SOuRCe Research Summary

July 2019 to June 2020

SOuRCe
Surgical Outcomes Research Centre

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Introduction

The Surgical Outcomes Research Centre (SOuRCe) was established in 2002 as a conjoint academic surgical research unit of the Royal Prince Alfred Hospital (RPAH) and the University of Sydney.

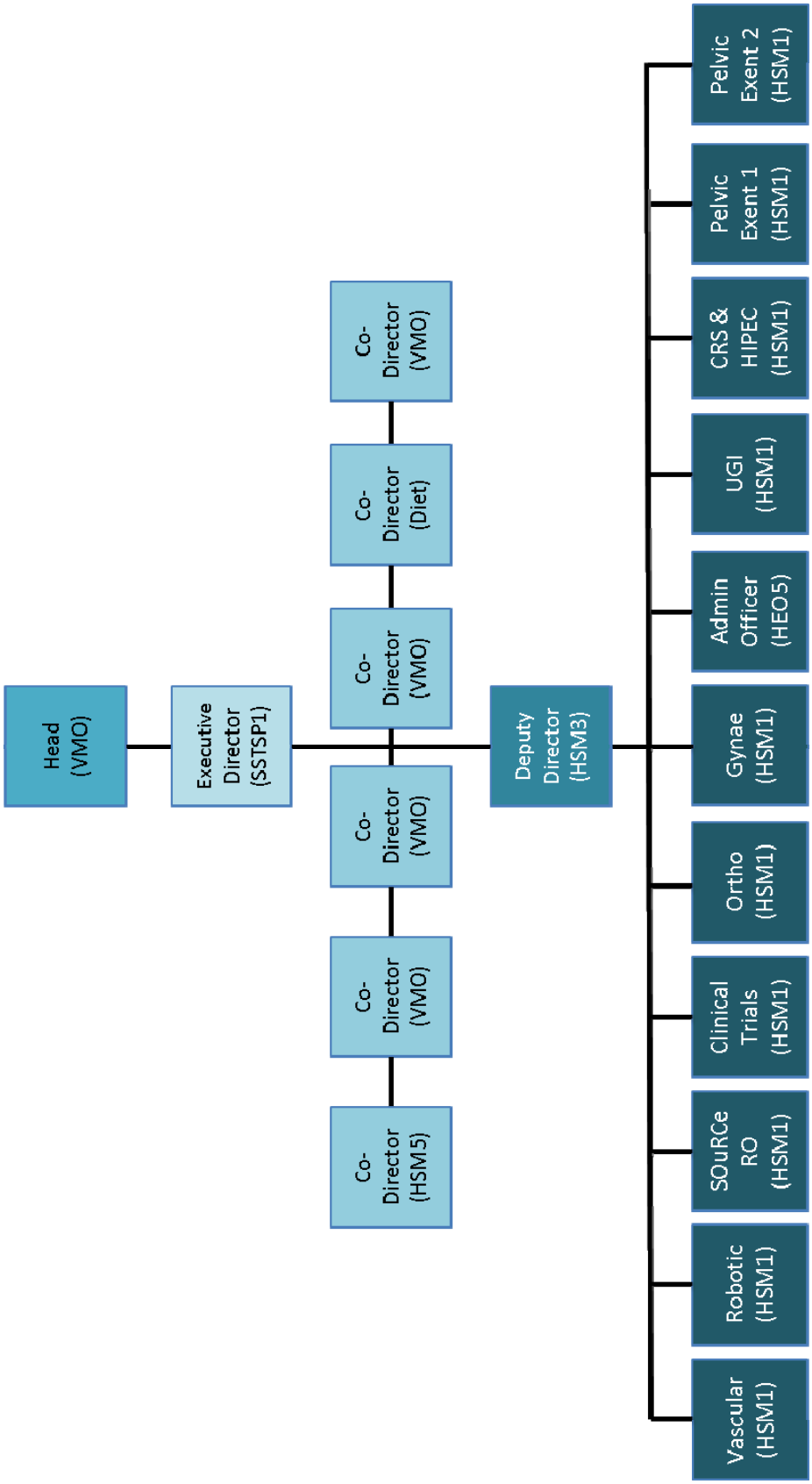
Headed by **Professor Michael Solomon** (Consultant Colorectal Surgeon at RPAH) and Executive Director **Professor Jane Young** (Cancer Epidemiologist at the University of Sydney), the primary goal of SOuRCe is to "*promote an evidence-based approach to improve clinical practice and to achieve the best possible outcomes for patients*".

Covering all surgical specialties, SOuRCe has established and continues to develop a renowned research profile of surgical outcomes research. Our work includes developing and improving new surgical techniques, enhancing quality of life and patient reported outcomes, and implementing evidence-based practice.

This report details the research activities supported by SOuRCe, which is part of **The Institute of Academic Surgery (IAS)**, over the 2018/19 financial year involving a wide range of surgical departments in the specialties of pelvic exenteration, peritonectomy, upper gastrointestinal, robotic surgery, orthopaedic surgery, gynaecological surgery and other surgery-related research programs.

We therefore would like to thank all our staff, students and collaborators for their hard work and contribution over the past year. We look forward to working with you in the next 12 months in enhancing our patients' outcomes.

SOuRCe Staff Structure

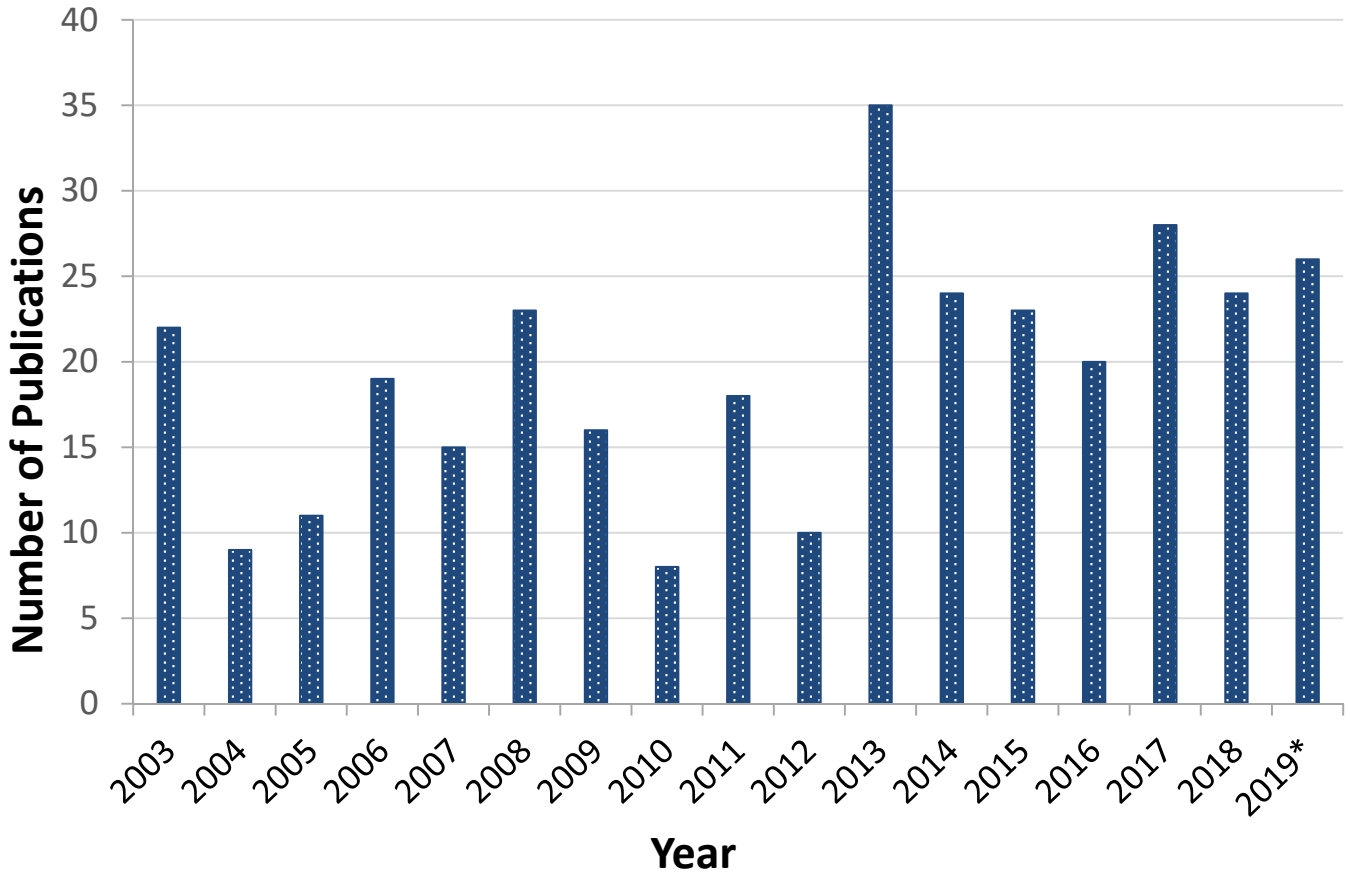


Research Output

SOuRCe collaborated in a wide range of articles published in the medical literature. Over the past five years, SOuRCe consistently has published more than 20 journal articles each year.

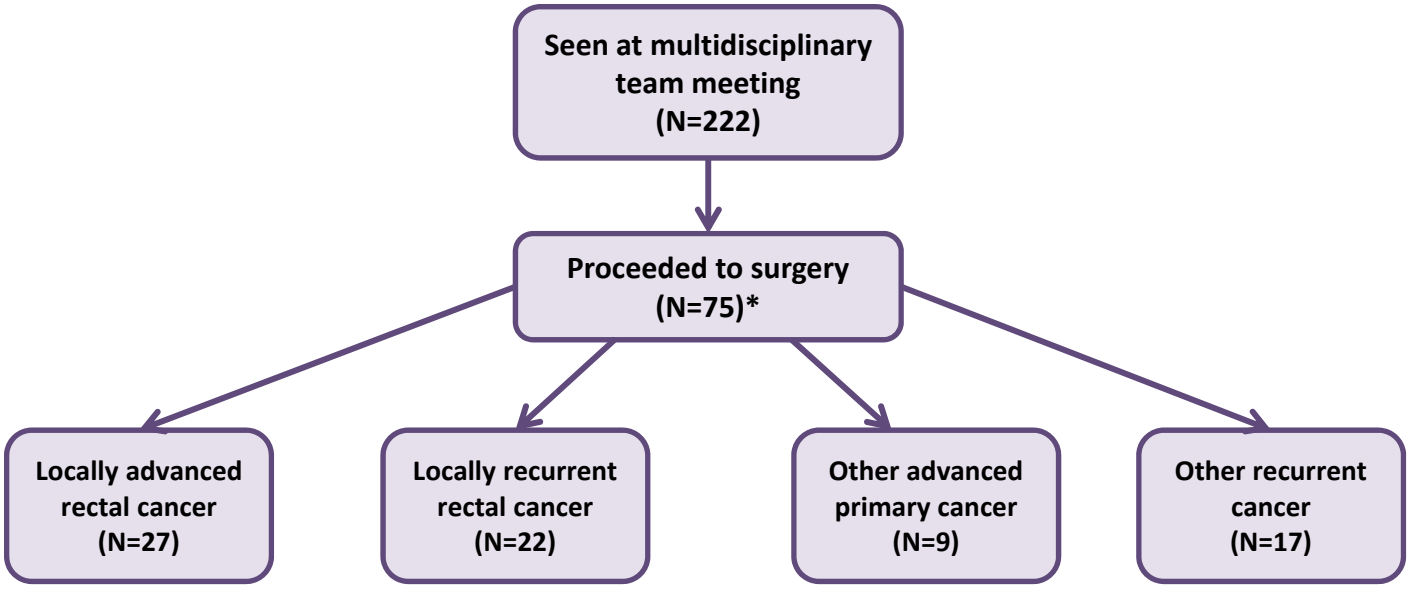
In addition to publications in peer-reviewed journals, SOuRCe staff and associates have had 44 posters/oral presentations accepted at local, national and international conferences during the 2018/19 Financial Year.

