

Research and Academics in KP California Emergency Medicine

Quarterly Report: 2020 Q4

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Hot Off the Press^a

TPMG (Northern CA)

Ballard D, Vinson D. Medically Clear: Trust your gut when you think it's not appendicitis. *Emerg Med News*. 2020;42(11):15.

Full-text: <https://bit.ly/38cwa6a>

Ballard D, Vinson D. Medically Clear: The less-is-more approach to acute diverticulitis. *Emerg Med News*. 2020;42(12):18.

Full-text: <https://bit.ly/33T5Gn9>

Shan J, **Ballard D, Vinson DR.** Publication non grata: The challenge of publishing non-COVID-19 research in the COVID era. *Cureus*. 2020;12(11):e11403.

Full-text: <https://doi.org/10.7759/cureus.11403>

^a Publications, including abstracts and educational works, are organized by the region of the leading TPMG/SCPMG emergency physician author, whose name is the first one in bold font. We also highlight all KP EM co-authors. Included are activities undertaken *during* PMG employment. Updates for coming quarterlies can be sent to David R. Vinson, KP CREST Network: david.r.vinson@kp.org

Reed ME, Huang J, Brand R, Graetz I, Jaffe MG, **Ballard DW**, Neugebauer R, Fireman B, Hsu J. Inpatient-outpatient shared electronic health records: Telemedicine and laboratory follow-up after hospital discharge. *Am J Manag Care*. 2020 Oct 16 [Epub ahead of print].

Full-text <https://www.ajmc.com/view/inpatient-outpatient-shared-electronic-health-records-telemedicine-and-laboratory-follow-up>

Garmel GM, Barker TD. Jaundice. In Harwood-Nuss' *Clinical Practice of Emergency Medicine*, 7th ed. Wolfson AB (ed). LWW: Philadelphia, PA; 2020, pp. 575-579.

Book at amazon: <https://www.amazon.com/dp/1975111591/>

Isaacs DJ, Johnson EJ, **Hofmann ER**, Rangarajan S, **Vinson DR**. Primary care physicians comprehensively manage acute pulmonary embolism without higher-level-of-care transfer. A report of two cases. *Medicine (Baltimore)*. 2020;99:45(e23031).

Full-text: <https://doi.org/10.1097/MD.00000000000023031>

Lee MO, Altamirano J, Garcia LC, Gisondi MA, Wang NE, **Lippert S**, Maldonado Y, Gharahbaghian L, Ribeira R, Fassiotto M. Patient age, race and emergency department treatment area associated with "Topbox" Press Ganey scores. *West J Emerg Med*. 2020;21(6):117-124.

Full-text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7673899/>

Sax DR, **Mark DG**, Huang J, Sofrygin OX, Rana JS, Collins SP, Storrow AB, Liu D, Reed ME. Use of machine learning to develop a risk stratification tool for emergency department patients with acute heart failure. *Ann Emerg Med*. 2020 Dec 19 [Epub ahead of print].

Abstract: <https://doi.org/10.1016/j.annemergmed.2020.09.436>

Shan J, Warton EM, Reed M, **Vinson D**, Kuppermann N, Dayan P, Dalziel S, Rauchwerger A, **Ballard D**. Effect of clinical decision support on head computed tomography for children with minor head trauma. *Ann Emerg Med*. 2020;76(4S):S44-S45 [abstract 114].

Abstract: [https://www.annemergmed.com/article/S0196-0644\(20\)30872-6/fulltext](https://www.annemergmed.com/article/S0196-0644(20)30872-6/fulltext)

Shan J, Isaacs D, Bath H, Julien D, **Vinson D**. How is "outpatient management" of acute pulmonary embolism defined in the primary literature? A narrative review. *Chest*. 2020;158(4S):A2228.

Kea B, Gowen K, Wenzel E, Alligood T, Robinson C, Le N, Kim J, Hunt R, **Vinson DR**, Sun BC. "They're the experts. So, how involved could I be?": Patient perspectives on oral anticoagulation decisionmaking. *Ann Emerg Med*. 2020;76(4S):S128 [abstract 332].

Abstract: [https://www.annemergmed.com/article/S0196-0644\(20\)31094-5/fulltext](https://www.annemergmed.com/article/S0196-0644(20)31094-5/fulltext)

Walker G. Emergentology: We need to take race out of algorithms. *Emerg Med News*. 2020;42(10):14.

Full-text: https://journals.lww.com/em-news/Fulltext/2020/10000/Emergentology_We_Need_to_Take_Race_Out_of.10.aspx

Walker G. Emergentology: The COVID-19 silver lining. *Emerg Med News*. 2020;42(11):20.

Full-text: https://journals.lww.com/em-news/Fulltext/2020/11000/Emergentology_The_COVID_19_Silver_Lining.10.aspx

Walker G. Emergentology: Waiting in the ED Is par for the course. *Emerg Med News*. 2020;42(12):23.

Full-text: https://journals.lww.com/em-news/Fulltext/2020/12000/Emergentology_Waiting_in_the_ED_Is_Par_for_the.11.aspx

SCPMG (Southern CA)

Ghobadi A, Lin B, Musigdilok VV, Park SJ, Palmer-Toy DE, Gould MK, **Vinson DR**, Hutchison DM, **Sharp AL**. Effect of using an age-adjusted d-dimer to assess for pulmonary embolism in community emergency departments. *Acad Emerg Med*. 2020 Nov 17 [Epub ahead of print].

Abstract: <https://pubmed.ncbi.nlm.nih.gov/33206443/>

Sharp AL, Huang BZ, Broder B, **Smith M**, Yuen G, Subject C, Nau C, Creekmur B, Tartof S, Gould MK. Identifying patients with symptoms suspicious for COVID-19 at elevated risk of adverse events: The COVAS score. *Am J Emerg Med*. 2020 Nov 5 [Online ahead of print].

Full-text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7642742/>

Kawatkar AA, **Sharp AL**, Baecker AS, Natsui S, Redberg RF, Lee MS, Ferencik M, Wu YL, Shen E, Zheng C, Musigdilok VV, Gould MK, Goodacre S, Thokala P, Sun BC. Early noninvasive cardiac testing after emergency department evaluation for suspected acute coronary syndrome. *JAMA Intern Med*. 2020 Oct 5 [Online ahead of print].

Abstract: <https://pubmed.ncbi.nlm.nih.gov/33031502/>

Kline J, **Sharp A**, Munson C. Validation of the COVAS (Comorbidities, Obesity, Vitals, Age, Sex) Score as a Practical Tool for Assessing Need for Intensive Care Services in Suspected SARS-CoV2 Patients. *Proceedings of IMPRS*. 2020;3(1).

Abstract: <https://doi.org/10.18060/24709>

Preciado SM, **Sharp AL**, Sun BC, Baecker A, Wu YL, Lee MS, Shen E, Ferencik M, Natsui S, Kawatkar AA, Park SJ, Redberg RF. Evaluating gender disparities in the emergency department management of patients with suspected acute coronary syndrome. *Ann Emerg Med*. 2020 Dec 23 [Online ahead of print].

Abstract: <https://doi.org/10.1016/j.annemergmed.2020.10.022>

Ioannides LKH, Sun BC, Baecker AS, Redberg RF, Lee M, Ferencik M, Wu Y, Shen E, Zheng C, Musigdilok V, Park SJ, **Sharp AL**. Not all HEART scores are created equal: identifying “low-risk” patients at higher risk. *JACEP Open*. 2020;1-7.

Full-text: <https://doi.org/10.1002/emp2.12315>

Zheng C, Sun BC, Wu YL, Ferencik M, Lee MS, Redberg RF, Kawatkar AA, Musigdilok VV, **Sharp AL**. Automated abstraction of myocardial perfusion imaging reports using natural language processing. *J Nucl Cardiol*. 2020 Nov 5 [Online ahead of print].

Full-text: <https://link.springer.com/article/10.1007/s12350-020-02401-z>

Moumneh T, Sun BC, Baecker A, Park S, Redberg R, Ferencik M, Lee MS, Douillet D, Roy PM, **Sharp AL**. Identifying patients with low-risk of acute coronary syndrome without troponin testing: Validation of the HEAR score. *Am J Med*. 2020 Oct 27 [Online ahead of print].

Abstract: <https://pubmed.ncbi.nlm.nih.gov/33127371/>

Lewis CC, Wellman R, Jones SMW, Walsh-Bailey C, Thompson E, Derus A, Paolino A, Steiner J, De Marchis EH, Gottlieb LM, **Sharp AL**. Comparing the performance of two social risk screening tools in a vulnerable subpopulation. *J Family Med Prim Care*. 2020;9(9):5026-5034.

Full-text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7652127/>

In Preparation^b

1. Understanding Cold Drink Heart: A Telephone-based Patient Survey

Principal Investigators: **David R. Vinson** (Roseville/Sacramento) and Mary E. Reed (DOR)

Co-Investigators: Judy Shan and Adina S. Rauchwerger (DOR)

Funding: TPMG’s Physician Researcher Program

KP Study Sites: KPNC

Summary: One means of atrial fibrillation (AF) recurrence prevention is the identification and avoidance of factors known to trigger AF. Among these is the rapid ingestion of icy cold drinks and food. Though this environmental precipitant is not well described, one recent survey from UCSF suggests this may be present in as many as 10% of patients with AF. Little research, however, has been undertaken on this condition; the literature is comprised exclusively of case reports. It is into this gap of knowledge that our patient survey speaks.

^b Funding in place, if applicable, but approval is pending by our respective Institutional Review Boards.

Just Launched

1. In-hospital mortality among patients with non-traumatic intracranial hemorrhage: In a hub-and-spoke model of neuroscience care, are outcomes non-inferior following presentation to a spoke versus a hub medical center?

Principal Investigator: **Dustin G. Mark** (Oakland/Richmond)

Co-Investigators: Chris Sonne (Radiology, Oakland), Mary E. Reed and E. Margaret Warton (DOR), and **David R. Vinson** (Roseville/Sacramento), of the KP CREST Network

Funding: KPNC Community Benefit Program

KP Study Sites: KPNC

Summary: KPNC provides neuroscience care using a hub-and-spoke model, where several hub hospitals serve as referral centers of neuroscience excellence, inclusive of dedicated neuroscience intensive care units staffed by board-certified neurointensivists. Within KPNC most patients with non-traumatic ICH are cared for in hospitals lacking neuroscience units, relying on remote neuroscience consultation and reserving transfer for patients likely to require neurosurgical interventions, in part given the limited census capacities of the neuroscience centers. The comparative efficacy of this care model (against default care of non-traumatic ICH within neuroscience centers) is unknown. To help address the knowledge gap, we propose to compare mortality rates between patients with non-traumatic ICH presenting to KPNC medical centers without neuroscience units (spokes) versus those with neuroscience units (hubs). To adjust for case mix we will use several strategies including adjustment for predicted mortality using hierarchical multivariable regression analyses and propensity score adjustment for hub presentation. We hypothesize that observed mortality will be similar between patients with non-traumatic ICH who present to neuroscience hub medical centers compared with non-neuroscience spoke medical centers within an integrated care delivery system.

