

# Is it intelligent to intercalate? A two centre cross-sectional study exploring the value of intercalated degrees, and the possible effects of the recent tuition fee rise in England

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## ABSTRACT

**Aims and objectives:** To explore the value of intercalated degrees, including student perceptions and academic sequelae. To gauge the likely effect of the recent tuition fee rise and to identify any differences in intercalated degrees between Bristol and Sheffield universities.

**Design:** Cross-sectional study using questionnaires.

**Setting:** Bristol and Sheffield Medical Schools, UK.

**Participants:** 1484 medical students in their clinical years were e-mailed the questionnaire. 578 students responded: 291 from Bristol and 287 from Sheffield (n=578; mean age=22.41; SD 1.944; 38.9% male; 61.1% female). The response rate from previous intercalators was 52.5% from Bristol and 58.7% from Sheffield, while for non-intercalators it was 27.7% and 34.6%, respectively.

**Main outcome measures:** (1) Student preconceptions, opinions, results and academic sequelae from intercalated degrees at both centres. (2) Students' attitudes concerning the effect of the increase in tuition fees.

**Results:** Those with clinical academic supervisors gained significantly more posters (p=0.0002) and publications (p<0.0001), and also showed a trend to gain more first class honours (p=0.055). Students at Sheffield had a significantly greater proportion of clinical academic supervisors than students at Bristol (p<0.0001). 89.2% said that an intercalated degree was the right decision for them; however, only 27.4% stated they would have intercalated if fees had been £9000 per annum.

**Conclusions:** Students clearly value intercalated degrees, feel they gained a substantial advantage over their peers as well as skills helpful for their future careers. The rise in tuition fees is likely to reduce the number of medical students opting to undertake an intercalated degree, and could result in a further reduction in numbers following an academic path. Sheffield University have more intercalating students supervised by clinical academics. Clinical academics appear more effective as supervisors for medical students undertaking an intercalated degree in terms of results and additional academic sequelae.

## ARTICLE SUMMARY

### Article focus

- To assess the value, academic sequelae and additional benefits of intercalated degrees.
- To gauge the likely effect of increasing tuition fees on interest in intercalated degrees.
- To assess and identify differences between Bristol and Sheffield universities, and how these might impinge on the success of their intercalated programmes.

### Key messages

- Clinical academics are preferable as supervisors for intercalated degrees; their students are awarded a greater number of first class honours awards, and produce significantly more poster presentations and publications from projects.
- The rise in tuition fees is likely to result in substantially fewer medical students opting to undertake an intercalated degree. This threatens to further reduce the number of doctors following an academic path.

## INTRODUCTION

An intercalated degree provides an opportunity for medical students to undertake an extra year of study and gain an additional qualification. Students are able to acquire a range of new skills, which not only build on existing knowledge and abilities, but also provide insight into the methodology and intellectual excitement involved in carrying out research. An array of academic subjects from scientific disciplines to ethics or business studies, as well as a variety of degree types; mainly Bachelor of Science (BSc), Bachelor of Arts (BA) or Bachelor of Medical Science (BMedSci) can be pursued. Most universities offer intercalated degrees as an option; however, several UK medical schools (including Oxford, Cambridge, Imperial, University College London and

## ARTICLE SUMMARY

**Strengths and limitations of this study**

- The strengths of the study include a reasonably good response rate from previous intercalators, thus diminishing the bias from differing views by non-respondents.
- There was a low response rate from the non-intercalators and therefore we have decided not to report this data in detail as it may well display such bias.
- We found similar trends at both universities, suggesting our data is generalisable to intercalating students at other institutions.
- This is a retrospective study and as such was subject to the bias observed in these studies.
- The length of time from which students had finished their intercalated degree was variable from a few months to 2.5 years suggesting we may have not captured the full benefit of the intercalated degree in some students as achievements, such as publications, can be a lengthy process.
- Some responders did not complete all of the questions in the questionnaire, which is a limitation encountered in this study.
- The demographics show that the sample was representative with respect to gender for each institution.
- Unfortunately it was not possible to accurately report the mean age this cohort of medical students, so we cannot determine whether the sample was representative with respect to age for each institution.

Nottingham) have compulsory intercalated degree years as part of the course.

