

# Motivation for studying medicine: assessing the similarities between UK and Ghanaian medical students

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## Abstract

Countries around the world experience challenges in ensuring equal distribution of health workers. For countries faced with this problem, there are many benefits to international co-operation. Before this can occur, however, there needs to be an understanding of the homogeneity of medical students between countries. This paper assesses the similarities in motivation to study medicine between medical students from the United Kingdom (UK) and Ghana. A survey previously performed on fourth-year Ghanaian students was reproduced with medical students in the UK. Students were asked to record their motivation for studying medicine, opinions on future career [general practice (GP) for UK students and a rural position for Ghanaian students] and basic demographics. The results were compared between the two cohorts using Fisher's exact test. Of medical students, 302 from Ghana and 78 from UK completed the survey. Of students, 63.5 and 75.0% were classified as intrinsically motivated in Ghana and the UK, respectively. Apart from parental education status, student demographics were broadly similar. Within the UK cohort, 30.1% of students considered it likely that they would work in GP in their future careers. Medical students are similarly motivated between the two countries. This suggests that greater co-operation may be possible when tackling difficulties in human resources for health. This is especially relevant for the UK, as the level of students predicting a career in GP in this study remains well below the national target.

## Introduction

Unequal distribution of health workers affects the health of populations around the world.<sup>1</sup> Globally, there is a disproportionate number of doctors working in urban as opposed to rural settings. Around 50% of the world's population lives in rural areas yet they are served by only 25% of available physicians.<sup>2</sup> This imbalance occurs in high, middle and low income countries<sup>3</sup> and also affects the uptake

within specialities, with fields such as primary care<sup>4</sup> and psychiatry<sup>5</sup> often being neglected. The resulting lack of health workers leads to direct health consequences for affected populations.<sup>6-8</sup> In an increasingly globalized world, international and domestic migration appear closely interconnected. As health workers continue to move in large numbers from areas of low health worker coverage to high, it is the poorest places with the greatest need that are disproportionately affected.<sup>9-12</sup> The United Kingdom (UK) is not exempt from these problems. As well as receiving and losing health workers internationally, it also experiences difficulty in ensuring an even distribution of doctors in certain geographical areas and specialities.<sup>13</sup> General practice (GP), for instance, has been struggling to fill its training places, and a significant proportion of current practitioners are set to retire in the next 5 years.<sup>14</sup> This deficit is felt most acutely in rural areas.<sup>15</sup>

The need for central planning in these situations is apparent due to the current failure of market forces. Forcing doctors to work in specific areas has generally failed when it has been attempted previously.<sup>1,16</sup> Ensuring compliance with job allocation is often impossible and can result in unmotivated doctors who fail to provide adequate care.<sup>1,9,17,18</sup> Incentivizing doctors to actively choose to work in an under-filled area would eliminate many of these difficulties.<sup>2,6</sup> Accordingly, countries around the world have researched and introduced a variety of strategies that have attempted to influence medical students' career choices.<sup>18,19</sup>

For countries with a need to redistribute health workers, such as the UK, learning from previous international attempts could highlight areas of good practice as well as identifying mistakes to be avoided. However, for knowledge to be transferable there must be an understanding of the similarity of medical students between countries. This information would also prove beneficial in managing international health worker migration. For instance, identifying medical students' homogeneity would be helpful in the setup of bilateral strategies appropriate to both cohorts. Appreciation of comparison's importance has led the World Health Organization (WHO) to call for *more international comparative research*.<sup>1</sup>

One area that would benefit from comparison is medical students' motivation. In high, middle and low income countries around the world, various studies have demonstrated the importance of motivation in a range of factors, including in influencing decisions about future careers and specialities.<sup>20-26</sup> One method of classifying motivation is as either intrinsic or extrinsic.<sup>27</sup> Kusrkar<sup>28</sup> describes intrinsic motivation as the drive to perform an activity for personal interest or enjoyment. Extrinsic motivation, on the other hand, is the

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desire to execute a task for a separable outcome such as obtaining a reward or avoiding a loss. Vaglum and colleagues,<sup>29</sup> in a study on Norwegian medical students, showed that the balance between extrinsic and intrinsic motivation in medical students has a strong influence on their future career choices. Similar findings have occurred in a diverse range of countries such as Switzerland,<sup>21</sup> the West Indies,<sup>30</sup> Netherlands,<sup>22</sup> Hungary,<sup>31</sup> Ghana,<sup>32</sup> and Egypt.<sup>33</sup>

As the Royal College of General Practitioners currently embarks upon a campaign to persuade UK medical students to choose GP as a career,<sup>14</sup> understanding the impact of underlying motivation would allow for better targeted interventions.<sup>33</sup> However, within the UK there is little literature studying the effect of motivation on student's future career choice. It is therefore beneficial to examine how similar UK medical students are to those in other countries. This knowledge would provide a greater understanding of the extent to which conclusions reached from foreign studies are transferrable, and thus could help compensate for the current dearth of UK research. In addition, if students are found to be similar, the UK could be more confident in learning from previous international attempts to influence career choices.

