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Some effects of having a family on medical careers: views of the UK medical graduates of 2002 surveyed in 2014

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1 **Some effects of having a family on medical careers: views of the UK medical**
2 **graduates of 2002 surveyed in 2014**

3
4 **Short title: Some effects of having a family on medical careers**

5
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18
19 **Word count:** [3157 words]

27 **ABSTRACT**

28

29 **Objectives:** To report the self-assessed views of a cohort of medical graduates about the
30 impact of having (or wanting to have) children on their specialty choice; and the extent to
31 which their employer was supportive of doctors with children.

32 **Setting:** United Kingdom (UK).

33 **Participants:** UK medical graduates of 2002 surveyed by post and email in 2014.

34 **Results:** The response rate was 64.2% (2057/3205). Most respondents were living with a
35 spouse or partner (86%) and, of these, 49% had a medical spouse. Having children, or
36 wanting to have children, had influenced specialty choice for 47% of respondents; for 56% of
37 doctors with children and 29% of doctors without children; for 59% of women and 28% of
38 men; and for 78% of general practitioners compared with 27% of hospital doctors and 18%
39 of surgeons. 42% of respondents regarded the NHS as a family-friendly employer, and 64%
40 regarded their specialty as family-friendly. More general practitioners (78%) than doctors in
41 hospital specialties (56%) regarded their specialty as family-friendly, whilst only 32% of
42 surgeons did so.

43 Of those who had taken maternity/paternity/adoption leave, 49% rated the levels of support
44 they had received in doing so as *excellent/good*, 32% said it was *acceptable* and 18% said
45 the support had been *poor/very poor*.

46 **Conclusions:** Having children is a major influence when considering specialty choice for
47 many doctors, especially women and general practitioners. Surgeons are least influenced in
48 their career choice by the prospect of parenthood. Almost half of doctors in hospital
49 specialties regard their specialty as family-friendly.

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51 [250 words]

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Strengths and limitations

- This was a national study, with a good level of response, of doctors who graduated from UK medical schools in 2002.
- The doctors were surveyed in their mid-thirties, 12 years after they had graduated – a time by which about two thirds of doctors have children.
- The response rate was high for a self-completed survey.
- However, some level of non-responder bias is, as with all surveys, a possibility.

Keywords: Physicians, junior; workforce; medical; family relations, quality of life.

65 BACKGROUND

66 Many factors may affect doctors' work-life balance. These include factors related to their
67 work, such as their stage of training, specialty, seniority and working pattern; and personal
68 factors including whether or not the doctor has children, whether they live with a spouse or
69 partner, and their gender. Longer work hours are associated with a higher possibility of work-
70 home 'conflict', which in turn is associated, research suggests, with increased likelihood of
71 burnout. (Dyrbye, Sotile et al. 2013) Women doctors in the United States were found to have
72 a higher divorce rate than men doctors: greater work hours among women were associated
73 with increased divorce prevalence, but not among men. (Ly, Seabury et al. 2015) A Swiss
74 study found that women doctors, especially those with children, have lower rates of
75 employment and lower levels of career success than male doctors; the women doctors in the
76 study showed higher levels of life satisfaction – regardless of parenthood status.(Buddeberg-
77 Fischer, Stamm et al. 2010)

78
79 In the United Kingdom (UK), domestic circumstances and working hours were of more
80 importance to women doctors than to men doctors when choosing a career specialty.(Smith,
81 Lambert et al. 2015) There are clear differences in specialty choice between men and
82 women, with surgery being chosen by a predominance of men, and general practice,
83 paediatrics, and obstetrics and gynaecology being chosen by a predominance of
84 women.(Lambert, Goldacre et al. 2006; Svirko, Goldacre et al. 2013) A UK study found that
85 only 40% of female doctors report taking on roles in addition to their clinical work, compared
86 with 87% of male doctors. (Academy of Medical Royal Colleges 2013) Female GPs,
87 especially those with children, have been found to be less involved in education, training,
88 primary care trusts (management organisations covering general/family practice), and
89 hospital service delivery than male GPs.(Wedderburn, Scallan et al. 2013)

90
91 We undertook a multi-purpose survey of all UK-trained doctors who graduated in 2002,
92 twelve years after qualification in 2014. The aim of this paper is to report on the self-

1 93 assessed views of these doctors about the impact of having (or wanting to have) children on
2
3 94 their specialty choice; and the extent to which their employer was supportive of doctors with
4
5 95 children. We also report on doctors' views about how family-friendly they felt the National
6
7 96 Health Service (NHS) was generally for doctors and specifically in their specialty. We
8
9 97 compared the replies of men and women, of those with and without children, and of those
10
11 98 working in different areas of medicine.
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13 99

100 **METHODS**

101 The UK Medical Careers Research Group surveyed the UK medical graduates of 2002. We
102 sent identical web-based and postal questionnaires twelve years after qualification (in 2014).
103 Up to four reminders were sent to non-respondents. Further details of the methodology are
104 available elsewhere (Lambert and Goldacre 2013).

105

106 Contact details for doctors were supplied to us by the General Medical Council (GMC) under
107 a data sharing agreement. The original cohort size of 4436 (2460 women, 1976 men, 55.5%
108 female) was reduced by 6 deceased doctors (1 man, 5 women), 71 doctors (45 men, 26
109 women) who asked to be excluded, and 290 doctors (113 men, 177 women) for whom the
110 GMC could not supply a current address or email. A further 864 doctors (507 men, 357
111 women) who had not replied to any of our previous surveys of the cohort were excluded from
112 the study due to a GMC embargo which restricted our survey to previous respondents. This
113 left a target population for the survey of 3205 (1895 women, 1310 men, 59.1% female).

114

115 The rationale for timing the survey approximately 12 years after graduation was that the
116 majority of the target population were of peak childbearing age and were likely to be
117 particularly aware of health service provision with regard to employment and family
118 formation.

119

1 120 We asked three questions about family formation and children: *'Has the fact of having*
2
3 121 *children, or of wanting to have children, influenced your choice of career specialty?'* *'Do you*
4
5 122 *regard the NHS as a family-friendly employer for doctors with children?'*, *'Do you regard your*
6
7 123 *specialty as a family-friendly specialty for doctors with children?'*. Each of these questions
8
9 124 had the options of *Yes, No, Don't know, or Prefer not to answer.*

11 125

13 126 Finally, we asked relevant doctors *'How would you describe the level of support you*
14
15 127 *received from employers in helping you to return to work after your most recent period of*
16
17 128 *Maternity/Paternity/Adoption leave?'* (with the options of *Excellent, Good, Acceptable, Poor,*
18
19 129 *Very poor, Did not return, or Prefer not to answer*). In analysis we combined responses of
20
21 130 excellent and good and refer to the combined group as 'excellent/good', and we similarly
22
23 131 combined poor and very poor to form 'poor/very poor', thereby reducing the five response
24
25 132 categories of assessment to three.

27 133

29 134 The data were initially analysed by univariable crosstabulation. To test statistical significance
30
31 135 we used chi-square statistics, Mann-Whitney tests and Kruskal-Wallis tests. Responses of
32
33 136 groups of doctors were compared using the following factors: gender; specialty (except
34
35 137 where otherwise stated, grouped by us for analysis into four groups: hospital medical
36
37 138 specialties, surgical specialties, general practice / family medicine (GP), other hospital-based
38
39 139 specialties combined); whether or not the doctor had children; whether or not the doctor had
40
41 140 a spouse / partner; and whether or not any spouse / partner was medically qualified. We
42
43 141 used multivariable binary logistic regression to assess the joint effect of factors.

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47 143

50 144 **RESULTS**

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54 146 **Response rate**

55 147

1 148 The response rate from the target population (see Method) was 64.2% (2057/3205). Among
2
3 149 women the response rate was 66.0% (1250/1895) and among men it was 61.6% (807/1310).
4
5 150 60.8% of respondents were women compared with 55.5% in the original cohort (i.e. prior to
6
7 151 the exclusions).
8

9 152

11 153 **Overview of the sample**

13 154

15 155 Of the 2057 respondents, 91.4% (N=1880) told us they were working in medicine in the UK,
16
17 156 5.4% (111) were working in medicine outside the UK, and the remainder were in
18
19 157 employment outside medicine (1.3%, 26), not in paid employment (1.4%, 28), or did not give
20
21 158 employment details (0.6%, 12).
22

23 159

25 160 We focused on the 1880 in UK medical employment. Of these, 60.5% were female, and
26
27 161 39.5% male. The median age of the respondents was 35.4 years. Most respondents were
28
29 162 living with a spouse or partner (86.0%). Of those living with a spouse, 49.2% had a medical
30
31 163 spouse. Women were more likely than men to have no spouse or partner (15.9% of women
32
33 164 compared with 11.1% of men). Men were more likely to have a medically qualified spouse or
34
35 165 partner (53.0% of men compared with 46.6% of women).
36

37 166

39 167 Of 1763 doctors who told us how many children aged under 16 years were resident in their
40
41 168 household, 32.7% answered none, 22.6% had one, 35.2% had two, and 9.5% had more
42
43 169 than two. The average age of the eldest child was 3.7 years (SD=2.7).
44

45 170

47 171 75.3% of respondents in UK medical employment were working full-time (94.4% of men,
48
49 172 62.6% of women). GPs were more likely to be working part-time (42.5%) than doctors
50
51 173 working in other specialties (15.1%).
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1 175 **Responses to the question: 'Has the fact of having children, or of wanting to have**
2
3 176 **children, influenced your choice of career specialty?'**

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5 177 Of all respondents who were working in medicine in the UK and who answered the question
6
7 178 (N=1811), 47% answered *yes* and 53% answered *no/don't know*.

8
9 179

10
11 180 To examine differences in response by gender, having children, specialty group,
12
13 181 partner/spouse status, and working hours, we reduced the working data to the 1716 doctors
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15 182 who had complete data for the five predictors.

16
17
18 183 Each of these five predictors showed significant ($p < 0.001$) variation when analysed in
19
20 184 isolation (Table 1): 59% of women and 28% of men agreed that consideration of children
21
22 185 had influenced their career choice; 56% of doctors with children and 29% of doctors without
23
24 186 children agreed; 18% of surgeons, 27% of doctors in the hospital medical specialties, 34% of
25
26 187 doctors in other hospital specialties, and 78% of doctors in general practice agreed; 50% of
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28 188 doctors with a medically qualified spouse, 49% of doctors with a non-medical spouse, and
29
30 189 30% of doctors with no spouse agreed; and 37% of doctors who worked full time agreed
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32 190 compared with 76% of doctors who worked less than full time.

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35 191 A multivariable logistic regression model was fitted, starting with all five predictors in the
36
37 192 model. Partner/spouse status was found not to be a significant predictor. The other four
38
39 193 predictors were retained. No interaction terms between predictors were found to improve the
40
41 194 fit of the model. The significance of specialty group as a predictor was due to the difference
42
43 195 between the responses of GPs and radiologists compared with those of other specialty
44
45 196 groups. Appendix 1 shows odds ratios and confidence intervals for the multivariable model
46
47 197 by specialty group with four significant factors (the specialty, gender, having children, and
48
49 198 full- or part-time working).

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51
52 199 Among women with children 91% (300/331) of GPs and 51% (172/336) of hospital doctors
53
54 200 agreed that consideration of children had influenced their career choice, while among men
55
56 201 with children, 75% (92/122) of GPs and 21% (70/334) of hospital doctors agreed.

1 202 Among women without children, 61% (68/112) of GPs and 28% (69/247) of hospital doctors
2
3 203 agreed, while among men without children 40% (19/48) of GPs and 7% (14/186) of hospital
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5 204 doctors agreed.

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8 205 Comparison of agreement rates for women hospital doctors with children showed that 43%
9
10 206 (84/196) of those working full time agreed that consideration of children had influenced their
11
12 207 career choice, compared with 63% (88/140) of those working part-time. Among women GPs
13
14 208 with children the equivalent figures for full timers and less than full timers were much closer
15
16 209 at 87% (117/135) and 93% (183/196). Numbers of men working less than full time were
17
18 210 insufficient (38 in all) for meaningful comparisons with those working full time.

21
22 211 **Responses to the question: 'Do you regard the NHS as a family-friendly employer for**
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24 212 **doctors with children?'**

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26 213 Of all respondents, 42% answered yes, and 58% answered *no/don't know*. To examine
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28 214 differences in response by gender, having children, specialty group, partner/spouse status,
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30 215 and working hours, we reduced the subjects to the 1720 doctors who had complete data for
31
32 216 the five predictors.

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35 217 Three of these five predictors showed significant ($p < 0.01$) variation when analysed in
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37 218 isolation (Table 2): more doctors with children (47%) than doctors without children (35%)
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39 219 regarded the NHS as a family-friendly employer for doctors with children; 44% of doctors
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41 220 with a medically qualified spouse, 45% of doctors with a non-medical spouse, and 33% of
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43 221 doctors with no spouse agreed; and 41% of doctors who worked full time agreed compared
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45 222 with 49% of doctors who worked less than full time.

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48 223 A multivariable logistic regression model was fitted, starting with all three predictors which
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50 224 were significant univariably. Partner/spouse status was found not to be a significant
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52 225 predictor. The other two predictors were retained. The interaction term between the
53
54 226 remaining two predictors did not improve the fit of the model. Appendix 1 shows odds ratios

1 227 and confidence intervals for the multivariable model with two significant factors (specialty
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3 228 group, and working hours).

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6 229 Among women with children 45% (148/330) of GPs and 56% (189/335) of hospital doctors
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8 230 agreed that the NHS is a family-friendly employer for doctors with children, while among men
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10 231 with children 42% (51/122) of GPs and 40% (135/335) of hospital doctors agreed.

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13 232 Among women without children, 30% (34/112) of GPs and 34% (86/250) of hospital doctors
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15 233 agreed, while among men without children 35% (17/49) of GPs and 39% (72/187) of hospital
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17 234 doctors agreed.

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20 235 Comparison of agreement rates for women hospital doctors with children showed that 52%
21
22 236 (102/196) of those working full time agreed that the NHS is a family-friendly employer for
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24 237 doctors with children, compared with 63% (87/139) of those working part-time. Among
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26 238 women GPs with children the equivalent figures for full timers and less than full timers were
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28 239 closer at 43% (58/135) and 46% (90/195). Numbers of men working less than full time were
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30 240 insufficient (38 in all) for meaningful comparisons with those working full time. Results are
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32 241 shown in Appendix 2 for specialties within our 'other hospital specialties' group, though the
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34 242 percentages are based on small counts and should be interpreted with caution.

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36
37 243 **Responses to the question: 'Do you regard your specialty as a family-friendly**
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39 244 **specialty for doctors with children?'**

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42 245 Of all respondents, 64% of doctors answered *yes* and 36% answered *no/don't know*. To
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44 246 examine differences in response by gender, having children, specialty group, partner/spouse
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46 247 status, and working hours, we reduced the working data to the 1720 doctors who had
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48 248 complete data for the five predictors.

