Female General Surgeons: current status, perceptions and challenges in South Africa

(A pilot study at a single academic complex)

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"In their new personal development, the girl and the woman will only be for a short time imitations of the good and bad manners of man and reiterations of man's professions … one day that girl and woman will exist, whose name will no longer mean simply a contrast to what is masculine, but something for itself, something that will not make one think of any supplement or limit,

but only of life and existence …"

Rainer Maria Rilke

"Letters to a Young Poet"

14 May 1904

DECLARATION

I, Dr. Liana Roodt, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise), and that neither the whole work or any part of it has been, is being or is to be submitted for another degree in this or any other university.

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Signature: Dr. Liana Roodt

Date: 7 August 2016

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ABSTRACT

Background: Today, the majority of medical graduates in South Africa and internationally, are female. Current literature suggests that the surgical workforce does not reflect this gender integration. This trend, as well as a decrease in the popularity of general surgery as career choice, has been investigated internationally. It is postulated that gender plays a significant role in specialty choice. In the midst of the gender debate, there are also generational shifts in preferences around work and lifestyle that need to be considered. Paucity of data about these trends from the African continent exists.

Aim: The aim of this study was to determine the gender, generational and discipline-specific factors that are currently impacting on general surgery as a career and specialty choice by administering questionnaires to undergraduate students, surgical trainees and consultant surgeons.

The questionnaires were designed to determine the:

1. "Status" of female general surgeons as opposed to male general surgeons.
2. "Perceptions" about female general surgeons opposed to male general surgeons.
3. "Challenges" faced by general surgeons, both male and female.

Methods: An institutionally validated, self-administered questionnaire was used to gather data on the current status, perceptions and challenges pertaining to general surgeons, male and female, at the University of Cape Town. The questionnaires were distributed to a group of final-year medical students, and to current surgical registrars and surgical consultants in the department of surgery, and were analysed with a particular focus on gender.

Results: The response rate from the surgical department was 67.8%: 29 (51%) respondents were consultant surgeons (six female and 23 male), and 28 were surgical registrars (11 female and 17 male). Of the 114 students invited, 59 (51.7%) completed the survey: 18 male and 41 female.

Status: The small numbers made it difficult to comment on the status of female surgeons within the discipline. However, the average age of female surgical consultants were six years younger than male consultants (39 vs. 45). Two female consultants were the head of a firm, none has been on the editorial board of a peer-reviewed journal, nor has acted as postgraduate research supervisors, but their average number of publications is almost equivalent to those of the male consultants.

Perceptions: A statistically significant proportion of registrars ($p = 0.03$; six [35%] female and 16 [40%] male) felt that women had an advantage when applying for a surgical training post. A total of 19 (33%) felt that there are too many female surgical registrars; only two (3.5%) felt there are too few. Nine (32%) registrars felt that more female surgeons complicate the departmental routine – male participants were statically more likely to consider a female presence disruptive ($p = 0.02$). Fourteen (50%) registrars, 13 (45%) consultants and 36 (61%) students think men are better suited for a career in general surgery, but the majority across all groups considers female surgeons just as technically competent as male surgeons. A minority of registrars (5/28: 18%) and consultants (4/29: 13.7%) perceive female surgeons to portray a lot of masculine qualities, while 24 (40.6%) students think female surgeons are more assertive, aggressive and decisive than women in other specialties.

Challenges: Poor work-life balance, the effect their surgical career has on their family and personal relationships, together with meeting research and academic demands, were identified as major challenges across both genders in the consultant and registrar groups. The majority of students, both male – 13 (72%), and female – 28 (68%), indicated that perceived lifestyle during training will deter them from choosing a career in general surgery. Nineteen (46.3%) female and six (33%) male students are deterred by the influence a surgical career may have on their personal relationships.

Conclusion: This pilot study moves the gender conversation in surgery beyond balancing numbers. More women in surgery does not necessarily translate into better integration – in our survey, men are still considered better suited for a career in general surgery. Women are considered disruptive to the discipline and are perceived to face more challenges in carving out a successful career in general V

surgery. There are, however, challenges that increasingly affect both genders. As the number of women in the surgical workforce rise, it will be imperative to distinguish what challenges are discipline rather than gender-related. Addressing gender as well as generational challenges may enable the discipline to draw the best candidates and restore general surgery to its position as a popular career choice.

(Abstract word count: 723)

TABLE OF CONTENTS

1. LITERATURE REVIEW

1.1 Introduction and background to project: the gender debate of 2015

"We are facing a crisis in the NHS. It's not a crisis caused by obesity, or dementia, or binge-drinking. It's a crisis caused by having too many women doctors … they are bringing the NHS to its knees – and if we don't do something about it soon, there will be profound consequences."

– *The Daily Mail*, 28 August 2015, Dr. Max Pemberton, psychiatrist and popular author

This provocative quote provides a fitting start to a discussion about a topic that is simultaneously seen as critical by some sections of society, and as over analysed and of little relevance by others: the impact of gender in the workplace.

In today's fast-changing social and corporate milieu, varied opinions have been aired with extensive attention received from both popular media and social scientists. The avalanche of literature on women in the workplace has gained significant momentum, with an outpouring of books, trends on social media and research published in scientific journals. Facebook COO Sheryl Sandberg's bestseller book, *Lean in*, is an example of the social spotlight being placed on obstacles faced by professional women.

The medical profession has been central to this ongoing debate. Worldwide, the number of female medical graduates steadily overtook the number of male graduates[1]. In 2001, South African medical schools enrolled equal numbers of men and women – by 2004, 60% of South African medical students were female[1]. This shifting demographic has since been postulated as the root of many South African healthcare challenges – from the shortage of rural doctors[2] to the shortage of certain specialists[1].

Dr. Pemberton, quoted above, is not the only professional to make extremely controversial statements on this issue. Dame Carol Black, former president of the Royal College of Physicians, suggested in 2004 that the feminisation of the medical profession would lead to its degradation, and in 2014,

Prof JM Thomas, a distinguished academic surgeon in the UK, stated emphatically that female doctors are a major threat to the survival and success of the NHS. In his article, also published by the *Daily Mail*

and since then cited widely, he makes what appears to be a compelling argument based on his impression that female doctors will, a) choose to work part-time at least at some point in their career, and b) that female doctors are more likely to choose, in his words, “less demanding” specialties.

While it is true that currently there are more women in medicine than men, the same does not hold true for the surgical disciplines. In 2013, the GMC produced this report on the gender distribution of doctors amongst specialties:

Specialty	Number of female practitioners	Number of male practitioners
General practice	29 272	31 711
Anaesthesia	3 118	6 940
Paediatrics	2 477	2 578
Psychiatry	1 778	3 302
General medicine	1 054	3 737
General surgery	467	3 779
Trauma and orthopaedics	191	3 629

The numbers seem impressive and have contributed to the furore about female doctors and their career choices. However, what is not clear is why so many women would choose paediatrics, which is known for its gruelling specialist training and demanding work schedules, and not surgery. Could the explanation about what is happening in medicine be more complex and nuanced? Is the increase in the number of female doctors a threat to medicine, or is the failure of surgical disciplines to attract women a potential crisis for these disciplines in the face of more and more women studying to become doctors? What are the factors, real or perceived, that are influencing women’s choice of career, and how should we intervene to ensure that surgery continues to select the best of both men and women to enter its training programmes?

The shifting paradigms around work hours, leave and the demand for an improved work-life balance by employees is a reality of the 21st century workplace. While this shift is largely attributed to the fact that there are more women in the workforce, there is evidence that more and more men are also demanding these changes. The impact on the workplace and medicine of the changes in the personal lives of men,

such as increasing paternal responsibility for children and greater gender equality in the home, has not received nearly as much comment and interest as the debate around women[3]. Yet, these generational issues are surely relevant to describing the current paradigm, as well as determining the best strategy for managing the very real challenges raised in this debate.

1.2 Women in the workforce in the 21st century

Gender equality has become synonymous with female empowerment. There is a societal perception that this has already been achieved, with popular media promoting the image of the successful woman in the modern economy. However, the facts do not support this perception. Women may make up a significant percentage of the current workforce, but where are those women working? USA labour statistics from 2013 reveal that women make up only 21% of scientists and engineers employed in business and industry. In science-related university departments, women hold 36% of adjunct and temporary faculty positions, but only 28% of tenure-track and 16% of full-professor positions. In the medical profession, only 34% of working physicians are women, while 91% of registered nurses are female. Even though more than 50% of medical graduates are women, only 37% are currently employed as faculty members, with only 19% as full professors[4]. In law firms, although women make up 45% of associates, they are only 15% of equity partners. In the sub-Saharan African context, the agricultural industry perhaps best demonstrates similar tendencies: while women are by far the majority of informal agricultural workers, they are grossly underrepresented as land owners, and generally overlooked during policy-making and strategic planning[5]. It appears that Michael Kimmel may be correct when stating, “Privilege is invisible to those who have it.”

1.3 A brief history of women in surgery

A historic perspective on women in medicine and surgery makes for interesting reading – seemingly coming full circle back to the 21st century. Historic texts suggest that women as healers – be it as shamans, wise women, witches, midwives or early scientists – are as old as the world itself[6,7]. Large bodies of work have recently been published, exploring the evolving role of women as healers, and bares evidence of the integral yet often hidden role women have played in the evolution of the art and science of medicine[8,9]. In her article, published in the *Canadian Journal of Surgery* in August 2009, Dr. Debrah Wirtzfield gives us a well-researched overview[10].

Ancient scripts, dating back to 3 500 BC, document the heroic stories of female surgeons in Greece, Egypt and Italy. This continued into the Common Era – two examples would be the Tetrabiblion text, accredited to Aëtius (150 CE), detailing the surgical techniques of one Aspasia – a Greco-Roman female surgeon, and *On the diseases and cures of Women*, a 63-chapter text dated around 200 BC, accredited to Metrodora – a documented female physician and practitioner of the Hippocratic methods of the time[7,10].

The Middle Ages rang in a dark era for women in general – and also for female physicians and surgeons. This was largely because of the male-dominated church, actively discouraging and later prohibiting women from medical practices. The Middle Ages saw the systematic disempowerment of women in medicine. The only documented resistance to this deliberate exclusion appears early in the 11th century in Italy: the continued education of women in medicine in Salerno as evident by some gynaecological texts, referenced for several centuries, and written by a woman surgeon called Tortula. The exclusion of women from surgery became absolute in 1540 when King Henry VIII granted the charter for the Company of Barber Surgeons and explicitly barred women from the profession[6,10].

Despite these edicts, women continued to practice medicine, hidden and unrecognised, well into the 18th and 19th centuries[7].

The 19th century is particularly remembered for the story of the "beardless lad" of Edinburgh, Dr. James Barry. This unique individual was a very successful surgeon who had mysterious personal habits, was very withdrawn and widely believed to be a homosexual. Only with his death was it confirmed that "he" was in fact a woman, and as secrets were disclosed, identified as Miranda Stuart. The story of this woman's double life is astounding: a successful male army surgeon (thought to be perhaps homosexual) on the one hand, and a woman (with anatomical changes suggesting prior pregnancy upon autopsy) on the other. One of the most poignant comments after her death came from a friend:

"She chose to be a military doctor. Not to fight for the right of a woman to become one, but simply to be one."[10]

At the same time that Miranda Stuart worked as a man, Dr. Elizabeth Blackwell became the first female physician in the USA. The second to graduate, Dr. Mary Edwards Walker, became the first female surgeon in the US army after having to practice several years as an army nurse.

The story in South Africa follows a similar trend of female exclusion, with a few determined and brilliant women risking social stigma and widespread resistance to become doctors. The first female doctor to practice in South Africa was Dr. Anna Petronella van Heerden. She later specialised in gynaecology, and her PhD thesis on endometriosis was the first medical thesis written in Afrikaans[11].

Mary Malahele-Xakana was the first black female doctor in South Africa, registering in 1947[12].

These frontrunners opened the field for a slow-growing female presence in modern medicine, one that only started gaining momentum in the 1970s. Today, in 2016, we see a female majority in medical graduates – not only internationally, but in South Africa as well[13]. As far as general surgery goes, statistics from the USA suggest a far slower increase in female surgical residents: from 2% in 1980 to a mere 14% in 2001, and now approaching 36% in 2016[10,14].

1.4 Gender in the medical profession and gender in general surgery: internal segregation within the medical profession

The question of gender and medical careers is not just a topic of opinion and public controversy. There were at least 212 articles published between 2005 and 2009[15] on gender in the medical profession. These publications are now in excess of a 1 000, addressing gender differences regarding a vast array of topics within the profession – from work hours to choice of specialty[16], to coping mechanisms and patterns of drug abuse[17, 18, 19].

It is a well-established fact that there has been a dramatic rise in the number of women entering the medical workforce over the past four decades[20]. In the USA, the number of female medical graduates has increased from 5% in 1952 to 48% in 2011[21]. By 2017, there will be more female doctors than male in the UK. In 2000, 51% of all South African medical students were women – steadily increasing to 56% in 2005. It is well established that women far outnumber men in all South African medical schools today, with some training institutions reporting as high as a 67% female constituency[13]. Between 2002 and 2006, registered female practitioners in South Africa increased by 24%. The overall increase in medical practitioners during the same period was 11%, with a 6% increase in male practitioners[22].

This trend is becoming evident in most specialties too[13, 23]. However, the surgical specialties lag behind. Women are far better represented in paediatrics, psychiatry, and obstetrics and gynaecology than in general surgery, orthopaedics and cardiothoracic surgery[20, 21].

As stated by the 2013 GMC report:

General surgery	467 females vs. 3 779 males
Trauma and orthopaedics	191 females vs. 3 629 males

Buddeberg-Fischer et al. cited that gender had the strongest significant influence on specialty choice amongst Swiss residents[16]. Surgical specialties were more popular choices amongst males, while

female residents showed a preference for obstetrics and gynaecology, paediatrics and anaesthesiology. Even after controlling for personality traits, career motivation and life goals, the effect of gender remained significant. This "internal segregation" within the profession has been well established worldwide[24].

The field of sociology has produced large bodies of work on the phenomenon of "internal segregation" within professions. "Occupational prestige hierarchy" seems to be one of the foundations of this research[25]. Within the medical profession, the work of Susan Hinze and Georgiann Davis are of particular interest. In her work, Hinze offers a model of specialty prestige based on a number of intense qualitative interviews with residents of the United States. Her findings were consistent with other similar studies, where residents ranked surgery as most prestigious, followed, in descending order, by internal medicine, anaesthesiology, radiology, pathology, obstetrics and gynaecology, paediatrics, dermatology and psychiatry[24]. Prestige was equated with, and defined by, the participants as a perceived toughness (physical ability), dedication (long working hours and longer training period), skill (ability to perform procedures) and cerebral ability, with surgery being described as a discipline requiring all of these attributes. When it became clear in the literature that there is a gender bias in the choice of specialty, the concept of a "masculine top and feminine bottom" regarding specialty prestige was strongly suggested. Davis et al. and many others still refer to women being underrepresented in the "prestigious specialties"[20].

