

Christopher R. Carpenter, MD, MSc
Clinical Educator Portfolio
Washington University School of Medicine
Division of Emergency Medicine

April 2, 2018

CLINICAL CONTRIBUTIONS

General Emergency Medicine Attending (2003-present)

- 2 shifts per week; 8-hours per shift at Barnes Jewish Hospital, tertiary care Level I trauma center with almost 100,000 annual visits.
- At Barnes Jewish Hospital supervision of emergency medicine residents, as well as off-service Internal Medicine, Surgery, and Psychiatry residents and medical students.
- In electronic medical records (HMED, EPIC) documentation of all findings, review of records and trainee notes, supervision of consultant trainees' procedures including thoracostomy tubes and fracture reductions, emergent airway management, and procedural sedation.
- Provide post-shift written feedback for all trainees.
- Average 1050 new patients seen per year.

Missouri Baptist Medical Center (2017-present)

- 1-3 shifts per month, 10-hour shifts
- Independently evaluate and treat patients with emergency medical and surgical conditions.
- Non-academic suburban community hospital with primarily geriatric demographic.
- Average 12 patients per shift.

DEVELOPMENT OF METHODS FOR IMPROVED QUALITY AND EFFICIENCY OF CLINICAL CARE

Geriatric Emergency Department Guidelines (2011-2013)

- First-authored American College of Emergency Physicians, American Geriatrics Society, Society for Academic Emergency Medicine, Emergency Nurses Association guidelines providing evidence-based protocols, quality matrices, educational requirements, and infrastructure required to provide high quality emergency care for aging populations.

Geriatric Emergency Department Collaborative (2014-present)

- John A. Hartford Foundation and West Health funded investigator in project to implement American College of Emergency Physician/American Geriatric Society geriatric emergency department guideline based quality improvement initiatives throughout healthcare systems.
- Worked with nine healthcare systems (Aurora-Wisconsin, University of Pittsburgh Medical Center, University of California-San Diego, University of Chicago, Northwestern University, Mt. Sinai-Icahn School of Medicine New York City, University of North Carolina-Chapel Hill, Emory Health, St. Joseph's Medical Center New Jersey) to implement quality improvement projects ranging from triage risk assessment to delirium detection interventions with monthly meetings, 2-day site visit, 1-year

booster site visit, and collection of pre-intervention needs assessment survey and post-intervention outcomes data.

Geriatric Emergency Department Accreditation (2016-present)

- First-authored American College of Emergency Physician's accreditation criteria for three-tiered recognition of documented adherence to geriatric emergency department guidelines.
- Serve on first American College of Emergency Physician's Geriatric Emergency Department Accreditation Board of Governor's reviewing 2-3 applications per month and conducting site visits for Level I applicants.

Geriatric Falls Prevention Protocol, Missouri Baptist Medical Center (2016-present)

- Injurious falls represent the leading cause of older adult trauma-related mortality, yet most emergency departments do not adhere to guideline-based management recommendations.
- Consulted with Missouri Baptist Medical Center to develop, implement, sustain, and evaluate a falls prevention protocol in conjunction with primary care and geriatrics.

Schwartz/Reisman Emergency Medicine Research Institute (SREMI) International Advisory Board (2014-present)

- Provide external assessment, mentorship, and networking for physician-scientists of Canada's first emergency medicine research institute.
- Establishing research foci priorities, endowed Chair objectives, budgetary justifications, and external funding opportunities for SREMI.
- Attending annual in-person meeting at the University of Toronto and regular input on SREMI scholars' manuscripts, grants, and career trajectory.
- Chair of the International Advisory Board since November 2017, overseeing bi-annual meeting of most prolific emergency medicine and family medicine clinical researchers from around the world and recruiting new members to the board.

ORIGINAL CONTRIBUTIONS TO MEDICAL LITERATURE

- **Carpenter CR**, Platts-Mills TF; Evolving prehospital, emergency department, and "inpatient" management models for geriatric emergencies, *Clin Geriatr Med* 2013; 29: 31-47.
- Hwang U, Shah MN, Han JH, **Carpenter CR**, Siu AL, Adams JG; At the Crossroads of the Emergency Department and the Aging Population: Navigating Emergency Care for Older Patients, *Health Affairs* 2013; 32: 2116-2121.
- **Carpenter CR**; Dementia and the rural emergency department, *J Rural Emerg Med* 2013; 1: 10-18.
- Geriatric Emergency Department Guidelines, *Ann Emerg Med* 2014; 63: e7-e25.
- Hogan TM, Olade TO, **Carpenter CR**; A Profile of Acute Care in an Aging America: Snowball Sample Identification and Characterization of United States Geriatric Emergency Departments in 2013, *Acad Emerg Med* 2014; 21: 337-346.
- **Carpenter CR**, Lo AX; Falling behind? Understanding Implementation Science in Future Emergency Department Management Strategies for Geriatric Falls Prevention, *Acad Emerg Med* 2015; 22: 478-480.
- **Carpenter CR**, Émond M; Pragmatic Barriers to Assessing Post-Emergency Department Vulnerability for Poor Outcomes in an Ageing Society, *Neth J Med* 2016; 74: 327-329.

- Mattu A, Grossman S, Rosen P, Anderson R, **Carpenter CR**, Chang A, Hirshon JM, Hwang U, Kennedy M, Melady D, Tolia V, Wilber S. *Geriatric Emergencies: A Discussion-Based Review*, Wiley-Blackwell 2016 ISBN: 978-1-118-75334-7
- Hwang U, **Carpenter CR**. *The Geriatric Emergency Department*. Wiler JL, Pines JM, Ward MJ (eds) *Value and Quality Innovations in Acute and Emergency Care*, Cambridge University Press 2017; 82-90.
- **Carpenter CR**, Taleghani N; *Older Adults in the Wilderness*. Auerbach PS (eds): *Wilderness Medicine*, 7th Edition. Elsevier 2017; 2149-2164.