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51 249 Each of these five predictors showed significant ($p < 0.001$) variation when analysed in
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53 250 isolation (Table 3): 69% of women and 57% of men agreed that their specialty is a family-
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55 251 friendly employer for doctors with children; 68% of doctors with children and 57% of doctors

1 252 without children agreed; 32% of surgeons, 53% of doctors in the hospital medical specialties,
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3 253 88% of psychiatrists, and 78% of doctors in general practice agreed; 63% of doctors with a
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5 254 medically qualified spouse, 69% of doctors with a non-medical spouse, and 55% of doctors
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7 255 with no spouse agreed; and 59% of doctors who worked full time agreed compared with 81%
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9 256 of doctors who worked less than full time.

11 257 A multivariable logistic regression model was fitted, starting with all five predictors in the
12
13 258 model. Gender, having children and partner/spouse status were not found to be significant
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15 259 predictors. The other two predictors (specialty group and working hours) were retained. The
16
17 260 interaction term between these two predictors did not improve the fit of the model. Doctors
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19 261 from the following specialty groups differed significantly in their responses to this question
20
21 262 from doctors in the hospital medical specialties group: those in Surgery were less likely to
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23 263 agree that their specialty was family-friendly, while those in GP, Radiology, Pathology, and
24
25 264 Psychiatry were more likely to agree. Appendix 1 shows odds ratios and confidence intervals
26
27 265 for the multivariable model with two significant factors (specialty group, and working hours).
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31 266 Results are shown in Appendix 2 for specialties within our 'other hospital specialties' group.
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34 267 **Level of support received on return to work**

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37 268 The doctors were asked '*How would you describe the level of support you received from*
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39 269 *employers in helping you to return to work after your most recent period of*
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41 270 *Maternity/Paternity/Adoption leave?*

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44 271 We excluded from analysis 4 doctors who replied that they had not returned after their period
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46 272 of leave: 831 doctors replied to the question. Of those doctors who returned, 49% (410)
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48 273 rated the support as *excellent/good*, 32% said it was *acceptable* and 18% said the support
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50 274 had been *poor/very poor*. We had replies from 215 men and 616 women. More men (58%)
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52 275 than women (46%) rated the level of support as *excellent/good* ($\chi^2_2=10.7$, $p<0.05$).

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1 277 There was no difference between the four specialty groups (grouped as hospital medical
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3 278 specialties, surgical specialties, general practice, and other hospital specialties combined,
4
5 279 see Method) in the ratings of level of support, either for all respondents ($\chi^2_6=2.0$, $p=0.92$), or
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7 280 for men ($p=0.61$) or women ($p=0.27$).
8

9 281

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11 282 Doctors living with a spouse/partner were more likely to rate their level of support as
12
13 283 *excellent/good* (56% medical spouse, 44% non-medical spouse) than doctors not living with
14
15 284 a spouse (19%, $\chi^2_4=19.7$, $p<0.001$). This pattern was observed among women doctors
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17 285 ($p<0.05$) but not men doctors ($p=0.13$).
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21 287 There was no difference in response to this question between those doctors who worked full-
22
23 288 time and those who worked part-time ($\chi^2_2=0.7$, $p=0.696$).
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25 289

26 290 **DISCUSSION**

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28 292 **Main findings**

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33 293 Almost half of all respondents said that having children, or wanting to have children, had
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35 294 influenced their specialty choice. More doctors with children, more women than men, more
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37 295 doctors who worked less than full time than those who worked full time, and more GPs than
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39 296 hospital doctors agreed with this statement. Although more doctors living with a
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41 297 spouse/partner than those without agreed that having children had influenced their specialty
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43 298 choice, this difference was not significant after adjustment for these other factors. No
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45 299 difference was observed between doctors with a medical spouse and doctors with a non-
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47 300 medical spouse.
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52 302 Two fifths of doctors regarded the NHS as a family-friendly employer for doctors with
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54 303 children and two thirds regarded their specialty as a family-friendly employer for doctors with
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1 304 children. More women than men agreed with the latter proposition. Three quarters of GPs
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3 305 regarded their specialty as family-friendly, whilst only a third of surgeons did so.

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5 306

6
7 307 Almost half of doctors said that the levels of support they had received when taking
8
9 308 maternity/paternity/adoption leave was *excellent/good*, though one in five said the support
10
11 309 had been *poor/very poor*. More men than women doctors rated the level of support as
12
13 310 *excellent/good*. Of those doctors living with a spouse, half had a medical spouse. More
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15 311 doctors living with a spouse/partner rated their level of leave support as *excellent/good* than
16
17 312 doctors not living with a spouse; and more doctors living with a medical spouse than doctors
18
19 313 with a non-medical spouse rated this support as *excellent/good*.

20
21 314

22 23 315 **Strengths and limitations**

24
25 316 This was a national study, with a good level of response, of doctors who graduated from UK
26
27 317 medical schools in 2002. The doctors were surveyed in their mid-thirties, 12 years after they
28
29 318 had graduated – a time by which about two thirds of doctors have children.(Goldacre,
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31 319 Davidson et al. 2012) The response rate was high for a self-completed survey. However,
32
33 320 some level of non-responder bias is, as with all surveys, a possibility.

34
35 321

36 37 322 **Comparison with existing literature**

38
39 323 Our respondents told us that considerations of parenthood influenced their specialty choice,
40
41 324 and we found that more women than men agreed with this. This is consistent with other
42
43 325 research which found that some men doctors tend to consider their own career to be more
44
45 326 important than that of their medically qualified spouse.(Stamm and Buddeberg-Fischer 2011)
46
47 327 Parenthood status has also been found to affect the career development of doctors, with
48
49 328 parents being less likely to hold a senior role than doctors without children.(Stamm and
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51 329 Buddeberg-Fischer 2011) We found that more GPs than hospital doctors say that
52
53 330 parenthood influenced their specialty choice. A Swiss study found that more family doctors

1 331 than hospital doctors are married, and more of them have children.(Buddeberg-Fischer,
2
3 332 Stamm et al. 2008)

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6
7 334 We found that surgeons were less likely to agree that their specialty was family-friendly than
8
9 335 were doctors who worked in other specialties. In the United States, surgeons have been
10
11 336 reported to face major challenges when trying to balance their personal and professional
12
13 337 lives.(Dyrbye, Freischlag et al. 2012)

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15 338

16
17 339 Doctors living with a spouse were more positive than doctors without a spouse about support
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19 340 received when taking leave; and of those doctors with a spouse, doctors in dual-doctor
20
21 341 relationships were the most positive. There could be financial reasons for this, as one study
22
23 342 points out, those in dual-doctor relationships may be able to make lifestyle choices due to
24
25 343 their high income.(Woodward 2005) This same study found that having a medically qualified
26
27 344 spouse was associated with reduced hours in clinical practice.

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29 345

30 346 **Implications / conclusions**

31
32 347 Parenthood is a key influence in GPs' specialty choice. However, doctors in other
33
34 348 specialties, especially surgery, are not influenced to the same extent by parenthood
35
36 349 considerations when choosing their specialty. Policy-makers should address the fact that
37
38 350 only half of doctors working in specialties other than general practice regard their specialty
39
40 351 as family-friendly.

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42 352

43 353 **Declarations**

44
45 354 Ethical approval: National Research Ethics Service, following referral to the Brighton and
46
47 355 Mid-Sussex Research Ethics Committee in its role as a multi-centre research ethics
48
49 356 committee (ref 04/Q1907/48 amendment Am02 March 2015).

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51 357

52 358 Consent for publication: Not applicable.

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2

3 360 Availability of data and material: It may be possible for the authors to make tabulated data,

4

5 361 produced in the course of this work but not included in the paper, available to interested

6

7 362 readers on request.

8

9 363

10

11 364 Competing interests: All authors have completed the Unified Competing Interest form at

12

13 365 www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and

14

15 366 all authors want to declare: (1) financial support for the submitted work from the policy

16

17 367 research programme, Department of Health. All authors also declare: (2) no financial

18

19 368 relationships with commercial entities that might have an interest in the submitted work; (3)

20

21 369 no spouses, partners, or children with relationships with commercial entities that might have

22

23 370 an interest in the submitted work; (4) no non-financial interests that may be relevant to the

24

25 371 submitted work.

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27 372

28

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30

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32

33 375 are not necessarily those of the funding body.

34

35 376

36

37 377 Authors' contributions: TL and MJG designed and conducted the survey. FS and TL

38

39 378 designed the analysis. FS performed the analysis and wrote the first draft of the paper. All

40

41 379 authors contributed to further drafts and all approved the final version.

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49 383 surveys.

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53 385 **References**

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Table 1: Responses to the question ‘Has the fact of having children, or of wanting to have children, influenced your choice of career specialty?’ (numbers and percentages of doctors who replied ‘yes’)

| Group | Men | | Women | |
|------------------------------|-------------|---------|-------------|----------|
| | % agreement | n/N | % agreement | n/N |
| All | 28.3 | 195/690 | 59.4 | 609/1026 |
| Has child(ren) | | | | |
| Yes | 35.5 | 162/456 | 70.8 | 472/667 |
| No | 14.1 | 33/234 | 38.2 | 137/359 |
| Specialty | | | | |
| Hospital medical specialties | 13.5 | 20/148 | 38.5 | 65/169 |
| Surgery | 14.0 | 19/136 | 28.8 | 17/59 |
| GP | 65.3 | 111/170 | 83.1 | 368/443 |
| Paediatrics | 8.0 | 2/25 | 35.1 | 33/94 |
| Emergency medicine | 10.3 | 3/29 | 26.1 | 6/23 |
| Obstetrics and gynaecology | 10.0 | 1/10 | 11.5 | 3/26 |
| Anaesthetics | 11.1 | 9/81 | 52.4 | 43/82 |
| Radiology | 50.0 | 12/24 | 73.3 | 22/30 |
| Clinical oncology | 20.0 | 2/10 | 50.0 | 9/18 |
| Pathology | 28.6 | 8/28 | 62.9 | 22/35 |
| Psychiatry | 27.6 | 8/29 | 44.7 | 21/47 |
| Partner/spouse status | | | | |
| Medical spouse | 27.7 | 89/321 | 68.4 | 273/399 |
| Non-medical spouse | 32.2 | 94/292 | 59.7 | 276/462 |
| No spouse | 15.6 | 12/77 | 36.4 | 60/165 |
| Working hours | | | | |
| Full time | 26.5 | 173/652 | 47.9 | 301/628 |
| Less than full time | 57.9 | 22/38 | 77.4 | 308/398 |

Statistical tests on % agreement:

Children (χ^2_1): Men 34.0, Women 101.5

Specialty group (χ^2_{10}): Men 173.6, Women 223.9

Partner/spouse status (χ^2_2): Men 8.4 (p=0.015), Women 49.8

Working hours (χ^2_1): Men 15.9, Women 86.4

All p<0.001 except where indicated.

Table 2: Responses to the question ‘Do you regard the NHS as a family-friendly employer for doctors with children?’ (numbers and percentages of doctors who replied ‘yes’)

| Group | Men | | Women | |
|------------------------------|-------------|---------|-------------|----------|
| | % agreement | n/N | % agreement | n/N |
| All | 39.7 | 275/693 | 44.5 | 457/1027 |
| Has child(ren) | | | | |
| Yes | 40.7 | 186/457 | 50.7 | 337/665 |
| No | 37.7 | 89/236 | 33.1 | 120/362 |
| Specialty | | | | |
| Hospital medical specialties | 40.4 | 61/151 | 41.2 | 70/170 |
| Surgery | 37.8 | 51/135 | 39.0 | 23/59 |
| General Practice | 39.8 | 68/171 | 41.2 | 182/442 |
| Paediatrics | 32.0 | 8/25 | 46.3 | 44/95 |
| Emergency medicine | 50.0 | 15/30 | 52.4 | 11/21 |
| Obstetrics and gynaecology | 10.0 | 1/10 | 48.1 | 13/27 |
| Anaesthetics | 43.2 | 35/81 | 48.8 | 40/82 |
| Radiology | 47.8 | 11/23 | 56.7 | 17/30 |
| Clinical oncology | 40.0 | 4/10 | 47.4 | 9/19 |
| Pathology | 42.9 | 12/28 | 51.4 | 18/35 |
| Psychiatry | 31.0 | 9/29 | 63.8 | 30/47 |
| Partner/spouse status | | | | |
| Medical spouse | 40.2 | 130/323 | 46.1 | 184/399 |
| Non-medical spouse | 39.9 | 117/293 | 47.5 | 221/465 |
| No spouse | 36.4 | 28/77 | 31.9 | 52/163 |
| Working hours | | | | |
| Full time | 40.0 | 262/655 | 41.0 | 259/631 |
| Less than full time | 34.2 | 13/38 | 50.0 | 198/396 |

Statistical tests on % agreement:
 Children (χ^2_1): Men 0.5 (p=0.496), Women 28.4
 Specialty group (χ^2_{10}): Men 8.0 (p=0.634), Women 14.5 (p=0.150),
 Partner/spouse status (χ^2_2): Men 0.4 (p=0.817), Women 12.6 (p=0.002)
 Working hours (χ^2_1): Men 0.3 (p=0.590), Women 7.5 (p=0.006)
 All p<0.001 except where indicated.

Table 3: Responses to the question ‘Do you regard your specialty as a family-friendly employer for doctors with children?’ (numbers and percentages of doctors who replied ‘yes’)

| Group | Men | | Women | |
|------------------------------|-------------|---------|-------------|----------|
| | % agreement | n/N | % agreement | n/N |
| All | 57.0 | 393/690 | 69.1 | 712/1030 |
| Has child(ren) | | | | |
| Yes | 57.6 | 261/453 | 75.6 | 505/668 |
| No | 55.7 | 132/237 | 57.2 | 207/362 |
| Specialty | | | | |
| Hospital medical specialties | 43.0 | 65/151 | 60.9 | 103/169 |
| Surgery | 32.6 | 44/135 | 31.7 | 19/60 |
| GP | 79.3 | 134/169 | 78.1 | 345/442 |
| Paediatrics | 52.0 | 13/25 | 65.3 | 62/95 |
| Emergency medicine | 26.7 | 8/30 | 39.1 | 9/23 |
| Obstetrics and gynaecology | 10.0 | 1/10 | 40.7 | 11/27 |
| Anaesthetics | 60.0 | 48/80 | 71.1 | 59/83 |
| Radiology | 95.7 | 22/23 | 80.0 | 24/30 |
| Clinical oncology | 80.0 | 8/10 | 63.2 | 12/19 |
| Pathology | 89.3 | 25/28 | 74.3 | 26/35 |
| Psychiatry | 86.2 | 25/29 | 89.4 | 42/47 |
| Partner/spouse status | | | | |
| Medical spouse | 53.4 | 172/322 | 70.3 | 281/400 |
| Non-medical spouse | 62.4 | 181/290 | 72.7 | 339/466 |
| No spouse | 51.3 | 40/78 | 56.1 | 92/164 |
| Working hours | | | | |
| Full time | 55.8 | 364/652 | 61.5 | 390/634 |
| Less than full time | 76.3 | 29/38 | 81.3 | 322/396 |

Statistical tests on % agreement:
 Children (χ^2_1): Men 0.2 (p=0.687), Women 36.5
 Specialty group (χ^2_{10}): Men 138.0, Women 93.4
 Partner/spouse status (χ^2_2): Men 6.2 (p=0.045), Women 16.1
 Working hours (χ^2_1): Men 5.3 (p=0.021), Women 43.8
 All p<0.001 except where indicated.

