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# Can I cut it? Medical students' perceptions of surgeons and surgical careers

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## **Abstract**

### **Background**

Recent years have seen a significant drop in applications to surgical residencies. Existing research has yet to explain *how* medical students make career decisions. This qualitative study explores students' perceptions of surgery and surgeons, and the influence of stereotypes on career decisions.

### **Methods**

Exploratory questionnaires captured students' perceptions of surgeons and surgery. Questionnaire data informed individual interviews, exploring students' perceptions in depth. Rigorous qualitative interrogation of interviews identified emergent themes, from which a cohesive analysis was synthesized.

### **Results**

Respondents held uniform stereotypes of surgeons as self-confident and intimidating; surgery was competitive, masculine, and required sacrifice. To succeed in surgery, students felt they must fit these stereotypes, excluding those unwilling, or who felt unable, to conform. Deviating from the stereotypes required displaying such characteristics to a level exceptional even for surgery; consequently, surgery was neither an attractive nor realistic career option.

### **Conclusions**

Strong stereotypes of surgery deterred students from a surgical career. As a field, surgery must actively engage medical students to encourage participation and dispel negative stereotypes that are damaging recruitment into surgery.

**Summary for table of contents**

Surgeons were stereotypically self-confident and intimidating, and surgery was stereotypically competitive, masculine, and requiring sacrifice. Students believed they must fit these stereotypes to succeed; thus many were deterred from a surgical career, which they saw as unattractive or unrealistic. Actively engaging students may dispel stereotypes that damage surgical recruitment.

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## Introduction

Application numbers to general surgery training have fallen over the last decade in the USA,<sup>1-5</sup> a pattern reflected in many countries worldwide.<sup>6-8</sup> This is a worrying trend, which not only has ramifications for recruitment of the best candidates into surgical careers,<sup>1</sup> but in the long term could jeopardize the quality and standard of surgical care we are able to deliver.<sup>4,9,10</sup> Further, it is well established that although women comprise a considerable proportion of the medical workforce, they continue to be under-represented in surgical specialties, further depleting surgery's recruitment pool.<sup>11-13</sup> Could general surgery, and perhaps surgery in general, be heading for a major recruitment crisis?

Many students are unwilling to consider a surgical career,<sup>14</sup> a decision that may be taken even before they begin clinical training.<sup>15</sup> In order to explain the pattern of students' applications to surgical training, we first need to understand the perceptions and experiences influencing their career choices. Many studies have sought to identify predictive factors for an individual choosing a career in surgery.<sup>16-22</sup> Factors predicting such a choice that recur in the literature include exposure to and participation within a surgical specialty,<sup>16,19,20</sup> perceived lifestyle or work-life balance,<sup>16,17,19,22,23</sup> access to role models,<sup>17,21,22,24</sup> derivation of satisfaction from surgery,<sup>16, 18</sup> and gender.<sup>2,11,25,26</sup> Female students have differing and negative experiences of surgery,<sup>26</sup> perceive a lack of fit between their perceptions of themselves and of what a surgeon must be,<sup>27</sup> and are significantly more likely to pursue surgery if they train in a hospital with abundant and prominent female role models.<sup>22</sup> Whilst there has been considerable emphasis by researchers on identifying these factors, few studies have considered *how* and *why* they may explain reluctance to engage in a surgical career. Hence, we propose an in-depth exploration of students' perceptions of surgery and surgeons, with a focus on stereotypes.

Stereotypes are cultural models which reflect social prototypes; they are not conjured from nowhere, but neither are they necessarily drawn from direct personal contact. Rather, they are socially and culturally derived figures which signal what is normal and what is not, and which are so deeply embedded in everyday life that they frequently go unnoticed. They consequently act as shortcuts to make assumptions about an individual quickly:<sup>28</sup> in all human social interaction we rely on social scripts and stereotypes to a certain extent in order to function

effectively in the world. Medicine is no different, and it is populated by a large number of specialized professionals, which may mean that stereotyping of particular specialties may be more likely.

