hours for GPs remained unchanged in Sweden (38 h), while it decreased in Great  
20 Britain (41 h to 40 h), Australia (42 h to 38 h) and New Zealand (42 h to 38 h).<sup>38</sup> A cross-sectional  
21 survey among GPs in Norway in 2018 documented long working weeks (55.6 h).<sup>14</sup> In Germany in  
22 2018, GPs reported longer working weeks than specialists in private practice (52.3 h vs. 50.1 h).<sup>39</sup>

23  
24 In comparison with our data from 2016 and 2019, doctors in other countries seem to have longer  
25 weekly working hours. In the “Work-Life Profiles of Today’s Physician 2014” by AMA Insurance in  
26 the US, 5% of doctors reported an average working week of >80 h, while 18% of doctors worked 61–  
27 80 h and 62% of doctors worked 40–60 h.<sup>40</sup> A study among specialists and senior doctors in German  
28 urology in 2016 showed that approximately 80% of the doctors had average weekly workhours beyond

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2  
3 1 50 h.<sup>41</sup> Another study among hospital doctors in Germany in 2019 documented long working weeks:  
4  
5 2 22% of them worked 60–80 h a week, 41% worked 49–59 h and 36% worked less than 49 h. An  
6  
7 3 average working week for full-time hospital doctors amounted to 57 h.<sup>42</sup> A survey among hospital  
8  
9 4 doctors in Austria from 2019 documented an average working week of 47 h, while hospital doctors in  
10  
11 5 leading positions had longer hours (51 h) than doctors in postgraduate training (49 h).<sup>43</sup>  
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16 7 *Proportion of doctors with work hours above the limitations of EWDT (>48 h/week) and part-time*  
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18 8 *work (<37 h/week)*

19  
20 9 The proportion of doctors who reported working >48 h/week (higher than the limitations in EWDT)  
21  
22 10 was high among all job positions, with an increasing trend for GPs and hospital doctors in leading  
23  
24 11 positions and a decreasing trend for speciality registrars. This is clearly higher than in most other  
25  
26 12 professional groups in Norway. For example, in a national survey in 2019, a total of 5% of all  
27  
28 13 employees as a whole worked more than 48 h per week,<sup>44</sup> whereas in our sample it varied between  
29  
30 14 18.7% for speciality registrars and 52.8% for GPs in 2019 (Table 2). Compared to our data among  
31  
32 15 hospital doctors in leading positions, senior hospital consultants and speciality registrars in 2019, the  
33  
34 16 proportion of doctors with a working week above 48 h was higher among German hospital doctors in  
35  
36 17 leading positions (76%), senior hospital consultants (43%), speciality registrars (71%) in 2019,<sup>42</sup> and  
37  
38 18 Hungarian hospital doctors (58%) in 2020.<sup>45</sup> A working week above 50 h was reported by 48% of  
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40 19 family doctors and 39% of specialists in private practice in Germany in 2018.<sup>39</sup>  
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45 21 As in other countries, a minority of the Norwegian doctors work part-time. Contrary to our  
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47 22 expectations, the present study documented a trend towards less part-time work in 2019. Especially  
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49 23 among speciality registrars, who are most likely to have small children, this was surprising (Table 2).  
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51 24 This contradicts previous national studies in Norway based on data from the same unbalanced cohort  
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53 25 of 1994–2014, which showed a trend towards more part-time work (<37 h/week) for speciality  
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55 26 registrars and senior hospital consultants (6.3% to 10.0%), specialists in private practice (14.8% to  
56  
57 27 25%) and doctors in academia (3.9% to 12.5%),<sup>31</sup>  
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3 1 Compared to doctors in our data from 2016 to 2019, the proportion of part-timers was higher among  
4  
5 2 populations with academics in Norway, but academics in general also showed a decreasing trend both  
6  
7 3 for males (11.3% to 10.0%) and females (26.3% to 24.1%).<sup>46</sup> In contrast, hospital doctors in Germany  
8  
9 4 showed an increase in part-time work (<40 h/week) from 15% in 2013 to 26% in 2019.<sup>42</sup> Furthermore,  
10  
11 5 14% of US doctors in 2014<sup>40</sup> and 21% of family doctors and 26% of specialists in private practice in  
12  
13 6 Germany worked <40 h a week in 2018.<sup>39</sup>  
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### 17 8 *Time spent on direct patient care*

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19 9 A previous study with the same unbalanced cohort data from 1994 to 2014 documented a considerable  
20  
21 10 reduction in time spent on direct patient care for senior hospital consultants and speciality registrars  
22  
23 11 (61% to 46%) and a marginal drop for GPs (73% to 69%) and specialists in private practice (75% to  
24  
25 12 72%).<sup>1</sup> This trend has not continued, as we do not find significant differences from 2016 to 2019  
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27 13 (Table 4).  
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### 32 15 **Explanations of the results**

