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Renal, Bladder and Prostate Cancer surgery outcomes with respect to Team Familiarity

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Abstract (298/300 words)

Objectives

Improvements in surgical outcomes have been achieved through centralisation, robotic surgery and enhanced recovery. Little attention has been paid to team membership and familiarity. In sport and industry, greater familiarity improves efficiency but can hamper innovation. We investigate outcomes in urological oncology according to team familiarity.

Subjects/patients

We assessed peri-operative times, length of stays and re-admission rates in all patients undergoing surgery for prostate, bladder and kidney cancer at Sheffield Teaching Hospitals from 2021 to September 2024. We analysed with respect to staff pairs and a validated Familiarity Score (FS) derived using 7 team members.

Results

In total, 1,043 patients, 319 staff members and 3,791 staff combinations were included. Mean FS was 14.2 (st. dev. 7.2) for all cases, and 13.7 (st. dev. 7.3), 9.3 (st. dev. 4.1) and 16.7 (st. dev. 7.1) for Renal, Bladder and Prostate surgeries (ANOVA $p<0.001$), respectively. Teams with higher familiarity had shorter times for all peri-operative intervals (ANOVA $p<0.041$), shorter lengths of stays (1.94 vs. 5.3 days, ANOVA $p<0.001$) and fewer readmissions within 30 days (4.1% vs. 8.0%, Chi sq. $p=0.01$). Greater familiarity led to savings of 26.2 mins, 44.2 mins and 12.8 mins for Renal, Bladder and Prostate surgeries, respectively. In multiple regression, using pre-operative features, greater familiarity was associated with fewer total case minutes (each 1 unit increase in FS equated to -1.88 mins (95% CI: -2.25 to -1.29, $p<0.001$). Regarding team dyads, the greatest tce in total case duration was for the surgeon #1/surgeon #2 combination (average 40.8 mins saving). Increased anaesthetic familiarly (with anaesthetic assistant) was associated with shorter anaesthetic room durations (ANOVA $p=0.007$) and shorter delays leaving theatre ($p<0.001$).

Conclusion

Greater team familiarity is associated with faster surgical times and shorter lengths of stay. The time savings could be used to improve theatre usage and efficiency.

Introduction

The surgery for urological cancers has become increasingly complex. Many surgeries are now part of multi-modal pathways, following neoadjuvant chemo, immunotherapy or hormonal therapies [1, 2], using a variety of platforms [3]. Advances in medicine have also meant that our patients are becoming increasingly co-morbid. For example, recent population surveys of participants with bladder cancer reveal that 71% are current or ex-smokers, 66% are overweight or obese, and only 23% undertake regular exercise [4-6]. Competing long-term conditions are self-reported in 72% of patients with bladder cancer (including 3 or more conditions in 20%) [5], 74% of men with prostate cancer (3 or more in 35%) [7], which mirror patterns in other cancers [8]. Consequently, many patients develop post-operative complications (e.g. 66% after radical cystectomy [3] or 21% after radical nephrectomy [9]), have prolonged lengths of stay or are readmitted after discharge (e.g. between 12-14% after radical prostatectomy in England and Wales, within the National Prostate Cancer Audit [10]).

Improvements in peri-operative outcomes have been achieved through centralisation of major surgeries [11, 12], enhanced recovery pathways [13], higher individual surgical volumes [14] and robotic surgery [15]. Various authors have also examined anaesthesiologist's experience (for example, detailing lower transfusion rates, shorter lengths of stay and fewer readmissions with more experienced staff in radical cystectomy [16, 17]) and detailed varieties of practice [18]. However, little attention has been paid to human team-working factors during surgery, such as team experience, composition and familiarity.

Team familiarity is an understanding of individual members knowledge of each other derived from shared experiences, knowledge of roles, relationships and trust or confidence [19]. It can be seen in well-functioning teams that overcome challenges, such as loss of key players in Premier league football teams [20], helps facilitate complex task completion [21], but can hamper innovation [19]. In surgery, team familiarity is associated with length of vascular procedures [22], short term patient outcomes in gastrointestinal cancer surgery [23] and improved efficiency (judged as time to starting surgery, surgical duration and turnover time) in urology [24]. A recent meta-analysis of team relationships within medicine identified greater team familiarity was associated with improved performance, but highlighted the lack of data and that most reports use process performance variables (e.g. checklist completion rates), rather than clinical outcomes (e.g. complications, length of stay)[21]. To build upon this knowledge in urology and address the lack of outcomes data, we analysed team familiarity within a large contemporary cohort of complex urological cancer surgeries at an NHS cancer centre.

Materials and Methods

Patients and procedures

We selected all patients undergoing radical surgery for prostate, bladder and kidney cancer at Sheffield Teaching Hospitals NHS Foundation trust from 1st January 2021 to date of extraction (2nd September 2024). This included open, laparoscopic and robotic radical prostatectomy, radical cystoprostatectomy and anterior pelvic exenteration, radical and partial nephrectomy. We obtained raw data from the hospital's operating room management information software system (ORMIS) and annotated with patient details, length of stay and readmission using the hospitals electronic patient record. This study was registered with the department/hospital as a service evaluation, and so no formal ethics committee was deemed necessary.