In an ethnographic work undertaken in the 1990s, Cassell provides us with a strong surgical stereotype,

*“The “iron surgeon” powerful, invulnerable, untiring. Those trained by him pass on the mystique, transmitting from one surgical generation to the next an embodied professional ethos. The iron surgeon does battle with death, exterminates disease, declares war on softness, sloth, and error. He is technically brilliant, clinically astute, technologically sophisticated. His feelings, if he has any, are private; his inner life, if he has time for one, is unengaged by his work. The feelings of his patients are also private. Their personalities, problems, hopes, aspirations, are irrelevant. The iron surgeon’s task is to excise disease. The rest is for nurses or social workers.”*

Cassell, 2000<sup>29</sup>

This picture portrays surgeons in terms of decisive, masculine perfection; by implication surgeons do not display weakness or emotion, nor spare thought for communication or family – issues which, if raised, are positioned as contradictory to their role. This potentially discourages anyone whose values or personal characteristics do not align with such a portrayal.

If students decide against a career in surgery before exposure to it,<sup>15</sup> we must assume that they have strong preconceptions of surgery. In order to understand this phenomenon we must consider the nature of surgical stereotypes, and how they influence students’ opinions of surgical careers. Whilst existing studies have focused on identifying predictive factors and correlations amongst large groups, the exploration of *why* such factors are powerful requires a different type of research, and there has been a call for more qualitative research within our field.<sup>30,31</sup> Employing novel research strategies not typical for the surgical domain, namely discourse analysis, we undertook to answer the research questions: What stereotypes of surgeons and surgery exist among medical students? And *how* do these stereotypes influence students’ ideas about surgical careers?

## Methods

### *Setting*

Ethical approval was granted by The University of Manchester Research Ethics Committee (Ref No: 11314). We conducted this study within a research-intensive UK medical school which trains approximately 450 students across five year groups. The University has a prominent surgical society and students are exposed to clinical surgical rotations in their first clinical year (Year 3) without exception. The medical school comprises four major teaching hospitals, each with a high turnover of surgical cases.

### **Summary**

This study took a qualitative approach, employing exploratory open-ended questionnaires grounded in the literature, to gain insight into students perceptions, further explored in-depth via individual interviews, for triangulation of the research subject.

### *Exploratory questionnaires*

We advertised for participants via the student intranet. We undertook purposive sampling of those who responded, to achieve representativeness in terms of year group and gender, while also including a broad range of career intentions. Of the sample (n=46), 59% were female; the group was evenly spread across the five year groups; and 45% were considering a surgical career. In the open-ended questionnaires, which had been previously piloted, we asked students to provide descriptions of a typical surgeon, and of a positive and negative surgical experience; we also asked them to share their hints about what would aid or hinder success in a surgical career. Analysis occurred alongside data collection, and questionnaire data were interrogated via qualitative analysis, isolating important themes that emerged pertaining to the research question. After analysis of 46 questionnaires the research team reached consensus that no new themes were emerging, and recruitment was stopped. The analysis was used to inform the design of in-depth interviews.



### *In-depth interviews*

We invited a further cohort, who had not completed questionnaires, to participate in in-depth face-to-face interviews, again via the student intranet. We purposively sampled students (n=12) by career intentions (surgery, not surgery, or unsure) to gain the broadest range of views, and by year group and gender to ensure representativeness (Table 1). KB, a medical student, was chosen to conduct the interviews to facilitate frank, honest discussion. Students were interviewed on a first-come, first-served basis until our sampling framework was fulfilled. We undertook in-depth individual interviews exploring students' experiences and perceptions of surgery and surgeons, and their subsequent career intentions. Questions were derived from analysis of the questionnaire data and included: "What are your experiences of surgery?", "What are your perceptions about a surgical career?", "What are surgeons like?", "Are there any stereotypes of surgeons?", "Are the surgeons you have met like their stereotypes?". Interviews were audio-recorded, transcribed verbatim and pseudonymized.