Annual Peer-Reviewed Publications



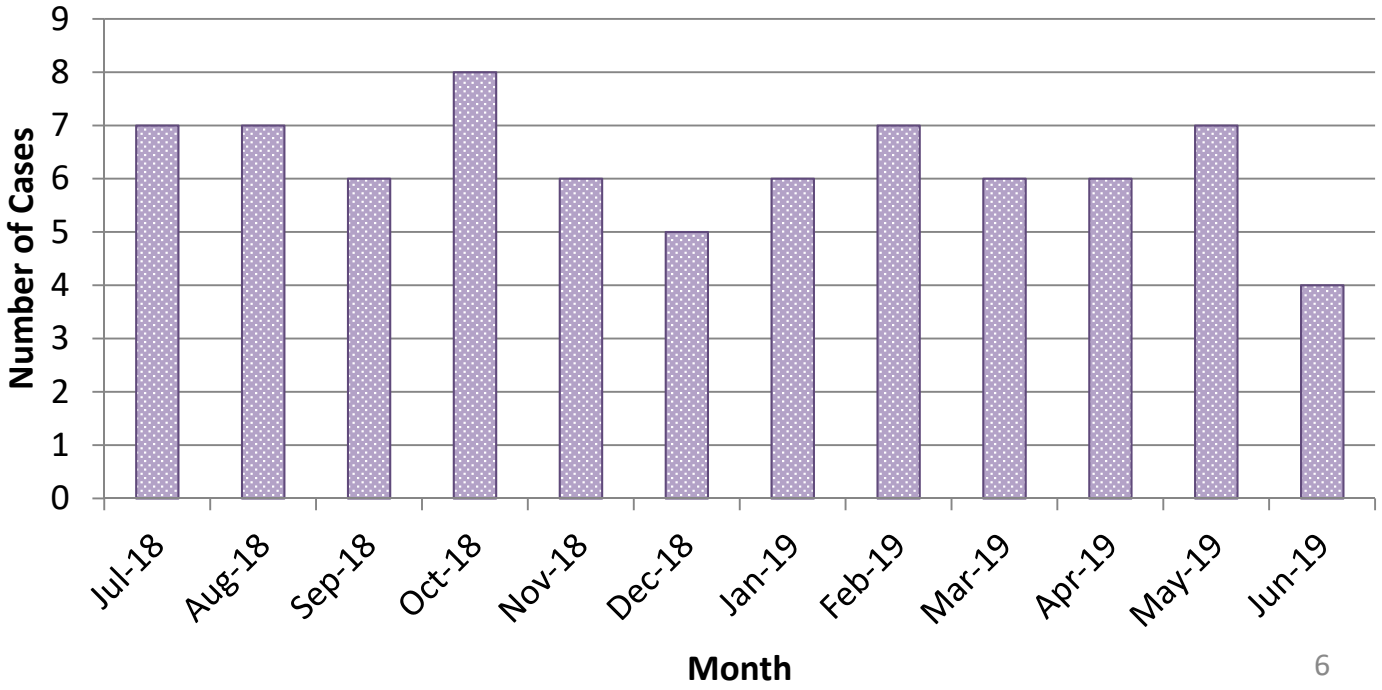
*As of 30 June 2019

Patient Flow 2018/2019



*5 patients were last seen in previous financial year

Monthly Surgical Volume

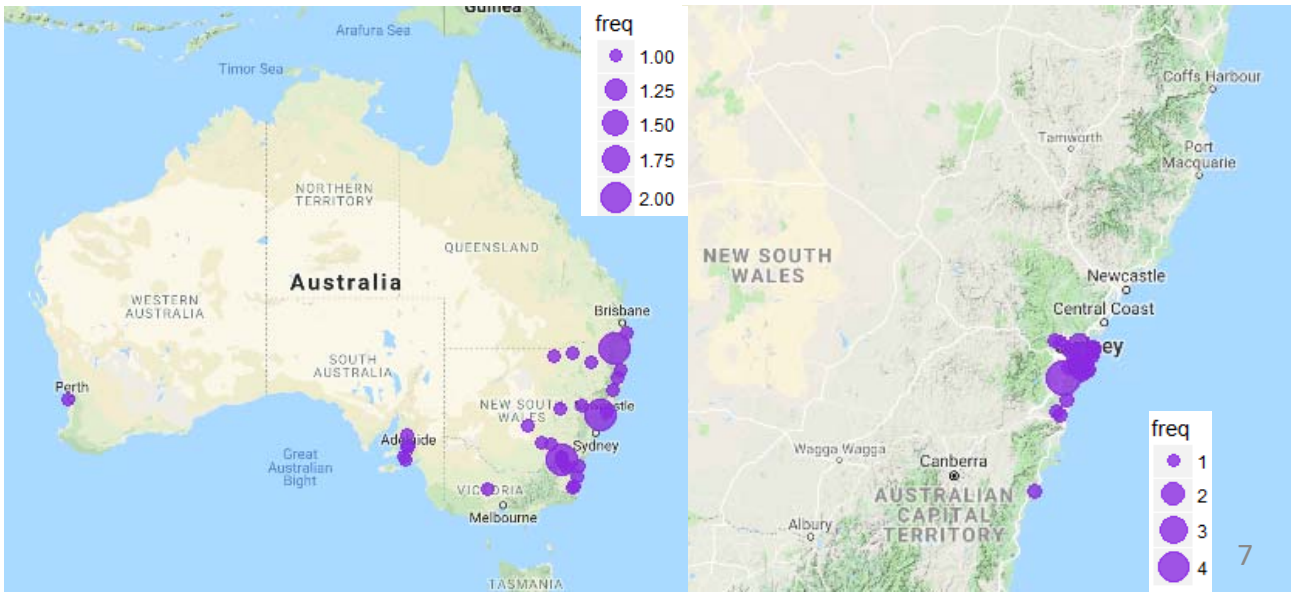


Patient and Surgical Characteristics

Age at surgery (mean ± SD)	59 ± 12 years
Gender, N (%)	
Male	39 (52%)
Female	36 (48%)
Median length of hospital stay [IQR]	21 days [15 to 29 days]
Median length of ICU stay [IQR]	3 days [2 to 5 days]
Median duration of surgery [IQR]	9.7 hours [7.8 to 11.6 hours]
Surgical urgency , N (%)	
Elective	70 (93%)
Emergency	5 (7%)
Location of residence, N (%)	
Sydney	37 (49%)
Regional NSW	23 (31%)
Interstate Australia or Overseas	15 (20%)

SD=standard deviation; IQR=interquartile range; ICU=intensive care unit; NSW= New South Wales

Geographic Distribution of Patients



2018/2019 Highlights

- In the 2018/2019 financial year, there were 75 pelvic exenteration surgeries, bringing the total number of surgeries to 748, involving 710 unique patients since the program began in 1994.

- Of the 75 pelvic exenteration surgeries performed during the 2018/2019 financial year, 63 of these patients consented to participate in the long-running study titled '***Long-term quality of life in patients with pelvic cancer***', bringing the total number of participants recruited to 437 since 2008.

Research Highlights

- The Sydney Catalyst funded PEPA Trial (***Feasibility and acceptability of pre-operative exercise to improve patient outcomes after major cancer surgery: a pilot randomised controlled trial***) completed recruitment during the 2018/2019 financial year, with the assistance of the colorectal surgeons and clinical nurse consultants bringing the total number of patients enrolled to 22, 11 of which underwent Pelvic Exenteration.

- On the 24th of October 2018, the Pelvic Exenteration Research Program achieved a unique milestone, reaching the 700th Pelvic Exenteration surgery being performed on this day. This was celebrated by a morning tea to acknowledge the hard work and dedication of the Royal Prince Alfred Hospital multidisciplinary team towards patient care and support.

- In June 2019, research team members presented the 'Pelvic Exenteration Showcase' to the wider team to inform them of the current data collected for both the clinical audit database (PESQI) and the long term quality of life study to spark ideas for future research. The presentation led by Lyndal Alchin and Kenneth Vuong (Pelvic Exenteration Research Officers) was received with great enthusiasm by our Pelvic Exenteration team.

Publications

Published Articles:

- Brown KGM, Solomon MJ, Lau YC, Steffens D, Austin KKS, Lee PJ. Sciatic and femoral nerve resection during extended radical surgery for advanced pelvic tumours: long-term survival, functional and quality of life outcomes. *Annals of Surgery* 2019; doi.org/10.1097/SLA.0000000000003390
- Venchiarutti RL, Solomon MJ, Koh CE, Young JM, Steffens D. Pushing the boundaries of pelvic exenteration by maintaining survival at the cost of morbidity. *British Journal of Surgery* 2019; doi.org/10.1002/bjs.11203
- The PelvEx Collaborative. Surgical and Survival Outcomes Following Pelvic Exenteration for Locally Advanced Primary Rectal Cancer. Results from an International Collaboration. *Annals of Surgery* 2019; 269:315-321; doi.org/10.1097/SLA.0000000000002528
- Lau YC, Brown KGM, Lee PJ. Pelvic Exenteration for Locally Advanced and Recurrent Rectal Cancer – How much more. *J Gastrointestinal Oncol* 2019; doi.org/10.21037/jgo.2019.01.21
- Lau YC, Jongerius K, Wakeman C, Heriot AG, Solomon MJ, Sagar PM, Tekkkis PP, Frizelle FA. Influence of the level of sacrectomy on survival in patients with locally advanced and recurrent rectal cancer. *British Journal of Surgery* 2019; doi.org/10.1002/bjs.11048
- Lee P, Tan WJ, Brown K, Solomon MJ. Addressing the empty pelvic syndrome following total pelvic exenteration: does mesh reconstruction help? *Colorectal Disease* 2018; 21:368-369; doi.org/10.1111/codi.14523
- Hogan SE, Solomon MJ, Carey SK. Exploring reasons behind patient compliance with nutrition supplements before pelvic exenteration surgery. *Supportive Care in Cancer* 2019; 27:1853-1860; doi.org/10.1007/s00520-018-4445-1
- The PelvEx Collaborative. Minimally invasive surgery techniques in pelvic exenteration: a systematic and meta-analysis review. *Surgical Endoscopy* 2018; 32:4707-4715; doi.org/10.1007/s00464-018-6299-5

Publications (continued)

Oral Presentations:

- Vuong K, Solomon MJ, Koh CE, Alchin L, Young J. *Long term pain and fatigue following pelvic exenteration*. Sydney Catalyst Postgraduate and Early Career Research Symposium, 26th June 2019, Sydney, Australia
- Alchin L, Koh C, Solomon MJ, Vuong K, Mendes C, Young JM, Steffens D. *The influence of stoma on quality of life before and after pelvic exenteration.* Sydney Catalyst Postgraduate and Early Career Researcher Symposium, 26th June 2019, Sydney, Australia
- Young J, Solomon MJ, Koh CE, Steffens D. *Clear surgical margin and absence of postoperative complications predict favourable outcomes following pelvic exenteration*. RACS 88th Annual Scientific Meeting, 6th-10th May 2019, Bangkok, Thailand
- Solomon MJ. *Subjective and objective outcomes of pelvic exenteration*. 17th Congress of Asia Pacific Federation of Coloproctology. 14th-17th March 2019, Kuala Lumpur, Malaysia
- Solomon MJ. *Tips, tricks and errors in resection of advanced and recurrent rectal cancer*. [Invited speaker] 17th Congress of Asia Pacific Federation of Coloproctology. 14th-17th March 2019, Kuala Lumpur, Malaysia
- Solomon MJ. *Pelvic exenteration: The evolution of radical surgical techniques for advanced and recurrent pelvic malignancy*. The 16th Annual Meeting of the Japanese Society of Gastroenterological Surgery, 1st-4th November 2018, Kobe, Japan
- Young JM, Steffens D, Venchiarutti RL, Koh CE, Solomon MJ. *Long-term consequences of exenterative surgery for people with pelvic cancer*. World Cancer Congress, 1st-4th October 2018, Kuala Lumpur, Malaysia
- Solomon MJ. *Pelvic Exenteration: Tips and Tricks and Error Traps.* European Society of Coloproctology, 26th-28th September 2018, Nice, France
- Van Ramshorst G, Young J, Solomon M. *Complications and impact on quality of life of Vertical Rectus Abdominis Myocutaneous (VRAM) flaps for reconstruction in pelvic exenteration surgery*. European Society of Coloproctology, 26th-28th September 2018, Nice, France

Publications (continued)

Oral Presentations (continued):

- Solomon M, Koh C, Young J, Steffens D. *Long-term survival and quality of life following pelvic exenteration*. European Society of Coloproctology, 26th-28th September 2018, Nice, France
- Solomon M, McCarthy A, Koh C, Young J, Steffens D. *Sacrectomy functional outcomes following pelvic exenteration for primary and recurrent pelvic malignancy.* European Society of Coloproctology, 26th-28th September 2018, Nice, France
- Denost Q, Tuech J-J, Ghouti L, Panis Y, Lelong B, Rouanet P, Faucheron J-L, Jafar M, Lefevre J, Saillour F, Savel H, Broc G, Quintard B, Rullier E, Heriot A, Solomon M. *International Benchmarking trial between France and Australia comparing management of T4 and local recurrent rectal cancer (PelviCare Trial)*. European Society of Coloproctology, 26th-28th September 2018, Nice, France
- Solomon M, Venchiarutti R, Steffens D, Koh C, Young J. *Expanding the boundaries of resectability in pelvic exenteration. The price of higher and wider resections*. European Society of Coloproctology, 26th-28th September 2018, Nice, France

Poster Presentations:

- Robosa R, Drennan P, Vuong, K, Steffens D, Chan R, Solomon M, Goeman E. *Infected collections following pelvic exenteration: first report of clinical microbiology in an Australian context.* Australian Society for Infectious Diseases Annual Scientific Meeting, 18th May 2019, Darwin, Australia
- Young J, Solomon MJ, Koh CE, Steffens D. *Clear surgical margin and absence of postoperative complications predict favourable outcomes following pelvic exenteration.* RACS 88th Annual Scientific Meeting, 6th-10th May 2019, Bangkok, Thailand

