



Surgical Trainee Research Initiative and Evaluation (STRIVE) Annual Report 2018-2019

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Dartmouth-Hitchcock Medical Center

July 2018 – June 2019

Introduction

Since 2016, the Surgical Trainee Research Initiative and Evaluation (STRIVE) Program has supported general and vascular surgery residents pursuing a research fellowship with sponsorship from the Department of Surgery at Dartmouth-Hitchcock Medical Center, as well as those enrolled in the VA Quality Scholars Program.

The STRIVE program compliments and strengthens the research mentorship offered by faculty through regular check-ins with research residents, operational support, and by offering a range of opportunities for residents to present, receive feedback, and engage in discussion on research projects with faculty and peers. These opportunities include weekly research-in-progress meetings held as part of the Chair's Academic and Non-technical Development Opportunities (CAN-DO) conference, the annual Surgical Trainees Advancing Research Symposium (STARS), travel funds to present at regional and national professional society meetings, and opportunities to participate in other multidisciplinary forums with faculty from across Dartmouth.

During their research year or years, general and vascular surgery residents are encouraged to actively seek out opportunities that align with their interests both within and beyond Dartmouth. STRIVE provides residents with guidance, encouragement and links to resources as appropriate. Each year, research residents pursue a range of opportunities to gain the experience they desire, from self-directed research training and quality improvement projects, to external research fellowship programs, such as the Surgical Education Research Fellowship and the VA Quality Scholars Program. This report summarizes the efforts and achievements of the general and vascular surgery residents engaged in full-time mentored research between July 2018 and June 2019.

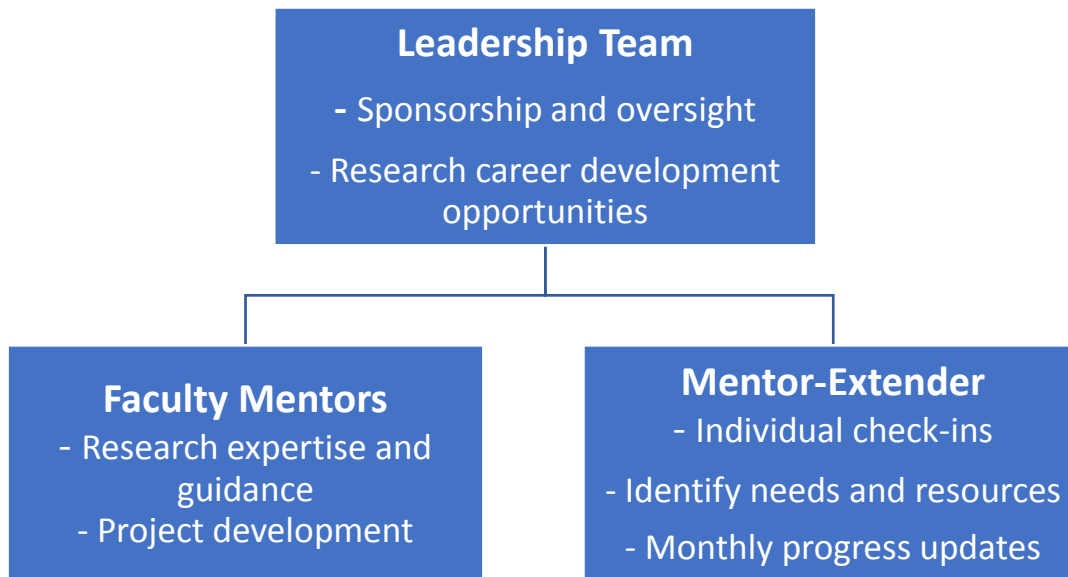
STRIVE Program Overview

The STRIVE program aims to track and support the progress of research residents in the Department of Surgery through regular check-ins and provide department leaders with timely and accurate information on the progress and achievements of research fellows.

The key elements of the program combine leadership and oversight from the Department Chair, Vice Chair for Research and Vice Chair for Education with faculty mentorship and operational support. Faculty mentors, or research PIs team up with research residents based on shared research interests. Faculty mentors serve as PIs for resident research projects, ensure quality of the research design and methods, and work closely with the residents on the abstract and manuscript preparation and presentations. Residents typically have multiple PIs who mentor them on specific projects throughout the year. This model helps ensure that residents gain exposure to a variety of research methods and work styles and a continuous pipeline of projects. In addition, residents alternate presenting their research-in-progress at the CAN-DO conference, which serves as a forum for informal peer review and feedback. To help mentors and research fellows make efficient use of their time together, STRIVE uses a mentor-extender model in which research residents have regular check-ins with the STRIVE Research Manager, Ms. Moore, in addition to their faculty mentor and/or Principal Investigators.

Ms. Moore helps the research residents with planning, organizing and executing their research projects and facilitates linkages with faculty experts, medical students, and support services as needed. The Department Chair and Vice Chairs receive monthly updates summarizing the current projects of each research resident and their progress over the past month. In addition, the Leadership Team and Research Manager convene for semi-annual review meetings to discuss interim progress, challenges, and ideas to further strengthen the program.

STRIVE Organizational Chart



Major Projects and Accomplishments

During the 2018-2019 academic year, the STRIVE program supported five surgical research residents: Jenaya Goldwag (general surgery), enrolled in the one-year home-based Surgical Education Research Fellowship (SERF) program; Allison Wilcox and Eleah Porter (general surgery), engaged in self-directed research; Spencer Trooboff (general surgery) 2nd year research fellow sponsored by the VAQS program; and Zachary Wanken (vascular surgery), sponsored by an American Heart Association (AHA) Strategically Funded Vascular Disease Research Network (SFRN) grant. At the beginning of the year, Ms. Moore met individually with each resident to understand their goals, research interests, and projects, and establish a plan for continued support.

Drs. Goldwag, Wanken and Trooboff were each enrolled in a distinct fellowship program with a defined structure, expert mentorship, and clear milestones. As a SERF fellow, Dr. Goldwag's research year was grounded in her primary question, "how do residents prepare for the operating room?". SERF assigned an external faculty from the University of Wisconsin, Madison, with expertise in surgical education and qualitative methods to mentor Dr. Goldwag. Dr. Wanken was enrolled full-time in the Master's in Science degree program at The Dartmouth Institute for Health Policy in Clinical Practice in addition to serving as a fellow in the Brigham-Dartmouth Center of the AHA SFRN under the mentorship of Dr. Goodney. His primary research interests centered on vascular surgery and he had pre-defined projects which aligned with milestones set by the MS program at TDI and the AHA SFRN project. As general surgery research residents, Drs. Wilcox and Porter were each working independently, but had some common interests in trauma/acute care and planned to collaborate with each other on projects throughout the year.