Appendix 1: Odds ratios and confidence intervals for the multivariable models on effect of having children and on family-friendliness (a, b and c, see footnotes)

| Group | a | | b | | c | |
|-------------------------------|-----------------|-------|----------------|-------|-----------------|-------|
| | OR (95% CI) | p | OR (95% CI) | p | OR (95% CI) | p |
| Gender | | | | | | |
| Male* | 1 | | 1 | | - | NS |
| Female | 2.9 (2.2, 3.8) | <.001 | - | NS | - | NS |
| Has child(ren) | | | | | | |
| Yes* | 1 | | 1 | | - | NS |
| No | 0.3 (0.2, 0.4) | <.001 | 0.6 (0.5, 0.8) | <.001 | - | NS |
| Specialty group | | | | | | |
| Hospital medical specialties* | 1 | | - | NS | 1 | |
| Surgery | 0.9 (0.6, 1.4) | 0.67 | - | NS | 0.5 (0.3, 0.7) | <.001 |
| GP | 8.1 (5.8, 11.5) | <.001 | - | NS | 2.8 (2.1, 3.7) | <.001 |
| Paediatrics | 0.8 (0.5, 1.3) | 0.29 | - | NS | 1.4 (0.9, 2.2) | 0.12 |
| Emergency medicine | 0.6 (0.3, 1.4) | 0.23 | - | NS | 0.4 (0.2, 0.8) | 0.01 |
| Obstetrics and gynaecology | 0.2 (0.1, 0.7) | 0.01 | - | NS | 0.4 (0.2, 0.9) | 0.02 |
| Anaesthetics | 1.5 (0.9, 2.3) | 0.1 | - | NS | 1.8 (1.2, 2.7) | 0.002 |
| Radiology | 5.6 (2.9, 10.8) | <.001 | - | NS | 6.4 (2.8, 14.6) | <.001 |
| Clinical oncology | 2.0 (0.8, 4.6) | 0.12 | - | NS | 2.2 (1, 5) | 0.06 |
| Pathology | 2.6 (1.4, 4.7) | 0.002 | - | NS | 4 (2, 7.7) | <.001 |
| Psychiatry | 1.4 (0.8, 2.5) | 0.27 | - | NS | 6.1 (2.9, 12.8) | <.001 |
| Partner/spouse status | | | | | | |
| Medical spouse* | - | NS | - | NS | - | NS |
| Non-medical spouse | - | NS | - | NS | - | NS |
| No spouse | - | NS | - | NS | - | NS |
| Working hours | | | | | | |
| Full time* | 1 | | 1 | | 1 | |
| Less than full time | 1.9 (1.4, 2.5) | <.001 | 1.2 (1.0, 1.6) | <.05 | 2.2 (1.7, 2.9) | <.001 |

Multivariable model based on numbers of doctors who replied 'yes' to a) Has the fact of having children, or of wanting to have children, influenced your choice of career specialty?; b) Do you regard the NHS as a family-friendly employer for doctors with children?; c) Do you regard your specialty as a family-friendly employer for doctors with children?

*Reference group for multivariable model.

'Multivariable' denotes binomial logistic regression result for each predictor with all other predictors in the model. We excluded cases where one or more predictors were missing, or where the dependent variable was missing, which reduced the sample size to 1716.

The Odds Ratios (OR) indicate the likelihood that a member of a group would regard the outcome variable as important, compared with a member of the reference group. Thus, for example, compared with a full-time doctor, a part-time doctor was twice as likely to regard children as an important influence on their choice of specialty.

Appendix 2: Numbers and percentages of respondents answering yes to the questions on family-friendliness^{ab}

| Respondent group | Total | | Have children | | No children | |
|---------------------------|-----------|-----------|---------------|-----------|-------------|-----------|
| | Male | Female | Male | Female | Male | Female |
| Total ^a | 39% (283) | 43% (475) | 40% (190) | 50% (348) | 37% (93) | 32% (127) |
| Total ^b | 57% (399) | 69% (724) | 57% (263) | 76% (509) | 55% (136) | 57% (215) |
| Medical specialties | 43% (65) | 60% (105) | 36% (33) | 67% (67) | 52% (32) | 51% (38) |
| Surgery | 32% (45) | 32% (20) | 35% (29) | 46% (12) | 29% (16) | 22% (8) |
| GP | 79% (136) | 78% (351) | 81% (97) | 82% (271) | 75% (39) | 67% (80) |
| Other hospital: | 63% (153) | 68% (248) | 64% (104) | 74% (159) | 63% (49) | 60% (89) |
| <i>Paediatrics</i> | 54% (14) | 66% (63) | 47% (9) | 73% (43) | 71% (5) | 54% (20) |
| <i>Emergency medicine</i> | 27% (8) | 39% (9) | 25% (5) | 25% (3) | 30% (3) | 55% (6) |
| <i>Anaesthetics</i> | 59% (48) | 71% (59) | 62% (37) | 74% (31) | 50% (11) | 68% (28) |
| <i>Radiology</i> | 92% (22) | 77% (24) | 100% (15) | 95% (20) | 78% (7) | 40% (4) |
| <i>Clinical Oncology</i> | 80% (8) | 63% (12) | 71% (5) | 67% (6) | 100% (3) | 60% (6) |
| <i>Pathology</i> | 90% (26) | 74% (26) | 86% (18) | 83% (19) | 100% (8) | 58% (7) |
| <i>Psychiatry</i> | 87% (26) | 88% (44) | 94% (15) | 91% (29) | 79% (11) | 83% (15) |

^a Question wording: 'Do you regard the NHS as a family-friendly employer for doctors with children?'

^b Question wording: 'Do you regard your speciality as a family-friendly employer for doctors with children?' (and all lines below Total^b)

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Children and medical careers, some influences and experiences: questionnaire survey of the UK medical graduates of 2002

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| | |

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Manuscripts

1 **Children and medical careers, some influences and experiences:**
2 **questionnaire survey of the UK medical graduates of 2002**

3
4 **Short title: Some effects of having a family on medical careers**

5
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18
19 **Word count:** [3335 words]

27 **ABSTRACT**

28

29 **Objectives:** To report the self-assessed views of a cohort of medical graduates about the
30 impact of having (or wanting to have) children on their specialty choice; and the extent to
31 which their employer was supportive of doctors with children.

32 **Setting:** United Kingdom (UK).

33 **Participants:** UK medical graduates of 2002 surveyed by post and email in 2014.

34 **Results:** The response rate was 64.2% (2057/3205). Most respondents were living with a
35 spouse or partner (86%) and, of these, 49% had a medical spouse. Having children, or
36 wanting to have children, had influenced specialty choice for 47% of respondents; for 56% of
37 doctors with children and 29% of doctors without children; for 59% of women and 28% of
38 men; and for 78% of general practitioners compared with 27% of hospital doctors and 18%
39 of surgeons. 42% of respondents regarded the NHS as a family-friendly employer, and 64%
40 regarded their specialty as family-friendly. More general practitioners (78%) than doctors in
41 hospital specialties (56%) regarded their specialty as family-friendly, whilst only 32% of
42 surgeons did so.

43 Of those who had taken maternity/paternity/adoption leave, 49% rated the levels of support
44 they had received in doing so as *excellent/good*, 32% said it was *acceptable* and 18% said
45 the support had been *poor/very poor*.

46 **Conclusions:** Having children is a major influence when considering specialty choice for
47 many doctors, especially women and general practitioners. Surgeons are least influenced in
48 their career choice by the prospect of parenthood. Almost half of doctors in hospital
49 specialties regard their specialty as family-friendly.

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51 [250 words]

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Strengths and limitations

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- This was a national study, with a good level of response, of doctors who graduated from UK medical schools in 2002.
 - The doctors were surveyed in their mid-thirties, 12 years after they had graduated – a time by which about two thirds of doctors have children.
 - The response rate was high for a self-completed survey.
 - However, some level of non-responder bias is, as with all surveys, a possibility.
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62 **Keywords:** Physicians, junior; workforce; medical; family relations, quality of life.

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BACKGROUND

Many factors may affect doctors' Work-Life Balance (WLB). These include factors related to their work, such as their stage of training, specialty, seniority and working pattern; and personal factors including whether or not the doctor has children, whether they live with a spouse or partner, and their gender. Longer work hours are associated with a higher possibility of work-home 'conflict', which in turn is associated, research suggests, with increased likelihood of burnout. [1] Women doctors in the United States (US) were found to have a higher divorce rate than men doctors: greater work hours among women were associated with increased divorce prevalence, but not among men. [2] A Swiss study found that women doctors, especially those with children, have lower rates of employment and lower levels of career success than male doctors; the women doctors in the study showed higher levels of life satisfaction – regardless of parenthood status.[3] A review of women physicians' status and experiences in Japan, Scandinavia, Russia, and Eastern Europe found that women were underrepresented in leadership positions even in countries where they were well represented in the workforce. [4] Despite differences between these countries in terms of women's participation in medicine, societal norms and policies - gender differences remain across specialties and within 'the medical hierarchy'. [4]

Women doctors consider future WLB when making their career choices.[5] In the United Kingdom (UK), domestic circumstances and working hours were of more importance to women doctors than to men doctors when choosing a career specialty.[6] There are clear differences in specialty choice between men and women, with surgery being chosen by a predominance of men, and general practice, paediatrics, and obstetrics and gynaecology being chosen by a predominance of women.[7 8] A UK study found that only 40% of female doctors report taking on roles in addition to their clinical work, compared with 87% of male doctors. [9] Female GPs, especially those with children, have been found to be less involved in education, training, primary care trusts (management organisations covering general/family practice), and hospital service delivery than male GPs.[10]

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3 94 We undertook a multi-purpose survey of all UK-trained doctors who graduated in 2002,
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5 95 twelve years after qualification in 2014. The aim of this paper is to report on the self-
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7 96 assessed views of these doctors about the impact of having (or wanting to have) children on
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9 97 their specialty choice; and the extent to which their employer was supportive of doctors with
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11 98 children. We also report on doctors' views about how family-friendly they felt the National
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13 99 Health Service (NHS) was generally for doctors and specifically in their specialty. We
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15 100 compared the replies of men and women, of those with and without children, and of those
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17 101 working in different areas of medicine.
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20
21 103 **METHODS**

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23 104 The UK Medical Careers Research Group surveyed the UK medical graduates of 2002. We
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25 105 sent identical web-based and postal questionnaires twelve years after qualification (in 2014).
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27 106 Up to four reminders were sent to non-respondents. Further details of the methodology are
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29 107 available elsewhere.[11]
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33 109 Contact details for doctors were supplied to us by the General Medical Council (GMC) under
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35 110 a data sharing agreement. The original cohort size of 4436 (2460 women, 1976 men, 55.5%
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37 111 female) was reduced by 6 deceased doctors (1 man, 5 women), 71 doctors (45 men, 26
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39 112 women) who asked to be excluded, and 290 doctors (113 men, 177 women) for whom the
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41 113 GMC could not supply a current address or email. A further 864 doctors (507 men, 357
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43 114 women) who had not replied to any of our previous surveys of the cohort were excluded from
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45 115 the study due to a GMC embargo which restricted our survey to previous respondents. This
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47 116 left a target population for the survey of 3205 (1895 women, 1310 men, 59.1% female).
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52 118 The rationale for timing the survey approximately 12 years after graduation was that the
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54 119 majority of the target population were of peak childbearing age and were likely to be
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1 120 particularly aware of health service provision with regard to employment and family
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3 121 formation.

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7 123 We asked three questions about family formation and children: *'Has the fact of having*
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9 124 *children, or of wanting to have children, influenced your choice of career specialty?'* *'Do you*
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11 125 *regard the NHS as a family-friendly employer for doctors with children?'*, *'Do you regard your*
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13 126 *specialty as a family-friendly specialty for doctors with children?'*. Each of these questions
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15 127 had the options of *Yes, No, Don't know, or Prefer not to answer.*
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19 129 Finally, we asked relevant doctors *'How would you describe the level of support you*
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21 130 *received from employers in helping you to return to work after your most recent period of*
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23 131 *Maternity/Paternity/Adoption leave?'* (with the options of *Excellent, Good, Acceptable, Poor,*
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25 132 *Very poor, Did not return, or Prefer not to answer.*) In analysis we combined responses of
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27 133 excellent and good and refer to the combined group as 'excellent/good', and we similarly
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29 134 combined poor and very poor to form 'poor/very poor', thereby reducing the five response
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31 135 categories of assessment to three.
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35 137 The data were initially analysed by univariable crosstabulation. To test statistical significance
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37 138 we used chi-square statistics, Mann-Whitney tests and Kruskal-Wallis tests. Responses of
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39 139 groups of doctors were compared using the following factors: gender; specialty (except
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41 140 where otherwise stated, grouped by us for analysis into four groups: hospital medical
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43 141 specialties, surgical specialties, general practice / family medicine (GP), other hospital-based
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45 142 specialties combined); whether or not the doctor had children; whether or not the doctor had
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47 143 a spouse / partner; and whether or not any spouse / partner was medically qualified. Under
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49 144 the group 'hospital medical specialties' we included the following: general medicine,
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51 145 cardiology, dermatology, endocrinology, geriatrics, nephrology, neurology, chest medicine,
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53 146 rheumatology/rehabilitation, academic medicine, genito-urinary medicine, genetics,
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55 147 gastroenterology, clinical pharmacology, infectious diseases, and occupational medicine.
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1 148 Under 'other hospital-based specialties' we combined the following: paediatrics, emergency
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3 149 medicine, obstetrics & gynaecology, anaesthesia, radiology, clinical oncology, psychiatry
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5 150 and pathology. We used multivariable binary logistic regression to assess the joint effect of
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7 151 factors.