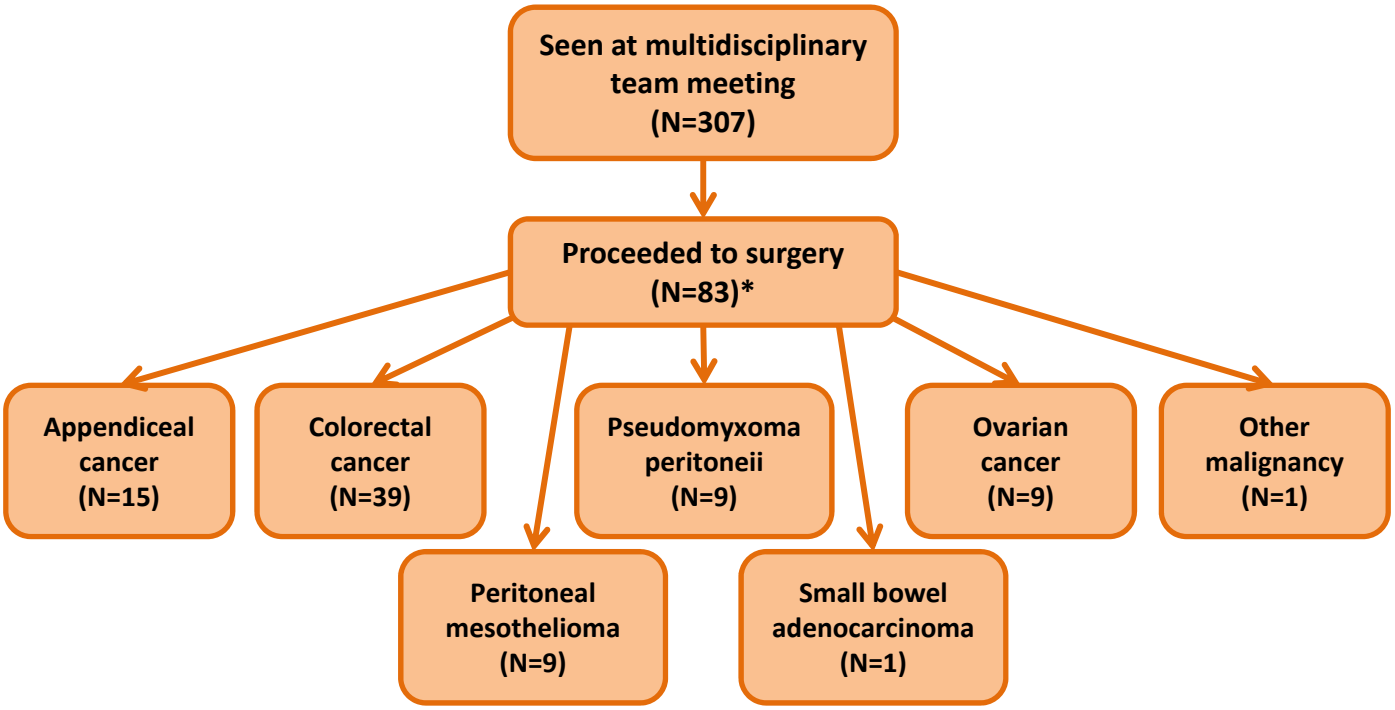
Publications (continued)

Poster Presentations (continued):

- Young JM, Steffens D, Venchiarutti RL, Koh CE, Solomon MJ. *Long-term consequences of exenterative surgery for people with pelvic cancer.* World Cancer Congress, 1st-4th October 2018, Kuala Lumpur, Malaysia
- Denost Q, Tuech J-J, Ghouti L, Panis Y, Lelong B, Rouanet P, Faucheron J-L, Jafar M, Lefevre J, Saillour F, Savel H, Broc G, Quintard B, Rullier E, Heriot A, Solomon M. *International Benchmarking trial between France and Australia comparing management of T4 and local recurrent rectal cancer (PelviCare Trial).* European Society of Coloproctology, 26th-28th September 2018, Nice, France
- Solomon M, Koh C, Young J, Steffens D. *Long-term survival and quality of life following pelvic exenteration.* European Society of Coloproctology, 26th-28th September 2018, Nice, France
- Solomon M, McCarthy A, Koh C, Young J, Steffens D. *Sacrectomy functional outcomes following pelvic exenteration for primary and recurrent pelvic malignancy*. European Society of Coloproctology, 26th-28th September 2018, Nice, France

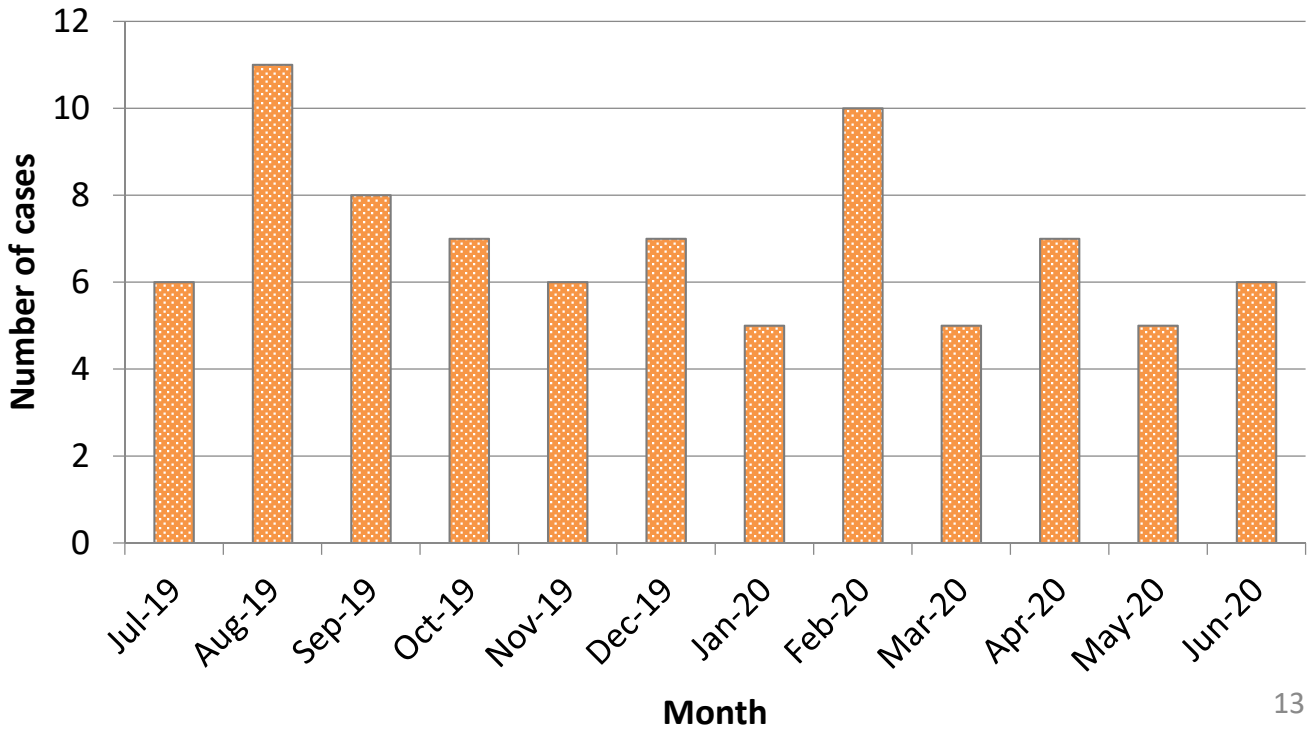
Pelvic Exenteration Service Team, Royal Prince Alfred Hospital, July 2018

Patient Flow 2019/2020



*including n=5 2nd CRS ± HIPEC surgeries

Monthly Surgical Volume



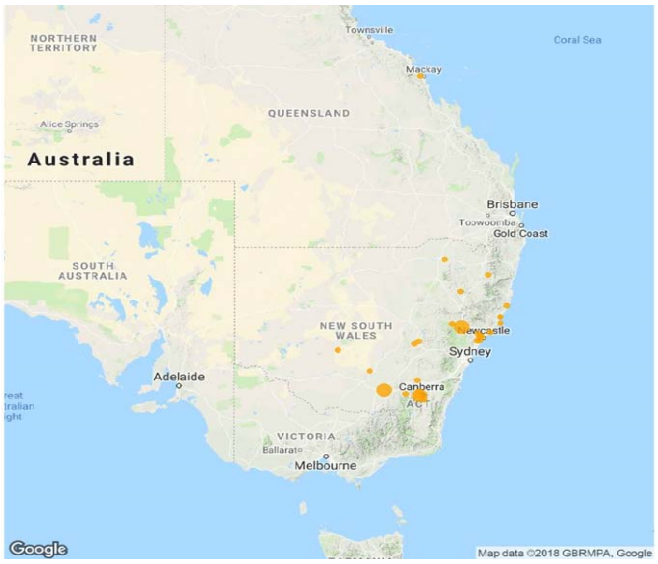
Patient and Surgical Characteristics

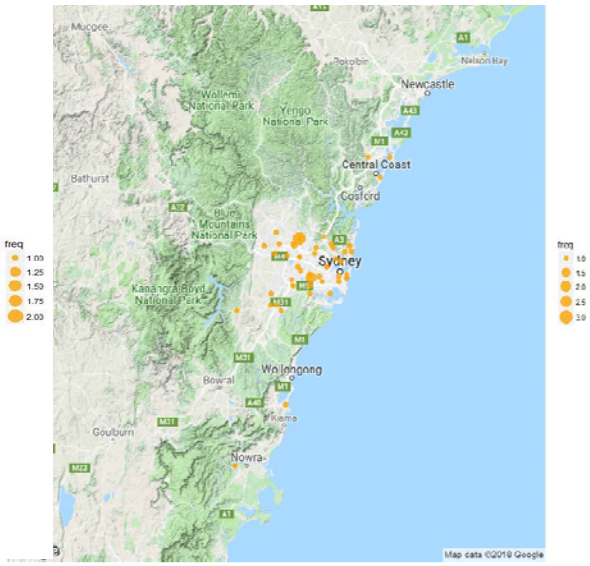
Age at surgery (mean ± SD)	54 ± 14 years
Gender, N (%)	
Male	35 (42%)
Female	48 (58%)
Median length of hospital stay [IQR]	18.0 days [13 to 22 days]
Median length of ICU stay [IQR]	5.0 days [4 to 6 days]
Median duration of surgery [IQR]	8.6 hours [7.0 to 9.9 hours]
Surgical urgency, N (%)	
Elective	73 (88%)
Emergency	10 (12%)
Location of residence, N (%)	
Sydney	56 (67%)
Regional NSW	22 (27%)
Interstate Australia	5 (6%)

SD=standard deviation; IQR=interquartile range; ICU=intensive care unit; NSW= New South Wales

***(N=58) 1st CRS + HIPEC surgery**

Geographic Distribution of Patients





2019/2020 Highlights

- During the 2019/2020 financial year, there were a total of 83 cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC) procedures, including 2nd CRS + HIPEC surgeries, bringing the total number of surgeries to 215.

- We applied and were successful in receiving two grants

  MRFF – Research Grants ($686,674.00): HyNOVA - A randomised study comparing Hyperthermic and Normothermic intraperitoneal chemotherapy following interval cytoreductive surgery for stage III epithelial ovarian, fallopian tube and primary peritoneal cancer.

  NHMRC – Clinical Trials and Cohort Studies ($1,119,877.00): PRIORITY TRIAL - Preoperative exercise for patients undergoing major abdominal cancer surgery: A Multicentre Randomised controlled Trial.