Many have attempted to empirically explain the intra-occupational sex segregation within the medical profession. Davis and Allison[20] approached the phenomenon by dividing possible contributing factors into "supply side" and "demand side" factors.

Some of the empirical "supply side" explanations offered by, for example, Hojat et al.[26], include "maternal and nurturing attitudes" and familiarity with the female body as motivations for women to choose paediatrics and obstetrics and gynaecology as specialties. Other authors also include gender socialisation (so-called feminine characteristics and behaviour patterns) as primary motivators for

specialty choice. In their landmark paper, Davis and Allison suggest that female surgeons are "particularly gender non-traditional"[20].

Of note is that even within surgery as specialty, we seem to be facing a situation of internal segregation. An international survey of female surgeons, published in 2016 by Kawase et al., reports that almost 50% of Japanese female surgeons and 20% of American female surgeons choose to sub-specialise in breast surgery[27]. One could conclude from this that, even within surgery, women seem to gravitate towards what may be perceived as the "softer" niches of the discipline, leaving trauma surgery, vascular and transplant surgery predominantly male.

These "supply side" arguments from the literature form the basis of our enquiry into the "status" of and "perceptions about" female general surgeons in South Africa. Not only is it important to look at the number of female students interested in general surgery as a career choice, the number of female registrars in training and number of practicing consultants, but also how they are perceived in comparison to their peers in other specialties. It is to this end that, for instance, the following questions were included in our surveys to all three groups:

- Perceived "masculine qualities" of female general surgeons
- How well suited women are perceived to be for a career in general surgery
- Perceived technical competence of female general surgeons

On the "demand side", limitations to women's advancement in male-dominated careers are attributed to structural barriers. These deterrents included perceived "family unfriendliness", inherent "lifestyle" of the discipline and obstacles to career advancement[16,23,28, 29.] However, these same deterrents do not seem to affect the choice of women to specialise in, for instance, obstetrics and gynaecology. In the case of obstetrics and gynaecology, it is postulated that patient preference (female patients showing a preference to be treated by female doctors) has greatly contributed to the gender shift within the specialty[16].

It is of great relevance to note that these "demand side" deterrents seem to cross the gender barrier.

There is growing evidence that the perceived lifestyle, impact on family and work hours of various specialties significantly affect both male and female students' chosen preference[28,30,31]. Thus, the impact on difference in generational rather than just gender attitudes towards work and personal life, seem critical. It is to this end that our surveys across three generations included questions on family life (including maternity and paternity leave), work-life balance, and perceived challenges during and after training.

While the shifting gender demographics in medicine might cause a threat to general surgery, other specialties seem to have less reason for concern: in 2003, 70.8% of US obstetrics and gynaecology residents were women (76.6% of surgical residents were men)[16,20]. This trend remains evident internationally. In the US, 82% of obstetrics and gynaecology residents were female in 2010, and women represented 73% of paediatric registrars[32]. In the same year (2010), only 36% of surgical residents were women[14].

In their study published in 2014, Munir et al. reports the following specialty preference amongst newly qualified female graduates: obstetrics and gynaecology (27.86%), radiology (14.88%), paediatrics (11.06%), general medicine (11.06%) and ophthalmology (6.87%)[33].

It would be fair to say that, while other specialties have experienced increased gender integration, surgery has remained male-dominated. Very little recent data from the African content or South Africa is available to make these comparisons, and it is imperative that we evaluate the current situation. Data from Zimbabwe published in 2010 reports an increase from 13% to 34% in female medical undergraduates[34], but in 2014, the number of female surgeons in the country was still only at 8%[34].

The last relevant published data found from South Africa is from Breier and Wildshut, who reported the internationally aligned trend at one South African academic institution in 2008: between 1999 and 2005, the MMed enrolments at the University of Cape Town had increased from 28% to 42% for female post-

graduate medical students. This nearly 50% increase, however, was not evenly split: psychiatry, paediatrics, anaesthetics, and obstetrics and gynaecology accounted for 57% of all female enrolments. Combined, the surgical disciplines (general surgery, orthopaedic surgery, neurosurgery, plastic surgery and cardiothoracic surgery) only produced 11% of female graduates[22]. This, however, has changed over recent years, with the UCT Department of General Surgery female enrolments approaching 50% in 2015 (as per active departmental staff register).

1.5 Current gender demographics in medicine and its potential influence on general surgery as discipline

With female medical graduates becoming the majority in many parts of the world, the failure to attract women into surgery potentially creates a crisis for the discipline in the future. Not just the lack of the needed numbers to fulfill service requirements, but also the ability to attract the very best medical graduates from across the spectrum, not just from the shrinking pool of male graduates. With this in mind, it would be short-sighted not to consider gender an important role player when considering the future of a specialty like general surgery. This concern is particularly pertinent in a developing economy like South Africa. Bluntly stated, if these statistics are true, can we afford to train more female than male practitioners in a country, and on a continent where surgical healthcare needs are ever increasing? Perhaps more wisely: how do we identify the underlying reasons for women and men gravitating away from general surgery, and correct these?

The World Health Organisation (WHO) has declared surgical disease a global health priority and, in its 2010 report, places mortality from disease and injury potentially treatable with surgical intervention at the top of their global disease burden list – above HIV and other communicable diseases[35]. This are echoed by the extensive reports recently published by the Lancet Commission on Global surgery, highlighting the massive need for surgical services world-wide (*www.**lancet**globalsurgery.org)* The United States, a developed country, is predicted to face a shortage of 1 875 surgeons in 2020, and 6 000 in 2050. This tendency has also been a real concern in South Africa, leading to an official

assessment of the "critical shortage" in general surgery by the Association of Surgeons in South Africa in 2004[36]. At this time, it was estimated that South Africa would need to produce in excess of 50 general surgeons per year – using the most conservative of numbers – with only 25 graduating per year at that stage. It is 11 years later and crucial to assess if and how we have addressed these concerns, and to consider the career longevity of new graduates.

1.6 Lifestyle and gender roles: how it affects general surgery as a career choice

In 1990, Schwartz et al. already described a propensity to choose specialties perceived to have fewer night calls and less work hours per week amongst US medical graduates[37]. Amongst the 346 students in nine American medical schools, traditional motivators such as remuneration fell by the wayside in comparison to perceived lifestyle.

Based on the work of Schwartz done in 1989 and 1990[37], the *JAMA* published an important article on the influence of a "controllable lifestyle" in the US specialty trends. Dorsey and Jarjoura report on this work a significant change in the specialty preference of senior medical students in the USA between 1996 and 2002. They concluded that the perception of a controllable lifestyle is the most significant contributor for the shifts: away from general surgery and family practice towards anaesthesiology and radiology. This was observed across both genders[31,37]. Gargiulo et al. echoes similar conclusions in an article published in 2006, where the authors reiterate that "lifestyle is not a women's issue". In an attempt to investigate what deters women from surgery, they conclude that both genders are steered away from a career in general surgery by largely one factor: lifestyle[38].

Drinkwater et al.[39] did a qualitative study in 2008 on the effect of gender on medical students' aspirations at the University of Manchester. Although a small study, work-life balance emerged as men and women's central aspiration. She, however, documents a clear difference between genders when enquiring about the pathway towards this balance. The female respondents showed readiness to avoid

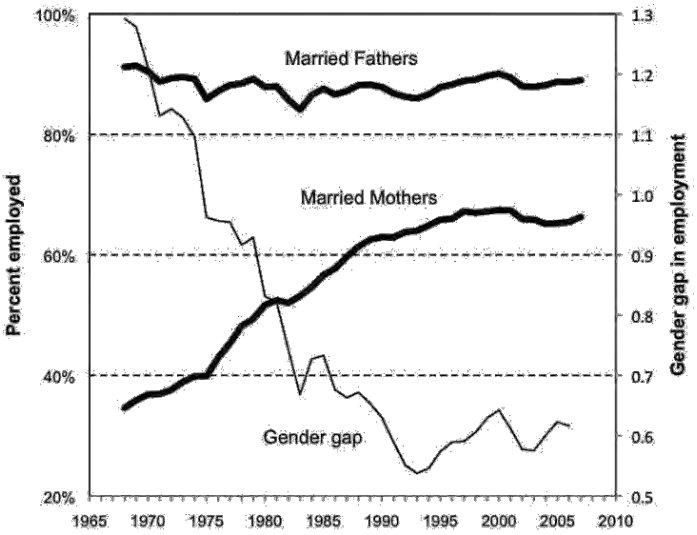
leadership and take time out for family life, while the men, although indicating a desire for better balance, did not necessarily equate this with taking time out of their careers to accept greater responsibilities at home[39]. Park et al. have noted a consistent equal interest in surgery as a career choice between the genders in American medical schools, but reports that women would reiterate a perceived role strain between career and home life as a possible deterrent from surgery[40].

Given the above, one is drawn to the social sciences for noteworthy comments on this phenomenon. Prominent is the work of Pamela Stone, both her book and academic publications[41]. In *Opting Out? Why Women Really Quit Careers and Head Home* (Berkeley, CA: University of California Press, 2007), Stone postulates that attention has shifted from how the workplace has failed women to how women might fail the workplace by getting caught up in their second job: the one at home. Despite their desire to have a career and family life, many women "opt out" of the career path to return home.

With her qualitative study, Stone aims to illustrate that women leave successful careers to return home as a last resort, and not a natural choice. Company policies, the pressure of their partner's traditional role preference and childrearing forms the framework of her arguments. Further work of Stone and Lovejoy, published in *The Annals of the American Academy of Political and Social Science*[42], concludes a "double bind" professional women find themselves in: that of ideal worker and ideal partner/parent.
They reject a notion of "new traditionalism", but instead show high levels of conflicting interest faced by their study cohort of professional women. Upon consideration to leave the workforce or scale down,

"work-based factors play a primary role, with characteristics of husbands playing an important secondary role[42]".

The work of Cotter et al., published in the *American Journal of Sociology* in 2011, paints a sobering picture and largely supports the work of Stone. They illustrate progressive gender liberation from the 1970s that came to a halt in the mid-90s, with very little change since.



"Employment rates of married mothers and married fathers: 1968–2007. Samples are married men and women with spouse present, and at least one own child in the household. The gender gap in employment is defined as the difference in log odds of being employed: gap p where m p = percent of married fathers employed, and f p = percent of married mothers employed. Data are from the Current Population Surveys (US), 1968–2007."

Given the above, one should therefore be cautious not to interpret the often-cited desire for "work-life balance" across both genders in the medical field as an indication of equalising gender roles. What is clear is that the lifestyle associated with general surgery during and after training is a powerful deterrent away from the profession for medical graduates[29,31,43,47].

An interesting ambiguity is found in the work of Ahmadiyeh and colleagues, published in 2010 by the *American Journal of Surgery*. The authors show that female surgeons less frequently report family trade-offs and surgical workload as a contributor to career dissatisfaction than male surgeons[48]. In line with this, Kawase, K et al.'s 2016 international survey reports high levels of motivation amongst female surgical respondents, even at the cost of family and lifestyle[27]. One could postulate that those women have self selected already, having chosen surgery, and therefore do not experience the "double bind" phenomenon. In their paper, based on a survey completed by 895 American board-certified surgeons, Troppmann et al.[49] also reports a high level of career satisfaction amongst female surgeons. This

paper, however, also supports the notion of a somewhat non-traditional life trajectory of the female surgeon: female surgeons were five times less likely to have children than male surgeons, and those that had children, had them later in life. This would suggest a significant trade-off for female surgeons – delaying, or even negating marriage and parenthood[50].

In Troppmann's survey of American board-certified surgeons, more men (91.7%) than women (63.8%) were married. Of those surgeons with children, 79.4% of the men reported their spouses to be the primary caretaker, while only 26.9% of women reported this. (The earlier-cited description by Davis and Allison[20] of female surgeons as "gender non-traditional" does come to mind.) Phillips, Nimeh, Braga and Lerner's 2014 survey-based article in the *Journal of the American College of Surgeons* conclude that American female surgeons have their first pregnancies later in life, fewer children and more frequent incidences of infertility[51]. It would seem that not much has changed in a decade, given statistics based on a similar survey done in 2002, provided by Sonnad and Colletti – also in the USA. They reported male surgeons to be statistically more likely to have children, and female surgeons to be more likely to have a partner who also worked full-time. Women surgeons spent on average twice as much time as their male colleagues on parenting duties[52].

Nevertheless, there are many other examples in the literature that reports high levels of career satisfaction amongst female surgeons[49,53,54]. This raises the question of how both genders, but in particular women, model the discipline (or more importantly their perceived "price tag" of the discipline) to younger generations.

The phenomenon of "paradigmatic trajectories" described by Hill and Vaughan eloquently speaks to this issue[55]: They state that:

" ... the processes of seeing, hearing, doing and imagining combined to form paradigmatic trajectories on which students could draw when making career decisions. They served as a 'hidden curriculum', in which the culture, beliefs and behaviours enacted by those within surgery shaped students'

experiences, participation and learning. Students interpreted these explicit and implicit messages about which practices led to success and who could engage in them."

In their work, they describe an inability of female students to positively identify with women in surgery. The dominant observation made by these students is in alignment with the work discussed at the start of this section: surgery does not offer a controllable lifestyle, and if you are a woman that plans on having a family, there is a cost to be calculated[39, 40, 41]. Students describe a belief in how difficult it is to be a female surgeon based on anecdotal evidence. Combine this with the societal trajectory of being a woman (having a family and sacrificing a career to some degree or another to do so) and you have conflict of paradigmatic trajectories – and a group that self-selects out of a surgical career[55].

In an attempt to delineate these complex distinctions in our study, we have included several questions on lifestyle (during and after training), family responsibilities as well as other possible deterrents and how surgeons are perceived as role models. Surgeons will be wise to reconsider how they represent the discipline and the impact their career choice has on their lives to medical students.

1.7 Perceptions about gender discrimination in general surgery

Aside from the structural work commitment issues in surgery, there is also the issue of gender discrimination within the discipline, whether real or perceived. While overt gender discrimination seems to be unusual, there is evidence from various authors that the subtler forms of bias are still rife. This includes belittlement, harassment, sexist humour, exclusion from departmental social events and perceived favouritism. While subtle, it has a significant impact and may derail surgical careers[14, 27, 55, 56,

57, 58].

There seems to be ample literature between 2002 and 2006, documenting a persistence of the "old boys' club" mentality in surgery and how this, combined with the "surgical personality", discourages women from entering the field[14,38]. Oancia et al. reports this to be so pervasive that they conclude an

"acclimatisation to the patriarchal surgical culture" of female students and residents[19]. This discrimination can be as subtle as an assumption by faculty that male students would be more interested in surgery, and contribute to the propensity of more male students being exposed to and allowed to perform procedures at an undergraduate level[57,59,60]. In their literature review published in 2014, Burgos and Josephson conclude that gender still is a determining factor in following a surgical career path. They cite gender discrimination and lack of gender awareness within the surgical field as factors deterring women. Other factors highlighted from the literature in their review include lack of positive female surgical role models, the "surgical personality" and the recurring theme of lifestyle and lack of balance[57].