2. Imaging in suspected renal colic: retrospective validation of clinical decision rules to predict uncomplicated ureteral stone

Principal Investigator: **Edward Durant** (Modesto/Manteca)

Co-Investigators: Vignesh Arasu (Radiology, Vallejo), Raymond Bernal (Urology, Manteca), Mary E. Reed and E. Margaret Warton (DOR), and **David R. Vinson** (Roseville/Sacramento) of the KP CREST Network

Funding: KPNC Community Benefit Program

KP Study Sites: KPNC

Summary: Computed tomography (CT) is considered the gold-standard for diagnostic imaging in suspected renal colic. Several researchers have attempted to develop clinical decision rules (CDRs)

to predict uncomplicated ureteral stone without the use of CT, but none have been well validated or widely adopted into clinical practice. We seek to remedy this deficit by creating simple CDRs based on recently-published consensus guidelines and to evaluate their performance in a large community-based population using a retrospective cohort design. Our research question is: among non-elderly adults who present to a KPNC ED and undergo CT for suspected ureteral stone, how well does the retrospective application of a new guideline-based clinical decision rule for CT imaging predict uncomplicated ureteral stone and patient safety outcomes compared with unstructured routine practice? The results will inform the development of a clinical pathway.

3. DIZZiness Treatment through Implementation & Clinical strategy Tactics (DIZZTINCT-2)

Principal Investigators: **Adam L. Sharp** (Los Angeles, DRE), Kevin Kerber and Will Meurer (University of Michigan)

Co-Investigators: Navdeep Sangha and Prasanth Manthena (Los Angeles), **Molly Jancis** (Panorama City), Laura Damschroeder (University of Michigan)

Funding: National Institute on Deafness and Other Communication Disorders (NIDCD)
2R01DC012760-06A1

Summary: This study aims to determine the impact of an enhanced implementation strategy to assist physicians to accurately diagnose and treat benign paroxysmal positional vertigo and vestibular neuritis across all KPSC emergency departments. This includes evaluating the impact on CT use, length of stay, adverse events, hospitalization and misdiagnosis. We will also measure the effectiveness of a patient targeted intervention on patient-reported outcomes and utilization as well as the lasting impact upon practice.

4. ACTIV-2/A5401. Adaptive Platform Treatment Trial for Outpatients with COVID-19 (Adapt Out COVID). A Multicenter Trial of the AIDS Clinical Trials Group (ACTG)

Principal Investigator: David Smith (UC San Diego)

Co-Investigators: **Adam Schwartz** (site lead for KP San Diego), with the help of Paul Dohrenwend, David Neison, Jonathan Kei, Brent Lorenzen, Jeff Lapoint, J. Matt Edwards, Jenny Chua-Tuan, Matthew Silver, Cliff Swap, and Don Mebust

Funding: National Institute of Allergy and Infectious Diseases, Eli Lilly and Company

KP Study Site: San Diego

Summary: Adapt Out COVID will evaluate the safety and efficacy of investigational agents for the treatment of symptomatic non-hospitalized adults with COVID-19. It begins with a phase II evaluation, followed by a transition into a larger phase III evaluation for promising agents. The trial is a randomized, blinded, controlled adaptive platform that allows agents to be added and dropped during the course of the study for efficient testing of new agents against placebo within the same trial infrastructure. The primary outcome measures in the phase II evaluation will be duration of symptoms, loss of detection of SARS-CoV-2 RNA by nasopharyngeal (NP) swab, and

safety. The phase III evaluation is a continuation of the phase II trial for agents that meet study-defined criteria for further evaluation and for which sufficient investigational agent is available. The fully powered phase III trial will evaluate the efficacy of each selected investigational agent compared to placebo to prevent hospitalization and death in non-hospitalized adults with COVID-19. <https://clinicaltrials.gov/ct2/show/NCT04518410>

Ongoing Research Projects^c

1. How effective are code leaders at determining high-quality cardiopulmonary resuscitation?

Principal Investigator: **Steve A. Aguilar** (San Diego)

Study Site: San Diego

Summary: This is a prospective study where participants will be shown two separate randomly selected 1-minute videos from a cohort of four. Two of the videos will show examples of high-quality chest compressions while one will display a rate superseding current guidelines and the final will show poor chest recoil with a compressor partially leaning on the chest during compressions. We hypothesize that participants will generally be poor assessors of high-quality chest compressions and hope that findings will generate interest in the importance of high-quality chest compressions during codes.

Status: Data collection complete. Manuscript written. Preparing for submission.

2. Does ACLS instruction utilizing high fidelity simulation and detailed video debriefing improve performance during critical scenarios?

Principal Investigator: **Steve A. Aguilar** (San Diego)

Co-Investigators: Mark Meyer, Charles Chiang, So Onishi, and Mark Lettinga (all San Diego)

Study Site: San Diego

Summary: This is a non-randomized, pre/post study to determine if a new method of teaching ACLS improves performance during critical scenarios. Participants in an ACLS course are being taught using new AHA-approved simulation curriculum. Performance at baseline and post-debriefing are measured using specific tools to evaluate performance in a cardiac arrest scenario.

Status: The data are collected. Analysis is underway.

3. Infant Fever STEWARD Project (STandardizing Emergency Work-up Around Risk Data)

^c Active studies are organized alphabetically by the leading TPMG or SCPMG emergency physician investigator, whose name is in bold font.

Principal Investigators: **Dustin W. Ballard** (San Rafael) and Tara Greenhow (Pediatric infectious disease; San Francisco)

Co-Investigators: KP CREST Network, **Adam L. Sharp** (DRE^d and Los Angeles), and Pediatric Hospitalists Bev Young and Tran Nguyen

Funding: Garfield Memorial Fund

KP Study Sites: KPNC and KPSC

Summary: **In Phase 1**, we will define retrospective incidence rates of clinical and utilization outcomes in two cohorts (age 7-90 days, and 91-365 days) presenting to the emergency department (ED) in Kaiser Permanente Northern California (KPNC) and Kaiser Permanente Southern California (KPSC) with fever. **In Phase 2**, we will deploy this incidence data in a structured electronic clinical decision support (CDS) module that promotes American Academy of Pediatrics guidelines and prospectively collects data. We will collect real-time patient-specific clinical data in a structured fashion based on age strata and offer CDS links to Peds HBS/Peds ID-approved guideline documents/flowcharts. CDS content and evaluation will emphasize utilization outcomes.

Status: Data collection is underway.

4. A systematic review of clinical practice guidelines for pediatric head injury in emergency medicine

Principal Investigator: PREDICT Network (Australia/New Zealand)

Co-Investigators: **Dustin W. Ballard** (San Rafael)

Funding: Fulbright Scholarship/Centres for Research Excellence (NHMRC)

KP Study Sites: N/A

Summary: To inform guideline development, the study team, with the assistance of the KP Library team, performed a literature search and appraisal from 2013 to 2019 and assessed existing guidelines addressing the acute management of children with mild to moderate head injury, including concussion. Six high quality guidelines were identified and are being drawn from to inform evidence updates and recommendations during the guideline development process.

Status: The systematic review work has been accepted for publication.

5. Sustainability of electronic clinical decision support system effects: an evaluation of two use cases

Principal Investigator: **Dustin W. Ballard** (San Rafael)

^d DRE = KPSC Department of Research & Evaluation (Pasadena); DOR = KPNC Division of Research (Oakland)

Co-Investigators: David R. Vinson (Roseville/Sacramento), Mary E. Reed, DrPH (DOR), and the KP CREST Network

Funding: KP Northern California Community Benefit Program

KP Study Sites: KP Northern California

Summary: Evidence supporting the effectiveness of electronic clinical decision support systems (CDSSs) is accumulating across condition-specific indications but is lacking in regard to the sustainability of CDSS-impacted practice change. We will assess the sustainability of CDSS-enabled practice change across two distinct ED use cases: 1) site-of-care treatment decisions for patients with acute pulmonary embolism (PE) and 2) imaging guidance for children with blunt head trauma. These are two distinct CDSS interventions encompassing different intervention time periods (2012-2014 vs. 2014-2015), patient populations (adult vs pediatrics), intervention sites (7 vs. 10), and interfaces (Epic flowsheet vs. RISTRA web services).

Status: Data collection for the pediatric arm is complete and we have presented an abstract at the 2020 Pediatric Academic Societies meeting and the American College of Emergency Physicians Research Forum. A manuscript is undergoing peer-review. Data collection for the PE arm is underway.

6. EHR-based decision support for pediatric acute abdominal pain in emergency care

Principal Investigator: Elyse O. Kharbanda, Health Partners, Minneapolis, MN

Co-investigators: **Dustin W. Ballard** (San Rafael), Mamata V. Kene (San Leandro/Fremont), Uli K. Chettipally (South SF, retired), David R. Vinson (Roseville/Sacramento), Dale M. Cotton (South Sacramento), and the KP CREST Network

Funding: National Institute of Child Health and Human Development (NICHD at the NIH)

Study Sites: 11 CREST EDs in KP Northern California

Summary: With a cluster randomized trial we are studying the impact of patient-specific electronic clinical decision support on the use of diagnostic imaging, clinical outcomes and costs of care among children with abdominal pain at risk for appendicitis.

Clinical Trial: <https://clinicaltrials.gov/ct2/show/NCT02633735>

Status: We have published five papers so far: (1) Our derivation and validation study of the pediatric Appendicitis Risk Calculator (pARC) in *Pediatrics*; (2) Our KP pARC validation study in *Ann Emerg Med*; (3) Our study of the development of our CDS tool in *EGEMS (Wash DC)*; (4) Our study of the impact of text message alerts to emergency physicians on clinical trial enrollment in *J Am Med Inform Assoc*; and our study of the diagnostic accuracy of physician gestalt in *Acad Emerg Med*. The pARC has been posted on MDCalc: <https://www.mdcalc.com/pediatric-appendicitis-risk-calculator-parc> Our impact paper is now in press for February.

7. Understanding the factors affecting hospital performance in out-of-hospital cardiac arrest: A mixed-methods study

Principal Investigator: Bryn Mumma (UC Davis)

Co-Investigators: **Sean Bouvet** (Walnut Creek) and the KP CREST Network

Funding: NHLBI at the NIH

KP Study Sites: The 7 PCI Facilities in KP Northern California

Summary: Out-of-hospital cardiac arrest (OHCA) is the most common cause of death from cardiac disease. Among patients who are resuscitated and survive to hospital admission, survival to hospital discharge ranges from 14% to 42% and varies significantly by region and hospital, indicating that hospital factors play a critical role. To improve outcomes, the American Heart Association recommends regionalized care at cardiac resuscitation centers that are closely aligned with STEMI centers. Our preliminary data from the 2011 California Office of Statewide Health Planning and Development (OSHPD) database show that treatment at a STEMI center is associated with both survival and good neurologic recovery at hospital discharge. We also found that rates of good neurologic recovery ranged from 39% to 67% ($p < 0.0001$) after adjusting for patient and hospital factors. The reasons for this variability are unknown. The goal of this proposal is to identify elements of clinical care and organizational culture for patients resuscitated from OHCA that are associated with good neurologic recovery.

Status: The study's first paper (independent of KP) was published in *Resuscitation*: <https://www.ncbi.nlm.nih.gov/pubmed/30590071> KPNC is participating in the physician survey element of the project, the data collection of which is now complete.