Ms. Moore maintained a running list of each resident's projects, met monthly with each of them, and provided ad hoc project-specific support as needed. Table 1 below summarizes the key achievements resulting from the residents' research activities over the course of the year. Each resident's specific interests and projects are detailed below.

Table 1: Publications and Presentations from DHMC Surgical Research Residents: July 2018 – June 2019

Resident	Presentations (<i>accepted - local and national conferences</i>)	Publications (<i>accepted - first author</i>)	Manuscripts (<i>under review - first author</i>)
Jenaya Goldwag	7	2 (1 iBook)	2
Allison Wilcox	7	4 (1 book chapter, 1 editorial)	1
Eleah Porter	7	2	2
Zach Wanken	14	1	2
Spencer Trooboff	6	4 (2 editorials)	2
Mean Number of Deliverables	8.2	3	2.4

Dr. Jenaya Goldwag:



With sponsorship from the Department of Surgery, Dr. Goldwag dedicated her research year to furthering her interest in surgical education research through completion of the SERF program. SERF is administered by the Association of Surgical Education (ASE), and aims to “equip investigators with the skills and knowledge needed to plan, implement and report research studies in the field of surgical education”. Dr. Goldwag’s primary research question, “*How to residents prepare for the OR?*” required her to gain skills and experience in qualitative study design and analysis, including conducting interviews, survey methods, and coding. In addition to her SERF project, Dr. Goldwag also sought out and acquired experience in grant-writing, retrospective chart reviews, systematic reviews, and multi-institutional surveys. **Overall, she completed the year with 2 first author publications, 2 manuscripts under review, and 7 first author abstracts accepted for poster or podium presentations.** She also submitted two proposals, one large AHRQ grant for an educational project led by Dr. Santos, and a smaller in-kind grant through the ASE’s Multi-Institutional Education Research Group.

SERF pairs residents with a research advisor with expertise in surgical education who guides them in the design, execution and dissemination of their chosen research project. Designated milestones include attendance at the ASE Annual Meeting in the Spring preceding the start of the fellowship year for training, networking and to select a topic; presentation of a project proposal at the American College of Surgeons (ACS) Clinical Congress in the Fall of 2017; and

a final project presentation at the ASE Annual Meeting the following Spring. Under the mentorship of her SERF advisor at University of Wisconsin, Madison, Dr. Goldwag conducted a literature review on resident OR preparation, then designed, tested and implemented qualitative interviews with 14 residents and medical students at Dartmouth-Hitchcock and the Geisel School of Medicine. This work was presented as a podium talk at ASE (in addition to required report-outs for SERF at ACS and Surgical Education Week) and is currently under review at the American Journal of Surgery.

Dr. Goldwag has also initiated a follow-on multi-institutional project examining specific types of educational resources utilized by surgical residents. This project is supported through in-kind assistance by ASE Multi-Institutional Education Research Group. Dr. Goldwag also partnered with Dr. Santos on the development and implementation of a curriculum for Laproscopic Common Bile Duct Exploration. For this project, she managed the submission of an R18 grant to the Agency for Healthcare Research and Quality (AHRQ), designed an iBook, and developed a nursing curriculum. As Dr. Goldwag has elected to extend her research fellowship for a second year in order to fortify her preparation for a career in surgical education research, execution of the LCBDE curriculum will be a focus in the coming year.

In addition to her focus on surgical education research, Dr. Goldwag partnered with Drs. Ivatury and Wilson on a variety of studies related to colon and rectal cancer surgery, and with Dr. Crockett on a project to examine the association between nonsteroidal anti-inflammatory drugs (NSAIDs) and intestinal perforations. Two of these chart review studies were related to quality of life (QoL) patient-reported outcomes (PRO) among colon and rectal cancer patients. This work was presented at the Academic Surgical Congress (ASC) and the Annual New England Society for Colon and Rectal Surgeons (NESCO) Conference and resulted in a publication in the Journal of Surgical Research. The systematic review manuscript is under review from the British Medical Journal. A third chart review on rectal cancer facial defects after stoma closure was presented at The Seventh Annual Surgical Trainees Advancing Research Symposium (STARS) and accepted as a poster by the New England Surgical Society (NESS). Lastly, Dr. Goldwag partnered with Dr. Briggs on an institutional study of All Terrain Vehicles (ATV) and snow mobile trauma in geriatric patients. The abstract was submitted to the Eastern Association for the Surgery of Trauma (EAST) and is under review. A similar project utilizing the National Trauma Database is underway and will continue into the coming year.

Publications

1. Goldwag J, Lyn R, Wilson L, Wilson M, and Ivatury S. Effect of Elective Sigmoidectomy for Diverticulitis on Bowel Function Patient-Reported Outcomes. J Surg Res. 2019 Apr 22; 241:135-140. Doi: 10.1016/j.jss.2019.03.041
2. Goldwag J, Marsicovetere P, Scalia P, Johnson H, Durand MA, Elwyn G, and Ivatury S. The impact of decision aids in patients with colorectal cancer: a systematic review. BMJ [Manuscript under review].
3. Goldwag J, and Jung S. Operating Room Preparation by General Surgery Residents: A qualitative analysis. American Journal of Surgery [Manuscript under review].
4. Goldwag J, Rosser J (Editors), 2018. Transcystic Common Bile Duct Exploration. 2018. The Stealth Learning Company. iBook. <https://itunes.apple.com/us/book/transcystic-common-bile-duct-exploration/id1447754319?mt=11>

Presentations

1. Goldwag J, Lyn R, Wilson L, Wilson M, and Ivatury S. Effect of Elective Sigmoidectomy for Diverticulitis on Bowel Function Patient-Reported Outcomes. Presented at 14th Annual Academic Surgical Congress; 2019 Feb 5-7th; Houston TX.
2. Goldwag J, and Jung S. Operating Room Preparation by General Surgery Residents: A qualitative analysis. Presented at Association for Surgical Education Annual Meeting at Surgical Education Week; 2019 April 23-27th; Chicago, IL.
3. Stucke R, Goldwag J, Fingeret A, and Rosenkranz K. Technology for training and assessment in residency: How to leverage apps and other software. Workshop held at Association for Surgical Education Annual Meeting at Surgical Education Week; 2019 April 23-27th; Chicago, IL.
4. Goldwag J, Sorensen M, and Jung S. Resource Use Among General Surgery Residents. Presented at Association for Surgical Education Annual Meeting at Surgical Education Week; 2019 April 23-27th; Chicago, IL.
5. Goldwag J, Wilson L, Ivatury S, Tsapakos M, and Wilson M. Incidence of Fascial Defects at Prior Stoma Sites in Patients with Colorectal Cancer. Presentation at The Seventh Annual STARS; 2019 May 9-10th; Lebanon, NH.

