

# Stanford

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## Eric Sun

Assistant Professor of Anesthesiology, Perioperative and Pain Medicine (Adult-MSD) and, by courtesy, of Medicine (Primary Care and Population Health)

 Curriculum Vitae available Online

### CLINICAL OFFICES

- **Anesthesia Department**

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### Bio

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### CLINICAL FOCUS

- Anesthesia

### ACADEMIC APPOINTMENTS

- Assistant Professor - University Medical Line, Anesthesiology, Perioperative and Pain Medicine
- Assistant Professor - University Medical Line (By courtesy), Medicine - Primary Care and Population Health

### BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Committee on Evidence- Based Clinical Practice Guidelines to Prescribing Opioids for Acute Pain, National Academies of Science, Engineering, and Medicine (2018 - 2019)
- Senior Economist, Council of Economic Advisers, Executive Office of the President (2019 - 2020)
- Member, Committee on Health and Public Policy, American Society of Anesthesiologists (2015 - 2017)
- Member, Committee on Anesthesia Workforce Trends, American Society of Anesthesiologists (2018 - present)
- Associate Editor, Anesthesiology (2019 - present)
- Associate Editor, Anesthesia and Analgesia (2015 - present)

### PROFESSIONAL EDUCATION

- Residency: Stanford University Anesthesiology Residency (2014) CA
- Internship: Santa Clara Valley Medical Center (2011) CA United States of America
- Medical Education: Pritzker School of Medicine University of Chicago Registrar (2010) IL

- Board Certification: Anesthesia, American Board of Anesthesiology (2016)
- PhD, University of Chicago Booth Graduate School of Business , Business Economics (2006)

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

My research examines questions of health economics and health policy, with a focus on economics and policy in the perioperative setting. Current research topics include the economics of treatments for chronic pain, as well as how physician practice organization affects outcomes and costs.

## Teaching

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### STANFORD ADVISEES

#### Postdoctoral Faculty Sponsor

Anjali Dixit

## Publications

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### PUBLICATIONS

- **Association Between Naloxone Co-Prescription Mandates and Post-Operative Outcomes.** *Annals of surgery*  
Du, A. L., Rishel, C. A., Sun, E. C.  
2023
- **Assessment of Perioperative Outcomes Among Surgeons Who Operated the Night Before.** *JAMA internal medicine*  
Sun, E. C., Mello, M. M., Vaughn, M. T., Kheterpal, S., Hawn, M. T., Dimick, J. B., Jena, A. B.  
2022
- **Surgeon Variation in Perioperative Opioid Prescribing and Medium or Long Term Opioid Utilization After Total Knee Arthroplasty: A Cross-Sectional Analysis.** *Anesthesiology*  
Cen, X., Jena, A. B., Mackey, S., Sun, E. C.  
2022
- **Association Between State Limits on Opioid Prescribing and the Incidence of Persistent Postoperative Opioid Use Among Surgical Patients.** *Annals of surgery*  
Sun, E. C., Rishel, C. A., Waljee, J. F., Brummett, C. M., Jena, A. B.  
2021
- **Assessment of Out-of-Network Billing for Privately Insured Patients Receiving Care in In-Network Hospitals.** *JAMA internal medicine*  
Sun, E. C., Mello, M. M., Moshfegh, J., Baker, L. C.  
2019
- **Association of Overlapping Surgery With Perioperative Outcomes** *JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*  
Sun, E., Mello, M. M., Rishel, C. A., Vaughn, M. T., Kheterpal, S., Saager, L., Fleisher, L. A., Damrose, E. J., Kadry, B., Jena, A. B., Kooij, F., Wilczak, J., Soto, et al  
2019; 321 (8): 762–72
- **Comparison of Anesthesia Times and Billing Patterns by Anesthesia Practitioners.** *JAMA network open*  
Sun, E. C., Dutton, R. P., Jena, A. B.  
2018; 1 (7): e184288
- **Association between concurrent use of prescription opioids and benzodiazepines and overdose: retrospective analysis** *BMJ-BRITISH MEDICAL JOURNAL*  
Sun, E. C., Dixit, A., Humphreys, K., Darnall, B. D., Baker, L. C., Mackey, S.  
2017; 356
- **Distribution of Prescription Opioid Use Among Privately Insured Adults Without Cancer: United States, 2001-2013.** *Annals of internal medicine*  
Sun, E. C., Jena, A. B.