There has been very little direct comparison

of motivation between medical students. One study examined motivation to study medicine between UK and Spanish medical students and determined some similarities between the two cohorts.<sup>34</sup> However, both Spain and the UK are high income, European countries. It would be helpful to expand upon this work by comparing medical students in very different situations.

To achieve this, this study has replicated a previous survey performed by Agyei-Baffour and colleagues<sup>32</sup> on Ghanaian medical students, applying it to UK students. Within Ghana, policy makers have struggled with high rates of domestic and international health worker migration that have deeply impacted upon the health of the population.<sup>23</sup> In their work, Agyei-Baffour and colleagues<sup>32</sup> used a questionnaire to analyze student's motivation to study medicine and its influence on their decision to work in a deprived area. In this study, UK medical students at a similar point in their studies were provided with the same questions. In terms of development, disease burden and healthcare, Ghana is dramatically different to the UK.<sup>35</sup> By comparing the results from both cohorts, this study hopes to assess how homogenous motivation is between medical students from these two vastly different countries.

## Materials and Methods

### Study site

The Ghanaian data was taken from results published by Agyei-Baffour and colleagues<sup>32</sup>. Their research was performed on 4<sup>th</sup> year medical students studying at two universities in Ghana. Medical students in Ghana undertake 3 years of basic science teaching followed by three years of clinical training and a two-year rotating housemanship.

The present study gathered its UK data from the University of Bristol Medical School (UBMS) between April and May 2015. UBMS is based in Bristol, a city with an estimated population of 430,000 people situated in the South-West of England.<sup>36</sup> Medical students in UBMS undertake two years of preclinical teaching followed by three years of clinical placements before graduation. Two further years follow as a junior doctor before a decision can be made to enter specialist training. Attempts were made to survey all 3<sup>rd</sup> year medical students. This year group was chosen as, having completed their pre-clinical training and just starting their clinical experience, they closely matched the professional experience of the Ghanaian cohort.

Data from the World Bank clearly demonstrates the difference between the two countries. The UK in 2013 had an estimated population of 64 million with a gross national

income (GNI) per capita of 41,680 USD.<sup>37</sup> In comparison, Ghana has an estimated population of 26 million, with a GNI per capita of 1770 USD.<sup>38</sup> In 2014, the UK was placed 14<sup>th</sup> on the Human Development Index whilst Ghana was 138<sup>th</sup>.<sup>39</sup> In terms of health worker density, in 2013 the UK had 2.8 physicians per 1000 population, roughly 20 times the 2008 Ghanaian figure of 0.11.<sup>40</sup>

### Ethical approval

Ethical approval was received from the University of Bristol Ethical Review Committee. All respondents voluntarily participated after having the purpose of the study explained to them. Consent was implied by filling out the questionnaire. All results were anonymous and confidential.

### Data collection

The use of questionnaires is a well-established method to compare medical students from different cohorts.<sup>41-43</sup> Paper questionnaires were handed out to all 3<sup>rd</sup> year UBMS students attending a compulsory workshop on future career choices. The questionnaire was compiled using the methodology reported by Agyei-Baffour and colleagues.<sup>32</sup> Attempts were made to keep questions as similar as possible to the published methodology, however some minor adjustments were required. Details of the questionnaire are given below, with any necessary changes highlighted.

Participants were first asked to choose the statement that most accurately represented their current position with regards to their future career. They could choose between i) *Definitely work in GP*; ii) *Likely to work in GP*; iii) *Unlikely to work in GP*; and iv) *Definitely not work in GP*. For analysis these were grouped into dichotomous positions of *Likely to be a GP* (statements 1&2) and *Unlikely to be a GP* (statements 3&4). This question differs from the Ghanaian study, which assessed students' willingness to work in a deprived area, and reflects the different health worker imbalances found in the two countries.

To assess motivation, students were presented with twelve factors and asked to pick the top three that motivated them to study medicine. Five intrinsic motivations were included: inspiration by a role model; desire to help others; interest in medicine as a subject matter; desire to give back to home community and loss of a loved one. Seven extrinsic motivations were included: job security and lifestyle; social status/prestige; income of physician; proposed by parents; opportunity to travel and work internationally; research opportunities and ability to use cutting edge technology. Participants were judged to have *strong* intrinsic motivation if they chose two or more intrinsic factors and *strong* extrinsic motivation if they chose two or more extrinsic factors. The

two states were thus mutually exclusive.