6. Goldwag J, Wilson L, Ivatury S, Tsapakos M, and Wilson M. Incidence of Fascial Defects at Prior Stoma Sites in Patients with Colorectal Cancer. Presentation at Annual NESCRC Conference; 2019 May 18-19th; Bretton Woods, NH.
7. Goldwag J, Lyn R, Wilson L, Wilson M, and Ivatury S. Effect of Elective Sigmoidectomy for Diverticulitis on Bowel Function Patient-Reported Outcomes. Presentation at Annual NESCRC Conference; 2019 May 18-19th; Bretton Woods, NH.

Dr. Allison Wilcox:



During her research year, Dr. Allison Wilcox's research interests focused on examining evidence and perceptions of gender bias towards female surgeons, use of guidelines in surgical research, and pediatric trauma/acute care surgery. **Overall, she completed the year with 4 first author publications, 1 manuscript under review, and 7 first author abstracts accepted for poster or podium presentations.**

Dr. Wong served as her overall research mentor and PI on core projects examining the visibility of female academic surgeons at the American College of Surgeons (ACS) Clinical Congress, Royal Australasian College of Surgeons (RACS) and ASC. In sum, this work resulted in a publication accepted by the Journal of the American College of Surgeons, three quickshot/brief presentations and one

poster at regional, national and international professional society meetings. Also under Dr. Wong's mentorship, Dr. Wilcox completed a comprehensive review of PRO research for inguinal hernias and use of the PRO Consort Extension Guidelines, resulting in a quickshot presentation at ASC and a publication in the Journal of Surgical Research. She also co-authored a systematic review on the use of SQUIRE guidelines in QI literature which has been accepted by Surgery and authored a book chapter on trends in palliative care with Dr. Wong. For another project stemming from her interest in gender bias, Dr. Wilcox partnered with internal medicine provider, Dr. Pinto-Powell on a survey examining residents and medical students experience and perception of bias during surgical consults. The manuscript is under review at the journal of Academic Medicine.

In pursuit of her other primary research interest related to pediatric trauma/acute care surgery, Dr. Wilcox partnered with Dr. Briggs on a retrospective observational study of pediatric snowmobile trauma using the National Trauma Database. For the analyses, the research team worked with SYNERGY biostatistics consultation core, which served as a valuable experience in learning to work with professional statisticians. The abstract was submitted to EAST in June 2019 and is currently pending a response. Working with Drs. Buchard and Mancini, Dr. Wilcox conceived and executed a retrospective chart review examining the association between strep milleri intra-abdominal infections and disease severity. The primary analyses was presented at the Surgical Infection Society meeting and STARS, and analyses of the pediatric patients has been accepted to NESS. Lastly, as a result of prior work with Dr. Baertschiger, Dr. Wilcox published a pediatric surgery case report in the Journal of Neonatal Surgery during her research year.

Publications

1. Wilcox AR, Trooboff SW, Lai CS, Turner PL, Wong SL. Trends in Gender Representation at the American College of Surgeons Clinical Congress and the Academic Surgical Congress: A Mixed Picture of Progress. Journal of the American College of Surgeons. In press accepted manuscript. Online 6/29/19. DOI: <https://doi.org/10.1016/j.jamcollsurg.2019.06.002>
2. Wilcox AR, Trooboff SW, Wong SL. Evaluating Patient-Reported Outcomes in Inguinal Hernia Clinical Trials. Journal of Surgical Research. In press accepted manuscript.
3. Sacks OA, Lambour AJ, Wilcox AR, Nammalwar S, Wong SL. Quality assessment of the literature on surgical quality improvement. Surgery. In press accepted manuscript. DOI: <https://doi.org/10.1016/j.surg/2019.05.0160039-6060>.

4. Merali N, Wilcox AR, Croitoru DP, Baertschiger RM. Infantile Hypertrophic Pyloric Stenosis Following Repair of H-type Tracheoesophageal Fistula Repair and Post-operative Erythromycin Therapy. *Journal of Neonatal Surgery*. 2019 Jan;8(1):7. DOI: <https://doi.org/10.21699/jns.v8i1.848>.
5. Wilcox AR and Wong SL. Trends in Palliative Surgical Care. *Advances in Surgery*. *In press*. Online 5/17/19. DOI: <https://doi.org/10.1016/j.yasu.2019.04.016>.
6. Wilcox AR and Wong, SL. Changing the status quo, including how we measure it. *Ann Surg Oncol*. 2018 Jul;25(7): 1801-1802. Epub 2018 May 3. doi: 10.1245/s10434-018-6500-z

Presentations

1. Wilcox AR, Lai CS, Stanzah FE, Farrar JG, Trooboff SW, Turner PL, Wong SL. Gender representation at surgical conferences: the American and Australasian experiences. Accepted as a Quickshot presentation at the Society of Asian Academic Surgeons, September 2019. Boston, MA.
2. Wilcox AR, Lai CS, Stanzah FE, Farrar JG, Wong SL. Gender representation by specialty track at surgical meetings: the American and Australasian experiences. Accepted as a brief presentation at the New England Surgical Society Annual Meeting, September 2019. Montreal, ON.
3. Wilcox AR, Sacks OA, Baumann LE, Porter ED, Croitoru DP, Baertschiger RM. Increased disease severity in patients suffering from appendicitis with cultures growing *Streptococcus anginosus*. Accepted as a poster at the New England Surgical Society Annual Meeting, September 2019. Montreal, ON.
4. Wilcox AR, Sacks OA, Baumann LE, Porter ED, Croitoru DP, Baertschiger RM. Increased disease severity in patients with appendicitis who grow *Streptococcus anginosus*. Presented by Dr. Baumann as a Mini Oral at the Surgical Infection Society Annual Meeting, June 2019. San Diego, CA.
5. Wilcox AR, Farrar JG, Stanzah FE, Trooboff SW, Crammond B, Turner PL, Wong SL, Lai CS. The Australasian and American Experiences of Gender Representation at Surgical Conferences: How Far Have We Progressed and What Does the Future Hold? Presented by Dr. Lai as an e-poster at the Royal Australasian College of Surgeons Annual Scientific Congress, May 2019. Bangkok, Thailand.
6. Wilcox AR, Trooboff SW, Wong SL. Evaluating Patient-Reported Outcomes in Inguinal Hernia Clinical Trials. Presented as a Quick Shot at the Academic Surgical Congress, February 2019. Houston, TX.
7. Wilcox AR, Wong SL. Trends in Gender Representation at the Academic Surgical Congress. Presented as a Quick Shot at the Academic Surgical Congress, February 2019. Houston, TX.