Approximately one-third of medical students in the UK medical schools undertake intercalated degrees.<sup>1 2</sup> Longitudinal studies into the effect of intercalated degrees have been conducted suggesting short-term benefits include improved exam performance of medical students subsequent to undertaking an intercalated degree. These students performed better in fourth-year examinations and elective reports than their peers who did not undertake an intercalated degree.<sup>3</sup> Additional benefits of taking an intercalated degree include having higher deep and strategic learning scores than when they applied to medical school and lower surface learning scores than their peers, showing a greater interest in medical research and laboratory medicine,<sup>1</sup> and being more likely to attract research grants.<sup>4 5</sup> These students also have a greater ability to critically evaluate research and understand methodological principles.<sup>6</sup> Interestingly, these advantageous effects are reduced in medical schools where a higher proportion of students undertake an intercalated degree.<sup>1</sup>

Intercalators are also likely to have more papers published in scientific journals.<sup>5</sup> The combination of higher examination results, an additional qualification (the intercalated degree) and published papers improves their chances of gaining their preferred choice of foundation school and rotation<sup>3</sup> as these carry points on the current foundation programme application in the UK.<sup>7</sup> Only 14% of British medical students have submitted an article for publication,<sup>8</sup> and now that entry into a competitive specialty is hugely difficult without evidence of

prior research participation, getting experience early on at medical school can not only act as evidence as an interest in a specialty and but also allows one to stand out at interviews.<sup>9</sup> In one of the most competitive specialties, plastic and reconstructive surgery, a survey showed that of 100 senior house officers in the UK and Ireland, 30% had intercalated degrees and 57% had published.<sup>10</sup> Research activity therefore undoubtedly benefits the student's future career, but it has similarly been shown to benefit their institutions as medical student publications can significantly increase a faculty's research output.<sup>11</sup> In terms of career aspirations, significantly fewer students who have undertaken an intercalated degree show an interest in general practice, compared with those who opted not to undertake an intercalated degree.<sup>1 12</sup>

At the University of Auckland in 2010, only 8.6% of students expressed an interest in an intercalated degree due to lack of interest, or for social and financial reasons.<sup>13</sup> This lack of interest may be put down to deficiency of exposure to academia.<sup>6</sup> The majority of these students rated lifestyle factors and earning potential as more important than the opportunity for research.<sup>13</sup> A recent study in the UK has investigated why the numbers of students wanting to undertake an intercalated degree is falling. The most common reasons stated are the avoidance of more student debt and lack of interest in another year of study.<sup>14</sup> It appears that the benefits of an intercalated degree need to be better presented to students.<sup>14</sup> In some UK medical schools, students feel intercalated degrees are only for the most academic students<sup>6</sup> and therefore would not consider it an option for them.

The Browne Review into the higher education funding in England published its findings in October 2010, recommending the removal of the cap on the level of fees that universities can charge.<sup>15</sup> In spite of numerous student protests the government won a vote in the House of Commons allowing universities to be able to charge up to £9000 a year for the annual tuition costs. Many universities including Sheffield and Bristol have since increased their fees to £9000. No studies have investigated medical students' perspectives of the effect of this fee rise on choosing to undertake an intercalated degree.

**METHODS****Aims**

(1) To assess the value and benefits, including student perceptions and academic sequelae, of intercalated degrees. (2) To gauge the likely effect of increasing tuition fees on interest in intercalation. A secondary aim of this study, and the reason for conducting it at two centres, is to assess and identify differences between the two universities, and how these might impinge on the success of their intercalated programmes.

**Study design**

A two-centre cross-sectional study using questionnaires.

### Ethical considerations

This study was granted full approval by the Faculty of Medicine and Dentistry Committee for Ethics in Bristol on 10 June 2011 (application number 101141). All subjects gave informed consent before taking part.

### Participants

This questionnaire was emailed to all students in years 3, 4 and 5 (clinical years) at both Bristol and Sheffield University Medical Schools, and uploaded into the Sheffield Medical school home webpage. In total, 717 students were emailed at Sheffield medical school and 767 at Bristol. Those who had not intercalated were only able to complete section 1 (Demographics and General Views) of the questionnaire on demographics and section 3 (The reasons students opt out of intercalated degrees) focusing on why they opted not to undertake an intercalated degree. Those that had previously intercalated make up the bulk of the data presented in this paper, as they completed section 1 and the large section 2 (The student experience of intercalated degrees) regarding their perceptions of and details from their intercalated degrees.