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34 16 Healthcare organisations are constantly subject to change in most Western countries. The relationship  
35  
36 17 between health care reforms and working conditions for doctors is complex, but several studies have  
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38 18 documented an increase in out-of-hospital care and pressure on GPs after the so-called "Co-ordination  
39  
40 19 reform" implemented in 2012<sup>47</sup>. The reform has been criticized for leading to: increase in  
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42 20 consultations, ordering laboratory services for appointment specialists, increase in tasks related to  
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44 21 preventive treatment, more follow-up care of pregnant women or patients with chronic diseases.<sup>13</sup>  
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46 22 Other reports confirmed this increased work pressure due to increase in consultations<sup>48</sup> and  
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48 23 documentation<sup>49</sup> and for more complex and time-consuming consultations<sup>50</sup> for GPs. The evaluative  
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50 24 study of "The Regular General Practitioners Scheme" from 2019 confirmed a significant rise in  
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52 25 workloads for GPs, which was related to increase in both new tasks and the volume of established  
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54 26 tasks.<sup>49</sup>  
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28 A majority of GPs (86%) reported that they "completely disagree" that regular working hours were

1 sufficient to carry out this increase in work tasks<sup>13</sup> It is therefore likely that the increase this study  
2 documents in weekly working hours and time spent on patient care for GPs is related to this and the  
3 following reform of 2015 called “The Future Primary Care – Proximity and Comprehensiveness  
4 Reform”<sup>51 52</sup> which additionally emphasized decentralised services close to where patients live to  
5 reduce costs, increasing the GPs responsibility. Before 2014 GPs reported high, but stable total weekly  
6 working hours of 48 hrs from 1994-2014.<sup>1 31</sup>

7  
8 Long working hours is one of the important contributors to work stress and reduced job satisfaction.<sup>53</sup>  
9 <sup>54</sup> Panel studies in Norway documented a significant decrease in several aspects of job satisfaction for  
10 GPs and hospital doctors from 2010 to 2017 and a significant increase of work stress for GPs as well  
11 as increasing work stress for hospital doctors from 2010 to 2019. One of the important aspects of this  
12 was time pressure arising from a heavy workload.<sup>17 18</sup> Another study among hospital doctors  
13 documented workload related to increasing workplace emphasis on production numbers and budget  
14 concerns.<sup>16</sup> In a survey of hospital doctors’ working conditions in 2018, hospital doctors assigned high  
15 scores to items related to engagement at work, assessment of work as meaningful and co-operation  
16 with colleagues but scored items related to workload and professional autonomy lower.<sup>55</sup>

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18 In the last few years, there have been worries about maintaining high-quality patient care. The  
19 introduction and use of electronic patient registration systems in several Western countries is  
20 described as taking a substantial amount of time from clinical tasks and increasing the risk of work  
21 stress and burnout for doctors.<sup>42 56-58</sup> A study among GPs in 2018 showed the potential negative effects  
22 of task shifting from hospital care specialists and other specialists to GPs on patient safety, such as the  
23 hazardous delay of necessary examinations or insufficient treatment due to lack of resources or risk of  
24 malpractice.<sup>59</sup> Other studies showed that inadequate communication between hospitals and primary  
25 care as well as competence problems in primary care can lead to inadequate patient care and frequent  
26 readmissions to hospitals for an increasing number of medically complex patients.<sup>60 61</sup> Several GPs in  
27 Norway explained that high workload affects their own quality of life as well as the ability to ensure

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2  
3 1 good quality of patient care.<sup>49</sup> A recent report shows that a part of the population do not have access to  
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5 2 an allocated GP at present and that this will grow into a much larger problem in the years to come.<sup>62</sup>  
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9 4 These findings fit well with our data from 2010 to 2019, where doctors in several job positions  
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11 5 reported long working weeks, with a significant increasing trend for male GPs and hospital doctors in  
12  
13 6 leading positions. Working above 48 h/week (above the EWDT) increased significantly – for both  
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15 7 genders to about half of the GPs and of hospital doctors in leading positions in 2019. (Table 2).  
16  
17 8 Interestingly, in 2019, both female (6.9%) and male (19.4%) speciality registrars, compared to other  
18  
19 9 job positions, had the lowest proportion of a members working over 48 h/week. This may be due to  
20  
21 10 ongoing societal changes called “downshifting”, implying that people choose to prioritise other  
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23 11 qualities in life by forgoing a higher income in exchange for a life with lower stress and more free  
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25 12 time.<sup>22</sup> Many hospital doctors – particularly female doctors – try to reduce their working hours by  
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27 13 choosing family-friendly specialities with less on-call or shift duties.<sup>26 63</sup> This indicates an ongoing  
28  
29 14 change in the profession regarding expectations about responsibilities outside of work hours and  
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31 15 having more predictable working hours.<sup>28</sup> Lesser work hours (promoting better work–home balance)  
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33 16 seems to be an important predictor for the choice of future speciality among medical students and  
34  
35 17 young doctors.<sup>23</sup> However, the tendency to choose less part-time work, including among speciality  
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37 18 registrars,<sup>26 27</sup> points in the opposite direction. Obligations to finish speciality training and temporary  
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39 19 work contracts among young doctors make it difficult to work part-time. Reduction of long work  
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41 20 hours and increased possibility for part-time work can be one aspect of reducing work–home conflict  
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43 21 and thus increasing doctors’ wellbeing and patient safety.<sup>6 7 64</sup>  
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49 23 Studies have also demonstrated that delivering high quality patient care and increasing the time spent  
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51 24 on direct patient care result in more satisfied patients and doctors<sup>16 29 30</sup> and that doctors themselves  
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53 25 would like to spend more of their time on this work.<sup>65 66</sup> In the present study period between 2016 and  
54  
55 26 2019, the time spent on direct patient care did not change. However, in our cohort of Norwegian  
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57 27 doctors, it fell from 1994 to 2014<sup>1</sup> and even further by 2019 in the present study, for instance, for GPs  
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59 28 (73%, 69%, 66%)and for senior hospital doctors and speciality registrars (62%, 44%, 42%). Long  
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3 1 working weeks and a decreasing trend in time spent on direct patient care suggest an increasing need  
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5 2 for devotion of time to tasks like documenting, reporting and encoding in the health sector.  
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7 3 Considering all of these points, it is not only enough to measure the number of hours worked (the  
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9 4 quantity) but also important to study the content of the work (the quality).  
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## 13 6 **Strengths and limitations**

