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

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

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ABSTRACT

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

Setting: United Kingdom (UK).

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

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

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

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

[250 words]

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.

BACKGROUND

Many factors may affect doctors' work-life balance. 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. (Dyrbye, Sotile et al. 2013) Women doctors in the United States 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. (Ly, Seabury et al. 2015) 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.(Buddeberg-Fischer, Stamm et al. 2010)

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.(Smith, Lambert et al. 2015) 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.(Lambert, Goldacre et al. 2006; Svirko, Goldacre et al. 2013) 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. (Academy of Medical Royal Colleges 2013) 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.(Wedderburn, Scallan et al. 2013)

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

assessed views of these doctors about the impact of having (or wanting to have) children on their specialty choice; and the extent to which their employer was supportive of doctors with children. We also report on doctors' views about how family-friendly they felt the National Health Service (NHS) was generally for doctors and specifically in their specialty. We compared the replies of men and women, of those with and without children, and of those working in different areas of medicine.

METHODS

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

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

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

We asked three questions about family formation and children: *'Has the fact of having children, or of wanting to have children, influenced your choice of career specialty?*' '*Do you regard the NHS as a family-friendly employer for doctors with children?', 'Do you regard your specialty as a family-friendly specialty for doctors with children?'.* Each of these questions had the options of *Yes, No, Don't know*, or *Prefer not to answer*.

Finally, we asked relevant doctors '*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?*' (with the options of *Excellent, Good, Acceptable, Poor, Very poor, Did not return,* or *Prefer not to answer*). In analysis we combined responses of excellent and good and refer to the combined group as 'excellent/good', and we similarly combined poor and very poor to form 'poor/very poor', thereby reducing the five response categories of assessment to three.

The data were initially analysed by univariable crosstabulation. To test statistical significance we used chi-square statistics, Mann-Whitney tests and Kruskal-Wallis tests. Responses of groups of doctors were compared using the following factors: gender; specialty (except where otherwise stated, grouped by us for analysis into four groups: hospital medical specialties, surgical specialties, general practice / family medicine (GP), other hospital-based specialties combined); whether or not the doctor had children; whether or not the doctor had a spouse / partner; and whether or not any spouse / partner was medically qualified. We used multivariable binary logistic regression to assess the joint effect of factors.

RESULTS

Response rate

The response rate from the target population (see Method) was 64.2% (2057/3205). Among women the response rate was 66.0% (1250/1895) and among men it was 61.6% (807/1310). 60.8% of respondents were women compared with 55.5% in the original cohort (i.e. prior to the exclusions).

Overview of the sample

Of the 2057 respondents, 91.4% (N=1880) told us they were working in medicine in the UK, 5.4% (111) were working in medicine outside the UK, and the remainder were in employment outside medicine (1.3%, 26), not in paid employment (1.4%, 28), or did not give employment details (0.6%, 12).

We focused on the 1880 in UK medical employment. Of these, 60.5% were female, and 39.5% male. The median age of the respondents was 35.4 years. Most respondents were living with a spouse or partner (86.0%). Of those living with a spouse, 49.2% had a medical spouse. Women were more likely than men to have no spouse or partner (15.9% of women compared with 11.1% of men). Men were more likely to have a medically qualified spouse or partner (53.0% of men compared with 46.6% of women).

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

75.3% of respondents in UK medical employment were working full-time (94.4% of men, 62.6% of women). GPs were more likely to be working part-time (42.5%) than doctors working in other specialties (15.1%).

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

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

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

Each of these five predictors showed significant ($p<0.001$) variation when analysed in isolation (Table 1): 59% of women and 28% of men agreed that consideration of children had influenced their career choice; 56% of doctors with children and 29% of doctors without children agreed; 18% of surgeons, 27% of doctors in the hospital medical specialties, 34% of doctors in other hospital specialties, and 78% of doctors in general practice agreed; 50% of doctors with a medically qualified spouse, 49% of doctors with a non-medical spouse, and 30% of doctors with no spouse agreed; and 37% of doctors who worked full time agreed compared with 76% of doctors who worked less than full time.

A multivariable logistic regression model was fitted, starting with all five predictors in the model. Partner/spouse status was found not to be a significant predictor. The other four predictors were retained. No interaction terms between predictors were found to improve the fit of the model. The significance of specialty group as a predictor was due to the difference between the responses of GPs and radiologists compared with those of other specialty groups. Appendix 1 shows odds ratios and confidence intervals for the multivariable model by specialty group with four significant factors (the specialty, gender, having children, and full- or part-time working).