The demographics assessed included sex, age, partnership status (*married/in a relationship vs single*) and parental education status (PES). A high PES was assigned if one or more parents had received a university degree. Instead of ethnicity, which was assessed in the Ghanaian study, UK students were asked whether they were a domestic or international student. Rural exposure was assessed by asking about birth location, location of secondary school and whether they had lived in a rural area at any point since the age of 5. In this questionnaire, rural was defined in line with the UK government definition as an area no bigger than a small town *i.e.* population less than 10,000.<sup>42</sup> This is slightly different from the definition used by Agyei-Baffour and colleagues<sup>32</sup> who described rural as an area with a population less than 5000. This change was necessary as the UK is more densely populated than Ghana, and thus definitions of the term *rural* vary accordingly.

### Statistical analysis

Results were analyzed using GraphPad Prism version 6.00 for Windows (GraphPad Software; Microsoft Corporation, Redmond, WA, USA). Main outcome of interest was comparison of motivation and demographics between UK and Ghanaian students. Bivariate associations and 95% confidence intervals (CIs) were calculated using Fisher's exact test.

## Results

### Demographics

Of the 244 UBMS medical students in 3<sup>rd</sup> year, 168 (69%) attended the lecture. Of these, 78 (46%) responded to the survey. The socio-demographic characteristics of respondents are shown in Table 1. A small majority of the participants were female (52.6%) with an average age of 22.0 years [standard deviation (SD)=1.77]. Most respondents were domestic students (83.3%) and were not in a relationship (57.9%). 61 (78.2%) respondents had a parent who had achieved a university degree. In terms of rural experience, half of the respondents (50.0%) had not lived in a rural area from the age of 5 and the majority had been born in an urban area (64.1%) and had gone to secondary school in an urban area (67.9%).

### Motivation

Two students did not report their motivation to study medicine or their current views of GP as a career and were therefore excluded from the analysis. When motivational factors were grouped, just over three quarters of respon-

dents were categorized as having an intrinsic motivation to study medicine ( $n=55$  or 75.3%). Only 30.1% ( $n=22$ ) of all participants stated that they definitely or likely work in GP in their future career. The relationship between motivation and future career opinions is shown in Table 2. A higher percentage of students who reported intrinsic motivation thought they were likely to work in GP compared to those who were extrinsically motivated (32.7 vs 22.2%, respectively). However, this does not reach significance when using Fisher's exact test ( $P=0.56$ ).

### Comparison with Ghanaian students

A comparison of UK and Ghanaian students' motivation for studying medicine can be found in Figure 1. Of UK students, 75.0% were categorized as intrinsically motivated compared to 63.5% of Ghanaian students. This difference does not reach a level of significance [odds ratio (OR) 1.64, 95% CI 0.92 to 2.91].

Demographic characteristics have been compared in Figure 2 and Table 3. Ethnicity was incomparable and the Ghanaian study did not report on the students' school location so both categories were excluded from comparison. Both sets of students are similar in age (UK 22.0 SD=1.77 vs Ghana 22.9, SD=1.40). There is a smaller proportion of males in the UK than in Ghana (OR 0.55, 95% CI 0.33 to 0.91). UK students are less likely to be in relationships (OR 0.59, 95% CI 0.32 to 0.98) and substantially more likely to have a parent who is university trained (OR 3.04, 95% CI 1.63 to 5.70). With regards to rural experience, UK students were far more likely to report being born in a rural area (OR 4.14, 95% CI 2.28 to 7.53) and having lived in a rural area since the age of 5 (OR 3.02, 95% CI 1.79 to 5.09) than their Ghanaian counterparts.

## Discussion

### Comparison of students' motivation

The results clearly demonstrate that the majority of both Ghanaian and UK students are intrinsically motivated, numbering 63.5 and 75.0%, respectively. Although UK students may be more likely to report intrinsic motivation, the results between the two cohorts are broadly similar. This homogeneity occurs despite living and training in areas with vastly different cultures, healthcare systems and living standards. This suggests that some level of transferability may be possible between both countries in the use of strategies that target underlying motivation of medical students.

However, this result must be treated with caution. Adjusting motivation into two binary