Publications

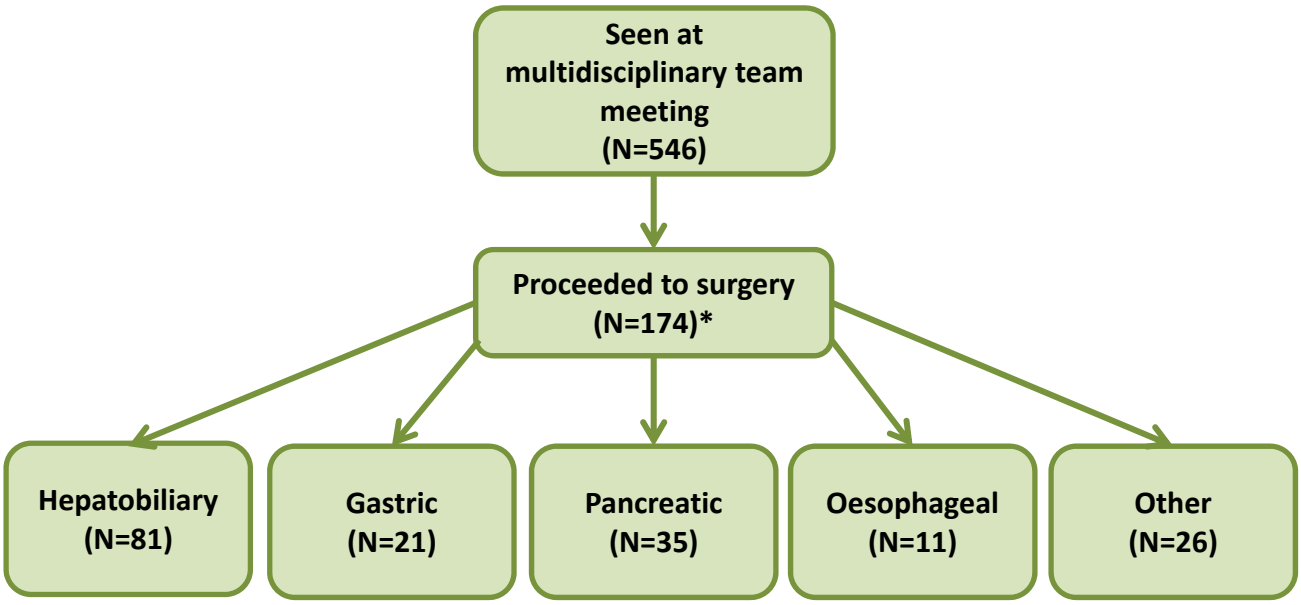
Published Articles:

- Steffens D, Koh C, Ansari N, Solomon MJ, Brown K, McBride K, Young J, Young CJ, Moran B. Quality of life following cytoreductive surgery and hyperthermic intraperitoneal chemotherapy: Early results from a prospective cohort study in 115 patients. *Annals of Surgical Oncology*. 2020; DOI: 10.1245/s10434-020-08443-4

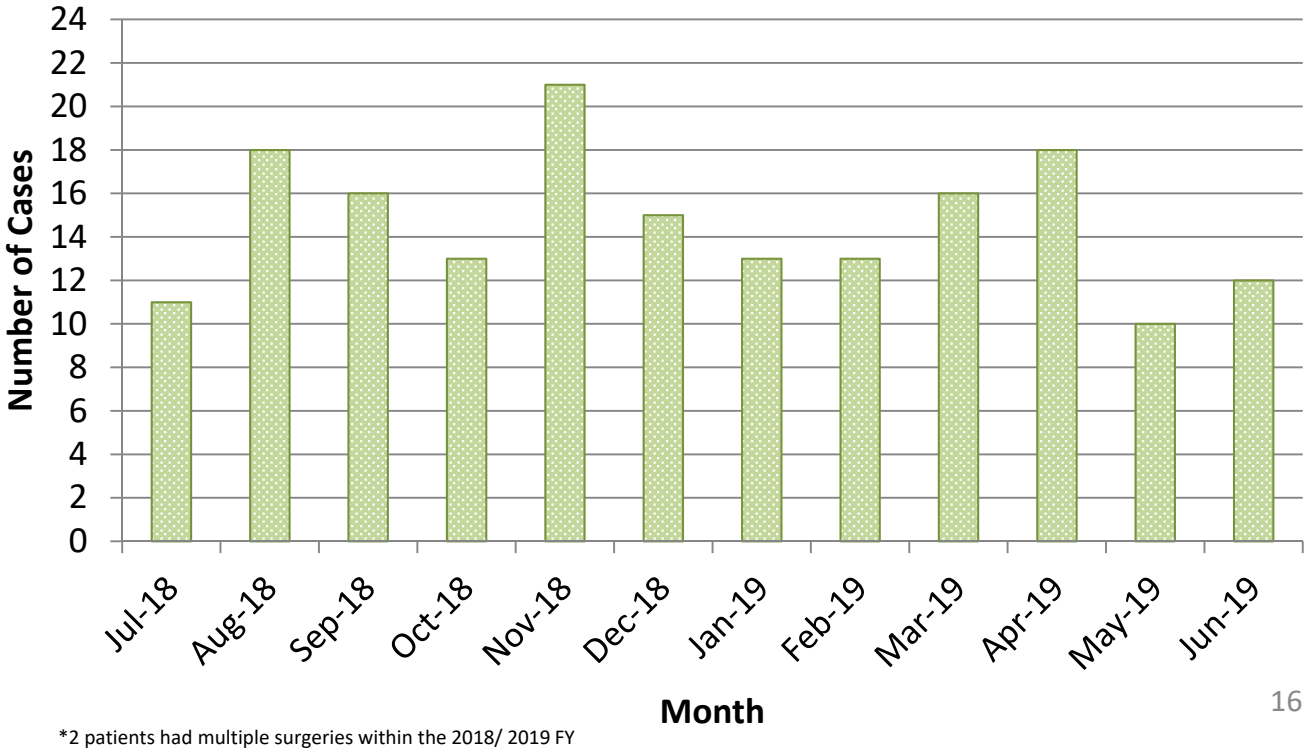
- Steffens D, Moran B. ASO author reflections: Quality of life trajectories after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy. *Annals of Surgical Oncology*. 2020 March [Accepted in press] DOI: 10.1245/s10434-020-08448-z

- Reece, L., Hogan, S., Allman-Farinelli, M., Carey S. Oral nutrition interventions in patients undergoing gastrointestinal surgery for cancer: A systematic literature review. Support Care Cancer (2020). https://doi.org/10.1007/s00520-020-05673-w

Patient Flow 2018/2019



Monthly Surgical Volume



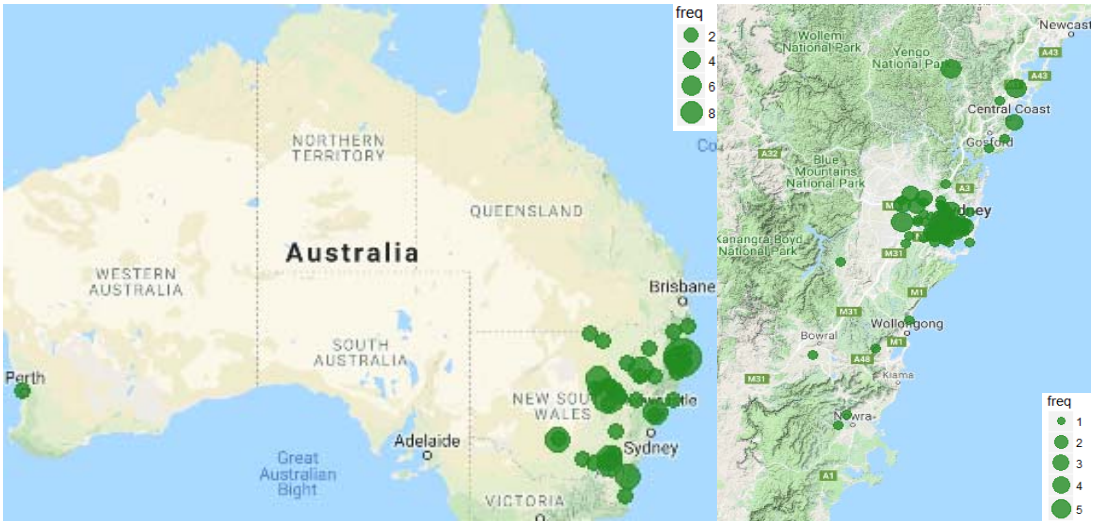
*2 patients had multiple surgeries within the 2018/ 2019 FY

Patient and Surgical Characteristics

Age at surgery, mean ± SD	60 ± 15 years
Gender, N (%)	
Male	105 (60%)
Female	71 (40%)
Median length of hospital stay [IQR]	7 days [5 to 14 days]
Median length of ICU stay [IQR]	6 days [4 to 10 days]
Surgical urgency, N (%)	
Elective	162 (92%)
Emergency	14 (8%)
Location of residence, N (%)*	
Sydney	105 (64%)
Regional NSW	53 (32%)
Interstate	6 (4%)

***12 patients are missing postcode data**
SD=standard deviation; IQR=interquartile range; ICU=intensive care unit; NSW=New South Wales

Geographic Distribution of Patients



***12 patients are missing postcode data**

Upper Gastrointestinal Research Program

2018/2019 Highlights

- The Upper Gastrointestinal Research Program has recorded 170 major cancer surgeries performed at the Royal Prince Alfred Hospital during the 2018/2019 financial year.

- Recruitment for two major randomised clinical trials are underway in the Upper Gastrointestinal Research Program:
  - Fit-4-Home Trial
  - TOLERATION Trial

Research Highlights

- **Very SuPPLE** is a randomised control trial investigating the effectiveness of preoperative very low calorie/ energy diet 2 weeks prior to surgery on liver stiffness and size, compared to patients with a normal diet. This project has received 2 grants within the 18-19 period. One was from the Central Clinical School at the University of Sydney which allowed the department to purchase and Indocyanine green (ICG) clearance machine and the second was from Sydney Catalyst which will assist with the running of the trial.

- **Fit-4-Home** is a randomised control trial investigating the use of electronic devices (fitbit) to encourage patients to move after surgery to reduce their hospital stay.

- **TOLERATION** is investigating the use of Total Parental Nutrition (TPN) following Pancreaticoduodenectomy (Whipple's procedure) to improve their nutrition after surgery by measuring grip strength. Patients are randomised into either usual care or TPN.

Publications

Published Articles:

- Hu LS, Zhang XF, Weiss M, Popescu I, Marques HP, Aldrighetti L, Maithel SK, Pulitano C, Bauer TW, Shen F, Poultsides GA, Soubrane O, Martel G, Koerkamp GB, Endo I, Pawlik, TM. Recurrence Patterns and Timing Courses Following Curative-Intent Resection for Intrahepatic Cholangiocarcinoma. *Annals of Surgical Oncology* 2019; 26:8; doi:10.1245/s10434-019-07353-4
- Maharaj A, Ioannou L, Croagh D, Zalcberg J, Neale RE, Goldstein D, Merrett N, Kench J, White K, Pilgrim C, Chantrill L, Cosman P, Kneebone A, Lipton L, Nikfarjam M, Philip J, Sandroussi C, Tagkalidis P, Chye R, Evans S. Monitoring quality of care for patients with pancreatic cancer: a modified Delphi consensus. *HPB* 2019; 21:4; doi:10.1016/j.hpb.2018.08.016.
- Akgül Ö, Bagante F, Olsen G, Cloyd JM, Weiss M, Merath K, Alexandrescu S, Marques HP, Aldrighetti L, Maithel SK, Pulitano C, Bauer TW, Shen F, Poultsides GA, Soubrane O, Martel, G, Koerkamp BG, Guglielmi A, Itaru E, Pawlik TM. Preoperative prognostic nutritional index predicts survival of patients with intrahepatic cholangiocarcinoma after curative resection. *Journal Surgical Oncology* 2018; 118:3; doi:10.1002/jso.25140
- Buettner S, Spolverato G, Kimbrough CW, Alexandrescu S, Marques HP, Lamelas J, Aldrighetti L, Gamblin TC, Maithel SK, Pulitano C, Weiss M, Bauer TW, Shen F, Poultsides GA, Marsh JW, IJzermans JNM, Koerkamp BG, Pawlik TM. The impact of neutrophil-tolymphocyte ratio and platelet-to-lymphocyte ratio among patients with intrahepatic cholangiocarcinoma. *Surgery* 2018; 164:3; doi:10.1016/j.surg.2018.05.002
- Lam S, Tan E, Menezes A, Martin D, Gallagher J, Storey D, Sandroussi C. A comparison of the operative outcomes of D1 and D2 gastrectomy performed at a single Western center with multiple surgeons: A retrospective analysis with propensity score matching. *World Journal of Surgical Oncology* 2018; 16:136; doi:10.1186/s12957-018-1422-6

Publications (continued)

Oral Presentations:

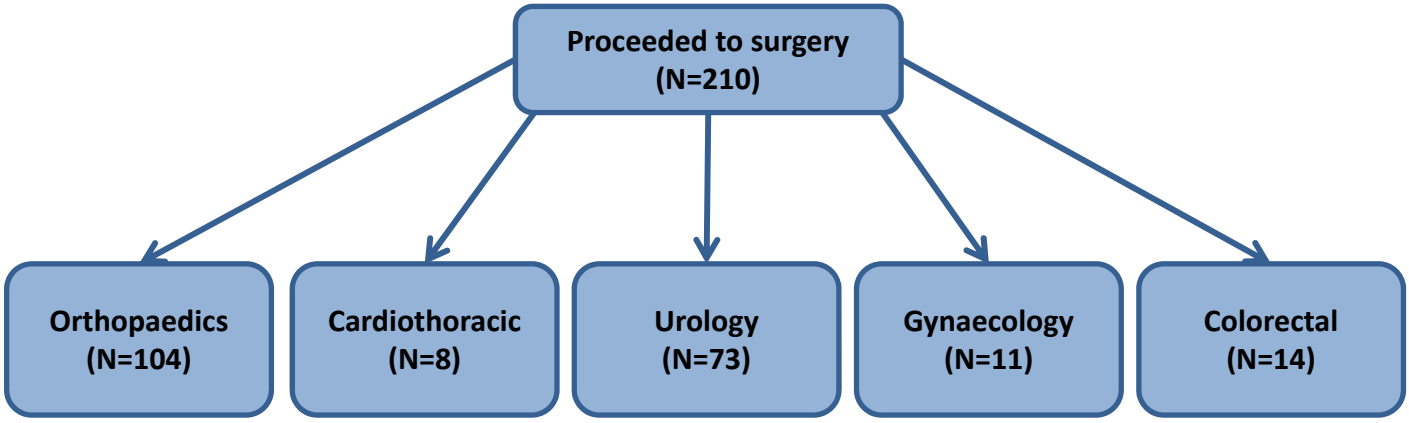
- Cui R, Park J, Toms C, Koh C, Yeo D. *The association between body mass index and liver resection outcomes in Hepatocellular carcinoma and Colorectal cancer metastases.* Sydney Catalyst Postgraduate and Early Career Research Symposium, 26th June 2019, Sydney, Australia
- Toms C, Steffens D, Yeo D, Sandroussi C. *Factors associated with length of stay in patients undergoing upper gastrointestinal cancer surgery*. Sydney Catalyst Postgraduate and Early Career Research Symposium, 26th June 2019, Sydney, Australia
- Sandroussi C. *Multivisceral resections* [Invited speaker] RACS 88th Annual Scientific Meeting, 6th-10th May 2019, Bangkok, Thailand
- Tan E, Sandroussi C. Liver resection in elderly patients over the age of 70 with primary liver cancer: A retrospective analysis*. Journal of Clinical Oncology* 2019; 37:no. 15_suppl. doi:10.1200/JCO.2019.37.15_suppl.e15647

Poster Presentations:

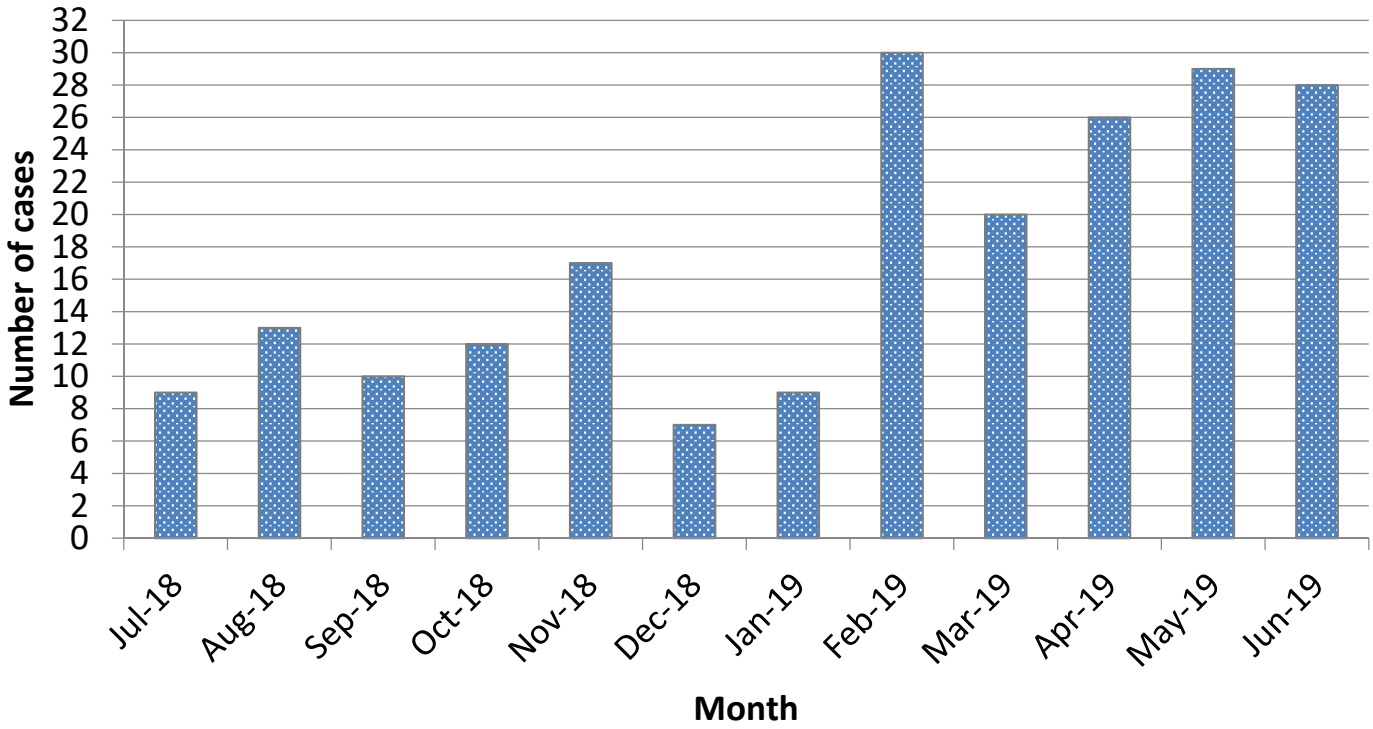
- Atchison L, Toms C, Yeo D, Steffens D. *To stich or not to stich? Optimal closure of abdominal laparoscopic port sites: A systematic review.* RACS 88th Annual Scientific Meeting, 6th-10th May 2019, Bangkok, Thailand
- Cui R, Park J, Toms C, Koh C, Yeo D. *The association between body mass index and liver resection outcomes in Hepatocellular carcinoma and Colorectal cancer metastases.* RACS 88th Annual Scientific Meeting, 6th-10th May 2019, Bangkok, Thailand

Robotic Research Program

Patient Flow 2018/2019



Monthly Surgical Volume

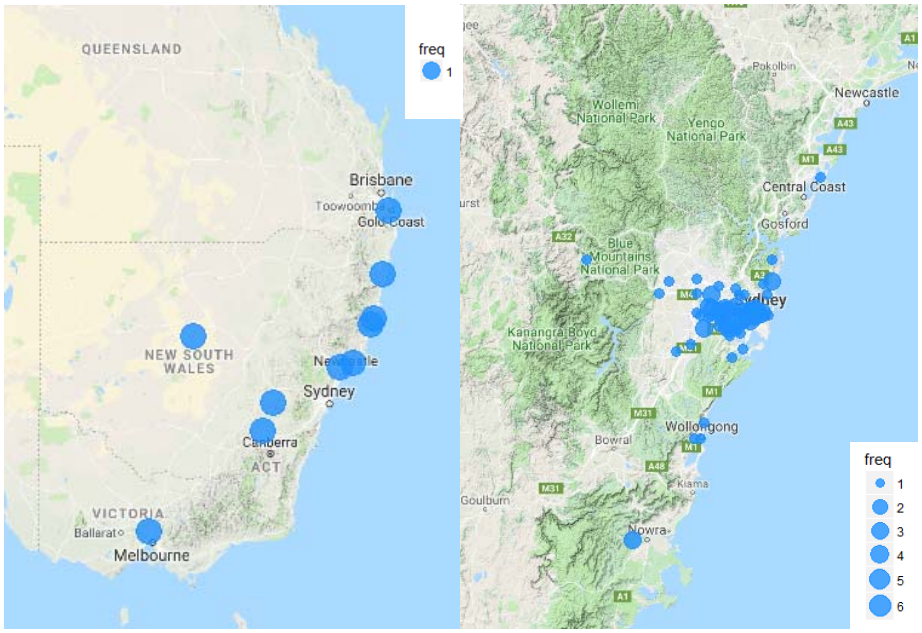


Patient and Surgical Characteristics

	Orthopaedics	Cardiothoracic	Urology	Gynaecology	Colorectal
Age at surgery, years (mean ± SD)	67.0 ± 12	61.0 ± 18	63.9 ± 8	37.8 ± 9	64.9 ± 13
Gender, N (%)					
Male	49 (47%)	1 (13%)	73 (100%)	0 (0%)	8 (57%)
Female	55 (53%)	7 (87%)	0 (0%)	11 (100%)	6 (43%)
Median length of hospital stay (days) [IQR]	4.5 days [3.4 to 5.4]	3.3 days [1.8 to 6.4]	1.9 days [1.7 to 2.9]	0.9 days [0.5 to 1.9]	5.9 days [4.1 to 9.7]
Length of ICU stay (days) (mean ± SD)	-	1.9 ± 0.2	-	-	-
Median duration of surgery [IQR]	1.8 hours [1.6 to 2.1)	3.6 hours [2.0 to 3.7]	5.1 hours [4.6 to 5.8]	2.9 hours [2.5 to 3.8]	8.5 hours [7.9 to 9.6]
Surgical urgency, N (%)					
Elective	104 (100%)	8 (100%)	73 (100%)	11 (100%)	14 (100%)
Emergency	-	-	-	-	-
Location of residence, N (%)*					
Sydney	92 (89%)	5 (83%)	58 (94%)	5 (100%)	9 (75%)
Regional NSW	12 (11%)	1 (17%)	3 (5%)	-	3 (25%)
Interstate	-	-	1 (1%)	-	-

***20 patients are missing postcode data; SD=standard deviation; IQR=interquartile range; ICU=intensive care unit; NSW=New South Wales**

Geographic Distribution of Patients



2018/2019 Highlights

- During the 2018/2019 financial year we had the addition of two new Robotic randomised controlled trials within the Urology Department:
  - Early unclamping versus regular clamping in robot assisted partial nephrectomy (PNUT): This multicentre trial aims to investigate the effectiveness of early unclamping versus regular unclamping on functional and oncological outcomes in patients undergoing robot-assisted partial nephrectomy.
  - Randomised study assessing urinary continence following robotic radical prostatectomy with or without an intraoperative retropubic vascularised fascial sling (RoboSling): A prospective study assessing early and late post-operative continence following Robot-assisted radical prostatectomy (RARP) in patients with and without a RoboSling procedure.
- Over 250 Robotic cases within the BEST database (August 2016- June 2019) and 130 Orthopaedic cases (April 2017-June 2019).
- Addition of the RoboLung study (Robotic Lung resection).
- New Robotic Surgical Fellow, Dr Jeremy Fallot, commenced his fellowship in February 2019.

Research Highlights

Robotic Research Database (BEST)

- Currently the BEST database has captured clinical and patient reported outcomes of 269 patients undergoing robotic assisted surgery at the Royal Prince Alfred Hospital. Researchers from the Institute of Academic Surgery and the Surgical Outcomes Research Centre are currently using the information collected in this database to provide a detailed overview of the cost of robotic assisted surgery. Two main studies are being developed:
    - Cost of robotic assisted surgery in the public sector (Hope or Hype?): This study aims to provide an overview of the cost of the implementation, the robotic procedure and the instruments and consumables for all cardiothoracic, colorectal, gynaecological and urological robotic procedure from June 2016 to June 2019.
    - Comparing robotic to open and laparoscopic surgery cases: This study aims to look at the different modes of surgery and to describe the difference in cost and patient and surgical characteristics.

Orthopaedics (PRO-LOAD)

- Currently there are two databases that are capturing the robotic orthopaedic data. The Lower Limb Arthroplasty database (LOAD) contains patient clinical data, whilst the patient reported outcomes are maintained in the patient reported outcomes Lower Limb Arthroplasty database (PRO-LOAD). There are four surgeons currently involved in this program with an additional surgeon commencing in the next year. Some highlights from the year include:
    - Database now also includes Total Knee Arthroplasty (TKA) cases as of October 2018.
    - The second DSMB meeting for robotic orthopaedic cases occurred on the 14th February 2019 after the 50th case.

Cardiothoracic

- 29 patients have reached the 1 year post-operative mark for the study titled: *"Robotic Coronary Artery Bypass"* (RoboCAB).
- The addition of the, *"Robotic lung resection"* study (RoboLung) which added two new surgeons to the robotic research program.

Urology

- Currently there are five surgeons involved in the Robotic Urology studies, with more surgeons predicted to join in the coming year with the addition of other sites.
    - The RoboSling study commenced in January 2019 and currently 12 patients have undergone surgery with the patient reaching their 6 month post-operative.
    - The PNUT study commenced in February 2019 and currently has 6 patient who have undergone surgery. Investigators are also currently in the process of adding two other sites into this program.
    - The ROSE "*Robotic and open surgery for prostate cancer: a prospective, multicentre, comparative study of functional and oncological outcomes"* study reaching over 140 patients.

Colorectal

Currently there are three surgeons involved in the Colorectal Robotic Assisted Research Program.

- Approval from DSMB for the, *"Robotic Assisted Rectal Resection"* study after the first 20 patients in December 2018.

Gynaecology

There are three surgeons involved in the Benign Gynaecology research program. Another surgeon is predicted to join in the coming year.

- Re-establishment of the, *"Robotic Surgery for Benign Gynaecology*" study with data now up-to-date and over 45 patients now recruited into this project.

- The addition of the Benign Gynaecology Research Officer to assist with the robotic program.