8. Characteristics of COVID-19 Patients Evaluated in the ED

Principal Investigators: **Dale M. Cotton** (South Sacramento) and Mary E. Reed (DOR)

Co-Investigators: Liyan Liu (DOR), Mamata V. Kene (San Leandro/Fremont), Dustin W. Ballard (San Rafael), Dustin G. Mark and Dana R. Sax (Oakland/Richmond), Erik R. Hofmann (South Sacramento), David R. Vinson (Roseville/Sacramento), Meena Ghiya (South San Francisco), Edward J. Durant (Manteca/Modesto), Sean C. Bouvet (Walnut Creek/Deer Valley), James S. Lin (Santa Clara), Ian D. McLachlan (San Francisco), Scott D. Casey (EM resident, UC Davis), with the CREST Network; Tara Greenhow (San Francisco; Pediatric Infectious Disease)

Funding: TPMG's Rapid Analytics Unit

KP Study Sites: KPNC

Summary: This retrospective cohort study will describe the characteristics and management of a consecutive series of ED patients across the region who tested positive for SARS-CoV-2 in the first

weeks of recognized disease in California. The results of this study will contribute to a better understanding of this patient population at a critical juncture of their care.

Status: We are completing analysis and writing the manuscript.

9. Cannabinoid Hyperemesis Syndrome in the ED: characteristics and determinants of length of stay

Principal Investigator: **Dale M. Cotton** (South Sacramento)

Co-Investigators: **Caleb D. Sunde, Erik Hofmann, Steven R. Offerman** and Carissa Shenko (South Sacramento), **David R. Vinson** (Roseville/Sacramento), E. Margaret Warton, Mary E. Reed, and Cynthia I. Campbell (DOR), and **the KP CREST Network**

Funding: KPNC Community Benefit Program

KP Study Sites: KPNC

Summary: This is a retrospective observational study of patients explicitly identified by diagnosis as having Cannabinoid Hyperemesis Syndrome (CHS) during an Emergency Department (ED) encounter in KPNC. We will describe patient demographics, cannabis use, treatments received, resource utilization, and length of stay (LOS) for ED visits given a diagnosis of CHS in 2016-2019. We will examine which factors, including treatment medications, influence ED LOS. Since a minority of CHS patients are explicitly coded as CHS during their encounter, we will also develop case-ascertainment strategies to find CHS patients who do not carry an explicit diagnosis.

Status: We are collecting data for two manuscripts.

10. Incorporation of bedside point of care echocardiogram findings to the Pulmonary Embolism Severity Index (PESI) score

Principal Investigator: **Dasia Esener** (San Diego)

Funding: AHRQ Grant

Study Sites: San Diego, Carolinas Medical Center

Summary: A prospective observational study examining the incidence of death or clinical deterioration within five days of acute PE diagnosis and within 30 days of diagnosis. Some evidence suggests that 1/3 of patients with low PESI scores have right ventricular (RV) dysfunction. The goal of this study is to incorporate bedside echo findings of RV dysfunction to the PESI score and follow short-term outcomes.

Status: Enrollment has completed. Data analysis is now underway.

11. The effect of CPR on direct and video laryngoscopy

Principal Investigator: **Jonathan Kei** (San Diego)

Co-Investigator: Don Mebust (San Diego)

KP Study Sites: KP Southern California

Summary: With more emphasis on continuous CPR per AHA guidelines, this study aims to assess the effect of CPR on direct and video laryngoscopy. Resident and attending physicians will be evaluated (timing, success rates) in the setting of a mannequin model.

Status: Manuscript is written. Pending submission.

12. Evaluation of the chief complaint of weakness in the emergency department

Principal Investigator: **Jonathan Kei** (San Diego)

Co-Investigators: Don Mebust (San Diego), Xinwei Liu (San Diego)

Study Site: KP San Diego

Summary: A chart review study examining the discharge diagnosis, length of stay and ED disposition on all patients that present to an emergency department with CC of "weakness" and how this compares to the rest of the ED patients.

Status: Data collection complete. Manuscript being written.

13. Optimizing quality and safety in the era of COVID-19: Virtual care first utilization and outcomes for potentially emergent conditions among KPNC members

Principal Investigators: **Mamata V. Kene** (San Leandro/Fremont) and **Dana R. Sax** (Oakland/Richmond)

Co-Investigators: Adina S. Rauchwerger, Judy Shan, Mary E. Reed (DOR), **Dustin G. Mark** (Oakland/Richmond), **Dale M. Cotton** (South Sacramento), **Dustin W. Ballard** (San Rafael), and **David R. Vinson** (Roseville/Sacramento) of the KP CREST Network

Funding: Garfield Memorial Fund

KP Study Sites: KPNC

Summary: KPNC rapidly increased virtual care services (video and telephone visits) and decreased in-person visits in March 2020 during the recognized arrival of the COVID-19 pandemic. How this shift in site of care affected downstream ED and hospital utilization and subsequent clinical outcomes has not been well described. In this retrospective cohort study, we will evaluate the safety and efficiency of virtual care first by examining three high-risk conditions that often require ED evaluation and hospitalization: chest pain, abdominal pain, and respiratory illness. Analysis of care-seeking behavior, utilization (telephone, video, in-person and ED visits) and outcomes for these complaints (that include likely COVID-19 illness as well as those occurring independent of SARS-CoV-2) will allow us to assess the safety and efficiency of current virtual care workflows

while identifying potential opportunities to optimize outcomes and resource utilization. Ultimately, our current understanding of how safely these urgent conditions can be managed virtually is limited, and the insights gathered herein will help shape care delivery during the continued pandemic and beyond, into the transformed landscape of healthcare delivery following the comprehensive disruptions of 2020.

14. Spinal epidural abscess: an evaluation of frequency of and risk factors for delay in diagnosis

Principal Investigator: **Mamata V. Kene** (San Leandro/Fremont)

Co-Investigators: Sarabeth M. Maciey (EM resident, Stanford); Erik R. Hofmann (South Sacramento), Meena Ghiya (South San Francisco), Edward J. Durant (Manteca/Modesto), Sean C. Bouvet (Walnut Creek/Deer Valley)

Funding: The KPNC Graduate Medical Education Program, Kaiser Foundation Hospitals

KP Study Sites: KPNC

Summary: Spinal epidural abscess (SEA) is a rare condition with increasing incidence that if not promptly diagnosed and treated can lead to permanent and devastating neurologic disability. Accurate diagnosis requires mobilization of magnetic resonance imaging (MRI), a relatively scarce resource in emergent situations, and transfer for surgical intervention. The clinical presentation of SEA can vary, however, and many patients have multiple visits before a diagnosis is established. Delays in diagnosis, the most common complaint in SEA malpractice claims, are costly, with awards ranging from several hundred thousand dollars to multiple millions, due to the high morbidity. This retrospective cohort study will identify incidence of and factors associated with potential delay in diagnosis of SEA.

Status: Data collection is underway.

15. Impact of Opioid Safety Initiative Education on Emergency Department Opioid Prescribing

Principal Investigator: **Mamata V. Kene** (San Leandro/Fremont)

Co-investigator: **Sunil Bhopale** (Redwood City), Mary E. Reed (DOR)

Funding: KP Delivery Science and Applied Research (DARE) Rapid Analytics Unit

Study Sites: KP Northern California

Summary: TPMG implemented an Opioid Safety Initiative (OSI) to steward ED opioid use in 2016. The initiative's intervention was education and ongoing monitoring and feedback via opioid safety champions. The impact of this initiative on long-term outcomes with respect to sustained changes in opioid prescribing has not been fully analyzed. This work will assess the impact of the OSI on opioid prescribing rates, among all ED patients, as well as among vulnerable populations.

Status: Data collection has begun.

16. Utilization of CT pulmonary angiograms for pulmonary embolism evaluation: predictors of higher yield and comparison to national rates

Principal Investigator: **Mamata V. Kene** (San Leandro/Fremont)

Co-Investigators: Dana R. Sax (Oakland/Richmond), David R. Vinson (Roseville/Sacramento), Mary E. Reed (DOR), and the KP CREST Network, along with Vignesh Arasu (Radiology, Vallejo)

Funding: KP Northern California Community Benefit Program

KP Study Sites: KP Northern California

Summary: This retrospective cohort study will evaluate the yield of CT pulmonary angiography (CTPA) in KPNC ED patients from 2012-2018 compared to national averages. We hypothesize that the CTPA yield will be higher in KPNC compared with non-integrated delivery systems, and will identify provider-, facility- and patient-level factors associated with CTPA use and yield rates. We will also apply natural language processing (NLP) techniques to identify whether risk stratification tools were documented in the record. The results of this study will inform future design of prospective clinical decision support for PE diagnostics that will facilitate risk stratification tool use prior to imaging ordering in hopes of optimizing CTPA use, with improvements in patient care, resource use, and department throughput.

Status: We presented an abstract of our NLP work at the 2020 Society for Academic Emergency Medicine. We hope to submit the manuscript soon.

17. Evaluating the incidence of contrast associated acute kidney injury in ED patients

Principal Investigator: **Mamata V. Kene** (San Leandro/Fremont)

Co-Investigators: Vignesh Arasu (Vallejo), Ajit Mahapatra (Santa Clara), Mary E. Reed (DOR), and the KP CREST Network

Funding: KP Northern California Community Benefit Program

Study Sites: KP Northern California

Summary: Recent studies of acute kidney injury (AKI) after IV contrast-enhanced computed tomography (CT) suggest that prior observational studies overestimate the incidence of contrast-associated AKI and cast doubt on whether IV contrast is even associated with AKI. In this retrospective observational study, we will evaluate AKI incidence among all adult ED patients with chronic kidney disease grades 3-5 undergoing CT with or without IV contrast. To account for differences in distributions of AKI risk factors between contrast and no contrast arms, we will apply propensity score matching before performing logistic regression analysis to evaluate whether contrast administration is associated with AKI.

Status: The manuscript is undergoing peer-review by an emergency medicine journal.

18. The development of a novel virtual online emergency medicine residency curriculum

Principal Investigator: **William Krauss** (San Diego)

Co-Investigator: Jessica Andrusaitis

Funding: None

Study Site: KP San Diego

Summary: This is a descriptive study on the development of a novel virtual online emergency medicine residency didactic curriculum. Surveys will be utilized to obtain feedback on participation and methods to improve this medium. Various platforms will be tested with the objective of increasing engagement and interactive learning, and then evaluated utilizing survey data/feedback.

Status: Data collection is ongoing.

19. The approach to pediatric patients with suspected sepsis: a qualitative study

Principal Investigator: Sage Meyers, Children's Hospital of Philadelphia (CHOP)

Co-investigators: **James S. Lin** (Santa Clara), John Morehouse and Jenna Timm (Oakland/Richmond), and the KP CREST Network

Study Sites: Santa Clara, Oakland, Richmond

Summary: We are participating in a multicenter qualitative study to evaluate the perceptions of clinicians (nurses, midlevel providers, physicians) and hospital leaders (quality, patient safety, hospital administration) around the care of pediatric ED patients with suspected sepsis. Interviews will be conducted with participants to characterize assessment of facilitators and barriers to appropriate care. This information will be used to generate a testable hypothesis for potential implementation techniques to improve compliance with sepsis care guidelines.