**Table 1. Socio-demographic characteristics and rural exposure of UK students.**

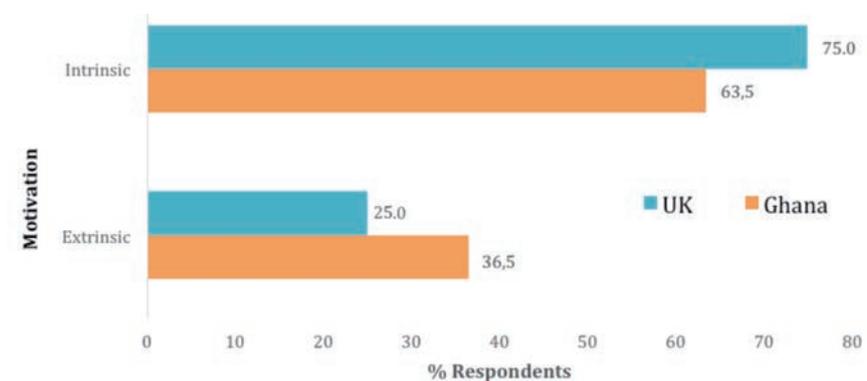
Variable	Frequency (n=78)	%
Gender		
Male	35	44.9
Female	41	52.6
NA/Prefer not to answer	2	2.6
Mean age (SD)	22.0 (1.77)	
Student status		
Domestic	65	83.3
International	10	12.8
NA/Prefer not to answer	3	3.8
Relationship status		
Married/In a relationship	20	25.6
Single	53	67.9
NA/Prefer not to answer	5	6.4
PES		
High*	61	78.2
Low	14	17.9
NA/Prefer not to answer	3	3.8
Lived in a rural area <sup>o</sup>		
Yes	37	47.4
No	39	50.0
NA/Prefer not to answer	2	2.6
Birthplace		
Rural <sup>f</sup>	26	33.3
Urban	50	64.1
NA/Prefer not to answer	2	2.6
Secondary school		
Rural	23	29.5
Urban	53	67.9
NA/Prefer not to answer	2	2.6

NA, not available; SD, standard deviation; PES, parental education status. \*High PES is one or more parents achieved a university degree; <sup>o</sup>from age five on; <sup>f</sup>rural is an area with population <10,000.

**Table 2. Comparison of intrinsic and extrinsic student motivation versus likelihood of entering general practice in future career.**

	Likely		Unlikely		Total* (n)
	n	%	n	%	
Intrinsic <sup>o</sup>	18	32.7	37	67.3	55
Extrinsic <sup>f</sup>	4	22.2	14	77.8	18
Total	22	30.1	51	69.9	73

\*Two students failed to answer the question and were thus excluded. <sup>o</sup>Intrinsic motivation is defined as factors chosen from: inspiration by a role model, desire to help others, interest in medicine as a subject matter, desire to give back to home community and loss of a loved one. <sup>f</sup>Extrinsic motivation is defined as factors chosen from: job security and life style, social status/prestige, income of physician, proposed by parents, opportunity to travel and work internationally, research opportunities and ability to use cutting-edge technology.



**Figure 1. Comparison of reported motivation between UK and Ghanaian medical students (%).**

categories (intrinsic or extrinsic) is a crude method that provides little detail. Determining which factor is intrinsic or extrinsic is open to interpretation and may be overly arbitrary. There is no weighting possible between the different motivational factors and the importance of each may differ widely between participants. In addition, it may be that context affects the practical implications of the underlying motivational factors. For instance, a desire for good *job security and lifestyle* may mean entirely different things between Ghanaian and UK students. Yet, despite this study's limited ability to capture nuances or high levels of detail, it does succeed in a direct comparison between two highly divergent populations.

It is also important not to draw overly specific conclusions from this result. Although underlying motivation has been shown in many contexts to influence career choice,<sup>20-26</sup> the relationship between the two is complicated and may differ greatly between the two cohorts. Additionally, the students were surveyed at the beginning of their clinical experience, and most would not yet have experienced at first-hand the realities of being a doctor. As they progress through their career, perception of both underlying motivation and career preferences may change.<sup>44</sup> Thus although mid-level medical students may be similar in both Ghana and the UK, by the time they are in a position to make career decisions they may have diverged significantly. Further research is therefore needed to compare junior doctors' motivations and decision-making processes between the two countries.

However, the results of this study remain important. They suggest that it is reasonable for countries such as the UK to look internationally and learn from others when attempting to manage difficulties in human resources for health. This presents a valuable opportunity to increase the movement of information between countries, regardless of income level. The increased transfer of information both ways between high-income countries, where the majority of research has taken place, and low-income countries, which have been disproportionately affected by imbalances in health worker distribution, would be beneficial for all. In addition, the global nature of migration ensures that the crisis in human resources for health cannot be tackled by one country alone.<sup>1,45</sup> In its world health report in 2006, the WHO recommends co-operation between countries in both research and practice to ensure effective solutions are found and implemented.<sup>1</sup> Considering a popular destination for Ghanaian health worker migrants is the UK,<sup>46</sup> understanding similarities between the workforces presents a useful starting point that should encourage both countries to work together in this area.

## Demographic differences between Ghanaian and UK students

At first view, it would appear that UK students have far greater exposure to rural life than their Ghanaian counterparts. However, the definition of rural exposure differs, with the UK's definition (population <10,000)<sup>47</sup> being twice the size of Ghana's (population <5000).<sup>48</sup> In addition, the practical implications of rural life vary greatly between the two countries. For instance, the World Bank estimated that in 2010 around 62% of the rural

population in Ghana did not have access to electricity and 19% did not have access to an improved water source.<sup>38</sup> Even in the most rural areas within the UK, conditions are generally vastly improved on this.<sup>37</sup> Thus a direct comparison is inappropriate.