Team members, metrics and outcomes

We extracted dates, procedural times, all team member names and surgical codes, and anonymised all identification. We recorded the time of the patient arriving for anaesthesia and calculated (in minutes) duration in anaesthetic room, time until surgery starts, duration of surgery and time before leaving theatre. We recorded the number of procedures for each team member as an individual, and in a pair (combinations of surgeon #1, surgeon #2, anaesthetist #1, anaesthetic assistant #1, scrub nurse #1, circulating practitioner #1 and circulating practitioner #2). Of note, surgeon #2 was the designated assistant surgeon and included nurses acting as surgical care practitioners. We calculated Familiarity Scores (FS's) using the method described by Powezka et al. [22] from the names of surgeon #1, surgeon #2, anaesthetist #1, scrub nurse #1, circulating practitioner #1, circulating practitioner #2, and anaesthetic assistant #1. We annotated each procedure by patient age and sex, length of stay (date of admission to discharge, in days) and readmission (defined as a hospital stay of ≥ 24 hours within 30 and 90 days, or 6 months from the date of surgery). For this calculation, we used the number of times that each pair worked together within the study period (1st January 2021 to 2nd September 2024) to calculate frequencies and only used these 7 staff roles in the calculation (as others were inconsistent).

Statistical analyses

Parameters were reported as means (± standard deviation (st. dev.)) or medians (± interquartile range (IQR)) depending upon distribution. Univariate comparisons were by Chi Squared, T or ANOVA, and Mann-Whitney U test depending on the variable. FS was analysed as a continuous variable or dichotomised around the mean. Surgeon dyads were analysed as continuous variables or dichotomised around the median. Multiple regression analyses were performed using a generalised linear model for continuous dependant variables (times, length of stays) or logistic regression for categorical variables (readmission). Inputs included covariates (age, FS, dyad counts) and fixed factors (sex, admission ward (TAU: theatre admissions unit or hospital ward), first on the list (yes or no), type of surgery, name of procedure, and route of surgery (robotic, laparoscopic or open)). All tests were two sided and significance defined using the ≤0.05 threshold. Statistical analyses were performed within SPSS statistics (version 29.0.2.0, IBM). A network map was created using all team member dyads (i.e. 7 team members per procedure equals 21 dyads) and their weight (i.e. number of shared procedures) within Gephi 0.10.1 [gephi.org][25].

Results

Patients and procedures

In total, 1,043 patients were suitable for analysis, including 571 undergoing radical prostatectomy, 210 renal surgery and 262 radical cystectomy (supplementary table 1). The cohort were reflective of the disease with an average age of 64.6 yrs (st. dev. 9.4) and the majority being men (904, 86.7%). Most patients went to theatre from a dedicated admissions unit (96.7%) and left theatre to a hospital ward (14.5% to home, 5.5% to critical care, 80.0% to a surgical ward). Route of surgery was robotic in 770, open in 260 and laparoscopic in 13 (all were renal surgery). The mean total case minutes was 222.5 mins (st. dev 61.2) and varied considerably by procedure (supplementary table 2 and supplementary figure 1). The mean length of stay was 3.2 (st. dev 4.4) days for renal surgery, 10.2 (st. dev 9.3) for cystectomy and 1.2 (st. dev 1.4) days for prostate surgery. Readmission occurred in 85 (8.1%) of patients including 66 and 76 within 30 and 90 days, respectively (supplementary table 3).

Team members and familiarity

In total, there were 319 individual staff members involved in these cases and experience varied considerably (range 1-360 cases, table 1). There were 3,791 different combinations of pairs (figure 1), including 104 for surgeons #1 and #2 (median 2.0, IQR 1.0-6.0), 216 for surgeon #1 with anaesthetist #1 (median 2.0, IQR 1.0-5.0) and 146 for surgeon #1 with scrub nurse #1 (median 4.0, IQR 1.0-10.25). The mean FS was 14.2 (st. dev 7.2) for all 1,043 procedures and 13.7 (st. dev 7.3), 9.3 (st. dev 4.1) and 16.7 (st. dev 7.1) for renal, bladder and prostate surgeries, respectively (figure 2). Least familiarity was seen in Radical Cystectomy (ANOVA p<0.001).

Familiarity scores, procedures and outcomes

We divided cases using mean FSs (supplementary table 1) into low and high familiarity. Greatest familiarity was seen in radical prostatectomy, consequently, higher FSs were seen in men, in younger patients, with robotic surgery (especially partial nephrectomy and radical prostatectomy), in those not admitted to critical care, and prior to 2024. In all cases, teams with higher familiarity had shorter times for all peri-operative time intervals (supplementary table 4, figure 3, all ANOVA p<0.041), shorter lengths of stay and fewer readmissions within 30 days (4.1% vs. 8.0%, Chi sq. p=0.01). Direct comparison revealed a negative correlation between FS and total case time (supplementary figure 2, Pearson correlation -0.36, p<0.001). In multiple regression using pre-operative parameters (age, sex, ward of admission, type and name of surgery, robotic/laparoscopic/open route, and FS), greater familiarity was associated with fewer total case minutes (supplementary table 7; each 1 unit increase in FS equated to -1.88 mins (95% CI: -2.25 to -1.29, p<0.001), but not shorter length of stays (supplementary table 8) or readmission within 30 days (logistic regression p>0.05).