Status: Interviews are complete. Analysis is underway.

20. Changes in ED patient volumes and acuity associated with the COVID-19 pandemic

Principal Investigator: **Brent Lorenzen** (San Diego)

Co-Investigator Adam Schwartz (San Diego)

Funding: none

KP Study Sites: Zion Medical Center and San Diego Medical Center

Summary: Retrospective data analysis of patient volumes, admission rates, acuity as measured by ESI score, and EMS arrivals. Compared 28-day period following the California state “stay at home” order to a control period, the comparable 28-day period from 2019. Compared to the year prior, daily patient volumes decreased by 42% and the proportion of ED patients admitted to the hospital increased from 16.6% to 21.6%.

Status: Manuscript was revised and resubmitted. Awaiting publication decision.

21. Prevalence, treatment and outcomes of ESBL urinary tract infections in the ED

Principal Investigator: **Dustin G. Mark** (Oakland/Richmond)

Co-Investigators: Zena Salim (KP Oakland IM Resident) and Bradley Frazee (Highland Hospital)

Funding: The KPNC Graduate Medical Education Program, Kaiser Foundation Hospitals

KP Study Sites: KPNC

Summary: Extended spectrum beta-lactamase (ESBL)-producing organisms pose unique challenges to clinicians in light of their resistance to some common antibiotics. In this retrospective cohort study, we will examine the treatment and outcomes of patients hospitalized with febrile urinary tract infections caused by ESBL-producing organisms.

Status: The manuscript is in press with *Ann Emerg Med*.

22. Dissemination and implementation of a shared decision-making strategy in ED patients with possible acute coronary syndrome: the patient-centered chest pain pathway

Principal Investigators: Erik Hess (Univ of Alabama, Birmingham; Mayo Clinic) and **Dustin G. Mark** (Oakland/Richmond)

Co-Investigators: Dustin W. Ballard (San Rafael), David R. Vinson (Roseville/Sacramento), Adina S. Rauchwerger (DOR), and the KP CREST Network

Funding: Patient-Centered Outcomes Research Institute (PCORI)

KP Study Sites: Oakland, Richmond, and San Rafael

Summary: This project will engage patients and key stakeholders in refining and embedding the Chest Pain Choice decision aid in routine emergency care. We will identify key barriers and facilitators to broad uptake of Chest Pain Choice that will result in a bundled pathway-driven strategy ready for implementation in 6 U.S. EDs representing 3 large integrated systems. The project will assess the extent to which the decision aid reaches all eligible patients, safely improves the patient experience of care (increase patient knowledge, increase patient satisfaction, decrease decisional conflict), and affects 30-day healthcare utilization.

Status: The shared decision-making tool has been implemented and we are evaluating factors associated with its uptake in clinical care. Data collection has recently completed. Analysis is nearly complete. We are writing the manuscript.

23. Chest pain STEWARD (STandardizing Emergency Work-up Around Risk Data) investigation

Principal Investigator: **Dustin G. Mark** (Oakland/Richmond) and Mary E. Reed (DOR)

Co-Investigators: KP CREST Network

Funding sources: TPMG's Delivery Science program and the Lokahi Foundation

Study Sites: KP Northern California

Summary: The prospective component is leveraging findings from the published retrospective study to provide point-of-care clinical decision support via the RISTRA platform to ED physicians, while dually serving as a prospective data collection tool to validate findings from the retrospective study. The period of implementation of our electronic clinical decision support tool across 13 CREST EDs completed at the end of 2019.

Status: Three studies have been published: Performance of coronary risk scores in patients with CP in the ED (*JACC*), 60-day major adverse cardiac event rates in ED CP patients with non-low modified HEART risk scores (*Am J Emerg Med*), and The performance of a retrospective method to determine risk score classification for ED patients with possible ACS (*Acad Emerg Med*). The validation manuscript has been provisionally accepted by *J Am Heart Assoc*.

24. The management of stable monomorphic ventricular tachycardia in the community ED setting

Principal Investigator: **Ian D. McLachlan** (San Francisco)

Co-Investigators: James S. Lin and Taylor Liu (Santa Clara), Sean C. Bouvet (Walnut Creek/Antioch), David R. Vinson (Roseville/Sacramento), Mary E. Reed (DOR), and the KP CREST Network

Funding: KP Northern California Community Benefit Program

Study Sites: KP Northern California

Summary: Monomorphic ventricular tachycardia (VT) is most often a precursor to life-threatening ventricular fibrillation and cardiac arrest. A small minority of patients with VT, however, present to the ED alert and oriented, with normal blood pressures. "Stable VT" may be amendable to pharmacological treatment, but because it's uncommon, few studies have compared treatments. This retrospective cohort study will include ED patients who were treated for stable monomorphic VT in KP Northern California. We will describe patient selection, treatment variation, VT termination rates, and major side effects.

Status: We presented an abstract of an interim analysis at the Society of Academic Emergency Medicine annual meeting, May 2019, and presented the complete dataset at the American College of Emergency Physicians in October 2019. The manuscript is under construction.

25. Recognition of outpatient pulmonary embolism (the ROPE study)

Principal Investigators: **Ian D. McLachlan** (San Francisco)

Co-Investigators: David R. Vinson (Roseville/Sacramento), Dustin W. Ballard (San Rafael), Mary E. Reed (DOR), Corby Makin (former UC Davis resident), Matt Stevenson (Stanford resident), and the KP CREST Network

Funding: KP Northern California Community Benefit Programs

Study Sites: KP Northern California

Summary: It is unknown what proportion of ED patients who receive an objectively-confirmed diagnosis of acute pulmonary embolism (PE) had seen an outpatient provider for explicit PE-related symptoms in the preceding weeks. This retrospective cohort study will answer the following questions: What patient characteristics facilitate early recognition of PE? Might delayed recognition occur because these patients have fewer risk factors to start with or more normal vital signs, making their PE harder to recognize? Does timing of recognition correlate with clinical outcomes?

Status: The manuscript is in the works. We presented an abstract at the American College of Emergency Physicians in October 2018.

26. Analysis of the effect of fascia iliaca block on decreasing opiate use for patients with hip fractures using a multidisciplinary management pathway

Principal Investigator: **Kenneth Perry** (San Diego)

Co-Investigators: Felipe Aguayo and Dasia Esener (San Diego)

Funding: Regional Research Committee Grant Fund

KP Study Sites: San Diego

Summary: Hip fractures lead to millions of ED visits each year and are associated with significant morbidity and mortality. When sustaining a hip fracture, patients are often given opioid medications to control pain, which may lead to complications including altered mental status, respiratory depression and hypotension leading to prolonged inpatient stays and increased morbidity and mortality. The fascia iliaca block using ultrasound guidance is an alternative to opioid pain medications by providing regional anesthesia to the areas of pain. It has been incorporated into a multidisciplinary pathway for pain management of hip fracture patients that present to the ED at Kaiser San Diego. The literature suggests that use of the fascia iliaca block may decrease the requirement for opioid medications and decrease length of stay.

Status: We presented an abstract at the Society for Academic Emergency Medicine, Las Vegas, May 2019. Manuscript undergoing peer-review.

27. RISTRIAGE: Standardizing Emergency Department Triage

Principal Investigator: **Dana R. Sax** (Oakland/Richmond)

Co-Investigators: Dustin G. Mark (Oakland/Richmond), Dustin W. Ballard (San Rafael), Mamata V. Kene (San Leandro/Fremont), David R. Vinson (Roseville/Sacramento), Mary E. Reed and Adina S. Rauchwerger (DOR) of the KP CREST Network

Funding: The Lokahi Board

KP Study Sites: KPNC

Summary: Patients presenting to most EDs in the US and to all EDs in KPNC are triaged by a standardized protocol into one of five levels of acuity. About 10% of patients who are initially triaged to a lower acuity group (usually with a significant wait time in a low acuity unit) are later found to have a more serious condition that should have had a higher triage classification. This is a significant quality problem which causes delay in diagnosis and treatment and preventable adverse outcomes. The consequence of this triage error is the need for additional patient hand-offs, avoidable rework, excessive resource use, patient dissatisfaction, and significantly increased liability risk. This study will determine the characteristics of adult patients who are mis-triaged to a lower acuity level and then identify a data-driven computer-based process to improve triage accuracy. Phase I is a retrospective analysis that will be followed by Phase II real-time building, testing and implementing a machine-based learning triage instrument in our EDs for integration into KP HealthConnect.

Status: Data collection continues. We would like to undertake a complementary study of pediatric patients.

28. Understanding variation in reporting for pediatric abdominal ultrasound studies, rates of "equivocal" studies, and association between ultrasound findings and the pARC score

Principal Investigator: **Dana R. Sax** (Oakland/Richmond)

Co-Investigators: Maura Olcese and Andrew Saxon (Oakland pediatric residents), Dustin W Ballard (San Rafael), Ed Durant (San Leandro/Modesto), and the KP CREST Network

Funding: Community Benefit Program, KP Oakland Pediatric Residency Program, and NIH (via the CREST Pediatric Abdominal Pain study)

KP Study Sites: CREST medical centers

Summary: There is significant variation in reporting for pediatric abdominal ultrasound studies despite studies suggesting the need for standardization. In addition, between 30-60% of

ultrasound reads are considered "equivocal," which often leads to further downstream testing, in particular CT scans. In this sub-study of a larger NIH-funded study of pediatric abdominal pain evaluation in the ED, we will describe rates of equivocal ultrasound (US) reports in KPNC, describe variation in reporting (including terminology and documentation of secondary signs of possible infection), and association between equivocal reports and risk of appendicitis as measured by the pARC score.

Status: Data collection is complete. We had an abstract accepted for presentation at the 2020 meeting of the Pediatric Academic Societies: "Prevalence of equivocal pediatric abdominal US reports for suspected appendicitis in 11 EDs in an integrated delivery system" and another presented at the 2020 meeting of the Society for Academic Emergency Medicine: "Indeterminate ultrasound in pediatric appendicitis is prevalent, poorly documented, and predicts additional imaging"

29. KP-specific heart failure risk prediction: KPNC Standardizing Emergency Work-ups Around Risk Data (STEWARD) heart failure project

Principal Investigator: **Dana R. Sax** (Oakland/Richmond) and Mary E. Reed (DOR)

Co-investigators: Dustin G. Mark (Oakland/Richmond), Jamal Rana (Oakland), Mamata V. Kene (San Leandro/Fremont), David R. Vinson (Roseville/Sacramento), Dustin W. Ballard (San Rafael), and the KP CREST Network

Funding: TPMG Delivery Science Program

Study Sites: KP Northern California

Summary: There are over one million ED visits across the U.S. each year for acute heart failure (AHF), with an average admission rate of 84%. EDs play a major role in the care of AHF patients through symptom management, coordination of care, and risk stratification to identify sicker patients needing admission. A clinical decision support tool to help predict AHF disease severity, employing accurate KPNC-specific risk estimates, would allow for more informed recommendations around venues and intensity of care customized to the KPNC setting. We propose a retrospective cohort study of adult patients presenting to a KPNC ED between 2015-2017 with AHF to validate clinical decision tools and determine KPNC-specific risk estimates for 30-day serious adverse events. We will also assess the feasibility of an EHR-linked clinical decision support system to extract heart failure-relevant data and efficiently present these to ED providers.