The questionnaire contained information on how the data was to be used. No identifying data were needed and everything therefore anonymised at source. It was voluntary to complete the forms and participation was therefore taken to be informed consent.

### Questionnaire

The questionnaire was initially designed using interviews with an opportunistic sample of 4 senior staff members and 6 medical students (3 intercalators, 3 non-intercalators) from both Bristol and Sheffield medical schools. A small pilot study was conducted on a similar cohort (n=15, 7 from Bristol medical school and 8 from Sheffield medical school) with a blank box at the end for feedback. The feedback allowed the authors to ascertain the overall understanding of the questions, whether the meaning of questions was similar for all respondents and if sufficient response categories were available. This

contributed to the evolution of the questionnaire, into its current form.

The questionnaire consists of three sections (appendix 1). The first section was to be answered by all students; it collected demographic information, preconceptions and opinions regarding intercalated degrees. The second section related to the experience of undertaking an intercalated degree: data collection regarding grades and academic sequelae of intercalated degree projects; reasons for undertaking the degrees; and opinions on their experience. The third section, which is not extensively reported in this paper was concerning the reasons why students chose not to intercalate.

### Statistical analysis

Statistical advice was sought and analysis was performed using prism 4 software. All responses were converted into percentages, and observational data were reported in this form. The responses were either in agreement, impartial or disagreeing with the questions of the survey. For the purpose of data analysis we combined the impartial and disagreement groups, and have reported the data as the percentage in agreement. The data as then split according to a number of different factors, including university, grade class and whether the student had a clinical academic as a supervisor. All comparisons were made using  $\chi^2$  tests for significance, with a p value below 0.01 being significant. This was due to a high number of significance tests with  $p < 0.05$  in the initial analysis which therefore was considered only weak evidence against a null hypothesis. The evidence was considered more convincing once  $p < 0.01$ .

### RESULTS

A total of 578 students responded to the questionnaire, 291 from Bristol Medical School and 287 from Sheffield Medical School (n=578; mean age=22.41; SD 1.944; 38.9% male; 61.1% female).

Table 1 provides data on the percentage of students that had intercalated in both institutions taken from the medical school records, the response rate from

**Table 1** Survey response rate, responder demographic information, the number of clinical academic supervisors for intercalator responders and benefits arisen from intercalated degrees

	Bristol	Sheffield	p Value
Number intercalating/total number of students (%)	316/767 (41.2)	160/717 (22.3)	
Number intercalators responding/number intercalating (%)	166/316 (52.5)	94/160 (58.7)	
Number non-intercalators responding/number of non-intercalators (%)	125/451 (27.7)	193/557 (34.6)	
Mean age (SD)	22.7 (1.79)	22.1 (2.06)	
Number of males (%)	109 (37.5)	117 (40.8)	
Number with clinical academic supervisor/number of intercalators (%)	52/159 (32.7)	61/94 (64.9)	$p < 0.0001$
Number of first class honours/number of intercalators (%)	53/155 (34.2)	56/85 (65.9)	$p = 0.0002$
Number of 2.1s/number of intercalators (%)	100/155 (64.5)	28/85 (32.9)	$p = 0.0002$
Number of publications/number of intercalators (%)	20/155 (12.9)	34/89 (38.2)	$p = 0.0003$
Number of oral conferences presented/number of intercalators (%)	46/154 (29.9)	31/87 (35.6)	$p = 0.9318$
Number of posters presented/number of intercalators (%)	36/159 (22.6)	56/88 (63.6)	$p < 0.0001$



intercalators and non-intercalators, demographic information from responders, as well as the number of intercalator responders that had a clinical supervisor and details of the benefits they gained from their intercalation.

The response rate from previous intercalators was 52.5% for Bristol and 58.7% for Sheffield, while for non-intercalators it was 27.7% and 34.6%, respectively. Intercalators were defined as students who had completed their intercalated degree.