EDUCATION CONTRIBUTIONS

GRADUATE MEDICAL EDUCATION

Course Master, Emergency Medicine Journal Club (2003-2013)

- Organize one Journal Club each month including development of Patient-Intervention-Comparator-Outcome (PICO) question-related search strategy, selection of highest yield research for that PICO question, completion of User's Guide to the Medical Literature critical appraisal forms, leading 3-hour discussion with emergency medicine trainees and faculty, grading trainees' submitted structured critical appraisals, and maintaining Journal Club website including archived discussions and evidence based medicine toolbox (<http://emed.wustl.edu/Journal-Club>).

Lecturer, Washington University Institute of Public Health course "*Systematic Review Methods*" (2012-2015)

- Annual one 1-hour post-graduate course exploring the methods of diagnostic systematic reviews.

Lecturer, Washington University Institute of Public Health course "*Implementation Science and Public Health*" (2012-present)

- Annual one 1-hour post-graduate course exploring the boundaries distinguishing evidence based medicine and implementation science, including pertinent multidisciplinary examples, Enhancing the Quality and Transparency of health Research (EQUATOR) reporting standards, pre-lecture reading assignments, and lecture.

Lecturer, Washington University Institute of Public Health course "*Patient Safety, Quality Measurement, and Quality Improvement*" (2012-present)

- Annual one 1-hour post-graduate course exploring the distinctions between quality improvement and implementation science, including pre-lecture homework and reading assignments, real-world examples, Quality and Transparency of health Research (EQUATOR) reporting standards, and lecture.

ORIGINAL CONTRIBUTIONS TO MEDICAL LITERATURE

- **Carpenter CR**; *Teaching Lifelong Learning Skills: Journal Club and Beyond*. Rogers RL, Mattu A, Winter M, Martinez J (eds): *Practical Teaching in Emergency Medicine* 2nd Edition. Oxford UK, Wiley-Blackwell, 2012; 151-162.

- Pines J, **Carpenter CR**, Raja A, Schuur J. Evidence-Based Emergency Care: Diagnostic Testing and Clinical Decision Rules 2nd Edition, Oxford UK, Wiley-Blackwell, 2013. ISBN: 978-0-470-65783-6
- **Carpenter CR**; Evidence based medicine and the rural emergency physician, *J Rural Emerg Med* 2013; 1: 10-25.
- Hunter B, **Carpenter CR**; The Development of Clinical Prediction Rules. Wilson MP, Guluma KZ, Hayden S (eds): Doing Research in Emergency and Acute Care: Making Order Out of Chaos” Wiley 2015; 139-147.
- **Carpenter CR**, Ruoff B; Evidence Based Medicine and Wilderness Medicine. Auerbach PS (eds): Wilderness Medicine, 7th Edition. Elsevier 2017; 2478-2487.

UNDERGRADUATE MEDICAL EDUCATION

Lecturer, “Clinical Decision Rules”, Practice of Medicine, Washington University School of Medicine (2010-2017)

- One 1-hour first-year medical student lecture exposing trainees to the concepts of Bayesian logic, likelihood ratios, and the science of deriving/validating/implementing clinical decision instruments.

LOCAL CURRICULAR DEVELOPMENT ACTIVITIES

Mentor, Washington University School of Medicine Department of Neurosurgery, Evidence Based Medicine curriculum (2014-present)

- Developed core curriculum for Neurosurgery residents at request of program director Greg Zipfel, Professor of Neurosurgery
- Organized four 1-hour lectures with pre-lecture reading and homework assignments on topics of clinical decision rules, systematic reviews, finding/critically appraising diagnostic research, and critical practice guidelines.

Course Master, Washington University-St. Louis University Schools of Medicine Combined Grand Rounds on “Geriatric Emergency Medicine Principles and Practice” (2016)

- Organized planning committee and led monthly teleconferences with keynote speakers from Toronto and Indianapolis.
- Obtained free CME for attendees from the American Academy of Emergency Medicine.
- Evaluated individual attendees’ pre-conference asynchronous learning via <https://geri-em.com/>.
- Summarized half-day conference in a *Missouri Medicine* manuscript to catalyze sustainable clinical and policy change.

Co-lead, Annual Larry Lewis Health Symposium (2017-present)

- Solicited department support for a new regional implementation and policy symposium designed to coalesce clinicians, ancillary providers, hospital administrators, payers, patients, and political leaders around topics of significant interest to catalyze sustainable improvements in the Triple Aim of healthcare.
- Coordinated symposium planning committee efforts to select topic of inaugural symposium (“Solving the Opioid Epidemic”), identified/recruited nationally recognized experts as speakers, used publishing network to solidify ongoing *Missouri Medicine* series for this topic coordinated from Washington University, and co-authored first two submissions to that series.

ORIGINAL CONTRIBUTIONS TO MEDICAL LITERATURE

- **Carpenter CR**, Hussain AM, Ward MJ, Zipfel GJ, Fowler S, Pines JM, Sivilotti MLA; Spontaneous Subarachnoid Hemorrhage in the Emergency Department: A Systematic Review and Meta-analysis Describing the Diagnostic Accuracy of History, Physical Exam, Imaging, and Lumbar Puncture with an Exploration of Test Thresholds, *Acad Emerg Med* 2016; 23: 963-1003.
- **Carpenter CR**, Melady D, Krausz C, Wagner J, Froelke B, Cordia J, Lowery D, Ruoff BE, Byrne LE, Miller DK, Lewis L; Improving Emergency Department Care for Aging Missourians: Guidelines, Accreditation, and Collaboration, *Missouri Med* 2017; 114: 447-452.
- Greenberg JK, Yan Y, **Carpenter CR**, Lumba-Brown A, Keller MS, Pineda JA, Brownson RC, Limbrick DD; A Clinical Risk Score for Managing Children with Mild Head Trauma and Intracranial Injury, *JAMA Pediatr* 2017; 171: 342-349.
- Lewis L, **Carpenter CR**, Schwarz ES, Jotte RS, Waller C, Winograd R, Williams R, Stenger S, Rehder H, Governick, Giuffra L; The opioid crisis in Missouri: A call to action for physicians, legislators, and society, *Missouri Med* 2017; 114: 440-446.
- **Carpenter CR**, Lewis L, Jotte R, Schwarz ES; A Bridge to Nowhere? Challenging outpatient transitions of care for adult emergency department patients with acute pain in the opioid epidemic era, *Missouri Medicine* (2018)

