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## Why do women leave surgical training? A qualitative and feminist study

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## Abstract

### Introduction

Women are under-represented in surgery and leave training at a higher rate than men. Studies in this area lack a feminist lens and predominantly use quantitative methods not well suited to the complexity of the problem.

### Methods

A researcher interviewed women who had chosen to leave surgical training. Supported by a male and female co-researcher, and in dialogue with study participants, she coded the findings and defined themes. By integrating findings with different theories and previous literature, an explanatory model was developed. The research team developed three aspects of this model, which had particular resonance for them, into a visual analogue.

### Results

Twelve women participated. The findings confirmed factors that earlier reports had identified as causes for women to leave surgery, and contributed six new factors- unavailability of leave, a distinction between 'valid' and 'invalid' reasons for leave, poor mental health, absence of interactions with a Women in Surgery section of their professional body and other supports, fear of repercussion, and lack of pathways for independent and specific support.

### Conclusions

The relationships between factors was complex and sometimes paradoxical. The visual analogue was a 'Tower of Blocks'. Individual factors contributed to women's decisions to leave so that, when 3 to 4 of them piled up, the whole Tower fell down and the blocks could not be easily repositioned. Women may be best helped by interventions that are alert to the possibility of unplanned negative effects, do not unduly focus on gender, and address multiple factors.

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## Why do women leave surgical training? A qualitative and feminist study

### Introduction

Women are under-represented in the surgical profession despite the Ottawa 2010 consensus that specialist training should aim to produce a workforce that is broadly representative of the population that they are serving.<sup>1</sup> In the UK and Australasia, women account for 11% of consultant surgeons.<sup>2, 3</sup> A particular concern is that women leave surgical training at a higher rate than men<sup>4</sup>, despite evidence that women may be more able applicants.<sup>5</sup>

Attempts to attract and retain women in surgery have been confounded by poor understanding of the problem.<sup>6</sup> Most researchers have used quantitative methods to investigate contributory factors. These have resulted in lists of possible factors accounting for women choosing to leave more often than men, such as lack of role models, lack of institutional support, gender discrimination and harassment,<sup>7</sup> sleep deprivation, adverse interactions with seniors,<sup>8</sup> pregnancy and childbirth,<sup>9,10</sup> and childrearing duties.<sup>11</sup> Two limitations of quantitative studies are that they are very good at describing 'what', but less good at explaining 'why' or 'how'; and they are not designed to investigate phenomena which are not yet described.

The small amount of qualitative research in this area demonstrates the potential for qualitative research to address these limitations. It shows that women pretend to enjoy sexualised banter in the operating theatre to give them credibility in a male-dominated world, which may violate their personal norms.<sup>12</sup> It shows that they have to demonstrate masculine traits to become a legitimate 'woman surgeon'.<sup>13</sup> It shows that trainees who choose to leave are less tolerant of the priority given to service provision over education, considering it a breach of the 'informal contract' on which clinical education depends.<sup>14</sup>

This research took the novel step of interviewing women who had chosen to leave surgical training. We use the phrase 'chose to leave' rather than the usual term 'attrition' in order to avoid the perjorative connotation of its definition *the process of reducing something's strength or effectiveness through sustained attack or pressure*.<sup>15</sup>

### Methods

#### Qualitative approach

Qualitative research can 'represent complexity well',<sup>16</sup> and shed light on culturally situated problems where fixed-choice surveys cannot. This is because the richness of language, coupled with a researcher's openness to paradoxical observations and interpretations, can frame problems in previously unimagined ways.<sup>17</sup>

#### Bourdieu

Pierre Bourdieu was a social theorist who developed the concept of habitus- the deeply ingrained habits, skills and dispositions that develop through life experiences. For example,

an appropriate ‘surgical’ habitus in a particular institution might include an assertive manner, a preference for direct and immediate communication, and the ability to take part in robust discussions with seniors. Importantly, habitus is often mistaken for natural ability, but it is actually culturally developed. This means that there is an unconscious bias towards others with ‘ability’ which is actually a preference for others with similar cultural background. Those with a different habitus must perform additional work to be considered as able as those whose cultural background enables them to already possess the required habitus.<sup>18</sup>

### Feminism

Feminism holds that institutions like surgery, that have been created by men and traditionally dominated by men, are defined by the absence of embedded roles for women. Female roles cannot simply be added to existing institutional structures.<sup>19</sup> Faced with the lack of a gender-congruent role, women must choose between identifying as a woman, and remaining ‘outside’ the traditional structures of surgery, or identifying as a surgeon in traditionally masculine terms.<sup>13</sup>

An important research implication of feminist theory is that tacitly sexist assumptions may be embedded in measurement instruments, so quantitative research can perpetuate injustice rather than challenge it. Qualitative research, on the other hand, lays researcher’s interpretations, and reasons for making them, more open to critical scrutiny.<sup>20,21</sup>

### Participatory co-creation

By taking a participatory qualitative approach, we could continue to actively involve women in the research process and the co-creation of understandings and potential solutions.<sup>22</sup> This made particular sense given the intelligent and articulate participant group. Participatory research methods have a tradition in feminist research because they challenge the assumption about the objective distance between the researcher and the research subject, and the convention that the researcher gains knowledge of the subject, but not vice versa. In contrast, feminist participatory research seeks a more authentic understanding by engaging the researcher and subject as equals who mutually share knowledge.<sup>23</sup> RL deliberately maintained contact with participants who indicated their willingness to do so, shared preliminary findings with them, and involved them in data analysis, essentially making them additional members to the research team (online appendix 1, sections 6 and 9).

### Research procedure

We briefly summarise the procedure here. For more detail, please refer to the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist in online appendix 1.

We publicised our intention to interview women who had left surgical training through the routine communications of the Royal Australasian College of Surgeons (RACS) and the RACS trainee association, inviting members to refer women known to them who had chosen to leave surgical training. We sent potential participants an information and consent form. Participants chose to be interviewed in person or by telephone; all but one chose a telephone interview. Recruitment and interviewing continued until a suitably varied group of participants had been interviewed, and the lack of new themes showed the sample was sufficient.