2017

- **Incidence of and Risk Factors for Chronic Opioid Use Among Opioid-Naive Patients in the Postoperative Period.** *JAMA internal medicine*  
Sun, E. C., Darnall, B. D., Baker, L. C., Mackey, S.  
2016; 176 (9): 1286-1293
- **Association Between "Balance Billing" Legislation and Anesthesia Payments in California: A Retrospective Analysis.** *Anesthesiology*  
Dixit, A., Heavner, D. L., Baker, L. C., Sun, E. C.  
2023
- **Meeting Report: First Cardiovascular Outcomes Research in Perioperative Medicine Conference.** *Anesthesia and analgesia*  
Bartels, K., Howard-Quijano, K., Prin, M., Shaefi, S., Steppan, J., Sun, E. C., Williams, B., Fox, A. A., Namuyonga, J., Shaw, A. D., Vavilala, M. S., Sessler, D. I.  
2023; 136 (2): 418-420
- **Variations in operating room staff compliance with mandatory daily electronic COVID-19 symptom screening.** *British journal of anaesthesia*  
Gessner, D. M., Sun, E., Fielding-Singh, V.  
2023; 130 (1): e10-e12
- **Hospital-level variability in regional nerve block administration by race for total knee arthroplasty.** *Regional anesthesia and pain medicine*  
Dixit, A. A., Kim, C. Y., Mariano, E. R., Krishnamoorthy, V., Ohnuma, T., Raghunathan, K., Bryan, W. E., Bartels, K., Sun, E. C.  
2022
- **Hospital-level variability in regional nerve block administration by race for total knee arthroplasty** *REGIONAL ANESTHESIA AND PAIN MEDICINE*  
Dixit, A. A., Kim, C. Y., Mariano, E. R., Krishnamoorthy, V., Ohnuma, T., Raghunathan, K., Bryan, W. E., Bartels, K., Sun, E. C.  
2022
- **The Opioid Crisis, Centers for Disease Control Opioid Guideline, and Naloxone Coprescription for Patients at Risk for Opioid Overdose.** *Anesthesia and analgesia*  
Benzon, H. T., Sun, E. C., Chou, R.  
2022; 135 (1): 21-25
- **Association of Medicaid Expansion With Neuraxial Labor Analgesia Use in the United States: A Retrospective Cross-Sectional Analysis.** *Anesthesia and analgesia*  
Xiao, M. Z., Whitney, D., Guo, N., Sun, E. C., Wong, C. A., Bentley, J., Butwick, A. J.  
2022; 134 (3): 505-514
- **Association Between Changes in Postoperative Opioid Utilization and Long-Term Health Care Spending Among Surgical Patients With Chronic Opioid Utilization.** *Anesthesia and analgesia*  
Sun, E. C., Rishel, C. A., Jena, A. B.  
2022; 134 (3): 515-523
- **Preoperative Opioid Utilization Patterns and Postoperative Opioid Utilization: A Retrospective Cohort Study.** *Anesthesiology*  
Rishel, C. A., Angst, M. S., Sun, E. C.  
2021; 135 (6): 1015-1026
- **Peripheral nerve block anesthesia/analgesia for patients undergoing primary hip and knee arthroplasty: recommendations from the International Consensus on Anesthesia-Related Outcomes after Surgery (ICAROS) group based on a systematic review and meta-analysis of current literature.** *Regional anesthesia and pain medicine*  
Memsoudis, S. G., Cozowicz, C., Bekeris, J., Bekere, D., Liu, J., Soffin, E. M., Mariano, E. R., Johnson, R. L., Go, G., Hargett, M. J., Lee, B. H., Wendel, P., Brouillette, et al  
2021
- **How Can Anesthesiologists Influence Policymaking? Reflections from a Year at the Council of Economic Advisers** *ANESTHESIOLOGY*  
Sun, E. C.  
2021; 134 (6): 841-844
- **Increased health care costs associated with new persistent opioid use after major surgery in opioid-naive patients.** *Journal of managed care & specialty pharmacy*  
Brummett, C. M., Evans-Shields, J., England, C., Kong, A. M., Lew, C. R., Henriques, C., Zimmerman, N. M., Sun, E. C.  
2021: 1-12