NATIONAL EDUCATIONAL ACTIVITIES

Lecturer, Society for Academic Emergency Medicine (2013-present)

- Initiated, organized, submitted, and led multiple competitive didactic proposals to leading academic medical association's annual scientific meeting on a variety of topics, including:
- Introduction to the EQUATOR Network and Implications for Emergency Medicine Research (2013)
- Quantifying Academic Productivity (2013)
- Taking Academic Writing Skills to Next Level (2014)
- Building a Geriatric Emergency Department (2014)
- Moving From Guidelines to Practice with Implementation Science (2016)
- Choosing Wisely in Geriatric Emergency Medicine (2017)
- An Update on NIA Funding Opportunities (2018)

Emergency Medical Abstracts Faculty (2015-2017)

- Premier recorded CME resource for emergency medicine since 1977 led by two individuals until 2015.
- Review 30 emergency medicine practice-changing manuscripts every 3-months for 3-hour podcast to which >10,000 physician subscribe.
- Conduct 30-minute with author of one of those manuscripts every 3-months.
- Record 30-minute essay once every 3-months on issues germane to practicing emergency physicians.

Emergency Medicine and Acute Care Series Faculty (2017-present)

- Premier CME resource for emergency medicine for over 30-years.
- Produce 1-2 synopses of topics based on most important 15-20 articles from Emergency Medical Abstracts archives.
- Provide eight 30-minute presentations without Power Point slides at courses around North America twice per year.

Co-Chair, Tom Steele Emergency Care Symposium Organizing Committee (2016)

- Developed 8-hour didactic CME curriculum for pre-hospital providers, nurses, and physicians that included traditional lecture material, handouts, podcasts, twitter-wall, mock trial, and participation awards.
- Coordinated transportation, lodging, and remuneration of speakers from Ontario Canada.
- Led curricular topics on evidence based medicine, knowledge translation, medical myths, and logical fallacies.

Visiting Professor to Multiple Emergency Medicine Programs (2013-present)

- Keynote speaker for Annual Resident Research Day and/or judged resident research presentations.
- Stanford University (April 2013)
- Lehigh Valley Allentown PA (April 2013)
- University of Texas-Southwestern, Dallas TX (April 2015)
- University of Maryland, Baltimore MD (June 2015)
- St. Joseph's Regional Medical Center, Paterson NJ (June 2015)
- University of Arkansas Medical Systems (June 2016)
- Mayo Clinic Rochester MN (May 2017)
- St. Mary Mercy Hospital, Livonia MI (September 2016)

Lecturer, Kaiser-Permanente 26th Annual Emergency Medicine Conference, Laguna Beach CA (2017)

- Invited expert to develop and deliver two lectures on Geriatric Emergencies and Neurological Emergency Updates

ORIGINAL CONTRIBUTIONS TO MEDICAL LITERATURE

- **Carpenter CR**, Cone D; Promoting Stewardship of Academic Productivity in Emergency Medicine: Using the h-index to Advance Beyond the Impact Factor, *Acad Emerg Med* 2013; 20: 1067-1069.
- Sarli CA, **Carpenter CR**; An overview of measuring academic productivity and changing definitions of scientific impact, *Missouri Medicine* 2014; 111: 399-403.
- **Carpenter CR**, Cone DC, Sarli CC; Using Bibliometrics to Highlight Academic Productivity and Research Impact: An Introduction to Contemporary Resources, *Acad Emerg Med* 2014; 21: 1160-1172.

INTERNATIONAL EDUCATIONAL ACTIVITIES

Initiated, coordinated, and led North American emergency medicine contingency to International Association of Gerontology and Geriatrics World Congress (2013)

- Identified, connected, and organized eight speakers for two distinct tracts.
- Developed and presented interactive lectures with handouts on topics of pain management, fruitful coordination efforts with multidisciplinary professional organizations, and evidence based medicine.

Mentor and lecturer, McMaster University Evidence Based Clinical Practice Course (2012-2013)

- Mentor ten emergency medicine early stage faculty on evidence based medicine educational strategies.
- Survey attendees to the prior 20 years' Evidence Based Clinical Practice courses and present synopsis of innovations and academic output to attendees.

Lecturer, Emergency Department Administrators' Conference in Toronto ON (2015-present)

- Develop topics of interest for Ontario hospital administrators' annual conference.
- Present interactive lecture on the topics of implementation science, big pharma hijacking of evidence based medicine, and malpractice in America.

Keynote Speaker, Australasian College of Emergency Medicine, Brisbane Australia (2015)

- Led "Delirium Detection and Management" half-day workshop.
- Presented research on vulnerability assessment instruments to Geriatric Special Interest Group.
- Introduced concept of Emergency Medicine Australasia "Acute Geriatrics" series, soliciting support of journal's editorial board, helped to launch the series, and continue to contribute to sustaining the general overview series.

Keynote Speaker, Irish Association of Emergency Medicine (2016)

- Delivered 1-hour lecture on "Geriatric Emergencies Onwards & Upwards"
- Guest reviewer judging research presentations

Co-lead, Integrated Care for Older Person's Symposium, Melbourne Australia (2016)

- Six months of monthly planning teleconferences.
- Five day event including day 1 with healthcare payers and governmental policy-makers, day 2 "Boot Camp" with emergency nurses, day 3 with emergency physicians, and days 4-5 with general practitioners and hospital administrators.
- Developed multiple didactic presentations, take-home tools boxes, handouts, and website material for various audiences.
- Post-event collaboration to develop multi-disciplinary "Best Practices" manuscript for dissemination.