Dr. Eleah Porter:



Dr. Porter's research interests lead her to conceive and design several multi-phased projects focused on trauma/acute care surgery and unnecessary screening tests. Her specific goals were to: build on prior work examining the occurrence of severe injury among alpine skiers and snowboarders; examine perceived need among surgeons for screening tests in trauma/acute care surgery patients, coupled with quality improvement interventions (QI) to reduce unnecessary tests; and lay the foundation for further trauma/acute care research projects to be completed during the following year as Critical Care Fellow. Her primary mentorship team consisted of Drs. Phillips,

Crockett, Angeles, Wolffing and Briggs. **Overall, she completed the year with 2 first author publications, 2 manuscripts under review, and 7 first author abstracts accepted for poster or podium presentations.** In addition, she submitted a grant to NESS to obtain funding for research assistant support to carry out prospective quality improvement interventions to reduce unnecessary tests.

Using data collected for her prior study, "Ski the East" which was presented at the Wilderness Medical Society Annual Meeting & Wilderness Medicine Conference in August of 2018, Dr. Porter partnered with Dr. Trooboff to analyze the association between helmet use and severely injured skiers in alpine winter sports. The abstract was accepted as a

featured 20-minute presentation at the Western Trauma Association Meeting in March 2020 and has been accepted to the Journal of Trauma.

To study perceptions and trends related to unnecessary tests, Dr. Porter devised a three-pronged research project consisting of a retrospective review of practice patterns, followed by a surgeon survey and presentation of results, and a prospective QI intervention. This approach was applied to study unnecessary use of post-chest tube chest x-rays, post-operative lab tests, and post-appendectomy labs. The post-chest tube chest x-ray project included a sub analyses to examine the association between receiving a chest x-ray and distance of patients' residence from the hospital. For this work she was awarded 2nd place at the Vermont Chapter of the ACS Spring. A related abstract was accepted for a brief presentation at NESS and the manuscript is under review at the Journal of Surgical Research. The other two projects will be presented as posters at NESS. The QI intervention is underway for each of the project, consisting of nine months of prospective data collection, measurement and "report cards" for surgeons, and will be completed during the subsequent year.

In addition to the QI interventions, Dr. Porter is also working with Dr. Briggs on three trauma-related research projects which will continue during her fellowship year: a retrospective study of geriatric ski trauma using the National Trauma Database; an examination of Vizient outcomes of EGS patients in the MICU, and a multi-institutional collaboration with the University of Vermont to characterize the New England rural trauma system. Dr. Porter is also assisting with a fourth project, led by Dr. Barth, to test new ways to improve adherence to excess opioid disposal guidelines.

Publications

1. Porter E, Finley D, Phillips J. Tension Hydrothorax Secondary to Small Cell Lung Cancer. *Respirology Case Reports*. 2019 March;7(5):1-3.
2. Porter E, Trooboff S, Haff M, Cooros J, Wolffing A, Briggs A, Rhynhart K, Crockett A. Helmet Use is Associated with Higher Injury Severity Scores in Alpine Skiers and Snowboarders Evaluated at a Level 1 Trauma Center. *J Trauma Acute Care Surg*. 2019 [in press].
3. Porter E, Fay K, Hasson R, Millington T, Finley D, Phillips J. Routine Chest X-Ray after Thoracic Surgery is Unnecessary. *J Surg Res* [under review].
4. Phillips J*, Porter E*, Beaulieu-Jones, Fay K, Hasson R, Millington T, Finley D. Postoperative Atrial Fibrillation Prophylaxis: Following Anatomic Resection Only. *J Surg Res* [under review].

Presentations

1. Porter E, Trooboff S, Fay K, Hasson R, Millington T, Finley D, Phillips J. Longer Travel Distance Associated with More Inpatient Chest Radiographs. Oral presentation. Vermont American College of Surgeons Spring Meeting 2019. [awarded second place]
2. Porter E, Ramkumar N, Wilcox A, Angeles C. Surgical Provider Attitudes Toward Etiology and Best Approach to Reduce Unnecessary Postoperative Lab Testing. Oral presentation. Dartmouth-Hitchcock Medical Center Surgical Trainees Advancing Research Symposium 2019, May 2019. Lebanon, NH
3. Porter E, Trooboff S, Haff M, Cooros J, Wolffing A, Briggs A, Rhynhart K, Crockett A. Helmet Use is Associated with Higher Injury Severity Scores in Alpine Skiers and Snowboarders. Podium presentation. Western Trauma Association Annual Meeting, March 2019. Snowmass, CO.
4. Porter E, Fay K, Hasson R, Millington T, Finley D, Angeles C, Phillips J. Chest Radiograph After Thoracic Surgery: Is it Necessary? Oral presentation. Academic Surgical Congress Annual Meeting, Feb 2019. Houston, TX.
5. Porter E, Wong LY, Kelly J, Trooboff S, Wilcox A, Angeles C. Less is More: Routine Postoperative Lab Testing in Elective General Surgery Patients. Oral presentation. Academic Surgical Congress Annual Meeting, Feb 2019. Houston, TX.
6. Porter E, Wong LY, Wilcox A, Goldwag J, Trooboff S, Martin E, Briggs A, Angeles C, Wolffing A. Routine Blood Count Monitoring is Unnecessary After Uncomplicated Appendectomy. Poster presentation. New England Surgical Society Annual Meeting, Sept 2019. Providence, RI.
7. Porter E, Trooboff S, Fay K, Hasson R, Millington T, Finley D, Phillips J. Longer Travel Distance Associated with Higher Utilization of Chest Radiographs After Chest Tube Removal in Thoracic Surgery Patients. Brief oral presentation. New England Surgical Society Annual Meeting 2019, Sept 2019. Providence, RI.