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

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

Comparison of agreement rates for women hospital doctors with children showed that 43% (84/196) of those working full time agreed that consideration of children had influenced their career choice, compared with 63% (88/140) of those working part-time. Among women GPs with children the equivalent figures for full timers and less than full timers were much closer at 87% (117/135) and 93% (183/196). Numbers of men working less than full time were insufficient (38 in all) for meaningful comparisons with those working full time.

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

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

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

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

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

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

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

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

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

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

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

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

A multivariable logistic regression model was fitted, starting with all five predictors in the model. Gender, having children and partner/spouse status were not found to be significant predictors. The other two predictors (specialty group and working hours) were retained. The interaction term between these two predictors did not improve the fit of the model. Doctors from the following specialty groups differed significantly in their responses to this question from doctors in the hospital medical specialties group: those in Surgery were less likely to agree that their specialty was family-friendly, while those in GP, Radiology, Pathology, and Psychiatry were more likely to agree. Appendix 1 shows odds ratios and confidence intervals for the multivariable model with two significant factors (specialty group, and working hours).

Results are shown in Appendix 2 for specialties within our 'other hospital specialties' group.

Level of support received on return to work

The doctors were asked '*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?*'

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

There was no difference between the four specialty groups (grouped as hospital medical specialties, surgical specialties, general practice, and other hospital specialties combined, see Method) in the ratings of level of support, either for all respondents (χ^2_6=2.0, p=0.92), or for men (p=0.61) or women (p=0.27).

Doctors living with a spouse/partner were more likely to rate their level of support as *excellent/good* (56% medical spouse, 44% non-medical spouse) than doctors not living with a spouse (19%, χ^2_4=19.7, p<0.001). This pattern was observed among women doctors (p<0.05) but not men doctors (p=0.13).

There was no difference in response to this question between those doctors who worked full-time and those who worked part-time (χ^2_2=0.7, p=0.696).

DISCUSSION

Main findings

Almost half of all respondents said that having children, or wanting to have children, had influenced their specialty choice. More doctors with children, more women than men, more doctors who worked less than full time than those who worked full time, and more GPs than hospital doctors agreed with this statement. Although more doctors living with a spouse/partner than those without agreed that having children had influenced their specialty choice, this difference was not significant after adjustment for these other factors. No difference was observed between doctors with a medical spouse and doctors with a non-medical spouse.

Two fifths of doctors regarded the NHS as a family-friendly employer for doctors with children and two thirds regarded their specialty as a family-friendly employer for doctors with

children. More women than men agreed with the latter proposition. Three quarters of GPs regarded their specialty as family-friendly, whilst only a third of surgeons did so.

Almost half of doctors said that the levels of support they had received when taking maternity/paternity/adoption leave was *excellent/good*, though one in five said the support had been *poor/very poor*. More men than women doctors rated the level of support as *excellent/good.* Of those doctors living with a spouse, half had a medical spouse. More doctors living with a spouse/partner rated their level of leave support as *excellent/good* than doctors not living with a spouse; and more doctors living with a medical spouse than doctors with a non-medical spouse rated this support as *excellent/good.*

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.(Goldacre, Davidson et al. 2012) The response rate was high for a self-completed survey. However, some level of non-responder bias is, as with all surveys, a possibility.

Comparison with existing literature

Our respondents told us that considerations of parenthood influenced their specialty choice, and we found that more women than men agreed with this. This is consistent with other research which found that some men doctors tend to consider their own career to be more important than that of their medically qualified spouse.(Stamm and Buddeberg-Fischer 2011) Parenthood status has also been found to affect the career development of doctors, with parents being less likely to hold a senior role than doctors without children.(Stamm and Buddeberg-Fischer 2011) We found that more GPs than hospital doctors say that parenthood influenced their specialty choice. A Swiss study found that more family doctors

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

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

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 income.(Woodward 2005) This same study found that having a medically qualified spouse was associated with reduced hours in clinical practice.

Implications / conclusions

Parenthood is a key influence in GPs' specialty choice. However, doctors in other specialties, especially surgery, are not influenced to the same extent by parenthood considerations when choosing their specialty. Policy-makers should address the fact that only half of doctors working in specialties other than general practice regard their specialty as family-friendly.

Declarations

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

Consent for publication: Not applicable.

Availability of data and material: It may be possible for the authors to make tabulated data, produced in the course of this work but not included in the paper, available to interested readers on request.

Competing interests: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and all authors want to declare: (1) financial support for the submitted work from the policy research programme, Department of Health. All authors also declare: (2) no financial relationships with commercial entities that might have an interest in the submitted work; (3) no spouses, partners, or children with relationships with commercial entities that might have an interest in the submitted work; (4) no non-financial interests that may be relevant to the submitted work.