Co-lead, Geriatric Emergency Medicine Tract for biennial International Conference on Emergency Medicine in Cape Town South Africa (2016)

- Several months of intermittent planning meetings.
- Four hour tract with 12 speakers from 6 continents presenting innovations in older adult emergency care.
- Developed Turning Point audience response system presentations, toolbox handout, and three lectures on assessment of geriatric vulnerability, implementation of geriatric guidelines into bedside practice, and avoidance of unnecessary diagnostic testing.

ORIGINAL CONTRIBUTIONS TO MEDICAL LITERATURE

- Nagaraj G, Burkett E, Hullick C, **Carpenter CR**, Arendts G; Is Delirium the Medical Emergency We Know Least About? *Emerg Med Australasia* 2016; 28: 456-458.
- Arendts G, **Carpenter C**, Hullick C, Burkett E, Nagaraj G, Rogers I; Approach to Death in the Older Emergency Department Patient, *Emerg Med Australasia* 2016; 28: 730-734.
- Hullick C, **Carpenter CR**, Critchlow R, Burkett E, Arendts G, Nagaraj G, Rosen T; Abuse of the older person: Is This the Case You Missed Last Shift? *Emerg Med Australas* 2017; 29: 223-228.
- **Carpenter CR**, Arendts, Hullick C, Nagaraj G, Cooper Z, Burkett E; Major Trauma in the Older Patient: Evolving Trauma Care Beyond Management of Bumps and Bruises, *Emerg Med Australas* 2017; 29: 450-455.
- Ellis B, **Carpenter CR**; Lowthian JA, Mooijaart SP, Nickel CH, Melady D; Statement on Minimum Standards for the Care of Older People in Emergency Departments by the Geriatric Emergency Medicine Special Interest Group of the International Federation for Emergency Medicine, *CJEM*; 2018; 16: 1.

- Burkett E, Osborn T, **Carpenter CR**, Arendts G, Hullick C, Nagaraj G; Sepsis in the Older Person: The Ravages of Time and Bacteria, *Emerg Med Australasia* 2018 (in press)

MENTORSHIP

- Anjan Tibrewala, MD in 2006.
 - o Provided research mentorship and career development guidance for multicenter observational diagnostic accuracy study of various ultra-brief emergency department dementia screening instruments.
 - o Current Position, Cardiologist in Lake Forest IL.
- Bobby DesPain, MD in 2008.
 - o Provided research mentorship with randomized controlled trial of a “geriatric technician” to screen elderly emergency department patients for prevalent geriatric syndromes.
 - o Current Position, General Surgery Resident, Warren Reed National Military Medical Center
- Travis Keeling, MD in 2008.
 - o Provided research mentorship with randomized controlled trial of a “geriatric technician” to screen elderly emergency department patients for prevalent geriatric syndromes.
 - o Current Position, community emergency physician Minneapolis MN
- Morgan Rothenberger, BA, OT (2008-2009)
 - o Provided research mentorship for project exploring accuracy of community-dwelling older adult cognitive impairment screening in the emergency department compared with post-recovery evaluation at home several weeks later.
 - o Current Position, community occupational therapist in Indianapolis.
- Tara Skeeba, MD in 2010 (see <http://gsres.wustl.edu/Profiles/Residents-Profiles/SkeebbaTara>)
 - o Provided research mentorship with project exploring association between cognitive impairment and health literacy in elderly emergency department patients
 - o Current Position, General Surgery Resident, Barnes Jewish Hospital
- Jonathan Heidt, MD (2009-2011)
 - o Provided research mentorship and career development guidance for chart review study linking research-based emergency department cognitive impairment screening with inpatient documentation of recognized dementia or delirium for admitted patients
 - o Current Position, Emergency Medicine Faculty, University of Missouri and Missouri Chapter ACEP President
- Dennis Balaban, MD (2011-2012)
 - o Provided research mentorship and career development guidance for observational study evaluating the association of elderly falls with sarcopenia and frailty.
 - o Current position, Neurology resident, Brigham and Women’s and Massachusetts’s General Hospital.
- Ross Passo, MD (2011-present)
 - o Provided research mentorship and career development guidance for observational study evaluating the association between acute or acute on chronic cognitive impairment (delirium, dementia, or delirium on dementia) and emergency department recidivism.
 - o Supported application for 1-year visiting NIH research position.
 - o Current position, medical student at Oregon Health Sciences University applying for Ophthalmology residency.
- Brian Fuller, MD, MSc (2012-2015)
 - o Provided faculty-level mentorship on systematic review methodology.

- Current position, Associate Professor of Critical Care and Emergency Medicine, Washington University in St. Louis School of Medicine
- Kanika Turner, MD (2011)
 - Provided research mentorship and career development guidance for health disparities research evaluating the bias of commonly used dementia screeners like the Montreal Cognitive Assessment in inner city African American communities.
 - Current position, family physician, St. Louis MO.
- Byron Powell, PhD (2010-2014)
 - Provide mentorship on clinical implementation science barriers, facilitators, and nomenclature.
 - Served on PhD dissertation committee.
 - Current position, Assistant Professor Health Policy and Management, University of North Carolina Gillings School of Global Public Health
- Jonas Marschall, MD (2012-2013)
 - Provided mentorship on systematic review methods.
 - Current position, Head of Infection Prevention, Bern University Hospital, Switzerland.
- Kevin Cullison, MD (2013-present)
 - Provided research mentorship and career development guidance for diagnostic systematic review evaluating the accuracy of history, physical exam, and common imaging modalities for blunt thoracolumbar spine injuries.
 - Supported successful application for New York Academy of Medicine Knowledge to Action Fellowship.
 - Current position, Clinical Instructor and Research Fellow, Department of Emergency Medicine, University of Pittsburgh
- James Vandenberg, MD, MSc (2013-present)
 - Provided research mentorship and career development guidance for diagnostic systematic review evaluating the accuracy of history, physical exam, and common imaging modalities for blunt thoracolumbar spine injuries.
 - Supported successful application for Master of Science in Clinical Investigation application at Washington University in St. Louis School of Medicine.
 - Current position, emergency medicine resident, Detroit Receiving Hospital, Wayne State University.
- Fahd Ahmad, MD, MSCI (2011-present)
 - Provide implementation science research and grant-writing mentorship, along with career development guidance for intervention exploring feasibility of electronic health record associated adolescent sexually transmitted infection screening.
 - Facilitated networking opportunities within Washington University Network for Dissemination and Implementation Research.
 - Reviewed national survey instrument and preliminary results.
 - Provided letters of support for promotions and multiple grants, as well as serving on faculty promotion committee.
 - Current position, Assistant Professor of Pediatric Emergency Medicine, St. Louis Children's Hospital.
- Beth Prusaczyk, PhD, MSW (2014-present)
 - Provide implementation science research mentorship and career development guidance for project focused on hospital transitions of care for cognitively impaired older adults.
 - Served on PhD dissertation committee.