RL started interviews by reconfirming participants' written consent, including permission to audiotape and transcribe the conversations. She returned transcripts to the participants, inviting them to check the contents and delete of portions if desired. RL updated the interview structure after each interview (as shown in online appendices 2 and 3) to elaborate themes.

The three authors independently open-coded the transcripts and RL recursively developed and refined a thematic structure. We maintained confidentiality by not involving participants until we had generated themes. We gave them de-identified extracts relating to themes, but not original transcripts, other than their own. We then combined themes from this study, insights from Bourdieu and feminism, and interpretations from existing literature to build a model that explained how the social conditions in surgical training influenced women to choose to leave. We developed three aspects of the model into a visual analogue that explained why women chose to leave, and suggested further actions.

Ethical approval was granted for this study by the institutional review board. A psychiatrist was recruited to be available if required to support participants.

## Results

Twelve women participated. All the Australian states and territories, and New Zealand, were represented amongst the interviewed participants. Five of the nine specialty streams were represented, and one participant had experience of two specialty streams, having been accepted from general surgical training into a different subspecialty training programme. The time spent in training ranged from 6 months to 4 years, and all participants except two had trained in both metropolitan and rural locations. Their interviews were very frank, sometimes shockingly so. No participants required support from the psychiatrist. No further themes emerged after eleven interviews, with a twelfth participant interviewed for confirmation. Eight of twelve participants chose to remain in the data analysis to differing degrees, and five remained involved up to the end.

Table 1 shows reasons for women to leave surgical training described by previous researchers and confirmed in this study. Table 2 shows six new reasons newly identified in this study. One was *unavailability of leave* such as for sickness or bereavement, sometimes in contravention of institutional leave policies. Another related reason was other staff judging some reasons for leave 'valid' and other reasons 'invalid'. A further reason was *poor mental health* which could be so severe that two participants had been suicidal. This contributed directly to the decision to leave surgery even when other factors that could affect mental health, such as fatigue and bullying, existed but were tolerable. A further reason, *absence of interactions with Women in Surgery section and other supports* was surprising given that this section is very active and participants would have appreciated knowing of it and receiving its support. Another reason, *fear of repercussion*, had been heightened by recent publicity<sup>24</sup>. *Lack of independent and specific support* was distinct from the fear of repercussion, relating to the lack of independent structures for trainee feedback.

Each of the new themes were supported by multiple participants, ranging from *poor mental health* (supported strongly by 2 participants and partially by 2 participants) to *fear of repercussion* (supported strongly by 8 participants). In qualitative research, the strength of a theme does not depend on the proportion of participants who support it, as the research

process aims to capture the full range of the phenomenon, and the most informative examples may be minority outliers. This is a particular consideration when researching socially situated problems; history demonstrates that social justice movements often begin with voices that are initially in the minority.

Online appendix 4 classifies all the previously known and newly identified factors in an explanatory model summarising social contexts of surgical culture, and mechanisms triggered by these contexts, which resulted in women choosing to leave.

### Insights from Bourdieu

Many of the participants had developed an early identity as a future surgeon, usually at medical school, and in one case as a teenager prior to medical school. This meant they had spent up to ten years preparing for surgical training and yet they mostly made the decision to leave within 6-18 months of starting specialty training. Two factors newly identified in this study, the unavailability of leave, and the distinction made between valid and invalid reasons for leave, help explain why the additional work required of women more easily reaches a critical level within the time-limited surgical training programme.

Invalid reasons were often ‘female’, such as psychological distress, pregnancy, maternity leave, and childrearing duties. The ‘invalidity’ arose through incongruence with the expected surgical habitus, and was clearly incongruent with modern social norms and institutional policies. The intersection between Bourdieu and feminism was fascinating because gender appeared to be a more dominant determinant of appropriate habitus than the actual reason for the leave request. One participant noted, for example, that a male colleague had been granted leave to train part-time to accommodate childrearing, while women were being dissuaded from applying for leave for the same reason.

### Insights from feminist theory

While surgeons of both genders are coming to expect a balance between their personal and professional lives<sup>25</sup>, some of our participants had unexamined assumptions that they were the primary caregivers or that their careers were secondary to their partner’s careers. This would increase the gap between identifying as a woman and identifying as a surgeon.

“As a mother, something may have to give. You’ve got a sick child at home and you’ve got a theatre list, the patient’s booked, they’re fasted and ready to go”.

*Participant J*

“For me it has been difficult balancing that because his career is just as challenging as mine is, but for me there’s been the pull between home life and work life”.

*Participant H*

Interactions between social contexts, mechanisms triggered and outcome were complex and sometimes paradoxical, as detailed in online appendix 5. Gender-based affirmative action remains framed within existing male-dominated institutional structures and works to maintain them; a form of ‘benevolent sexism’<sup>26</sup> in which ‘seemingly liberal thematic motifs serve as a benign cover for a selectively hostile and exclusionary disciplinary practice’.<sup>27</sup> In our study there was concern that interventions specifically for women implied that women required

‘special’ or ‘additional’ treatment, amplifying differences between genders and implying that women were not as able as men.

“There’s not a big gaping issue around women in surgery that needs a solution of dinners and support. If anything, I actually cringe a bit at that, thinking we don’t want to be highlighted more”.

*Participant J*

Amplification of gender difference tended to inhibit male mentorship, teaching and socialisation. This limited the support systems available to female trainees and perpetuated the exclusion of women from the traditional structures of surgery. This is consistent with studies showing that women are less likely to identify role models<sup>28</sup> and be socially included.<sup>29</sup>

“They’d go out for lunch and do this and do that. I was like: you bastards...I didn’t really feel like I was part of the gang. They’re all boys. I was the only girl on the team.”