External Programs in Research: VA Quality Scholars Program & AHA SFRN Fellowship

In the 2018-2019 year, Dr. Trooboff completed his second year of the two-year VAQS Fellowship, while Dr. Wanken served as the AHA SFRN research fellow for the Brigham-Dartmouth Center. These external fellowships allowed each resident to complete the MS degree program at The Dartmouth Institute for Health Policy and Clinical Practice (TDI) as part of their research training. Led by Dr. Louise Davies, Brant Oliver, Brenda Sirovich, and Philip Goodney, the VAQS program at the White River Junction VA Medical Center has a longstanding history of success in mentorship and career development. It focuses on methods in outcomes research, quality improvement, and medical communication. A full report can be obtained at <http://www.vaoutcomes.org>. The AHA SFRN fellowship is funded through a four-year grant awarded to Dr. Goodney in April 2018 to study the use and effect of integrated management strategies for patients with peripheral arterial disease. The fellowship component included monthly professional development seminars offered by AHA, quarterly SFRN center meetings with the Brigham-Dartmouth team, and an annual network meeting with SFRN teams from across the country, all of which emphasized professional networking and collaboration.

Dr. Spencer Trooboff:



Dr. Trooboff entered the second year of his VAQS Fellowship with the aim of completing three key projects initiated during the prior year, in addition to collaborating with others to advance new surgical research projects. **Overall, he completed the year with 4 first author publications, 2 manuscripts under review, and 6 first author abstracts accepted for poster or podium presentations.** His primary mentors included Dr. Goodney and Dr. Wong.

Dr. Trooboff's primary project, conducted under the mentorship of Dr. Goodney, utilized Vascular Quality Initiative registry-linked claims data to evaluate the cumulative cost of open and endovascular surgical repair for abdominal aortic aneurysms. Dr. Trooboff obtained a data use agreement from the Centers for Medicare and Medicaid Services (CMS) in August 2018, which allowed him to use the data for his TDI Capstone project. In preliminary work, he examined Medicare reimbursement for index endovascular abdominal aortic aneurysm procedures. This work was presented at the Society for Clinical Vascular Surgery and the manuscript is under review at the Annals of Vascular Surgery. Following this, he worked closely with an expert Medicare claims analyst (Barbara Gladders, DHMC) to translate programming code and derive new variables for reintervention and imaging costs for both open abdominal aneurysm repair and EVAR procedures, and then compare cumulative costs. The resulting work is in the final stages of manuscript preparation and will be submitted to the Journal of Vascular Surgery (JVS) or Circulation CQO in the coming weeks. For his second project continued from year one, he completed a regional multi-center analysis of readmission after cardiac surgery. This paper has also been accepted in the Journal of Cardiac Surgery. Lastly, the systematic review on the psychosocial outcomes for adolescents undergoing bariatric surgery which Dr. Trooboff completed in the first year of his research fellowship, has been accepted to Obesity Surgery.

Throughout the year, Dr. Spencer also collaborated with a number of other researchers, assisting with analyses and is a co-author on various projects currently under review.

Publications (2018-2019 year only)

1. Trooboff SW, Stucke RS, Riblet NBV, Kulkarni A, Anand R, Casey A, Hofley MA. Psychosocial Outcomes Following Adolescent Metabolic and Bariatric Surgery: A Systematic Review and Meta-Analysis. *Obes Surg*. 2019 2019 Aug 6. doi: 10.1007/s11695-019-04048-3. [Epub ahead of print]. PMID: 31388963.
2. Trooboff SW, Magnus PC, Ross CS, Chaisson K, Kramer RS, Helm RE, Desaulniers H, De La Rosa RC, Westbrook BM, Duquette D, Brown JR, Olmstead EM, Malenka DJ, Iribarne A. A Multi-Center Analysis of Readmission after Cardiac Surgery: Experience of The Northern New England Cardiovascular Disease Study Group. *J Card Surg*. 2019 Jun 18. doi: 10.1111/jocs.14086. [Epub ahead of print]. PMID: 31212387.
3. Trooboff SW, Iribarne A. Long-term hospital readmissions after surgical versus transcatheter aortic valve replacement (Commentary). *Ann Thorac Surg*. 2019 May 29. pii: S0003-4975(19)30712-X. doi: 10.1016/j.athoracsur.2019.04.034 [Epub ahead of print]. PMID: 31152728.
4. Trooboff SW, Iribarne A. Adverse drug reactions to contrast media – Invited commentary. 2019;11(7):2680-2684.
5. Trooboff SW, Wanken Z, Goodney PP. Characterizing Reimbursements for Medicare Patients Receiving Endovascular Abdominal Aortic Aneurysm Repair at Vascular Quality Initiative Centers. *Ann Vasc Surg* [under review].
6. Trooboff SW, Iribarne A. What Influences Patient Satisfaction after Cardiac Surgery? A Prospective Analysis. *Ann Thorac Surg* [under review].

Presentations

1. Trooboff SW. Medicare Reimbursement for Endovascular Aortic Aneurysm Repair is Decreasing and Varies Substantially Across Centers. Society for Clinical Vascular Surgery, 47th Annual Symposium, March 2018. Boca Raton Hotel, Boca Raton, FL.
2. Trooboff SW. Understanding the Black Box: The Role of Specialist Intensity and Surgical Utilization in Accountable Care Organization Success. The American College of Surgery Clinical Congress (Podium), Oct. 23, 2018. SF217 HSR IV. Boston Convention and Exhibition Center, Boston, MA.
3. Trooboff SW. What Influences Patient Satisfaction after Cardiac Surgery? A Prospective Analysis of Predictors of Patient Hospital Experience. Oral presentation. Dartmouth-Hitchcock Medical Center Surgical Trainees Advancing Research Symposium 2019. Dartmouth-Hitchcock Medical Center, Lebanon, NH.
4. Trooboff SW. What Influences Patient Satisfaction after Cardiac Surgery? A Prospective Analysis of Predictors of Patient Hospital Experience. Moderated poster. Dartmouth-Hitchcock Medical Center Heart and Vascular Education and Research Trainee (HEART) Symposium, May 2019. Dartmouth-Hitchcock Medical Center, Lebanon, NH.
5. Trooboff SW. What Influences Patient Satisfaction after Cardiac Surgery? A Prospective Analysis of Predictors of Patient Hospital Experience. The Society of Thoracic Surgeons, 55th Annual Meeting, January 2019. San Diego Convention Center, San Diego, CA.
6. Trooboff SW. What Does Accountable Care and Value Mean to A Surgeon? VA National Quality Scholars Program – Summer Institute, August 2018. Houston, TX.