- Current position, post-doctoral research fellow Vanderbilt University.
- Enyo Ablordeppey, MD, MPH (2014-present)
 - Provided diagnostic accuracy and systematic review research mentorship and career development guidance for critical care project quantifying the ability of point-of-care ultrasound to supplant x-ray as confirmation of central line placement.
 - Current position, Assistant Professor of Emergency Medicine and Critical Care.
- Andrew Zozula, MD (2015-2016)
 - Provided systematic review research mentorship and career development guidance for pre-hospital fall-risk reduction project.
 - Current position, emergency medicine resident, Stanford University.
- Jacob Greenberg, MD (2015-present)
 - Provide research and grant mentorship for derivation/validation of clinical prediction instrument to risk-stratify children for short-term adverse events following mild traumatic brain injury with non-operative intracranial injury identified on imaging to begin standardizing post-imaging disposition decisions.
 - Current position, Neurosurgery resident, Barnes Jewish Hospital.
- Sean Stickle, MD (2016-present)
 - Provide research mentorship for diagnostic accuracy meta-analysis of point-of-care ultrasound to determine etiology of undifferentiated shock in emergency department patients.
 - Current position, Assistant Professor of Emergency Medicine, Washington University in St. Louis School of Medicine.

Serve as co-PI for GEMSSTAR U13 Biennial Conferences supporting over 100 junior investigators in aging research in the fields of emergency medicine, vascular surgery, orthopedic surgery, critical care, cardiology, rheumatology, infectious disease, anesthesiology, otolaryngology, ophthalmology hospital medicine, obstetrics, neurology, urology, and neuro-radiology (see <https://www.americangeriatrics.org/programs/geriatrics-specialists-initiative/gemsstarjahnigen/gemsstar-u13-conferences>)

ORIGINAL CONTRIBUTIONS TO MEDICAL LITERATURE

- Powell BJ, McMillen JC, Proctor EK, **Carpenter CR**, Griffey RT, Bungler AC, Glass JE, York JL: A compilation of strategies for implementing clinical innovations in health and mental health, *Med Care Res Rev* 2012; 69: 123-157.
- Fuller B, Mohr N, Drewry AM, **Carpenter CR**; Lower tidal volume at initiation of mechanical ventilation may reduce progression to acute respiratory distress syndrome: A systematic review. *Crit Care Med* 2013; 17(1): R11.
- Marschall J, **Carpenter CR**, Fowler S, Trautner BA; Antibiotic prophylaxis for urinary tract infection after urinary catheter removal: a meta-analysis, *BMJ* 2013; 346: f3147.
- Powell BJ, Proctor EK, Glisson CA, Kohl PL, Raghavan R, Brownson RC, Stoner BP, **Carpenter CR**, Palinkas LA; A mixed methods multiple case study of implementation as usual in children's social service organizations: Study protocol, *Implement Sci* 2013; 8: 92.
- Fuller B, Mohr N, Skrupky L, Fowler SA, Kollef M, **Carpenter CR**; The use of inhaled prostaglandins in patients with acute respiratory distress syndrome: a systematic review and meta-analysis, *Chest* 2015; 147: 1510-1522.
- Zozula A, **Carpenter CR**, Lipsey K, Stark S; Can prehospital emergency services reduce falls or fall-related morbidity in community-dwelling older adults? A systematic review, *Emerg Med J* 2016; 33: 345-350.

- Prusaczyk B, Cherney SM, **Carpenter CR**, DuBois JM; Informed Consent with Cognitively Impaired Adults: Transdisciplinary Challenges and Opportunities, *Clinical Gerontologist* 2017; 40: 63-73.
- Ablordeppey E, Drewry AM, Beyer AB, Theodoro DL, Fowler SA, Fuller BM, **Carpenter CR**; Diagnostic Accuracy of Central Venous Catheter Confirmation by Bedside Ultrasound Versus Chest Radiography in Critically Ill Patients: A Systematic Review and Meta-Analysis, *Crit Care Med* 2017; 45: 715-724.
- Walston J, Robinson TN, Zieman S, McFarland F, **Carpenter CR**, Althoff KN, Andrew MK, Blaum CS, Brown PJ, Buta B, Ely EW, Ferrucci L, High KP, Kritchevsky SB, Rockwood K, Schmader KE, Sierra F, Sink KM, Varadhan R, Hurria A; Integrating Frailty Research into the Medical Specialties – Report from a U13 Conference, *J Am Geriatr Soc* 2017 65: 2134-2139.