Students at Sheffield University gained a significantly larger number of first class degrees than students at Bristol University ( $p=0.0002$ ). They also gained significantly more publications ( $p=0.0003$ ) and poster presentations ( $p<0.0001$ ).

Students who undertook an intercalated degree at Sheffield had a significantly greater proportion of clinical academic supervisors than students at Bristol ( $p<0.0001$ ).

Those with clinical academic supervisors gained significantly more poster presentations ( $p=0.0002$ ) and publications ( $p<0.0001$ ) as a result of their intercalated degrees, and also showed a trend to gain more first-class honours ( $p=0.055$ ).

### Student perception data

The questionnaire offered participants five options in response to the statements presented: strongly agree, agree, impartial, disagree and strongly disagree. In order to report student perceptions, the student responses were simplified into agree, impartial and disagree. The impartial and disagree responses were then combined, and the number of students agreeing with the question or statement expressed as a percentage of the total responses (table 2).

Of the students who undertook an intercalated degree, 89.2% of students said that an intercalated degree was the right decision for them. In contrast, only 27.4% of these students said they would have intercalated if the fees were £9000, which displays a significant difference ( $p<0.0001$ , 196.3).

In total, 57.9% of all the students (66% at Sheffield) believe that intercalated degrees give a student a substantial advantage over their peers. A total of 84.2% really enjoyed their degrees and 90.9% thought an intercalated degree provided skills helpful to them in their future careers. The most popular reason for students undertaking an intercalated degree was that it may increase their chances of getting the job they want, with 69.6% of the intercalators choosing this option.

In total, 46.3% of students reported choosing an intercalated degree because they were interested in research, and there was a significant difference between the number of students from Bristol and Sheffield reporting this as a factor in their decision: 60% of students from Sheffield compared with 38.2% from Bristol ( $p=0.024$ , 11.29).

First-class honours intercalator students appeared to have significantly more initial interest in research with 72% choosing an intercalated degree because they were interested in research, compared to 29.1% of those who gained a lower class ( $p<0.0001$ , 31.31), and expressed significantly more desire to increase their chances of getting an academic job in the future (49.1% vs 24.4%,  $p=0.0036$ , 15.61).

### Reasons not to intercalate

The final section, for students who did not intercalate, asked whether they regretted their decision, and what the reasons were for their decision not to intercalate. There were a number of options available, and a free text box if their reason did not fall any of the categories. This revealed that few students regretted their decision not to intercalate (13.3%). The main reasons for deciding not to intercalate reported were that they did not want to spend another year at university (57.9%) and having financial constraints (49.1%) (Table 3).

## DISCUSSION

### Student perceptions

The overwhelming percentage of intercalator students reporting that they really enjoyed their intercalated degrees, gained a substantial advantage over their peers as well as skills helpful to their future careers, implies that students clearly do value intercalated degrees. There are a number of transferable skills acquired from an intercalated degree, including statistical analysis and in-depth research skills (both scientific and literature based). Although these skills are taught, in rather less depth, within the medical curriculum, it is a very different proposition when they are being applied to your own data. With medical literature rapidly expanding it is important that medical students understand evidence based medicine. This opinion is shared among the student population with only 35% of medical students at a London medical school thinking that a greater emphasis should not be placed on research in the medical curriculum.<sup>16</sup> Only 15.3% of students who opted not to take an intercalated degree at Aberdeen medical school said they had enough information to inform their decision,<sup>14</sup> illustrating the need for Medical schools to clearly convey the benefits of intercalating.

Although 46.3% of students reported choosing an intercalated degree because they were interested in research, there was an interesting difference between the number of students from Bristol and Sheffield reporting this as a factor in their decision: 60% of students from Sheffield, compared with 38.2% from Bristol ( $p=0.024$ , 11.29). Most students at Sheffield Medical School completed a BMedSci, which involves 1 year of full-time research—either clinical or laboratory work, two pieces of course work, and a 30 000 word dissertation, which is examined in the form of a viva. Students at Bristol however, mainly complete a BSc, which is