We undertook qualitative analysis, coding the transcripts according to emergent themes in the data.<sup>32-34</sup> This process was undertaken by researchers independently (EH and KB) and then discussed within the research team in order to challenge interpretations of the data. Further, an external researcher coded a random selection of transcripts to ensure rigor and minimize bias. We then synthesized the emergent themes and hierarchically organized them into meta-themes pertinent to the research questions. To best explore the nature and impact of stereotypes, we undertook a secondary discourse analysis, a methodology with which to examine language as a tool to understand individuals' assumptions, perceptions and beliefs, in this case about surgery. In accordance with Gee<sup>35</sup>, data was further interrogated to examine power systems, assumptions, beliefs, values, and cultural models within the data. This allowed examination not only of stereotypes explicitly voiced by participants, but also how they subsequently consciously or unconsciously subscribed to them in the interview.

## **Results**

### **Summary**

Remarkably uniform stereotypes of surgery and surgeons ran throughout participants' responses. Even though they were aware of the stereotypes they were drawing on, students believed surgeons were confident and

intimidating, and that the surgical realm was a competitive and masculine domain requiring sacrifice. Students believed success in surgery required fitting into the stereotypes and possessing this battery of impressive personal characteristics. To deviate from this norm, for example in terms of gender or character, required being exceptional even within the surgical domain. This left many students feeling that surgery was not a possible career for them, often before they had clinical exposure to it.

### **What surgeons are like:**

#### ***Confident***

Students held stereotypes of surgeons as self-confident.

*“I think to be a surgeon you’ve got to be... confident of your abilities... very sure of yourself and, if you aren’t, I suppose you have to be very good at portraying confidence and... hiding that part of you.”*

**Hannah**, 4th year, not considering surgery

*“In order to get things done you have to be very like, harsh... and blunt... I understand when they are like that ‘cause when they say things, they need things to get done... Like especially when people’s lives are literally on the table, then you have to... get things done properly, and assert the authority so that when you know things need to be done, you get them done.”*

**Charlotte**, 3rd year, unsure

As these extracts demonstrate, students often felt that excessive self-confidence and authority were integral characteristics of a surgeon, necessary both to engender trust from patients and to command and lead a team, excusing surgeons from behavior perceived as “rude”. This included their very direct communication style, which, while interpreted favorably by some as “honest” and “frank” by some, was seen as “brutal” and “mean” by many. This dual interpretation also applied to surgeons’ self-confidence, which was often perceived as arrogance.

*“When you think of a surgeon, that’s the sort of person you think of, like quite smug and thinks he’s like... the absolute best.”*

**Ben**, 1st year, not considering surgery

For students, the "typical arrogant surgeon" stereotype was extremely negative, whilst simultaneously being inseparable from and necessary to the role of a surgeon.

### ***Intimidating***

Participants respected individual surgeons for being "hard working", "skilled", "knowledgeable", "calm under pressure", and "good teachers". Yet surgeons were stereotypically "intimidating" due to their "aggressive" and "impersonal" nature and being "always busy", which made students apprehensive of future interactions.

*"Sometimes it feels like you can't ask [questions], because... they seem very, quite, intimidating people, surgeons."*

**Charlotte**, 3rd year, unsure

The negative stereotypes persisted even when in direct conflict with students' actual experiences of surgeons as "encouraging", "keen to teach" and "friendly"; meeting surgeons who did not conform was insufficient to dispel the stereotypes.

*"So far many of them have lived up to their stereotypes... some surgeons don't, some surgeons are really, really nice, erm the other vascular surgeon on the firm, the lead, he was really lovely and I have a lot of respect for him, but a lot of surgeons can be quite boyish and like playing with their toys and I know it's a stereotype but I do think sometimes, sometimes it's true."*

**Hannah**, year 4, not considering surgery

Many students retold stories and rumors of surgeons' behavior. While students may not have had direct negative experiences of surgeons themselves, they came to expect, through such stories, that such events were possible within surgical culture.