15 7 The study's main strength is the representative cohort that provides a solid basis for generalisation of  
16  
17 8 the results to practising doctors in Norway. The same cohort was followed up with over time. There  
18  
19 9 were similarities in survey methods and key items on working hours at both points in time. The  
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21 10 response rates were fairly good: 73.1% in 2016 and 72.5% in 2019. They were higher than in some  
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23 11 similar studies but do not rule out the possibility of a non-response bias.<sup>31</sup> Analyses were based on  
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25 12 self-reported questionnaire data with the possibility of both over- and underestimation of the working  
26  
27 13 hours. However, as the majority of doctors answered at both points in time (80% in 2016 and 88% in  
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29 14 2019 - see Respondents), the changes in work hours documented in the study should be reliable.  
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33 16 The doctors' self-reporting of hours spent on their various workday components may, of course, be  
34  
35 17 inaccurate. The level of working hour accuracy can probably be improved, but there has been built-in  
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37 18 quality control throughout, as each individual doctor had been asked to add up their own working hour  
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39 19 components to arrive at a total number of hours worked per week.  
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43 21 A previous study documented variations in the interpretation of the concept of "direct patient care"  
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45 22 among doctors from different job positions.<sup>1</sup> To a greater degree than others, GPs and specialists  
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47 23 working in private practice referred to "only face-to-face contact with patients" when talking about  
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49 24 patient care, while more doctors working in administration or management included "all work directly  
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51 25 related to individual patients, including work on patient records, telephone calls and meetings" and  
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53 26 "other". However, the majority responded either "only face-to-face contact with patients" (47%) or  
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55 27 "all direct contact with individual patients, including phone calls, emailing, etc." (24%), which reflects  
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57 28 our questionnaire's definition of direct patient care.<sup>1</sup> In addition, since the same doctors were polled on  
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3 1 each occasion largely, the reliability of changes over time in the data increases significantly and could  
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5 2 be assessed as repeated measurements. Unfortunately, data on other and more specific variables  
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7 3 for doctors in different job positions that may have an effect on time spent, such as staffing levels,  
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9 4 distribution of tasks and workday organisation, were not included.  
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## 13 6 **Policy implications**

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15 7 Variations in distribution of work time, proportion of doctors working >48 h/week and time spent on  
16  
17 8 direct patient care across job positions call for more comparative analyses in the future. Several  
18  
19 9 doctors reported reduced time spent on direct patient care. It is impossible to determine what  
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21 10 constitutes the optimal proportion of time spent on direct patient care. However, more time spent in  
22  
23 11 patient care is a quality indicator. It results in more satisfied doctors and patients.<sup>29</sup> Good patient care  
24  
25 12 depends on individual and organisational factors, including quality improvement and evaluation.  
26  
27 13 Reducing the proportion of doctors working >48 h/week among Norwegian doctors is important and  
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29 14 has been found to improve both doctors' health and quality of patient care.<sup>67 64</sup> The possibility to adapt  
30  
31 15 the number of work hours to other life commitments (including the possibility of working part-time) is  
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33 16 important to maintain a good balance between professional and private life. This balance is an  
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35 17 important factor for career decisions, such as staying in or leaving job positions.<sup>67 68</sup> Specific attention  
36  
37 18 should be paid to male and female GPs. Low recruitment to primary care is a concurrent issue in  
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39 19 Norway.<sup>50 69</sup> Improving the working conditions of doctors and ensuring optimal working hours may  
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41 20 cause more doctors to choose or to remain in general practice.  
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## 61 22 **Conclusion**

62 23 Compared to the stipulated work hours in Norway, doctors of both genders work long hours, and  
63 24 length has increased significantly for male GPs and hospital doctors in leading positions from 2016 to  
64 25 2019. The proportion of time spent on direct patient care fell for some job positions over time. GPs  
65 26 and specialists in private practice spent about two-thirds of their time on direct patient care, while  
66 27 hospital doctors spend less than half of their time on it. In 2019, of the proportion of doctors with work  
67 28 hours above the limitations in EWDT was highest among GPs and hospital doctors in leading

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- 1 positions of both genders and lowest among speciality registrars. Since a long working week affects
- 2 both the doctors' own well-being and the quality of patient care, regular assessments of working hours
- 3 followed by analyses and appropriate actions are useful interventions.