**Table 2** Student perception data according to university, grade class and degree supervisor

Student perceptions	All data	Bristol	Sheffield	CAS	Non-CAS	First	2.1
'An intercalated degree will make me a better doctor'	223/151/580	93/74/294	131/77	73/25/114	83/37/145	78/23/110	65/37/129
Number agree/number impartial/total responses (percentage agreeing)	(38.5)	(31.6)	/289 (45.3)	(64.0)	(57.2)	(70.9)	(50.4)
'An intercalated degree gives a medical student a big advantage over his/her peers'	335/134/579	144/70/296	191/63/289	88/13/114	93/32/147	88/13/110	79/29/131
Number agree/number impartial/total responses (percentage agreeing)	(57.9)	(48.6)	(66.1)	(77.2)	(63.3)	(80.0)	(60.3)
'Should only be available to top quartile students'	74/88/578	53/55/301	21/33/288	18/19/116	30/30/146	21/21/110	26/23/131
Number agree/number impartial/total responses (percentage agreeing)	(12.8)	(17.6)	(7.3)	(15.6)	(20.5)	(19.1)	(19.8)
'Should be a compulsory aspect of undergraduate education'	55/83/579	32/41/291	23/42/291	10/17/114	20/14/145	16/15/110	11/14/128
Number agree/number impartial/total responses (percentage agreeing)	(9.5)	(11.0)	(7.9)	(8.8)	(13.8)	(14.5)	(8.6)
'An intercalated degree is an easy year'	54/125/580	29/57/296	25/68/289	8/14/115	7/14/145	6/12/110	9/15/129
Number agree/number impartial/total responses (percentage agreeing)	(9.3)	(9.8)	(8.7)	(7.0)	(4.8)	(5.5)	(7.0)
'I really enjoyed my intercalated degree'	209/21/248	131/13/160	77/8/90	92/11/110	120/12/146	96/9/110	104/12/129
Number agree/number impartial/total responses	(84.3)	(81.9)	(85.6)	(83.6)	(82.2)	(87.3)	(80.6)
'In retrospect it was the right decision for me'	222/17/249	141/6 /159	80/11/91	99/10/112	124/11/144	103/7/110	109/8 /128
Number agree/number impartial/total responses (percentage agreeing)	(89.2)	(88.7)	(87.9)	(88.4)	(86.1)	(93.6)	(85.2)
'I chose an intercalated degree because I was interested in research'	117/46/253	60/25/157	57/21/95	58/23/113	61/24/144	72/18/110	37/26/127
Number agree/number impartial/total responses (percentage agreeing)	(46.2)	(38.2)	(60.0)	(51.3)	(42.4)	(65.5)	(29.1)
'I chose an intercalated degree to improve the chance of me getting the job I want'	176/42/253	109/26/158	67/16/95	81/19/113	97/25/145	83/18 /110	83/21 /127
Number agree/number impartial/total responses (percentage agreeing)	(69.6)	(69.0)	(70.5)	(71.7)	(66.9)	(75.5)	(65.4)
'I chose it to increase my chances of getting an academic job'	90/57/252	46/38/158	44/19/95	40/28/114	51/32/144	54/24/110	31/30/127
Number agree/number impartial/total responses (percentage agreeing)	(35.7)	(29.1)	(46.3)	(35.0)	(35.4)	(49.0)	(24.4)
'An intercalated degree would have appealed less if more people did them'	62/43/252	35/29/158	27/14/95	32/21/114	30/25/144	30/18/109	26/21/127
Number agree/number impartial/total responses	(24.6)	(22.2)	(28.4)	(28.1)	(20.8)	(27.5)	(20.5)
'During my intercalated degree I learned skills which will be very useful during my career'	230/17/253	140/12/157	89/5/95	108/4/113	124/15/144	102/5/110	112/12/127
Number agree/number impartial/total responses	(90.9)	(89.2)	(93.7)	(95.6)	(86.1)	(92.7)	(88.2)
Would you intercalate for £9000?	69/252 (27.4)	46/158	23/93	26/111	45/146	33/109	33/128
Number YES, Number responses (%)		(29.0)	(24.7)	(23.4)	(30.8)	(30.2)	(25.8)

CAS, Clinical Academic Supervisor.