Given imbalances in the cases, we compared outcomes and FS for separate operative groups (supplementary table 5, figure 3). Within renal surgeries, teams with higher familiarity had shorter operations (ANOVA p<0.001) and consequently shorter total times in theatre (p<0.001), and shorter lengths of stay (p=0.031). When all times are combined, teams with lower familiarity took 26.2 mins (cumulative difference in means) longer to complete the renal surgery than those with high FS. Within radical cystectomy, teams with higher familiarity had shorter anaesthetic times (ANOVA p=0.041), shorter operations (p=0.027) and shorter total times in theatre (p=0.006). When all times are combined, teams with lower familiarity took 44.2 mins (cumulative difference in means) longer to complete the RC than those more familiar teams. Within radical prostatectomy, teams with higher familiarity had shorter anaesthetic times (ANOVA p=0.039), shorter operations (p=0.027) and spent less time in theatre (p=0.006). When all times are combined, teams with lower familiarity took 12.8 mins (cumulative difference in means) longer to complete the prostatectomy, than those with higher FS. Direct comparisons revealed negative correlations between FS and total case time for each procedure, and that the relationship differed by type surgery (figure 4).

Individual staff pairs (dyads) and outcomes

We compared each of the outcomes using the frequency of dyad combinations (low and high familiarity pairings, stratified using median values, table 2). The greatest difference in total case duration was seen for the surgeon #1/surgeon #2 combination (40.83 mins) and the least for anaesthetist #1/scrub nurse #1 (0.18 mins). Greater familiarity in surgical or anaesthetic staff impacted different times of the procedures. For example, increased anaesthetic familiarly (anaesthetist/anaesthetic assistant) did not impact operative times, but was associated with shorter durations in the anaesthetic room (1.96 mins, p=0.007) and less delay in leaving theatre (2.26 mins, p<0.001). In multiple regression using all dyad combinations and pre-operative factors, shorter operative duration (total case mins) was associated with the surgeon #1/surgeon #2 combination (supplementary table 9, each 1 unit increase in dyad frequency equated to -0.17 mins

(95%CI: -0.25 to -0.10), p<0.001)) and the surgeon #1/anaesthetist #1 combination (each 1 unit increase equated to -0.58 mins (95%CI: -0.88 to -0.28), p<0.001)). Length of stay was associated with being first on the list (supplementary table 10, estimate = -22.67 days (95%CI: -39.48 to -5.86), p=0.01) and the anaesthetist #1/scrub nurse #1 combination (each 1 unit increase in dyad frequency equated +0.16 days gain in stay (0.05-0.26), p=0.003). In multiple regression using all dyad combinations, shorter anaesthetic duration was associated with anaesthetic familiarly (1 unit increase in FS equated to -0.21 mins (-0.35 to -0.0.6), p=0.005, full data not shown).

Discussion

In this single centre series, we have shown improvements in theatre efficiency with increasing team familiarity. Improvements are role specific, with surgical familiarity improving surgical efficiency and anaesthetic familiarity improving anaesthetic efficiency. Our findings build upon prior literature [21, 24] and present a contemporary picture of urological cancer surgery with respect to team membership.

There are various observations that deserve discussion. Firstly, despite this being a recent three-year, single centre cohort, there were more than 300 staff in 5,700 combinations involved in these surgeries. The network map (figure 1) shows the complexity of these relationships. Whilst there were only 13 primary surgeons, there were 83 primary anaesthetists and 34 lead scrub nurses. We have previously reported (in a separate patient population) that anaesthetists with greater experience in cystectomy had lower transfusion rates and shorter lengths of stay [16]. Our findings show the large numbers of staff involved in these surgeries and the challenge needed to teach procedural-specific skills to all individual team members (especially given that the route of surgeries varied between robotic, laparoscopic and open). It is recognised that large variations in staff membership, and especially the use of employed nurses in their overtime or external agency nurses, can be detrimental to patient care [26]. Experience and seniority are also important. For example, Zaranko et al. reported that nursing staffing and seniority levels were associated with in hospital mortality using nursing rostering and patient data from 66,923 hospital admissions in 3 National Health Service Trusts in England [27].