*"And like just the fear of them being like the stereotypical surgeon. And then, not really like not understanding if, you know, you've done something wrong that you might want, you know, some, like, some"*

*counsel or like to be told how to do it better. They just kind of like make fun of you, you know, for doing it wrong. And that would be quite intimidating.”*

**Isabella**, 2nd year, considering surgery

Further, for those with direct experience, the stories and rumors became normalized, rendering such behavior acceptable.

*“It may seem bad but um, I think ‘cause the fact that patients are like anesthetized... like there’s more of a relaxed atmosphere and more jokey, like obviously you can say things without offending the patient, ‘cause they don’t know what you’re saying as such.”*

**Harry**, 4th year, considering surgery

Such expectations, driven by stereotypes, meant it was harder for clinical students to approach and engage with surgeons. This further reduced their enjoyment and experience of surgical placements.

### **What surgery is like:**

Students of all year groups, including those who had not yet had contact with surgeons in clinical training, held consistent stereotypes of the culture and practice of surgery as competitive, masculine and requiring sacrifice.

### ***Competitive***

Every participant described surgery as competitive. It was seen as competitive in three senses, all closely related yet subtly different. First, the perceived competition to enter the career, through developing skills and achievements to stand out from peers. Second, the perceived importance of displaying competitive personality traits in order to fit into the domain, by appearing the most proactive and high-performing, and by putting themselves forward and taking opportunities, even at others’ expense. Third, the perceived ruthless culture of competitiveness within surgery, promoting non-collaborative working and lack of collegiality. Competitiveness was such an inherent and important part of surgery that it was simply unimaginable that surgery could be any other way.

*“Erm, I think most people know it’s competitive. So you know you have to stand out from the crowd.”*

**Joanne**, 2nd year, not considering surgery

*“I think you have to... just make sure you’ve got the competitive edge compared to other people because it is so competitive.”*

**Charlotte**, 3rd year, unsure

*“I think the competitiveness of it all can put people off.”*

**Hannah**, 4th year, not considering surgery

As a result, some people did not wish to devote the time and energy to accruing accolades they saw as necessary to enter the career. Neither did they see themselves as possessing the competitive personality traits, nor even aspiring to do so. But most importantly, while some participants felt perfectly able to compete, they were deterred by their perception of the competitive culture.

*“I just know it’s really competitive and I’m a competitive person but probably not as competitive as other people I know who want to be surgeons... people I know who say they want to be surgeons now, they all kind of fit into like a certain type. Like they’re really, really quite competitive. So no, I really can’t see myself being a surgeon. \*laughs\*”*

**Rebecca**, 1st year, not considering surgery

### **Masculine**

Surgery was also seen as a masculine domain, with both male and female students ascribing a male gender to their surgical stereotypes.

*“Stereotypes? Men. It’s always men.”*

**Neela**, 5th year, considering surgery

*“People have a view of a typical surgeon kind of like a rugby lad... especially orthopedics everyone says that the orthopedics, of all the surgeons, are like the lad surgeons... I don’t know if it’s true.”*

**Isabella**, 2nd year, considering surgery

However, it was not just that students thought of surgeons themselves as male, but that surgical stereotypes and masculine stereotypes were closely aligned, meaning the wider culture of surgery was perceived as masculine. The masculine qualities perceived necessary for success were believed to be held by both male and female surgeons alike, qualities which students did not ordinarily associate with women. Female surgeons, necessarily displaying these qualities in order to participate in the surgical domain, were seen as remarkable, and “manly”.