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Authors' contributions: TL and MJG designed and conducted the survey. FS and TL designed the analysis. FS performed the analysis and wrote the first draft of the paper. All authors contributed to further drafts and all approved the final version.

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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')

	Men		Women	
Group	% 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')

	Men		Women	
Group	% 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')

	Men		Women	
Group	% 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)

	a		b		c	
Group	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]

	Total		Have children		No children	
Respondent group	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)
Paediatrics	54% (14)	66% (63)	47% (9)	73% (43)	71% (5)	54% (20)
Emergency medicine	27% (8)	39% (9)	25% (5)	25% (3)	30% (3)	55% (6)
Anaesthetics	59% (48)	71% (59)	62% (37)	74% (31)	50% (11)	68% (28)
Radiology	92% (22)	77% (24)	100% (15)	95% (20)	78% (7)	40% (4)
Clinical Oncology	80% (8)	63% (12)	71% (5)	67% (6)	100% (3)	60% (6)
Pathology	90% (26)	74% (26)	86% (18)	83% (19)	100% (8)	58% (7)
Psychiatry	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])

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

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

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ABSTRACT

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

Setting: United Kingdom (UK).

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

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

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

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

[250 words]

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.

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]

We undertook a multi-purpose survey of all UK-trained doctors who graduated in 2002, twelve years after qualification in 2014. The aim of this paper is to report on the self-assessed views of these doctors about the impact of having (or wanting to have) children on their specialty choice; and the extent to which their employer was supportive of doctors with children. We also report on doctors' views about how family-friendly they felt the National Health Service (NHS) was generally for doctors and specifically in their specialty. We compared the replies of men and women, of those with and without children, and of those working in different areas of medicine.

METHODS

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

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

The rationale for timing the survey approximately 12 years after graduation was that the majority of the target population were of peak childbearing age and were likely to be

particularly aware of health service provision with regard to employment and family formation.

We asked three questions about family formation and children: *'Has the fact of having children, or of wanting to have children, influenced your choice of career specialty?*' '*Do you regard the NHS as a family-friendly employer for doctors with children?', 'Do you regard your specialty as a family-friendly specialty for doctors with children?'.* Each of these questions had the options of *Yes, No, Don't know*, or *Prefer not to answer*.

Finally, we asked relevant doctors '*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?*' (with the options of *Excellent, Good, Acceptable, Poor, Very poor, Did not return,* or *Prefer not to answer*). In analysis we combined responses of excellent and good and refer to the combined group as 'excellent/good', and we similarly combined poor and very poor to form 'poor/very poor', thereby reducing the five response categories of assessment to three.

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

Under 'other hospital-based specialties' we combined the following: paediatrics, emergency medicine, obstetrics & gynaecology, anaesthesia, radiology, clinical oncology, psychiatry and pathology. We used multivariable binary logistic regression to assess the joint effect of factors.

RESULTS

Response rate

The response rate from the target population (see Method) was 64.2% (2057/3205). Among women the response rate was 66.0% (1250/1895) and among men it was 61.6% (807/1310). 60.8% of respondents were women compared with 55.5% in the original cohort (i.e. prior to the exclusions).

Overview of the sample

Of the 2057 respondents, 91.4% (N=1880) told us they were working in medicine in the UK, 5.4% (111) were working in medicine outside the UK, and the remainder were in employment outside medicine (1.3%, 26), not in paid employment (1.4%, 28), or did not give employment details (0.6%, 12).

We focused on the 1880 in UK medical employment. Of these, 60.5% were female, and 39.5% male. The median age of the respondents was 35.4 years. Most respondents were living with a spouse or partner (86.0%). Of those living with a spouse, 49.2% had a medical spouse. Of 1763 doctors who told us how many children aged under 16 years were resident in their household, 32.7% answered none, 22.6% had one, 35.2% had two, and 9.5% had more than two. The average age of the eldest child was 3.7 years (SD=2.7). 75.3% of

respondents in UK medical employment were working full-time. GPs were more likely to be working part-time (42.5%) than doctors working in other specialties (15.1%).