Secondly, we show that more familiar teams are more efficient in terms of time taken to complete an operation, and may have improved patient outcomes. Whilst univariate associations between recovery and FS (e.g. shorter lengths of stay and fewer readmissions) did not survive multivariate analysis, the confidence intervals were close to significance and so perhaps this reflects sample size rather than a lack of difference. Larger studies are warranted to test these findings. Regardless, the reductions in time taken to complete surgery are not negligible (e.g. average of 39 mins for all cases or 44 minutes for radical cystectomy) and so familiarity could be used to better plan operating list content (perhaps additional cases or increased complexity for high-familiarity or fewer/lower complexity cases for low-familiarity teams). One could also specify a high-familiar team is needed for specific cases of higher complexity or longer duration. With regards to recovery, the length of stay (average of 2 days) and readmission reductions (8.0% to 4.1%) were similar to the benefits from robotic surgery [3] without the additional costs, and make increasing team familiarity likely to be cost-effective [28].

Thirdly, to understand teams and memberships in detail we analysed a single score for the entire team (i.e. FS) and individual team pairs. The former appeared robust (as it included all members), but varied considerably between procedures. This variation reflects the need of robotic surgery to have highly trained bedside assistants (acting semi-independently) in addition to the primary surgeon (sitting distant at the console), compared to open surgery in which the assistant is standing next to the primary surgeon (and so can be less independent). We compared outcomes using FS scores derived from the entire cohort and so there was an uneven distribution by cases (for example, high-familiarity teams were present in 38% of renal surgeries, 12% of cystectomies and 59% of prostatectomies). Whilst this meant some observations reflected the operation rather than team familiarity, associations with shorter operative times persisted in multiple regression analysis. Our observations regarding team dyads were limited in the data distribution. Whilst a few pairs were very common (154 surgeries for one pair), most were rare and so the median counts were all between 1 and 4. Whilst this precluded a detailed comparison between team pair composition and outcomes, we did see broadly reassuring findings (procedural efficiencies linked to team roles) and reinforced the importance of key team members [24].

There are various limitations to discuss. This was a retrospective service evaluation and so potential biases (such as non-random combinations of staff favouring working with each other, or more complex cases with specific teams) were possible. We tried to prevent bias by collecting a large series of consecutive cases, using electronic records for completeness and unbiased data collection, and anonymising all names before analysis. As detailed above, there were differences in FS score between procedures and so comparisons were not balanced (in terms of sample sizes and patient features). For example, most of the renal surgeries were partial nephrectomies (many robotic) and most open surgery was for cystectomy. To address this, we calculated individual FS for each of the 3 types of surgeries. These were more balanced than the whole cohort FS (e.g. high-familiarity teams present in 42% of renal surgeries, 45% of cystectomies and 47% of prostatectomies) and analyses did not show any real differences to our total cohort FS observations (supplementary table 6). As also detailed above, despite using 1,043 cases, we didn't obtain enough variation in dyad numbers to allow much in-depth analysis of the importance of pairs. Finally, these observations reflect findings from a large cancer centre within National Health Service England and partly included cases during the 2nd wave of the COVID-19 pandemic (in 2021). The findings may not be immediately transferable to other settings, although they do complement those from North America [24], Australia [29] and fit public health proposals in Canada [30].

Conclusions

In conclusion, we have shown that teams with higher familiarity are more efficient in theatre and are associated with shorter patient length of stay, and fewer admissions within 30 days of discharge. Team familiarity should be used when planning operating lists and could be used to improve efficiency within hospitals.

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Author contributions

Imogen Roberts undertook data analysis, report drafting and interpretation. James Catto had full access to all the data in the study, provided supervision and overview of the project, and takes responsibility for the integrity of the data and the accuracy of the data analysis. Marcus Cumberbatch contributed to the conception and design of the study, and secured funding. All authors had access to all the data in the study, participated in developing or reviewing the manuscript, and provided final approval to submit the manuscript for publication.