*Participant E*

More worryingly, defining a surgical trainee by their female gender necessarily highlighted their feminine characteristics, creating the setting for sexual harassment and discrimination. Previous research consistently shows that women experience these behaviours at a higher rate than men.<sup>9, 30, 31</sup>

“I’m like: Yeah I’m a girl. [imitating higher voice] *Of course I’m going to get around in my heels and my handbag...* I think probably when I was a resident and deciding to do surgery, I experienced more gender stereotyping...”

*Participant D*

### Development of visual analogue

The interactions had several striking features: *factors were additive, the final impetus to leave could be relatively small, and small interventions could have prevented this.* Our visual analogue is a Tower of Blocks (Figure 1). Blocks represent factors that contributed to the decision to leave, with the ‘toppling’ of the Tower representing the choice to leave. There is a threshold effect after 3-4 blocks, the last block causing the entire tower to fall. This represents the 3-4 factors that act in an additive way, after which a choice to leave surgical training becomes more likely in the same way that a tower is more likely to topple the higher it is built.

The Tower of Blocks, although a simple analogue, acts as a bridge to understanding the higher rate of women choosing to leave surgical training. When the potential factors comprising the ‘blocks’ are considered, it can be seen that pregnancy affects women only, while others affect women predominantly, such as sexual harassment<sup>30</sup>, impact of childbearing<sup>10</sup>, lack of role models,<sup>7,28</sup> and inaccessibility of leave for ‘invalid’ gender-related reasons. Women have more ‘blocks’ to deal with in the real-world context of surgical training and are more likely to have the requisite 3-4 blocks already ‘stacked’. A factor that causes additional stress to a male trainee is more likely to be the final ‘block’ that causes a woman to leave.



Just as a tower of blocks can be rebalanced with small adjustments, our study indicates that surprisingly small interventions- a cup of tea, a meeting, a supportive chat- could have been effective in preventing them from choosing to leave.

“I had a phone call from one of the consultants...Is there anything I can do to convince you to stay? I was like, well you could have friggin’ told me all these nice things back when I was working for you”.

*Participant I*

It can also be seen that a tower ‘at the threshold’ with several blocks already ‘stacked’ can be toppled by small actions, even if no further blocks are added. This reflects the finding that the final impetus to leave was sometimes seemingly minor- a poor interaction with a senior, a declined leave application. Context also matters, as the same factor might have different outcomes depending on the context. For example, participants considered long working hours acceptable in the context of providing patient care in a busy rotation, but found it less acceptable to do the same in order to satisfy the demands of a bullying senior.

These are important considerations when supporting trainees at risk of leaving, where attention must be paid to the daily interactions that can act as small ‘toppling’ actions, as well as the large factors that constitute the blocks themselves, and the contexts in which those blocks are being ‘stacked’. Meeting these formidable requirements are worthwhile because, once the tower has fallen, it cannot be rebuilt simply by removing the last block or reversing the last small action. In other words, once the choice to leave surgical training has been made, it cannot be reversed simply by addressing the final event.

## Discussion

The paradoxical and unexpected negative effects of affirmative action programmes imply that women might be better helped by interventions that do not focus unduly on gender. Such interventions are likely to improve surgical training for both women and men, and there is a sense of equity in the idea that work done to advance the cause of women in surgery need not do so at the expense of their male colleagues.

The Tower of Blocks should be transferable to other contexts of surgical training, regardless of location, healthcare setting, or training programme structure. The contributory factors may differ according to context and can be elucidated by local research, but their additive effect implies that interventions targetting single factors will only be partially effective at best. Any efforts to improve the retention of women in surgical training must address multiple factors in order to avoid ‘toppling the blocks’ for any individual woman.

Supporting the likely transferability of the Tower of Blocks, early dissemination shows that it is intuitive and easily understood. Phrases such as ‘we should unstack some blocks for [name]’ or ‘I’m about to topple my blocks’ have entered common usage in some institutions and are not limited to trainees, nor by gender.

The specific actions that might be effective in different settings will again depend on the local context. These sorts of actions can be implemented informally and immediately without significant cost or large changes in surgical training structures. The explanatory model (online appendix 4) suggests many areas that could be targeted. For example, ‘distinction between valid and invalid reasons for leave’ could be addressed by strengthening leave

policies to prevent value judgements on the validity of the reason for the leave request, while ‘lack of independent and specific support’ could be addressed by planned meetings with mentors from outside the immediate surgical team.

The model suggests other potential solutions that require further research. Is it possible to ‘stack blocks better’ by helping trainees to develop resilience and coping mechanisms? Are consultants able to ‘stack more blocks’ than their trainees, and if so, what strategies or skills allow them to do so? Or do consultants exhibit the same threshold of 3-4 blocks, and could this inform interventions for consultants approaching burnout? Do blocks ‘unstack’ with time, for example through better access to leave and part-time training?

### Strengths and limitations

The main limitation of this study is the small number of women interviewed. From a critical realist stance, the size of a research sample is not the sole, or even main arbiter of rigour. Recruiting more participants and increasing the size of the dataset would have done as much to compromise the depth of the analysis as to increase its breadth. From a sampling viewpoint, the total target group (women who have chosen to leave surgical training in Australasia) was estimated at only 80 due to existing gender disparity.

Another possible limitation is that the role of RL as a consultant surgeon may have introduced biases due to a power differential to which she remained unaware. RL is a younger consultant and a near-peer to the participants who, having already entered and subsequently left surgical training, were advanced in PGY years. It is possible that participants left things ‘unspoken’, though the frankness displayed in the interviews, including the disclosure of extremely personal events, suggests that any perceived power differential was effectively addressed.

The strengths of this study are that it demonstrates the ability of qualitative interviews to gather rich data from a target group whose small size limits the power of quantitative methods; it utilises qualitative methodology in a novel way to synthesize data into an explanatory model; and it maximises the contribution of participants through a participatory co-created paradigm. This study design is potentially transferable to other contexts.