Women were much less likely than men to be working full-time (men 94.4% (695/736), women 62.6% (696/1112); χ^2_1=239.5, p<0.001). Within general practice 84.3% of men and 47.3% of women were working full-time (150/178 and 221/467; χ^2_1=70.5, p<0.001). Within hospital practice 97.8% of men and 73.5% of women were working full-time (534/546 and 456/620; χ^2_1=131.4, p<0.001). Women were more likely than men to have no spouse or partner (men 11.1% (80/720), women 15.9% (173/1097); χ^2_1=7.8, p=0.005). Among those with a spouse or partner, men were more likely than women to have a medically qualified spouse or partner (men 53.0% (338/638), women 46.6% (426/914); χ^2_1=5.8, p=0.016). Women and men were equally likely to have children (men 67.3% (477/709), women 67.3% (709/1054); χ^2_1=0.0, p=1.0).

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

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

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

Each of these five predictors showed significant (p<0.001) variation when analysed in isolation (Table 1): 59% of women and 28% of men agreed that consideration of children had influenced their career choice; 56% of doctors with children and 29% of doctors without children agreed; 18% of surgeons, 27% of doctors in the hospital medical specialties, 34% of doctors in other hospital specialties, and 78% of doctors in general practice agreed; 50% of doctors with a medically qualified spouse, 49% of doctors with a non-medical spouse, and

30% of doctors with no spouse agreed; and 37% of doctors who worked full time agreed compared with 76% of doctors who worked less than full time.

A multivariable logistic regression model was fitted, starting with all five predictors in the model. Partner/spouse status was found not to be a significant predictor. The other four predictors were retained. No interaction terms between predictors were found to improve the fit of the model. The significance of specialty group as a predictor was due to the difference between the responses of GPs and radiologists compared with those of other specialty groups. Appendix 1 shows odds ratios and confidence intervals for the multivariable model by specialty group with four significant factors (the specialty, gender, having children, and full- or part-time working).

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

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

Comparison of agreement rates for women hospital doctors with children showed that 43% (84/196) of those working full time agreed that consideration of children had influenced their career choice, compared with 63% (88/140) of those working part-time. Among women GPs with children the equivalent figures for full timers and less than full timers were much closer at 87% (117/135) and 93% (183/196). Numbers of men working less than full time were insufficient (38 in all) for meaningful comparisons with those working full time.

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

Of all respondents, 42% answered *yes*, and 58% answered *no/don't know*. To examine differences in response by gender, having children, specialty group, partner/spouse status,

and working hours, we reduced the subjects to the 1720 doctors who had complete data for the five predictors.

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

A multivariable logistic regression model was fitted, starting with all three predictors which were significant univariably. Partner/spouse status was found not to be a significant predictor. The other two predictors were retained. The interaction term between the remaining two predictors did not improve the fit of the model. Appendix 1 shows odds ratios and confidence intervals for the multivariable model with two significant factors (specialty group, and working hours).

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

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

Comparison of agreement rates for women hospital doctors with children showed that 52% (102/196) of those working full time agreed that the NHS is a family-friendly employer for doctors with children, compared with 63% (87/139) of those working part-time. Among women GPs with children the equivalent figures for full timers and less than full timers were closer at 43% (58/135) and 46% (90/195). Numbers of men working less than full time were insufficient (38 in all) for meaningful comparisons with those working full time. Results are

shown in Appendix 2 for specialties within our 'other hospital specialties' group, though the percentages are based on small counts, are not suitable for multivariable modelling, and should be interpreted with caution.

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

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

Each of these five predictors showed significant ($p<0.001$) variation when analysed in isolation (Table 3): 69% of women and 57% of men agreed that their specialty is a family-friendly employer for doctors with children; 68% of doctors with children and 57% of doctors without children agreed; 32% of surgeons, 53% of doctors in the hospital medical specialties, 88% of psychiatrists, and 78% of doctors in general practice agreed; 63% of doctors with a medically qualified spouse, 69% of doctors with a non-medical spouse, and 55% of doctors with no spouse agreed; and 59% of doctors who worked full time agreed compared with 81% of doctors who worked less than full time.

A multivariable logistic regression model was fitted, starting with all five predictors in the model. Gender, having children and partner/spouse status were not found to be significant predictors. The other two predictors (specialty group and working hours) were retained. The interaction term between these two predictors did not improve the fit of the model. Doctors from the following specialty groups differed significantly in their responses to this question from doctors in the hospital medical specialties group: those in Surgery were less likely to agree that their specialty was family-friendly, while those in GP, Radiology, Pathology, and Psychiatry were more likely to agree. Appendix 1 shows odds ratios and confidence intervals for the multivariable model with two significant factors (specialty group, and working hours).

Results are shown in Appendix 2 for specialties within our 'other hospital specialties' group.