DEVELOPMENT OF CME COURSES

Best Evidence in Emergency Medicine Co-Founder and Faculty (2005-present)

- Identify 5-10 potentially emergency medicine practice-changing and newsworthy research manuscripts each week for voting by >200 practicing physicians around the world
- Derived and validated BEEM Rater screening instrument to filter physician-rated practice-changing, newsworthy evidence.
- Summarize BEEM Rater selected manuscripts in throw away journals (Emergency Physicians' Monthly) and at multiple annual BEEM courses worldwide (Dubai, Norway, Costa Rica, Canada, United States).

Course Co-Chair, Evidence Based Diagnostics at University of California-San Francisco (2012-2015)

- Design curriculum for diagnostic methods course for all-level learners in the fields of medicine, lab science, and state/federal lab certification entities.
- Build pre- and post-test to stratify attendees into novice, intermediate, and advanced work groups for Hippocratic learning modules individualized for learner baseline knowledge.
- Run the course annually at UCSF and by invitation at the Society for Academic Emergency Medicine as a pre-conference in 2014.

ORIGINAL CONTRIBUTIONS TO MEDICAL LITERATURE

- Worster A, Kulasegaram M, **Carpenter CR**, Vallera T, Upadhye S, Sherbino J, Haynes RB; Interrater reliability assessment of the Best Evidence in Emergency Medicine (BEEM) Rater Scale, a medical literature rating tool for emergency physicians, *Acad Emerg Med* 2011; 18: 1193-2000.
- **Carpenter CR**, Sarli CC, Fowler SA, Kulasegaram K, Vallera T, Lapaine P, Schalet G, Worster A; BEEM Rater Scores Correlate with Publications' Future Citations, *Acad Emerg Med* 2013; 20: 1004-1012.
- Kohn MA, **Carpenter CR**, Newman TB; Understanding the direction of bias in studies of diagnostic test accuracy, *Acad Emerg Med* 2013; 32: 2116-2121.

DEVELOPMENT OF NEW EDUCATIONAL MATERIAL

Associate Editor, *Annals of Internal Medicine's* ACP Journal Club (2013-present)

- Respond to weekly queries from McMaster Online Rating of the Evidence emails rating emergency medicine and geriatric manuscripts for newsworthiness and relevance.
- Once monthly, review abstract, identify key specialty-specific questions, identify appropriate commentators, solicit and edit commentary.
- Once or more yearly, serve as commentator for one ACP Journal Club synopsis.

Founder and Original Editor-in-Chief, *Journal of Rural Emergency Medicine* (2014-2016)

- Fostered idea for a rural specific emergency medicine journal with the American College of Emergency Physician's Rural Section.
- Organized, recruited editorial board, solicited advertisers, received original reviews and research manuscripts from rural providers and stakeholders, oversaw peer-review, published, and disseminated first two issues of the journal (<http://emed.wustl.edu/Research/Chris-Carpenter-Bio/Journal-of-Rural-Emergency-Medicine>) with topics including cardiac arrest, malpractice concerns, workforce challenges, near drowning, farm trauma, and traumatic brain injury protocols.
- Participated in subsequent American College of Emergency Physician's Rural Emergency Medicine Task Force exploring alternatives to a rural specific journal.

Deputy Editor-in-Chief, *Academic Emergency Medicine* (2015-present)

- Serve as Acting Editor-in-Chief when current Editor-in-Chief is in conflict on submissions or out-of-country.
- Approximately 10 hours/week for various reviewing and administrative duties.
- Participate in biannual face-to-face meetings with editorial board and monthly Senior Editorial Board teleconferences, help to recruit high quality editorial board members, obtain feedback from and provide feedback to the editorial board and reviewers, weigh in on decisional conflicts between authors and reviewers, and align objectives between the Society of Academic Emergency Medicine Board of Directors and the journal's readers.
- Developed two series for the journal by formulating concept to Editorial Board and co-authoring the original submissions.
 - o The first series was "Evidence Based Diagnostics" in 2011, which has had one or more articles on the journal's annual "Top 10 Most Downloaded" list since 2012.
 - o The second series was "Hot Off the Press" (<http://thesgem.com/the-sgem-hot-off-the-press/>), which merged a high-yield manuscript with social media via a podcast interview with the lead author using a structured critical appraisal form, free CME, Twitter/Facebook/blog audience interactive feedback, and a published synopsis of social media commentary and the evidence based medicine critical appraisal of the article several months later. Also, coordinated co-authorship opportunity for resident scholars of the American College of Emergency Physician's Knowledge to Action Fellowship in conjunction with the Emergency Medicine Resident's Association and New York Academy of Medicine.

Associate Editor, *Journal of the American Geriatrics Society* (2015-present)

- Serve as Decision Editor for 15-20 manuscripts per year.
- Review manuscripts assigned by other editorial board members.
- Author occasional editorials reviewing implications of accepted manuscripts.