### Further research

With these strengths and limitations in mind, the next steps should include research to examine the factors affecting men choosing to leave surgical training. With the exception of pregnancy, factors typified as ‘female’, such as sexual harassment and childrearing, also affect men. Literature tends to either foreground women<sup>13,28</sup> or to treat the genders equally.<sup>8,32</sup> The feminist lens, positing women as the norm and men as the examined ‘other’, would suggest that there ought to be studies examining specifically ‘male’ factors that cause men to choose to leave surgical training, a literature that is so far lacking. It is unknown, for example, if men have unexamined assumptions about their gender role.

It is also worth noting the absent voice of other genders and sexualities. Surgical specialties are ranked as the least inclusive of sexual and gender minorities<sup>33</sup> and efforts to conceal orientation<sup>34</sup> could be considered additional ‘work’ to achieve a surgical habitus. Feminist theory has a tradition of embracing diversity through the critical examination of institutional structures that are predominantly male and heterosexual.<sup>19</sup> If the findings of this study are transferable, it would be reasonably expected that interventions targetting minority genders or

sexualities in surgery may result in unplanned negative effects, through the same mechanisms of exaggerating 'otherness' resulting in negative attention and loss of collegial and social supports.

### Conclusion

The reasons why women leave surgical training are complex and context-dependent. Women may be best helped by interventions that are alert to the possibility of unplanned negative effects, do not unduly focus on gender, and address multiple factors. Individual factors act in an additive way, exhibit a threshold effect, and can be easily understood as the Tower of Blocks.

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## Research in context

### Evidence before this study

Women are under-represented in surgery, accounting for 11% of consultant surgeons. Women leave surgical training at a higher rate than men. The problem is poorly understood, with most previous literature using quantitative methods that capture simple relationships well but may not be well suited to complex problems.

### Added value of this study

This study used a novel application of qualitative methodology to capture complexity, including paradoxical effects. Six new factors contributing to women choosing to leave surgical training emerged- inaccessibility of leave, a distinction between valid and invalid reasons for leave, poor mental health, absence of interactions with the Women in Surgery section and other supports, fear of repercussion, and lack of pathways for independent and specific support

### Implications of all the available evidence

The findings from this study were synthesized with existing quantitative and qualitative literature into an explanatory model. Bourdieu and feminist theory provides novel insights into paradoxical effects. Individual factors act in an additive way, exhibit a threshold effect at 3-4 factors, and can be easily understood as a Tower of Blocks. Women may be best helped by interventions that are alert to the possibility of unplanned negative effects, do not unduly focus on gender, and address multiple factors.

## **Panel- Concepts in brief**

### **Habitus**

A concept developed by Pierre Bourdieu. The deeply ingrained habits, skills and dispositions that develop through life experiences. A 'surgical' habitus might include an assertive manner, a preference for direct and immediate communication, and the ability to take part in robust discussions with seniors.

### **Feminism**

Feminism positions women as the 'norm'. A feminist stance defines institutions such as surgery by the absence of embedded roles for women. Women must choose between identifying as a woman, and remaining 'outside' the traditional structures of surgery, or identifying as a surgeon in traditionally masculine terms.

### **Feminist research methods**

*Qualitative research* is preferred because it avoids tacitly sexist assumptions that may be embedded in quantitative measures, such as measuring work volumes that are more easily achieved by men working without career breaks, instead of the quality of that work.

*Participatory co-creation* challenges the assumption about the objective distance between the researcher and the research subject, and the patriarchal stance that the researcher gains knowledge of the subject, but not vice versa. Participatory research treats the researcher and subject as equals who mutually share knowledge.

**Table 1**

<b>Factors described in previous literature confirmed in this study</b>
<p><b>Long working hours</b></p> <p><i>'I didn't understand how we could have a team of 8 people, we would all be there from 6:30 in the morning until 8 o'clock at night. I thought it was a bit unnecessary and perhaps we could have devised a way [to better manage fatigue]. That turned into: Well you can just go home then.'</i> (G)</p> <p><i>'I remember one weekend in [hospital name] being on call for 72 hours and you got 2 or 3 hours of sleep each night... I was wrecked... I didn't have time to brush my teeth. Little things became big things.'</i> (J)</p>
<p><b>Fatigue and sleep deprivation</b></p> <p><i>'...the reason I ended up withdrawing [from training] is that my priorities changed and being able to control things like getting enough sleep and exercising and actually eating regularly and those kind of things became more important to than continuing my surgical training.'</i> (A)</p> <p><i>'...they think... that we'll just cover for it and nobody will die, kind of thing because everybody else just copes but they cope by not... by everyone being unhappy and tired and stressed and that's not a healthy workplace.'</i> (I)</p>
<p><b>Unpredictable lifestyle</b></p> <p><i>'I just felt very much like my whole life was completely out of my control... it was to the extent of: We could call you one day and say this job is now someone else's and you're moving 4 hours away tomorrow.'</i> (B)</p> <p><i>'Are you going to be moved to the country, that type of thing that you don't have any control over where you go... particularly when your partner has not got as flexible a job arrangement as your own. That's hard.'</i> (G)</p>
<p><b>Impact on relationships</b></p> <p><i>'...in the 6 months... we had one afternoon where we were both home in time to have a cup of coffee together. Only once in 6 months. And we were sitting there that afternoon going: What are we doing? Is this going to be what our life is...?'</i> (B)</p> <p><i>'...there were lots of rocky patches... I didn't really realise it until I stepped out of it, how rough that was...I came to understand a lot more how hard that is on a relationship... it improved our relationship, stepping out [of training].'</i> (F)</p>
<p><b>Lack of learning opportunities</b></p> <p><i>'My supervisor at the time who I really like and clinically I learnt from, would not let me operate. He did not have the patience to teach someone how to operate so I worked long hours for him.... and didn't really learn anything procedurally.'</i> (H)</p> <p><i>'He was pleasant enough but just didn't allow either of us primary operating experience, even assisting we were not allowed to do anything. The most I did that term with him was apply silver nitrate to someone's ingrown toenail.'</i> (G)</p>
<p><b>Bullying</b></p> <p><i>'...he kept yelling at her with the [whole theatre team] there and he's just like saying 'No you idiot. Don't do it like this'. Just not constructive, not helpful, not appropriate... They just blamed her for everything, even if it wasn't her fault.'</i> (I)</p> <p><i>'[the bullying culture] was set by the consultants and you could see it because the Fellow and the senior trainee both felt it as well. You could see them get reprimanded and their heads would hang... I was like: OK it's not just me, I'm not [the only one] being victimised here... It didn't make it any better.'</i> (E)</p>