Level of support received on return to work

Of 887 doctors who described the level of support received on their return to work after having a child, 18% said the support had been *poor/very poor* (Table 4). Men rated the level of support more highly than did women. There were no significant differences by specialty group or by working hours. The small number of respondents without a partner appeared to score their support more negatively. See footnote to Table 4 for statistical results.

DISCUSSION

Main findings

Almost half of all respondents said that having children, or wanting to have children, had influenced their specialty choice. More doctors with children, more women than men, more doctors who worked less than full time than those who worked full time, and more GPs than hospital doctors agreed with this statement. Although more doctors living with a spouse/partner than those without agreed that having children had influenced their specialty choice, this difference was not significant after adjustment for these other factors. No difference was observed between doctors with a medical spouse and doctors with a non-medical spouse.

Two fifths of doctors regarded the NHS as a family-friendly employer for doctors with children and two thirds regarded their specialty as a family-friendly employer for doctors with children. More women than men agreed with the latter proposition. Three quarters of GPs regarded their specialty as family-friendly, whilst only a third of surgeons did so.

Almost half of doctors said that the levels of support they had received when taking maternity/paternity/adoption leave was *excellent/good*, though one in five said the support had been *poor/very poor*. More men than women doctors rated the level of support as *excellent/good.* Of those doctors living with a spouse, half had a medical spouse. More doctors living with a spouse/partner rated their level of leave support as *excellent/good* than doctors not living with a spouse; and more doctors living with a medical spouse than doctors with a non-medical spouse rated this support as *excellent/good.*

Although it is not explicit in our study, there is interplay between doctors' views of parenthood and the effect it may have on their careers and career choices, and the level of support available within different parts of the health service to doctors who are parents. Concepts such a family-friendliness may be hard to reconcile with the working requirements of certain specialty areas, particularly those in which unanticipated acute conditions may present which require treatment of unknown length or at unsocial times of day or night. The challenge is to manage work in these areas to improve family-friendliness without compromising patient care, at a time when the health service is under unprecedented pressures.

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 [12] and would be able to respond from their own experience to questions about the family friendliness, or otherwise, of the health service. The response rate was high for a self-completed survey. However, some level of non-responder bias is, as with all surveys, a possibility.

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

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

Comparison with existing literature

Our respondents told us that considerations of parenthood influenced their specialty choice, and we found that more women than men agreed with this, as did doctors with children. Other research in the UK has found that women in particular cite considerations of WLB as the most common reason for not pursuing certain career specialties.[13] Research in the US found that 78% of women believe that their career has been restricted by having children.[14] Parenthood status has also been found to affect the career development of doctors, with parents being less likely to hold a senior role than doctors without children.[15] We found that more GPs than hospital doctors say that parenthood influenced their specialty choice. A Swiss study found that more family doctors than hospital doctors are married, and more of them have children.[16] A large-scale Australian study of GPs found that about half of the GPs were content with their WLB, and women reported a better WLB than men.[17] One study reported that Australian medical students believed that 'family commitments' were very important when making career decisions, and female students believed that working part-time was important for WLB.[18]

We found that surgeons were less likely to agree that their specialty was family-friendly than were doctors who worked in other specialties. In the US, surgeons have been reported to face major challenges when trying to balance their personal and professional lives.[19] In the UK, despite rising numbers of female surgical trainees, the number of LTFT posts available is inadequate.[20]

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 income.[21] This same study found that having a medically qualified spouse was associated with reduced hours in clinical practice.

Implications / conclusions

Parenthood is a key influence in GPs' specialty choice. However, doctors in other specialties, especially surgery, are not influenced to the same extent by parenthood considerations when choosing their specialty. Policy-makers should address the fact that only half of doctors working in specialties other than general practice regard their specialty as family-friendly.

Declarations

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

Consent for publication: Not applicable.

Availability of data and material: It may be possible for the authors to make tabulated data, produced in the course of this work but not included in the paper, available to interested readers on request.

Competing interests: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and all authors want to declare: (1) financial support for the submitted work from the policy

research programme, Department of Health. All authors also declare: (2) no financial relationships with commercial entities that might have an interest in the submitted work; (3) no spouses, partners, or children with relationships with commercial entities that might have an interest in the submitted work; (4) no non-financial interests that may be relevant to the submitted work.

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Authors' contributions: TL and MJG designed and conducted the survey. FS and TL designed the analysis. FS performed the analysis and wrote the first draft of the paper. All authors contributed to further drafts and all approved the final version.