For peer review only

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2  
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4

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7  
8  
9 4

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13 the accuracy of the data analysis.  
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16 9  
17  
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20  
21 12

22  
23 13 **Competing interest** None declared.  
24  
25 14

26 15 **Ethics approval** According to the Regional Committee for Medical Research Ethics, the study based  
27 on 'Norwegian Physician Survey - A biennial prospective questionnaire survey of a representative  
28 sample of Norwegian physicians' is exempt from review in Norway, cf. §§ 4 of The Act. The project  
29 can be implemented without the approval by the Regional Committee for Medical Research Ethics  
30 (IRB 0000 1870). In addition, approval for data protection of the biennial prospective survey among  
31 Norwegian doctors was obtained from the Norwegian Social Science Data Service (Reference 19521).  
32  
33 21

34 22 **Data sharing statement** The authors may be able to provide aggregated data on which the analysis is  
35 based, on request. No additional data are available.  
36  
37 24

38  
39 25 **Patient consent** N/A  
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41 26

42  
43 27 **STROBE Statement:** The authors confirm that they have followed the list of the STROBE Statement  
44 (BMJ 2007;335:806–808).  
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48 30 **Transparency declaration:** The lead author (JR) affirms that the manuscript is an honest, accurate  
49 and transparent account of the study being reported; that no important aspects of the study have been  
50 omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been  
51 explained.  
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## 1 References

1. Rosta J, Aasland OG. Doctors' working hours and time spent on patient care in the period 1994 - 2014. *Tidsskrift for Den norske legeforsening* 2016;136(16):1355-9.
2. Angerer P, Weigl M. Physicians' psychosocial work conditions and quality of care: A literature review. *Professions and Professionalism* 2015;5(1):1-20.
3. Rathert C, Williams ES, Linhart H. Evidence for the Quadruple Aim: A Systematic Review of the Literature on Physician Burnout and Patient Outcomes. *Med Care* 2018;56(12):976-84.
4. Mangory KY, Ali LY, Isaksson Rø K, et al. Effect of burnout among physicians on observed adverse patient outcomes: a literature review. *Health Services Research* 2021;21(1):369.
5. Isaksson Rø K, Rosta J, Tyssen R, et al. Doctors Well-being, Quality of Patient Care and Organizational Change: Norwegian Experiences. In: Montgomery A, van der Doef M, Panagopoulou E, et al., eds. *Connecting Healthcare Worker Well-Being, Patient Safety and Organisational Change: The Triple Challenge*. Cham: Springer International Publishing 2020:91-114.
6. Rosta J, Aasland OG. Work hours and self rated health of hospital doctors in Norway and Germany. A comparative study on national samples. *BMC Health Services Research* 2011;11:40.
7. Rosta J, Gerber A. Excessive working hours and health complaints among hospital physicians: a study based on a national sample of hospital physicians in Germany. *German Medical Science* 2007;5DOC09.
8. Maybury C. The European Working Time Directive: a decade on. *Lancet* 2014;384(9954):1562-3.
9. Rodriguez-Jareño MC, Demou E, Vargas-Prada S, et al. European Working Time Directive and doctors' health: a systematic review of the available epidemiological evidence. *BMJ Open* 2014;4(7):e004916.
10. Pedersen Fischer A, Busk Nørøxe K, Bro F, et al. Alment praktiserende lægers psykiske arbejdsmiljø og jobtilfredshed 2016 (General Practitioners' psychological work environment and job satisfaction 2016). Aarhus: Research Unit for General Practice, 2016.
11. Owen K, Hopkins T, Shortland T, et al. GP retention in the UK: a worsening crisis. Findings from a cross-sectional survey. *BMJ Open* 2019;9(2):e026048.
12. Zhou AY, Panagioti M, Galletta-Williams H, et al. Burnout in Primary Care Workforce. In: Montgomery A, van der Doef M, Panagopoulou E, et al., eds. *Connecting Healthcare Worker Well-Being, Patient Safety and Organisational Change: The Triple Challenge*. Cham: Springer International Publishing 2020:59-72.
13. Johnsen TM, Berge V, Høivik F, et al. Trønderopprørets fastlegeundersøkelse og helsemedarbeiderundersøkelse 2018 (Trønderopprør's investigation of regular GPs and co-workers 2018). Available: <http://www.flo20.no/wp-content/uploads/2018/06/TOundersøkelse-2.pdf> (accessed 11 October 2022).
14. Morken T, Rebnord IK, Maartmann-Moe K, et al. Workload in Norwegian general practice 2018 - an observational study. *BMC Health Services Research* 2019;19(1):434-34.
15. Ey & Vista Analyse. Evaluering av fastlegeordningen 2019 (Evaluation of the GP scheme 2019). Available: <https://www.regjeringen.no/contentassets/7cd212bf5f0642c1a5d0d480f0923e6d/evaluerin-g-av-fastlegeordningen---sluttrapport-fra-ey-og-vista-analyse.pdf> (accessed 11 October 2022).
16. Baathe F, Rosta J, Bringedal B, et al. How do doctors experience the interactions among professional fulfilment, organisational factors and quality of patient care? A qualitative study in a Norwegian hospital. *BMJ Open* 2019;9(5):e02
17. Rosta J, Aasland OG, Nylenna M. Changes in job satisfaction among doctors in Norway from 2010 to 2017: a study based on repeated surveys. *BMJ Open* 2019;9(9):e027891.
18. Rosta J, Båathe F, Aasland OG, et al. Changes in work stress among doctors in Norway from 2010 to 2019: a study based on repeated surveys. *BMJ Open* 2020;10(10):e037474.