Status: Data collection is underway. We presented an abstract at the 2020 American College of Cardiology meeting: The 30-day adverse outcomes among patients treated in the ED for HF by LV systolic function status. *J Am Coll Cardiol.* 2020;75(11S1):880 [abstract]. We have a manuscript in peer-review: "30-day outcomes of patients with AHF treated in the ED."

30. A Randomized, Double-blind, Placebo-Controlled, Phase 2 Study to Evaluate the Efficacy and Safety of LY3819253 and LY3832479 in Participants with Mild-to-Moderate COVID-19 Illness (BLAZE-1)

Principal Investigator: Daniel M. Skovronsky (Eli Lilly)

Co-Investigators: **Adam Schwartz** (site lead at KP San Diego), with help from Brent Lorenzen, Clifford J Swap, David Neison, Donald P Mebust, Jeff Lapoint, Jenny Chua-Tuan, J Matthew Edwards, Jonathan Kei, Matthew A Silver, and Paul B Dohrenwend

Funding: Eli Lilly and Co.

KP Study Sites: Zion Medical Center, San Diego Medical Center

Summary: This is a phase II randomized, double-blind, placebo-controlled trial for patients with mild to moderate COVID-19. Objectives include, but are not limited to, viral clearance, hospitalization, ED visit and death. The therapeutic is a potent, neutralizing IgG1 monoclonal antibody (mAb) directed against the spike protein of SARS-CoV-2. It is designed to block viral attachment and entry into human cells, thus neutralizing the virus, potentially preventing and treating COVID-19. Treatment arms initially include varying doses of LY3819253. A further amendment included an additional arm with two mAbs. Interim analyses have demonstrated safety and a relative risk reduction for hospitalization/ED visit of 72%.

Status: Results from the interim analysis have been published. Chen P, et al; BLAZE-1 Investigators. SARS-CoV-2 Neutralizing Antibody LY-CoV555 in Outpatients with Covid-19. *N Engl J Med*. 2020 Oct 28 [Epub ahead of print]. <https://www.nejm.org/doi/full/10.1056/NEJMoa2029849>

31. Utility of Fluid Resuscitation in Low-Risk Patients with Severe Sepsis

Principal Investigator: **Todd A. Seigel** (Oakland)

Co-Investigators: Vincent Liu (DOR and Critical Care, Santa Clara) and **John Morehouse** (Oakland/Richmond)

Funding: KPNC Community Benefit Program

KP Study Sites: KPNC

Summary: This retrospective cohort study from 1/1/2012-12/31/18 will determine whether current protocolled interventions to treat severe sepsis (defined as clinical syndrome of suspected infection and serum lactate values between 2-3.99 mmol/L) in ED can be further refined based upon patients' presenting severity of illness. We hypothesize that patients with severe sepsis and lowest severity of illness (projected mortality less than 3%) will not have additional benefit from ED IV fluid administration. We hope to characterize more refined treatment algorithms for patients with severe sepsis, and specifically aim to demonstrate that current approaches to this heterogenous patient cohort may be resulting in overtreatment.

Status: Data collection is underway.

32. Prognosis in patients with confirmed or suspected COVID-19

Principal Investigators: **Adam L. Sharp** (Los Angeles/DRE), George Yuen (Orange County; Pulm/CC), Michael K. Gould, Claudia Nau, JaeJin An, and Kristi Reynolds (DRE)

Co-Investigators: Brian Z. Huang, (DRE), Benjamin Broder (Baldwin Park; Hospitalist), Matthew Smith (Los Angeles), Ali Ghobadi (Orange County), Matthew Silver (San Diego), Harminder Brar (Los Angeles), Christopher Subject (Los Angeles; Hospitalist), Kenneth Robinson (Panorama City), Natalie Mourra (Los Angeles; Family Medicine), Beth Creekmur (DRE), Sara Tartof (DRE), Steven Steinberg (Panorama City; Family Medicine), Michael K. Gould (DRE)

Funding: Regional Research Committee of Kaiser Permanente Southern California. Grant No.: KP-RRC-20200401

KP Study Sites: KPSC

Summary: The portfolio includes 4 projects that address stakeholder-driven questions regarding prognosis among: (1) ED patients with symptoms suggestive of possible COVID-19; (2) hospitalized patients with confirmed or suspected COVID-19; (3) critically ill patients with confirmed or suspected COVID-19; and (4) patients with hypertension and confirmed or suspected COVID-19.

Status: The ED study is completed. Other studies are collecting and analyzing data.

33. Understanding risk factors of firearm-related injuries and death in adult and pediatric populations: risk prediction and opportunities for prevention

Principal Investigator: Rulin Hechter (Pasadena)

Co-Investigators: **Adam L. Sharp** (DRE and Los Angeles), Sonya Negrif (DRE), Margo Sidell (DRE), Corinna Koebnick (DRE), Claudia Nau (DRE), Rebecca Cunningham (U of Michigan)

Funding: KP Task Force on Firearm Injury Prevention

KP Study Sites: KP Southern California

Summary: This study will develop a risk prediction model for both intentional and unintentional firearm-related injuries using data from KP Southern California. We will integrate individual, family, and community-level risk factors to develop a risk score that could be used to identify high-risk patients for targeted screening in the general medical setting. The study will also generate a heatmap to identify high-risk communities to inform strategies for firearm injury prevention interventions at the medical center and clinic level. The investigators will lay the foundation for implementing the risk score in care delivery to support real-time clinical decision making through collaboration with clinical stakeholders and operational leaders.

Status: Data collection is underway.

34. NBA-KP Lower Extremity Injury Prevention (LEIP) Research Program

Principal Investigator: **Adam L. Sharp** (DRE and Los Angeles), Anna Davis (CESR, Los Angeles)

Co-Investigators: Bob Sallis (Riverside), Corrine Munoz-Plaza (DRE, Los Angeles)

Funding: National Basketball Association and KP National Advertising & Sports Marketing

KP Study Sites: N/A

Summary: The ultimate goal of this proposal is to decrease rates of lower extremity injury (LEI) among youth athletes, with a special focus on high school basketball players, through consistent use of an evidence-based warm-up program. The study aims to accomplish the following: (1) Characterize the current state of LEI prevention (LEIP) warm-up programs among high-school aged youth basketball teams; (2) Develop an evidence-based warm-up program designed specifically for basketball LEIP, informed by input from HS players and coaches (Aim 1) to be feasibly implemented into routine use; (3) Understand approaches that result in the greatest adoption of and adherence to the LEIP program, by comparing alternative methods for delivering/disseminating and implementing the LEIP program.

Status: Qualitative data collection and systematic review are underway.

35. Comparative effectiveness of early diagnostic and disposition strategies for suspected acute coronary syndrome

Principal Investigators: **Adam L. Sharp** (DRE and Los Angeles) and Ben Sun (Penn)

Co-Investigators: Rita Redberg (UCSF), Michael Gould (DRE), Ernest Shen (DRE), Chengyi Zheng (DRE), Aniket Kawatkar (DRE)

Funding: NHLBI

Study Sites: KP Southern California

Summary: This is a comparative effectiveness study of five early diagnostic (stress ECG, stress echo, stress MP, CCTA or NO testing) and three disposition (inpatient, observation status, discharge) strategies for the ED evaluation of suspected acute coronary syndrome (ACS). We will study a prospective observational cohort of ~170,000 patients accrued over 5 years at EDs within the KPSC health system. The ultimate goal of this proposal is to improve outcomes after an ED evaluation for suspected ACS.

Status: We're in year 2 of a 4-year grant.

36. National diagnostic performance dashboard to measure and track diagnostic error using big data

Principal Investigators: **Adam L. Sharp** (DRE and Los Angeles), David Newman-Toker (Johns-Hopkins), Ketan Mane (KPMA)

Co-Investigators: Najilla Nassery (Johns-Hopkins), Ejaz Shamim (KPMA), Michael Gould (DRE) and Ernest Shen (DRE)

Funding: Moore Foundation

Sites: KP Southern California, Johns Hopkins, and KP Mid-Atlantic

Summary: Diagnostic errors may be the leading cause of preventable harm in U.S. healthcare, with estimates suggesting 12 million people a year are affected. New approaches to diagnostic performance measurement are vital to improve care moving forward. Evidence showing stroke misdiagnosed as benign dizziness in the ED is a target for improvement and this effort aims to operationalize a diagnostic performance dashboard for this condition. KPSC and KPMA will use similar methods to understand if myocardial infarction, pulmonary embolism, and sepsis offer similar opportunities to improve diagnostic performance.

Status: We're in year 2 of 2-year grant. An abstract was presented at ACEP, Oct 2019. Manuscript preparation underway.

37. The management of atrial fibrillation and flutter in emergency medicine (the TAFFY Study)

Principal Investigator: **David R. Vinson** (Roseville/Sacramento)

Co-investigators: The KP CREST Network, Jie Huang (DOR), Patricia Ramos (KP Portland), David Glaser (KP Denver), Bory Kea (OHSU)

Funding: Garfield Memorial National Research Fund

Study Sites: KP Northern California (7 EDs)

Summary: This prospective cohort study is profiling the characteristics of ED patients with non-valvular AF in community settings, describing the variation in management across EDs, and correlating patient and management variables with utilization, procedures, and complications.

Status: A manuscript on quality of life outcomes was published in *Ann Emerg Med*. A manuscript on the anticoagulation of ED patients with AF at high risk was published in *West J Emerg Med*. Our third manuscript is undergoing peer-review, this on facility-level variation in hospitalization. The next study will describe the management of recent-onset AF.

38. Ibutilide, amiodarone and procainamide for the cardioversion of atrial fibrillation/flutter: the Pharm CAFÉ Study

Principal investigator: **David R. Vinson** (Roseville/Sacramento)

Co-investigator: Dustin W. Ballard (San Rafael), Aaron M. Rome (South Sacramento), Garrett Thiel, Oliver Dutczak and Nelya Lugovskaya (UC Davis, current or recent), Matt D. Stevenson (Stanford), Margaret Warton (DOR), Manvi R. Nagam (UN Reno) and the KP CREST Network

Funding: KP Northern California Community Benefit Program

Study Sites: KP Northern California

Summary: We are comparing effectiveness and adverse event rates of these three drugs at four hours. This comparative effectiveness study will yield important information to help guide emergency providers in the selection of pharmacological agents for the cardioversion of AF/F.

Status: We have presented four abstracts. The ibutilide study has been published. We presented an abstract at ACEP in Denver, Oct. 2019. A manuscript comparing the agents is under construction.

39. Clinical decision support for atrial fibrillation and flutter

Principal Investigators: **David R. Vinson** (Roseville/Sacramento) and Mary Reed (DOR)

Co-Investigators: E. Margaret Warton (DOR), Dustin W. Ballard (San Rafael), Dustin G. Mark (Oakland), Bory Kea (OHSU), Dale M. Cotton (South Sacramento), Jodi Loyles (KP Regional), Alan S. Go (DOR), Matt Solomon (OAK, Cardiology) and the KP CREST Network

Funding: TPMG's Deliver Science Program (via the Physician Researcher Program)

Study Sites: KP Northern California

Summary: Our preliminary descriptive and analytic work evaluated drug selection for stroke prevention with the recent availability of direct oral anticoagulants like dabigatran. We also have designed, built, and implemented a web-based computerized clinical decision support tool to aid in the comprehensive management of ED patients and inpatients with atrial fibrillation and flutter.