*[discussing the surgeon stereotype] “My mum actually had a routine operation last year but her surgeon was female, but she actually fitted that description quite well as well! \*laughs\* but I think it does tend to fit in more with, sort of, male stereotypes and surgical stereotypes kind of overlap a bit if you get me? As in... if you look at stereotypical gender roles \*laughs\* and like men tend to be seen as more of like you know, the macho type, “I’m gonna do this by myself and I don’t need anyone’s help” and go in and save the day... and I think there’s therefore the crossover [of masculine stereotypes and surgical stereotypes].”*

**Ben**, 1st year, not considering surgery

*“I’d imagine they’d [female surgeons] just be like, quite manly. \*laughs\* Not... in a bad way, but... if they’re working within a predominantly male environment they have to sort of adapt slightly.”*

**Joanne**, 2nd year, not considering surgery

Participants did describe a female surgeon stereotype distinct from the male stereotype, though they often had not met any women surgeons. Female surgeons were seen as “confident”, “extremely competent”, “strong-willed”, “motivated”, “hard-working”, “focussed” and “ambitious” but also “scary”, “competitive”, “stressed”, “abrasive”, “highly strung”, “cold” and “stern”. Although students were quick to justify why female surgeons might appear this way, they could not deny the effect this preconception had on their thoughts about surgery. This meant that, for some female students who were interested in surgery, the female surgeon stereotypes did not fit with their ideas of who they wanted to be in the future.

***Requires sacrifice***

Sacrifice was seen as an integral part of commitment to a surgical career, requiring substantial time and energy, given willingly by “driven” surgeons at the expense of other areas of life and in a way that exceeded that required by other medical specialties.

*“The drive that surgeons have, I feel it’s ‘cause it’s competitive, maybe that’s why they feel like they have to have that drive, compared to if they do medicine, it just seems that the drive is different.”*

**Charlotte**, 3rd year, unsure

*“I think a surgical career’s very tough... if you compare it to general practice where you can be working a few days a week and... surgeons who are spending a lot of time on call, coming out in the middle of the night, and that kind of thing. Working very long hours and have a very long training thing, I think that that can put people off in terms of family life.”*

**Tom**, 5th year, considering surgery

The perceived impossibility of a work-life balance in surgery was universal, and, for many, made surgery very unattractive. Students saw a future in which they must sacrifice their own life goals, most notably their family life, in order to have a surgical career. This sacrifice, regarded by most as hugely unattractive, was perceived as positive by those considering surgery, for whom the arduous requirements were symbolic of their perceived “prestige” of being a surgeon. Work-life balance was deemed particularly important for female students, many of whom refused to consider surgery even at an early stage in medical school as they assumed they could not be a good mother and a surgeon.

*[On why she doesn’t want to do surgery] “I feel like ‘cause I’m female and if I was to have a family I want to be able to... look after my kids and at the same time have a good part time job, one that’s easy to get as well, and do my job at the same time.”*

**Charlotte**, 3rd year, unsure

*“The timetabling and the work-life balance is a large thing... for those that are looking into having families especially. Erm, I think that’s probably actually quite a big thing but especially for women. Because if you know you want to have kids you don’t necessarily want to be on nights and on call all the time.”*

**Isabella**, 2nd year, considering surgery

### **Influence of stereotypes on medical students’ perceptions of surgery**

#### ***Fit in to succeed***

Students felt they must “fit in” to surgical stereotypes and the culture of surgery in order to succeed in a surgical career. It was not simply that students opted out of surgery having experienced it, but rather that the perceived culture of surgery made it very difficult for many students to ever consider opting in.

*“I think there are these stereotypes associated to surgeons and surgery, and yeah, I think maybe if you thought that you were gonna be really different from the rest of your peers it might make you think twice... I think if you’ve got your heart set on being a surgeon... you’re going to be a surgeon. I think maybe the stereotype more affects whether you sort of you want to set your heart on being a surgeon in the first place.”*

**Ben**, 1st year, not considering surgery

An individual surgeon’s deviation from the stereotype was always conspicuous. Further, a students’ desire to become a surgeon was surprising to others if they did not fit the stereotype, repeatedly causing them to reflect on how they did not meet society’s expectations of a future surgeon.

*“When I tell people that I want to do surgery they’re like, “Really?!” Like, “Are you sure you want to? You don’t seem like the typical, you don’t have the typical surgical character about you.””*

**Neela**, 5th year, considering surgery

Students were discouraged from pursuing surgery by their understanding that if you were unable to fit into surgery your experiences would be very unpleasant.