Men are not the only perpetrators when it comes to gender discrimination. There is a high degree of same-sex discrimination (women against women) observed in several studies in a wide variety of fields[61, 62, 63]. In a recent survey published on *Medical Education Online* in 2015[14], Bruce et al. demonstrated that amongst the 331 members of the Association of Women Surgeons interviewed, 40% of all respondents observed or experienced acts of discrimination against women surgeons by other women. As the feminisation of medicine continues, it would be critical to remain aware of this phenomenon and actively discourage such behaviour.

1.8 The glass ceiling: perceived gender bias towards a career in academic surgery

In 1975, the American College of Surgeons released a statement encouraging us, "… to look beyond our prejudices and unsupported convictions toward the full use of the gifts women can bring to medicine and surgery."[52] How well have we done?

Given the rapid rise in female medical graduates, it comes as a surprise that the number of American full professors in the medical faculty, reported by the 2009 AAMC database, was only 18.5%[58]. A 2013 study notes that female full professors in medicine have only increased from 14% in 2003 to 21% in

2013[64]. Even more surprising is that the number of women in tenure positions has remained unchanged at 30% over the last decade[64]. These disparities have come to be known as the "leaky pipeline" of academic medicine[65].

The discrepancy that exists between the sexes with regard to training surgeons becomes even more pronounced amongst qualified surgeons in academic and leadership positions[3, 66, 68]. Although a certain degree of disparity is expected, given the only recent rise in number of women within the surgical profession, the increase at the top is disproportionately slow[27, 67, 69].

Women are consistently underrepresented as full professors, heads of units and on editorial boards, particularly in comparison to women in other specialties[67, 70]. In their analyses of AAMC data from 1995 to 2009, Sexton et al. calculated that at the current rate gender parity at this level, i.e. 50% female full professors in surgery, would only be achieved in 2096[69]. This analysis reveals that, proportionally, the professorial numbers of women in surgery have been stagnant over the last 15 years – despite an increase in the absolute number of female academic surgeons[69].

If one compares the work done by Sonnad and Colletti in 2002 and that of Cochran et al. in 2013, it is disconcerting to note that not much have changed in the perceived barriers to the promotion of female surgical faculty. Sonnad and Colletti's national survey cite lack of support, decreased levels of collaboration, exclusion from informal departmental networking and challenges surrounding family responsibilities as perceived difficulties by female surgeons contributing to their lesser status within the academic arena[52]. Cochran et al. concludes from their survey conducted in eight major academic centres in the USA that women experience lack of mentorship, differential treatment based on sex and challenges surrounding childrearing as career barriers for female faculty[66]. They also note that there seems to be a shift, albeit not statistically significant, in how male faculty perceives their family responsibilities, with more male surgeons reporting a difficulty in balancing their academic careers with life at home[66].

A concept that appears increasingly in the literature on gender in academic medicine over the last five years is that of the "stereotype threat" – women are communal, men are independent and argentine – and this descriptive societal belief comes with prescriptive gender behaviour[65,71,72]. Vast bodies of social science literature describe these inherit and pervasive societal beliefs around gender characteristics and expected behaviour. Central to the concept of the "stereotype threat" is that the assumed nurturing characteristics of a woman put her at a disadvantage against the assumed logic, rationality and decisive nature of a man when it comes to leadership, promotion and authority[58,72]. Considering the previous reference to female surgeons as being "gender non-traditional"[20] and the existing gender segregation in medicine[24, 25, 26], it would be wise to consider the "stereotype threat" a valid contributor to the surgical glass ceiling.

1.9 What would a preferable future look like?

Little data currently exists about the implementation of strategies to ensure the career longevity of women in surgery. One would hope that, once strategies are employed, it would be to the benefit of both genders – ultimately ensuring a discipline that draws the best candidates possible. In their survey, Snyder et al. suggests the following specific interventions based on a survey conducted in five American medical schools in 2008[73]:

1. Strict adherence to an 80-hour workweek.
2. Introducing the option of part-time residency training programmes.
3. Greater acceptance of maternity and paternity leave.
4. On-site childcare.
5. Part-time posts and more flexible work hours.
6. Shared practice.

7. Equal numbers of male and female residents and faculty.

While surgery as a specialty will never, by its nature, produce a fully predictable and controlled lifestyle, a greatly coveted characteristic for specialties amongst the new generation of medical graduates, their research suggests that the above changes could result in greater interest in the discipline across both genders, but for women in particular[73].

Very little research into the implementation of job-sharing and part-time residency exists within the surgical specialty. From the limited literature available, the main issues are: managing complex human resource logistics, ensuring quality and continuity of patient care, and ensuring adequate training of surgical trainees[74, 75, 76]. Drawing from the experience of the business world, potential stigmatisation of those who opt for a job-sharing or part-time training position is also a significant challenge[77]. However, an Australian paediatric training programme that has instituted job-sharing, reported an overall positive experience from its residents[74]. Programmes like these, as well as private practices that have successfully implemented job-sharing and time flexibility, will have to provide much-needed guidance.

A far greater challenge is to shift pervasive societal beliefs and expectations around gender roles – as the literature we have discussed shows, these core beliefs play a major role in how accessible and achievable a successful career in surgery is for women.

1.10 Conclusion

The issue of gender as it pertains to general surgery is important, with multiple complex and often nuanced societal and individual factors playing a role. This issue should now, more than ever, be viewed against the backdrop of generational and societal shifts in work-life expectations. In the South African context, we also need to take cognisance of the challenges and needs of a developing economy with a resource-limited healthcare system. By actively engaging the gender debate in a sensible manner, we may learn how to ensure the best future for the noble specialty of general surgery.

It is important that necessary changes are not viewed only through gender-tinted lenses. There is a very real possibility that these changes will benefit all surgeons and the lives they touch – regardless of gender – and bring us closer to a society where, in the words of the enigmatic Dr. Seuss, "… a person is a person … and that is all".

(Word count literature review: 6 264)

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2. PUBLICATION-READY MANUSCRIPT

(as per author guidelines for World Journal of Surgery: available in Section 4.4)

2.1 Title page

2.1.1 Title

Female general surgeons: current status, perceptions and challenges in South Africa (A pilot study at a single academic complex)

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2.1.3 **Running head** – Female general surgeons in South Africa

2.1.4 **Keywords** – gender, general surgery, female surgeons, South Africa

2.1.5 Trial registration/Ethics – Human Research Ethics Committee of the University of Cape Town (HREC REF343/2015)

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2.1.8 Manuscript word count – 5 207

2.2 Abstract

Background

It is postulated that gender plays a significant role in surgical specialty choice.

Aim

The aim of this study was to determine the gender, generational and discipline-specific factors that are currently impacting on general surgery as a career.

Methods

Questionnaires were distributed to determine the current status, perceptions and challenges pertaining to general surgeons, male and female, at the University of Cape Town.

Results

The response rate from the surgical department was 67.8%: 29 (51%) respondents were consultant surgeons (six female and 23 male), and 28 were surgical registrars (11 female and 17 male). Of 114 students invited, 59 (51.7%) completed the survey: 18 male and 41 female. A total of 19 (33%) trainees felt that there are too many female surgical registrars; only two (3.5%) felt there are too few. Nine (32%) registrars felt that more female surgeons complicate the departmental routine – male participants were statistically more likely to consider a female presence disruptive ($p = 0.02$). Poor work-life balance, the effect their surgical career has on their family and personal relationships, together with meeting research and academic demands, were identified as major challenges across both genders in the consultant and registrar groups.

Conclusion

In our survey, men are still considered better suited for a career in general surgery; women are considered disruptive to the discipline and are perceived to face more challenges in carving out a successful career in general surgery.

Word count abstract: 234

2.3 Text of article

Introduction and background

"*We are facing a crisis in the NHS. It's not a crisis caused by obesity, or dementia, or binge-drinking. It's a crisis caused by having too many women doctors … they are bringing the NHS to its knees – and if we don't do something about it soon, there will be profound consequences.*"

– Dr. Max Pemberton, The Daily Mail: 28 August 2015

This provocative quote provides a fitting start to a discussion about a topic that is simultaneously seen as critical by some sections of society, and as over analysed and of little relevance by others: the impact of gender on the work place.

The medical profession has been central in this ongoing debate. At least 212 articles were published between 2005 and 2009 on gender in the medical profession[1]. These publications are now in excess of a 1 000 – addressing gender differences regarding a vast array of topics within the profession: from work hours to choice of specialty and practice, to coping mechanisms and patterns of drug abuse[2, 3, 4, 5].

There has been a dramatic rise in the number of women entering the medical profession over the past four decades[6]. Worldwide, the number of female medical graduates steadily overtook the number of male graduates. In the USA, the number of female medical graduates has increased from 5% in 1952 to 48% in 2011[7]. In 2001, South African medical schools enrolled equal numbers of men and women – by 2004, 60% of South African medical students were female[8]. This shifting demographic has since been postulated as the root of many South African healthcare challenges: from the shortage of rural doctors[2] to the shortage of certain specialists[9,10].

As a logical result of this trend, most specialties today have increasing numbers of women in their ranks[10,11]. The surgical specialties, however, lag behind. Women are far better represented in paediatrics, psychiatry, and obstetrics and gynaecology than in general surgery, orthopaedics and 33

cardiothoracic surgery[7,12]. In 2010 in the US, 82% of obstetrics and gynaecology residents were female, and women represented 73% of paediatric registrars[13]. In the same year (2010), only 36% of surgical residents were women[14].

It has become clear that the question of gender and medical careers is not just a topic of opinion and public controversy – it has real implications for the surgical workforce.

While other specialties have experienced increased gender integration, surgery has remained male-dominated. Very little recent data from the African content or South Africa is available to make these comparisons, and it is imperative that we evaluate the current situation. Data from Zimbabwe published in 2010 reports an increase from 13% to 34% in female medical undergraduates[15], but in 2014, the number of registered female surgeons in the country was still only 8%[15]. The last published data found from South Africa is from Breier and Wildshut, who reported the internationally aligned trend at one South African academic institution in 2008: between 1999 and 2005, the MMed enrolments at the University of Cape Town had increased from 28% to 42% for female post graduate medical students8. This increase, however, was not evenly split: psychiatry, paediatrics, anaesthetics, and obstetrics and gynaecology accounted for 57% of all female enrolments. Combined, the surgical disciplines (general surgery, orthopaedic surgery, neurosurgery, plastic surgery and cardiothoracic surgery) only produced 11% of the female graduates8. This, however, has changed over recent years, with the UCT Department of General Surgery female trainees approaching 40% in 2015. (*As per active departmental staff register.*)

Further examination of this heavily debated topic is justified, especially in the context of South Africa as a marker for the greater African context. Globally, the popularity of general surgery as a choice of specialty has declined dramatically over the last decade, despite a predicted increase in need by the World Health Organisation (WHO)[16, 17, 18]. This tendency has also been a real concern in South Africa, leading to an official assessment of the "critical shortage" in general surgery by the Association of

Surgeons in South Africa in 2004.[9]. At this time, it was estimated that South Africa would need to 34

produce in excess of 50 general surgeons per year – using the most conservative of numbers – with only 25 graduating per year at that stage9. It is more than a decade later and crucial to assess if and how we have addressed these concerns.

The most common factors leading to the diminished popularity of general surgery cited by researches internationally, are lifestyle implications and an increase in the number of female medical graduates[17,19, 20, 21, 22]. A South African survey done in 2004–2006 also cites the changing demographics of medical students (a dramatic increase in females nearing 60% in all medical schools) as a significant contributing factor to the critical shortage in general surgery. Lifestyle, long working hours, poor comparative remuneration and litigation are also mentioned as significant contributing factors in the South African context[9,23]. This, however, was across both genders.

Aims

The aim of this study was to determine the gender, generational and discipline-specific factors that are currently impacting on general surgery as a career and specialty choice by administering questionnaires to undergraduate students, surgical trainees and consultant surgeons.

The questionnaires were designed to determine the:

1. "Status" of female general surgeons as opposed to male general surgeons.
2. "Perceptions" about female general surgeons opposed to male general surgeons.
3. "Challenges" faced by general surgeons, both male and female.

We postulate that the gender debate often arises when an institution or discipline is faced with shifting paradigms, such as those related to work hours, leave and the progressive consideration of the employee's personal life. While it is difficult to identify the multitude subtle parameters that may have changed in working life, it is easy to pinpoint the rising number of women in the work force. It might therefore seem plausible, and even convenient, to equate new challenges and victories to the changing

gender demographics. However, it is important to explore whether certain challenges are discipline-specific or generational rather than just gender-related.

Methods

The Human Research Ethics Committee of the University of Cape Town granted ethical approval for this study (HREC REF343/2015). The self-administered, anonymously returned electronic and paper-based questionnaires were distributed to general surgery consultants, registrars and rotating final-year surgical students. (Please refer to appendices 4.1, 4.2, 4.3 and 4.4.) The participants were from the Department of General Surgery affiliated to the University of Cape Town. Consultants and registrars had the opportunity to anonymously complete the electronic survey from July 2015 to September 2015. Final-year students were offered the opportunity to complete the survey anonymously either electronically or on paper during the month of November 2015.

Survey questions to the three groups differed slightly to accommodate career stage.

The surveys used in this cross-sectional observational and comparative study were compiled by the investigators and institutionally validated as follows:

- Questions for the questionnaires were set by the primary investigator (post-graduate student) after extensive literature review of the topic, and reviewed by the internal supervisor.
- The questionnaires were subsequently reviewed and further refined by the external supervisor as well as staff at the UCT Clinical Research Centre.
- With the help of the Clinical Research Centre, a focus group discussion was held with representatives from all three study populations (students, registrars, consultants). The focus group discussion was observed and analysed by a representative of the Clinical Research Centre, with subsequent improvements.

The literature-based questions were structured into three sections:

- To delineate “Status” (defined as relative social and professional standing)[24]: demographics, questions on qualifications, publications and career path.
- To describe “Perceptions” (defined as the way general surgeons and their behaviour and profession are regarded, understood and interpreted by the above groups, with specific interest in gender and generational differences)[24]: questions on personal and professional behaviour, preferences and experiences in general surgery.
- To determine “Challenges” (understood to be difficulties or obstacles)[24]: survey questionnaires included questions on personal and professional limitations, difficulties or obstacles experienced in general surgery.

Data was stored on three spreadsheet registries (Microsoft Excel, Redmond, WA, USA). Descriptive and inferential statistical methods were employed to describe demographics and the comparison between registrar and consultant responses and, where applicable, student responses, as well as between male and female responses. Statistical analysis was done using the Python modules Panda and SciPy. Chi-squared test and Fisher’s exact test were used for comparative analysis of the three groups’ responses, as well as male and female comparisons. A $p<0.05$ was considered statistically significant.