**Impact of pregnancy and childbirth**

*'...if being female, you're the one who has the baby and if you decide to breastfeed and... regardless a lot of the initial stuff falls to the mum when you have kids and so not making any effort to put us in the same place as a family, played a big role in me choosing to leave...' (D)*

*'The Chair of the Board in [location] said on our welcome meeting with her that if we got pregnant we couldn't expect any support from her.' (H)*

**Impact of childrearing duties**

*'...bosses have said to them, to their face, I don't think there's any point in me training you because you're going to get married and have kids and then what use are you going to be to this surgical service?' (A)*

*'I certainly did get a few comments about the unwise, the anti-wisdom of having children during training... 'I don't know. These trainees who think they can have babies and just go on... and just expect us to manage when their kid is sick', was one comment' (I)*

**Lack of role models**

*'...once I left [my sole female role model] where I did my intern years... I actually didn't have another female consultant until I was a registrar. So all through my PHO [non training registrar] time, they were all male consultants so it wasn't even an option.' (absence of role models, B)*

*'Females, I guess the ones that I worked with, because they could do it: what's your excuse? Do it. Meaning because they can be mums and surgeons, it's doable... so what's your excuse sort of thing... females in surgery aren't exactly the most sensitive specimens around. They are quite... what's the word, they've got tough skin and... they're just quite rigid.' (inappropriate role models, F)*

**Sexism/discrimination**

*'If a male surgeon were to raise his voice in theatre because something he wants wasn't prepared... the nurses would quickly try to find the instrument that he wants... but if a female surgeon wants to do the same, there would be a lot of talk in the tea room about how badly she behaved in theatre afterwards.' (C)*

*'...sexist jokes are widely seen to be acceptable and you're considered overly sensitive, and thus not well suited to the profession if you think otherwise.' (K)*

**Sexual harassment and assault**

*'...in one of the hospitals there is a picture of sex positions up on the wall and I find it odd that it needs to be up in a professional health care service registrar office.' (L)*

*'...he was notorious for smiling and winking at female trainees and that always made me feel extremely uncomfortable...I never had anything more than winking and smiling and the occasional elbow nudge, but that was enough. That, to me, was definitely inappropriate and was not done to the boys.' (B)*

*'...waving his chest in my face saying 'come on [name]. Touch my nipples. Touch my nipples. You know you want to.' (D)*

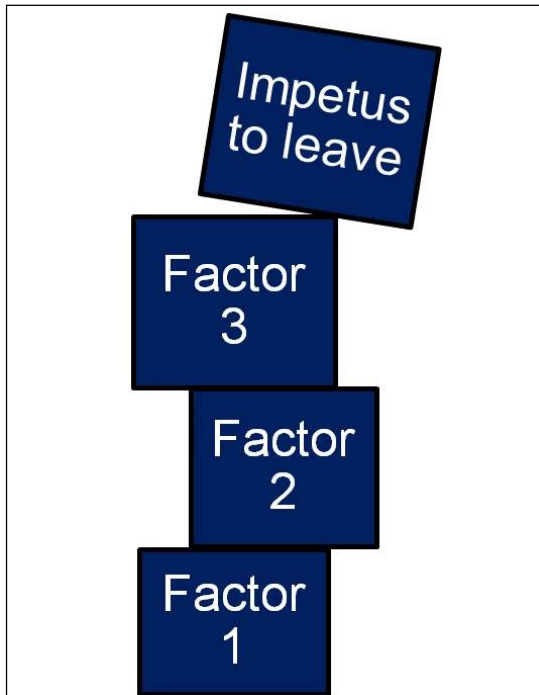
**Table 2**

New factors identified in this study
<p><b>Unavailability of leave</b></p> <p><i>‘when my father died, I was only allowed 3 days off work.... I had to go to work the morning of his funeral.’ (K)</i></p> <p><i>‘ [The Director of Training] said: You guys, we’re short staffed this term. There’s going to be no leave in the first 4 months of this [6 month] term. If you’re sick, I won’t be finding replacements for you... that’s not my job... you’d better get each other’s numbers.’ (E)</i></p> <p><i>‘All these years I’ve spent all my annual leave on work- either studying or attending a course or a conference or doing something related to work and not actually going home to visit or doing something else for a holiday.’ (C)</i></p>
<p><b>A distinction between valid and invalid reasons for leave</b></p> <p><i>‘I definitely used the ankle injury as an excuse [to get leave] rather than the psychological distress [about bullying] I was feeling’. (L)</i></p> <p><i>‘...[colleague unable to take leave despite] horrendous morning sickness and sitting in theatre looking green and still getting up to operate and stuff like that. It just looked like really hard work and then I think one of her babies, she only took 4 weeks maternity leave because of the way that it had all been...’ (D)</i></p> <p><i>‘I got a pretty clear picture from a lot of the older surgeons that it’s not right for a mum to be a surgeon.... [but] a male colleague of mine went part-time just because he wanted to spend more time with his wife and child. He got away with it because he was a male, Anglo male, lovely guy...’ (J)</i></p>
<p><b>Poor mental health</b></p> <p><i>‘Ultimately I didn’t see more than 2 choices: kill myself or leave’. (K)</i></p> <p><i>‘I’d seriously considered driving my car off the road, twice... The thing that stopped me... was that I was the trauma reg on call.... I’d be the one they’d have to call.’ (E)</i></p>
<p><b>Absence of interactions with Women in Surgery section and other supports</b></p> <p><i>‘I think what would have made a huge difference for me would have been the opportunity to actually sit down with a group of female consultants from various specialties, just to gauge in a very frank conversation about time commitments, work life balance and those sorts of things.’ (B)</i></p> <p><i>‘I’d have loved the social support of something like this... Perhaps it would prevent the downward spiral of social isolation from developing’ (K)</i></p>
<p><b>Fear of repercussion</b></p> <p><i>‘If I say something, that’s the end and I can never go back... I think that’s why a lot of people haven’t reported issues that they have had... for fear that ends their options forever’ (B)</i></p> <p><i>‘...most people I know won’t complain about bullying... because there is so much fear about talking about it, particularly on the program or [if] you’re wanting to get back on the programme.’ (D)</i></p> <p><i>‘...they felt it wasn’t worth their career to support [a bullied colleague] to that level. They were prepared to verbally say: Yes, it was terrible. It was horrible, the things that they did to you. But when it came to actually giving any tangible support, they weren’t willing to.’ (I)</i></p>
<p><b>Lack of pathways for independent and specific support</b></p>