**Table 3** Reasons for students choosing not to undertake an intercalated degree

Reasons not to intercalate	Non-intercalator responses
'I chose not to intercalate because I have no interest in research.'	123/48/279
Number agree/number impartial/total responses (percentage agreeing)	(44.1)
'I chose not to intercalate because I didn't want to spend an extra year at university.'	162/44/280
Number agree/number impartial/total responses (percentage agreeing)	(57.9)
'I chose not to intercalate because of financial reasons'	136/49/277
Number agree/number impartial/total responses (percentage agreeing)	(49.1)
'I chose not to intercalate because I did not find a project I was interested in'	114/70/279
Number agree/number impartial/total responses (percentage agreeing)	(51.6)
I regret my decision not to intercalate.	37/56/279
Number agree/number impartial/total responses (percentage agreeing)	(13.3)

composed of exams and a research-based dissertation; these are broken down into credit points, the whole year being 120 credit points, of which the dissertation provides 40–60. The exposure to and involvement in research appears to be lower at Bristol, which may at least in part explain their lower intrinsic research interest.

This disparity in attitude towards research was also reflected in the interest in academic jobs. The principal reason for choosing to undertake an intercalated degree was reported to be because it may increase the chances of the student getting the job they want (69.6%); this was reflected in every single group, regardless of what grade they achieved, which supervisor they had or which university they studied at. Interestingly, a recent study in New Zealand reported an interest in a career in research and academic medicine was the most commonly cited reason for undertaking an intercalated degree.<sup>17</sup> It could be seen as bad practice to encourage undertaking an intercalated degree solely for curriculum vitae motives; however, having this extra degree has been shown to have a positive impact on preparedness for working. Intercalators have been found to feel significantly better prepared, less anxious and more confident about starting their pre-registration house officer year.<sup>18</sup>

Perhaps unsurprisingly, significantly more students who attained first-class honours chose an intercalated degree because they were interested in research (72% vs 29.1%,  $p < 0.0001$ , 31.31), and to increase their chances of getting an academic job in the future (49.1% vs 24.4%,  $p = 0.0036$ , 15.61). These students were more satisfied with the degree overall. One possible explanation for the large difference in the proportion of first class degrees awarded at Sheffield compared to Bristol could be that only the more academically inclined students at Sheffield decided to intercalate as a much smaller proportion of students intercalate at Sheffield (22.3%) compared with Bristol (44.2%). Some medical students have been shown to feel that intercalated degrees are only for the most academic students in the year group.<sup>6</sup> Aberdeen Medical School is similar to Sheffield in having a low intercalation rate of 17.9% (from 2003 to 2007) and these intercalating students had performed better than their colleagues in

several written exams previous to intercalating.<sup>3</sup> The lower proportion of intercalating students at Sheffield producing more benefits from the intercalation than the large cohort at Bristol, is in line with the dilution described by McManus *et al*,<sup>1</sup> whereby the positive effects of intercalated degrees are reduced in medical schools where a higher proportion of students undertake them, probably due to less selection of the top performers. Another factor in this disparity could be that Sheffield have a bespoke medical sciences degree, which caters specifically for intercalators, where as students in Bristol join the final year of alternative degrees.

### Recent fee increase

Previous studies have clearly shown a diminishing number of students undertaking intercalated degrees and following an academic career.<sup>13 14</sup> This is coupled with a decline in recruitment to clinical academia, which in turn results in an age disparity, with fewer fresh faces entering the clinical academic community. In the UK 63% of clinical academics were over the age of 46 in 2010, compared with only 53% in 2004.<sup>4</sup> This fall is likely to be compounded by the tuition fee increase, as fewer doctors will be entering the PhD pool.

The potential effect of the tuition fee increase in England is highlighted by our study with 89.2% of students reporting that an intercalated degree was the right decision for them, and only 27.4% of the same students reporting that they would have intercalated if the fees were £9000. We assume that future students are likely to embark on intercalated degrees at a rate suggested by these responses.

At present, the NHS student bursaries pay student tuition fees after 4 years of study for all undergraduate medical students, so the government will cover the fees of an intercalated degree as well as the fifth year of medical school. This needs to be better publicised to students thinking about undertaking an intercalated degree, as it is not a well-advertised or well-known option. Amazingly it is not mentioned in either of the prospectuses for intercalated degrees at Bristol or Sheffield Medical schools. This could help encourage many more medical students

to intercalate, providing that this arrangement does not change.