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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')

	Men		Women	
Group	% 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')

	Men		Women	
Group	% 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')

	Men		Women	
Group	% 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
	Excellent/good	Acceptable	Poor/very poor	
	% (n)	% (n)	% (n)	N (100%)
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 χ^2_2=12.5, p=0.002; Specialty χ^2_6=1.5, p=0.96; Partner/spouse χ^2_2=12.9, p=0.002; Working hours χ^2_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)

	a		b		c	
Group	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]

	Total		Have children		No children	
Respondent group	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)
Paediatrics	54% (14)	66% (63)	47% (9)	73% (43)	71% (5)	54% (20)
Emergency medicine	27% (8)	39% (9)	25% (5)	25% (3)	30% (3)	55% (6)
Anaesthesia	59% (48)	71% (59)	62% (37)	74% (31)	50% (11)	68% (28)
Radiology	92% (22)	77% (24)	100% (15)	95% (20)	78% (7)	40% (4)
Clinical Oncology	80% (8)	63% (12)	71% (5)	67% (6)	100% (3)	60% (6)
Pathology	90% (26)	74% (26)	86% (18)	83% (19)	100% (8)	58% (7)
Psychiatry	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])

Manuscript ID bmjopen-2017-016822 entitled "Children and medical careers, some influences and experiences: questionnaire survey of the UK medical graduates of 2002"onse to Reviewers

Trevor W Lambert, Fay Smith, Michael J Goldacre

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

Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	DONE
		(b) Indicate number of participants with missing data for each variable of interest	DONE
		(c) Summarise follow-up time (eg, average and total amount)	DONE
Outcome data	15*	Report numbers of outcome events or summary measures over time	DONE
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
		(*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	DONE
Discussion			
Key results	18	Summarise key results with reference to study objectives	DONE
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
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	DONE
Generalisability	21	Discuss the generalisability (external validity) of the study results	DONE
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	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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Combining parenthood with a medical career: questionnaire survey of the UK medical graduates of 2002 covering some influences and experiences

Short title: Combining parenthood with a medical career

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ABSTRACT

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

Setting: United Kingdom (UK).

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

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

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

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

[250 words]

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.

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]

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

METHODS

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

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

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

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

Finally, we asked relevant doctors '*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?*' (with the options of *Excellent, Good, Acceptable, Poor, Very poor, Did not return,* or *Prefer not to answer*). In analysis we combined responses of excellent and good and refer to the combined group as 'excellent/good', and we similarly combined poor and very poor to form 'poor/very poor', thereby reducing the five response categories of assessment to three.

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

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

RESULTS

Response rate

The response rate from the target population (see Method) was 64.2% (2057/3205). Among women the response rate was 66.0% (1250/1895) and among men it was 61.6% (807/1310). 60.8% of respondents were women compared with 55.5% in the original cohort (i.e. prior to the exclusions).

Overview of the sample

Of the 2057 respondents, 91.4% (N=1880) told us they were working in medicine in the UK, 5.4% (111) were working in medicine outside the UK, and the remainder were in employment outside medicine (1.3%, 26), not in paid employment (1.4%, 28), or did not give employment details (0.6%, 12).

We focused on the 1880 in UK medical employment. Of these, 60.5% were female, and 39.5% male. The median age of the respondents was 35.4 years. Most respondents were living with a spouse or partner (86.0%). Of those living with a spouse, 49.2% had a medical spouse. Of 1763 doctors who told us how many children aged under 16 years were resident in their household, 32.7% answered none, 22.6% had one, 35.2% had two, and 9.5% had more than two. The average age of the eldest child was 3.7 years (SD=2.7). 75.3% of respondents in UK medical employment were working full-time. GPs were more likely to be working part-time (42.5%) than doctors working in other specialties (15.1%).

Women were much less likely than men to be working full-time (men 94.4% (695/736), women 62.6% (696/1112); χ^2_1=239.5, p<0.001). Within general practice 84.3% of men and 47.3% of women were working full-time (150/178 and 221/467; χ^2_1=70.5, p<0.001). Within hospital practice 97.8% of men and 73.5% of women were working full-time (534/546 and 456/620; χ^2_1=131.4, p<0.001). Women were more likely than men to have no spouse or partner (men 11.1% (80/720), women 15.9% (173/1097); χ^2_1=7.8, p=0.005). Among those with a spouse or partner, men were more likely than women to have a medically qualified spouse or partner (men 53.0% (338/638), women 46.6% (426/914); χ^2_1=5.8, p=0.016). Women and men were equally likely to have children (men 67.3% (477/709), women 67.3% (709/1054); χ^2_1=0.0, p=1.0).