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12 13 154 **RESULTS**

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16 17 156 **Response rate**

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21 158 The response rate from the target population (see Method) was 64.2% (2057/3205). Among
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23 159 women the response rate was 66.0% (1250/1895) and among men it was 61.6% (807/1310).
24
25 160 60.8% of respondents were women compared with 55.5% in the original cohort (i.e. prior to
26
27 161 the exclusions).
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31 32 163 **Overview of the sample**

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36 165 Of the 2057 respondents, 91.4% (N=1880) told us they were working in medicine in the UK,
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38 166 5.4% (111) were working in medicine outside the UK, and the remainder were in
39
40 167 employment outside medicine (1.3%, 26), not in paid employment (1.4%, 28), or did not give
41
42 168 employment details (0.6%, 12).
43

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45 169

46
47 170 We focused on the 1880 in UK medical employment. Of these, 60.5% were female, and
48
49 171 39.5% male. The median age of the respondents was 35.4 years. Most respondents were
50
51 172 living with a spouse or partner (86.0%). Of those living with a spouse, 49.2% had a medical
52
53 173 spouse. Of 1763 doctors who told us how many children aged under 16 years were resident
54
55 174 in their household, 32.7% answered none, 22.6% had one, 35.2% had two, and 9.5% had
56
57 175 more than two. The average age of the eldest child was 3.7 years (SD=2.7). 75.3% of
58

1 176 respondents in UK medical employment were working full-time. GPs were more likely to be
2
3 177 working part-time (42.5%) than doctors working in other specialties (15.1%).
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6
7 179 Women were much less likely than men to be working full-time (men 94.4% (695/736),
8
9 180 women 62.6% (696/1112); $\chi^2_1=239.5$, $p<0.001$). Within general practice 84.3% of men and
10
11 181 47.3% of women were working full-time (150/178 and 221/467; $\chi^2_1=70.5$, $p<0.001$). Within
12
13 182 hospital practice 97.8% of men and 73.5% of women were working full-time (534/546 and
14
15 183 456/620; $\chi^2_1=131.4$, $p<0.001$). Women were more likely than men to have no spouse or
16
17 184 partner (men 11.1% (80/720), women 15.9% (173/1097); $\chi^2_1=7.8$, $p=0.005$). Among those
18
19 185 with a spouse or partner, men were more likely than women to have a medically qualified
20
21 186 spouse or partner (men 53.0% (338/638), women 46.6% (426/914); $\chi^2_1=5.8$, $p=0.016$).
22
23 187 Women and men were equally likely to have children (men 67.3% (477/709), women 67.3%
24
25 188 (709/1054); $\chi^2_1=0.0$, $p=1.0$).
26

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30 190 **Responses to the question: 'Has the fact of having children, or of wanting to have**
31
32 191 **children, influenced your choice of career specialty?'**

33
34 192 Of all respondents who were working in medicine in the UK and who answered the question
35
36 193 (N=1811), 47% answered *yes* and 53% answered *no/don't know*.
37

38 194

39
40 195 To examine differences in response by gender, having children, specialty group,
41
42 196 partner/spouse status, and working hours, we reduced the working data to the 1716 doctors
43
44 197 who had complete data for the five predictors.
45

46
47 198 Each of these five predictors showed significant ($p<0.001$) variation when analysed in
48
49 199 isolation (Table 1): 59% of women and 28% of men agreed that consideration of children
50
51 200 had influenced their career choice; 56% of doctors with children and 29% of doctors without
52
53 201 children agreed; 18% of surgeons, 27% of doctors in the hospital medical specialties, 34% of
54
55 202 doctors in other hospital specialties, and 78% of doctors in general practice agreed; 50% of
56
57 203 doctors with a medically qualified spouse, 49% of doctors with a non-medical spouse, and
58

1 204 30% of doctors with no spouse agreed; and 37% of doctors who worked full time agreed
2
3 205 compared with 76% of doctors who worked less than full time.
4

5
6 206 A multivariable logistic regression model was fitted, starting with all five predictors in the
7
8 207 model. Partner/spouse status was found not to be a significant predictor. The other four
9
10 208 predictors were retained. No interaction terms between predictors were found to improve the
11
12 209 fit of the model. The significance of specialty group as a predictor was due to the difference
13
14 210 between the responses of GPs and radiologists compared with those of other specialty
15
16 211 groups. Appendix 1 shows odds ratios and confidence intervals for the multivariable model
17
18 212 by specialty group with four significant factors (the specialty, gender, having children, and
19
20 213 full- or part-time working).
21

22
23 214 Among women with children 91% (300/331) of GPs and 51% (172/336) of hospital doctors
24
25 215 agreed that consideration of children had influenced their career choice, while among men
26
27 216 with children, 75% (92/122) of GPs and 21% (70/334) of hospital doctors agreed.
28

29
30 217 Among women without children, 61% (68/112) of GPs and 28% (69/247) of hospital doctors
31
32 218 agreed, while among men without children 40% (19/48) of GPs and 7% (14/186) of hospital
33
34 219 doctors agreed.
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37 220 Comparison of agreement rates for women hospital doctors with children showed that 43%
38
39 221 (84/196) of those working full time agreed that consideration of children had influenced their
40
41 222 career choice, compared with 63% (88/140) of those working part-time. Among women GPs
42
43 223 with children the equivalent figures for full timers and less than full timers were much closer
44
45 224 at 87% (117/135) and 93% (183/196). Numbers of men working less than full time were
46
47 225 insufficient (38 in all) for meaningful comparisons with those working full time.
48

49
50 226 **Responses to the question: 'Do you regard the NHS as a family-friendly employer for**
51
52 227 **doctors with children?'**
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54
55 228 Of all respondents, 42% answered *yes*, and 58% answered *no/don't know*. To examine
56
57 229 differences in response by gender, having children, specialty group, partner/spouse status,
58

1 230 and working hours, we reduced the subjects to the 1720 doctors who had complete data for
2
3 231 the five predictors.

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6 232 Three of these five predictors showed significant ($p < 0.01$) variation when analysed in
7
8 233 isolation (Table 2): more doctors with children (47%) than doctors without children (35%)
9
10 234 regarded the NHS as a family-friendly employer for doctors with children; 44% of doctors
11
12 235 with a medically qualified spouse, 45% of doctors with a non-medical spouse, and 33% of
13
14 236 doctors with no spouse agreed; and 41% of doctors who worked full time agreed compared
15
16 237 with 49% of doctors who worked less than full time.

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19 238 A multivariable logistic regression model was fitted, starting with all three predictors which
20
21 239 were significant univariably. Partner/spouse status was found not to be a significant
22
23 240 predictor. The other two predictors were retained. The interaction term between the
24
25 241 remaining two predictors did not improve the fit of the model. Appendix 1 shows odds ratios
26
27 242 and confidence intervals for the multivariable model with two significant factors (specialty
28
29 243 group, and working hours).

30
31
32 244 Among women with children 45% (148/330) of GPs and 56% (189/335) of hospital doctors
33
34 245 agreed that the NHS is a family-friendly employer for doctors with children, while among men
35
36 246 with children 42% (51/122) of GPs and 40% (135/335) of hospital doctors agreed.

37
38
39 247 Among women without children, 30% (34/112) of GPs and 34% (86/250) of hospital doctors
40
41 248 agreed, while among men without children 35% (17/49) of GPs and 39% (72/187) of hospital
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43 249 doctors agreed.

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46 250 Comparison of agreement rates for women hospital doctors with children showed that 52%
47
48 251 (102/196) of those working full time agreed that the NHS is a family-friendly employer for
49
50 252 doctors with children, compared with 63% (87/139) of those working part-time. Among
51
52 253 women GPs with children the equivalent figures for full timers and less than full timers were
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54 254 closer at 43% (58/135) and 46% (90/195). Numbers of men working less than full time were
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56 255 insufficient (38 in all) for meaningful comparisons with those working full time. Results are
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1 256 shown in Appendix 2 for specialties within our 'other hospital specialties' group, though the
2
3 257 percentages are based on small counts, are not suitable for multivariable modelling, and
4
5 258 should be interpreted with caution.
6
7

8 259 **Responses to the question: 'Do you regard your specialty as a family-friendly**
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10 260 **specialty for doctors with children?'**
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12
13 261 Of all respondents, 64% of doctors answered *yes* and 36% answered *no/don't know*. To
14
15 262 examine differences in response by gender, having children, specialty group, partner/spouse
16
17 263 status, and working hours, we reduced the working data to the 1720 doctors who had
18
19 264 complete data for the five predictors.
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22 265 Each of these five predictors showed significant ($p < 0.001$) variation when analysed in
23
24 266 isolation (Table 3): 69% of women and 57% of men agreed that their specialty is a family-
25
26 267 friendly employer for doctors with children; 68% of doctors with children and 57% of doctors
27
28 268 without children agreed; 32% of surgeons, 53% of doctors in the hospital medical specialties,
29
30 269 88% of psychiatrists, and 78% of doctors in general practice agreed; 63% of doctors with a
31
32 270 medically qualified spouse, 69% of doctors with a non-medical spouse, and 55% of doctors
33
34 271 with no spouse agreed; and 59% of doctors who worked full time agreed compared with 81%
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36 272 of doctors who worked less than full time.
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39 273 A multivariable logistic regression model was fitted, starting with all five predictors in the
40
41 274 model. Gender, having children and partner/spouse status were not found to be significant
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43 275 predictors. The other two predictors (specialty group and working hours) were retained. The
44
45 276 interaction term between these two predictors did not improve the fit of the model. Doctors
46
47 277 from the following specialty groups differed significantly in their responses to this question
48
49 278 from doctors in the hospital medical specialties group: those in Surgery were less likely to
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51 279 agree that their specialty was family-friendly, while those in GP, Radiology, Pathology, and
52
53 280 Psychiatry were more likely to agree. Appendix 1 shows odds ratios and confidence intervals
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55 281 for the multivariable model with two significant factors (specialty group, and working hours).
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1 282 Results are shown in Appendix 2 for specialties within our 'other hospital specialties' group.
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4 283 **Level of support received on return to work**

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6
7 284 Of 887 doctors who described the level of support received on their return to work after
8
9 285 having a child, 18% said the support had been *poor/very poor* (Table 4). Men rated the level
10
11 286 of support more highly than did women. There were no significant differences by specialty
12
13 287 group or by working hours. The small number of respondents without a partner appeared to
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15 288 score their support more negatively. See footnote to Table 4 for statistical results.
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20 291 **DISCUSSION**

21 292

22 293 **Main findings**

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27 294 Almost half of all respondents said that having children, or wanting to have children, had
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29 295 influenced their specialty choice. More doctors with children, more women than men, more
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31 296 doctors who worked less than full time than those who worked full time, and more GPs than
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33 297 hospital doctors agreed with this statement. Although more doctors living with a
34
35 298 spouse/partner than those without agreed that having children had influenced their specialty
36
37 299 choice, this difference was not significant after adjustment for these other factors. No
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39 300 difference was observed between doctors with a medical spouse and doctors with a non-
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41 301 medical spouse.
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47 303 Two fifths of doctors regarded the NHS as a family-friendly employer for doctors with
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49 304 children and two thirds regarded their specialty as a family-friendly employer for doctors with
50
51 305 children. More women than men agreed with the latter proposition. Three quarters of GPs
52
53 306 regarded their specialty as family-friendly, whilst only a third of surgeons did so.
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1 308 Almost half of doctors said that the levels of support they had received when taking
2
3 309 maternity/paternity/adoption leave was *excellent/good*, though one in five said the support
4
5 310 had been *poor/very poor*. More men than women doctors rated the level of support as
6
7 311 *excellent/good*. Of those doctors living with a spouse, half had a medical spouse. More
8
9 312 doctors living with a spouse/partner rated their level of leave support as *excellent/good* than
10
11 313 doctors not living with a spouse; and more doctors living with a medical spouse than doctors
12
13 314 with a non-medical spouse rated this support as *excellent/good*.

15 315

17 316 Although it is not explicit in our study, there is interplay between doctors' views of
18
19 317 parenthood and the effect it may have on their careers and career choices, and the level of
20
21 318 support available within different parts of the health service to doctors who are parents.
22
23 319 Concepts such a family-friendliness may be hard to reconcile with the working requirements
24
25 320 of certain specialty areas, particularly those in which unanticipated acute conditions may
26
27 321 present which require treatment of unknown length or at unsocial times of day or night. The
28
29 322 challenge is to manage work in these areas to improve family-friendliness without
30
31 323 compromising patient care, at a time when the health service is under unprecedented
32
33 324 pressures.

35 325

37 326 **Strengths and limitations**

39 327 This was a national study, with a good level of response, of doctors who graduated from UK
40
41 328 medical schools in 2002. The doctors were surveyed in their mid-thirties, 12 years after they
42
43 329 had graduated – a time by which about two thirds of doctors have children [12] and would be
44
45 330 able to respond from their own experience to questions about the family friendliness, or
46
47 331 otherwise, of the health service. The response rate was high for a self-completed survey.
48
49 332 However, some level of non-responder bias is, as with all surveys, a possibility.

51 333

54 334 The first of our questions asked whether having, or wanting to have, children had influenced
55
56 335 the doctors' choice of career specialty. A degree of recall bias is possible in the replies to

1 336 this question. However, many doctors will have considered the implications of having a
2
3 337 family at the time they were making their career choices.
4

5 338

7 339 **Comparison with existing literature**

9 340 Our respondents told us that considerations of parenthood influenced their specialty choice,
10
11 341 and we found that more women than men agreed with this, as did doctors with children.

12 342 Other research in the UK has found that women in particular cite considerations of WLB as
13
14 343 the most common reason for not pursuing certain career specialties.[13] Research in the US

15 344 found that 78% of women believe that their career has been restricted by having
16
17 345 children.[14] Parenthood status has also been found to affect the career development of

18 346 doctors, with parents being less likely to hold a senior role than doctors without children.[15]
19
20 347 We found that more GPs than hospital doctors say that parenthood influenced their specialty

21 348 choice. A Swiss study found that more family doctors than hospital doctors are married, and
22
23 349 more of them have children.[16] A large-scale Australian study of GPs found that about half

24 350 of the GPs were content with their WLB, and women reported a better WLB than men.[17]
25
26 351 One study reported that Australian medical students believed that 'family commitments' were

27 352 very important when making career decisions, and female students believed that working
28
29 353 part-time was important for WLB.[18]
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33 356

34 357 We found that surgeons were less likely to agree that their specialty was family-friendly than
35
36 358 were doctors who worked in other specialties. In the US, surgeons have been reported to

37 359 face major challenges when trying to balance their personal and professional lives.[19] In the
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39 360 UK, despite rising numbers of female surgical trainees, the number of LTFT posts available

40 361 is inadequate.[20]
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1 363 Doctors living with a spouse were more positive than doctors without a spouse about support
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3 364 received when taking leave; and of those doctors with a spouse, doctors in dual-doctor
4
5 365 relationships were the most positive. There could be financial reasons for this, as one study
6
7 366 points out, those in dual-doctor relationships may be able to make lifestyle choices due to
8
9 367 their high income.[21] This same study found that having a medically qualified spouse was
10
11 368 associated with reduced hours in clinical practice.