The Ghanaian study found that high PES was associated with a low desire to work in rural areas. The influence of family background in medical career decisions has been identified in other studies<sup>20,33</sup> although it is not a consistent finding.<sup>25</sup> The influence of PES is

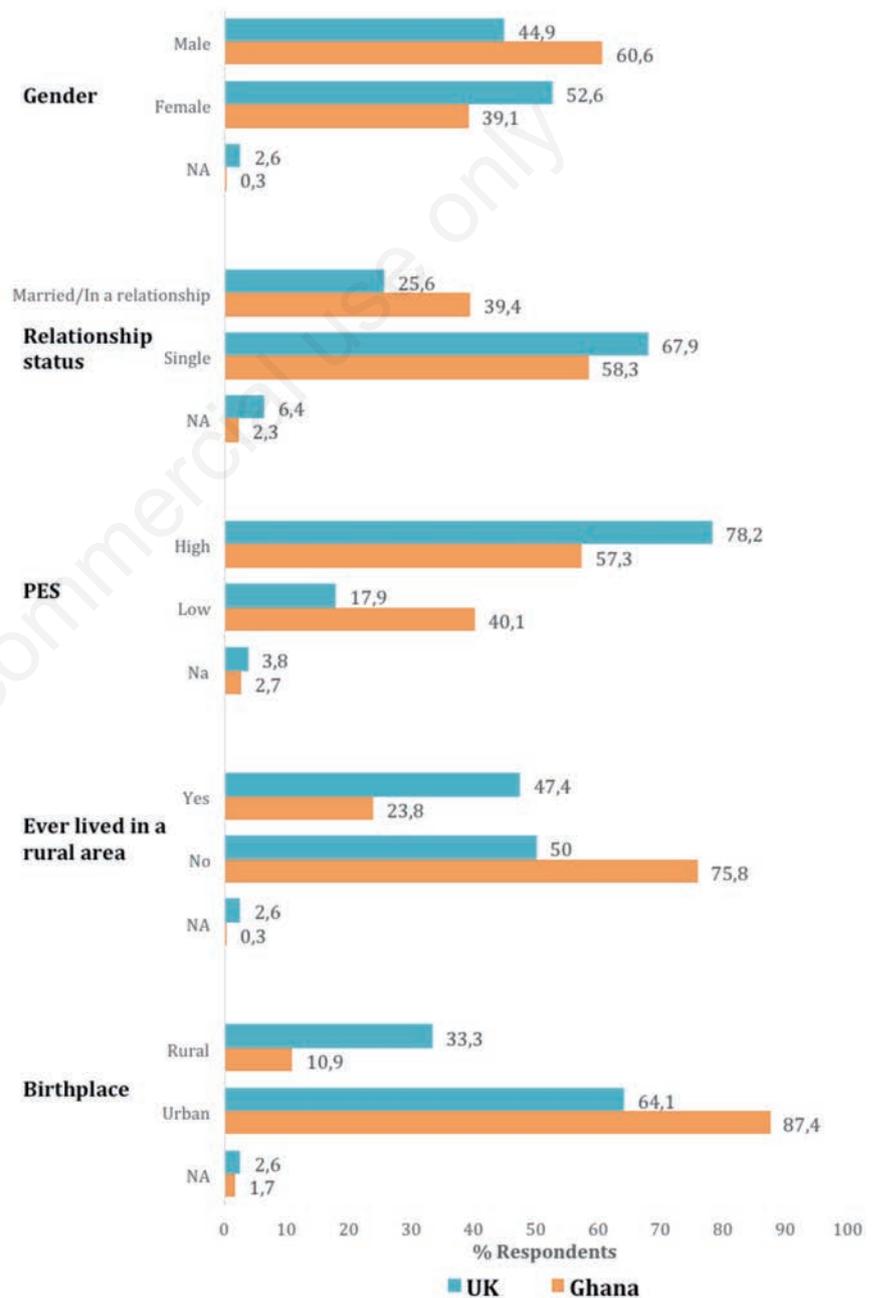


Figure 2. Comparison of demographics between UK and Ghanaian medical students (%). PES=parental education status.

important, as UK students are much more likely to have a parent who is a university-trained professional than their Ghanaian counterparts (OR 3.04, 95% CI 1.63 to 5.70). Little is known about the effect of PES on UK students and this study is too low powered to determine if any association exists. Two UK studies that have examined this topic indirectly found no obvious relationship.<sup>49,50</sup> However, the influence of PES on career decisions was only a minor consideration in both of these and more work is needed to fully explore this area. Until this occurs, the difference in the rate of high PES between the two cohorts presents an unknown variable when attempting to compare Ghanaian and UK medical students' career decisions.