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

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

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

Each of these five predictors showed significant (p<0.001) variation when analysed in isolation (Table 1): 59% of women and 28% of men agreed that consideration of children had influenced their career choice; 56% of doctors with children and 29% of doctors without children agreed; 18% of surgeons, 27% of doctors in the hospital medical specialties, 34% of doctors in other hospital specialties, and 78% of doctors in general practice agreed; 50% of doctors with a medically qualified spouse, 49% of doctors with a non-medical spouse, and 30% of doctors with no spouse agreed; and 37% of doctors who worked full time agreed compared with 76% of doctors who worked less than full time.

A multivariable logistic regression model was then fitted, starting with all five predictors in the model. Partner/spouse status was found not to be a significant predictor. The other four predictors were retained. No interaction terms between predictors were found to improve the fit of the model. The significance of specialty group as a predictor was due to the difference between the responses of GPs and radiologists compared with those of other specialty groups. Appendix 1 shows odds ratios and confidence intervals for the multivariable model by specialty group with four significant factors (the specialty, gender, having children, and full- or part-time working).

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

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

Comparison of agreement rates for women hospital doctors with children showed that 43% (84/196) of those working full time agreed that consideration of children had influenced their career choice, compared with 63% (88/140) of those working part-time. Among women GPs with children the equivalent figures for full timers and less than full timers were much closer at 87% (117/135) and 93% (183/196). Numbers of men working less than full time were insufficient (38 in all) for meaningful comparisons with those working full time.

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

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

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

A multivariable logistic regression model was fitted, starting with all three predictors which were significant univariably. Partner/spouse status was found not to be a significant predictor. The other two predictors were retained. The interaction term between the remaining two predictors did not improve the fit of the model. Appendix 1 shows odds ratios and confidence intervals for the multivariable model with two significant factors (specialty group, and working hours).

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

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

Comparison of agreement rates for women hospital doctors with children showed that 52% (102/196) of those working full time agreed that the NHS is a family-friendly employer for doctors with children, compared with 63% (87/139) of those working part-time. Among women GPs with children the equivalent figures for full timers and less than full timers were closer at 43% (58/135) and 46% (90/195). Numbers of men working less than full time were insufficient (38 in all) for meaningful comparisons with those working full time. Results are shown in Appendix 2 for specialties within our 'other hospital specialties' group, though the

percentages are based on small counts, are not suitable for multivariable modelling, and should be interpreted with caution.

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

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

Each of these five predictors showed significant ($p<0.001$) variation when analysed in isolation (Table 3): 69% of women and 57% of men agreed that their specialty is a family-friendly employer for doctors with children; 68% of doctors with children and 57% of doctors without children agreed; 32% of surgeons, 53% of doctors in the hospital medical specialties, 88% of psychiatrists, and 78% of doctors in general practice agreed; 63% of doctors with a medically qualified spouse, 69% of doctors with a non-medical spouse, and 55% of doctors with no spouse agreed; and 59% of doctors who worked full time agreed compared with 81% of doctors who worked less than full time.

A multivariable logistic regression model was fitted, starting with all five predictors in the model. Gender, having children and partner/spouse status were not found to be significant predictors. The other two predictors (specialty group and working hours) were retained. The interaction term between these two predictors did not improve the fit of the model. Doctors from the following specialty groups differed significantly in their responses to this question from doctors in the hospital medical specialties group: those in Surgery were less likely to agree that their specialty was family-friendly, while those in GP, Radiology, Pathology, and Psychiatry were more likely to agree. Appendix 1 shows odds ratios and confidence intervals for the multivariable model with two significant factors (specialty group, and working hours).

Results are shown in Appendix 2 for specialties within our 'other hospital specialties' group.

Level of support received on return to work

Of 887 doctors who described the level of support received on their return to work after having a child, 18% said the support had been *poor/very poor* (Table 4). Men rated the level of support more highly than did women. There were no significant differences by specialty group or by working hours. The small number of respondents without a partner appeared to score their support more negatively. See footnote to Table 4 for statistical results.

DISCUSSION

Main findings

Almost half of all respondents said that having children, or wanting to have children, had influenced their specialty choice. More doctors with children, more women than men, more doctors who worked less than full time than those who worked full time, and more GPs than hospital doctors agreed with this statement. Although more doctors living with a spouse/partner than those without agreed that having children had influenced their specialty choice, this difference was not significant after adjustment for these other factors. No difference was observed between doctors with a medical spouse and doctors with a non-medical spouse.

Two fifths of doctors regarded the NHS as a family-friendly employer for doctors with children and two thirds regarded their specialty as a family-friendly employer for doctors with children. More women than men agreed with the latter statement. Three quarters of GPs regarded their specialty as family-friendly, whilst only a third of surgeons did so.