ORIGINAL CONTRIBUTIONS TO MEDICAL LITERATURE

- **Carpenter CR**, Pines JM, Schuur JS, Calfee RC, Muir M, Raja AS; Evidence Based Diagnostics: Adult scaphoid fracture, *Acad Emerg Med* 2014; 21: 102-121.
- **Carpenter CR**, Pines JM, Schuur JS, Calfee RC, Muir M, Raja AS; Evidence Based Diagnostics: Adult scaphoid fracture, *Acad Emerg Med* 2014; 21: 102-121.
- **Carpenter CR**, Avidan MS, Wildes T, Stark S, Fowler SA, Lo AX; Predicting community-dwelling older adult falls following an episode of emergency department care: a systematic review, *Acad Emerg Med* 2014; 21: 1069-1082.
- **Carpenter CR**, Shelton E, Fowler SA, Suffoletto B, Platts-Mills TF, Rothman RE, Hogan T; Risk factors and screening instruments to predict adverse outcomes for older emergency department patients: a systematic review, *Acad Emerg Med* 2015; 22: 1-21.
- Milne WK, Choo EK, **Carpenter CR**; Hot off the presses: assessing older adult fall risk in the emergency department, *Acad Emerg Med* 2015; 22: 121-123.
- Scott KR, Milne WK, Arora S, **Carpenter CR**; Hot off the press: Post-emergency department automated messaging to improve follow-up compliance – What is the Number Needed to Text? *Acad Emerg Med* 2015; 22: 639-641.
- Drake A, Milne WK, **Carpenter CR**; Hot off the press: Subdissociative dose ketamine for acute pain in the ED, *Acad Emerg Med* 2015; 22: 887-889.
- Otterness K, Milne WK, **Carpenter CR**; Hot off the press: B-lines and focused lung ultrasound to diagnose acute heart failure in dyspneic patients, *Acad Emerg Med* 2015; 22: 1122-1124.
- Westafer LM, **Carpenter CR**, Milne WK; Hot off the press: outpatient anticoagulation for venous thromboembolism diagnosed in the emergency department, *Acad Emerg Med* 2015; 22: 1355-1357.
- Dahn CM, Milne WK, **Carpenter CR**; Hot Off the Press: Do Emergency Department-Based Predischarge Educational Interventions for Adult Asthma Patients Improve Outcomes? *Acad Emerg Med* 2016; 23: 650-652.
- Cullison K, **Carpenter CR**, Milne WK; Hot Off the Press: Use of Shared Decision-Making for Management of Acute Musculoskeletal Pain in Older Adults Discharged from the Emergency Department, *Acad Emerg Med* 2016; 23: 956-958.

COMMUNITY SERVICE CONTRIBUTIONS

Guest Editor-in-Chief, *Clinics in Geriatric Medicine* (2013)

- Invited by Elsevier to identify 14 contemporary topics relevant to geriatric emergencies, identify thought-leaders to author reviews on those topics, solicit the reviews, provide peer-review of the first- and second-drafts of these reviews, and many copyedits.
- Developed novel approach to merge geriatrician, emergency provider, and relevant subspecialist when applicable for topics ranging from palliative care to transitions of care, major trauma, pain management, acute visual changes, dizziness, weakness, stroke, and abuse.

Co-lead, National Institutes of Health Working Group to derive Implementation Science Framework (2013)

- Co-led with Ross Brownson from Washington University in St. Louis Dissemination and Implementation Research Core
- Developed and presented justification for standardized Implementation Science reporting standards to investigators, researchers, and NIH program officers from across North America.

National Institute of Health representative for StaRI work group (2013-present)

- Using NIH Implementation Science Framework coordinated with EQUATOR Network to begin developing standardized Implementation Science reporting standards.
- The EQUATOR Network connected NIH Working Group with the StaRI team who invited me to participate; two-day meeting in London England in 2015.

Society for Academic Emergency Medicine representative to first annual Preventing Overdiagnosis Conference (Dartmouth University, New Hampshire 2013)

- Submitted competitive didactic to Preventing Overdiagnosis conference on behalf of the American College of Emergency Physicians and Society for Academic Emergency Medicine.
- Led afternoon workshop exploring definitions, measures, and outcomes of “overdiagnosis” within emergency medicine.
- First-authored summary manuscript describing the first three “Preventing Overdiagnosis” conferences for the emergency medicine community.

White House Council on Aging Geriatric Abuse Panel (Bethesda MD, 2016)

- Invited to participate in 1-day multidisciplinary panel on “Elder Abuse” to represent emergency medicine’s geriatric emergency department guideline team and the NIH Implementation Science framework work group with co-authorship of manuscript by geriatricians with pediatric and geriatric abuse experts.

Guest Editor-in-Chief, *Academic Emergency Medicine* 2015 Consensus Conference issue on “Optimizing Diagnostic Imaging” (available open access at <https://www.onlinelibrary.wiley.com/toc/15532712/22/12>)

- Participated in monthly teleconferences for 1-year prior to conference, serving as the editorial voice for the authors of 12 manuscripts deriving from the conference.
- Attended 1-day Consensus Conference, actively participating in multiple breakout groups.
- Provided peer-review on each Consensus Conference manuscript.

Co-Chair *Academic Emergency Medicine* 2016 Consensus Conference on Shared Decision Making (available open access at <https://www.onlinelibrary.wiley.com/toc/15532712/23/12>)

- Co-authored small conference grants from NIA and Patient Centered Outcomes Research.
- Participated in monthly teleconferences for 1-year prior to conference, leading several breakout group topics.
- Co-authored multiple manuscripts with funders, researchers, and clinician attendees of the Consensus Conference, of which one of 15-20 articles selected annually by the American Board of Emergency Medicine as mandatory reading for the 2018 Lifelong Learning Series.

American College of Emergency Physicians’ Clinical Policy Subcommittee (2015-2016)

- Assigned by ACEP President to Transient Ischemic Attack (TIA) Clinical Policy Subcommittee
- Participated in monthly meetings with four co-authors and ACEP Clinical Policy Committee members to develop, edit, and publish the current emergency medicine guidelines for TIA, which were selected by the American Board of Emergency Medicine as mandatory reading for the 2019 Lifelong Learning Series.

NIH and PCORI Study Sections

- Content expert reviewer for National Heart, Lung, and Blood Institute Special Study Section “Sickle Cell Disease Implementation Consortium Using Implementation Science to Optimize Care for Adolescents and Young Adults with Sickle Cell Disease” (U01 RFA-HL-16-010, 2016)
- Reviewer for National Institute of Health Grants for Early Medical and Surgical Specialists Transition to Aging Research (GEMSSTAR) Study Section (2017)
- Content expert reviewer for National Institute of Dental and Craniofacial Research U01 Special Study Section “Implementation Science Research to Improve Dental, Oral, and Craniofacial Health (U01 RFA DE18-001, 2017)
- Patient Centered Outcomes Research Institute Merit Review Study Section on Implementation of Effective Shared Decision Making Approaches in Practice Settings (2018)