Results

a) Status

The questionnaire was distributed to a total number of 84 members of the general surgery department and 114 students. A total of 29 consultants (23 male and six female) and 28 registrars (17 male and 11 female) responded to the electronic survey. (Response rate of 67.8%). Fifty nine (response rate of 51.7% – 41 female, 18 male) students returned a completed questionnaire. (**Figure 1**)

The average age of the registrars was 34.7 for males (range 30–45) and 32.5 (range 25–35) for females. The average age of female consultants was 39 (range 30–50) opposed to 45.6 (range 35–65) for male consultants.

Seven male consultant respondents are or have been head of firms, with two female consultant correspondents currently heading clinical units. Seven male consultants have acted on an editorial board of a medical publication, and three have acted as post-graduate research supervisors. Of the female respondents, none have fulfilled these respective roles. (**Table 1**)

b) Perceptions

Regarding the number of female surgical registrars

A greater proportion of registrars agreed that there is a gender bias in favour of women when applying for training posts, compared to consultants ($x2 = 10.79$; $p = 0.03$). Although not statistically significant, 16 out of 40 (40%) of male responders strongly felt that female applicants had an advantage. This advantage was perceived by 35% (six) of female respondents. The student survey did not explore this question, since they have never applied for a specialty.

Ten consultants (34%) are concerned that training more female surgeons will ultimately lead to a shortage of general surgeons, seven were equivocal on this matter, while 12 disagreed that training more female surgeons could potentially lead to a shortfall in practicing general surgeons. This question was only asked to the consultant surgeons.

Eleven (39.3%) of the registrars and seven (24%) of the consultants felt there are too many female surgical registrars. **Table 2** represents a summary of the combined registrar and consultant responses to the number of female surgical registrars, analysed according to gender.

Of interest is that six out of 17 female respondents felt that the number of female general surgery registrars is irrelevant, and five felt that there are too many female surgical registrars.

Of the female students, 32% (13/41) indicated that they would be interested in general surgery as a career choice, opposed to 61% (11/18) male students, who indicated their interest in pursuing general surgery.

Of note, 37% (15) female students indicated that they liked general surgery but were unlikely to choose it as a specialty, given their experience of general surgeons. Three male students (22%), despite liking general surgery, were deterred from the specialty due to an unfavourable opinion of surgeons.

General gender-based perceptions

Nine out of 28 (32%) registrars felt that more female surgeons complicate the day-to-day function of the department, while only 10% (3/29) of consultants agreed with this statement. Male participants were statistically more likely ($p = 0.02$) to consider a female presence disruptive. Of note is that three of the 17 female respondents agreed strongly that more female surgeons complicate departmental function.

Fifty percent (14/28) of the registrars and 44.8% (13/29) of the consultants indicated that they feel men to be better suited for a career in general surgery. Of interest is that 45% (5/11) of the female registrar respondents agreed with this statement. This perception was even more pronounced amongst the medical students: 56% (23/41) of the female students and 72% (13/18) of the male students felt that men are better suited for a career in general surgery. (**Figure 2**)

The majority of respondents (73%), however, consider female surgeons technically just as competent as their male counterparts in theatre. Women were more likely to consider female surgeons technically competent ($p = 0.002$).

Five registrars and four consultants indicated that they perceive female surgeons to portray a lot of masculine qualities. More men (25%) indicated that they were equivocal about this statement. The student responses are captured in **Table 3**.

c) Perceived challenges

Around career advancement and the demands of a surgical career

Twenty one (36.8%) of the total respondents (13 women, eight men) felt that their gender is a relevant factor in their career advancement. Fifty six percent (32/57, 21 male) of the total respondents disagreed with the statement that men and women face equal challenges in carving out a successful career in general surgery. Thirty one percent (9/29) of the consultants considered their gender a relevant factor in their career choice. Six students, all of them female, indicated that their gender is a relevant challenge that would deter them from choosing general surgery. The number of students that felt that female surgeons face more challenges in carving out a successful career in general surgery was 66.1% (72.2% male, 63.4% female students).

There was no difference between consultants and registrars on whether the demands of surgery affects females more than males. With gender analysis, opinion was widely spread amongst females, while men were slightly more likely to agree that females are more affected (18/40 = 45%).

There was no statistical significance on how men and women across the generations viewed the ability of male and female registrars to keep up with the demands of the specialty. It should, however, be noted that none of the responders felt that men find it harder to keep up than women. On the other hand, 12 respondents (11 men, one woman) indicated that they think female registrars find it harder to keep up than male registrars. The majority felt that gender was irrelevant and that resilience was individual rather than gender-dependent.

The impact of family and other perceived challenges

Sixty nine point five percent of students (13/18 male, 28/41 female) were under the impression that female surgeons face more challenges than male surgeons when it comes to work-life balance.

Nineteen (65.5%) consultants and 20 (71.4%) registrars indicated that they do not feel individuals should defer having a family until training is complete. Upon combined gender analysis for these two groups, three (17.6%) female respondents felt that individuals should defer having a family until training is complete, while another three (17.6%) were equivocal about this statement.

The affirmative responses of consultants and registrars regarding maternity and paternity leave is summarised in **Table 4**.

Fifty two percent (15/29) of the consultants found themselves more sympathetic towards female registrars than male registrars when it came to family responsibilities. The majority of consultants (52%) and registrars (54%) across both genders indicated that their surgical career has placed significant strain on their family/partner.

Both consultants and registrars were asked to indicate what they experienced as their greatest challenges as general surgeons. They could choose any number of options. Their responses are summarised in **Table 5** (no statistical significance).

A similar question was asked to students – they were given a similar list of challenges and asked which of these will deter them from a career in general surgery. Their responses are summarised in **Table 6**.

Discussion

The status of, perceptions about and challenges faced by female general surgeons in South Africa cannot be deducted by this small pilot study alone, but valuable insights have been gained.

Buddeberg-Fischer et al. cited that gender had the strongest significant influence on specialty choice amongst Swiss residents[25]. Even after controlling for personality traits, career motivation and life goals,

the effect of gender remained significant, with women choosing anaesthetics, paediatrics, obstetrics and psychiatry[25]. This gender divide within the profession has been well established worldwide[26]. The field of sociology has produced large bodies of work on the phenomenon of "internal segregation" within professions, including medicine. This divide correlates with so-called "occupational prestige hierarchy"[26]. When it became clear in the literature that there is a gender bias in the choice of specialty, the concept of a "masculine top and feminine bottom" regarding specialty prestige was strongly suggested[26,27]. Davis et al. and many others still refer to women as being underrepresented in the "prestigious specialties"[12].

Many have attempted to empirically explain the intra-occupational sex segregation within the medical profession. Davis and Allison[12] approached the phenomenon by dividing possible contributing factors into "supply side" and "demand side" factors.

Some of the empirical "supply side" explanations offered by, for example, Hojat et al.[28], include "maternal and nurturing attitudes" and familiarity with the female body as motivations for women to choose paediatrics and obstetrics and gynaecology as specialties. Other authors also include gender socialisation (so-called feminine characteristics and behaviour patterns) as primary motivators for specialty choice. In their landmark paper, Davis and Allison suggest that female surgeons are "particularly gender non-traditional"[12]. On the "demand side", limitations to women's advancement in male-dominated careers are attributed to structural and discriminatory barriers. Other arguments, pertaining to the discipline itself, widely cited as "demand side" deterrents for women to choose surgical specialties, are: perceived "family friendliness", inherent "lifestyle" of the discipline and obstacles to career advancement[11,17,20,25].

"Supply side" arguments from the literature form the basis of our enquiry into the "status of" and "perceptions about" female general surgeons in South Africa. The small numbers of our study make it difficult to comment on the status of female surgeons within the discipline. The average age of female surgical consultants were six years younger than male consultants (39 vs. 45). Two female consultants

were the head of a firm, none has been on the editorial board of a peer-reviewed journal nor has acted as postgraduate research supervisor, but their average number of publications is almost equivalent to those of the male consultants.

Although it is important to look at the number of female students interested in general surgery as a career choice, the number of female registrars in training and number of practicing consultants, "supply side arguments" suggest the importance of how female surgeons are perceived in comparison to their peers in other specialties. It is to this end that, for instance, the following questions were included in our surveys to all three groups:

- Perceived "masculine qualities" of female general surgeons.
- How well suited women are perceived to be for a career in general surgery.
- Perceived technical competence of female general surgeons.

Within the consultant and registrar groups, the vast majority of respondents did not perceive female surgeons to portray a lot of masculine qualities. The student responses, however, were interesting: female surgeons were perceived more aggressive, assertive and decisive than other female specialist by almost 50% of the respondents – and as many indicated that they experienced male surgeons as more aggressive, assertive and decisive than other male specialists. This hints to the fact that students may identify what is essentially a "surgical personality". It is troubling that there seems to be a pervasive perception amongst all three groups across both genders (most pronounced amongst students) that men are generally better suited for a career in general surgery. This, despite the fact that most of the respondents felt female surgeons to be technically as competent as their male colleagues.

Questions around the challenges faced by surgeons aimed to address the so-called "demand side" deterrents for women to choose surgical specialties[11,17,20,25]. It is interesting that these same deterrents do not seem to affect the choice of women to specialise in, for instance, obstetrics and gynaecology. In the case of obstetrics and gynaecology, it is postulated that patient preference (female patients

showing a preference to be treated by female doctors) has greatly contributed to the gender shift within the specialty[25].

We included questions around maternity and paternity leave, perceived "family friendliness", inherent "lifestyle" of the discipline and obstacles to career advancement. There is growing evidence that the perceived lifestyle, impact on family and work hours of various specialties significantly affect all students' chosen preference[20,21,29].

From our responses, it seems that lifestyle concerns indeed cross not only gender, but also generational barriers. In our survey, the top two factors that would deter both male and female students from a career in general surgery is lifestyle and poor work-life balance. This is in line with international literature[20,22,30]. Interestingly, registrars and consultants from both genders listed research responsibilities as their greatest career challenge. It is shortly followed by balancing their personal and professional lives. The majority of respondents felt that their career had a negative impact on their partners and families.

Regarding the surgeon and family life, the majority of our respondents felt that there is no need for a surgical trainee to defer having a family. This, however, was somewhat contradicted by the 31.9% of men who felt that paternity leave during training is a luxury and 14.6% who felt that maternity leave is a luxury. Respondents seem conflicted around the issue of maternity and paternity leave. Although the majority felt that the contractually allocated paternity leave is inadequate, there are still approximately 40% that find women going on maternity leave frustrating. This is more pronounced amongst the registrars – one could postulate that this is because they are the group that predominately have to compensate for the absent colleagues. Another interesting finding is that female consultants are the only group that do not necessarily feel that maternity leave should be longer than paternity leave. Perhaps this illustrates a greater willingness, or desire, for equal partnership when it comes to parenting responsibilities.

From our survey, it would seem that surgeons perceive their gender to be less of an issue in terms of career advancement and challenges. A large proportion of registrars and consultants indicated that they feel gender is irrelevant in a number of questions. Those that did perceive a negative gender bias, rather perceive it to be in favour of women when applying for training posts. This may be as a result of departmental affirmative action policies, which guide the appointment of new registrars and aim to address the gender imbalance in surgery. Students, however, are of the opinion that women face more challenges – not only in terms of career advancement, but also in terms of achieving work-life balance.

This leads to the question of how surgeons model themselves to the students – especially female surgeons. A surprising number of female respondents felt that the current number of female surgical registrars is irrelevant, and five women indicated that there are too many. Also of note is the large percentage of female surgical registrars that indicated that men are better suited for a career in general surgery. Given these numbers, one has to wonder how these perceptions from the women inside the discipline shape those of the students – and contribute to the 37% of female students that, despite liking general surgery, will not consider it a viable career choice. Of interest is the work done by Hill and Vaughan, describing the phenomenon of "paradigmatic trajectories"[31]. They state that: " ... *the processes of seeing, hearing, doing and imagining combined to form paradigmatic trajectories on which students could draw when making career decisions. They served as a 'hidden curriculum', in which the culture, beliefs and behaviours enacted by those within surgery shaped students' experiences, participation and learning. Students interpreted these explicit and implicit messages about which practices led to success and who could engage in them.*"

In their work, they describe an inability of female students to positively identify with women in surgery[32, 33, 34]. Students describes a hear-say belief in how difficult it is to be a female surgeon. Combined with the societal trajectory of being a women (have a family and sacrifice a career to some degree or another to do so), this leads to a conflict of paradigmatic trajectories – and a group that self-selects out

of a surgical career[31]. Surgeons, female surgeons in particular, would be wise to reconsider how they represent themselves to the next generation.

Little data currently exist about the implementation of strategies to ensure the career longevity of particularly women in surgery. One would hope that, once strategies are employed, it would be to the benefit of both genders – ultimately ensuring a discipline that draws the best candidates possible. Based on their survey conducted in five American medical schools in 2008, Snyder et al. suggest the following specific interventions[35]:

1. Strict adherence to an 80-hour work week.
2. Introducing the option of part-time residency training programmes.
3. Greater acceptance of maternity and paternity leave.
4. On-site childcare.
5. Part-time posts and more flexible work hours.
6. Shared practice.
7. Equal numbers of male and female residents and faculty.

Surgery as a specialty will always involve a degree of unpredictability and after-hour work, unlike other medical specialties favoured by the new generation of medical graduates. However, research shows that changes, like the above, can be made within surgery to attract greater interest from both men and women[35]. Very little research into the implementation of job-sharing and part-time residency exists, and it will come with its own challenges. From the limited literature available, the main concerns are managing complex human resource logistics, maintaining quality and continuity of patient care and ensuring adequate training of surgical trainees[36, 37, 38]. Drawing from the experience of the business world, potential stigmatisation of those who opt for a job-sharing or part-time training position is also a significant challenge[77]. However, an Australian paediatric training programme that has instituted job-

sharing, reported an overall positive experience from its residents[74]. Programmes like these, as well as private practices that has successfully implemented job-sharing and time flexibility, will have to provide much-needed guidance.

A far greater challenge is to shift pervasive societal beliefs and expectations around gender roles, as these core beliefs play a major role in how accessible and achievable a successful career in surgery is for women.

Conclusion

The issue of gender as it pertains to general surgery is important, with multiple complex and often nuanced societal and individual factors playing a role. This issue should now, more than ever, be viewed against the backdrop of generational and societal shifts in work-life expectations. Balanced gender numbers do not necessarily translate into a balanced work environment. If we are to attract the best in the discipline, the surgical fraternity has to be cognisant of the changes in the work and life expectations of young doctors, both men and women. We believe that this pilot study moves the gender conversation in medicine beyond balancing numbers by interrogating perceptions and challenges across three generations. As the number of women in the surgical workforce rises, it will be imperative to distinguish the challenges that are discipline and generational rather than those that are gender-related. By actively engaging the gender debate in a sensible manner, we may learn much to ensure the future of this specialty. We hope that this study will inform future research at other institutions and aid in exploring how general surgery can evolve into a discipline attractive to both genders and across generations.

Limitations

- Single-centre study
- Small number of respondents
- Small sub-groups

Comment

All three surveys will be made available by the corresponding author on request.