Almost half of doctors said that the levels of support they had received when taking maternity/paternity/adoption leave was *excellent/good*, though one in five said the support

had been *poor/very poor*. More men than women doctors rated the level of support as *excellent/good.* Of those doctors living with a spouse, half had a medical spouse. More doctors living with a spouse/partner rated their level of leave support as *excellent/good* than doctors not living with a spouse; and more doctors living with a medical spouse than doctors with a non-medical spouse rated this support as *excellent/good.*

Although it is not explicit in our study, there is interplay between doctors' views of parenthood and the effect it may have on their careers and career choices, and the level of support available within different parts of the health service to doctors who are parents. Concepts such as family-friendliness may be hard to reconcile with the working requirements of certain specialty areas, particularly those in which unanticipated acute conditions may present which require treatment of unknown length or at unsocial times of day or night. The challenge is to manage work in these areas to improve family-friendliness without compromising patient care, at a time when the health service is under unprecedented pressures.

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 [12] and would be able to respond from their own experience to questions about the family friendliness, or otherwise, of the health service. The response rate was high for a self-completed survey. However, some level of non-responder bias is, as with all surveys, a possibility. The good response rate, the recency of the survey, and the inclusion of most of the doctors who have had children in the 2002 cohort, indicate that these findings are probably generalisable to doctors who are considering the impact of having children on their specialty choice in England at present.

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

Comparison with existing literature

Our respondents told us that considerations of parenthood influenced their specialty choice, and we found that more women than men agreed with this, as did doctors with children. Other research in the UK has found that women in particular cite considerations of WLB as the most common reason for not pursuing certain career specialties.[13] Research in the US found that 78% of women believe that their career has been restricted by having children.[14] Parenthood status has also been found to affect the career development of doctors, with parents being less likely to hold a senior role than doctors without children.[15] We found that more GPs than hospital doctors say that parenthood influenced their specialty choice. A Swiss study found that more family doctors than hospital doctors are married, and more of them have children.[16] A large-scale Australian study of GPs found that about half of the GPs were content with their WLB, and women reported a better WLB than men.[17] One study reported that Australian medical students believed that 'family commitments' were very important when making career decisions, and female students believed that working part-time was important for WLB.[18]

We found that surgeons were less likely to agree that their specialty was family-friendly than were doctors who worked in other specialties. In the US, surgeons have been reported to face major challenges when trying to balance their personal and professional lives.[19] In the UK, despite rising numbers of female surgical trainees, the number of LTFT posts available is inadequate.[20]

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.

Implications / conclusions

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

Declarations

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

Consent for publication: Not applicable.

Availability of data and material: It may be possible for the authors to make tabulated data, produced in the course of this work but not included in the paper, available to interested readers on request.

Competing interests: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and all authors want to declare: (1) financial support for the submitted work from the policy research programme, Department of Health. All authors also declare: (2) no financial relationships with commercial entities that might have an interest in the submitted work; (3) no spouses, partners, or children with relationships with commercial entities that might have an interest in the submitted work; (4) no non-financial interests that may be relevant to the submitted work.

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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')

	Men		Women	
Group	% 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')

	Men		Women	
Group	% 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')

	Men		Women	
Group	% 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
	Excellent/good	Acceptable	Poor/very poor	
	% (n)	% (n)	% (n)	N (100%)
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 χ^2_2=12.5, p=0.002; Specialty χ^2_6=1.5, p=0.96; Partner/spouse χ^2_2=12.9, p=0.002; Working hours χ^2_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)

	a		b		c	
Group	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]

	Total		Have children		No children	
Respondent group	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)
Paediatrics	54% (14)	66% (63)	47% (9)	73% (43)	71% (5)	54% (20)
Emergency medicine	27% (8)	39% (9)	25% (5)	25% (3)	30% (3)	55% (6)
Anaesthesia	59% (48)	71% (59)	62% (37)	74% (31)	50% (11)	68% (28)
Radiology	92% (22)	77% (24)	100% (15)	95% (20)	78% (7)	40% (4)
Clinical Oncology	80% (8)	63% (12)	71% (5)	67% (6)	100% (3)	60% (6)
Pathology	90% (26)	74% (26)	86% (18)	83% (19)	100% (8)	58% (7)
Psychiatry	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])

Manuscript ID bmjopen-2017-016822 entitled "Combining parenthood with a medical career: questionnaire survey of the UK medical graduates of 2002 covering some influences and experiences**"**

Trevor W Lambert, Fay Smith, Michael J Goldacre

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.