12
13 369

14 370 **Implications / conclusions**

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17 371 Parenthood is a key influence in GPs' specialty choice. However, doctors in other
18
19 372 specialties, especially surgery, are not influenced to the same extent by parenthood
20
21 373 considerations when choosing their specialty. Policy-makers should address the fact that
22
23 374 only half of doctors working in specialties other than general practice regard their specialty
24
25 375 as family-friendly.

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27 376

28 377 **Declarations**

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30
31 378 Ethical approval: National Research Ethics Service, following referral to the Brighton and
32
33 379 Mid-Sussex Research Ethics Committee in its role as a multi-centre research ethics
34
35 380 committee (ref 04/Q1907/48 amendment Am02 March 2015).

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39 382 Consent for publication: Not applicable.

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43
44 384 Availability of data and material: It may be possible for the authors to make tabulated data,
45
46 385 produced in the course of this work but not included in the paper, available to interested
47
48 386 readers on request.

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50 387

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20
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22
23 402 designed the analysis. FS performed the analysis and wrote the first draft of the paper. All
24
25 403 authors contributed to further drafts and all approved the final version.

26 404

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35 409 **References**

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Table 1: Responses to the question 'Has the fact of having children, or of wanting to have children, influenced your choice of career specialty?' (numbers and percentages of doctors who replied 'yes')

| Group | Men | | Women | |
|------------------------------|-------------|---------|-------------|----------|
| | % agreement | n/N | % agreement | n/N |
| All | 28.3 | 195/690 | 59.4 | 609/1026 |
| Has child(ren) | | | | |
| Yes | 35.5 | 162/456 | 70.8 | 472/667 |
| No | 14.1 | 33/234 | 38.2 | 137/359 |
| Specialty | | | | |
| Hospital medical specialties | 13.5 | 20/148 | 38.5 | 65/169 |
| Surgery | 14.0 | 19/136 | 28.8 | 17/59 |
| GP | 65.3 | 111/170 | 83.1 | 368/443 |
| Paediatrics | 8.0 | 2/25 | 35.1 | 33/94 |
| Emergency medicine | 10.3 | 3/29 | 26.1 | 6/23 |
| Obstetrics and gynaecology | 10.0 | 1/10 | 11.5 | 3/26 |
| Anaesthesia | 11.1 | 9/81 | 52.4 | 43/82 |
| Radiology | 50.0 | 12/24 | 73.3 | 22/30 |
| Clinical oncology | 20.0 | 2/10 | 50.0 | 9/18 |
| Pathology | 28.6 | 8/28 | 62.9 | 22/35 |
| Psychiatry | 27.6 | 8/29 | 44.7 | 21/47 |
| Partner/spouse status | | | | |
| Medical spouse | 27.7 | 89/321 | 68.4 | 273/399 |
| Non-medical spouse | 32.2 | 94/292 | 59.7 | 276/462 |
| No spouse | 15.6 | 12/77 | 36.4 | 60/165 |
| Working hours | | | | |
| Full time | 26.5 | 173/652 | 47.9 | 301/628 |
| Less than full time | 57.9 | 22/38 | 77.4 | 308/398 |

Statistical tests on % agreement:

Children (χ^2_1): Men 34.0, Women 101.5

Specialty group (χ^2_{10}): Men 173.6, Women 223.9

Partner/spouse status (χ^2_2): Men 8.4 ($p=0.015$), Women 49.8

Working hours (χ^2_1): Men 15.9, Women 86.4

All $p < 0.001$ except where indicated.

Table 2: Responses to the question ‘Do you regard the NHS as a family-friendly employer for doctors with children?’ (numbers and percentages of doctors who replied ‘yes’)

| Group | Men | | Women | |
|------------------------------|-------------|---------|-------------|----------|
| | % agreement | n/N | % agreement | n/N |
| All | 39.7 | 275/693 | 44.5 | 457/1027 |
| Has child(ren) | | | | |
| Yes | 40.7 | 186/457 | 50.7 | 337/665 |
| No | 37.7 | 89/236 | 33.1 | 120/362 |
| Specialty | | | | |
| Hospital medical specialties | 40.4 | 61/151 | 41.2 | 70/170 |
| Surgery | 37.8 | 51/135 | 39.0 | 23/59 |
| General Practice | 39.8 | 68/171 | 41.2 | 182/442 |
| Paediatrics | 32.0 | 8/25 | 46.3 | 44/95 |
| Emergency medicine | 50.0 | 15/30 | 52.4 | 11/21 |
| Obstetrics and gynaecology | 10.0 | 1/10 | 48.1 | 13/27 |
| Anaesthesia | 43.2 | 35/81 | 48.8 | 40/82 |
| Radiology | 47.8 | 11/23 | 56.7 | 17/30 |
| Clinical oncology | 40.0 | 4/10 | 47.4 | 9/19 |
| Pathology | 42.9 | 12/28 | 51.4 | 18/35 |
| Psychiatry | 31.0 | 9/29 | 63.8 | 30/47 |
| Partner/spouse status | | | | |
| Medical spouse | 40.2 | 130/323 | 46.1 | 184/399 |
| Non-medical spouse | 39.9 | 117/293 | 47.5 | 221/465 |
| No spouse | 36.4 | 28/77 | 31.9 | 52/163 |
| Working hours | | | | |
| Full time | 40.0 | 262/655 | 41.0 | 259/631 |
| Less than full time | 34.2 | 13/38 | 50.0 | 198/396 |

Statistical tests on % agreement:
 Children (χ^2_1): Men 0.5 (p=0.496), Women 28.4
 Specialty group (χ^2_{10}): Men 8.0 (p=0.634), Women 14.5 (p=0.150),
 Partner/spouse status (χ^2_2): Men 0.4 (p=0.817), Women 12.6 (p=0.002)
 Working hours (χ^2_1): Men 0.3 (p=0.590), Women 7.5 (p=0.006)
 All p<0.001 except where indicated.

Table 3: Responses to the question ‘Do you regard your specialty as a family-friendly employer for doctors with children?’ (numbers and percentages of doctors who replied ‘yes’)

| Group | Men | | Women | |
|------------------------------|-------------|---------|-------------|----------|
| | % agreement | n/N | % agreement | n/N |
| All | 57.0 | 393/690 | 69.1 | 712/1030 |
| Has child(ren) | | | | |
| Yes | 57.6 | 261/453 | 75.6 | 505/668 |
| No | 55.7 | 132/237 | 57.2 | 207/362 |
| Specialty | | | | |
| Hospital medical specialties | 43.0 | 65/151 | 60.9 | 103/169 |
| Surgery | 32.6 | 44/135 | 31.7 | 19/60 |
| GP | 79.3 | 134/169 | 78.1 | 345/442 |
| Paediatrics | 52.0 | 13/25 | 65.3 | 62/95 |
| Emergency medicine | 26.7 | 8/30 | 39.1 | 9/23 |
| Obstetrics and gynaecology | 10.0 | 1/10 | 40.7 | 11/27 |
| Anaesthesia | 60.0 | 48/80 | 71.1 | 59/83 |
| Radiology | 95.7 | 22/23 | 80.0 | 24/30 |
| Clinical oncology | 80.0 | 8/10 | 63.2 | 12/19 |
| Pathology | 89.3 | 25/28 | 74.3 | 26/35 |
| Psychiatry | 86.2 | 25/29 | 89.4 | 42/47 |
| Partner/spouse status | | | | |
| Medical spouse | 53.4 | 172/322 | 70.3 | 281/400 |
| Non-medical spouse | 62.4 | 181/290 | 72.7 | 339/466 |
| No spouse | 51.3 | 40/78 | 56.1 | 92/164 |
| Working hours | | | | |
| Full time | 55.8 | 364/652 | 61.5 | 390/634 |
| Less than full time | 76.3 | 29/38 | 81.3 | 322/396 |

Statistical tests on % agreement:

Children (χ^2_1): Men 0.2 (p=0.687), Women 36.5

Specialty group (χ^2_{10}): Men 138.0, Women 93.4

Partner/spouse status (χ^2_2): Men 6.2 (p=0.045), Women 16.1

Working hours (χ^2_1): Men 5.3 (p=0.021), Women 43.8

All p<0.001 except where indicated.

Table 4: Responses to the question “How would you describe the level of support you received from employers in helping you to return to work after your most recent period of Maternity/Paternity/Adoption leave?”

| Group | Reply to question | | | Total N (100%) |
|------------------------------|-------------------------|---------------------|-------------------------|-------------------|
| | Excellent/good % (n) | Acceptable % (n) | Poor/very poor % (n) | |
| All | 49.6 (440) | 31.8 (282) | 18.6 (165) | 887 |
| Gender | | | | |
| Men | 58.7 (135) | 28.7 (66) | 12.6 (29) | 230 |
| Women | 46.4 (305) | 32.9 (216) | 20.7 (136) | 657 |
| Specialty | | | | |
| Hospital medical specialties | 50.4 (67) | 30.8 (41) | 18.8 (25) | 133 |
| Surgery | 47.8 (32) | 34.3 (23) | 17.9 (12) | 67 |
| GP | 51.1 (193) | 31.5 (119) | 17.5 (66) | 378 |
| Other hospital specialties | 46.7 (129) | 33.7 (93) | 19.6 (54) | 276 |
| Partner/spouse | | | | |
| Has spouse | 50.4 (432) | 21.0 (266) | 18.6 (159) | 857 |
| No spouse | 14 (3) | 62 (13) | 24 (5) | 21 |
| Working hours | | | | |
| Full time | 49.9 (264) | 31.0 (164) | 19.1 (101) | 529 |
| Less than full time | 49.0 (166) | 33.6 (114) | 17.4 (59) | 339 |

Statistical tests: Gender $\chi^2=12.5$, $p=0.002$; Specialty $\chi^2=1.5$, $p=0.96$; Partner/spouse $\chi^2=12.9$, $p=0.002$; Working hours $\chi^2=0.8$, $p=0.67$.

Appendix 1: Odds ratios and confidence intervals for the multivariable models on effect of having children and on family-friendliness (a, b and c, see footnotes)

| Group | a | | b | | c | |
|-------------------------------|-----------------|-------|----------------|-------|-----------------|-------|
| | OR (95% CI) | p | OR (95% CI) | p | OR (95% CI) | p |
| Gender | | | | | | |
| Male* | 1 | | 1 | | - | NS |
| Female | 2.9 (2.2, 3.8) | <.001 | - | NS | - | NS |
| Has child(ren) | | | | | | |
| Yes* | 1 | | 1 | | - | NS |
| No | 0.3 (0.2, 0.4) | <.001 | 0.6 (0.5, 0.8) | <.001 | - | NS |
| Specialty group | | | | | | |
| Hospital medical specialties* | 1 | | - | NS | 1 | |
| Surgery | 0.9 (0.6, 1.4) | 0.67 | - | NS | 0.5 (0.3, 0.7) | <.001 |
| GP | 8.1 (5.8, 11.5) | <.001 | - | NS | 2.8 (2.1, 3.7) | <.001 |
| Paediatrics | 0.8 (0.5, 1.3) | 0.29 | - | NS | 1.4 (0.9, 2.2) | 0.12 |
| Emergency medicine | 0.6 (0.3, 1.4) | 0.23 | - | NS | 0.4 (0.2, 0.8) | 0.01 |
| Obstetrics and gynaecology | 0.2 (0.1, 0.7) | 0.01 | - | NS | 0.4 (0.2, 0.9) | 0.02 |
| Anaesthesia | 1.5 (0.9, 2.3) | 0.1 | - | NS | 1.8 (1.2, 2.7) | 0.002 |
| Radiology | 5.6 (2.9, 10.8) | <.001 | - | NS | 6.4 (2.8, 14.6) | <.001 |
| Clinical oncology | 2.0 (0.8, 4.6) | 0.12 | - | NS | 2.2 (1, 5) | 0.06 |
| Pathology | 2.6 (1.4, 4.7) | 0.002 | - | NS | 4 (2, 7.7) | <.001 |
| Psychiatry | 1.4 (0.8, 2.5) | 0.27 | - | NS | 6.1 (2.9, 12.8) | <.001 |
| Partner/spouse status | | | | | | |
| Medical spouse* | - | NS | - | NS | - | NS |
| Non-medical spouse | - | NS | - | NS | - | NS |
| No spouse | - | NS | - | NS | - | NS |
| Working hours | | | | | | |
| Full time* | 1 | | 1 | | 1 | |
| Less than full time | 1.9 (1.4, 2.5) | <.001 | 1.2 (1.0, 1.6) | <.05 | 2.2 (1.7, 2.9) | <.001 |

Multivariable model based on numbers of doctors who replied 'yes' to a) Has the fact of having children, or of wanting to have children, influenced your choice of career specialty?; b) Do you regard the NHS as a family-friendly employer for doctors with children?; c) Do you regard your specialty as a family-friendly employer for doctors with children?

*Reference group for multivariable model.

'Multivariable' denotes binomial logistic regression result for each predictor with all other predictors in the model. We excluded cases where one or more predictors were missing, or where the dependent variable was missing, which reduced the sample size to 1716.

The Odds Ratios (OR) indicate the likelihood that a member of a group would regard the outcome variable as important, compared with a member of the reference group. Thus, for example, compared with a full-time doctor, a part-time doctor was twice as likely to regard children as an important influence on their choice of specialty.

Appendix 2: Numbers and percentages of respondents answering yes to the questions on family-friendliness^{ab}

| Respondent group | Total | | Have children | | No children | |
|---------------------------|-----------|-----------|---------------|-----------|-------------|-----------|
| | Male | Female | Male | Female | Male | Female |
| Total ^a | 39% (283) | 43% (475) | 40% (190) | 50% (348) | 37% (93) | 32% (127) |
| Total ^b | 57% (399) | 69% (724) | 57% (263) | 76% (509) | 55% (136) | 57% (215) |
| Medical specialties | 43% (65) | 60% (105) | 36% (33) | 67% (67) | 52% (32) | 51% (38) |
| Surgery | 32% (45) | 32% (20) | 35% (29) | 46% (12) | 29% (16) | 22% (8) |
| GP | 79% (136) | 78% (351) | 81% (97) | 82% (271) | 75% (39) | 67% (80) |
| Other hospital: | 63% (153) | 68% (248) | 64% (104) | 74% (159) | 63% (49) | 60% (89) |
| <i>Paediatrics</i> | 54% (14) | 66% (63) | 47% (9) | 73% (43) | 71% (5) | 54% (20) |
| <i>Emergency medicine</i> | 27% (8) | 39% (9) | 25% (5) | 25% (3) | 30% (3) | 55% (6) |
| <i>Anaesthesia</i> | 59% (48) | 71% (59) | 62% (37) | 74% (31) | 50% (11) | 68% (28) |
| <i>Radiology</i> | 92% (22) | 77% (24) | 100% (15) | 95% (20) | 78% (7) | 40% (4) |
| <i>Clinical Oncology</i> | 80% (8) | 63% (12) | 71% (5) | 67% (6) | 100% (3) | 60% (6) |
| <i>Pathology</i> | 90% (26) | 74% (26) | 86% (18) | 83% (19) | 100% (8) | 58% (7) |
| <i>Psychiatry</i> | 87% (26) | 88% (44) | 94% (15) | 91% (29) | 79% (11) | 83% (15) |

^a Question wording: 'Do you regard the NHS as a family-friendly employer for doctors with children?'