*'who do you talk to if you're having issues with your supervisor at work? Because you can't really go to the director of the department that you've worked for...maybe having some kind of channel where you can express your grievances...' (A)*

*'there needs to be functional channels to be able to report bullying that's not internal because at the moment I have a bit of a chuckle at some of the press releases because the people who were speaking have reputations as being some of the biggest bullies in surgery.'* (D)

**Figure 1**



The Tower of Blocks

## Online appendix 1

### COREQ (Consolidated criteria for reporting qualitative research) <sup>35</sup>

#### Domain 1: Research team and reflexivity

##### Personal characteristics

1. Interviewer  
RL conducted the interviews.
2. Credentials  
RL- MBChB, FRACS, BA(Ed), MSurgEd  
DN- PhD, FAcadMEd, FSSH  
TD- MA, DM, FRCP, MHPE, PhD, HonFAcadMEd
3. Occupation  
RL- general and breast surgeon  
DN- sociologist and education researcher  
TD- retired internist and education researcher
4. Gender  
RL- female  
DN- female  
TD- male
5. Experience and training  
RL- an experienced quantitative researcher. This study was undertaken as part of a MSurgEd supervised by DN and TD.  
DN- an experienced qualitative researcher in medical education  
TD- an experienced qualitative researcher in medical education

##### Relationship with participants

6. Relationship established  
RL is an early career consultant and a near-peer to some participants. All participants were recruited as described below, but some were already known to her through professional networks. Participants formed relationships during the interviews with RL, and contact was maintained after the interviews as a deliberate part of the study design.
7. Participant knowledge of the interviewer  
The reasons for doing the research were detailed in the patient information and consent form, and participants were aware that the study would specifically ask about the factors that contributed to the decision to leave surgical training. Participants were also aware that the interviewer was a consultant surgeon.
8. Interviewer characteristics  
RL's role as a surgeon had the advantage that familiarity with the topic helped her understand participants' stories and ask exploratory questions. Recognising that this could also be a disadvantage through influencing participants' responses, and her interpretation of them, DN and TD added a non-surgical stance.

#### Domain 2: Study design

##### Theoretical framework

9. Methodological orientation and Theory  
Within the critical realist epistemology, a participatory co-created paradigm<sup>22</sup> was chosen to minimise any perceived power imbalance and to offer an opportunity for the

highly intelligent and articulate participants, having been closely acquainted with surgical training, to become members of the research team. This involvement was voluntary. Bourdieu and feminist theory provided interpretive insights.

#### Participant selection

##### 10. Sampling and 11. Method of approach

Purposive sampling was used. The target population was women who had chosen to leave the surgical training programme for reasons other than underperformance since the introduction of the programme in 2007, approximately 80 in total. In order to maintain confidentiality within the surgical community, recruitment using training databases held by RACS was not performed. Instead, a snowball recruitment strategy publicised the study through the routine communications of RACS and the RACS trainee association, inviting members to refer women known to them who had chosen to leave surgical training.

The RACS trainee association deemed the study to be of sufficient urgency to scan the provided paper flyer and distribute it to their membership by email in advance of the next training day. This was the only departure from the planned recruitment protocol. Both the flyer and the notice in the weekly online newsletter 'went viral' on social media, resulting in rapid recruitment. Participants were identified by sequential alphabetical letters throughout the study.

##### 12. Sample size

Twelve participants were interviewed.

##### 13. Non-participation

Five participants did not interview- two moved overseas, two became uncontactable by email or phone, and one became ineligible as she reapplied and was accepted back into the surgical training programme.

#### Setting

##### 14. Setting of data collection

Participants were interviewed in person at a private location of their choice or by telephone. All but one of the participants preferred to interview by telephone. The two most common reasons for this preference were convenience, and a desire to maintain dignity as the participants expected to be distressed by the topics discussed.

##### 15. Presence of non-participants

Only the participant and interviewer were present.

##### 16. Description of sample

All the Australian states and territories, and New Zealand, were represented amongst the interviewed participants. Five of the nine specialty streams were represented, and one participant had experience of two specialty streams, having been accepted from general surgical training into a different subspecialty training programme.

#### Data collection

##### 17. Interview guide

A semi-structured interview framework was used (online appendix 2) and recursively refined for emerging themes (final interview framework, online appendix 3). It was not pilot tested.

##### 18. Repeat interviews

In lieu of repeat interviews, the participatory co-created paradigm encouraged participants to remain involved with data analysis and development of the explanatory model. See item 28. Participant checking.

19. Audio recording

Interviews were audiotaped digitally and transcribed by a medical typist.

20. Field notes

Field notes were made directly after each interview and kept as part of a reflexive diary.

21. Duration

The interviews ranged in total length from 45 minutes to almost 2 hours.

22. Data saturation

Data saturation, as judged by non-emergence of new themes, was reached after 11 interviews, with one more participant interviewed for confirmation.

23. Transcripts returned

Transcripts were anonymised and returned to the participant for checking, including deletions of portions if desired. The range of editing to the original transcripts varied greatly. Two participants returned the transcripts verbatim, many added short comments or anecdotes, and one participant attached a large volume of additional comments in a separate email after returning her original transcript.