### Underlying motivation of UK students

As far as the author is aware, this is the first study to directly examine the effect of UK medical students' motivation for studying medicine on their speciality preferences. The observed differences between intrinsically and extrinsically motivated students were not statistically significant. However, other studies performed around the world have found an association between high intrinsic motivation and a tendency for primary care.<sup>25</sup> Additionally, much research has explored the link between motivation and certain demographic factors, specifically gender.<sup>4,20,21,29,49</sup> Preliminary logisti-

cal regression performed within this present study suggests that gender may be a confounding factor within the Bristol cohort. However, numbers are too low to produce meaningful results.

Despite not revealing an association between motivation and career choice, the result of the present study demonstrates that a large majority of UK students report themselves as being intrinsically motivated. Underfilled areas and specialities should therefore consider appealing to this intrinsic motivation in order to attract the highest proportion of medical students possible. Further qualitative and longitudinal research is needed to identify the specific actions that could achieve this.

### Number of UK students likely to work in general practice

A worrying finding of the present study is that only 30.1% of respondents thought they were likely or definitely going to work in GP during their future career. This supports previous studies that suggest the number of students interested in GP is low<sup>13,51-54</sup> and is below the Department of Health target of 50% recruitment of medical graduates to GP.<sup>14</sup> The students surveyed were in their 3<sup>rd</sup> year of study, and much can change before graduation and eventual career choices, and numbers interested in GP has been shown to increase

as time goes on.<sup>55</sup> However, the low numbers interested at this stage of training is concerning, as early career intentions have been shown to be predictive of future career.<sup>53</sup> This study's findings suggest that efforts to increase recruitment for GP may need to start before the start of clinical years.

### Limitations

This study has several limitations. As previously mentioned, the dividing of motivation into two categories lowers the level of detail gained and risks inappropriately grouping different motivational factors. However, the limitations are consistent between both groups of students. Thus this study's primary goal of accurately comparing the results of two different cohorts remains valid.

There is also a danger that the results do not accurately represent the respective populations. Social desirability may have biased the results despite efforts to limit this by making the questionnaires anonymous and confidential. The study also attempted to sample an accurate representation of Bristol medical students by distributing the questionnaire at a compulsory event. However, those who chose not to fill in the survey or attend the event may differ in some way from the respondents. Finally, Bristol medical students may not necessarily be representative of UK medical students overall.

To build upon this study, further qualitative research could develop a deeper understanding of the motivational factors present in medical students and the effect they have on career choices. Conducting focus groups from each cohort would allow for a more detailed exploration of themes and perspectives. This would create further awareness of potential differences and similarities in motivational factors, their practical implications and their importance in the career decision-making process.

### Conclusions

This study contributes to current understanding by demonstrating that despite the vast differences between their countries, UK and Ghanaian medical students have similar motivations to study medicine. This provides evidence that should support countries to cooperate and learn from each other when tackling problems relating to human resources for health. In the current global situation, collaboration and transfer of information is key to ensure that countries are both well informed and can act effectively. On this background, the importance of continuing to assess the similarities of workforces between countries is clear.

This study also has important implications

**Table 3. A comparison of medical students' demographics between the UK and Ghana.**

Variable	UK (%)	Ghana (%)	OR (95% CI)
Gender			
Male	44.9	60.6	0.55 (0.33 to 0.91)
Female	52.6	39.1	
NA/Prefer not to answer	2.6	0.3	
Mean age (SD)	22.0 (1.77)	22.9 (1.4)	-
Relationship status			
Married/In a relationship	25.6	39.4	0.59 (0.32 to 0.98)
Single	67.9	58.3	
NA/Prefer not to answer	6.4	2.3	
PES			
High*	78.2	57.3	3.04 (1.63 to 5.70)
Low	17.9	40.1	
NA/Prefer not to answer	3.8	2.7	
Lived in a rural area <sup>o</sup>			
Yes	47.4	23.8	3.02 (2.28 to 7.53)
No	50.0	75.8	
NA/Prefer not to answer	2.6	0.3	
Birthplace			
Rural	33.3	10.9	4.14 (2.28 to 7.53)
Urban	64.1	87.4	
NA/Prefer not to answer	2.6	1.7	

OR, odds ratio; CI, confidence interval; SD, standard deviation; NA, not available; PES, parental education status. \*High PES is one or more parents achieved a university degree; <sup>o</sup>from age five on.

for the UK as it begins to formulate its own strategies to increase the proportion of its students choosing GP. The results demonstrate the importance of intrinsic motivation for UBMS medical students. As motivation plays a role in determining future career choice, any future strategies must maintain awareness of this.