Publications

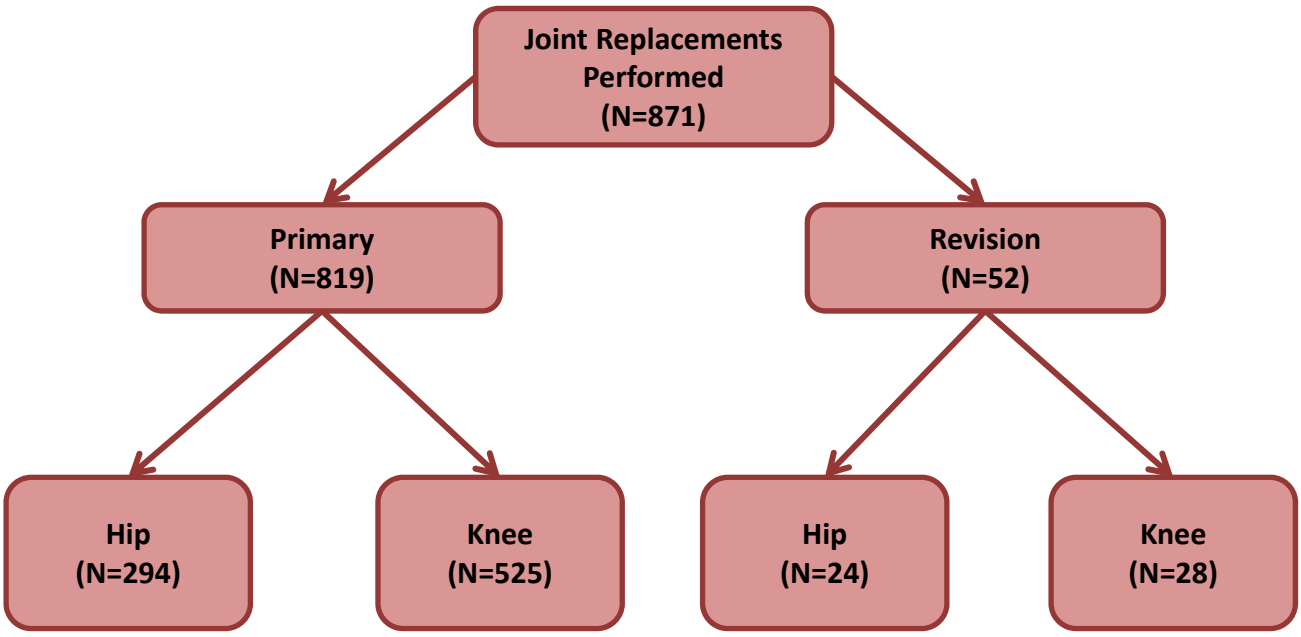
Poster Presentations:

- Diepen D, Chan L, Tse V, Thanigasalam R, Leslie S, Lalak A. MP74-06 Preoperative functional ultrasound imaging of the pelvic floor: correlation with early continence outcomes post radical prostatectomy. American Urological Association 2019 Annual Meeting, 3rd-6th May, Chicago, United Stated of America
- Stanislaus C, Steffens D, McBride K, Solomon, M, Young J, Thanigasalam N, Leslie S, Bannon P. *Overview of robotic cancer surgery in a tertiary pubic hospital.* Sydney Catalyst Postgraduate and Early Career Researcher Symposium, 26th June 2019, Sydney, Australia
- Yao J, Hameed A, Allen R, Pleass H, Lam V, Leslie S, Kim L, Lau H. V08-12 New frontiers: extracorporeal vascular reconstruction with robotic renal autotransplantation. American Urological Association 2019 Annual Meeting, 3rd-6th May, Chicago, United Stated of America

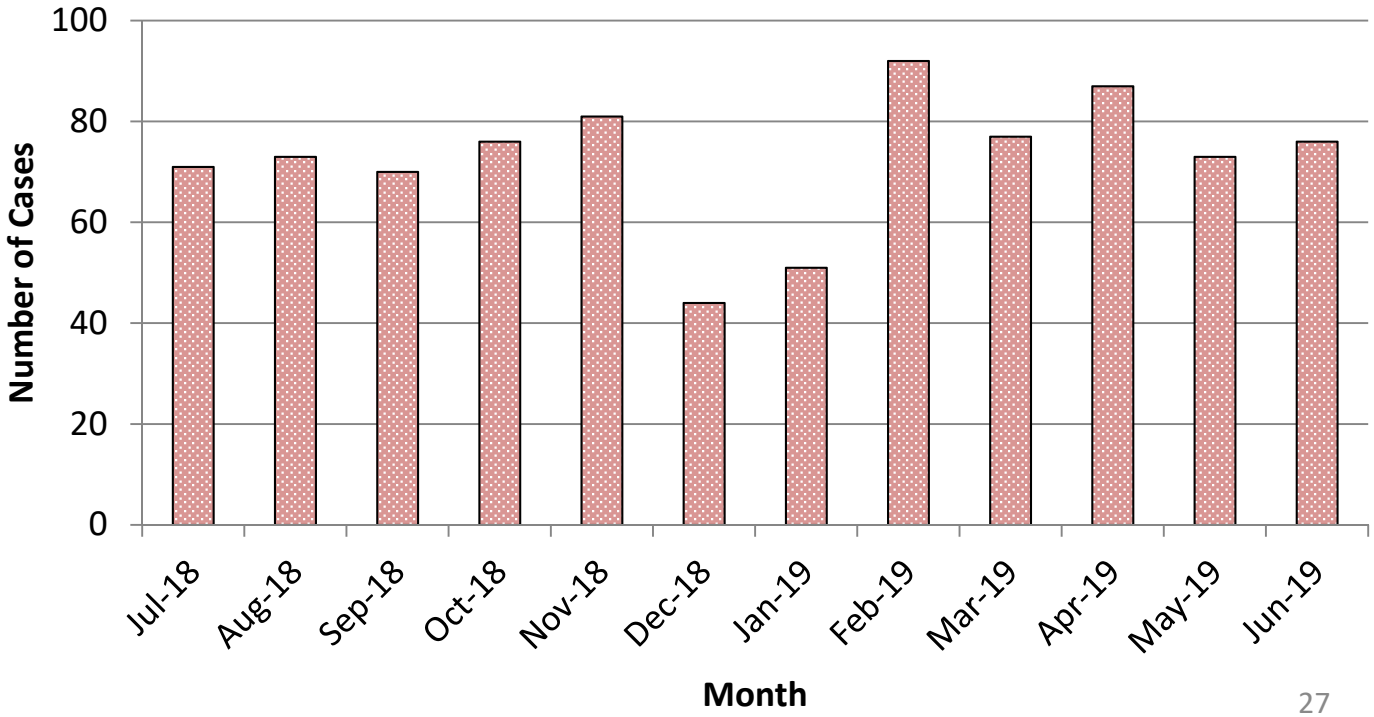
Published Articles:

- Fernando H, Garcia C, Hossack T, Ahmadi N, Thanigasalam R, Gillatt D. Incidence, Predictive Factors and Preventive Measures for Inguinal Hernia following Robotic and Laparoscopic Radical Prostatectomy: A Systematic Review. *Journal Of Urology* 2019; 201(6), 1072-1079.
- McBride K, Steffens D, Solomon M, Anderson T, Young J, Leslie S, Thanigasalam R, Bannon P. Research as the gatekeeper: Introduction of robotic-assisted surgery into the public sector. *Australian Health Review* 2019; doi:10.1071/AH19045
- McBride K, Steffens D, Duncan, K, Bannon P, Solomon M. Knowledge and attitudes of theatre staff prior to the implementation of robotic-assisted surgery in the public sector. *PLOS ONE* 2019; doi: 10.1371/journal.pone.0213840
- Van Diepen D, Chan L, Thanigasalam R, Lalak A, Leslie S, Sved P, Tse V. PD37-12 Perineal ultrasound assessment of pelvic floor function: a novel method of functional imaging of the pelvic floor prior to radical prostatectomy. *Journal of Urology* 2019*, 199*(4 Supplement); e735-e735; doi:10.1016/j.juro.2018.02.1747

Patient Flow 2019/2020



Monthly Surgical Volume

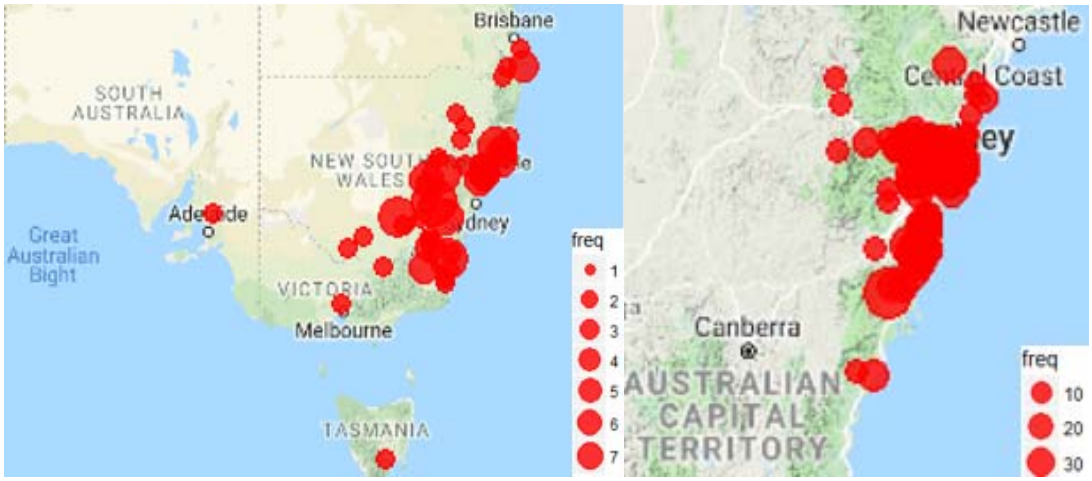


Patient and Surgical Characteristics

Age at surgery (mean ± SD)	68 ± 12 years
Gender, N (%)	
Male	354 (41%)
Female	517 (59%)
Median length of hospital stay [IQR]	5 days [3 to 6 days]
Hip	5 days [3 to 6 days]
Knee	5 days [3 to 6 days]
Median duration of surgery [IQR]	1.5 hours [1.3 to 1.9 hours]
Hip	1.5 hours [1.3 to 1.8 hours]
Knee	1.5 hours [1.3 to 1.9 hours]
Surgical urgency, N (%)	
Elective	871 (100%)
Location of Residence, N (%)	
Sydney	792 (91%)
Regional NSW	69 (8%)
Interstate	10 (1%)

SD=standard deviation; IQR=interquartile range; ICU=intensive care unit; NSW = New South Wales

Geographic Distribution of Patients



2018/2019 Highlights

- Clinically relevant data for all hip and knee replacements performed at RPAH are captured in the Lower Limb Arthroplasty Database (LOAD). This database has now captured over 1500 cases.

- The use of the MAKO (Stryker) robot for joint replacements has been closely monitored by a Data Safety and Monitoring Board. After the 50th robotic case was performed on the 14th of February 2019, the board met with investigators and deemed the program safe to continue. The 100th robotic case has subsequently been performed on the 6th of May 2019.

- The department is currently collaborating with Leiden University Medical Center, The Netherlands, to facilitate the largest study investigating Tenosynovial Giant Cell Tumours ever attempted.