^b Question wording: 'Do you regard your specialty as a family-friendly employer for doctors with children?' (and all lines below Total^b)

1 **Manuscript ID bmjopen-2017-016822 entitled “Children and medical careers, some influences**
 2 **and experiences: questionnaire survey of the UK medical graduates of 2002”onse to**
 3 **Reviewers**

4 Trevor W Lambert, Fay Smith, Michael J Goldacre

5 **STROBE Statement**

| | Item No | Recommendation | |
|---------------------------|---------|---|------|
| Title and abstract | 1 | (a) Indicate the study’s design with a commonly used term in the title or the abstract | DONE |
| | | (b) Provide in the abstract an informative and balanced summary of what was done and what was found | DONE |
| Introduction | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | DONE |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | DONE |
| Methods | | | |
| Study design | 4 | Present key elements of study design early in the paper | DONE |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | DONE |
| Participants | 6 | (a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up | DONE |
| | | (b) For matched studies, give matching criteria and number of exposed and unexposed | N/A |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | DONE |
| 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 | DONE |
| Bias | 9 | Describe any efforts to address potential sources of bias | DONE |
| Study size | 10 | Explain how the study size was arrived at | DONE |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | DONE |
| Statistical methods | 12 | (a) Describe all statistical methods, including those used to control for confounding | DONE |
| | | (b) Describe any methods used to examine subgroups and interactions | DONE |
| | | (c) Explain how missing data were addressed | DONE |
| | | (d) If applicable, explain how loss to follow-up was addressed | N/A |
| | | (e) Describe any sensitivity analyses | N/A |
| Results | | | |
| 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 | DONE |
| | | (b) Give reasons for non-participation at each stage | DONE |
| | | (c) Consider use of a flow diagram | N/A |

| | | | | |
|----|--------------------------|-----|--|------|
| 1 | Descriptive data | 14* | (a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders | DONE |
| 2 | | | (b) Indicate number of participants with missing data for each variable of interest | DONE |
| 3 | | | (c) Summarise follow-up time (eg, average and total amount) | DONE |
| 4 | Outcome data | 15* | Report numbers of outcome events or summary measures over time | DONE |
| 5 | 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 | DONE |
| 6 | | | (b) Report category boundaries when continuous variables were categorized | N/A |
| 7 | | | (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period | N/A |
| 8 | Other analyses | 17 | Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses | DONE |
| 9 | Discussion | | | |
| 10 | Key results | 18 | Summarise key results with reference to study objectives | DONE |
| 11 | 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 | DONE |
| 12 | Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | DONE |
| 13 | Generalisability | 21 | Discuss the generalisability (external validity) of the study results | DONE |
| 14 | Other information | | | |
| 15 | 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 | DONE |

*Give information separately for exposed and unexposed groups.

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 <http://www.strobe-statement.org>.

BMJ Open

Combining parenthood with a medical career: questionnaire survey of the UK medical graduates of 2002 covering some influences and experiences

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Manuscripts

1 **Combining parenthood with a medical career: questionnaire survey of the UK**
2 **medical graduates of 2002 covering some influences and experiences**

3
4 **Short title: Combining parenthood with a medical career**

5
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18
19 **Word count:** [3335 words]

27 **ABSTRACT**

28

29 **Objectives:** To report the self-assessed views of a cohort of medical graduates about the
30 impact of having (or wanting to have) children on their specialty choice; and the extent to
31 which their employer was supportive of doctors with children.

32 **Setting:** United Kingdom (UK).

33 **Participants:** UK medical graduates of 2002 surveyed by post and email in 2014.

34 **Results:** The response rate was 64.2% (2057/3205). Most respondents were living with a
35 spouse or partner (86%) and, of these, 49% had a medical spouse. Having children, or
36 wanting to have children, had influenced specialty choice for 47% of respondents; for 56% of
37 doctors with children and 29% of doctors without children; for 59% of women and 28% of
38 men; and for 78% of general practitioners compared with 27% of hospital doctors and 18%
39 of surgeons. 42% of respondents regarded the NHS as a family-friendly employer, and 64%
40 regarded their specialty as family-friendly. More general practitioners (78%) than doctors in
41 hospital specialties (56%) regarded their specialty as family-friendly, whilst only 32% of
42 surgeons did so.

43 Of those who had taken maternity/paternity/adoption leave, 49% rated the levels of support
44 they had received in doing so as *excellent/good*, 32% said it was *acceptable* and 18% said
45 the support had been *poor/very poor*.

46 **Conclusions:** Having children is a major influence when considering specialty choice for
47 many doctors, especially women and general practitioners. Surgeons are least influenced in
48 their career choice by the prospect of parenthood. Almost half of doctors in hospital
49 specialties regard their specialty as family-friendly.

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51 [250 words]

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Strengths and limitations

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- This was a national study, with a good level of response, of doctors who graduated from UK medical schools in 2002.
 - The doctors were surveyed in their mid-thirties, 12 years after they had graduated – a time by which about two thirds of doctors have children.
 - The response rate was high for a self-completed survey.
 - However, some level of non-responder bias is, as with all surveys, a possibility.
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Keywords: Physicians, junior; workforce; medical; family relations, quality of life.

BACKGROUND

Many factors may affect doctors' Work-Life Balance (WLB). These include factors related to their work, such as their stage of training, specialty, seniority and working pattern; and personal factors including whether or not the doctor has children, whether they live with a spouse or partner, and their gender. Longer work hours are associated with a higher possibility of work-home 'conflict', which in turn is associated, research suggests, with increased likelihood of burnout. [1] Women doctors in the United States (US) were found to have a higher divorce rate than men doctors: greater work hours among women were associated with increased divorce prevalence, but not among men. [2] A Swiss study found that women doctors, especially those with children, have lower rates of employment and lower levels of career success than male doctors; the women doctors in the study showed higher levels of life satisfaction – regardless of parenthood status.[3] A review of women physicians' status and experiences in Japan, Scandinavia, Russia, and Eastern Europe found that women were underrepresented in leadership positions even in countries where they were well represented in the workforce. [4] Despite differences between these countries in terms of women's participation in medicine, societal norms and policies - gender differences remain across specialties and within 'the medical hierarchy'. [4]

Women doctors consider future WLB when making their career choices.[5] In the United Kingdom (UK), domestic circumstances and working hours were of more importance to women doctors than to men doctors when choosing a career specialty.[6] There are clear differences in specialty choice between men and women, with surgery being chosen by a predominance of men, and general practice, paediatrics, and obstetrics and gynaecology being chosen by a predominance of women.[7 8] A UK study found that only 40% of female doctors report taking on roles in addition to their clinical work, compared with 87% of male doctors. [9] Female GPs, especially those with children, have been found to be less involved in education, training, primary care trusts (management organisations covering general/family practice), and hospital service delivery than male GPs.[10]

1 93
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3 94 We undertook a multi-purpose survey of all UK-trained doctors who graduated in 2002,
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5 95 twelve years after qualification in 2014. The main objective of this paper is to report on the
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7 96 self-assessed views of these doctors about the impact of having (or wanting to have)
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9 97 children on their specialty choice. Secondary objectives were to report doctors' views about
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11 98 how family-friendly they felt the National Health Service (NHS) was generally for doctors with
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13 99 children and specifically in their specialty. We compared the replies of men and women, of
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15 100 those with and without children, and of those working in different areas of medicine.
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17 101

102 **METHODS**

103 The UK Medical Careers Research Group surveyed the UK medical graduates of 2002. We
104 sent identical web-based and postal questionnaires twelve years after qualification (in 2014).
105 Up to four reminders were sent to non-respondents. Further details of the methodology are
106 available elsewhere.[11]

107
108 Contact details for doctors were supplied to us by the General Medical Council (GMC) under
109 a data sharing agreement. The original cohort size of 4436 (2460 women, 1976 men, 55.5%
110 female) was reduced by 6 deceased doctors (1 man, 5 women), 71 doctors (45 men, 26
111 women) who asked to be excluded, and 290 doctors (113 men, 177 women) for whom the
112 GMC could not supply a current address or email. A further 864 doctors (507 men, 357
113 women) who had not replied to any of our previous surveys of the cohort were excluded from
114 the study due to a GMC embargo which restricted our survey to previous respondents. This
115 left a target population for the survey of 3205 (1895 women, 1310 men, 59.1% female).

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117 The rationale for timing the survey approximately 12 years after graduation was that the
118 majority of the target population were of peak childbearing age and were likely to be
119 particularly aware of health service provision with regard to employment and family
120 formation.

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3 122 We asked the following questions about family formation and children: *'Has the fact of*
4
5 123 *having children, or of wanting to have children, influenced your choice of career specialty?'*
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7 124 *'Do you regard the NHS as a family-friendly employer for doctors with children?'*, *'Do you*
8
9 125 *regard your specialty as a family-friendly specialty for doctors with children?'*. Each of these
10
11 126 questions had the options of Yes, No, *Don't know*, or *Prefer not to answer*.

127

128 Finally, we asked relevant doctors *'How would you describe the level of support you*
129 *received from employers in helping you to return to work after your most recent period of*
130 *Maternity/Paternity/Adoption leave?'* (with the options of *Excellent, Good, Acceptable, Poor,*
131 *Very poor, Did not return, or Prefer not to answer*). In analysis we combined responses of
132 excellent and good and refer to the combined group as 'excellent/good', and we similarly
133 combined poor and very poor to form 'poor/very poor', thereby reducing the five response
134 categories of assessment to three.

135

136 The data were initially analysed by univariable crosstabulation. To test statistical significance
137 we used chi-square statistics, Mann-Whitney tests and Kruskal-Wallis tests. Responses of
138 groups of doctors were compared using the following factors: gender; specialty (except
139 where otherwise stated, grouped by us for analysis into four groups: hospital medical
140 specialties, surgical specialties, general practice / family medicine (GP), other hospital-based
141 specialties combined); whether or not the doctor had children; whether or not the doctor had
142 a spouse / partner; and whether or not any spouse / partner was medically qualified. Under
143 the group 'hospital medical specialties' we included the following: general medicine,
144 cardiology, dermatology, endocrinology, geriatrics, nephrology, neurology, chest medicine,
145 rheumatology/rehabilitation, academic medicine, genito-urinary medicine, genetics,
146 gastroenterology, clinical pharmacology, infectious diseases, and occupational medicine.
147 Under 'other hospital-based specialties' we combined the following: paediatrics, emergency
148 medicine, obstetrics & gynaecology, anaesthesia, radiology, clinical oncology, psychiatry

1 149 and pathology. We used multivariable binary logistic regression to assess the joint effect of
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3 150 factors.

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9 153 **RESULTS**

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13 155 **Response rate**

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17 157 The response rate from the target population (see Method) was 64.2% (2057/3205). Among
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19 158 women the response rate was 66.0% (1250/1895) and among men it was 61.6% (807/1310).
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21 159 60.8% of respondents were women compared with 55.5% in the original cohort (i.e. prior to
22
23 160 the exclusions).
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27 162 **Overview of the sample**

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31 164 Of the 2057 respondents, 91.4% (N=1880) told us they were working in medicine in the UK,
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33 165 5.4% (111) were working in medicine outside the UK, and the remainder were in
34
35 166 employment outside medicine (1.3%, 26), not in paid employment (1.4%, 28), or did not give
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37 167 employment details (0.6%, 12).
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41 169 We focused on the 1880 in UK medical employment. Of these, 60.5% were female, and
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43 170 39.5% male. The median age of the respondents was 35.4 years. Most respondents were
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45 171 living with a spouse or partner (86.0%). Of those living with a spouse, 49.2% had a medical
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47 172 spouse. Of 1763 doctors who told us how many children aged under 16 years were resident
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49 173 in their household, 32.7% answered none, 22.6% had one, 35.2% had two, and 9.5% had
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51 174 more than two. The average age of the eldest child was 3.7 years (SD=2.7). 75.3% of
52
53 175 respondents in UK medical employment were working full-time. GPs were more likely to be
54
55 176 working part-time (42.5%) than doctors working in other specialties (15.1%).
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3 178 Women were much less likely than men to be working full-time (men 94.4% (695/736),
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5 179 women 62.6% (696/1112); $\chi^2_1=239.5$, $p<0.001$). Within general practice 84.3% of men and
6
7 180 47.3% of women were working full-time (150/178 and 221/467; $\chi^2_1=70.5$, $p<0.001$). Within
8
9 181 hospital practice 97.8% of men and 73.5% of women were working full-time (534/546 and
10
11 182 456/620; $\chi^2_1=131.4$, $p<0.001$). Women were more likely than men to have no spouse or
12
13 183 partner (men 11.1% (80/720), women 15.9% (173/1097); $\chi^2_1=7.8$, $p=0.005$). Among those
14
15 184 with a spouse or partner, men were more likely than women to have a medically qualified
16
17 185 spouse or partner (men 53.0% (338/638), women 46.6% (426/914); $\chi^2_1=5.8$, $p=0.016$).
18
19 186 Women and men were equally likely to have children (men 67.3% (477/709), women 67.3%
20
21 187 (709/1054); $\chi^2_1=0.0$, $p=1.0$).
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25 189 **Responses to the question: 'Has the fact of having children, or of wanting to have**
26
27 190 **children, influenced your choice of career specialty?'**
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29 191 Of all respondents who were working in medicine in the UK and who answered the question
30
31 192 (N=1811), 47% answered *yes* and 53% answered *no/don't know*.
32

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34
35 194 To examine differences in response by gender, having children, specialty group,
36
37 195 partner/spouse status, and working hours, we reduced the working data to the 1716 doctors
38
39 196 who had complete data for the five predictors.
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42 197 Each of these five predictors showed significant ($p<0.001$) variation when analysed in
43
44 198 isolation (Table 1): 59% of women and 28% of men agreed that consideration of children
45
46 199 had influenced their career choice; 56% of doctors with children and 29% of doctors without
47
48 200 children agreed; 18% of surgeons, 27% of doctors in the hospital medical specialties, 34% of
49
50 201 doctors in other hospital specialties, and 78% of doctors in general practice agreed; 50% of
51
52 202 doctors with a medically qualified spouse, 49% of doctors with a non-medical spouse, and
53
54 203 30% of doctors with no spouse agreed; and 37% of doctors who worked full time agreed
55
56 204 compared with 76% of doctors who worked less than full time.
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1 205 A multivariable logistic regression model was then fitted, starting with all five predictors in the
2
3 206 model. Partner/spouse status was found not to be a significant predictor. The other four
4
5 207 predictors were retained. No interaction terms between predictors were found to improve the
6
7 208 fit of the model. The significance of specialty group as a predictor was due to the difference
8
9 209 between the responses of GPs and radiologists compared with those of other specialty
10
11 210 groups. Appendix 1 shows odds ratios and confidence intervals for the multivariable model
12
13 211 by specialty group with four significant factors (the specialty, gender, having children, and
14
15 212 full- or part-time working).