Dr. Zach Wanken:



As a vascular surgery resident, Dr. Wanken's research interests center on vascular surgery outcomes, including cost, surveillance, reintervention after endovascular aneurysm repair (EVAR). As a full-time MS student at TDI, Dr. Wanken sought to align his research projects with class deliverables when possible. This allowed him to maximize both the practical and educational aspects of his fellowship. **Overall, Dr. Wanken completed the year with 1 first author publications, 2 manuscripts under review, and 14 first author abstracts accepted for poster or podium presentations.**

In partnership with Dr. Goodney and other members of the AHA SFRN team, Dr. Wanken used the Vascular Quality Initiative (VQI) registry dataset linked to Medicare claims to examine adherence to long-term surveillance guidelines among patients treated with EVAR. This project involved working closely with an expert Medicare claims analyst. Dr. Wanken presented this

work at three regional meetings (including the Dartmouth-Hitchcock HEART symposium) and two national meetings. The manuscript has been accepted as a research letter at *Circulation*, pending revisions. In related work, Dr. Wanken led efforts to map International Classification of Disease, version 9 (ICD 9) codes to ICD version 10 codes. This work was necessary to update the VQI-Medicare linked datasets with claims data from 2015-2016, following the United States' switch from ICD9 to ICD10 codes on October 1, 2015. The mapping methodology was presented at Vascular Discoveries in May 2019. The manuscript is undergoing revisions and will be resubmitted to the *Journal of Vascular Surgery (JVS)*. The updated coding algorithms will be evaluated in future work as part of the Vascular Implant Surveillance and Interventional Outcomes Network (VISION). Using the same VQI-Medicare dataset, Dr. Wanken partnered with Dr. Trooboff to examine index costs for EVAR. Dr. Wanken presented the abstract at the Annual Meeting of the Vascular and Endovascular Surgical Society and is a co-author on the manuscript under review at the *Annals of Vascular Surgery*.

For his TDI coursework, Dr. Wanken embarked on a systematic review of reintervention after EVAR, which resulted in a poster presentation at the Vascular Annual Meeting (VAM) and a manuscript which is under review at *JVS*. His TDI capstone project centered on a retrospective chart review examining outcomes of the Endologix AFX graft. Dr. Wanken will present this work as a podium talk at the New England Society for Vascular Surgery (NESVS) Annual Meeting in September 2019 and aims to submit a manuscript to *JVS* by the end of the calendar year.

Publications

1. Wanken ZJ, Columbo JA, Mao J, Kang R, Trooboff SW, Moore KO, Kang J, Suckow BD, Sedrakyan A, Stone DH, Goodney PP. Claims-Based Surveillance for Reintervention after Endovascular Aneurysm Repair Among Non-Medicare Patients. Research Letter in *Circulation*, 2019 [in press].
2. Wanken ZJ, Anderson PB, Bessen SY, Rode JB, Columbo JA, Trooboff SW, Moore KO, Goodney PP. Transitioning from ICD-9 to ICD-10 in Administrative Claims Based Research for Cardiovascular Procedures. Submitted to *J of Vasc. Surgery* [under review].
3. Wanken ZJ, Suckow BD. Coiling of Aberrant Tibial Artery Pseudoaneurysm After Iatrogenic Orthopedic Injury. Submitted to *J of Vasc. Surgery*. [under review].

Presentations

1. Wanken ZJ, Anderson PB, Trooboff SW, Columbo JA, Goodney PP. Comparison of Endologix Endografts made with Strata Fabric Versus Intuitrak and Duaply Fabrics. To be presented as podium presentation at the New England Society for Vascular Surgery Annual Meeting, Sept. 2019. Providence, RI.
2. Wanken ZJ, J. Barnes JA, Trooboff SW, Columbo JA, Tarun K, Jella BA, Kim DJ, Kim BS, Khoshgowari A, Riblet N, Goodney PP. A Systematic Review and Meta-Analysis of Reintervention Following Endovascular Abdominal Aortic Aneurysm Repair. Presented in poster competition of SVS Vascular Annual Meeting, June 2019. Boston, MA.
3. Columbo JA, Barbara H. Gladders, Wanken ZJ, Trooboff SW, Suckow BS, Stone DH, Powell RJ, Goodney PP. Reimbursement for Reintervention After EVR in the Vascular Quality Initiative. Presented in the interactive poster session of the SVS Vascular Annual Meeting, June 2019. Boston, MA.
4. Nikolaos Zacharias, Goodney PP, Stone DH, Wanken ZJ, Powell RJ. Innominate Artery Revascularization: Long-term Outcomes and Comparison of Open and Endovascular Approach. Presented in the poster competition of the SVS Vascular Annual Meeting 2019, June 2019. Boston, MA.
5. Wanken ZJ, Columbo JA, Mao J, Kang R, Trooboff SW, Moore KO, Kang J, Suckow BD, Sedrakyan A, Stone DH, Goodney PP. Claims-Based Surveillance for Reintervention after Endovascular Aneurysm Repair Among Non-Medicare Patients. Poster presentation, Eastern Vascular Surgical Society Meeting, September 2018, Washington D.C.
6. Wanken ZJ, Trooboff SW, Gladders B, Moore KO, Columbo JA, Ramkumar N, Sedrakyan A, Goodney PP. Characterization of Endovascular Abdominal Aortic Aneurysm Repair Surveillance Using Vascular Quality