## References

- World Health Organization. The World Health Report 2006: working together for health. Geneva: World Health Organization; 2006.
- World Health Organization. Increasing access to health workers in remote and rural areas through improved retention: policy recommendations. Geneva: World Health Organization; 2010.
- Dussault G, Franceschini MC. Not enough there, too many here: understanding geographical imbalances in the distribution of the health workforce. *Hum Resour Health* 2006;4:12.
- Maiorova T, Stevens F, Zee J, et al. Shortage in general practice despite the feminisation of the medical workforce: a seeming paradox? A cohort study. *BMC Health Serv Res* 2008;8:262.
- Katschnig H. Are psychiatrists an endangered species? Observations on internal and external challenges to the profession. *World Psychiatry* 2010;9:21-8.
- Hongoro C, McPake B. How to bridge the gap in human resources for health. *Lancet* 2004;364:1451-6.
- Chen LC. Striking the right balance: health workforce retention in remote and rural areas. *Bull World Health Organ* 2010;88:323.
- Mackey TK, Liang BA. Rebalancing brain drain: exploring resource reallocation to address health worker migration and promote global health. *Health policy* 2012;107:66-73.
- Lehmann U, Dieleman M, Martineau T. Staffing remote rural areas in middle- and low-income countries: a literature review of attraction and retention. *BMC Health Serv Res* 2008;8:19.
- McCoy D, McPake B, Mwapasa V. The double burden of human resource and HIV crises: a case study of Malawi. *Hum Resour Health* 2008;6:16.
- Smith RD, Chanda R, Tangcharoensathien V. Trade in health-related services. *Lancet* 2009;373:593-601.
- Lopes C. Restrictions on health worker migration proving problematic. *CMAJ* 2008;178:269-70.
- Lambert T, Goldacre R, Smith F, Goldacre MJ. Reasons why doctors choose or reject careers in general practice: national surveys. *Br J Gen Pract* 2012;62:e851-8.
- GP Taskforce. Securing the future GP workforce. Delivering the mandate on GP expansion. GP taskforce final report. Available from: <http://hee.nhs.uk/wp-content/uploads/sites/321/2014/07/GP-Taskforce-report.pdf>
- Mack M, Maxwell H, Hogg D, Gillies J. Being rural: exploring sustainable solutions for remote and rural healthcare; 2014. Available from: <http://www.rcgp.org.uk/policy/rcgp-policy-areas/rural-general-practice.aspx>
- McPake B, Mills A. What can we learn from international comparisons of health systems and health system reform? *Bull World Health Organ* 2000;78:811-20.
- Frehywot S, Mullan F, Payne PW, Ross H. Compulsory service programmes for recruiting health workers in remote and rural areas: do they work? *Bull World Health Organ* 2010;88:364-70.
- Buykx P, Humphreys J, Wakerman J, Pashen D. Systematic review of effective retention incentives for health workers in rural and remote areas: towards evidence-based policy. *Aust J Rural Health* 2010; 18:102-9.
- Wilson NW, Couper ID, De Vries E, et al. A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. *Rural Remote Health* 2009;9:1060.
- Vaglum P, Wiers-Jenssen J, Ekeberg O. Motivation for medical school: the relationship to gender and specialty preferences in a nationwide sample. *Med Educ* 1999;33:236-42.
- Buddeberg-Fischer B, Klaghofer R, Abel T, Buddeberg C. The influence of gender and personality traits on the career planning of Swiss medical students. *Swiss Med Wkly* 2003;133:535-40.
- van Tongeren-Alers M, van Esch M, Verdonk P, et al. Are new medical students' specialty preferences gendered? Related motivational factors at a Dutch medical school. *Teach Lear Med* 2011;23:263-8.
- Johnson JC, Nakua E, Dzodzomenyo M, et al. For money or service?: a cross-sectional survey of preference for financial versus non-financial rural practice characteristics among Ghanaian medical students. *BMC Health Serv Res* 2011;11:300.
- Leon BK, Riise Kolstad J. Wrong schools or wrong students? The potential role of medical education in regional imbalances of the health workforce in the United Republic of Tanzania. *Hum Resour Health* 2010;8:3.
- Puertas EB, Arosquipa C, Gutierrez D. Factors that influence a career choice in primary care among medical students from high-, middle-, and low-income countries: a systematic review. *Rev Panam Salud Publica* 2013;34:351-8.
- Khater-Menassa B, Major S. Factors influencing the choice of specialty among medical students in Lebanon. *J Med Liban* 2005;53:16-20.
- Frey BS, Jegen R. Motivation crowding theory. *J Econ Surv* 2001;15:589-611.
- Kusurkar RA, Ten Cate TJ, van Asperen M, Croiset G. Motivation as an independent and a dependent variable in medical education: a review of the literature. *Med Teach* 2011;33:e242-62.
- Heiligers P. Gender differences in medical students' motives and career choice. *BMC Med Educ* 2012;12:82.
- Wierenga AR, Branday JM, Simeon DT, et al. Motivation for and concerns about entering a medical programme. *West Indian Med J* 2003;52:304-10.
- Girasek E, Molnár R, Eke E, Szócska M. The medical career choice motivations - Results from a Hungarian study. *Cent Eur J Med* 2011;6:502-9.
- Ageyi-Baffour P, Kotha S, Johnson J, et al. Willingness to work in rural areas and the role of intrinsic versus extrinsic professional motivations - a survey of medical students in Ghana. *BMC Med Educ* 2011;11:56.
- Mohamed A. Willingness and professional motivations of medical students to work in rural areas: a study in Alexandria, Egypt. *Healthc Low Resour Settings* 2013;1:4.
- Pastor A, Lopez-Roig S, Sanchez S, et al. Analysing motivation to do medicine cross-culturally: the international motivation to do medicine scale. *Psychol Writings* 2009;2:3-9.
- Castaldo A. Migration of health professionals from Ghana: which trainees are more prone to leave. Workshop on Human Resources For Health And Migration: Mobility, Training and the Global Supply of Health Workers, 16-17 May 2007. p.10. Available from: [http://r4d.dfid.gov.uk/PDF/Outputs/MigrationGlobPov/MSPP-Adriana\\_Castaldo.pdf](http://r4d.dfid.gov.uk/PDF/Outputs/MigrationGlobPov/MSPP-Adriana_Castaldo.pdf)
- Bristol City Council. The Population of Bristol. 2014. <http://www.bristol.gov.uk/page/council-and-democracy/population-bristol>
- The World Bank. Country Profile: United Kingdom. Available from: <http://data.worldbank.org/country/united-kingdom>
- The World Bank. Country Profile: Ghana. Available from: <http://data.worldbank.org/country/ghana>. 2015. Accessed 22/05/2015
- United Nations Development Programme. 2014 Human Development Report. New York 2014. Available from: <http://hdr.undp.org/en/content/human-development>