19. Schroder-Aasen T. Arbeidstid (Working time), 2016. Available: <https://yngreleger.no/artikkel/arbeidstid> (accessed 11 October 2022).
20. Aasland OG, Rosta J. Fastlegenes arbeidstid 2000-08 (The working hours of general practitioners 2000-2008). *Tidsskrift for Den norske legeforening* 2011;131(11):1076-80.
21. Lovdata. Forskrift om fastlegeordning i kommunene 2021 (Regulations on GP arrangements in the municipalities 2021). Available: <https://lovdata.no/dokument/SF/forskrift/2012-08-29-842> (accessed 11 October 2022).
22. Hamilton C. Downshifting in Britain A sea-change in the pursuit of happiness, 2003. Available: <http://www.tai.org.au/documents/downloads/DP58.pdf> (accessed 20 October 2021).
23. Diderichsen S. It's just a job: a new generation of physicians dealing with career and work ideals. Doctoral thesis. Umeå University, 2017.
24. Dyrbye LN, Freischlag J, Kaups KL, et al. Work-home conflicts have a substantial impact on career decisions that affect the adequacy of the surgical workforce. *Arch Surg* 2012;147(10):933-9.
25. Treister-Goltzman Y, Peleg R. Female Physicians and the Work-Family Conflict. *The Israel Medical Association Journal: IMAJ* 2016;18(5):261-6.
26. Johannessen K, Hagen T. Individual and hospital-specific factors influencing medical graduates' time to medical specialization. *Social Science and Medicine* 2013;97:170-75.
27. Fimland SK, Kjenås AS, Isaksson Rø K, et al. Medical students' attitudes and expectations for future working conditions. *Tidsskrift for Den norske legeforening* 2019;139(17):1660-64.
28. Hertzberg T, Tyssen R, Skirbekk H, et al. Work-home balance in two cohorts of Norwegian doctors. *Tidsskrift for Den norske legeforening* 2019;139(19):915-20.
29. Bovier P, Perneger T. Predictors of work satisfaction among physicians. *European Journal of Public Health* 2003;13(4):299-305.
30. Friedberg M, Chen P, Van Busum K, et al. Factors Affecting Physician Professional Satisfaction and Their Implications for Patient Care, Health Systems, and Health Policy Santa Monica: RAND Corporation, 2013.
31. Rosta J, Aasland OG. Weekly working hours for Norwegian hospital doctors since 1994 with special attention to postgraduate training, work-home balance and the European Working Time Directive: a panel study. *BMJ Open* 2014;4(10).
32. Rosta J, Isaksson Rø K. Overlegenes arbeidsforhold og helse i perioden 2010-2019 (The senior doctors' working conditions and health in the period 2010-2019). *Overlegen* 2021(1):21-24.
33. Messenger J, Group. WC. Working time and the future of work 2018. Available: [https://www.ilo.org/global/topics/future-of-work/publications/research-papers/WCMS\\_649907/lang--en/index.htm](https://www.ilo.org/global/topics/future-of-work/publications/research-papers/WCMS_649907/lang--en/index.htm) (accessed 11 October 2022).
34. Eurofund. 6th European Working Condition Survey 2015. Available: <https://www.eurofound.europa.eu/surveys/european-working-conditions-surveys/sixth-european-working-conditions-survey-2015> (accessed 13 March 2023).
35. DNLF. Yrkesaktive leger under 70 år – 2018 (Practicing doctors in Norway <70 years – 2018). Available: <https://www.legeforeningen.no/om-oss/legestatistikk/yrkesaktive-leger-i-norge/> (accessed 11 March 2023).
36. Bø T, Håland I. Sysselsatte med ekstra lange arbeidsuker (Employees with extra long working weeks). *Økonomiske analyser* 2012;5:13-15.
37. Holmboe O, Bjertnæs ØA, Bukholm G, et al. Commonwealth Fund-undersøkelsen i 2009 blant allmennleger: Resultater fra en komparativ undersøkelse i 11 land. (Commonwealth Fund survey in 2009 among primary care physicians: results from a comparative survey in 11 countries). Oslo: Nasjonalt kunnskapssenter for helsetjenesten, 2009.
38. Skudal KE, Holmboe O, Bjertnæs ØA, et al. Commonwealth Fund-undersøkelsen blant allmennleger i elleve land i 2019 (Commonwealth Fund survey of general practitioners in eleven countries in 2019). Oslo: FHI, 2019.
39. INFAS. Ärztemonitor 2018: Ergebnisse für Haus- und Fachärzte (Survey on doctors: GPs and specialits 2018). Available:

- 1  
2  
3 1 [https://www.kbv.de/media/sp/infas\\_TabBand\\_AerzteMonitor2018\\_Aerzte\\_20180615.pdf](https://www.kbv.de/media/sp/infas_TabBand_AerzteMonitor2018_Aerzte_20180615.pdf)  
4 2 (accessed 11 October 2022).  
5 3  
6 40. AMA Staff News Writer. How many hours are in the average physician workweek? 6 January  
7 4 2015. Available: [https://www.ama-assn.org/practice-management/physician-health/how-](https://www.ama-assn.org/practice-management/physician-health/how-many-hours-are-average-physician-workweek)  
8 5 many-hours-are-average-physician-workweek (accessed 11 October 2022).  
9 6  
10 7 41. Struck JP, Stahl L, Braun M, et al. The working time load of specialists and senior physicians in  
11 8 German urology - a critical assessment. *Der Urologe* 2019;58(8):918-23.  
12 9  
13 42. IQME. Ergebnisbericht der Mitgliederbefragung 2019 (Report of member survey 2019). Available:  
14 10 [https://www.marburger-bund.de/sites/default/files/files/2020-01/Gesamtauswertung%20-](https://www.marburger-bund.de/sites/default/files/files/2020-01/Gesamtauswertung%20-%20MB-Monitor%202019-presse.pdf)  
15 11 %20MB-Monitor%202019-presse.pdf (accessed 11 October 2022).  
16 12  
17 43. IMAS. Österreichische Spitalärztebefragung 2019 (Austrian hospital physician survey 2019). PK-  
18 13 Unterlage: Wien.  
19 14  
20 44. STAMI-Rapport. Faktabbok om arbeidsmiljø helse (Factbook on working environment and  
21 15 health). Oslo: Statens arbeidsmiljøinstitutt, 2021.  
22 16  
23 45. Chamber H-HM. The medical community sticks together and does not accept the circumvention  
24 17 of the profession 2020. [https://mok.hu/hirek/mokhirek/az-orvostarsadalom-osszetart-es-](https://mok.hu/hirek/mokhirek/az-orvostarsadalom-osszetart-es-nem-fogadja-el-a-szakma-megkeruleset)  
25 18 nem-fogadja-el-a-szakma-megkeruleset (accessed 11 October 2022).  
26 19  
27 46. SSB. Arbeidskraftundersøkelsen (The labor force survey), 2021. Available:  
28 20 <https://www.ssb.no/statbank/table/09790/tableViewLayout1/> (accessed 11 October 2022).  
29 21  
30 47. Norwegian Ministry of Health and Care Service. The Coordination Reform. Available:  
31 22 [https://www.regjeringen.no/contentassets/d4f0e16ad32e4bbd8d8ab5c21445a5dc/en-](https://www.regjeringen.no/contentassets/d4f0e16ad32e4bbd8d8ab5c21445a5dc/en-gb/pdfs/stm200820090047000en_pdfs.pdf)  
32 23 gb/pdfs/stm200820090047000en\_pdfs.pdf (accessed 11 October 2022).  
33 24  
34 48. Texmon I. Kortere pasientlister, lengre arbeidsdager? (Shorter patient lists, longer working  
35 25 days?). SSB Analyse 2018/14. Available: [https://www.ssb.no/helse/artikler-og-](https://www.ssb.no/helse/artikler-og-publikasjoner/kortere-pasientlister-lengre-arbeidsdager)  
36 26 publikasjoner/kortere-pasientlister-lengre-arbeidsdager (accessed 11 October 2022).  
37 27  
38 49. EY and Vista Analyse. Evaluering av fastlegeordningen 2019 (Evaluation of The Regular General  
39 28 Practitioners Scheme 2019). Available:  
40 29 <https://www.regjeringen.no/no/aktuelt/fastlegeordningen-er-evaluert/id2667485/> (accessed  
41 30 11 October 2022).  
42 31  
43 50. Theie M, Halvard Lind L, Haugland L, et al. Fastlegeordning i krise. Hva siger tallene? (GP scheme  
44 32 in crisis. What do the numbers say?): Oslo: MENON-Publikation, 2018.  
45 33  
46 51. Norwegian Ministry of Health and Care Service. Fremtidens primærhelsetjeneste – nærhet og  
47 34 helhet (The future primary care – proximity and comprehensiveness). Oslo: Norwegian  
48 35 Ministry of Health and Care Services, 2015.  
49 36  
50 52. Rørtveit G. Future primary care in Norway: valid goals without clear strategies. *Scandinavian*  
51 37 *Journal of Primary Health Care* 2015;33(4):221-22.  
52 38  
53 53. Epstein RM. Time, autonomy, and satisfaction. *J Gen Intern Med* 2000;15(7):517-8.  
54 39  
55 54. Tomioka K, Morita N, Saeki K, et al. Working hours, occupational stress and depression among  
56 40 physicians. *Occupational Medicine* 2011;61(3):163-70.  
57 41  
58 55. Ramboll. Spørreskjemaundersøkelse - sykehuslegers arbeidsforhold 2018 (Survey on hospital  
59 42 doctors working conditions 2018). Available:  
60 43 [https://www.dagensmedisin.no/contentassets/b79cfab99ba6437bb3ccf9efa9ad75aa/sporre-](https://www.dagensmedisin.no/contentassets/b79cfab99ba6437bb3ccf9efa9ad75aa/sporre-undersokelse-om-sykehuslegers-arbeidsforhold-2018.pdf)  
undersokelse-om-sykehuslegers-arbeidsforhold-2018.pdf (accessed 11 October 2022).  
56 44  
57 56. Eschenroeder HC, Manzione LC, Adler-Milstein J, et al. Associations of physician burnout with  
58 45 organizational electronic health record support and after-hours charting. *Journal of the*  
59 46 *American Medical Informatics Association: JAMIA* 2021;28(5):960-66.  
60 47  
57 48 57. Sinsky C, Colligan L, Li L, et al. Allocation of Physician Time in Ambulatory Practice: A Time and  
58 49 Motion Study in 4 Specialties. *Annals of Internal Medicine* 2016;165(11):753-60.  
59 50  
60 58. Arndt BG, Beasley JW, Watkinson MD, et al. Tethered to the EHR: Primary Care Physician  
Workload Assessment Using EHR Event Log Data and Time-Motion Observations. *Annals of*  
*Family Medicine* 2017;15(5):419-26.