16
17
18 213 Among women with children 91% (300/331) of GPs and 51% (172/336) of hospital doctors
19
20 214 agreed that consideration of children had influenced their career choice, while among men
21
22 215 with children, 75% (92/122) of GPs and 21% (70/334) of hospital doctors agreed.

23
24
25 216 Among women without children, 61% (68/112) of GPs and 28% (69/247) of hospital doctors
26
27 217 agreed, while among men without children 40% (19/48) of GPs and 7% (14/186) of hospital
28
29 218 doctors agreed.

30
31
32 219 Comparison of agreement rates for women hospital doctors with children showed that 43%
33
34 220 (84/196) of those working full time agreed that consideration of children had influenced their
35
36 221 career choice, compared with 63% (88/140) of those working part-time. Among women GPs
37
38 222 with children the equivalent figures for full timers and less than full timers were much closer
39
40 223 at 87% (117/135) and 93% (183/196). Numbers of men working less than full time were
41
42 224 insufficient (38 in all) for meaningful comparisons with those working full time.

43
44
45 225 **Responses to the question: 'Do you regard the NHS as a family-friendly employer for**
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47 226 **doctors with children?'**

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50 227 Of all respondents, 42% answered *yes*, and 58% answered *no/don't know*. To examine
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52 228 differences in response by gender, having children, specialty group, partner/spouse status,
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54 229 and working hours, we reduced the subjects to the 1720 doctors who had complete data for
55
56 230 the five predictors.

1 231 Three of these five predictors showed significant ($p < 0.01$) variation when analysed in
2
3 232 isolation (Table 2): more doctors with children (47%) than doctors without children (35%)
4
5 233 regarded the NHS as a family-friendly employer for doctors with children; 44% of doctors
6
7 234 with a medically qualified spouse, 45% of doctors with a non-medical spouse, and 33% of
8
9 235 doctors with no spouse agreed; and 41% of doctors who worked full time agreed compared
10
11 236 with 49% of doctors who worked less than full time.

14 237 A multivariable logistic regression model was fitted, starting with all three predictors which
15
16 238 were significant univariably. Partner/spouse status was found not to be a significant
17
18 239 predictor. The other two predictors were retained. The interaction term between the
19
20 240 remaining two predictors did not improve the fit of the model. Appendix 1 shows odds ratios
21
22 241 and confidence intervals for the multivariable model with two significant factors (specialty
23
24 242 group, and working hours).

27 243 Among women with children 45% (148/330) of GPs and 56% (189/335) of hospital doctors
28
29 244 agreed that the NHS is a family-friendly employer for doctors with children, while among men
30
31 245 with children 42% (51/122) of GPs and 40% (135/335) of hospital doctors agreed.

34 246 Among women without children, 30% (34/112) of GPs and 34% (86/250) of hospital doctors
35
36 247 agreed, while among men without children 35% (17/49) of GPs and 39% (72/187) of hospital
37
38 248 doctors agreed.

41 249 Comparison of agreement rates for women hospital doctors with children showed that 52%
42
43 250 (102/196) of those working full time agreed that the NHS is a family-friendly employer for
44
45 251 doctors with children, compared with 63% (87/139) of those working part-time. Among
46
47 252 women GPs with children the equivalent figures for full timers and less than full timers were
48
49 253 closer at 43% (58/135) and 46% (90/195). Numbers of men working less than full time were
50
51 254 insufficient (38 in all) for meaningful comparisons with those working full time. Results are
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53 255 shown in Appendix 2 for specialties within our 'other hospital specialties' group, though the
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1 256 percentages are based on small counts, are not suitable for multivariable modelling, and
2
3 257 should be interpreted with caution.
4
5

6 258 **Responses to the question: ‘Do you regard your specialty as a family-friendly**
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8 259 **specialty for doctors with children?’**
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10
11 260 Of all respondents, 64% of doctors answered *yes* and 36% answered *no/don’t know*. To
12
13 261 examine differences in response by gender, having children, specialty group, partner/spouse
14
15 262 status, and working hours, we reduced the working data to the 1720 doctors who had
16
17 263 complete data for the five predictors.
18

19
20 264 Each of these five predictors showed significant ($p<0.001$) variation when analysed in
21
22 265 isolation (Table 3): 69% of women and 57% of men agreed that their specialty is a family-
23
24 266 friendly employer for doctors with children; 68% of doctors with children and 57% of doctors
25
26 267 without children agreed; 32% of surgeons, 53% of doctors in the hospital medical specialties,
27
28 268 88% of psychiatrists, and 78% of doctors in general practice agreed; 63% of doctors with a
29
30 269 medically qualified spouse, 69% of doctors with a non-medical spouse, and 55% of doctors
31
32 270 with no spouse agreed; and 59% of doctors who worked full time agreed compared with 81%
33
34 271 of doctors who worked less than full time.
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37 272 A multivariable logistic regression model was fitted, starting with all five predictors in the
38
39 273 model. Gender, having children and partner/spouse status were not found to be significant
40
41 274 predictors. The other two predictors (specialty group and working hours) were retained. The
42
43 275 interaction term between these two predictors did not improve the fit of the model. Doctors
44
45 276 from the following specialty groups differed significantly in their responses to this question
46
47 277 from doctors in the hospital medical specialties group: those in Surgery were less likely to
48
49 278 agree that their specialty was family-friendly, while those in GP, Radiology, Pathology, and
50
51 279 Psychiatry were more likely to agree. Appendix 1 shows odds ratios and confidence intervals
52
53 280 for the multivariable model with two significant factors (specialty group, and working hours).
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57 281 Results are shown in Appendix 2 for specialties within our ‘other hospital specialties’ group.
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1 282 **Level of support received on return to work**

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3
4 283 Of 887 doctors who described the level of support received on their return to work after
5
6 284 having a child, 18% said the support had been *poor/very poor* (Table 4). Men rated the level
7
8 285 of support more highly than did women. There were no significant differences by specialty
9
10 286 group or by working hours. The small number of respondents without a partner appeared to
11
12 287 score their support more negatively. See footnote to Table 4 for statistical results.
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19 290 **DISCUSSION**

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23 292 **Main findings**

24
25 293 Almost half of all respondents said that having children, or wanting to have children, had
26
27 294 influenced their specialty choice. More doctors with children, more women than men, more
28
29 295 doctors who worked less than full time than those who worked full time, and more GPs than
30
31 296 hospital doctors agreed with this statement. Although more doctors living with a
32
33 297 spouse/partner than those without agreed that having children had influenced their specialty
34
35 298 choice, this difference was not significant after adjustment for these other factors. No
36
37 299 difference was observed between doctors with a medical spouse and doctors with a non-
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39 300 medical spouse.
40

41 301

42
43 302 Two fifths of doctors regarded the NHS as a family-friendly employer for doctors with
44
45 303 children and two thirds regarded their specialty as a family-friendly employer for doctors with
46
47 304 children. More women than men agreed with the latter statement. Three quarters of GPs
48
49 305 regarded their specialty as family-friendly, whilst only a third of surgeons did so.
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52
53 307 Almost half of doctors said that the levels of support they had received when taking
54
55 308 maternity/paternity/adoption leave was *excellent/good*, though one in five said the support
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1 309 had been *poor/very poor*. More men than women doctors rated the level of support as
2
3 310 *excellent/good*. Of those doctors living with a spouse, half had a medical spouse. More
4
5 311 doctors living with a spouse/partner rated their level of leave support as *excellent/good* than
6
7 312 doctors not living with a spouse; and more doctors living with a medical spouse than doctors
8
9 313 with a non-medical spouse rated this support as *excellent/good*.

10 314

11
12
13 315 Although it is not explicit in our study, there is interplay between doctors' views of
14
15 316 parenthood and the effect it may have on their careers and career choices, and the level of
16
17 317 support available within different parts of the health service to doctors who are parents.
18
19 318 Concepts such as family-friendliness may be hard to reconcile with the working requirements
20
21 319 of certain specialty areas, particularly those in which unanticipated acute conditions may
22
23 320 present which require treatment of unknown length or at unsocial times of day or night. The
24
25 321 challenge is to manage work in these areas to improve family-friendliness without
26
27 322 compromising patient care, at a time when the health service is under unprecedented
28
29 323 pressures.

30 324

31 325 **Strengths and limitations**

32
33
34 326 This was a national study, with a good level of response, of doctors who graduated from UK
35
36 327 medical schools in 2002. The doctors were surveyed in their mid-thirties, 12 years after they
37
38 328 had graduated – a time by which about two thirds of doctors have children [12] and would be
39
40 329 able to respond from their own experience to questions about the family friendliness, or
41
42 330 otherwise, of the health service. The response rate was high for a self-completed survey.
43
44 331 However, some level of non-responder bias is, as with all surveys, a possibility. The good
45
46 332 response rate, the recency of the survey, and the inclusion of most of the doctors who have
47
48 333 had children in the 2002 cohort, indicate that these findings are probably generalisable to
49
50 334 doctors who are considering the impact of having children on their specialty choice in
51
52 335 England at present.

1 336 The first of our questions asked whether having, or wanting to have, children had influenced
2
3 337 the doctors' choice of career specialty. A degree of recall bias is possible in the replies to
4
5 338 this question. However, many doctors will have considered the implications of having a
6
7 339 family at the time when they were making their career choices.
8

9 340

11 341 **Comparison with existing literature**

13 342 Our respondents told us that considerations of parenthood influenced their specialty choice,
14
15 343 and we found that more women than men agreed with this, as did doctors with children.

17 344 Other research in the UK has found that women in particular cite considerations of WLB as
18
19 345 the most common reason for not pursuing certain career specialties.[13] Research in the US
20
21 346 found that 78% of women believe that their career has been restricted by having
22
23 347 children.[14] Parenthood status has also been found to affect the career development of
24
25 348 doctors, with parents being less likely to hold a senior role than doctors without children.[15]

27 349 We found that more GPs than hospital doctors say that parenthood influenced their specialty
28
29 350 choice. A Swiss study found that more family doctors than hospital doctors are married, and
30
31 351 more of them have children.[16] A large-scale Australian study of GPs found that about half
32
33 352 of the GPs were content with their WLB, and women reported a better WLB than men.[17]
34
35 353 One study reported that Australian medical students believed that 'family commitments' were
36
37 354 very important when making career decisions, and female students believed that working
38
39 355 part-time was important for WLB.[18]
40

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47 359 We found that surgeons were less likely to agree that their specialty was family-friendly than
48
49 360 were doctors who worked in other specialties. In the US, surgeons have been reported to
50
51 361 face major challenges when trying to balance their personal and professional lives.[19] In the
52
53 362 UK, despite rising numbers of female surgical trainees, the number of LTFT posts available
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55 363 is inadequate.[20]
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Doctors living with a spouse were more positive than doctors without a spouse about support received when taking leave; and of those doctors with a spouse, doctors in dual-doctor relationships were the most positive. There could be financial reasons for this, as one study points out, those in dual-doctor relationships may be able to make lifestyle choices due to their high joint income.[21] This same study found that having a medically qualified spouse was associated with reduced hours in clinical practice.

372 **Implications / conclusions**

373 Parenthood is a key influence in choosing general practice as a career. It is noteworthy that 374 considerations of parenthood should have such a profound effect on doctors' career choice. 375 Doctors in other specialties, especially surgery, are not influenced to the same extent by 376 parenthood considerations when choosing their specialty. Policy-makers should address the 377 fact that only half of doctors working in specialties other than general practice regard their 378 specialty as family-friendly.

380 **Declarations**

381 Ethical approval: National Research Ethics Service, following referral to the Brighton and 382 Mid-Sussex Research Ethics Committee in its role as a multi-centre research ethics 383 committee (ref 04/Q1907/48 amendment Am02 March 2015).

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42 412 **References**

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Table 1: Responses to the question 'Has the fact of having children, or of wanting to have children, influenced your choice of career specialty?' (numbers and percentages of doctors who replied 'yes')

| Group | Men | | Women | |
|------------------------------|-------------|---------|-------------|----------|
| | % agreement | n/N | % agreement | n/N |
| All | 28.3 | 195/690 | 59.4 | 609/1026 |
| Has child(ren) | | | | |
| Yes | 35.5 | 162/456 | 70.8 | 472/667 |
| No | 14.1 | 33/234 | 38.2 | 137/359 |
| Specialty | | | | |
| Hospital medical specialties | 13.5 | 20/148 | 38.5 | 65/169 |
| Surgery | 14.0 | 19/136 | 28.8 | 17/59 |
| GP | 65.3 | 111/170 | 83.1 | 368/443 |
| Paediatrics | 8.0 | 2/25 | 35.1 | 33/94 |
| Emergency medicine | 10.3 | 3/29 | 26.1 | 6/23 |
| Obstetrics and gynaecology | 10.0 | 1/10 | 11.5 | 3/26 |
| Anaesthesia | 11.1 | 9/81 | 52.4 | 43/82 |
| Radiology | 50.0 | 12/24 | 73.3 | 22/30 |
| Clinical oncology | 20.0 | 2/10 | 50.0 | 9/18 |
| Pathology | 28.6 | 8/28 | 62.9 | 22/35 |
| Psychiatry | 27.6 | 8/29 | 44.7 | 21/47 |
| Partner/spouse status | | | | |
| Medical spouse | 27.7 | 89/321 | 68.4 | 273/399 |
| Non-medical spouse | 32.2 | 94/292 | 59.7 | 276/462 |
| No spouse | 15.6 | 12/77 | 36.4 | 60/165 |
| Working hours | | | | |
| Full time | 26.5 | 173/652 | 47.9 | 301/628 |
| Less than full time | 57.9 | 22/38 | 77.4 | 308/398 |

Statistical tests on % agreement:

Children (χ^2_1): Men 34.0, Women 101.5

Specialty group (χ^2_{10}): Men 173.6, Women 223.9

Partner/spouse status (χ^2_2): Men 8.4 (p=0.015), Women 49.8

Working hours (χ^2_1): Men 15.9, Women 86.4

All p<0.001 except where indicated.