### **Domain 3: analysis and findings**

#### **Data analysis**

24. Number of data coders

All transcripts were coded independently by the three authors.

25. Description of the coding tree

A 'mind map' was used instead of a coding tree in order to better capture complexity (available from authors on request). An attempt at constructing a coding tree imposed an artificial hierarchy that did not adequately represent the inter-relationships between the themes, since themes could become more major or minor depending on the social context and mechanism triggered.

26. Derivation of themes

Themes were derived from the data.

27. Software

Software was not used.

28. Participant checking

Participants were invited to add, comment, or elaborate on themes as part of the participatory co-creation process. Four participants chose not to be involved in further discussion after returning their transcripts and the remaining eight participants were involved to differing degrees, with five participants remaining involved until the conclusion of the study. This meant that the contribution of the majority of participants, especially the five who remained involved until the conclusion of the study, greatly exceeded the data from their initial interview. The duration of involvement (6 months from first interview to explanatory model) enabled deep rapport and continuous participant-checking, resulting in correspondingly rich understandings.

#### **Reporting**

29. Quotations presented

Participant quotations are presented in Tables 1 and 2. Each is identified by participant letter.

30. Data and findings consistent

There was good consistency between data and findings, with the participatory co-creation paradigm ensuring that participants problematised any findings that were inconsistent with data.

31. and 32. Clarity of major and minor themes

A distinction was not made between ‘major’ and ‘minor’ themes (see comments on artificial hierarchy under 25. Description of coding tree). Themes and interactions could not be cleanly separated and this reflects real-world complexity. However, the similarity of experiences between participants was striking, as was the overall lack of divergent experiences. Divergent experiences, where they occur, are described in the Results and Discussion sections.



## Online appendix 2

### Initial interview schedule

#### General questions (and potential clarifiers)

When you think about your surgical training, how do you feel? (and why?)  
What attracted you to surgery in the first place? (How did you get hooked? Why did you want to do it?)  
Were there any deterrents that you had considered prior to starting surgical training? (eg time commitment, demands of family, need to relocate frequently).  
How did you come to the decision to leave? (What were the main factors underlying your decision to leave? Was it more of a gradual process, or a critical incident? Was it mainly your decision, or a decision made by others?)  
What are you doing now? How does it contrast with surgery?

#### Specific questions (if not already covered)

##### Surgical culture

How would you describe the surgical culture? (The culture in the operating theatre, in tea rooms, on ward rounds, in clinic).  
Can you think of times when you felt that you belonged? (Describe the situation. Why did you feel that you belonged?)  
Can you think of times when you felt that you did not belong? (Describe the situation. Why did you feel that you did not belong?)  
How much did you experience gender stereotyping? (Being asked to undertake nursing roles, having to assert authority over male juniors, being given different tasks to males).  
How much did you experience gender discrimination? (Clarify- discrimination vs harassment vs abuse)  
Do you think males and females place a different significance to these behaviours?  
What was your reaction to the surgical culture?  
Did your behaviour change? (If yes- in what ways? How effective were the changes?)  
Were there ways in which your gender was an advantage?  
Overall, do you think the surgical culture is changing? (If yes- for better or for worse? Which aspects are better and which aspects are worse?)  
What aspects of surgical culture are most in need of change in order to improve surgical training?

##### Role models

Did you have any good role models or mentors in surgery?  
If yes-  
How did they come to be your role models or mentors? (Informal arrangement or formal programme, eg via College?)  
What qualities about your role models or mentors did you value?  
How did they influence your decision to enter surgical training?  
How did they influence your decision to leave surgical training?  
Do you think that female role models or mentors are preferable to male role models or mentors?  
Did you have any bad role models or mentors in surgery?  
If yes-  
How did they come to be your role models or mentors? (Informal arrangement or formal programme, eg via College?)  
What qualities make you consider them as bad role models or mentors??  
How did they influence your decision to enter surgical training?  
How did they influence your decision to leave surgical training?  
In general, how supportive were your female colleagues? (Senior and junior)

##### Relationships

Did you have a partner during training?  
If yes-  
How did you manage the balance between your needs and your partner's needs?  
(Specifically ask about time, career pathways, study, housework, childcare, recreation/hobbies, geographical location)  
How well did your partner cope during your training?  
Did you experience the breakup of a relationship during training?  
If yes-

Did surgical training contribute to that breakup? (if yes- how?)

Children during training

Did you have children when you started training?

If yes-

How did you manage the demands of the family during training?

What childcare arrangements did you make? (Specifically ask about on-site childcare).

What arrangements worked well?

What arrangements didn't work well?

How supportive were your junior staff and colleagues of your family needs?

How supportive were senior staff and supervisors of your family needs?

Pregnancy during training

Did you have a pregnancy during training?

If yes-

What reactions did your junior staff and colleagues have to your pregnancy?

What reactions did your supervisors or the College have to your pregnancy?

How much did surgical training affect the timing of the pregnancy?

How much did the timing of the pregnancy affect surgical training?

How long did you take off work?

Did you return to fulltime or part-time work? (If fulltime- Did you consider part-time options? If part-time-

What was your experience of finding part-time options?)

Which aspects of your return to work were well managed?

Which aspects of your return to work were not well managed?

If no-

Was surgical training a factor? (If yes, clarify why.)

If yes to either children or pregnancy during training

Thinking about being a good surgeon and being a good Mum- how much do they overlap? Or not? (How much do you see them being compatible? Did you, or anyone you know, manage the balance well?)

Interaction with the College

How much involvement or experience did you have with the Women in Surgery section of the College?

Did you find the activities of the Women in Surgery section helpful?

How could the College improve the experience of women in surgical training?

**Summing up**

What do you miss about surgical training? (Is there anything that you miss about surgical training?)

Is there anything that would have helped you to remain in training?

Is there anything else that we haven't covered in this interview that you think is important?

## Online appendix 3

### Final interview schedule - Changes from initial interview schedule highlighted

#### General questions (and potential clarifiers)

When you think about your surgical training, how do you feel? (and why?)