- Initiative and Medicare Claims Linked Data. Awarded Second place in the Dartmouth Heart and Vascular Center HEART Symposium, May 2019. Lebanon, NH.
7. Wanken ZJ, Trooboff SW, Gladders B, Moore KO, Columbo JA, Ramkumar N, Sedrakyan A, Goodney PP. Characterization of Endovascular Abdominal Aortic Aneurysm Repair Surveillance Using Vascular Quality Initiative and Medicare Claims Linked Data. Abstract accepted for poster presentation, Vascular Research Initiatives Conference as part of Vascular Discovery, May 2019. Boston, MA.
 8. Wanken ZJ, Gladders B, Columbo JA, Goodney PP. Characterization of Endovascular Aortic Aneurysm Surveillance Using Vascular Quality Initiative and Medicare Claims Linked Data. Research in Progress, Presented at VSGNE Regional Meeting, November 2018, New Haven, CT.
 9. Wanken ZJ, Anderson PB, Bessen SY, Rode JB, Columbo JA, Trooboff SW, Moore KO, Goodney PP. Transitioning from ICD-9 to ICD-10 in Administrative Claims Based Research for Cardiovascular Procedures. Presented at Vascular Discoveries, May 2019. Boston, MA.
 10. Wanken ZJ, Hila R, Columbo JA, Kang R, Spangler EA, Newhall K, Brooke BS, Dosluoglu H, Lee E, Raffeto JD, Henke PK, Tang GL, Mureebe L, Kougas P, Johanning JM, Arya S, Scali ST, Stone DH, Suckow BD, Orion K, Halpern VA, O'Connell J, Inhat D, Nelson P, Tzeng E, Zhou W, Barry M, Sirovich B, Goodney PP, The Prove-AAA Study Team. Lessons Learned from a Cluster Randomized Trial of a Decision Aid for Veterans Facing Abdominal Aortic Aneurysm Repair. Presented at the Annual Meeting of the Association of VA Surgeon, April 2019. Seattle, WA.
 11. Wanken ZJ, Goodney PP, Creeager MA. Building a Cohort for the Evaluation of Integrated Care in Patients with Concomitant Vascular Disease and Diabetes. Presented at the Annual Meeting of Vascular Disease Strategically Focused Research Network of the American Heart Association, February 2019. Lexington, KY.
 12. Wanken ZJ. Rapid Disseminated Aneurysmosis in a Patient with New Diagnosis of Multiple Myeloma: A Series of Cases in One Patient. Podium presentation, Fellows at CARVE Competition, Feb 2019. Third Place Finisher. Vail, CO.
 13. Wanken ZJ, Trooboff SW, Gladders B, Sedrakyan A, Columbo JA, Suckow BD, Stone DH, Goodney PP. Endovascular Aneurysm Repair Cost Varies by Complication Type and Center but Not by Endograft Manufacturer. Podium Presentation, Annual Meeting of the Vascular and Endovascular Surgical Society, Feb 2019. Snowbird, UT.
 14. Wanken ZJ, Suckow BD. Coiling of Aberrant Tibial Artery Pseudoaneurysm After Iatrogenic Orthopedic Injury. Presented at Fellows Face-Off Competition, VIVA symposium, November 2018. Las Vegas, NV.

STRIVE Research Meetings and Events

In addition to regular check-ins with research residents, STRIVE has integrated the elements for sharing research and receiving peer feedback that were previously in place. Each Wednesday, 5-6pm is reserved for a Resident Research-in-Progress meeting as part of the Chair's Academic and Non-technical Development Opportunities Conference. The research discussions provide residents and faculty with a venue for sharing research in progress, receiving feedback, and refining ideas.

Chair's Academic and Non-technical Development Opportunities Conference – Schedule of Research Presentations

DATE	PRESENTER	TOPIC
7/11/18	Jenaya Goldwag	Project Proposal
7/25/18	Eleah Porter	Are Post-Op Labs Necessary?
8/1/18	Allison Wilcox	Research-in-progress
8/8/18	Julia Danforth & Meredith Sorensen	Public Perception of the importance of surgeon volumes
8/22/18	Medical Students	Exchange on Medical Student Summer Research Experience
8/29/18	Zach Wanken	Research-in-progress
9/5/18	Spencer Trooboff	Research-in-progress
		NESS Practice Presentations:
		Ryland Stucke, "Defining Consult Competence: A novel Tool for Evaluating the Surgical Consult Entrustable Professional Activity (EPA)"
		Dan Underbakke, "Medicare Beneficiaries With Rectal Cancer in Regions With Lower Colorectal Surgeon Density Have Higher Rates of Abdominoperineal Resection: A Dartmouth Atlas Study"
9/19/18	Eleah Porter Ryland Stucke Dan Underbakke	Eleah Porter, "Amiodarone prophylaxis after anatomic lung resection"
9/26/18	Jenaya Goldwag	Research-in-progress
10/3/18	Robert Allen	Cloud Surgery I- The PostOp Packing List
10/31/18	Spencer Trooboff	Research-in-progress
11/7/18	Allison Wilcox	Research-in-progress
11/28/18	Jennifer Perri	Research-in-progress
12/5/18	Jenaya Goldwag	Research-in-progress
12/12/18	Eleah Porter	Research-in-progress
1/2/2019	Zach Wanken	Research-in-progress
	Victoria Teveris, Jesse Columbo & Karina Newhall	
1/9/2019		Practice Talks (various conferences)
1/16/2019	Special Lecture: Joseph Meyers, MD	"Surgical exposure of major blood vessels, chest and mediastinum" Fuller Board Room
	Allison Wilcox, Mark Eid, Racquel Lyn	
1/23/2019		ASC Practice Talks
	Ishara Lareef, Olivia Sacks, Julia Danford	
1/25/2019	Lauren Gamble	ASC Practice Talks

	Jenaya Goldwag, Eleah Porter, Brendin R.	
1/30/2019	Beaulieu-Jones	ASC Practice Talks
2/13/2019	Philip Goodney	Tips and Tricks: Revise and Resubmit
2/20/2019	Jenaya Goldwag	How to handle data acquisition
2/27/2019	Eleah Porter	WTA Practice Talk
3/13/2019	Spencer Trooboff	Research-in-progress
3/20/2019	Allison Wilcox	Research-in-progress
4/3/2019	Zach Wanken	Research-in-progress
4/10/2019	<i>Jenaya Goldwag</i>	ASE Practice Talk
5/1/2019	Spencer Trooboff	Research-in-progress
5/8/2019	Eleah Porter	Research-in-progress
5/15/2019	Laura Baumann	"Strep milleri intra-abdominal infections and disease severity" Practice Presentation for Surgical Infection Society
5/29/2019	Zach Wanken	Research-in-progress
6/5/2019	Nivi Ramkumar	Biostatistics – Review of Basics

Surgical Trainees Advancing Research Symposium (STARS-7)

The Seventh Annual Surgical Trainees Advancing Research Symposium (STARS) was held over two days on May 9 and 10, 2019. Twenty-seven abstracts featuring original research conducted by DHMC surgical residents and medical students were submitted and reviewed by the judges panel, consisting of surgical faculty from various specialties: Drs. Joseph Phillips, Rachel Moses, Philip Goodney, Caprice Greenberg, Sandra Wong, Jacob Greenberg, S. Joga Ivatury, Christina Angeles, Kari Rosenkranz, Jennifer Hong, and Joshua Aronson. Twenty-seven abstracts were submitted, of which and fifteen were selected for presentation. The two-day symposium included “Dinner With the Stars” with guest speaker, Jacob Greenberg, MD, EdM, FACS, associate professor and program director for the General Surgery Residency Program at the University of Wisconsin. Throughout the evening surgical trainees gave short presentations on their research. The symposium continued the next morning with “Rising Stars Presentations” featuring research from top young surgical investigators and a talk from guest speaker, Caprice Greenberg MD, MPH, FACS, professor for the Department of Surgery at the University of Wisconsin.