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Figures

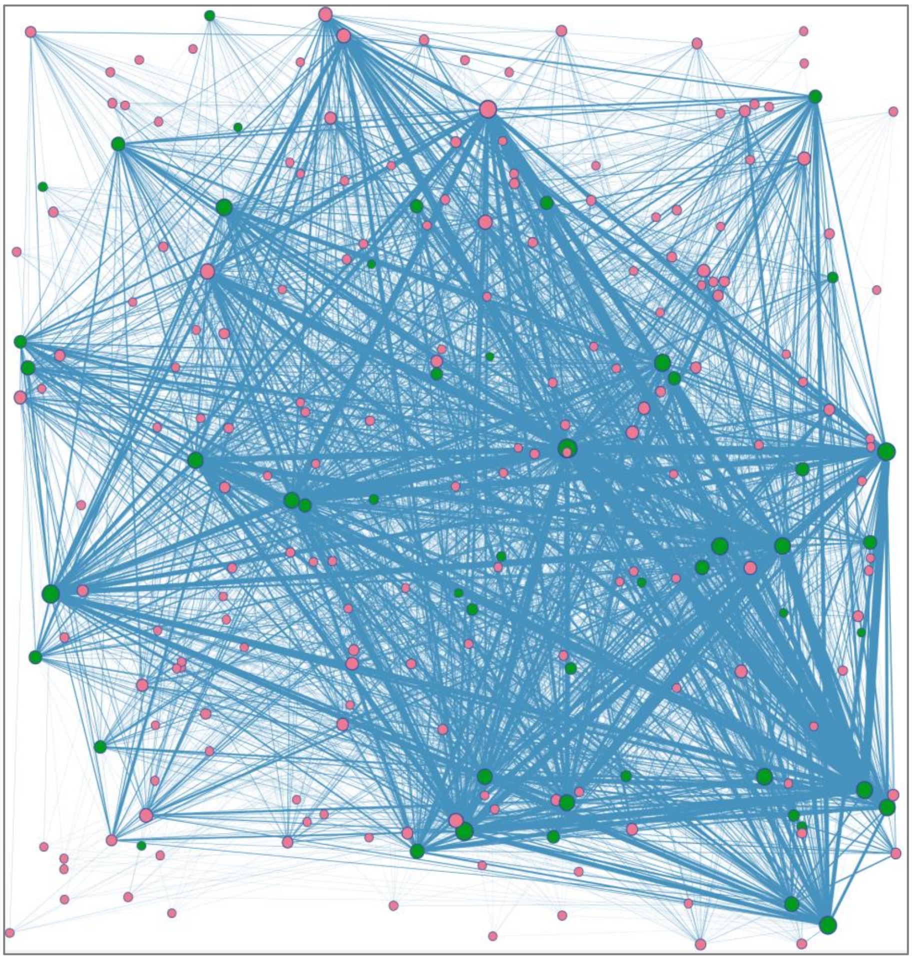

Figure 1. Network map showing relationship between the staff in this study. Nodes represent individual staff (coloured according to weight, i.e. number of cases of overlap with other members (green highest 25% and pink the other 75%)) and connections (n=3,791) show proximity to other staff.

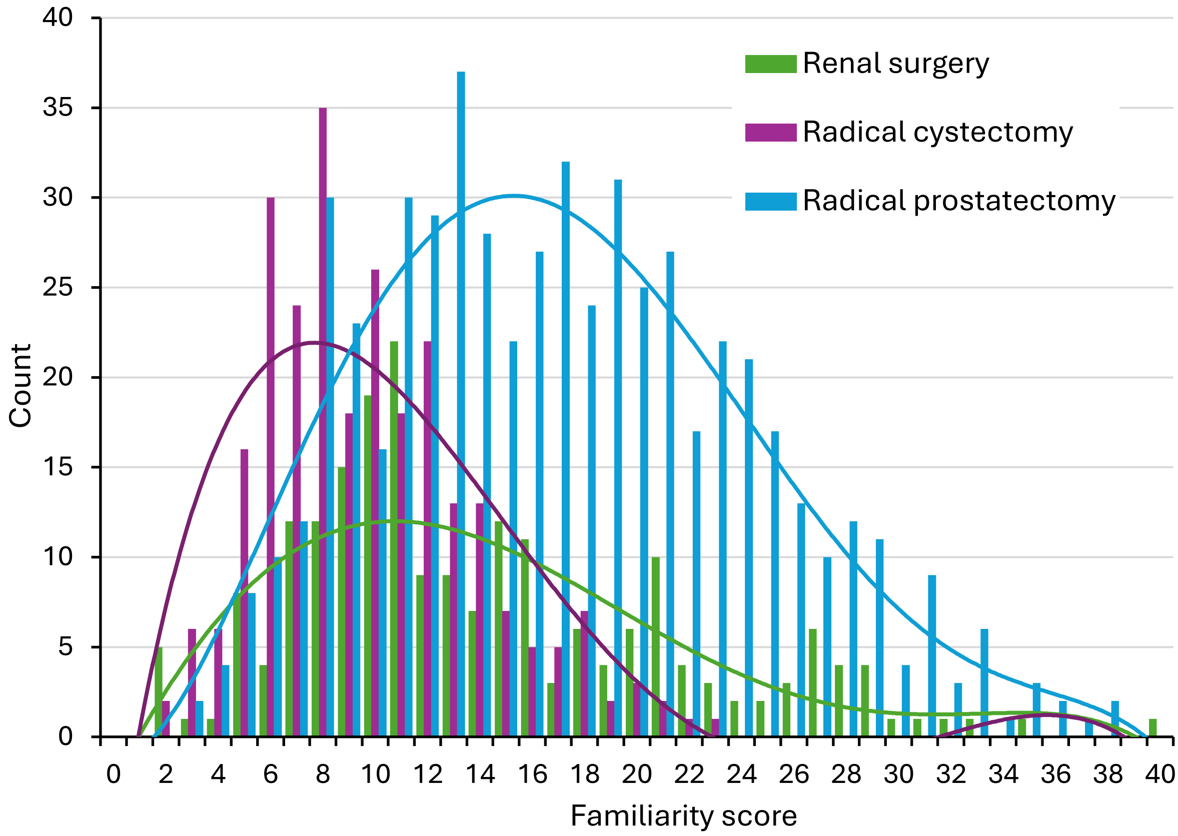

Figure 2. Familiarity Scores by type of surgery (histogram counts and polynomial trendline of best fit). Greatest familiarity was seen in radical prostatectomy (mean (±st. dev.) FS 16.7 (±7.2)), then renal surgery (13.7 (±7.3)), and least within radical cystectomy (FS 9.3 (±4.1)).