Publications

Published Articles:

- Karunaratne S, Duan M, Pappas E, Fritsch B, Boyle R, Gupta S, Stalley P, Horsley M, Steffens D. The effectiveness of robotic hip and knee arthroplasty on patient-reported outcomes: a systematic review and meta-analysis. *International Orthopaedics* 2019. 43:6; doi:10.1007/s00264-018-4140-3

- Putnis S, Neri T, Grasso S, Linklater J, Fritsch B, Parker D. ACL hamstring grafts fixed using adjustable cortical suspension in both the femur and tibia demonstrate healing and integration on MRI at one year. *Knee Surgery, Sports Traumatology, Arthroscopy* 2019; ePub; doi:10.1007/s00167-019-05556-6

- Twiggs JG, Wakelin EA, Fritsch BA, Liu DW, Solomon MI, Parker DA, Klasan A, Miles BP. Clinical and statistical validation of a probabilistic prediction tool of total knee arthroplasty outcome. *Journal of Arthroplasty* 2019; ePub; doi:10.1016/j.arth.2019.06.007

Publications (continued)

Published Articles (continued):

- An VVG, Twiggs J, Leie M, Fritsch BA. Kinematic alignment is bone and soft tissue preserving compared to mechanical alignment in total knee arthroplasty. *Knee* 2019; 26:2; doi:10.1016/j.knee.2019.01.002
- Klasan A, Putnis SE, Yeo WW, Fritsch BA, Coolican MR, Parker DA. Advanced age is not a barrier to total knee arthroplasty: a detailed analysis of outcomes and complications in an elderly cohort compared with average age total knee arthroplasty patients. *Journal of Arthroplasty* 2019; ePub; doi:10.1016/j.arth.2019.05.007
- An VV, Sivakumar BS, Phan K, Fritsch BA, Sher D. Isolated versus combined medial patellofemoral ligament reconstruction for lateral instability of the patella. *Journal of Orthopaedic Surgery (Hong Kong)* 2019; 27:1; doi:10.1177/2309499018820698
- Chahla J, Murray IR, Robinson J, Lagae K, Margheritini F, Fritsch B, Leyes M, Barenius B, Pujol N, Engebretsen L, Lind M, Cohen M, Maestu R, Getgood A, Ferrer G, Villascusa S, Uchida S, Levy BA, Von Bormann R, Brown C, Menetrey J, Hantes M, Lording T, Samuelsson K, Frosch KH, Monllau JC, Parker D, La Prade RF, Gelber PE. Posterolateral corner of the knee: an expert consensus statement on diagnosis, classification, treatment, and rehabilitation. *Knee Surgery, Sports Traumatology, Arthroscopy* 2018; 27:8; doi:10.1007/s00167-018-5260-4
- Wakelin EA, Tran L, Twiggs JG, Theodore W, Roe JP, Solomon MI, Fritsch BA, Miles BP. Accurate determination of post-operative 3D component positioning in total knee arthroplasty: the AURORA protocol. *Journal of Orthopaedic Surgery and Research* 2018; 13:1; doi:10.1186/s13018-018-0957-0
- Sehgol TA, Boyle RA. Surgical treatment of meta-diaphyseal osteonecrosis: case report and review of the literature. *ANZ Journal of Surgery* 2018; 89:6; doi:10.1111/ans.14303
- Muir C, Szajer J, Mansberg R, Russo R, Banh J, Boyle R, Crawford B. Low bone mineral density in a man with recurrent minimal trauma fractures: a cauTIOnary tale of unrecognised hypophosphatasemia. *Internal Medicine Journal* 2018; 48:8; doi:10.1111/imj.13980

Publications (continued)

Oral Presentations:

- Dave A, Matthews T, Gupta S. *Litigation trends following total hip arthroplasty in Australia.* Australian Orthopaedic Association Queensland Branch Scientific Meeting, 7th June 2019, Noosa Heads, Australia
- Youlden D, Farhat M, Havard H, Stalley, P. *Surgical predictors of postoperative dislocation in Bayley-Walker reverse-constrained proximal humerus replacements.* Australian Orthopaedic Association Queensland Branch Scientific Meeting, 7th June 2019, Noosa Heads, Australia
- Youlden D, Tong Y, Karunaratne S, Gupta S. *Does room sharing affect length of stay following THR and TKR?* Australian Orthopaedic Association Queensland Branch Scientific Meeting, 7th June 2019, Noosa Heads, Australia
- Kim R, Boyle R, Chapuis P, Karunaratne S, Stalley P. *The epidemiology of tenosynovial giant cell tumour at a state-wide tumour referral centre*. Australian Orthopaedic Association South Australia/Northern Territory Branch Scientific Meeting, 9th November, Stepney, Australia
- Kim R, Boyle R, Chapuis P, Karunaratne S, Stalley P. *Tenosynovial giant cell tumour at a state-wide tumour referral centre*. Australasian Sarcoma Study Group Annual Scientific Meeting, 12th October 2018, Perth, Australia
- Stalley P. *Indications for wide resection and preoperative embolization*. Australian Orthopaedic Association Annual Scientific Meeting, 11th October 2018, Perth, Australia
- Boyle R. *Tumour: managing metastases, knowing when to stop*. Australian Orthopaedic Association Annual Scientific Meeting, 11th October 2018, Perth, Australia
- Sivaji S, Boyle R, Karunaratne S, Stalley P. *An assessment of functional outcomes in the largest known series of sacrectomy/pelvic exenteration patients worldwide*. Australian Orthopaedic Association Annual Scientific Meeting, 11th October 2018, Perth, Australia

Publications (continued)

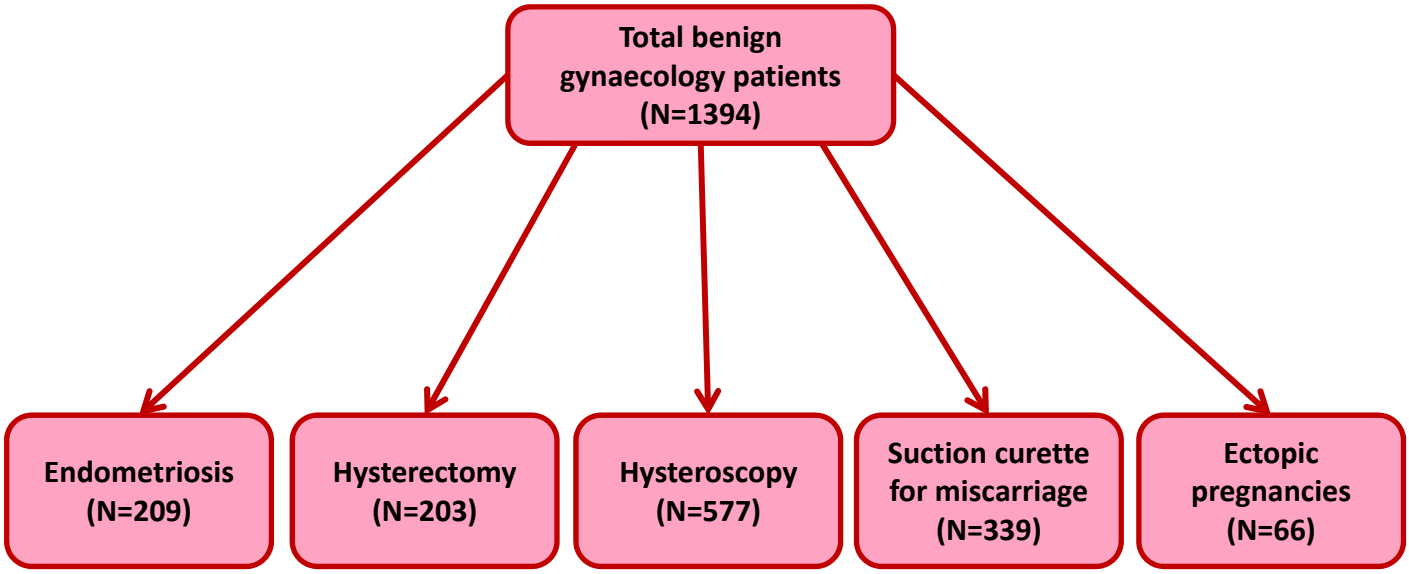
Oral Presentations (continued):

- Farhat M, Stalley P. *Experience with Bayley-Walker reverse constrained proximal humeral replacement*. Australian Orthopaedic Association Annual Scientific Meeting, 11th October 2018, Perth, Australia
- Havard H, Stalley P. *Planning and design of 3D custom implants for massive pelvic defects: the lessons we've learnt thus far*. Australian Orthopaedic Association Annual Scientific Meeting, 11th October 2018, Perth, Australia
- Boyle R. *The posterior cortex is a reliable reference for reproducing native femoral anteversion with a prosthetic stem*. Australian Orthopaedic Association Annual Scientific Meeting, 9th October 2018, Perth, Australia
- Stalley P. *Approach to spinal tumours and surgical options for both primary and secondary malignancies*. New Zealand Orthopaedic Spine Society Meeting, 5th October 2018, Noosa, Australia
- Stalley P. *Lumbosacral tumours and reconstruction options*. New Zealand Orthopaedic Spine Society Meeting, 5th October 2018, Noosa, Australia
- Stalley P. *Robotic surgery and 3D printing in pelvic reconstruction.* Back to PA Day: Innovations for Better Health Outcomes, 6th September 2018, Camperdown, Australia
- Farey J, Pierrepoint J, Gupta S. *Abductor function following anterolateral approach for total hip arthroplasty: a gait motion analysis study.* Australian Orthopaedic Association New South Wales Branch Scientific Meeting, 4th August 2018, Hunter Valley, Australia

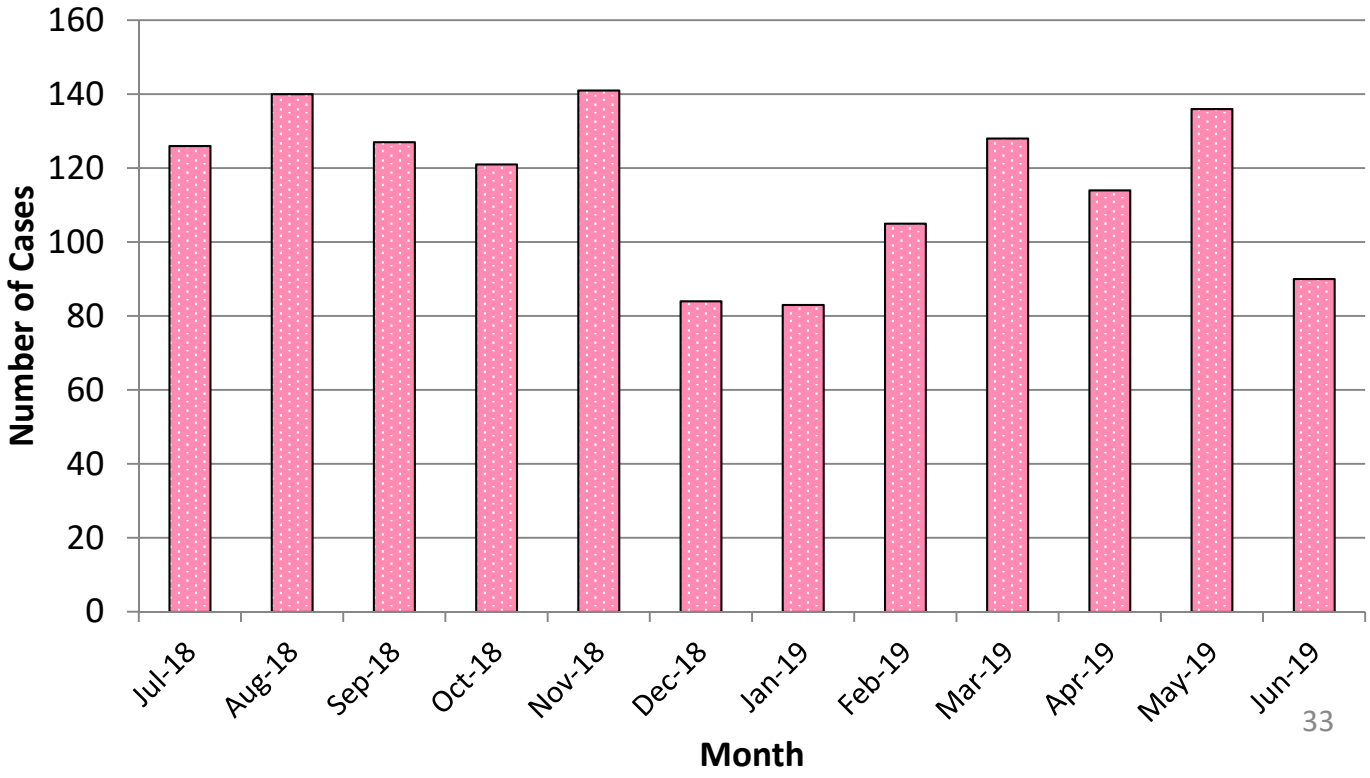
Poster Presentations:

- Lim J, Ho M, Karunaratne S, Lansdown A. *Adductor canal catheters: displacement & sensory blockade*. Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine Annual Scientific Meeting, 29th April 2019, Kuala Lumpur, Malaysia