Status: We presented an abstract at the American College of Emergency Physicians in October 2019 in San Diego and are finishing data analysis. We are also piloting a clinical decision support tool at the three Capitol Service Area EDs.

40. Optimal anticoagulation strategies for patients with newly detected acute atrial fibrillation

Principal Investigators: Bory Kea (OHSU) and **David R. Vinson** (Roseville/Sacramento)

Co-Investigators: E. Margaret Warton and Mary E. Reed (DOR), Ben Sun (Penn), Rochelle Fu (OHSU), Merritt Raitt (Portland VA Medical Center), and Greg YH Lip (University of Birmingham)

Funding: NIH's National Heart, Lung, and Blood Institute (NHLBI)

Study Sites: KP Northern California

Summary: In this retrospective cohort study of patients with newly-detected AF/FL we will describe the incidence, time lag, and predictors of oral anticoagulation (OAC) prescribing after an ED discharge diagnosis of new AF/FL, determine whether validated outpatient risk stratification scores can identify a subgroup of ED patients discharged with new AF/FL who are at high risk for stroke and death, and compare the rates of these events for patients prescribed ED OACs vs patients not prescribed OACs at their index ED visit. These results will improve our understanding of ED OAC initiation and inform parallel research we are doing (above) on the development of

clinical decision support tools and guidelines to aid in management of AF/FL patients in our EDs and inpatient settings.

Status: We presented an abstract at the Society for Academic Emergency Medicine annual meeting, May 2019, and presented another at the American Heart Association meeting in November 2019. The manuscript is being written.

41. Management of Acute PuLmonary Embolism (the MAPLE study)

Principal Investigator: **David R. Vinson** (Roseville/Sacramento)

Co-investigators: The KP CREST Network, Matt Silver, Cliff Swap, and Billy Krauss (San Diego), David H. Wang (Scripps, San Diego), Tamara Pleshakov (Los Angeles), Cyrus Yamin (Oakland/Richmond), Victoria Clague (San Rafael)

Funding: Garfield Memorial National Research Fund, KP Northern California Community Benefit Program, and the TPMG Delivery Science and Physician Researcher Programs.

Study Sites: KP Northern California

Summary: This retrospective cohort study describes the population of patients with acute PE across several regions from Jan 2013 through April 2015. We will analyze physician practice patterns and patient outcomes.

Status: We have published 7 papers to date: (1) post-ED follow-up, (2) the performance of the PE Severity Index, (3) the safety of home management, (4) breakthrough PE despite adequate anticoagulation, (5) pt satisfaction with home care; (6) the predictive role of presyncope; and (7) the predictive role of pre-arrival imaging. Our current study is evaluating the contribution of right ventricular dilatation on outcomes in ED patients managed as outpatients.

42. Comprehensive primary care clinic-based pulmonary embolism management

Principal Investigator: **David R. Vinson** (Roseville/Sacramento)

Co-Investigators: Erik R. Hofmann (South Sacramento), Suresh Rangarajan (Adult Primary Care) and Dustin G. Mark (Oakland), Dayna J. Isaacs and Elizabeth J. Johnson (UC Davis), Karen L. Wallace (Radiology, San Jose), and the KP CREST Network

Funding: KPNC Community Benefit Program

KP Study Sites: KPNC

Summary: The initial site of care of patients with newly diagnosed, acute, symptomatic PE is undergoing a transition away from routine hospitalization for select low-risk patients. Patients with mild symptoms frequently present to their primary care clinicians and have their diagnosis established by pulmonary imaging and some of these are managed without referral to the ED or

hospital. This retrospective cohort study will describe and analyze the care of PE patients who are diagnosed and managed in the primary care setting over a 7-year study period (2013-2019).

Status: We have nearly completed manual chart review. We have published two cases reports: in *European Heart Journal Case Reports* and *Medicine (Baltimore)*. We presented an abstract of interim data at the American College of Physicians regional meeting (Oct 2020) and will present at their national meeting (2021). We also have several abstracts under review for the American Thoracic Society for their May 2021 meeting.

43. What does it mean to manage acute pulmonary embolism as an “outpatient”? A brief report.

Principal Investigator: **David R. Vinson** (Roseville/Sacramento)

Co-Investigators: Judy Shan (KP CREST Network, DOR), Dayna Isaacs, Liz Johnson, and Harjot Bath (UC Davis), and Dani Julien (Sacramento State University)

Funding: The PI is supported by the TPMG Physician Researcher Program

Summary: The evidence for the effectiveness and safety of outpatient management of select ambulatory low-risk patients with acute pulmonary embolism continues to mount. But what is meant by outpatient management? Lack of definitional clarity may hinder understanding of this emerging management strategy and lack of uniformity may impede its translation into clinical practice. We seek to describe the range of definitions provided in the literature.

Status: We presented an abstract at the 2020 meeting of the American College of Chest Physicians in October. The manuscript as a “brief report” is currently undergoing peer-review.

44. Identifying ED patients with mild traumatic intracranial hemorrhage at low risk for acute critical care intervention

Principal Investigator: **David R. Vinson** (Roseville/Sacramento)

Co-investigators: Kanwal Gill and Manny Garrido (Roseville/Sacramento), James S. Lin (Santa Clara), Dustin G. Mark (Oakland), Alex Buss (Walnut Creek/Antioch), Travis Anderson (UC Davis), Brock Daniels (New York Presbyterian), Vignesh Arasu (Vallejo), Cody McHargue (UCSF), E. Margaret Warton (DOR), and the KP CREST Network

Funding: KP Northern California Community Benefit Programs

Study Sites: KP Northern California

Summary: This multicenter retrospective cohort study seeks to answer two questions: what is the classification performance of the UC Davis clinical prediction instrument in identifying Kaiser patients with mild traumatic intracranial hemorrhage who do not require critical care interventions within 48h? What patient-level and facility-level characteristics are associated with non-ICU care?

Status: Data collection is complete. We presented an abstract on the validation of the UC Davis rules at the 2017 meeting of the Society of Academic Emergency Medicine presented another on the derivation of a community-specific rule at ACEP, October 2017. The first manuscript will be submitted in 2021.

45. Acute emergency care and outcomes for stroke, myocardial infarction, and surgery during the COVID-19 pandemic in KPNC: Implications for care delivery during COVID-19 recovery phase and future surges

Principal Investigators: Robert Chang (South San Francisco, Vascular Surgery), Mai Nguyen-Huynh (DOR and Walnut Creek, Neurology), Matt Solomon (Oakland, Cardiology), **David R. Vinson** (Roseville/Sacramento)

Co-Investigators: Jeff Klingman, Melissa Meighan, Molly Burnett, Alexander Flint, Xian Nan Tang, Alan Go, Edward McNulty, Jeffrey Douaiher, and Giye Choi

Funding: Garfield Memorial Fund

KP Study Sites: KPNC

Summary: We have two aims: (1) To assess **the decreased trends** in acute presentation to KPNC emergency departments (EDs) for chest pain and acute MI, stroke symptoms, and acute surgical emergencies during the COVID-19 pandemic, and compare the presenting patient characteristics, processes of care, and short and long-term outcomes (i.e., all-cause mortality, condition-specific outcomes) for patients who presented during the early COVID-19 pandemic to those who presented to the ED before the pandemic; and (2) To evaluate the potential **consequences of delayed presentations** for chest pain/acute MI, stroke symptoms, and acute surgical emergencies on long-term patient outcomes and healthcare system utilization, by examining the downstream, potential long-term consequences of avoided care.

Status: We are in early data collection.

46. How fast is fast enough? Assessing door-to-needle times and outcomes of stroke patients receiving acute thrombolysis therapy under the KPNC Stroke EXPRESS program

Principal Investigator: Mai Nguyen-Huynh (DOR and Walnut Creek, Neurology)

Co-Investigators: Xian Nan Tang (Sacramento), Jeff Klingman (Walnut Creek), Janet Alexander (DOR), Alexander Flint (Redwood City), and **David R. Vinson** (Roseville/Sacramento)

Funding: TPMG Delivery Science Program

KP Study Sites: KPNC

Summary: This cohort study will include consecutive members with acute ischemic stroke treated with intravenous alteplase before (2012-2015) and after (2016-2019) the region-wide implementation of the KPNC Stroke EXPRESS program run by telestroke neurologists. We will

evaluate the association between door-to-needle times and 90-day functional outcomes and mortality. We hypothesize that the EXPRESS program significantly improved door-to-needle times and 90-day outcomes.

Status: Analysis is underway.

47. Population-based estimate of potential accuracy of field-based identification of endovascular treatment candidates

Principal Investigators: Jeffrey G. Klingman and Mai N. Nguyen-Huynh (Walnut Creek)

Co-investigators: Janet G. Alexander (DOR), **David R. Vinson** (Roseville/Sacramento), Lauren E. Klingman (Stanford University)

Study Sites: KP Northern California

Summary: This multicenter retrospective cohort study seeks to estimate the accuracy of field-based identification of patients with stroke-like symptoms who might be candidates for endovascular stroke therapy.

Status: The manuscript is undergoing revision for an emergency medicine journal.

48. An Individual patient-level meta-analysis of the marginal contribution of right ventricle assessment to the prediction of 30-day all-cause mortality in patients with low-risk pulmonary embolism

Principal Investigators: Giorgio Maraziti and Cecilia Becattini (University of Perugia, Italy)

Co-Investigators: David Jiménez (Universidad de Alcalá, Madrid, España), **David R. Vinson** (Roseville/Sacramento), and others

Funding: University of Perugia, Italy

KP Study Sites: KPNC

Summary: The need to evaluate for right ventricular function in patients with low-risk pulmonary embolism is unclear. We are undertaking a meta-analysis using individual patient-level data to evaluate the marginal effect of adding right ventricular assessment to the PE Severity Index and its simplified counterpart.

Status: The manuscript is undergoing peer-review with a European journal.

49. Incidence of outpatient thromboembolism in patients with SARS-CoV-2 infections

Principal Investigators: Nareg Roubinian (Oakland, Pulmonology and Hematology) and Julie Schmittiel (DOR)

Co-Investigators: Jenny Dusendang and Vincent Liu (DOR), **David R. Vinson** (Roseville/Sacramento), and **Dustin G Mark** (Oakland/Richmond)

Funding: TPMG's Rapid Analytics Unit

KP Study Sites: KPNC

Summary: Several studies suggest that critically ill patients with COVID-19 are frequently developing laboratory abnormalities compatible with hypercoagulability and a high rate of thromboembolic complications. The risk for infection-induced coagulopathy and thromboembolic events is known to evolve through the course of hospitalization and current recommendations are for thromboprophylaxis guided by coagulation testing and radiographic monitoring. Rates of thromboembolic events and the benefit for thromboprophylaxis following hospitalization are not well established. In addition, thrombotic events have been observed in mild- or moderately-ill COVID-19 patients who were not admitted to the hospital; however, data on the incidence of these events are not available. In this retrospective cohort study, we will evaluate the incidence of venous thromboembolism in these populations. Our results will inform KP clinical guidelines regarding the use of thromboprophylaxis to reduce the risk of thromboembolism in outpatients with moderate disease and in patients with severe disease following hospitalization.