ORIGINAL CONTRIBUTIONS TO MEDICAL LITERATURE

- Neta G, Glasgow RE, **Carpenter CR**, Grimshaw JM, Rabin BA, Fernandez ME, Brownson RC; A framework for enhancing the value of research for dissemination and implementation, *Am J Public Health* 2015; 105: 49-57.
- Hess EP, Grudzen CR, Thompson R, Raja AS, Cone DC, **Carpenter CR**; Shared decision making in the emergency department: respecting patient autonomy when seconds count, *Acad Emerg Med* 2015; 22: 856-864.
- Finnerty NM, Rodriguez R, **Carpenter CR**, Sun B, Theyyanni N, Ohle R, Dodd K, Schoenfeld E, Elm K, Kline J, Holmes JF, Kuppermann N; Clinical decision rules for diagnostic imaging in the emergency department: A research agenda, *Acad Emerg Med* 2015; 22: 1406-1416.
- Kanzaria HK, McCabe A, Meisel Z, LeBlanc A, Schaffer JT, Bellolio MF, Vaughan W, Applegate KE, Hollander JE, Grudzen CR, Mills AM, **Carpenter CR**, Hess EP; Advanced patient-centered outcomes in emergency department diagnostic imaging: A research agenda. *Acad Emerg Med* 2015; 22: 1435-1446.
- **Carpenter CR**, Raja AS, Brown MD; Overtesting and the downstream consequences of overtreatment: Implications of “Preventing Overdiagnosis” for Emergency Medicine, *Acad Emerg Med* 2015; 22: 1484-1492.
- Lo BM, **Carpenter CR**, Hatten BW, Wright BJ, Brown MD; American College of Emergency Physicians Clinical Policy: Critical Issues in the Evaluation of Adult Patients with Suspected Transient Ischemic Attack in the Emergency Department, *Ann Emerg Med* 2016; 68: 354-370.
- Beach SR, **Carpenter CR**, Rosen T, Sharps P, Gelles R; Screening and Detection of Elder Abuse: Research Opportunities and Lessons Learned from Emergency Geriatric Care, Intimate Partner Violence, and Child Abuse, *J Elder Abuse Neglect* 2016; 28: 185-216.
- Grudzen CR, Anderson JR, **Carpenter CR**, Hess EP; Shared Decision Making in the Emergency Department: Development of a Policy-Relevant Patient-Centered Research Agenda, *Acad Emerg Med* 2016; 23: 1313-1319.
- Dodd KW, Berman A, Brown J, Carr BG, Dunn P, Escobedo M, Gayer C, Grieser M, **Carpenter C**, Hess EP, Grudzen CR; Funding Research in Emergency Department Shared Decision Making: A Summary of the 2016 Academic Emergency Medicine Consensus Conference Panel Discussion, *Acad Emerg Med* 2016; 23: 1340-1345.
- Kanzaria H, Booker-Vaughns J, Itakura K, Yadav K, Kane B, Gayer C, Lin G, Leblanc A, Gibson R, Chen E, Williams P, **Carpenter CR**; Dissemination and Implementation of Shared Decision-Making into Clinical Practice: A Research Agenda, *Acad Emerg Med* 2016; 23: 1368-1379.
- Hogan TM, Richmond N, **Carpenter CR**, Biese K, Hwang U, Shah MN, Escobedo M, Berman A, Broder JS, Platts-Mills TF, Shared Decision Making to Improve the Emergency Care of Older Adults: A Research Agenda, *Acad Emerg Med* 2016; 23: 1386-1393.

- Sepucha K, Breslin M, Graffeo C, **Carpenter CR**, Hess EP; State of the Science: Tools and Measurement for Shared Decision Making, *Acad Emerg Med* 2016; 23: 1325-1331.
- Pinnock H, Barwick M, **Carpenter CR**, Eldridge S, Grandes G, Griffiths CJ, Rycroft-Malone J, Meissner P, Murray E, Patel A, Sheikh A, Taylor SJ; Standards for Reporting Implementation Studies (StaRI) Statement, *BMJ* 2017; 356: i6795.
- Pinnock H, Barwick M, **Carpenter CR**, Eldridge S, Grandes-Odriozola G, Griffiths C, Rycroft-Malone J, Meissner P, Murray E, Patel A, Sheikh A, Taylor S; Standards for Reporting Implementation Studies (StaRI) Explanation and Elaboration Document, *BMJ Open* 2017; 7: e013318.
- **Carpenter CR**, Pinnock H; Transforming Research to Practice Change: StaRI Aims to Overcome Knowledge Inertia: The Standards for Reporting Implementation Studies Guidelines, *J Am Geriatr Soc* 2017; 65: 1664-1666.
- **Carpenter CR**, Pinnock H; Starry Aims to Overcome Knowledge Translation Inertia: The Standards for Reporting Implementation Studies (StaRI) Guidelines, *Acad Emerg Med* 2017; 1027-1029.

DEPARTMENT, HOSPITAL, UNIVERSITY, HOSPITAL COMMITTEES/ACTIVITIES

Faculty Advisor, Institute for Healthcare Improvement Open School Chapter, Washington University School of Medicine (2010-2015)

- Lead and guide student group focusing on the overlap between quality improvement and implementation science in patient safety.
- Provide case-based lectures and facilitate discussions to group members (biannually)

Participant, Washington University Network for Dissemination and Implementation Research (WUNDIR, 2010-present)

- Participate in every other month meetings.
- Present implementation research news and review WUNDIR member grants.

Member, Washington University Institute for Public Health and Harvey A. Friedman Center for Aging (2011-present, see <https://publichealth.wustl.edu/scholars/christopher-r-carpenter/>)

Debriefing Facilitator, Barnes-Jewish Hospital (2011-present)

- Lead multidisciplinary debriefing after serious safety events

Reviewer, Barnes-Jewish Hospital Clinical Awards (2014)

- Review nominations
- Participate in award committee panel discussion
- Approximately 15 hours to review packages and participate in panel

Reviewer, ICTS-BJHF Funding Program, Washington University in St. Louis (2015)

- Review grants for study section
- Approximately 40 hours of preparation time and participation in study group.