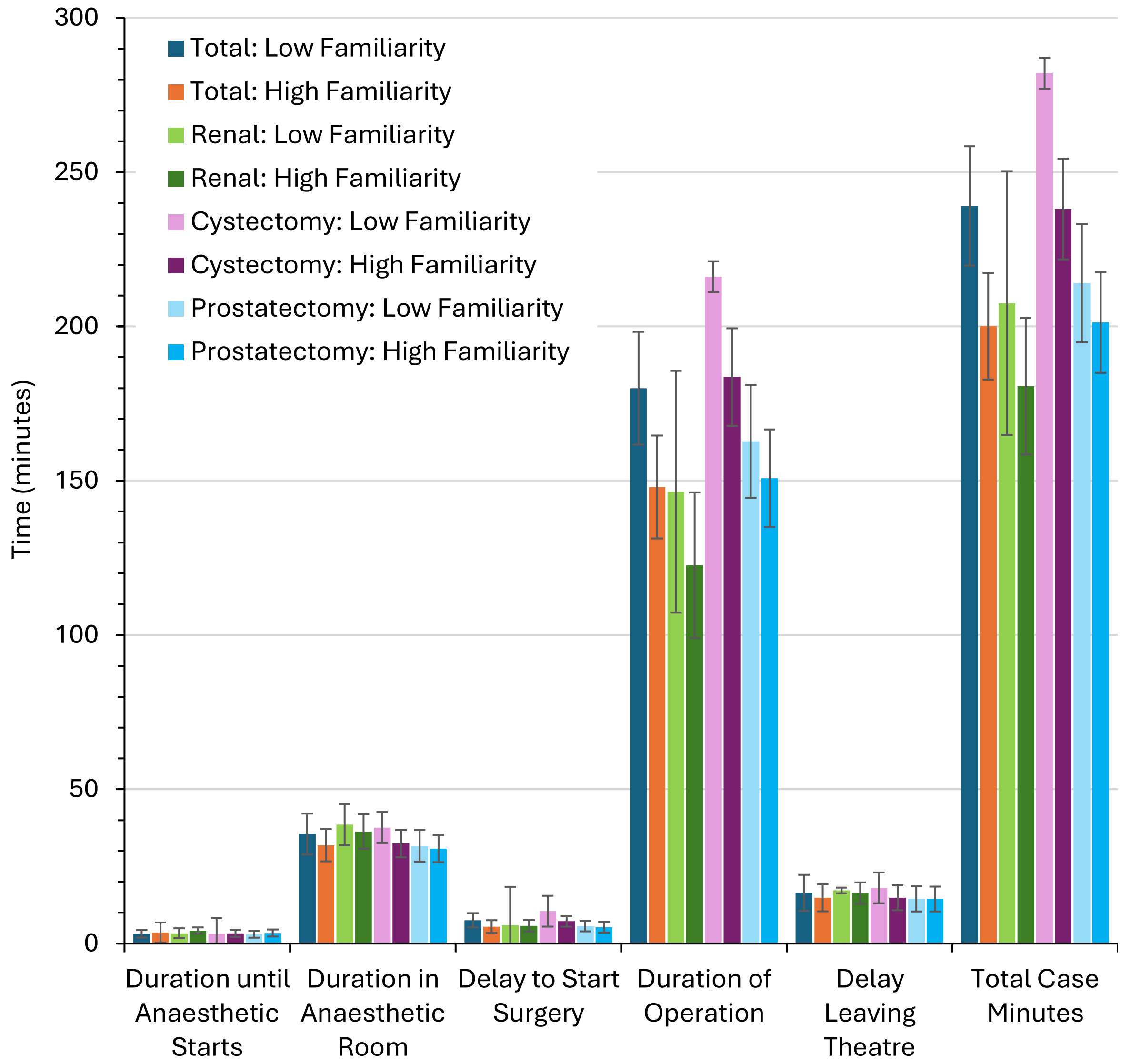

Figure 3. Operative durations in all cases, stratified into high and low familiarity teams using mean Familiarity Scores (all comparisons are statistically significant (ANOVA p<0.041)) for all cases and for each organ.