Status: The manuscript is undergoing revision for *JAMA Intern Med*.

Recent Publications (since Jan 2020)^e

TPMG (Northern CA)

Ballard D, Dimmig J. Medically Clear: Nonmydriatic ocular fundus photography and how it could avoid missed diagnoses. *Emerg Med News*. 2020;42(1):1,31.

Essay: https://journals.lww.com/em-news/fulltext/2020/01000/medically_clear_nonmydriatic_ocular_fundus.2.aspx

Wilson CL, Tavender EJ, Phillips N, Hearps S, Foster K, O'Brien S, Borland M, Watkins GO, McLeod L, Putland M, Priestley S, Brabyn C, **Ballard DW**, Craig S, Dalziel S, Oakley E, Babl FE; Paediatric Research in Emergency Department's International Collaborative. Variation in CT use for paediatric head injuries across different types of emergency departments in Australia and New Zealand. *Emerg Med J*. 2020;37(11):686-689.

Abstract: <https://emj.bmj.com/content/early/2020/08/17/emmermed-2020-209719>

Ballard D, Vinson D. Medically Clear: A new way to manage (or just observe) pneumothorax. *Emerg Med News*. 2020;42(9):21.

^e A more comprehensive list of publications from the KP CREST Network can be found online: <http://www.kprest.net/>

Full-text: https://journals.lww.com/em-news/Fulltext/2020/09000/Medically_Clear_A_New_Way_to_Manage_or_Just.15.aspx

Chang AD, **Carter K**. Twisted teeth: ovarian torsion secondary to mature teratoma. *Cureus*. 2020;12(1):e6649.

Full-text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7015113/>

Nishijima DK, Gaona SD, Faul M, Tancredi DJ, Waechter T, Maloney R, Bair T, Blitz A, **Elms AR**, Farrales RD, Howard C, Montoya J, Garzon H, Holmes JF; Sacramento County Prehospital Research Consortium. The association of trauma center transport and long-term functional outcomes in head-injured older adults transported by emergency medical services. *Acad Emerg Med*. 2020;27(3):207-216.

Abstract: <https://www.ncbi.nlm.nih.gov/pubmed/31917495>

Garmel GM. A letter to graduating residents and fellows during the Covid-19 pandemic. *EM Resident*. 2020;47(3):36-37.

Full-text: <https://www.emra.org/emresident/article/covid-attending/>

May T, **Garmel GM**. Rotator cuff injury. 2020 Apr 20. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2020.

Full-text: <https://www.ncbi.nlm.nih.gov/books/NBK547664/>

Garmel GM, Pettis HM, Lane DR, Darvish A, Winters M, Vallee P, Mattu A, Haydel MJ, Cheaito MA, Bond MC, Kazzi A. Clerkships in emergency medicine. *J Emerg Med*. 2020;58(4):e215-e222.

Full-text: [https://www.jem-journal.com/article/S0736-4679\(19\)31023-6/fulltext](https://www.jem-journal.com/article/S0736-4679(19)31023-6/fulltext)

Simon LE, **Kene MV**, Warton EM, Rauchwerger AS, **Vinson DR**, Reed ME, Chettipally UK, **Mark DG**, **Sax DR**, **McLachlan DI**, **Cotton DM**, **Lin JS**, Kharbanda AB, Kharbanda EO, **Ballard DW**. Diagnostic performance of emergency physician gestalt for predicting acute appendicitis in patients age 5-20 years. *Acad Emerg Med*. 2020;27(9):821-831.

Abstract: <http://dx.doi.org/10.1111/acem.13931>

DOR Spotlight: <https://spotlight.kaiserpermanente.org/emergency-physicians-can-use-clinical-experience-to-accurately-predict-whether-a-child-has-appendicitis/>

Jabourian A, Dong F, **Mackey K**, Vaezazizi R, Pennington TW, Neeki M. Evaluation of safety and efficacy of prehospital paramedic administration of sub-dissociative dose of ketamine in the treatment of trauma-related pain in adult civilian population. *Cureus*. 2020;12(8):e9567.

Full-text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7411289/>

Mark DG, Huang J, Kennedy CK, **Vinson DR**, **Ballard DW**, Reed ME. 60-day major adverse cardiac event in emergency department patients with non-low modified HEART scores. *Am J Emerg Med*. 2020 May 27 [Epub ahead of print].

Abstract: [https://www.ajemjournal.com/article/S0735-6757\(20\)30442-3/fulltext](https://www.ajemjournal.com/article/S0735-6757(20)30442-3/fulltext)

Mark DG, Huang J, **Kene MV**, **Sax DR**, **Cotton DM**, **Lin JS**, **Bouvet SC**, Chettipally UK, **Anderson ML**, **McLachlan II**, Simon LE, Shan J, Rauchwerger AS, **Vinson DR**, **Ballard DW**, Reed ME; Kaiser Permanente CREST Network Investigators. Automated retrospective calculation of the EDACS and HEART scores in a multicenter prospective cohort of emergency department chest pain patients. *Acad Emerg Med*. 2020;27(10):1028-1038.

Abstract: <https://doi.org/10.1111/acem.14068>

Rana JS, **Mark D**, Huang J, Rauchwerger AS, Reed ME, **Sax DR**. The 30-day adverse outcomes among patients treated in the ED for HF by LV systolic function status. *J Am Coll Cardiol*. 2020;75(11S1):880.

Abstract: http://www.onlinejacc.org/content/75/11_Supplement_1/880

Offerman S, Gosen J, Thomas SH, Padilla-Jones A, Ruha AM, Levine M. Bupropion associated seizures following acute overdose: who develops late seizures. *Clin Toxicol (Phila)*. 2020 Mar 26 [Epub ahead of print].

Abstract: <https://www.ncbi.nlm.nih.gov/pubmed/32212940>

Ko J, Zhu S, Alabaster A, Wang J, **Sax DR**. Prehospital treatment and Emergency Department outcomes in young children with food allergy. *J Allergy Clin Immunol Pract*. 2020;8(7):2302-2309.e2.

Abstract: <https://www.ncbi.nlm.nih.gov/pubmed/32302786>

Ko J, Zhu S, Alabaster A, Wang J, **Sax DR**. Health care utilization outcomes after implementation of early peanut-introduction guidelines. *J Allergy Clin Immunol Pract*. 2020 Sep 8 [Online ahead of print].

Vinson DR. Redressing the underrecognition of “Cold Drink Heart”: Patients teaching physicians about atrial fibrillation triggered by cold drink and food. *Perm J*. 2020;24:19.238.

Full-text: <http://www.thepermanentejournal.org/issues/2020/summer/7503>

Vinson DR, Bath H, Huang J, Reed ME, **Mark DG**. Hospitalization is less common in ambulatory patients with acute pulmonary embolism diagnosed before emergency department referral than after arrival. *Acad Emerg Med*. 2020;27(7):588-599.

Abstract: <https://pubmed.ncbi.nlm.nih.gov/32470189/>

Featured in NEJM's *Journal Watch*

Vinson DR, Engelhart DC, Bahl D, Abraham AS, **Swanson WP**, **Cotton DM**, **Krauss WC**, Huang J, Reed ME, **Mark DG**. Presyncope increases risk for intensive care in emergency department patients with acute pulmonary embolism. *West J Emerg Med*. 2020;21(3):703-713.

Full-text: <https://escholarship.org/uc/item/13j1b5rw>

Hui KJ, Arasu VA, **Vinson DR**, **Cotton DM**. Image diagnosis: neodymium magnetic bead ingestion in a toddler. *Perm J*. 2020;24:19.165.

Full-text: <http://www.thepermanentejournal.org/issues/2020/summer/7490>

Vinson DR, Aujesky D, Geersing GJ, Roy PM. Comprehensive outpatient management of low-risk pulmonary embolism: can primary care do this? A narrative review. *Perm J*. 2020;24:19.163.

Full-text: <https://bitly.com/PEinPrimaryCare>

Simon LE, Shan J, Rauchwerger AS, Reed ME, Warton EM, **Vinson DR**, Konik ZI, Vlahos JW, Groves K, **Ballard DW**. Paramedics' perspectives on telemedicine in the ambulance: A survey study. *JEMS*. 2020 Apr 30 [Epub].

Full-text: <https://www.jems.com/2020/04/30/perspectives-on-telemedicine/>

Kea B, Waites BT, Lin A, Raitt M, **Vinson DR**, Ari N, Welle L, Sill A, Button D, Sun BC. Practice gap in atrial fibrillation oral anticoagulation prescribing at Emergency Department home discharge. *West J Emerg Med*. 2020;21(4):924-934.

Full-text: <https://escholarship.org/uc/item/30n769qp>

Natsui S, Doctor JN, May LS, **Vinson DR**, Arora S, Yadav K, Zein D, Meeker D. Trends in measurement and improvement of emergency physician performance: an environmental scan. *eMed Res*. 2020;2:100006.

Full-text: <https://bit.ly/2UFEusr>

Walker G. Calculated decisions: GRACE ACS risk and mortality calculator. *Emerg Med Pract*. 2020;22(1):CD6-CD7.

Full-text:

https://www.ebmedicine.net/topics.php?action=showTopic&topic_id=621&ad=calculators#GRACE

Walker G. Emergentology: The methidemic may be worse than heroin. *Emerg Med News*. 2020;42(1):1,6.

Essay: https://journals.lww.com/em-news/Fulltext/2020/01000/Emergentology_The_Methidemic_May_Be_Worse_than.3.aspx

Walker G. Emergentology: The EMR dilemma hidden in plain sight. *Emerg Med News*. 2020;42(2):13.

Essay: https://journals.lww.com/em-news/Fulltext/2020/02000/Emergentology_The_EMR_Dilemma_Hidden_in_Plain.6.aspx

Walker G. Emergentology: What can EM learn from Disney? *Emerg Med News*. 2020;42(3):19.

Essay: https://journals.lww.com/em-news/Fulltext/2020/03000/Emergentology_What_Can_EM_Learn_from_Disney.18.aspx

Walker G. Emergentology: Imagine a (Disney) ED with the Proper Resources. *Emerg Med News*. 2020;42(4):22.

Essay: https://journals.lww.com/em-news/Fulltext/2020/04000/Emergentology_Imagine_a_Disney_ED_with_the.16.aspx

Walker G. Emergentology: Are Phenotypes a Magic Bullet for Sepsis? *Emerg Med News*. 2020;42(5):15.

Essay: https://journals.lww.com/em-news/Fulltext/2020/05000/Emergentology_Are_Phenotypes_a_Magic_Bullet_for.14.aspx

Walker G. Emergentology: A Dream of Nuanced Sepsis Care. *Emerg Med News*. 2020;42(6):18.