Judges from the Sixth Annual STARS: Joseph Phillips, Rachel Moses, Philip Goodney, Caprice Greenberg, Sandra Wong, Jacob Greenberg, S. Joga Ivatury, Christina Angeles, Kari Rosenkranz (not pictured: Jennifer Hong and Joshua Aronson)

Abstract Winners:

- First Place: Kevin Shee, PhD, “Micro-RNA let-7f-5p is a Novel Biomarker of Recurrence in Non-Muscle Invasive Bladder Cancer.”
- Second Place: Michael Rezaee, MD, “The Impact of Low Versus High Surveillance Intensity Surveillance Cystoscopy on Surgical Care and Cancer Outcomes in Patients With High-Risk Non-Muscle Invasive Bladder Cancer.”
- Third Place: Jenaya Goldwag, MD, “Incidence of Fascial Defects at Prior Stoma Sites in Patients With Colorectal Cancer.”

THE SEVENTH ANNUAL STARS
(SURGICAL TRAINEES ADVANCING RESEARCH SYMPOSIAM)

Thursday Night Dinner with the Stars

Featuring Invited Speaker Presentation and “Quickshots” from surgical trainees. May 9, 2019 from 5:30–8PM. Auditorium F

Ord.	Time	Author	Title
1	6:00	Ravinder Kang, MD, MS	Eliminating Opioids from Breast Surgery: A Retrospective Review of a Perioperative Breast Bundle
2	6:07	Eleah D. Porter, MD	Surgical Provider Attitudes Toward Etiology and Best Approach to Reduce Unnecessary Postoperative Lab Testing at Two Teaching Hospitals
3	6:14	Rob Allen, MD	Deep Sleep, Beeps and Creeps: A pilot assessment of in-hospital sleep quality in elective surgical patients.
4	6:21	Jenaya L. Goldwag, MD	Incidence of Fascial Defects at Prior Stoma Sites in Patients with Colorectal Cancer
5	6:28	Spencer W. Trooboff, MD, MBA	What Influences Patient Satisfaction after Cardiac Surgery? A Prospective Analysis of Predictors of Patient Hospital Experience
6	6:36	Jacob Greenberg, MD, EdM, FACS, University of Wisconsin	Surgical Psychology 101
7	7:21	Gina Tundo, MD	Safety of urethroplasty in the comorbid population
8	7:28	Kevin Krughoff, MD	Initial Experience of MRI-Fusion Biopsy in the Community Setting
9	7:35	Lael Reinstatler, MD	Re-examining an old trend: The Association of Human Papillomavirus and Bladder Cancer.
10	7:42	Olivia A. Sacks, BA	Streptococcus anginosus is associated with increased disease severity in patients with appendicitis

Friday Morning Rising Stars Presentations

Featuring Keynote Speaker and “Quickshots” from Surgical Trainees. May 10, 2019 from 6:30 – 8:30AM. Auditorium H

Ord.	Time	Author	Title
1	6:45	Kevin Krughoff, MD	Impact of a Multidisciplinary Kidney Stone Prevention Clinic
2	6:52	Allison R. Wilcox, MD	Gender representation at surgical conferences: the American and Australasian experiences
3	6:59	Jesse A. Columbo, MD, MS	Variation in ultrasound diagnostic thresholds for carotid stenosis in the United States.
4	7:07	Caprice Greenberg, MD, MPH, FACS, University of Wisconsin	Stop Fixing Women
5	7:53	J Aaron Barnes, MD	The Evolution of the Financial Delivery of EVR in Contemporary Practice
6	8:00	Kevin Shee, PhD	MicroRNA let-7f-5p is a novel biomarker of recurrence and a potential therapeutic opportunity in non-muscle invasive bladder cancer
7	8:07	Michael E. Rezaee, MD, MPH	The impact of low- versus high-intensity surveillance cystoscopy on surgical care and cancer outcomes in patients with high-risk non-muscle-invasive bladder cancer

Co-Directors: Philip P. Goodney, MD, MS and Kari M. Rosenkranz, MD

Prizes: \$500 / \$250 / \$100 (1st/2nd/3rd)

Judges: Christina V. Angeles, MD; Joshua Aronson, MD; Philip P. Goodney, MD, MS; Caprice Greenberg, MD, MPH; Jacob Greenberg, MD, EdM; Jennifer Hong, MD; Srinivas Joga Ivatury, MD, MHA; Rachel Moses, MD, MPH; Joseph Phillips, MD; Kari M. Rosenkranz, MD; Sandra L. Wong, MD, MS

Resident Travel Funds For Research Support

The Department of Surgery provides funding for travel expenses for residents to present original scientific work at regional and national professional society meetings. Trips are pre-approved by the Vice Chair for Research and expenses are monitored by the STRIVE Program Manager. In the 2018-2019 year, the DoS sponsored 46 trips (32 National, and 14 Regional) totaling \$47,202 in expenditures. A total of 25 residents encompassing the sections of general surgery, urology, plastic surgery, dermatology, and otolaryngology made use of the fund for research presentations.

Looking Ahead

In the coming year, the STRIVE program will continue to offer broad support for research residents through regular check-ins, guidance and links to resources, and frequent opportunities to share and discuss research projects at all stages of development. New this year, the CAN-DO meeting will incorporate monthly Surgical Education Research meetings, designated specifically for those with an interest in surgical education research. In addition, the STRIVE Sharepoint site, which contains a compendium of resources and answers to frequently asked questions, has been recently updated and expanded with input from prior year research residents. It is hoped that residents will access this site frequently and contribute additional resources throughout the year, thus building on the collective knowledge accumulated from past years.

Three new incoming research residents, Drs. Aaron Barnes, Mark Eid, and Phillip Grey have joined Dr. Goldwag for 2020 Academic Year. Each participated in the STRIVE Transition meeting held in July 2019 to hear insights from outgoing research residents, share their individual goals, and understand the expectations and resources offered to research residents through the Department of Surgery. Ms. Moore has met with each of them to identify their overall goals and project ideas and will continue to meet with them individually throughout the year to support and encourage their progress. In the fourth year of the STRIVE program, the leadership team will aim to meet quarterly to review progress and challenges, and identify ways to further strengthen the program and ensure that each resident navigates their research year successfully and returns to their clinical residency equipped with new skills which will serve them both in clinical and academic pursuits.