What attracted you to surgery in the first place? (How did you get hooked? Why did you want to do it?)

If I had asked you at that point 'how do you see yourself in 10 years' time?', what would you have said?

Were there any deterrents that you had considered prior to starting surgical training? (eg time commitment, demands of family, need to relocate frequently).

How did you come to the decision to leave? (What were the main factors underlying your decision to leave?

Was it more of a gradual process, or a critical incident? Was it mainly your decision, or a decision made by others?)

How did you feel about leaving something that you decided to do when you were.... (age/stage of deciding to do surgery)

What are you doing now? How does it contrast with surgery?

#### Specific questions (if not already covered)

##### Surgical culture

How would you describe the surgical culture? (The culture in the operating theatre, in tea rooms, on ward rounds, in clinic).

Were you able to access leave? (If no- was that a college policy, a hospital policy or a work policy?)

Preface- scale of behaviours from 'low level' sexism through discrimination through to harassment, bullying, and then to sexual assault.

There is increasing evidence that low level sexism can be very damaging. Examples include sexist jokes, inappropriate language, comments made about you as a woman, or comments made about other women in your presence. How much did you experience low level sexism? (Clarify- was this due to a widespread culture, or manifested by an individual or group of individuals?)

How much did you experience gender discrimination?

How much did you experience bullying and harassment?

Did you experience unwanted touching?

Did you experience sexual assault?

Do you think males and females place a different significance to these behaviours?

Were there ways in which your gender was an advantage?

How much did your experience of gendered behaviours influence your decision to leave?

##### Role models and mentors

In general, how supportive were your female colleagues? (Senior and junior)

Thinking about good role models or mentors in surgery...

How did they come to be your role models or mentors? Did you use the Mentor Matching Service?

Do you think that female role models or mentors are preferable to male role models or mentors?

(Describe concept of negative role models in surgery)

Thinking about negative role models in surgery...

What was their impact on you?

Do you think that negative female role models have a particular impact on female trainees?

##### Relationships

What had you heard about having a relationship during training?

Did you have a partner during training?

If yes-

How did you manage the balance between your needs and your partner's needs?

(Specifically ask about time, career pathways, study, housework, childcare, recreation/hobbies, geographical location)

How well did your partner cope during your training?

Did you experience the breakup of a relationship during training?

If yes-

Did surgical training contribute to that breakup? (if yes- how?)

##### Children during training

**What had you heard about having children during training?**

Was surgical training a factor in deciding whether to have children?

Did you have children when you started training?

If yes-

How did you manage the demands of the family during training?

What childcare arrangements did you make? (Specifically ask about on-site childcare).

What arrangements worked well?

What arrangements didn't work well?

How supportive were your junior staff and colleagues of your family needs?

How supportive were senior staff and supervisors of your family needs?

**Pregnancy during training**

**What had you heard about pregnancy during training?**

Did you have a pregnancy during training?

If yes-

What reactions did your junior staff and colleagues have to your pregnancy?

What reactions did your supervisors or the College have to your pregnancy?

How much did surgical training affect the timing of the pregnancy?

How much did the timing of the pregnancy affect surgical training?

How long did you take off work?

Did you return to fulltime or part-time work? (If fulltime- Did you consider part-time options? If part-time-

What was your experience of finding part-time options?)

Which aspects of your return to work were well managed?

Which aspects of your return to work were not well managed?

**If yes to either children or pregnancy during training**

Thinking about being a good surgeon and being a good Mum- how much do they overlap? Or not? (How much do you see them being compatible? Did you, or anyone you know, manage the balance well?)

**Interaction with the College**

How could the College improve the experience of women in surgical training?

Is there anything that would have helped you to remain in training?

How much involvement or experience did you have with the Women in Surgery section of the College?

Did you find the activities of the Women in Surgery section helpful?

**Do you think you would have used, say, a Women in Surgery network run by the College?**

What about:-

Run by the Women in Surgery section

Run by peers/colleagues (talk about anonymity here)

Run by an external agency (eg AMA support service)

Social media- Facebook, Twitter

Any other form of support they can suggest?

**Summing up**

Is there anything else that we haven't covered in this interview that you think is important?

## Online appendix 4

### Key

What was known      What this study adds

Social contexts of surgical culture	Mechanisms triggered	Outcome
<b>Lifestyle factors</b> Long working hours Sleep deprivation Unpredictability of hours <b>Training environment</b> Poor quality learning opportunities- ‘breach of informal contract’ Bullying and harassment Unavailability of leave Distinction between valid and invalid reasons for leave Adverse interactions with College/training authority Absence of interactions with Women in Surgery or other supports Fear of repercussion Lack of independent and specific support <b>Factors predominantly affecting women</b> Pregnancy and childbirth Childrearing Lack of flexible training Lack of positive female role models Discrimination Gendered behaviour <b>Other</b> Poor mental health	Unreasonable levels of personal sacrifice to conform to perceived ‘surgical culture’  Peripheral participation/loss of paradigmatic trajectory Disproportionate effect of bullies  Adverse (or absent) interactions with College/training providers act in multiple ways  Gendered hidden curriculum  Competing discourses as women and surgeons  Interventions specifically for women in surgery may have unintended effects  Poor mental health Factors are additive but the final impetus to leave may be relatively small... ...and small interventions may be preventative	<p style="text-align: center;">----- Women choosing to leave -----</p>

## Online appendix 5

Context	Mechanism	Outcome
Apparently straightforward proposition...		
Interventions targeted at women in surgery	Women feel more valued	Less likely to leave
Reframed (unexpected negative outcomes)...		
Interventions targeted at women in surgery	Attention drawn to women; exaggerates 'otherness' of women	Increased genderised behaviour
Interventions targeted at women in surgery	Men feel alienated	Loss of collegial and social support to female colleagues
Interventions targeted at women in surgery	Implies that women somehow need special treatment	Amplified conflict between discourse as woman and discourse as surgeon; identity incongruence