Essay: https://journals.lww.com/em-news/Fulltext/2020/06000/Emergentology_A_Dream_of_Nuanced_Sepsis_Care.15.aspx

Walker G. Calculated decisions: Infective endocarditis (IE) mortality risk score. *Emerg Med Pract*. 2020;22(9):CD3.

Walker G. Calculated decisions: NEXUS chest decision instrument for blunt chest trauma. *Emerg Med Pract*. 2020;22(Suppl 8):CD7-CD8.

Walker G. Emergentology: COVID-19-induced decisional vertigo. *Emerg Med News*. 2020;42(7):1,35.

Essay: https://journals.lww.com/em-news/Fulltext/2020/07000/Emergentology_COVID_19_Induced_Decisional_Vertigo.2.aspx

Walker G. Emergentology: Restraints and restraint. *Emerg Med News*. 2020;42(8):1,34.

Essay: https://journals.lww.com/em-news/Fulltext/2020/08000/Emergentology_Restraints_and_Restraint.1.aspx

Walker G. Emergentology: What does 'Defund the Police' mean to the ED? *Emerg Med News*. 2020;42(9):9.

Essay: https://journals.lww.com/em-news/Fulltext/2020/09000/Emergentology_What_Does_Defund_the_Police_Mean.5.aspx

Abstracts from Recent National Academic Meetings

American Thoracic Society (ATS), Pediatric Academic Societies (PAS), Society for Academic Emergency Medicine (SAEM). CREST abstract links are here: <https://www.kpcrest.net/publications>

Duanmu Y, Bellino A, Liang EJ, **Huang RW**, Goukasian N, Arun S, Kohn MA, Lobo V, Anderson KL. Accuracy of ED Assessment for Cardiac Tamponade. *Acad Emerg Med*. 2020;27(S1):S95 [abstract 208].

Kene M, Arasu V, Warton M, Reed ME, Rauchwerger AS, Shan J, **Vinson DR**. Accurately identifying pulmonary embolism in imaging reports using natural language processing. *Acad Emerg Med*. 2020;27(S1):S76-S77 [abstract 155].

Bath H, **Mark DG**, Huang J, Reed ME, **Vinson DR**. Patients with a clinic-based diagnosis of PE prior to ED transfer have lower resource needs than those diagnosed in the ED. *Am J Respir Crit Care Med*. 2020;201:A2012.

Sax DR, **Mark DG**, Huang J, Collins SP, Storrow AB, Liu D, Reed ME. Testing and enhancing an emergency department acute heart failure risk stratification tool. *Acad Emerg Med*. 2020;27(S1):S167 [abstract 412].

Sax D, **Vinson DR**, **Durant E**, Stram D, **Ballard D**, Saxon A, Olcese M. Prevalence of equivocal pediatric abdominal ultrasound reports for suspected appendicitis in 11 emergency departments in an integrated delivery system. E-PAS2020:2814.211.

Mesznik KM, Ko J, Zhu SX, **Sax DR**. Retrospective review of young children with food-induced anaphylaxis presenting to the emergency department. *Acad Emerg Med*. 2020;27(S1):S241-S242 [abstract 618].

Olcese ME, Saxon A, **Sax DR**, **Vinson DR**, **Durant E**, Stram D, **Ballard DW**. Equivocal ultrasound in pediatric appendicitis is prevalent, poorly documented, and predicts additional imaging. *Acad Emerg Med*. 2020;27(S1):S93 [abstract 201].

Vinson DR, **Mark DG**, **Ballard DW**. Deciding when to anticoagulate patients with isolated subsegmental pulmonary embolism. *BMJ*. 2020 Sept 1. Rapid response.

Link: <https://www.bmj.com/content/370/bmj.m2177/rr-2>

Vinson DR, Kea B, Coll-Vinent B, Barrett TW. Emergency department cardioversion of acute atrial fibrillation. *Lancet*. 2020;396(10255):885.

Full-text: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)31314-3/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31314-3/fulltext)

Vinson D, **Ballard D**. Medically Clear: A case of Cold Drink Heart. *Emerg Med News*. 2020;42(8):13.

Essay: <https://bit.ly/3ndOAbG>

Letter to the editor: <https://bit.ly/34yKN0n>

Reference article: <https://bit.ly/3cVa5b4>

Vinson DR, Isaacs DJ, Johnson EJ. Managing acute pulmonary embolism in primary care in a patient declining emergency department transfer: a case report. *Eur Heart J Case Rep*. 2020;4(5):1-4.

Full-text: <https://doi.org/10.1093/ehjcr/ytaa266>

Nguyen-Huynh MN, Tang XN, **Vinson DR**, Flint AC, Alexander JG, Meighan M, Burnett M, Sidney S, Klingman JG. Acute stroke presentation, care and outcomes in community hospitals in Northern California during the COVID-19 pandemic. *Stroke*. 2020;51(10):2918-2924.

Full-text (free): <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7434008/>

KP National PR Essay: <https://about.kaiserpermanente.org/our-story/health-research/news/fewer-patients-seeking-stroke-care-during-covid-19>

Isaacs DJ, Johnson EJ, **Vinson DR**. Comprehensive management of acute pulmonary embolism in the primary clinic setting without transfer of care: A case report. *Am J Respir Crit Care Med*. 2020;201:A7257.

Shan J, Warton M, Reed M, **Vinson DR**, Rauchwerger A, **Ballard D**, Kuppermann N, Dayan PS, Dalziel SR. Effect of clinical decision support on head computed tomography for children with minor head trauma. *E-PAS* 2020;4121.386.

Kea B, Warton M, Reed ME, Go AS, Olshansky B, Lip GY, Raitt M, Sun B, **Vinson DR**, **Ballard DW**. Emergency department Initiation of stroke prophylaxis for atrial fibrillation impacts long-term use. *Acad Emerg Med*. 2020;27(S1):S58 [abstract 104].

SCPMG (Southern CA)

Beier L, Davis J, **Esener D**, Grant C, Fields JM. Carotid Ultrasound to Predict Fluid Responsiveness: A Systematic Review. *J Ultrasound Med*. 2020;39(10):1965-1976

Full-text: <https://onlinelibrary.wiley.com/doi/full/10.1002/jum.15301>

Reply to letter: <https://onlinelibrary.wiley.com/doi/full/10.1002/jum.15458>

Thomas A, Raper JD, Lupez K, Cox CA, **Esener D**, Abrams E, Boyd J, Davison J, Leech S, Ockerse P, Johnson J, Nomura JT, Runyon MS, Hogg M, Melton M, Ferre R, Weekes AJ. Prognostic Value of Right Ventricular Dysfunction Assessments in Determining Low-Risk Pulmonary Embolism. *Acad Emerg Med*. 2020;27(S1):S25 [abstract 39].

DiCroce CB, Gaspari RJ, Nalbandian AD, Harvey JC, Hill M, Cadigan B, Lusiak M, Soucy Z, Russell F, Stowell J, Nolting L, **Esener D**, Gottlieb M, Alerhand S, Nelson BP, Pare J, Naraghi L. Characteristics of Brief Limited Cardiac Ultrasound and Its Implications on Resuscitation: A Multicenter REASON Study. *Acad Emerg Med*. 2020;27(S1):S110 [abstract 250].

Schwartz A, Hersh K, **Dohrenwend P**. Electronic Chart Assignment's Impact on Emergency Department Operational Metrics. *Acad Emerg Med*. 2020;27(S1):S91 [abstract 194].

Sharp AL, Baecker A, Riccomini S, Pallegada R, Nassery N, Park S, Musigdilok V, Hassoon A, Lee MD, Peterson S, Pitts S, Newman-Toker D. Evaluating mental health and substance abuse disorders as potential associations with missed ED AMI diagnoses. *Acad Emerg Med*. 2020;27(S1):S9-10 [abstract 7].

Sharp AL, Baecker A, Nassery N, Park S, Hassoon A, Lee MS, Peterson S, Pitts S, Wang Z, Zhu Y, Newman-Toker DE. Missed acute myocardial infarction in the emergency department-standardizing measurement of misdiagnosis-related harms using the SPADE method. *Diagnosis (Berl)*. 2020 Jul 23. Online ahead of print.

Abstract: <https://pubmed.ncbi.nlm.nih.gov/32701479/>

Hloannides KL, Sun B, Baecker A, Redberg RF, Lee MS, Ferencik M, Wu YL, Shen E, Zheng C, Musigdilok V, **Sharp AL**. Not all HEART Scores Are Created Equal: Identifying “Low-Risk” Patients at Higher Risk. *Acad Emerg Med*. 2020;27(S1):S35 [abstract 58].

Tartof SY, Qian L, Hong V, Wei R, Nadjafi RF, Fischer H, Li Z, Shaw SF, Caparosa SL, Nau CL, Saxena T, Rieg GK, Ackerson BK, **Sharp AL**, Skarbinski J, Naik TK, Murali SB. Obesity and mortality among patients diagnosed with COVID-19: Results from an integrated health care organization. *Ann Intern Med*. 2020;173(10):773-781.

Full-text: <https://www.acpjournals.org/doi/10.7326/M20-3742>

Negriff S, DiGangi MJ, **Sharp AL**, Wu J. Medical visits from birth to 6 months predict child maltreatment diagnoses up to age 5. *Clin Pediatr (Phila)*. 2020;59(14):1258-1264

Abstract: <https://pubmed.ncbi.nlm.nih.gov/32698613/>

Gould MK, **Sharp AL**, Nguyen HQ, Hahn EE, Mittman BS, Shen E, Alem AC, Kanter MH. Embedded research in the learning healthcare system: ongoing challenges and recommendations for researchers, clinicians, and health system Leaders. *J Gen Intern Med*. 2020 May 29 [Online ahead of print].

Full-text: <https://link.springer.com/article/10.1007%2Fs11606-020-05865-4>

Rogers AJ, Hamity C, **Sharp AL**, Jackson AH, Schickedanz AB. Patients' attitudes and perceptions regarding social needs screening and navigation: Multi-site survey in a large integrated health system. *J Gen Intern Med*. 2020;35(5):1389-1395.

Full-text: <https://link.springer.com/article/10.1007/s11606-019-05510-9>

Rogers A, Hu YR, Schickedanz A, Gottlieb L, **Sharp A**. Understanding high-utilizing patients based on social risk profiles: a latent class analysis within an integrated health system. *J Gen Intern Med*. 2020;35(7):2214-2216

Link: <https://link.springer.com/article/10.1007%2Fs11606-019-05510-9>

Zheng C, Sun BC, Wu YL, Lee MS, Shen E, Redberg RF, Ferencik M, Natsui S, Kawatkar AA, Musigdilok VV, **Sharp AL**. Automated identification and extraction of exercise treadmill test results. *Am Heart Assoc*. 2020;9(5):e014940.

Full-text: <https://www.ahajournals.org/doi/full/10.1161/JAHA.119.014940>

Altman D, Sun B, Lin B, Baecker A, Samuels-Kalow M, Park S, Shen E, Wu YL, **Sharp A**. Impact of physician-patient language concordance on patient outcomes and adherence to clinical chest pain recommendations. *Acad Emerg Med*. 2020;27(6):487-491.

Abstract: <https://www.ncbi.nlm.nih.gov/pubmed/32056327>

Silver MA. Remember that patient. *J Emerg Med*. 2020;59(3):467-468