2.4 Legend for tables and figures

Figures

Tables

2.5 Tables and figures

Figure 1: Gender distribution of respondents.

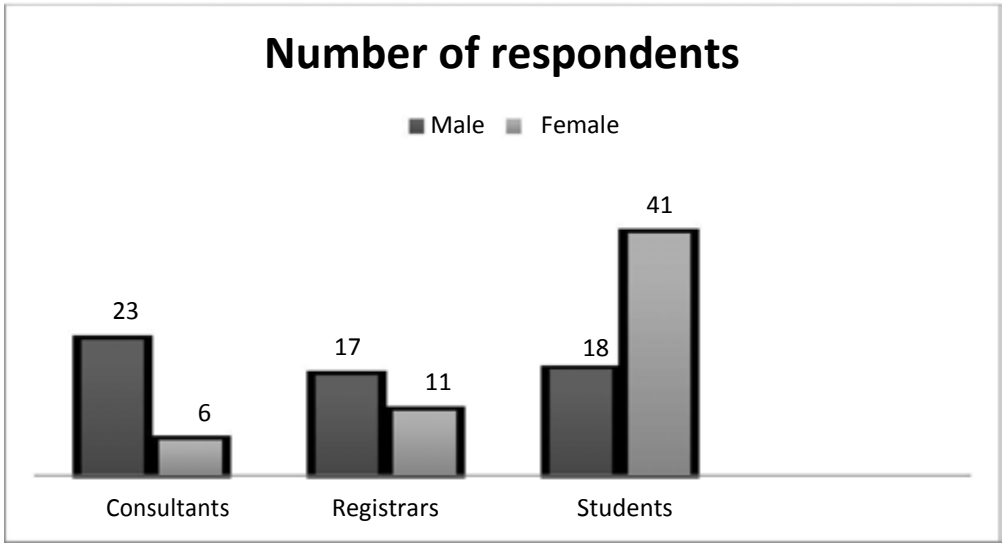
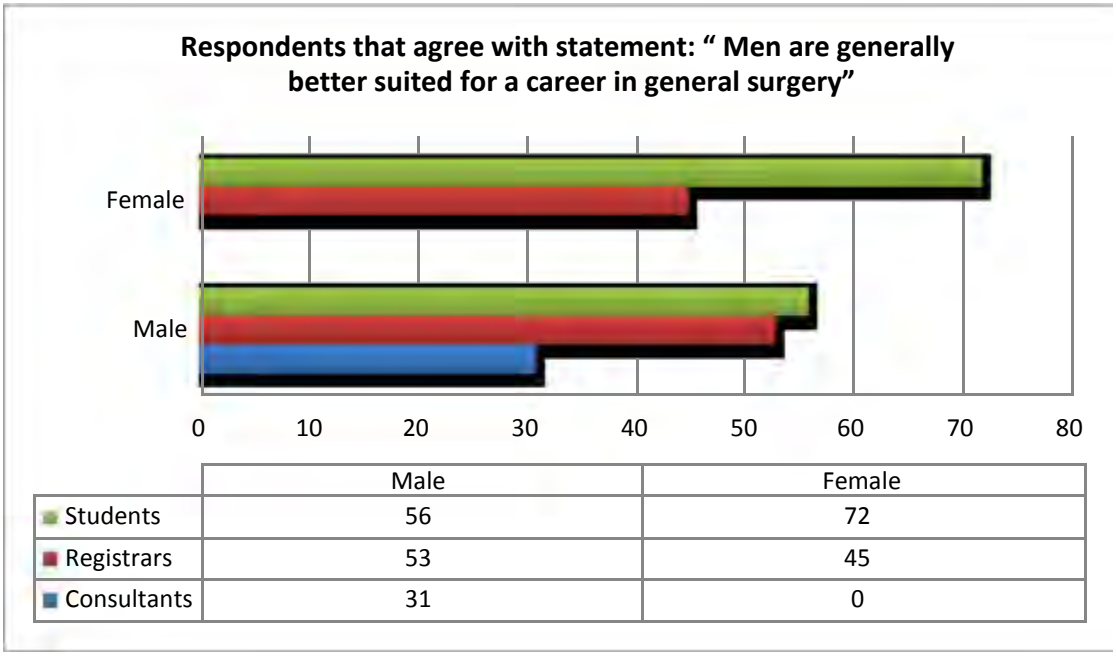


Figure 2: Respondents that agree with statement: “Men are generally better suited for a career in general surgery.”



	Male	Female
Students	56	72
Registrars	53	45
Consultants	31	0

Table 1: Leadership, research and age distribution of consultants

	Male consultants	Female consultants
Average age	45.6 years	39 years
Head of firm	7	2
Editorial board	7	–
Post graduate research supervisor	3	–
Average number of publications	4.6	5.1

Table 2: Perceptions on current number of female registrars.

Perception on number of female surgical registrars	% Male (n = 40)	% Female (n = 17)	% Total (n = 57)
Irrelevant	37.5 (15)	35.3 (6)	36.8 (21)
Too many	35 (14)	23.5 (5)	33 (19)
Well-balanced distribution	25 (10)	23.5 (5)	26.3 (15)
Too few	2.5 (1)	17.6 (1)	3.5 (2)

Table 3: Student perceptions on gender and personality traits amongst general surgeons.

Perception explored	% Affirmative male responses (n = 18)	% Affirmative female responses (n = 41)
I find female surgeons more assertive, aggressive and decisive than women in other specialties	49.9	41.4
I find male surgeons more assertive, aggressive and decisive than men in other specialties	50	31.7
I think female surgeons are expected to act different than women in other specialties, e.g. be tough, be “one of the boys”	33.3	41.4
I think male surgeons are expected to act different than men in other specialties, e.g. be tough, be “one of the boys”	33.3	31.7

Table 4: The affirmative responses of consultants and registrars regarding maternity and paternity leave is summarised.

	% Male consultants (n = 23)	% Female consultants (n = 6)	% Male registrars (n = 17)	% Female registrars (n = 11)
I have taken paternity leave	34.8	N/A	17.6	N/A
I have taken maternity leave	N/A	50	N/A	9.1
Paternity leave is a luxury while training as a general surgeon	26	0	5.9	0
Maternity leave is a luxury while training as a general surgeon	8.7	0	5.9	9.1
The contractually allocated 1–5 days' paternity leave are inadequate	73.9	100	94.1	100
Maternity leave should remain longer than paternity leave	78.3	50	70.6	72.7
I find female registrars and consultants going on maternity leave frustrating	39	0	41.2	45.5

Table 5: Challenges experienced by general surgeons.

CHALLENGE	MALE (n = 40)	FEMALE (n = 17)
Academic demands	13 (32.5%)	8 (47%)
Research demands	26 (65%)	11 (64.7%)
Clinical responsibilities	7 (17.5%)	1 (5.8%)
Effect on personal relationships	13 (32.5%)	10 (58.8%)
Effect on my family	20 (50%)	6 (35.2%)
On-call schedule	11 (27.5%)	6 (35.2%)
Litigation	4 (10%)	1 (5.8%)
Balancing personal and professional life	24 (60%)	9 (52.9%)
Financial reward	13 (32.5%)	1 (5.8%)
Career opportunities in SA	9 (22.5%)	2 (11.7%)
Poor work-life balance	22 (55%)	8 (47%)

Table 6: Student perceptions on challenges faced by general surgeons

CHALLENGE	MALE	FEMALE
Lifestyle during training	13 (72.2%)	28 (68.3%)
Lifestyle after training	6 (33%)	19 (46.3%)
Impact on personal relationships	6 (33%)	19 (46.3%)
Academic demands	6 (33%)	5 (12.2%)
On-call schedule	9 (50%)	15 (37.5%)
Litigation	2 (11%)	6 (14.6%)
Poor work-life balance in general	7 (38.9%)	21 (51.2%)
Career opportunities in SA	0 (0%)	1 (2.4%)
Financial reward	0 (0%)	0 (0%)
Surgery as discipline	2 (11%)	16 (39%)
My gender	0 (0%)	6 (14.6%)

2.6 Acknowledgements

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- Prof Vanessa Burch (Department of Internal Medicine: University of Cape
- Town) Dr. Delva Shamley (University of Cape Town Research Centre)
- Cody Reddy (University of Cape Town Research Centre)

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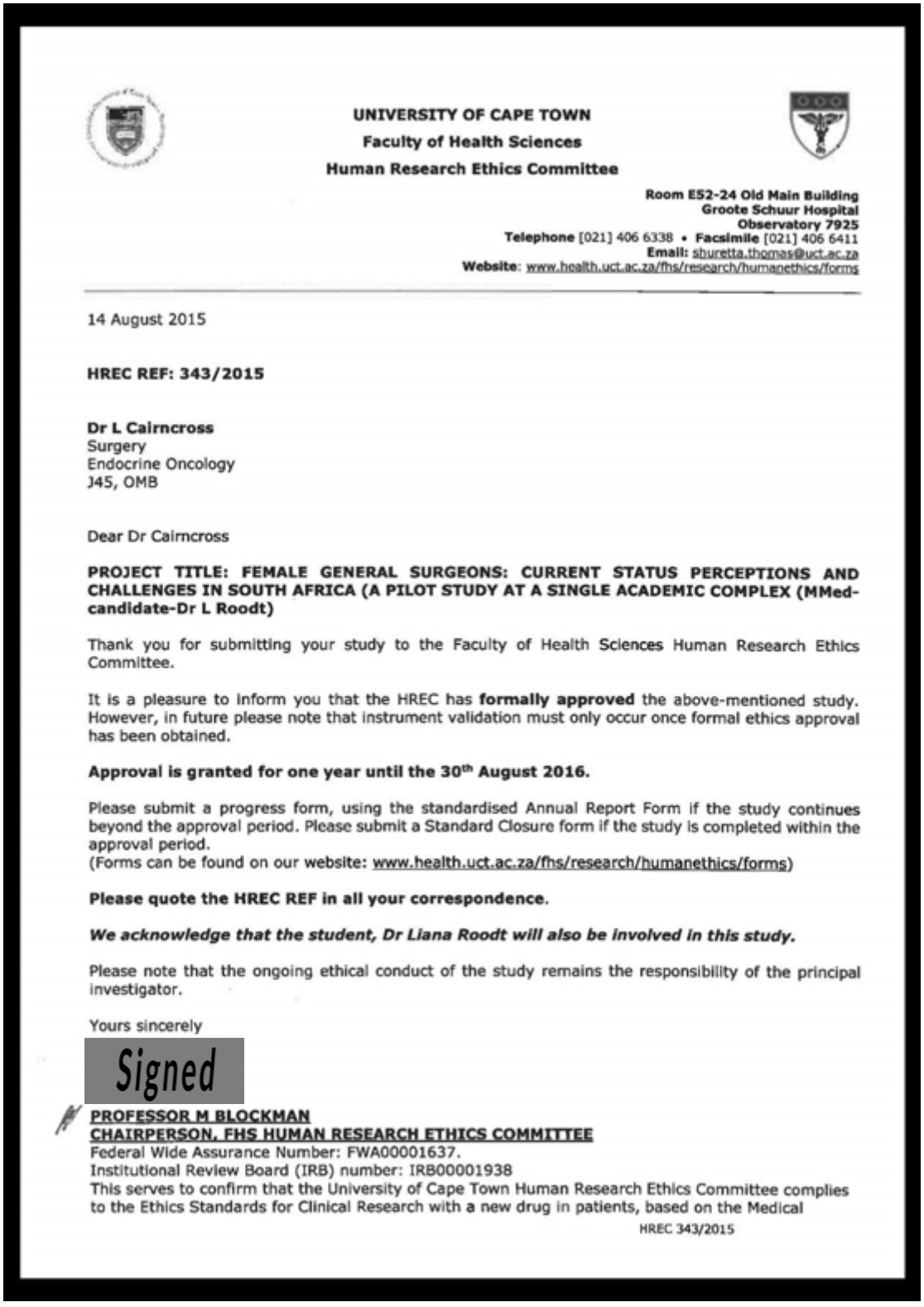
3. STUDY APPROVAL DOCUMENTATION

3.1 Human Research Ethics Committee



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room E52-24 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6338 • **Facsimile** [021] 406 6411
Email: shuretta.thomas@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

14 August 2015

HREC REF: 343/2015

Dr L Cairncross
Surgery
Endocrine Oncology
J45, OMB

Dear Dr Cairncross

PROJECT TITLE: FEMALE GENERAL SURGEONS: CURRENT STATUS PERCEPTIONS AND CHALLENGES IN SOUTH AFRICA (A PILOT STUDY AT A SINGLE ACADEMIC COMPLEX (MMed-candidate-Dr L Roodt)

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study. However, in future please note that instrument validation must only occur once formal ethics approval has been obtained.

Approval is granted for one year until the 30th August 2016.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

Please quote the HREC REF in all your correspondence.

We acknowledge that the student, Dr Liana Roodt will also be involved in this study.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Yours sincerely

Signed

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE
Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938
This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical

HREC 343/2015

3.2 UCT post-graduate administration approval

Dear Dr Roodt

Candidature Approval (RDTLIA001)

Degree	MMed Surgery
Title	Female general surgeons: current status perceptions and challenges in South Africa (A pilot study at a single academic complex)
Department	Surgery
Supervisor	Dr Lydia Cairncross
Ethics Approval	343/2015

I am pleased to advise that the Chair of the Dissertations/Doctoral & Masters Committee has approved your candidature for the above degree on behalf of the Committee. Formal approval was obtained by publication in the Dean's Circular, PG-Med Jan-April 2016.

Yours sincerely

Vuyi Mgoqi

Vuyiseka Mgoqi |Receptionist: PG Academic Administration |Faculty of Health Sciences | University of Cape Town | Room N2.19, Wernher & Beit North, Health Sciences Campus, Anzio Rd, Observatory, 7925 | ☎ + 27 21 406 6751 + 27 21 406 6584 | Office Hours: 08h30 - 16h30 Unavailable Hours: 13h00 - 13h30

3.3 HR 194 access to UCT staff for research purposes

HR194	ACCESS TO UCT STAFF FOR RESEARCH PURPOSES	UNIVERSITY OF CAPE TOWN

RECEIVED
02 SEP 2015
ED: HR OFFICE

NOTES
1. Forms must be downloaded from the UCT website: http://www.uct.ac.za/depts/sapweb/forms/forms.htm
2. This form must be completed by applicants who are requesting to access UCT staff for the purpose of research.
3. A copy of the research proposal as well as the Ethics Committee approval must be attached.
4. It is the **responsibility of the researcher/s to apply for ethical clearance** from the relevant Faculty's Research in Ethics Committee (REC).
5. If you are requesting staff information, you are required to complete the HR Information Request Form (HR190) and submit it together with all the required documentation.
6. The turnaround time for a reply is **approximately 10 working days unless specified as urgent.**
7. Return the completed application form and all the above documentation to Joy Henry via email: joy.henry@uct.ac.za; or deliver to: For the Attention: Executive Director, Human Resources Department, Bremner Building, Room 214, Lower Campus, UCT.