Furthermore, medical educators must increase awareness of other opportunities for research experience, as finances to support oneself through an extra year of university may impede the option of an intercalated degree for some students.<sup>14</sup> Our study findings are also consistent with this, showing that 49.1% of students opted not to intercalate due to financial reasons. The plethora of alternatives include funding schemes for students to complete research during their holidays and elective, research-based student-selected modules and clinical academics advertising projects that could be taken on alongside their undergraduate course.<sup>9</sup> The UK Medical Students Association (UKMSA) has a website facility ([www.ukmsa.org](http://www.ukmsa.org)) where students are able to post their interest in carrying out research projects giving clinical academics and researchers a database for recruiting students to carry out research. Medical schools could run a more local version of this on their websites or indeed provide a link to the UKMSA website. In total, 55% of students reported not taken part in research at medical school due to lack of opportunities,<sup>8</sup> which may simply just be a genuine lack of awareness of these opportunities.<sup>19</sup>

### Clinical academics

The University of Bristol has 185 clinical academics in the Faculty (plus three in its sister Faculty, Faculty of Medical and Veterinary Sciences). This is a slight reduction from 2008, when there were 189. The University of Sheffield has only 76 employed clinical academics. Despite this disparity in the number of clinical academics, a smaller proportion of intercalating students from Bristol (32.7%) were supervised by a clinical academic than in Sheffield (64.9%). This could be due to the wider diversity of degrees taken at Bristol, for example, psychology, international health and medical humanities.

Students with clinical academic supervisors gained more first class honours ( $p=0.055$ ) presented significantly more posters ( $p=0.0002$ ) and co-authored more publications ( $p<0.0001$ ) from their intercalated research. This will become an increasingly important statistic with much greater emphasis being placed on value for money. Feedback on what the supervisor provides will undoubtedly contribute to the metric for measuring this.

### Strengths and weaknesses of this study

This was a retrospective study and as such was subject to the bias observed in such studies. We did however have a reasonably good response rate from the intercalators diminishing the bias from differing views by non-respondents. In contrast, due to the low response rate from the non-intercalators we have decided not to report this data in detail as it may well display such bias. These data did however support current literature that proposes the most common reason students opted not to intercalate was to avoid another year of study and acquire more

debt.<sup>14</sup> Perhaps the reason for this low response rate amongst non-intercalators can be put down to no vested interest in intercalated degrees due to not having undertaken one. Another weakness to this study includes that some responders did not complete all of the questions.

The demographics show that the sample was representative with respect to gender for each institution. 37.5% of the responders from Bristol were male, which correlates well with their 39:61 ratio of males to females.<sup>20</sup> Similarly, the 40.8% of responders from Sheffield being male compares to the 42:58 ratio of males to females at Sheffield medical school.<sup>20</sup> Unfortunately it was not possible to accurately report the mean age of medical students in their clinical years of medical school; however, with Bristol having a 16% mature student population and Sheffield 14%<sup>20</sup> the mean age of 22.7 and 22.1, respectively, appears to be fair for the clinical years of medical school.

We also compared two universities and found similar trends in both, suggesting our data were generalisable to intercalating students at other institutions. The comparison of data between the two institutions also pointed to some very interesting differences, which need to be followed up in a larger cohort of subjects.

The length of time from which students had finished their intercalated degree was variable from a few months to 2.5 years suggesting we may have not captured the full benefit of the intercalated degree in some students as achievements, such as publications, can be a lengthy process.

This study adds to the literature that clinical academic supervisors appear to enhance benefits that intercalated degrees can provide with their students being awarded a greater number of first-class honours awards, and producing significantly more poster presentations and publications from projects. Furthermore, the rise in tuition fees is likely to result in substantially fewer medical students opting to undertake an intercalated degree, threatening to further reduce the number of doctors following an academic path.