*“Erm, and I think that the fear of, like the fear of it being like the stereotype, the fear of turning up and everyone like laughing at you and making loads of jokes and like, just, yeah... Like, if... I think the kind of fear of like walking in and if you know all of the surgeons know each other and they’re all like having banter*



*and just feeling like kind of small and left out and like you're not, you know, not included, like that at first might be pretty scary..."*

**Isabella**, 2nd year, considering surgery

***If you're going to be different, you have to be better***

Deviating from the stereotype meant being 'othered'; always being remarkable for standing out. This meant that success, for anyone not fitting the stereotype, required exceptional characteristics - working harder, being tougher, being better.

*"I think there's that kind of [stereotypical] surgeon, and I feel like there's surgeons who are just really, really, really, really smart and they can just go ahead without being like that... If the people who are blunt, erm, wanna get respect, they'll get respect anyway because they're quite authoritative people... But if they're really smart they'll get respect 'cause they're smart..."*

**Charlotte**, 3rd year, unsure

It was easier for men to see themselves as fitting in to the surgical stereotype as they were more likely to be seen to possess the requisite masculine qualities. Students believed that female surgeons faced a harder career trajectory than their male counterparts; in addition to embodying the masculine characteristics expected, they had to work harder to succeed.

*"If you are the only female in a male workplace you just have to be confident that like, you are equally as good, if not better than them."*

**Joanne**, 2nd year, not considering surgery

*"To be a female surgeon you have to be really quite a powerful person and come across as quite motivated and you have to, it's very competitive field so you really, really have to go for it. It's, I don't know I, I think to be a female surgeon you have to be pretty amazing to be able to compete with all the big competitive fierce manliness, and I know this is all stereotype you know but at the end of the day there's some truth in it."*

**Hannah**, 4th year, not considering surgery

## Discussion

Students held stereotypes of surgeons as self-confident and intimidating, and of surgical culture as competitive, masculine, and requiring sacrifice. Students thought they must fit these stereotypes to become a surgeon, which deterred many from considering a surgical career. Further, to remain successful while deviating from the stereotypes required displaying valued characteristics to a level exceptional even for surgery, excluding a further subset who did not believe this was a realistic possibility. Stereotypes exerted their influence even before medical students encountered surgery, and published research suggests the influence may persist throughout residency.<sup>27</sup> The existence of stereotypes may contribute to both falling applications to surgical residency and to attrition once in surgical training, for example among female trainees in the UK.<sup>13</sup>

The strength of the stereotype becomes the issue, then, because of the type of person it demands; the question becomes not one of who chooses a surgical career, but of who is unable to; of who is excluded from the possibility of doing so. Our data suggest that a change in surgical stereotypes may increase the number and diversity of students considering surgery as a career in general, and in particular may address the issue of women's under-representation. In agreement with other international studies, our participants perceived surgery as a masculine domain, which was off-putting to those of both genders, but more notably women, who did not see themselves as able or willing to work in such a culture.<sup>26,36</sup> A similar workplace culture exists in financial services and management consultancy, and has been described as 'competitive masculinity'.<sup>37,38</sup> As such, a macho culture of competitiveness and sacrifice is symptomatic of a normalizing gendered discourse of what it is to be an 'ideal' surgeon, to the exclusion of many of both genders. Prescriptive gender stereotypes provide a cultural framework for what are and are not suitable behaviors for surgeons:<sup>28</sup>

*“You know, there are stereotypes, about the monster female surgeon, how scary she is... She is not feminine. Nobody likes her. How dare she, she's supposed to be raising children.”*

*Middle-aged female surgeon<sup>36</sup>*

In occupying this masculine domain, female surgeons may be perceived negatively since they violate the prescribed stereotypical behaviors of both a surgeon and a woman. Hence the perceived culture of surgery may explain underrepresentation of women in surgery.