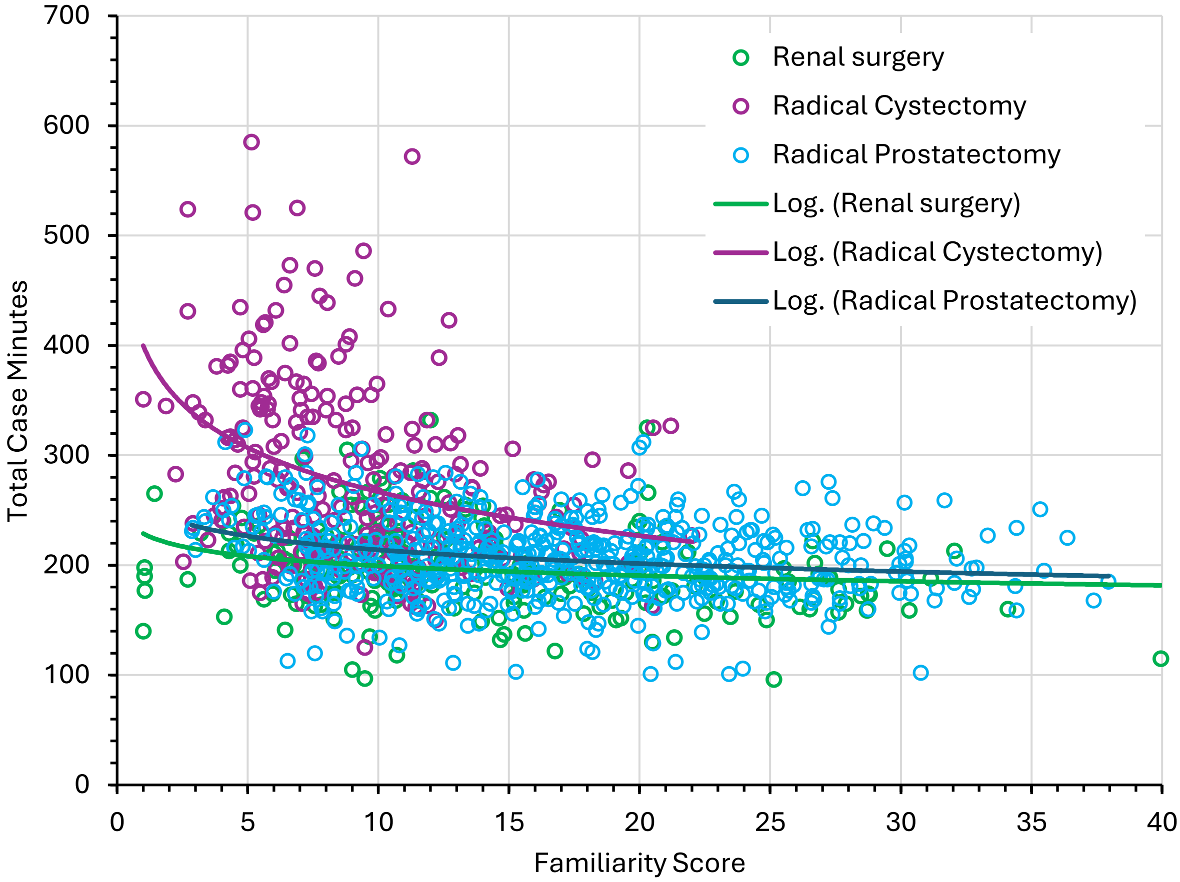

Figure 4. Scatter plot of FS versus total case minutes for each individual operation reveals negative correlations for all cases (Pearson correlation (r) -0.36, p<0.001), Renal surgery (r = -0.28, p<0.001), Radical cystectomy (r = -0.32, p<0.001) and Radical prostatectomy (r = -0.21, p<0.001).

Tables

	Individuals/	Number of Cases		
	Combinations (n)	Median	IQR	Range
Individuals				
Surgeon 1	13	56.0	35.5-165.0	18-360
Surgeon 2	43	4.0	1.0-37.0	1-360
Anaesthetist 1	83	3.0	1.0-17.0	1-98
Scrub N.	34	64.0	11.0-166.5	1-352
Circ. Practitioner 1	41	63.0	15.5-139.0	1-352
Circ. Practitioner 2	60	41.5	2.0-106.5	1-352
Anaesthetic Assistant	45	2.0	1.0-14.0	1-254
Combinations				
Surgeon 1, Surgeon 2	104	2.0	1.0-6.0	1-154
Surgeon 1, Anaesthetist 1	216	2.0	1.0-5.0	1-42
Surgeon 1, Scrub N. 1	146	4.0	1.0-10.25	1-53
Surgeon 1, Circ. Practitioner 1	169	3.0	1.0-7.5	1-75
Surgeon 1, Circ. Practitioner 2	233	3.0	1.0-6.0	1-47
Surgeon 1, Anaesthetic Assistant	126	1.0	1.0-9.5	1-91
Surgeon 2, Anaesthetist 1	292	2.0	1.0-3.0	1-30
Surgeon 2, Scrub N. 1	219	1.0	1.0-4.0	1-48
Surgeon 2, Circ. Practitioner 1	245	1.0	1.0-4.0	1-59
Surgeon 2, Circ. Practitioner 2	297	2.0	1.0-3.0	1-35
Surgeon 2, Anaesthetic Assistant	187	1.0	1.0-4.0	1-71
Anaesthetist 1, Scrub 1	446	1.0	1.0-3.0	1-15
Anaesthetist 1, Circ. Practitioner 1	455	1.0	1.0-3.0	1-17
Anaesthetist 1, Circ. Practitioner 2	547	1.0	1.0-2.0	1-13
Anaesthetist 1, Anaesthetic Assistant	313	2.0	1.0-4.0	1-22
Scrub N. 1, Circ. Practitioner 1	208	2.0	1.0-6.0	1-38
Scrub N. 1, Circ. Practitioner 2	349	2.0	1.0-4.0	1-24
Scrub N. 1, Anaesthetic Assistant	249	2.0	1.0-5.5	1-41
Circ. Practitioner 1, Circ. Practitioner 2	347	2.0	1.0-4.0	1-24
Circ. Practitioner 1, Anaesthetic Assistant	271	2.0	1.0-5.0	1-38
Circ. Practitioner 2, Anaesthetic Assistant	318	2.0	1.0-4.0	1-22