- 1  
2  
3 1 59. Malterud K, Aamlund A, Fosse A. How can task shifting put patient safety at risk? A qualitative  
4 2 study of experiences among general practitioners in Norway. *Scandinavian Journal of Primary*  
5 3 *Health Care* 2020;38(1):24-32.  
6 4 60. Glette MK, Kringeland T, Røise O, et al. Exploring physicians' decision-making in hospital  
7 5 readmission processes - a comparative case study. *BMC Health Services Research*  
8 6 2018;18(1):725.  
9 7 61. Knutsen Glette M, Kringeland T, Røise O, et al. Hospital physicians' views on discharge and  
10 8 readmission processes: a qualitative study from Norway. *BMJ Open* 2019;9(8):e031297.  
11 9 62. Eggen FW, Steen JI, Gunstad IF. Legebarometeret (The doctor barometer). Oslo:  
12 10 Samfunnsøkonomisk analyse AS, 2021.  
13 11 63. Johannessen K, Hagen T. Variations in labor supply between female and male hospital physicians:  
14 12 Results from a modern welfare state. *Health Policy* 2012;107(1):74-82.  
15 13 64. Leineweber C, Baltzer M, Magnusson Hanson LL, et al. Work-family conflict and health in Swedish  
16 14 working women and men: a 2-year prospective analysis (the SLOSH study). *European Journal*  
17 15 *of Public Health* 2013;23(4):710-6.  
18 16 65. Røhme K, Kjekshus L. Når tiden telles - sykehuslegers tidsbruk og arbeidsoppgaver (When time  
19 17 counts - hospital doctors' time use and tasks). *Tidsskrift for Den norske legeforening*  
20 18 2001;121(12):1458-61.  
21 19 66. Halvorsen P, Edwards A, Aaraas I, et al. What professional activities do general practitioners find  
22 20 most meaningful? Cross sectional survey of Norwegian general practitioners. *BMC Family*  
23 21 *Practice* 2013;Mar 23(14-41)  
24 22 67. Scanlan JN, Still M. Relationships between burnout, turnover intention, job satisfaction, job  
25 23 demands and job resources for mental health personnel in an Australian mental health  
26 24 service. *BMC Health Services Research* 2019;19(1):62-62.  
27 25 68. Pettersson J, Börjesson J. I väntan på AT: en samhällsekonomisk studie, 2019. (Waiting for  
28 26 internship: a socio-economic study, 2019). Available:  
29 27 <https://sif.se/syif/app/uploads/2019/07/i-vantan-pa-at.pdf> (assessed 11 October 2022).  
30 28 69. Birkeli CN, Rosta J, Aasland OG, et al. Why are doctors opting out of general practice? *Tidsskrift*  
31 29 *for Den norske legeforening* 2020;140(5).  
32  
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38 31  
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**Table 1 Sample, number of respondents, response rates and the makeup of job positions for which we have data on gender, working hours and age (<70 years) in 2016 and 2019**

	2016	2019
Sample, n	2 195	2 084
Respondents, n	1 604	1 511
Response rate, %	73.1	72.5
Job positions, n (females %)		
All <sup>(a)</sup>	1 481 (53.2)	1 351 (53.5)
Hospital doctors in leading position	84 (27.4)	84 (33.3)
Senior hospital consultants	348 (48.0)	379 (50.9)
Speciality registrars	354 (70.6)	366 (71.9)
General practitioners	271 (42.2)	245 (46.9)
Specialists in private practice	58 (34.5)	56 (35.7)
Doctors in academia	61 (55.7)	68 (50.0)
Community medical officer	54 (55.6)	57 (57.9)
Doctors in administrative position	31 (29.0)	26 (30.8)
Interns in district or hospital <sup>(b)</sup>	167 (71.3)	18 (66.7)
Other job categories	52 (40.4)	52 (32.7)

(a) Number of respondents with no data on working time, or gender or age (or respondents  $\geq 70$  years) were 123 in 2016 and 160 in 2019.

(b) As the number of interns was very low in 2019, these data are not commented in the results section.



1 **Table 2** Distribution of total weekly working hours by doctors working in different job positions in 2016 and 2019

	2016				2019			
	n	%			n	%		
		<37 hours	37-48 hours	>48 hours		<37 hours	37-48 hours	>48 hours
<b>Hospital doctors in leading position</b>								
males	61	1.7	<b>63.9</b>	<b>34.4</b>	56	0.0	<b>42.9 (b)</b>	<b>57.1 (c)</b>
females	23	0.0	<b>82.6</b>	<b>17.4</b>	28	0.0	<b>53.6 (b)</b>	<b>46.4 (c)</b>
<b>Senior hospital consultants</b>								
males	181	<b>6.6*</b>	64.1	<b>29.3*</b>	186	<b>1.1* (a)</b>	65.6	<b>33.3*</b>
females	167	<b>13.2*</b>	68.8	<b>18.0*</b>	193	<b>7.3*</b>	74.6	<b>18.1*</b>
<b>Speciality registrars</b>								
males	104	5.7	76.0	18.3	103	1.0	<b>79.6*</b>	<b>19.4*</b>
females	250	4.8	<b>82.0</b>	<b>13.2</b>	262	1.9	<b>91.2* (b)</b>	<b>6.9* (c)</b>
<b>General practitioners</b>								
males	157	6.4	<b>48.4*</b>	<b>45.2*</b>	130	6.2	<b>36.1 (b)</b>	<b>57.7 (c)</b>
females	115	10.4	<b>61.8*</b>	<b>27.8*</b>	115	11.3	<b>41.7 (b)</b>	<b>47.0 (c)</b>
<b>Specialists in private practice</b>								
males	38	7.9	57.9	34.2	36	5.6	55.5	38.9
females	20	25.0	55.0	20.0	20	15.0	55.0	30.0
<b>Doctors in academia</b>								
males	27	18.5	59.3	22.2	34	8.8	52.9	38.3
females	34	8.8	64.7	26.5	34	2.9	52.9	44.2
<b>Community medical officer</b>								
males	24	20.8	50.0	29.2	24	<b>8.3*</b>	58.3	33.4
females	30	26.7	60.0	13.3	33	<b>30.3*</b>	57.6	12.1
<b>Doctors in administrative position</b>								
males	22	31.8	<b>45.5*</b>	22.7	18	11.1	50.0	38.9
females	9	0.0	<b>88.9*</b>	11.1	8	25.0	62.5	12.5