Patient Flow 2018/2019



Monthly Surgical Volume

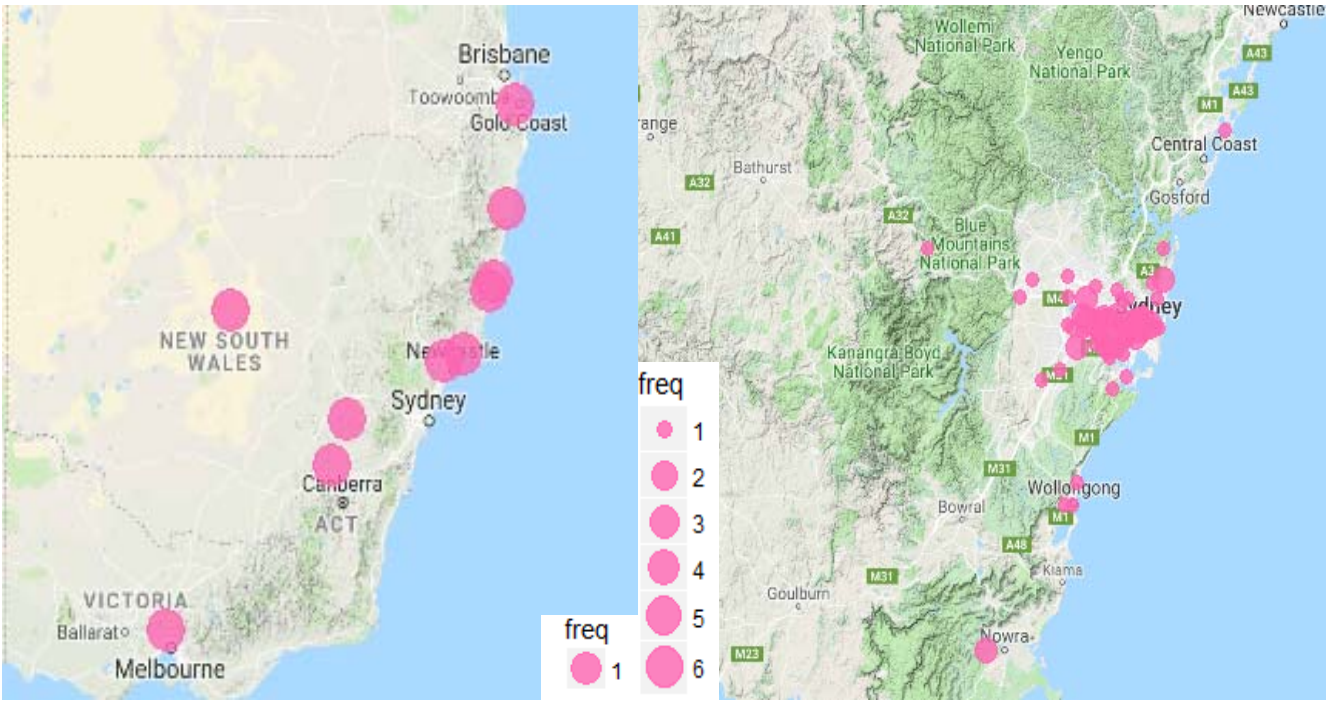


Patient and Surgical Characteristics

Age at surgery (mean ± SD)	40 ± 12 years
Gender, N (%)	
Female	1394 (100%)
Median length of hospital stay [IQR]	1 day [1 to 2 days]
Median duration of surgery [IQR]	0.8 hours [0.5 to 1.6 hours]
Surgical urgency , N (%)	
Elective	1144 (82%)
Emergency	250 (18%)

SD=standard deviation; IQR=interquartile range; ICU=intensive care unit

Geographic Distribution of Patients



Benign Gynaecology

2018/2019 Highlights

- The Benign Gynaecology Research Program has recorded 1394 surgeries performed at the Royal Prince Alfred Hospital during the 2018/2019 financial year.

- In April 2019, the Benign Gynaecology Department has appointed Ms Dana Georgevsky . Dana's overall role is to coordinate and manage all Benign Gynaecology research projects.

Research Highlights

- **Benign Gynaecology Surgical Research Database**: We are currently in the process of submitting an application to the ethics committee to allow us to capture data from the three main areas in Benign Gynaecology, including Endometriosis, Uterine Surgeries and pelvic floor surgeries which includes urinary incontinence and prolapses. This surgical database will contain all demographic, pre-operative history, surgery details, post-operative details as well as quality of life data in the form of patient reported outcome measures.

- **Pelvic Mesh Research Database**: We are also in the process of developing a research protocol to submit to ethics to retrospectively identify all patients that have had a Mesh inserted here at Royal Prince Alfred Hospital in the last ten years. We will capture various patient reported outcome measures which will contribute to the Pelvic Mesh research database, along with clinical assessment data collected in the Mesh clinic. Once we have identified all patients of interest any patient/s that has had any problems with their surgery will be referred to our Pelvic Mesh clinical service at RPA for a comprehensive assessment from the multi disciplinary team.

- Agreement from the University of Sydney to establish new Master's course in Sexual and Reproductive Health commencing 2018

Publications

Published Articles:

- Dunkley S, Curtin JA, Marren AJ, Heavener RP, McRae S, Curnow JL. (2019) Updated Australian consensus statement on management of inherited bleeding disorders in pregnancy. *Med J Aust*; 210(7):326-332; doi:10.5694/mja2.50123

- Walters KA, Eid S, Edwards MC, Thuis-Watson R, Desai R, Bowman M, Marren AJ, Handelsman DJ. (2019) Steroid profiles by liquid chromatography-mass spectroscopy of matched serum and single dominant ovarian follicular fluid from women undergoing IVF. *Reprod Biomed Online*; 38(1)30-37; doi:10.1016/j.rbmo.2018.10.006

- Alnitkar G, Phillips CL, Hoyos CM, Marren AJ, Bowman MC, Yee BJ (2018). Linking sleep disturbance to idiopathic male infertility. *Sleep Med Rev*; 42:149-159; doi:10.1016/j.smrv.2018.07.006

- Li YH, Marren A. (2018) Recurrent pregnancy loss: a summary of international evidence-based guidelines and practice. *Australian Journal of General Practice*, 47: 432-436

- Li Y, Marren AJ. (2018) How to Treat: Endometriosis. *Australian Doctor.*

Cancer Variations

- Over the past year, SOuRCe has continued to investigate variations in cancer surgical care and outcomes under the leadership of Professor Jane Young. We have focused on the nature and timeliness of pathways to diagnosis and treatment for people with lung and head and neck cancer, particularly for people living outside metropolitan areas and for those from culturally and linguistically diverse backgrounds. Following a sabbatical period at the Usher Institute of Population Health Sciences at the University of Edinburgh in 2018, Professor Jane Young was awarded funding to establish a Sydney-Edinburgh consortium to progress cancer variations research.

  - **The University of Sydney-The University of Edinburgh Partnership Collaboration Award (2018)**
    - Investigators: Professor Jane Young (USyd CI), Dr Evropi Theordoratou (UEdin CI), A/Professor Cherry Koh, Professor Michael Solomon, Dr Kheng-Seong Ng, Ms Rebecca Venchiarutti, Mr Yazhou He, Dr Peter Hall, Professor Eva Morris, Professor Paul Finan, Dr David Morrison
    - Funding: $20,000

Research Highlights

- In April 2019, SOuRCe welcomed researchers from the University of Edinburgh for the first University of Sydney-University of Edinburgh Partnership Symposium, and a reciprocal event will be held in September 2019 in Edinburgh, Scotland.

- Dr Evropi Theodoratou, and PhD students Wei Xu and Yazhou He, presented on *Genomic, Clinical and Health System Perspectives on Variations in Colorectal Cancer Outcomes.*

USYD-Edinburgh Partnership Symposium, Sydney, April 2019

Head and Neck Cancer Pathways

- Rebecca Venchiarutti is undertaking a PhD examining geographic variations in pathways to diagnosis and treatment of head and neck cancer in NSW under the supervision of Professor Jane Young, Professor Jonathan Clark, Associate Professor Carsten Palme and Professor Michael Solomon.

- This work is being conducted in collaboration with researchers and clinicians at the Chris O'Brien Lifehouse, the Mid North Coast Cancer Institute, the Northern NSW Cancer Institute, and the University of Sydney.

- Three projects are currently underway:
  - A retrospective review of times to diagnosis and treatment of patients with oral cancer *(manuscript under review)*

  - A prospective study recruiting newly diagnosed head and neck cancer patients from Sydney, the Mid North Coast of NSW, and the North Coast of NSW

  - A survey of general practitioners investigating facilitators and barriers to referral of suspected head and neck cancer in primary care, and the differential experiences and views of regional/remote GPs and metropolitan GPs

Cancer Care Coordination (CONNECT)

- The Cancer Care Coordination Questionnaire for Patients (the CCCQ-P) was translated into Chinese (Simplified and Traditional), and Arabic during 2017 and 2018.

- This resource will provide researchers with a tool to measure cancer care coordination in patients from non-English speaking background, which are an often overlooked group in research.

- The manuscript is currently under review, and there has already been interest in this resource from cancer researchers in China.

Publications

Published Articles

- Morrell S, Young J, Roder D. The burden of cancer on primary and secondary health care services before and after cancer diagnosis in New South Wales, Australia. *BMC Health Services Research* 2019; 19:431; doi:10.1186/s12913-019-4280-1
- Lim BT, Huang Y-J, Shepherd HL, Shaw J, Costa D, Durcinsoka I, Young JM, White K, Sze M, Butow P. Health literacy and cancer care coordination in Chinese migrant patients and their carers: a cross-sectional survey. *Psycho-Oncology* 2019; 1-8; doi:10.1002/pon.5050
- Collett GK, Durcinoska I, Rankin NM, Blinman P, Barnes DJ, Anderiesz C, Young JM. Patients' experience of lung cancer care coordination: a qualitative exploration. *Supportive Care in Cancer* 2019; 27:485-493; doi:10.1007/s00520-018-4338-3
- Purdie S, Creighton N, White K, Baker D, Ewald D, Lee C, Lyon A, Man J, Michail D, Miller A, Tan L, Currow D, Young J. Pathways to diagnosis of non-small cell lung cancer: a descriptive cohort study. *NPJ Primary Care Respiratory M*edicine 2019; 29:2; doi:10.1038/s41533-018-0113-7
- Creighton N, Purdie S, Soeberg M, Walton R, Baker D, Young J. Self-selection in a population-based cohort study: impact on health service use and survival for bowel and lung cancer assessed using data linkage. *BMC Medical Research Methodology* 2018; 18:84 doi:10.1186/s12874-018-0537-3
- Mazza D, Lin X, Walter FM, Young JM, Barnes DJ, Mitchell P, Brijnath B, Martin A, Emery JD. The LEAD study protocol: a mixed-method cohort study evaluating the lung cancer diagnostic and pre-treatment pathways of patients from Culturally and Linguistically Diverse (CALD) backgrounds compared to patients from Anglo-Australian backgrounds. *BMC Cancer* 2018; 18(1):754; doi:10.1186/s12885-018-4671-4
- Beesley VL, Janda M, Burmeister EA, Goldstein D, Gooden H, Merrett ND, O'Connell DL, Wyld DK, Chan RJ, Young JM, Neale RE. Association between pancreatic cancer patients' perception of their care coordination and patient-reported and survival outcomes. *Palliative & Supportive Care* 2018; 16(5):534-543; doi:10.1017/S1478951517000608

Publications (continued)

Oral Presentations

- Venchiarutti RL, Clark JR, Palme CE, Shakespeare TP, Hill J, Tahir ARM, Dwyer P, Young JM. *Geographic variation in time to diagnosis and treatment of oral cavity and oropharynx cancer in NSW.* Sydney Catalyst Postgraduate and Early Career Research Symposium, 26th June 2019, Sydney, Australia (Winner of Best T2/3 Presentation)
- Venchiarutti RL. *Barriers to timely referral to head and neck specialists: a survey of general practitioners.* SOuRCe Think Tank, 21st June 2019, Sydney, Australia
- Young J. *Unwarranted variation in follow up after colorectal cancer treatment in NSW*. University of Sydney – University of Edinburgh Partnership Symposium (Genomic, clinical and health system perspectives on variations in colorectal cancer outcomes), 4th-5th April 2019, Sydney, Australia
- Venchiarutti RL, Palme CE, Clark JR, Tune D, Young JM. *Influence of remoteness of residence on timeliness of diagnosis and treatment, and survival of patients with head and neck cancer in New South Wales, Australia.* Clinical Oncology Society of Australia's 45th Annual Scientific Meeting, 13th-15th November 2018, Perth, Australia ('Best of the Best Orals – Epidemiology')
- Venchiarutti RL, Palme CE, Clark JR, Young JM. *Geographic variations in time to treatment and survival outcomes for head and neck cancer patients in New South Wales, Australia: a retrospective cohort study.* Translational Cancer Research Network Symposium, 30th October 2018, Sydney, Australia
- Venchiarutti RL, Clark JR, Palme CE, Young JM. Impact of remoteness of residence on time to diagnosis and treatment of head and neck cancer in NSW. *Asia Pacific Journal of Clinical Oncology* 2018; 14(S6):1-34; doi:10.1111/ajco.13071
- Venchiarutti R, Clark J, Palme CE, Solomon M, Young J. Pathways to treatment of oropharynx, oral cavity and cutaneous SCC. *Journal of Global Oncology* 2018; 4(S2):p41s; doi:10.1200/jgo.18.33700

Publications (continued)

Oral Presentations (continued)

- Venchiarutti RL, Palme CE, Clark JR, Tune D, Young J. *Variations in time to diagnosis and treatment of head and neck cancer: comparing outcomes of metropolitan and regional/remote patients in NSW.* Mid North Coast Local Health District Health Innovation and Research Symposium, 16th-17th August 2018, Coffs Harbour, Australia
- Venchiarutti R, Clark J, Palme CE, Solomon M, Young J. *Pathways to treatment of oropharynx, oral cavity and cutaneous SCC*. ANZHNCS Annual Scientific Meeting, 26th-28th July 2018, Melbourne, Australia

Poster Presentations

- Venchiarutti RL, Clark JR, Palme CE, Shakespeare TP, Hill J, Tahir ARM, Dwyer P, Young JM. *Regional/remote differences in timeliness of diagnosis and treatment of head and neck cancer in NSW.* On the Shoulders of Giants: Past, Present, Future in Head and Neck Cancer, 29th June 2019, Sydney, Australia
- Venchiarutti RL, Palme CE, Clark JR, Young JM. *Geographic variations in time to diagnosis and treatment of head and neck cancer in NSW.* Sydney Cancer Conference, 11th-12th October 2018, Sydney, Australia