SECTION A: APPLICANT DETAILS

Title	DR	Name	Liana Roodt
Telephone number	0823243694	Email address	lianaroodt@gmail.com
Student number	RDTLIA001	Staff number	54326893
Visiting researcher ID / passport number			
Faculty Officer contact details	Department of General Surgery: Office of Prof D Kahn		
	michelle.ashing@uct.ac.za		
University or institution at which employed or a registered student	University of cape Town		
Faculty or department in which you are registered or work	General Surgery		
Address (if not UCT)			

SECTION B: SUPERVISOR DETAILS

	Title and name	Telephone number	Email address
Supervisor	Dr Lydia Calmcross	0827867014	lydiacalm@gmail.com
Co-Supervisor			

SECTION C: APPLICANT'S FIELD OF STUDY (if applicable) / TITLE OF RESEARCH PROJECT / STUDY

Degree	Mmed		
Research project or title	The impact of gender on status, perceptions about and challenges faced by General Surgeons in South Africa		
Research proposal attached	x Yes	☐ No	
Target population (number of UCT staff)	+/- 80 UCT (SENIOR SCHOOL SURGICAL ACADEMICS (CONSULTANTS & REGISTRARS)		
Amount of time required for an interview and/or questionnaire	20 minutes		
Lead Researcher details	Dr Liana Roodt (lianaroodt@gmail.com)		
Proof of ethical clearance status attached	x☐ Yes	☐ No	

DSA 100: Research access to students

	RESEARCH ACCESS TO STUDENTS	DSA 100

NOTES

1. This form must be FULLY completed by all applicants that want to access UCT students for the purpose of research.
2. Return the fully completed (a) DSA 100 application form by email, in the same word format, together with your: (b) research proposal inclusive of your survey, (c) copy of your ethics approval letter / proof (d) informed consent letter for Moonira.khan@uct.ac.za. You application will be attended to by the Executive Director, Department of Student Affairs (DSA), UCT.
3. The turnaround time for a reply is approximately 10 working days.
4. NB: it is the responsibility of the researcher/s to apply for and to obtain ethics approval and to comply with amendments that may be requested; as well as to obtain approval to access UCT staff and/or UCT students, from the following, at UCT, respectively: (a) Ethics: Chairperson, Faculty Research Ethics Committee* (FREC) for ethics approval, (b) Staff access: Executive Director: HR for approval to access UCT staff, and (c) Student access: Executive Director Student Affairs for approval to access UCT students.
5. Note: UCT Senate Research Protocols requires compliance to the above, even if prior approval has been obtained from any other institution/agency. UCT's research protocol requirements applies to all persons, institutions and agencies from UCT and external to UCT who want to conduct research on human subjects for academic, marketing or service related reasons at UCT.
6. Should approval be granted to access UCT students for this research study, such approval is effective for a period of one year from the date of approval (as stated in Section D of this form), and the approval expires automatically on the last day.
7. The approving authority reserves the right to revoke an approval based on reasonable grounds and/or new information.

SECTION A: RESEARCH APPLICANT/S DETAILS

Position	Staff / Student No	Title and Name	Contact Details (Email / Cell / land line)
A.1 Student Number	RDTLIA001	Dr Liana Roodt	lianaroodt@gmail.com
A.2 Academic / PASS Staff No.			
A.3 Visitor/ Researcher ID No.			
A.4 University at which a student or employee	University of Cape Town	Address if *not* UCT:	
A.5 Faculty/ Department/School	Faculty of Health Sciences – Department of General Surgery		
A.6 APPLICANTS DETAILS If different from above	Title and Name	Tel.	Email

SECTION B: RESEARCHER/S SUPERVISOR/S DETAILS

Position	Title and Name	Tel.	Email
B.1 Supervisor	Dr Lydia Cairncross	082 786 7014	lydiacairn@gmail.com
B.2 Co-Supervisor/s	Dr Ines Buccimazza		ines.buccimazza@gmail.com

SECTION C: APPLICANT'S RESEARCH STUDY FIELD AND APPROVAL STATUS

C.1 Degree – if applicable	Mmed
C.2 Research Project Title	Female General Surgeons: current status, perceptions and challenges in South Africa. A pilot study at a single academic complex.
C.3 Research Proposal	Attached: Yes [x] No [ ]
C.4 Target population	6th Year medical students, surgical registrars and surgical consultants
C.5 Lead Researcher details	If different from applicant:
C6. Will use research assistant/s	Yes [ ] No [x] If yes, provide a list of names, contact details and ID no.
C.7 Research Methodology and Informed consent:	Research methodology: Observational survey Informed consent: will be obtained, participation is voluntary and confidentiality is assured.
C.8 Ethics clearance status from UCT's Faculty Ethics Research Committee (FREC)	Approved by the FREC Yes [x] With amendments: Yes [ ] No [ ] (a) Attach copy of your ethics approval. Attached: Yes (b) State date and reference no. of ethics approval: Date: 14/08/2015 Ref. No.: HREC343/2015

SECTION D: APPLICANT/S APPROVAL STATUS FOR ACCESS TO STUDENTS FOR RESEARCH PURPOSE

(To be completed by the ED, DSA or Nominee)

	Approved / With Terms / Not	* Conditional approval with terms	Applicant/s Ref. No.:
D.1 APPROVAL STATUS	(i) Yes [x] (ii) With terms (iii) No	(a) Access to students for this research study must only be undertaken after written ethics approval has been obtained. (b) In event any ethics conditions are attached, these must be complied with before access to students.	RDTLIA001/Dr Liana Roodt

D.2 APPROVED BY:	Designation	Name	Signature	Date of Approval
	Executive Director Department of Student Affairs	*Dr Moonira Khan*	Signed	*31 August 2015*

4. APPENDICES

4.1 Study participant information sheet

INFORMATION SHEET FOR POTENTIAL PARTICIPANTS: GENERAL SURGERY SURVEY SOUTH AFRICA

Thank you for considering completing this survey
- It should only take 10-15 minutes of your time

IMPORTANT NOTICE:

Thank you for considering to complete this survey
- It should only take 10-15 minutes of your time

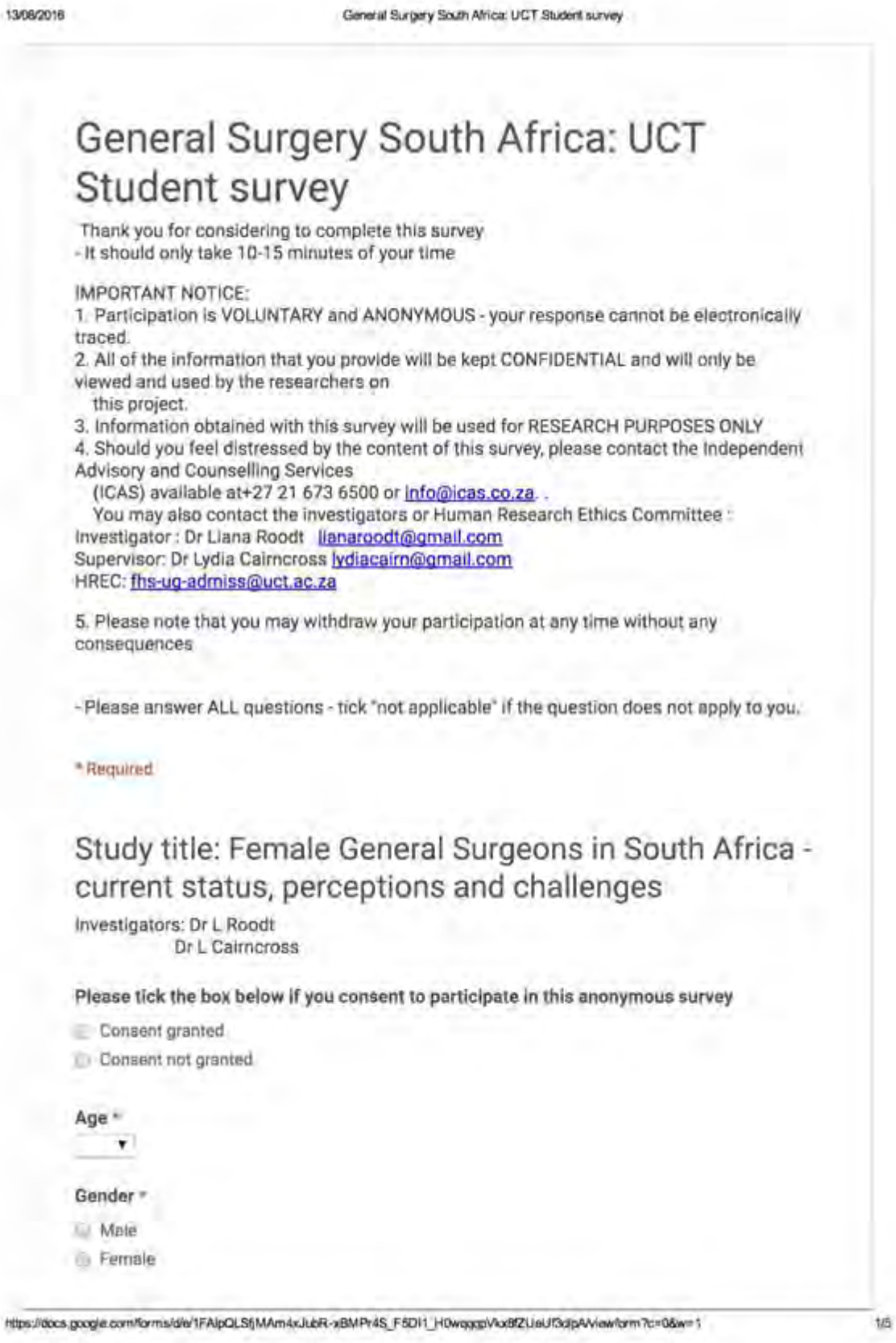
1. Participation is VOLUNTARY and ANONYMOUS - your response cannot be electronically traced.
2. All of the information that you provide will be kept CONFIDENTIAL and will only be viewed and used by the researchers on this project.
3. Information obtained with this survey will be used for RESEARCH PURPOSES ONLY
4. Should you feel distressed by the content of this survey, please contact the Independent Advisory and Counselling Services (ICAS) available at+27 21 673 6500 or info@icas.co.za. .
   You may also contact the investigators or Human Research Ethics Committee :
   Investigator : Dr Liana Roodt lianaroodt@gmail.com
   Supervisor: Dr Lydia Cairncross lydiacairn@gmail.com
   HREC: fhs-ug-admiss@uct.ac.za

5. Please note that you may withdraw your participation at any time without any consequences

- Please answer ALL questions - tick "not applicable" if the question does not apply to you.

If you understand the above information you can consent to participate in this study by clicking on "consent granted" at the start of the questionnaire. If you do not want to participate, click on "consent not granted" and exit the survey.

4.2 Student survey



13/08/2016 General Surgery South Africa: UCT Student survey

General Surgery South Africa: UCT Student survey

Thank you for considering to complete this survey
- It should only take 10-15 minutes of your time

IMPORTANT NOTICE:
1. Participation is VOLUNTARY and ANONYMOUS - your response cannot be electronically traced.
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3. Information obtained with this survey will be used for RESEARCH PURPOSES ONLY
4. Should you feel distressed by the content of this survey, please contact the Independent Advisory and Counselling Services (ICAS) available at+27 21 673 6500 or Info@icas.co.za. .
You may also contact the investigators or Human Research Ethics Committee :
Investigator : Dr Liana Roodt lianaroodt@gmail.com
Supervisor: Dr Lydia Cairncross lydiacairn@gmail.com
HREC: fhs-ug-admiss@uct.ac.za

5. Please note that you may withdraw your participation at any time without any consequences

- Please answer ALL questions - tick "not applicable" if the question does not apply to you.

* Required

Study title: Female General Surgeons in South Africa - current status, perceptions and challenges

Investigators: Dr L Roodt
Dr L Cairncross

Please tick the box below if you consent to participate in this anonymous survey

- Consent granted
- Consent not granted

Age *

Gender *

- Male
- Female

https://docs.google.com/forms/d/e/1FAIpQLSfjMAm4xJubR-xBMPr4S_F5DI1_H0wqqqpVkxBfZUaUf3dpA/viewform?c=0&w=1 1/5

I have enjoyed my general surgery blocks *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I am very interested in a career in general surgery *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

After my exposure to general surgery, I think it is a good career choice *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I experienced general surgeons as happy with their career choice *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think general surgery is a poor career choice for a man *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think general surgery is a poor career choice for a woman *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think it is difficult being a general surgeon regardless of your gender *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think men are generally more suited for a career in general surgery *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I find female surgeons more assertive, aggressive and decisive than women in other specialties eg paediatrics/ medicine

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I find male surgeons more assertive, aggressive and decisive than men in other specialties eg paediatrics/ medicine

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think female surgeons are expected to act different than women in other specialties e.g be tough, be "one of the boys"

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think male surgeons are expected to behave differently than men in other specialties e.g "tough", "one of the boys"

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think male general surgeons make good role models *

- ○ Strongly disagree
- ○ Strongly agree

I think female general surgeons are good role models *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I found it very easy to work with and learn from female general surgeons *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I find it easy to work with and learn from male general surgeons *

1 2 3 4 5

It is my impression that female surgeons face more challenges than male surgeons in terms of career advancement

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

It is my impression that male surgeons face more challenges than female surgeons in terms of career advancement *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

It is my impression that female surgeons face more challenges than male surgeons when it comes to work/life balance

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

It is my impression that male surgeons face more challenges than female surgeons when it comes to work/life balance *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think of general surgery as a career that is traditionally thought to be more appropriate for men ("an old boys club") *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I like surgery but think it is unlikely that I will choose it as a career given my experience of general surgeons *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Reasons that will prevent me from choosing general surgery as a career include *