Abbreviations: Scrub N. = Scrub nurse/practitioner; Circ. = Circulating practitioner.

Table 1. Individual staff members and combinations of staff in each role.

Dyad familiarity	Surgeon 1 & Surgeon 2			Surgeon 1 & Anaesthetist 1			Surgeon 1 & Scrub N. 1			Anaesth. 1 & Scrub N. 1			Anaesth. 1 & Anaesth. Asstn. 1		
	Mean	St. Dev.	p value*	Mean	St. Dev.	p value*	Mean	St. Dev.	p value*	Mean	St. Dev.	p value*	Mean	St. Dev.	p value*
Duration until anaesthetic starts (Mins)															
Low	3.40	2.76		3.28	2.69		3.40	2.84		3.37	3.40		3.19	3.19	
High	3.35	3.43		3.42	3.39		3.28	3.26		3.33	2.59		3.56	2.83	
Difference**	0.05		0.80	-0.14		0.45	0.12		0.53	0.04		0.82	-0.37		**0.05**
Duration in anaesthetic room (Mins)															
Low	35.16	12.51		34.47	11.55		34.54	11.42		33.72	11.19		34.75	11.60	
High	32.41	10.15		33.39	11.46		33.25	11.60		34.22	11.89		32.80	11.31	
Difference**	2.75		**<.001**	1.08		0.13	1.29		0.07	-0.49		0.49	1.96		**0.007**
Delay to start surgery (Mins)															
Low	8.04	17.27		7.59	16.56		7.34	16.46		6.41	9.89		6.17	4.52	
High	5.34	3.34		5.68	3.67		5.97	3.98		7.00	14.59		7.38	18.11	
Difference**	2.71		**0.001**	1.91		**0.01**	1.37		0.07	-0.59		0.44	-1.20		0.12
Duration of operation (Mins)															
Low	182.83	64.87		174.12	63.87		172.37	58.94		166.72	53.86		167.07	57.90	
High	148.07	35.57		157.50	43.92		159.61	51.84		166.09	58.51		165.70	53.77	
Difference**	34.76		**<.001**	16.61		**<.001**	12.76		**<.001**	0.64		0.86	1.37		0.70
Delay leaving theatre (Mins)															
Low	16.11	10.55		16.55	10.51		15.89	10.23		16.16	10.39		16.69	10.60	
High	15.19	8.26		14.85	8.51		15.59	8.97		15.32	8.78		14.42	7.76	
Difference**	0.92		0.14	1.70		**0.01**	0.31		0.62	0.85		0.17	2.26		**<.001**
Total case (Mins)															
Low	241.73	71.18		232.60	70.76		229.86	65.06		222.70	58.56		224.80	63.99	
High	200.89	36.77		211.14	45.84		214.29	55.38		222.52	64.12		219.47	57.43	
Difference**	40.83		**<.001**	21.46		**<.001**	15.57		**<.001**	0.18		0.96	5.34		0.17
Length Of Stay (Days)															
Low	5.49	8.23		4.24	6.87		3.88	6.17		3.31	5.02		3.60	5.34	
High	2.04	2.93		3.46	5.79		3.87	6.65		4.51	7.60		4.16	7.18	
Difference**	3.45		**<.001**	0.78		**0.05**	0.01		1.00	-1.20		**0.003**	-0.56		0.15

	n	%		n	%		n	%		n	%		n	%	
Readmission within 30 days															
Low	38	7.60%		31	5.60%		38	6.90%		32	5.90%		34	5.80%	
High	22	4.80%	0.84	35	7.20%	0.312	28	5.70%	0.46	34	6.90%	0.78	31	7.00%	0.43
Readmission within 90 days															
Low	41	8.20%		36	6.50%		43	7.80%		36	6.60%		36	6.10%	
High	29	6.40%	0.3	40	8.20%	0.3	33	6.80%	0.54	40	8.10%	0.7	39	8.80%	0.1
Readmission - yes															
Low	47	9.30%		38	6.90%		47	8.50%		40	7.30%		40	6.80%	
High	31	6.80%	0.16	47	9.60%	0.11	38	7.80%	0.69	45	9.10%	0.29	44	9.90%	0.07

* Statistical tests: ANOVA for all times. Chi squared test for readmission. ** Difference in mean times

Table 2. Differences in times and readmissions rates according to high and low familiarity (around the median) for staff dyads.