To address this issue, we must consider how such strongly-held, remarkably uniform negative stereotypes can be challenged. One approach is via role modeling, which increases students' attraction to surgery.<sup>22,39-42</sup> Role models are a way of encountering the 'reality' of surgery, and thus countering the prevailing stereotypes. The more diverse the role models available to students are, the more potential there will be to dispel the stereotype that all surgeons fit a single persona.<sup>26</sup> Yet our data suggest role modeling alone may not suffice: stereotypes persisted even when students were consciously aware that their ideas were stereotypical *and* had real-life counter-examples drawn from their own experiences. The challenge, then, in addition to an approach at the level of the individual, is to alter the stereotypes on a macro-scale.

Awareness of stereotypes is a powerful position in itself, if it provokes controversy and discussion; awareness provides an opportunity to collectively challenge widespread perceptions of surgery and surgeons, allowing reinterpretation of existing stereotypes into something more inclusive. Let us consider a hypothetical alternative to Cassell's description, where surgeons are "friendly and approachable. A diverse group who always work hard and play hard, combining their clinical commitments with family life. They are excellent teachers, technically brilliant and prioritize their patients, communicating empathetically, to strive for the best surgical outcomes." This alternative account does not devalue surgeons' skills, or weaken the specialty, though it undoubtedly tackles some of our participants' concerns about surgery. Such a change may subsequently alter students' expectations; for example, a direct communication style may be perceived as honest and helpful rather than harsh or mean.

While negative stereotypes of surgery and surgeons prevail, they will continue to jeopardize recruitment in terms of numbers and quality. Surgeons, and particularly surgical educators, should be aware of the stereotypes, notice them and challenge them, whether it be in the way surgeons are spoken about by colleagues or portrayed in

written communications. Engagement with students to discuss their perceptions may not be enough, as even those students aware of stereotypes subscribe to them strongly. There is, however, growing evidence that offering experiences of participation in surgery and alternative stories of ‘real-life’ surgeons may dispel their negative assumptions.<sup>24</sup> Future work is needed to evaluate how students’ views of surgery can change, and whether interventions countering surgical stereotypes are effective.

This study takes a novel approach to a long-established problem within surgical education. By focusing on the voices of the medical students, we were able to capture their perceptions of surgery and how these shape their career intentions. A significant strength of our study, therefore, is that it begins to address the mechanisms underlying patterns identified by previous studies.

In qualitative research, the prioritization of rich, detailed data comes at the expense of the observation of broader patterns and factors across a population. This study, therefore, makes limited claims to generalizability; however, we took several steps to address this issue. First, we drew on previous large-scale questionnaire studies investigating recruitment to surgery in a number of studies to inform our study design. Second, we sampled purposively, to include a breadth of participants in our analysis. Third, the research team comprised a medical student, surgical resident, Dean, researcher, and educator, whose diverse perspectives posed rigorous challenge to the analysis. Further, EH and KB maintained reflexive diaries to counter the influence of their own assumptions and biases on the analysis. Yet, our study does examine a particular group in a particular setting and it is possible that a microclimate of surgical culture existed; for example, Manchester Medical School has a large, active undergraduate surgical society set up to promote surgical careers. Further work is needed to compare and contrast these findings with data from other contexts.

## **Conclusion**

Strong stereotypes of surgery and surgeons existed amongst medical students. These stereotypes deterred many from considering a surgical career. Surgeons and surgical educators should be aware of stereotypes, encourage

participation in surgery and share 'real-life' narratives to challenge and dispel the negative stereotypes that are influencing surgical recruitment.

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**Table 1 - Interview Purposive Sample**

<b>Pseudonym</b>		<b>Year</b>	<b>Career Ideas</b>
Ben		1	Not considering surgery
Rebecca	Preclinical	1	Not considering surgery
Joanne	study	2	Unsure
Isabella		2	Considering surgery
Charlotte		3	Unsure
Stephen	Clinical	3	Not considering surgery
Hannah	study	4	Not considering surgery
Harry		4	Considering surgery
Neela		5	Considering surgery
Tom	Final year	5	Considering surgery
Luke	study	5	Not considering surgery
Lily		5	Considering surgery