### Implications of this study

This is a topical issue due to the recent fee increase and the likely consequential disincentive to students. Our data imply that students do value intercalated degrees; it also suggests the potential disincentive of the raised tuition fee on the numbers applying for them. If fewer people undertake intercalated degrees, clinicians may have fewer skills in the future, which could conceivably not only reduce the UK's excellent record in academic clinical medicine, but also possibly lead to a decline in the excellence of our medicine itself. Medical schools need to consider how best to publicise this opportunity to their students; including more detailed information on the NHS bursary schemes, as well as feedback from both supervisors and students on the value and benefits their intercalation projects.



### Unanswered questions and future research

Information from students currently studying medicine at a university where intercalated degrees are compulsory should be explored, and the results compared with this study. Students at obligatory intercalation medical schools do support the compulsory programme,<sup>21</sup> probably reflecting the nature of applicants to those particular medical schools. It would however be interesting to see if the benefits from intercalating are still apparent in these schools. It would also be helpful for medical schools to review students' future careers after undertaking an intercalated degree, in order to quantify evidence whether an intercalated degree confers a career advantage.

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### REFERENCES

- McManus IC, Richards P, Winder BC. Intercalated degrees, learning styles, and career preferences: prospective longitudinal study of UK medical students. *BMJ* 1999;319:542–6.
- The British Medical Association Medical Students' Committee. The insider's guide to medical schools, 2004.
- Cleland JA, Milne A, Sinclair H, *et al.* An intercalated BSc degree is associated with higher marks in subsequent medical school examinations. *BMC Med Ed* 2009;9:24.
- Funston GM, Young AMH. Action is required to safeguard the future of academic medicine in the UK. *Nat Med* 2012;18:194.
- Evered DC, Anderson J, Griggs P, *et al.* The correlates of research success. *BMJ* 1987;295:241–6.
- Rushforth B. Academic medicine and intercalated degrees—the myth of student choice. *Med Ed* 2004;38:1136–8.
- FP/AFP 2013 Applicant's handbook, The UK Foundation Programme Office, June 2012.
- Griffin MF, Hindocha S. Publication practices of medical students at British medical schools: experience, attitudes and barriers to publish. *Med Teach* 2011;33:e1–8.
- Mabvuure NT. Twelve tips for introducing students to research and publishing: a medical student's perspective. *Med Teach* 2012;34:705–9.
- Whitaker IS, Eyre JR, Izadib D, *et al.* Plastic surgery senior house officers in the UK and Ireland: academic background, publication rates and research plans. *Br J Plast Surg* 2004;57:139–42.
- Jacobs CD, Cross PC. The value of medical student research: the experience at Stanford University School of Medicine. *Med Ed* 1995;29:342–6.
- Lambert TW, Goldacre MJ, Davidson JM, *et al.* Graduate status and age at entry to medical school as predictors of doctors' choice of long-term career. *Med Ed* 2001;35:450–4.
- Park SJ, McGhee CN, Sherwin T. Medical students' attitudes towards research and a career in research: an Auckland, New Zealand study. *N Z Med J* 2010;23:34–42.
- Nicholson JA, Cleland J, Lemon J, *et al.* Why medical students choose not to carry out an intercalated BSc: a questionnaire study. *BMC Med Ed* 2010;10:25.
- Brown J. Department for Business, Innovation and Skills, corp creator. Securing a sustainable future for higher education: an independent review of higher education funding and student finance, 2010.
- Rosenthal F, Ogden F. Changes in medical education: The beliefs of medical students. *Med Ed* 1998;32:127–32.
- Park SJ, Liang MM, Sherwin TT, *et al.* Completing an intercalated research degree during medical undergraduate training: barriers, benefits and postgraduate career profiles. *N Z Med J* 2010;24:123:24–33.
- Evans DE, Roberts CM. Preparation for practice: how can medical schools better prepare PRHOs? *Med Teac* 2006;28:549–52.
- Burgoyne LN, O'Flynn S, Boylan GB. Undergraduate medical research: the student perspective. *Med Ed Online* 2010;10:15. <http://med-ed-online.net/index.php/meo/article/view/5212> (accessed 15 Sep 2011)
- <http://unistats.direct.gov.uk/> (accessed 10 Oct 2011)
- Collins JP, Fairish S, McCalman JS, *et al.* A mandatory intercalated degree programme: revitalising and enhancing academic and evidence-based medicine. *Med Teach* 2010;32:541–6.