Table 2: Responses to the question ‘Do you regard the NHS as a family-friendly employer for doctors with children?’ (numbers and percentages of doctors who replied ‘yes’)

| Group | Men | | Women | |
|------------------------------|-------------|---------|-------------|----------|
| | % agreement | n/N | % agreement | n/N |
| All | 39.7 | 275/693 | 44.5 | 457/1027 |
| Has child(ren) | | | | |
| Yes | 40.7 | 186/457 | 50.7 | 337/665 |
| No | 37.7 | 89/236 | 33.1 | 120/362 |
| Specialty | | | | |
| Hospital medical specialties | 40.4 | 61/151 | 41.2 | 70/170 |
| Surgery | 37.8 | 51/135 | 39.0 | 23/59 |
| General Practice | 39.8 | 68/171 | 41.2 | 182/442 |
| Paediatrics | 32.0 | 8/25 | 46.3 | 44/95 |
| Emergency medicine | 50.0 | 15/30 | 52.4 | 11/21 |
| Obstetrics and gynaecology | 10.0 | 1/10 | 48.1 | 13/27 |
| Anaesthesia | 43.2 | 35/81 | 48.8 | 40/82 |
| Radiology | 47.8 | 11/23 | 56.7 | 17/30 |
| Clinical oncology | 40.0 | 4/10 | 47.4 | 9/19 |
| Pathology | 42.9 | 12/28 | 51.4 | 18/35 |
| Psychiatry | 31.0 | 9/29 | 63.8 | 30/47 |
| Partner/spouse status | | | | |
| Medical spouse | 40.2 | 130/323 | 46.1 | 184/399 |
| Non-medical spouse | 39.9 | 117/293 | 47.5 | 221/465 |
| No spouse | 36.4 | 28/77 | 31.9 | 52/163 |
| Working hours | | | | |
| Full time | 40.0 | 262/655 | 41.0 | 259/631 |
| Less than full time | 34.2 | 13/38 | 50.0 | 198/396 |

Statistical tests on % agreement:
 Children (χ^2_1): Men 0.5 (p=0.496), Women 28.4
 Specialty group (χ^2_{10}): Men 8.0 (p=0.634), Women 14.5 (p=0.150),
 Partner/spouse status (χ^2_2): Men 0.4 (p=0.817), Women 12.6 (p=0.002)
 Working hours (χ^2_1): Men 0.3 (p=0.590), Women 7.5 (p=0.006)
 All p<0.001 except where indicated.

Table 3: Responses to the question ‘Do you regard your specialty as a family-friendly employer for doctors with children?’ (numbers and percentages of doctors who replied ‘yes’)

| Group | Men | | Women | |
|------------------------------|-------------|---------|-------------|----------|
| | % agreement | n/N | % agreement | n/N |
| All | 57.0 | 393/690 | 69.1 | 712/1030 |
| Has child(ren) | | | | |
| Yes | 57.6 | 261/453 | 75.6 | 505/668 |
| No | 55.7 | 132/237 | 57.2 | 207/362 |
| Specialty | | | | |
| Hospital medical specialties | 43.0 | 65/151 | 60.9 | 103/169 |
| Surgery | 32.6 | 44/135 | 31.7 | 19/60 |
| GP | 79.3 | 134/169 | 78.1 | 345/442 |
| Paediatrics | 52.0 | 13/25 | 65.3 | 62/95 |
| Emergency medicine | 26.7 | 8/30 | 39.1 | 9/23 |
| Obstetrics and gynaecology | 10.0 | 1/10 | 40.7 | 11/27 |
| Anaesthesia | 60.0 | 48/80 | 71.1 | 59/83 |
| Radiology | 95.7 | 22/23 | 80.0 | 24/30 |
| Clinical oncology | 80.0 | 8/10 | 63.2 | 12/19 |
| Pathology | 89.3 | 25/28 | 74.3 | 26/35 |
| Psychiatry | 86.2 | 25/29 | 89.4 | 42/47 |
| Partner/spouse status | | | | |
| Medical spouse | 53.4 | 172/322 | 70.3 | 281/400 |
| Non-medical spouse | 62.4 | 181/290 | 72.7 | 339/466 |
| No spouse | 51.3 | 40/78 | 56.1 | 92/164 |
| Working hours | | | | |
| Full time | 55.8 | 364/652 | 61.5 | 390/634 |
| Less than full time | 76.3 | 29/38 | 81.3 | 322/396 |

Statistical tests on % agreement:
 Children (χ^2_1): Men 0.2 (p=0.687), Women 36.5
 Specialty group (χ^2_{10}): Men 138.0, Women 93.4
 Partner/spouse status (χ^2_2): Men 6.2 (p=0.045), Women 16.1
 Working hours (χ^2_1): Men 5.3 (p=0.021), Women 43.8
 All p<0.001 except where indicated.

Table 4: Responses to the question “How would you describe the level of support you received from employers in helping you to return to work after your most recent period of Maternity/Paternity/Adoption leave?”

| Group | Reply to question | | | Total N (100%) |
|------------------------------|-------------------------|---------------------|-------------------------|-------------------|
| | Excellent/good % (n) | Acceptable % (n) | Poor/very poor % (n) | |
| All | 49.6 (440) | 31.8 (282) | 18.6 (165) | 887 |
| Gender | | | | |
| Men | 58.7 (135) | 28.7 (66) | 12.6 (29) | 230 |
| Women | 46.4 (305) | 32.9 (216) | 20.7 (136) | 657 |
| Specialty | | | | |
| Hospital medical specialties | 50.4 (67) | 30.8 (41) | 18.8 (25) | 133 |
| Surgery | 47.8 (32) | 34.3 (23) | 17.9 (12) | 67 |
| GP | 51.1 (193) | 31.5 (119) | 17.5 (66) | 378 |
| Other hospital specialties | 46.7 (129) | 33.7 (93) | 19.6 (54) | 276 |
| Partner/spouse | | | | |
| Has spouse | 50.4 (432) | 21.0 (266) | 18.6 (159) | 857 |
| No spouse | 14 (3) | 62 (13) | 24 (5) | 21 |
| Working hours | | | | |
| Full time | 49.9 (264) | 31.0 (164) | 19.1 (101) | 529 |
| Less than full time | 49.0 (166) | 33.6 (114) | 17.4 (59) | 339 |

Statistical tests: Gender $\chi^2=12.5$, $p=0.002$; Specialty $\chi^2=1.5$, $p=0.96$; Partner/spouse $\chi^2=12.9$, $p=0.002$; Working hours $\chi^2=0.8$, $p=0.67$.

Appendix 1: Odds ratios and confidence intervals for the multivariable models on effect of having children and on family-friendliness (a, b and c, see footnotes)

| Group | a | | b | | c | |
|-------------------------------|-----------------|-------|----------------|-------|-----------------|-------|
| | OR (95% CI) | p | OR (95% CI) | p | OR (95% CI) | p |
| Gender | | | | | | |
| Male* | 1 | | 1 | | - | NS |
| Female | 2.9 (2.2, 3.8) | <.001 | - | NS | - | NS |
| Has child(ren) | | | | | | |
| Yes* | 1 | | 1 | | - | NS |
| No | 0.3 (0.2, 0.4) | <.001 | 0.6 (0.5, 0.8) | <.001 | - | NS |
| Specialty group | | | | | | |
| Hospital medical specialties* | 1 | | - | NS | 1 | |
| Surgery | 0.9 (0.6, 1.4) | 0.67 | - | NS | 0.5 (0.3, 0.7) | <.001 |
| GP | 8.1 (5.8, 11.5) | <.001 | - | NS | 2.8 (2.1, 3.7) | <.001 |
| Paediatrics | 0.8 (0.5, 1.3) | 0.29 | - | NS | 1.4 (0.9, 2.2) | 0.12 |
| Emergency medicine | 0.6 (0.3, 1.4) | 0.23 | - | NS | 0.4 (0.2, 0.8) | 0.01 |
| Obstetrics and gynaecology | 0.2 (0.1, 0.7) | 0.01 | - | NS | 0.4 (0.2, 0.9) | 0.02 |
| Anaesthesia | 1.5 (0.9, 2.3) | 0.1 | - | NS | 1.8 (1.2, 2.7) | 0.002 |
| Radiology | 5.6 (2.9, 10.8) | <.001 | - | NS | 6.4 (2.8, 14.6) | <.001 |
| Clinical oncology | 2.0 (0.8, 4.6) | 0.12 | - | NS | 2.2 (1, 5) | 0.06 |
| Pathology | 2.6 (1.4, 4.7) | 0.002 | - | NS | 4 (2, 7.7) | <.001 |
| Psychiatry | 1.4 (0.8, 2.5) | 0.27 | - | NS | 6.1 (2.9, 12.8) | <.001 |
| Partner/spouse status | | | | | | |
| Medical spouse* | - | NS | - | NS | - | NS |
| Non-medical spouse | - | NS | - | NS | - | NS |
| No spouse | - | NS | - | NS | - | NS |
| Working hours | | | | | | |
| Full time* | 1 | | 1 | | 1 | |
| Less than full time | 1.9 (1.4, 2.5) | <.001 | 1.2 (1.0, 1.6) | <.05 | 2.2 (1.7, 2.9) | <.001 |

Multivariable model based on numbers of doctors who replied 'yes' to a) Has the fact of having children, or of wanting to have children, influenced your choice of career specialty?; b) Do you regard the NHS as a family-friendly employer for doctors with children?; c) Do you regard your specialty as a family-friendly employer for doctors with children?

*Reference group for multivariable model.

'Multivariable' denotes binomial logistic regression result for each predictor with all other predictors in the model. We excluded cases where one or more predictors were missing, or where the dependent variable was missing, which reduced the sample size to 1716.

The Odds Ratios (OR) indicate the likelihood that a member of a group would regard the outcome variable as important, compared with a member of the reference group. Thus, for example, compared with a full-time doctor, a part-time doctor was twice as likely to regard children as an important influence on their choice of specialty.

Appendix 2: Numbers and percentages of respondents answering yes to the questions on family-friendliness^{ab}

| Respondent group | Total | | Have children | | No children | |
|---------------------------|-----------|-----------|---------------|-----------|-------------|-----------|
| | Male | Female | Male | Female | Male | Female |
| Total ^a | 39% (283) | 43% (475) | 40% (190) | 50% (348) | 37% (93) | 32% (127) |
| Total ^b | 57% (399) | 69% (724) | 57% (263) | 76% (509) | 55% (136) | 57% (215) |
| Medical specialties | 43% (65) | 60% (105) | 36% (33) | 67% (67) | 52% (32) | 51% (38) |
| Surgery | 32% (45) | 32% (20) | 35% (29) | 46% (12) | 29% (16) | 22% (8) |
| GP | 79% (136) | 78% (351) | 81% (97) | 82% (271) | 75% (39) | 67% (80) |
| Other hospital: | 63% (153) | 68% (248) | 64% (104) | 74% (159) | 63% (49) | 60% (89) |
| <i>Paediatrics</i> | 54% (14) | 66% (63) | 47% (9) | 73% (43) | 71% (5) | 54% (20) |
| <i>Emergency medicine</i> | 27% (8) | 39% (9) | 25% (5) | 25% (3) | 30% (3) | 55% (6) |
| <i>Anaesthesia</i> | 59% (48) | 71% (59) | 62% (37) | 74% (31) | 50% (11) | 68% (28) |
| <i>Radiology</i> | 92% (22) | 77% (24) | 100% (15) | 95% (20) | 78% (7) | 40% (4) |
| <i>Clinical Oncology</i> | 80% (8) | 63% (12) | 71% (5) | 67% (6) | 100% (3) | 60% (6) |
| <i>Pathology</i> | 90% (26) | 74% (26) | 86% (18) | 83% (19) | 100% (8) | 58% (7) |
| <i>Psychiatry</i> | 87% (26) | 88% (44) | 94% (15) | 91% (29) | 79% (11) | 83% (15) |

^a Question wording: 'Do you regard the NHS as a family-friendly employer for doctors with children?'

^b Question wording: 'Do you regard your specialty as a family-friendly employer for doctors with children?' (and all lines below Total^b)

1 **Manuscript ID bmjopen-2017-016822 entitled “Combining parenthood with a medical career:**
 2 questionnaire survey of the UK medical graduates of 2002 covering some influences and
 3 experiences”
 4
 5
 6

7 Trevor W Lambert, Fay Smith, Michael J Goldacre
 8
 9

10 **STROBE Statement**

| | Item No | Recommendation | |
|------------------------------|----------------|---|----------|
| Title and abstract | 1 | (a) Indicate the study’s design with a commonly used term in the title or the abstract | Page 1 |
| | | (b) Provide in the abstract an informative and balanced summary of what was done and what was found | Page 2 |
| Introduction | | | |
| Background/rationale | 2 | Explain the scientific background and rationale for the investigation being reported | Page 4-5 |
| Objectives | 3 | State specific objectives, including any prespecified hypotheses | Page 5 |
| Methods | | | |
| Study design | 4 | Present key elements of study design early in the paper | Page 5 |
| Setting | 5 | Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection | Page 5-6 |
| Participants | 6 | (a) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up | Page 5-6 |
| | | (b) For matched studies, give matching criteria and number of exposed and unexposed | N/A |
| Variables | 7 | Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable | Page 5-6 |
| 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 | Page 5-6 |
| Bias | 9 | Describe any efforts to address potential sources of bias | Page 5-6 |
| Study size | 10 | Explain how the study size was arrived at | Page 5-6 |
| Quantitative variables | 11 | Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why | Page 5-6 |
| Statistical methods | 12 | (a) Describe all statistical methods, including those used to control for confounding | Page 5-6 |
| | | (b) Describe any methods used to examine subgroups and interactions | Page 5-6 |
| | | (c) Explain how missing data were addressed | Page 5-6 |
| | | (d) If applicable, explain how loss to follow-up was addressed | N/A |
| | | (e) Describe any sensitivity analyses | N/A |
| Results | | | |
| 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 | Page 7 |

| | | | |
|--------------------------|-----|--|--------------|
| | | (b) Give reasons for non-participation at each stage | Page 7 |
| | | (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 | Page 7-8 |
| | | (b) Indicate number of participants with missing data for each variable of interest | Page 7 foll. |
| | | (c) Summarise follow-up time (eg, average and total amount) | N/A |
| Outcome data | 15* | Report numbers of outcome events or summary measures over time | 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 | Page 7 foll. |
| | | (b) Report category boundaries when continuous variables were categorized | N/A |
| | | (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 | Page 8-11 |
| Discussion | | | |
| Key results | 18 | Summarise key results with reference to study objectives | Page 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 | Page 13 |
| Interpretation | 20 | Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence | Page 14-15 |
| Generalisability | 21 | Discuss the generalisability (external validity) of the study results | Page 15 |
| Other information | | | |
| 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 | Page 16 |

*Give information separately for exposed and unexposed groups.

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 <http://www.strobe-statement.org>.