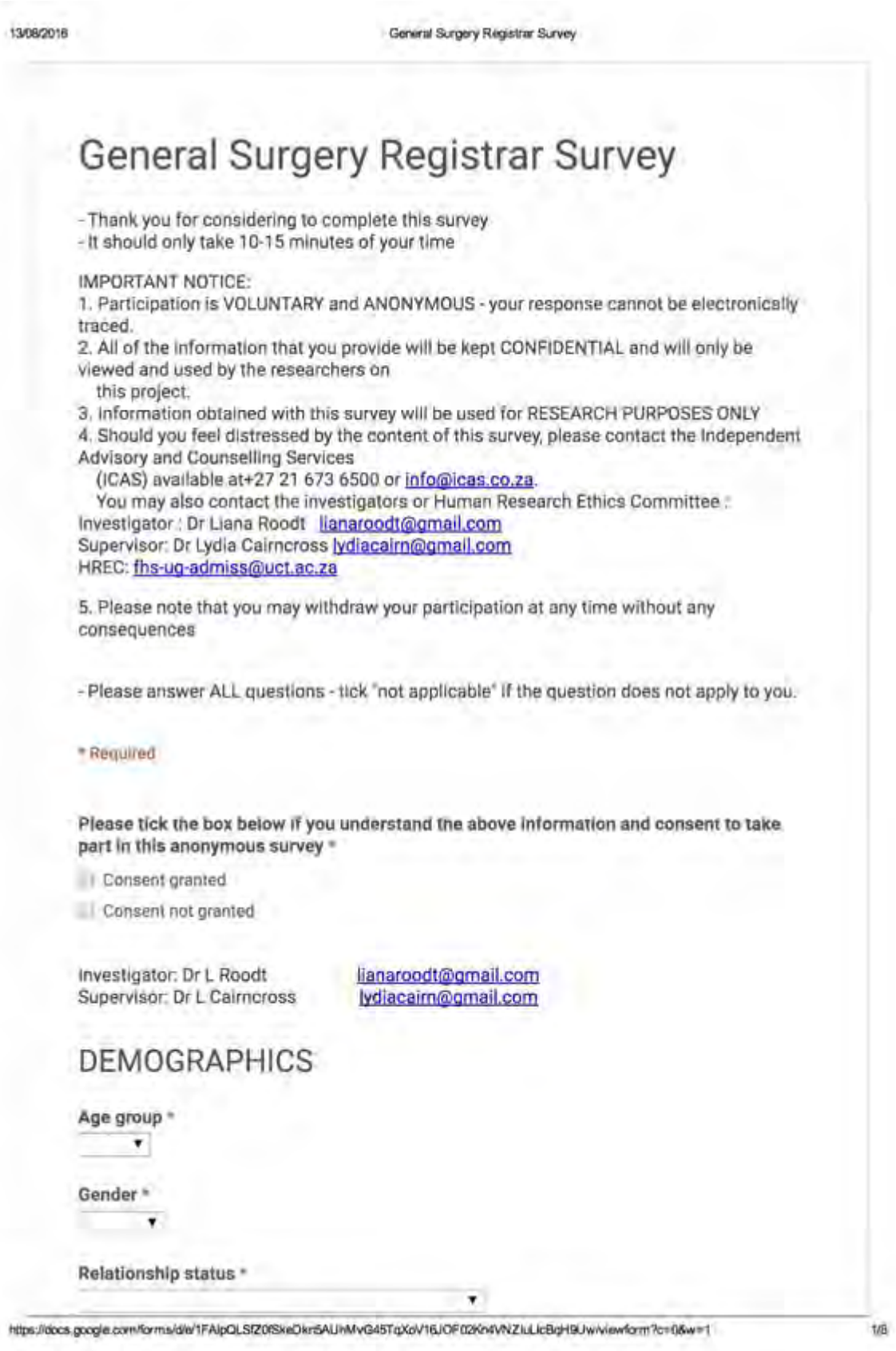
Please choose as many options as you like

- ☐ Lifestyle during training

- [ ] Lifestyle after training
- [ ] Impact on personal relationships
- [ ] Academic demands
- [ ] On call schedule
- [ ] Risk of being sued (litigation)
- [ ] Poor work/life balance in general
- [ ] Career opportunities in South Africa
- [ ] Financial reward
- [ ] Surgery as a discipline eg operating, the pathology etc.
- [ ] My gender

Submit

4.3 Registrar survey



13/08/2016 General Surgery Registrar Survey

General Surgery Registrar Survey

- Thank you for considering to complete this survey
- It should only take 10-15 minutes of your time

IMPORTANT NOTICE:
1. Participation is VOLUNTARY and ANONYMOUS - your response cannot be electronically traced.
2. All of the information that you provide will be kept CONFIDENTIAL and will only be viewed and used by the researchers on this project.
3. Information obtained with this survey will be used for RESEARCH PURPOSES ONLY
4. Should you feel distressed by the content of this survey, please contact the Independent Advisory and Counselling Services (ICAS) available at+27 21 673 6500 or info@icas.co.za.
You may also contact the investigators or Human Research Ethics Committee :
Investigator : Dr Liana Roodt lianaroodt@gmail.com
Supervisor: Dr Lydia Cairncross lydiacairn@gmail.com
HREC: fhs-ug-admiss@uct.ac.za

5. Please note that you may withdraw your participation at any time without any consequences

- Please answer ALL questions - tick "not applicable" if the question does not apply to you.

* Required

Please tick the box below if you understand the above information and consent to take part in this anonymous survey *

- Consent granted
- Consent not granted

Investigator: Dr L Roodt lianaroodt@gmail.com
Supervisor: Dr L Cairncross lydiacairn@gmail.com

DEMOGRAPHICS

Age group *

Gender *

Relationship status *

https://docs.google.com/forms/d/e/1FAIpQLSfZ0fSkeOkr5AUhMvG45TqXoV16JOF02Kn4VNZIuLlcBgH9Uw/viewform?c=0&w=1 1/8

Do you have children? *

CAREER PATH

When did you complete your undergraduate studies? *

yyyy/mm/dd

When did you start your registrar training? *

yyyy/mm/dd

When do plan to complete your registrar training? *

yyyy/mm/dd

Once your FCS training is completed, you intend to: *

Please the choose the option that best describes your intention. Rural practice refers to any practice outside of a large metropole.

If you intend to sub-specialise, please indicate your area of interest *

Do you have any other post graduate degrees? *

How many research publications do you have? *

If you had access to a surgical mentorship program, you would prefer *

GENERAL PERCEPTIONS

I find the current number of female general surgery registrars concerning *

I think women, in general, make excellent surgeons *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think men, in general, make excellent surgeons *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think having a lot of female surgeons complicates the day-to-day functioning of a surgical department *
(E.g division of tasks, meeting schedules, on call schedules)

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think female surgeons generally portray a lot of masculine qualities *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

It is difficult to work under a female surgeon as a team leader *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I trust and respect the opinion of senior female surgeons as much as I trust and respect those of senior male surgeons *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

In general, I find female colleagues to be more anxious than male colleagues *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think my female colleagues are technically as good as their male counterparts in the operating theatre *

1	2	3	4	5
○	○	○	○	○

I find working with female surgical colleagues easy *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Nursing staff respects female surgeons as much as they respect male surgeons *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

In general, I find female colleagues to be calmer than male colleagues *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think women currently have an unfair advantage over men to get appointed in general surgery training posts purely because of their gender *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think men are generally better suited for a career in general surgery *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

When conflict about long working hours and on call schedules arise, it is my impression that *

- ○ Women find it harder to keep up
- ○ Men find it harder to keep up
- ○ Gender is irrelevant, it is individual personalities

I think my gender is irrelevant to my career advancement

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think men and women face equal challenges in carving out a successful career in general surgery *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Perceived challenges and solutions

Have you taken any paternity leave during your registrar training? *

▼

If yes (you have taken paternity leave), please indicate the maximum period of leave you have taken *

- 1- 3 days
- One week
- More than 1 week but less than 1 month
- More than 1 month
- Not applicable

Do you think contractual maternity and paternity leave should be of equal length? *

- Yes
- No - maternity leave should remain longer than paternity leave
- No - paternity leave should be longer than maternity leave

Do you think the contractually allocated 3-5 days of paternity leave are adequate? *

- Yes
- No

Do you think paternity leave should be non-negotiable or do you think it is a luxury while training as a general surgeon? *

▼

Have you taken maternity leave during your registrar training? *

▼

If yes (you have taken maternity leave), please indicate the period of time per pregnancy *

- The legally prescibed 4 months
- Less than 4 months
- More than 4 months
- Not applicable

Do you think maternity leave during surgical registrar training is non-negotiable or a luxury? *

▼

I find female colleagues going on maternity leave frustrating *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

When a fellow registrar goes on maternity leave it does not affect me at all *

Please tick the option that best describe your experience

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

When a fellow registrar goes on maternity leave, hospital administration and senior surgical staff plan sufficiently to compensate for her absence *

	1	2	3	4	5	
Strongly strongly disagree	○	○	○	○	○	Strongly agree

I sometimes feel that trainees that are married or have children have certain advantages over single trainees when it comes to work hours, leave allocation and flexibility *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Have you experienced any difficulties/ resistance from your department and/or colleagues when you needed to request time off for family responsibilities? *

	1	2	3	4	5	
I have experienced no difficulties or resistance at all	○	○	○	○	○	It was very difficult and I experienced a lot of resistance

I think people should wait to start with their families until after their training regardless of gender *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I do not think men should have children during their surgical training *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I do not think women should have children during their surgical training *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

If it was an option, I would strongly consider job sharing while completing my training over a extended period of time *

JOB SHARING = work hours and remuneration shared between two individuals over an extended

training period

	1	2	3	4	5	
Yes, definitely	○	○	○	○	○	No, not at all

Being a surgical registar has placed significant strain on my partner/ family *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Being a surgical registrar has significantly limited my involvement in other activities e.g. recreational sport, hobbies and community involvement *

	1	2	3	4	5	
Strongly agree	○	○	○	○	○	Strongly disagree

I think general surgery is a difficult lifestyle choice for both males and females *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I am often concerned that my personal life is negatively affected by my career choice *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think the lifestyle demands of surgical training affects females more than males *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

The most challenging aspects of my training as a general surgeon are: *

Please choose any number of options that you feel most applicable options

- ☐ Academic demands
- ☐ Research demands
- ☐ Clinical responsibilities
- ☐ Mastering technical skills
- ☐ The effect it has on my personal relationships
- ☐ The effect it has on my family
- ☐ My on-call schedule

- [ ] Balancing my personal and professional life
- [ ] Financial reward
- [ ] Litigation
- [ ] Poor work/life balance
- [ ] Career opportunities in South Africa

Given the option, I would choose to specialise in general surgery again *

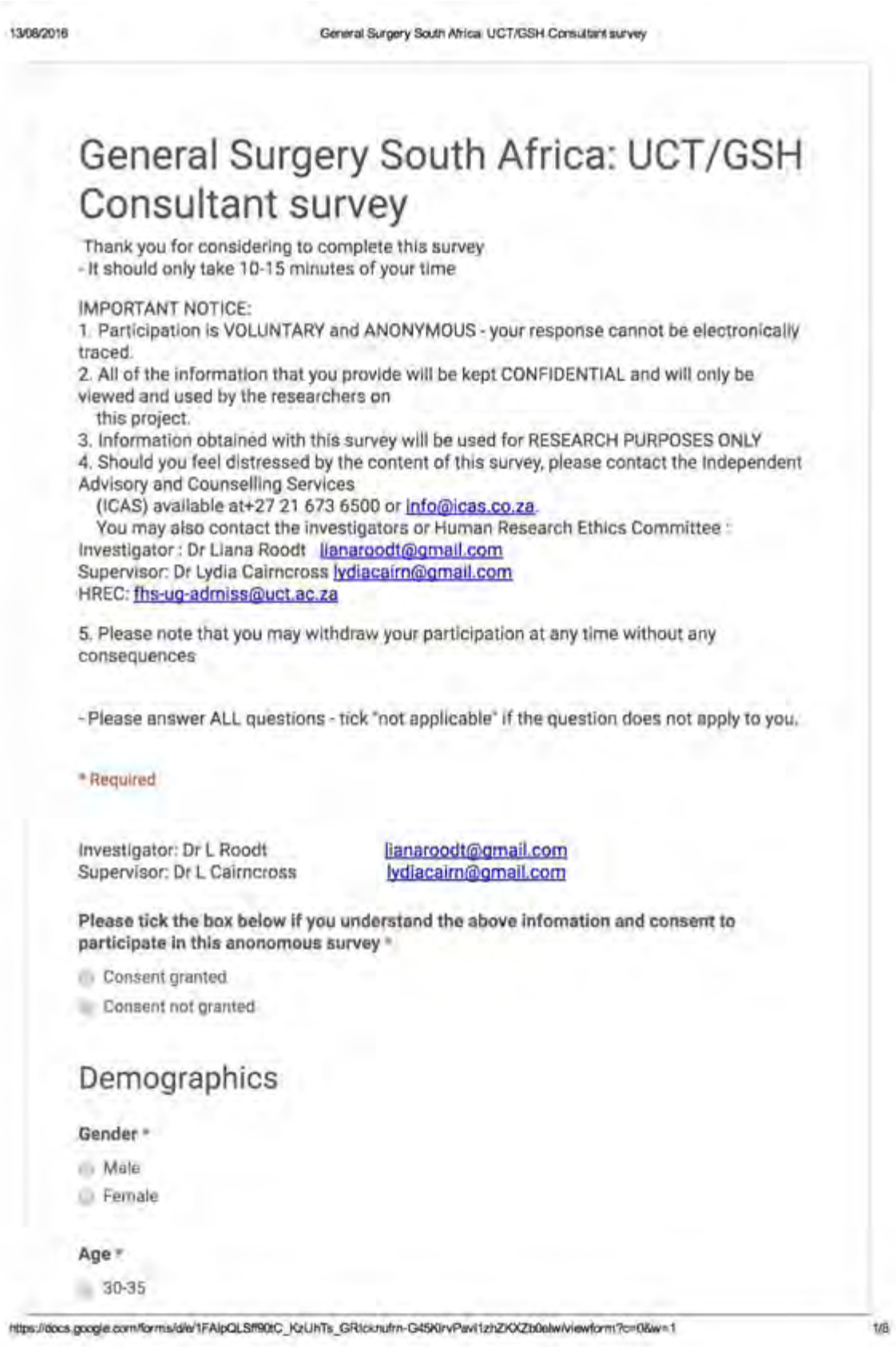
	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I am satisfied with my career choice *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

Submit

4.4 Consultant survey



13/08/2016 General Surgery South Africa: UCT/GSH Consultant survey

General Surgery South Africa: UCT/GSH Consultant survey

Thank you for considering to complete this survey
- It should only take 10-15 minutes of your time

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2. All of the information that you provide will be kept CONFIDENTIAL and will only be viewed and used by the researchers on this project.
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Investigator : Dr Liana Roodt lianaroodt@gmail.com
Supervisor: Dr Lydia Cairncross lydiacairn@gmail.com
HREC: fhs-ug-admiss@uct.ac.za

5. Please note that you may withdraw your participation at any time without any consequences

- Please answer ALL questions - tick "not applicable" if the question does not apply to you.