- report-2014
40. World Health Organization. Global Health Observatory Data Repository. 2015. Available from: <http://apps.who.int/gho/data/node.main.A1444>
  41. Crossley ML, Mubarik A. A comparative investigation of dental and medical student's motivation towards career choice. *Br Dent J* 2002;193:471-3.
  42. Kelly JC, O'Briain DE, Kumar T, et al. Orthophobia and orthophilia: the attitude of medical students and doctors to orthopaedics, an international comparison. *Irish J Med Sci* 2010;179:S151-S.
  43. O'Sullivan E, Ryan CA. An international comparison of professional attitudes among medical students in Ireland. *Med Teach* 2011;33:424-5.
  44. Compton MT, Frank E, Elon L, Carrera J. Changes in U.S. medical students' specialty interests over the course of medical school. *J Gen Intern Med* 2008;23:1095-100.
  45. Lofters AK. The "brain drain" of health care workers: causes, solutions and the example of Jamaica. *Can J Public Health* 2012;103:e376-8.
  46. Buchan J, Dovio D. International recruitment of health workers to the UK: a report for DFID. London: Health Systems Resource Centre 2004.
  47. Department for Environment Food & Rural Affairs. Rural Urban Classification. 2013. Available from: <https://www.gov.uk/government/collections/rural-urban-definition>
  48. Ghana Statistical Service. 2010 Population & Housing census: Summary Report of Final Results. Accra: GSS2012. 2010. Available from: [http://www.statsghana.gov.gh/docfiles/2010phc/Census2010\\_Summary\\_report\\_of\\_final\\_results.pdf](http://www.statsghana.gov.gh/docfiles/2010phc/Census2010_Summary_report_of_final_results.pdf)
  49. McManus IC, Livingston G, Katona C. The attractions of medicine: the generic motivations of medical school applicants in relation to demography, personality and achievement. *BMC Med Educ* 2006;6:11.
  50. Cleland JA, Johnston PW, Anthony M, et al. A survey of factors influencing career preference in new-entrant and exiting medical students from four UK medical schools. *BMC Med Educ* 2014;14:151.
  51. Maudsley G, Williams L, Taylor D. Medical students' and prospective medical students' uncertainties about career intentions: cross-sectional and longitudinal studies. *Med Teach* 2010;32:e143-e51.
  52. Lambert TW, Goldacre MJ, Turner G. Career choices of United Kingdom medical graduates of 2002: questionnaire survey. *Med Educ* 2006;40:514-21.
  53. Lambert T, Goldacre M. Trends in doctors' early career choices for general practice in the UK: longitudinal questionnaire surveys. *Br J Gen Pract* 2011;61:e397-403.
  54. Svirko E, Goldacre MJ, Lambert T. Career choices of the United Kingdom medical graduates of 2005, 2008 and 2009: Questionnaire surveys. *Med Teach* 2013; 35:365-75.
  55. Henderson E, Berlin A, Fuller J. Attitude of medical students towards general practice and general practitioners. *Br J Gen Pract* 2002;52:359-63.