\* Differences in proportions between male and female doctors significant at the <0.05 level using Pearson's chi-square test.

(a) Changes in proportion of working <37 hours from 2016 to 2018-2019 are significant at the <0.05 level using Pearson's chi-square test.

(b) Changes in proportion of working 37-48 hours from 2016 to 2018-2019 are significant at the <0.05 level Pearson's chi-square test.

(c) Changes in proportion of working >48 hours from 2016 to 2018-2019 are significant at the <0.05 level Pearson's chi-square test.

**Table 3** Linear mixed models with estimated marginal means of total weekly working hours and time spent on direct patient care in hours among doctors working full-time. Separate analyses for gender.

	Males				Females			
	Total weekly working hours		Direct patient care		Total weekly working hours		Direct patient care	
	2016	2019	2016	2019	2016	2019	2016	2019
General practitioners	48.7	50.9 (a)	32.8	33.1	48.3	49.3	33.1	32.0 (a)
Hospital doctors in leading position	48.2	50.6 (a)	16.3 (b)	16.6 (b)	45.8	47.3	13.0 (b)	18.3 (b)
Senior hospital consultants	46.5 (b)	47.8* (b)	20.5 (b)	21.5 (b)	45.4 (b)	45.6* (b)	18.6 (b)	18.9 (b)
Speciality registrars	44.9 (b)	46.6* (b)	17.7 (b)	18.3 (b)	44.4 (b)	43.6* (b)	17.3 (b)	16.6 (b)
Specialists in private practice	47.8	47.3 (b)	33.6	30.8	48.6	44.9 (a) (b)	32.4	30.9
Doctors in academia	44.7 (b)	47.8 (b)	6.8 (b)	7.4 (b)	44.9 (b)	46.7 (b)	5.7 (b)	4.2 (b)
Community medical officer	46.5	50.0	19.3 (b)	19.9 (b)	42.7 (b)	44.5 (b)	16.9 (b)	17.9 (b)
Doctors in administrative position	46.1	47.8 (b)	3.6 (b)	2.6 (b)	42.7 (b)	43.3 (b)	5.4 (b)	3.6 (b)

\* Differences in estimated marginal means between male and female doctors are significant at the <0.05 level

(a) Changes in estimated marginal means from 2016 to 2019 are significant at the <0.05 level.

(b) Differences in estimated marginal means across job positions with GP as reference are significant at the <0.05 level.

**Table 4 Mixed model on proportion of time spent on direct patient care (with fixed gender, age and job position) by doctors in different job positions**

	<b>2016</b> (%)	<b>2019</b> (%)	<b>Mean difference</b>	<b>P-Value</b>
Specialists in private practice	70.4	66.4	-4.0	0.176
General practitioners	68.5	65.8	-2.7	0.050
Senior hospital consultants	43.1	43.5	0.4	0.707
Community medical officer	40.1	38.1	-2.0	0.535
Speciality registrars	40.0	39.8	-0.2	0.909
Hospital doctors in leading position	32.2	34.3	2.1	0.363
Doctors in academia	13.8	11.7	-2.1	0.486
Doctors in administrative position	6.2	5.0	-1.2	0.787

**STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology\***  
**Checklist for cohort, case-control, and cross-sectional studies (combined)**

**"Changes in weekly working hours, proportion of doctors with hours above the limitations of EUs working time directive (EWDI) and time spent on direct patient care for doctors in Norway from 2016 to 2019: A study based on repeated surveys"**

**Rosta J, Isaksson Rø K.**

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1-2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
<b>Introduction</b>			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-6
Objectives	3	State specific objectives, including any pre-specified hypotheses	6
<b>Methods</b>			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	6
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7-8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7-8
Bias	9	Describe any efforts to address potential sources of bias	8
Study size	10	Explain how the study size was arrived at	6 and Table 1
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	9
		(b) Describe any methods used to examine subgroups and interactions	9

		(c) Explain how missing data were addressed	9 and Table 1
		(d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed <i>Cross-sectional study</i> —If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
<b>Results</b>			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	9-10 and Table 1 9-10 and Table 1 N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	9-10 and Table 1 9-10 and Table 1 N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	N/A N/A N/A
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	10-12, Table 2-4 10-12, Table 2 and 4 N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
<b>Discussion</b>			
Key results	18	Summarise key results with reference to study objectives	12-13
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	18-19
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	15-18
Generalisability	21	Discuss the generalisability (external validity) of the study results	13-15
<b>Other information</b>			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	N/A

\*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at [www.strobe-statement.org](http://www.strobe-statement.org).