* Required

Investigator: Dr L Roodt lianaroodt@gmail.com
Supervisor: Dr L Cairncross lydiacairn@gmail.com

Please tick the box below if you understand the above infomation and consent to participate in this anonomous survey *

- Consent granted
- Consent not granted

Demographics

Gender *

- Male
- Female

Age *

- 30-35

https://docs.google.com/forms/d/e/1FAIpQLSff90tC_KzUhTs_GRtcknufrn-G45KlrvPavl1zhZKXZb0elw/viewform?c=0&w=1 1/8

- 36-40
- 41-45
- 46-50
- 51-55
- 56-60
- >60

Relationship status *

- Single
- Married
- Committed partership
- Divorced - remarried
- Divorced - single
- Divorced - committed partnership

Do you have children? *

- Yes
- No

Career path

When did you complete your post graduate studies? *

yyyy/mm/dd

The focus of your surgical practice currently is *

How many research publications do you have? *

Please indicate if you have fulfilled any of the following roles *

- Head of firm
- Senior consultant
- Served on editorial board of any medical publications
- Any other recognised leadership position within your institution
- Post graduate research supervisor

General Perceptions

I find the current number of female general surgical registrars concerning *

I think having more female surgeons complicates the day-to-day functioning of a surgical

department *

E.g distribution of tasks, meeting times, on call schedules

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think men are generally better suited than women for a career in general surgery *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think women are generally better suited for a career in general surgery than men *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think female surgeons generally portray a lot of masculine qualities *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I find working with female general surgery collegues and trainees easy *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

It is difficult to work under a female surgeon as team leader *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think female surgeons are technically as good as their male counterparts in theatre *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think women currently have an unfair advantage over men to get appointed in general surgery training posts purely because of their gender *

	1	2	3	4	5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

I think men currently have an unfair advantage over women to get appointed in a general surgery training post *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

I find training female general surgeons more challenging than training male general surgeons *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

When conflict about long working hours and on call schedules arise is is my perception that *

- ○ Women find it harder to keep up
- ○ Men find it harder to keep up
- ○ Gender is irrelevant

I think my gender is irrelevant in my career advancement *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

I think men and women face the same challenges in carving out a successful career in general surgery *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

I think gender is irrelevant when it comes to choosing a career in general surgery *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

Perceived challenges and solutions

Have you ever taken paternity leave *

- ○ Yes, once

- Yes, more than once
- No
- Not applicable

If yes (you have taken paternity leave) indicate the maximum time you have ever taken *

- 1-3 days
- 1 Week
- More than one week but less than one month
- More than one month
- Not applicable

Do you think the contractually allocated paternity leave of 1-5 days are adequate? *

- Yes
- No

Do you think paternity leave should be non-negotiable (a must) or do you think it is a luxury while training as a general surgeon? *

- It is a luxury
- It is non-negotiable - a must

In terms of the length of contractually allocated maternity and paternity leave, you think *

- Maternity and paternity leave should be of equal lenght
- Maternity leave should remain longer than paternity leave
- Paternity leave should be longer than maternity leave

Have you ever taken maternity leave? *

- Yes, once
- Yes, more than once
- No
- Not applicable

If yes (you have taken maternity leave) indicate the maximum period *

- The legally prescribed 4 months
- More than 4 months
- Less than 4 months
- Not applicable

Do you think maternity leave should be non-negotiable (a must) or do you think it is a luxury while training as a general surgeon? *

- It is a luxury
- It is non-negotiable - a must

I find female general surgical consultants and registrars going on maternity leave

frustrating *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I think people should wait to start with their families until after their training regardless of gender *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I find myself more sympathetic to female registrars than male registrars when it comes to family responsibilities *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

I am concerned that job sharing during training will compromise general surgery training *

JOB SHARING = hours of work and remuneration shared between two employees over an extended training period

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

With regards to indépendant general surgery practice, it is my impression that *

- ○ Women are more likely to choose this as a career option
- ○ Men are more likely to choose this as a career option
- ○ Gender is irrelevant

With regards to sub- specialisation, it is my impression that *

- ○ Women are more likely to choose this as a career option
- ○ Men are more likely to choose this as a career option
- ○ Gender is irrelevant

I think that training as many female as male general surgeons will ultimately lead to a shortage of general surgery services *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

My career as a general surgeon has placed significant strain on my partner/ family *

	1	2	3	4	5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

My career in general surgery has significantly limited my involvement in other activities e.g. recreational sport, hobbies, community involvement etc *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

I think the lifestyle demands of surgical training affects females more than males *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

In think general surgery is a difficult life style choice for both males and females *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

The most challenging aspects in my career as general surgeon thus far has been *

Please choose all the options most applicable options

- ☐ Academic responsibilities
- ☐ Research responsibilities
- ☐ Clinical responsibilities
- ☐ The effect it has on my personal relationships
- ☐ The effect it has on my family
- ☐ My on-call schedule
- ☐ Litigation
- ☐ Balancing my personal and professional life
- ☐ Financial reward
- ☐ Career opportunities in South Africa
- ☐ Poor work/life balance

Given the option, I would choose to specialise in general surgery again *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

I am satisfied with my career choice *

1 2 3 4 5

Strongly disagree ○ ○ ○ ○ ○ Strongly agree

Submit

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4.5 Author guidelines for submission: World Journal of Surgery

WORLD JOURNAL OF SURGERY INSTRUCTIONS FOR AUTHORS

GENERAL

World Journal of Surgery (*WJS*) publishes original articles that offer significant contributions to knowledge in the broad fields of clinical surgery, innovative developments in surgery, global surgical practice and economics, surgical education, rural surgery and surgical history. *WJS* welcomes predominantly human research, including clinical research, outcomes, and health service research. Laboratory research will be published only if it is highly significant and with clear and immediate translational potential to surgical care. *WJS* has an international circulation and is designed to serve as a medium for rapid dissemination of new and important information about the science and art of surgery throughout the world. In the interests of a wide international readership, use of the English language is required. Articles that are accepted for publication are done so with the understanding that they, or their substantive contents, have not been and will not be submitted to any other publication.

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- Invited Scientific Review
- Invited Symposium Papers
- Reply to Letter to the Editor
- Invited Commentary
- Surgical History

MANUSCRIPT SUBMISSION GUIDELINES AND REQUIREMENTS

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MANUSCRIPT PREPARATION AND ORGANIZATION

General instructions:

- Use a normal, plain font (e.g., 10-12 point Times Roman or Arial) for text
- Double-space the text
- Use italics for emphasis
- Use the automatic page numbering function to number the pages
- Do not use field functions
- Use tab stops or other commands for indents, not the space bar
- Use the table function, not spreadsheets, to make tables

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- **DO NOT** use all capital letters for a heading; use initial caps instead.
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- **DO NOT** use carriage returns at the end of each line of text (use the word wrap feature).

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- A concise and informative title

- The name(s) of the author(s) including the affiliation(s) and address(es) of each author. The complete name and address of the author to whom correspondence should be sent, as well as his/her phone number, fax number, and email address.
- A short title for use as a running head.
- Keywords: 2-3 keywords relevant to the manuscript
- Trial registration number for randomized clinical trials (see "Types of Manuscripts: Original Scientific Reports" above)
- Grant support for the research reported
- Potential and real conflicts of interest
- Manuscript word count

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1. Introduction: conveys the background and purpose of the report
2. Material and Methods
3. Results & Discussion

When required by the nature of the report, manuscripts that do not follow this specific format may be accepted.

ACKNOWLEDGEMENTS: A brief statement should acknowledge individuals, other than authors, who were of direct help in the reported work or if the work was supported by a federal or commercial grant. All acknowledged persons should give their written consent to being named in the manuscript. This consent is to be uploaded upon manuscript submission.

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1. Honda T, Nozaki M, Isono N, et al (2001) Endoscope-assisted facial fracture repair. World J Surg 25:1075-1083

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2. Jones MC, Smith RB, Treatment of gastric cancer (1976) In: Ford TL (ed) Cancer of the Digestive System, Springer-Verlag, Berlin, p. 140-154

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- Save and name your figure files with "Fig" and the figure number (e.g., Fig1.eps)

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CONSENSUS STATEMENT ON SUBMISSION AND PUBLICATION OF MANUSCRIPTS

(Published in the June 2001 issue of *World Journal of Surgery*, page A7)

Increasing problems of duplicate and fraudulent submissions and publications have prompted the editors of surgical journals, including *World Journal of Surgery*, to support these overall principles of publication:

Duplicate Submission and Publication

In general, if a manuscript has been peer-reviewed and published, any subsequent publication is duplication. Exceptions to this general rule may be:

a) Prior publication in meeting program abstract booklets or expanded abstracts such as those published by the Surgical Forum of the American College of Surgeons or Transplantation Proceedings. However, these must be referenced in the final manuscript.

b) A manuscript which extends an original database (a good rule might be expansion by 50% or more) or which analyzes the original database in a different way in order to prove or disprove a different hypothesis. Previous manuscripts reporting the original database must, however, be referenced.

c) Manuscripts which have been published originally in non-English language journals, provided that the prior publication is clearly indicated on the English language submission and referenced in the manuscript. In some circumstances, permission to publish may need to be obtained from the non- English language journal.

For example, any submission duplicating material previously published in full in "Proceedings" or book chapters is considered duplicate unless the exceptions in (a) above apply. Similarly, manuscripts dealing with subgroups of data (i.e., patients) that have previously been analyzed, discussed and published as a larger group are considered duplicate unless (b) above applies.

The Internet raises special concerns. If data have previously appeared on the Internet, submission of those data for publication is considered duplication. If Internet publication follows journal publication, the journal publication should be clearly referenced. Some journals may provide early Internet publication of accepted peer reviewed papers which are subsequently published in that journal. This does not constitute duplication if both manuscripts are identical and covered by the same single copyright.

Fraudulent Publication

The following activities are examples of fraudulent publication practices:

a) Willful and knowing submissions of false data for publication.
b) Submission of data from sources not the author's (or authors') own.
c) Falsely certifying that the submitted work is original and has not been submitted to, or accepted by, another journal.
d) Sponsoring or vouching for a manuscript containing data over which the sponsor has no control or knowledge.
e) Allowing one's name to appear as an author without having contributed significantly to the study.
f) Adding an author's name to a manuscript to which he/she has not contributed, or reviewed or agreed to in its current form.
g) Flagrant omission of reference to the work of other investigators which established their priority.
h) Falsification of any item on the copyright form.
i) Failure to disclose potential conflict of interest with a sponsoring agency.

While not intended as an all-inclusive document, these examples and guidelines should alert authors to potential problems that should be avoided when they are considering submission of a manuscript to a peer-reviewed journal.

Surgery Journal Editors Group Consensus Statement on the Adoption of the COPE Guidelines

We, the undersigned member journals of the Surgery Journal Editors Group (SJEG), in the furtherance of integrity in surgical and scientific publication, agree to adopt the guidelines established by the Committee on Publication Ethics (COPE)[1]. The COPE guidelines represent a means of addressing a variety of ethical concerns, including duplicate publication and authorship misconduct issues, which have, unfortunately, become more prevalent.

This statement is being simultaneously published in the respective journals of the members of the Surgery Journal Editors Group, as follows:

American Journal of Surgery
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Annals of Surgery
Layton F Rikkers, MD, Keith D Lillemoe, MD
Annals of Surgical Oncology
Charles M Balch, MD
Annals of Thoracic Surgery
L Henry Edmunds Jr, MD
Archives of Surgery
Julie Freischlag, MD
BJS
Derek Alderson, MD, Jonothan J Earnshaw, MD
Burns
Steven E Wolf, MD
Canadian Journal of Surgery
Edward J Harvey, MD, Garth L Warnock, MD
Der Chirurg
JR Siewert, MD
Digestive Surgery
Markus W Büchler, MD, John P Neoptolemos, MD
Diseases of the Colon and Rectum
Robert D Madoff, MD
ePlasty
Stephen M Milner, MD
Female Pelvic Medicine & Reconstructive Surgery
Alfred E Bent, MD
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Journal of Laparoendoscopic & Advanced Surgical Techniques, C Daniel Smith, MD
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Harvey J Sugerman, MD
Surgical Endoscopy
Alfred Cuschieri, MD, Mark Talamini, MD
Surgical Innovation
Adrian Park, MD, Lee Swanstrom, MD
Surgical Laparoscopy, Endoscopy & Percutaneous Techniques,
Maurice E Arregui, MD, Carol Scott-Conner, MD, PhD

The American Surgeon
J David Richardson, MD
World Journal of Surgery

John G Hunter, MD
Zentralblatt für Chirurgie
Hans Lippert, MD, Ulrich Hopt, MD, Karl-Walter Jauch, MD

[1]*COPE Committee on Publication Ethics. http://publicationethics.org/guidelines*

CONSENSUS STATEMENT ON SURGERY JOURNAL AUTHORSHIP – 2006

In the majority of clinical and research studies submitted to surgery journals for possible publication, many individuals participate in the conception, execution, and documentation of each of those works. However, recognition of work in the form of authorship has varied widely. This consensus statement is being issued to clarify and define the criteria for surgical journal authorship.

The following guidelines should be used to identify individuals whose work qualifies them as authors as distinct from those who are contributors to the work under consideration. All persons designated as authors should qualify for authorship, and all those who qualify should be so credited.

A. Authorship Criteria
Individuals claiming authorship should meet all of the following 3 conditions:

1. Authors make substantial contributions to conception and design, and/or acquisition of data, and/or analysis and interpretation of data;
2. Authors participate in drafting the article or revising it critically for important intellectual content; and
3. Authors give final approval of the version to be submitted and any revised version to be published.

Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. Allowing one's name to appear as an author without having contributed significantly to the study or adding the name of an individual who has not contributed or who has not agreed to the work in its current form is considered a breach of appropriate authorship.

Acquisition of funding, collection of data, contributing cases, or general supervision of the research group, of itself, or just being the Chair of the department does not justify authorship if the above criteria are not fulfilled.

B. Order of Authors
The order of authorship on the byline should be a joint decision of the co-authors. Authors should be prepared to explain the order in which authors are listed.

C. Multi-Center Studies
When a large, multi-center group has conducted the work, the group should identify the individuals who accept direct responsibility for the manuscript. These individuals should fully meet the criteria for authorship defined above and editors will ask these individuals to complete journal-specific author and conflict of interest disclosure forms. When submitting a group-author manuscript, the corresponding author should clearly indicate the preferred citation and should clearly identify all individual authors as well as the group name.

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All contributors who do not meet the criteria for authorship should be listed in an acknowledgments section. Examples of those who might be acknowledged include: individuals who allowed their clinical experience (i.e., cases) to be included, a person who provided purely technical help, writing assistance, or a department Chair who provided only general support. Financial and material support should also be acknowledged.

Groups of persons who have contributed materially to the paper but whose contributions do not justify authorship may be listed under a heading such as "clinical investigators" or "participating investigators," and their function or contribution should be described - for example, "served as scientific advisors," "critically reviewed the study proposal," "collected data," or "provided and cared for study patients."

Because readers may infer their endorsement of the data and conclusions, all persons listed as contributors must give written permission to be acknowledged.

E. In Conclusion

This consensus statement is intended as a basic guide for authors. In the interest of promoting the highest ethics in surgical publishing and the surgical sciences, we ask that authors take these criteria into careful consideration when submitting a manuscript to a peer-reviewed surgical journal. This statement is being simultaneously published in the respective journals of the members of the Surgical Journal Editors Group, as follows:

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The American Surgeon
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Garth L. Warnock, MD, James P. Waddell, MD
Current Surgery
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Digestive Surgery
Markus Büchler, MD, John Neoptolemos, MD
Diseases of the Colon & Rectum
Victor Fazio, MD
Journal of the American College of Surgeons
Timothy J. Eberlein, MD
Journal of Burn Care and Research
Richard Gamelli, MD
Journal of Gastrointestinal Surgery
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Journal of the Japan Medical Surgical Assoc
Yasuo Idezuki, MD
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