- **The link between health and economic preferences: Evidence from 22 OECD countries.** *Health economics*  
Cen, X., Johnston, D. W., Kung, C. S., Shields, M. A., Sun, E. C.  
2021
- **Making a business plan for starting a transitional pain service within the US healthcare system.** *Regional anesthesia and pain medicine*  
Sun, E. C., Mariano, E. R., Narouze, S. n., Gabriel, R. A., Elsharkawy, H. n., Gulur, P. n., Merrick, S. K., Harrison, T. K., Clark, J. D.  
2021
- **Association Between Preoperative Benzodiazepine Use and Postoperative Opioid Use and Health Care Costs.** *JAMA network open*  
Rishel, C. A., Zhang, Y., Sun, E. C.  
2020; 3 (10): e2018761
- **Incidence of and Factors Associated With Prolonged and Persistent Postoperative Opioid Use in Children 0-18 Years of Age.** *Anesthesia and analgesia*  
Ward, A., De Souza, E., Miller, D., Wang, E., Sun, E. C., Bambos, N., Anderson, T. A.  
2020; 131 (4): 1237-1248
- **Mind Over Matter: Reducing Perioperative Opioid Use Through Patient Education.** *Anesthesia and analgesia*  
Dunn, L. K., Sun, E. C.  
2020; 130 (3): 556-58
- **The Safety and Efficacy of Transnasal Humidified Rapid-Insufflation Ventilatory Exchange for Laryngologic Surgery.** *The Laryngoscope*  
Nekhendzy, V. n., Saxena, A. n., Mittal, B. n., Sun, E. n., Sung, K. n., Dewan, K. n., Damrose, E. J.  
2020
- **The Surgeon's Role in the Opioid Crisis: A Narrative Review and Call to Action.** *Frontiers in surgery*  
Shadbolt, C., Abbott, J. H., Camacho, X., Clarke, P., Lohmander, L. S., Spelman, T., Sun, E. C., Thorlund, J. B., Zhang, Y., Dowsey, M. M., Choong, P. F.  
2020; 7: 4
- **Predictors of post-anaesthesiology residency research productivity: preliminary report.** *British journal of anaesthesia*  
Haight, E. S., Chen, F., Tanaka, P., Brock-Utne, J. G., Macario, A., Sun, E. C., Tawfik, V. L.  
2019
- **American Society for Enhanced Recovery and Perioperative Quality Initiative-4 Joint Consensus Statement on Persistent Postoperative Opioid Use: Definition, Incidence, Risk Factors, and Health Care System Initiatives ANESTHESIA AND ANALGESIA**  
Kent, M. L., Hurley, R. W., Oderda, G. M., Gordon, D. B., Sun, E., Mythen, M., Miller, T. E., Shaw, A. D., Gan, T. J., Thacker, J. M., McEvoy, M. D., POQI-4 Working Grp  
2019; 129 (2): 543-52
- **Outcomes Associated With Overlapping Surgery-Reply.** *JAMA*  
Sun, E., Kheterpal, S., Jena, A. B.  
2019; 322 (3): 275-76
- **Trends in Direct Hospital Payments to Anesthesia Groups: A Retrospective Cohort Study of Nonacademic Hospitals in California.** *Anesthesiology*  
O'Connell, C., Dexter, F., Mauler, D. J., Sun, E. C.  
2019
- **Regional Anesthesia and Readmission Rates After Total Knee Arthroplasty**  
Chi, D., Mariano, E. R., Memtsoudis, S. G., Baker, L. C., Sun, E. C.  
LIPPINCOTT WILLIAMS & WILKINS.2019: 1319-27
- **Risk and Risk Factors for Chronic Opioid Use Among Opioid-Naive Patients With Newly Diagnosed Musculoskeletal Pain in the Neck, Shoulder, Knee, or Low Back** *ANNALS OF INTERNAL MEDICINE*  
Moshfegh, J., George, S. Z., Sun, E.  
2019; 170 (7): 504-505
- **Anaesthetic care of patients undergoing primary hip and knee arthroplasty: consensus recommendations from the International Consensus on Anaesthesia-Related Outcomes after Surgery group (ICAROS) based on a systematic review and meta-analysis.** *British journal of anaesthesia*  
Memtsoudis, S. G., Cozowicz, C. n., Bekeris, J. n., Bekere, D. n., Liu, J. n., Soffin, E. M., Mariano, E. R., Johnson, R. L., Hargett, M. J., Lee, B. H., Wendel, P. n., Brouillette, M. n., Go, et al  
2019

- **The Penn Classification Predicts Hospital Mortality in Acute Stanford Type A and Type B Aortic Dissections.** *Journal of cardiothoracic and vascular anesthesia*  
Tien, M. n., Ku, A. n., Martinez-Acero, N. n., Zvara, J. n., Sun, E. C., Cheung, A. T.  
2019
- **Regional Anesthesia: A Silver Bullet, Red Herring, or Neither?** *Anesthesiology*  
Sun, E. C., Memtsoudis, S. G., Mariano, E. R.  
2019; 131 (6): 1205–6
- **Association of Early Physical Therapy With Long-term Opioid Use Among Opioid-Naive Patients With Musculoskeletal Pain.** *JAMA network open*  
Sun, E., Moshfegh, J., Rishel, C. A., Cook, C. E., Goode, A. P., George, S. Z.  
2018; 1 (8): e185909
- **United States State-Level Variation in the Use of Neuraxial Analgesia During Labor for Pregnant Women.** *JAMA network open*  
Butwick, A. J., Bentley, J., Wong, C. A., Snowden, J. M., Sun, E., Guo, N.  
2018; 1 (8): e186567
- **Anesthesia Care Team Composition and Surgical Outcomes** *ANESTHESIOLOGY*  
Sun, E. C., Miller, T. R., Moshfegh, J., Baker, L. C.  
2018; 129 (4): 700–709
- **Liposomal Bupivacaine Does Not Reduce Inpatient Opioid Prescription or Related Complications after Knee Arthroplasty: A Database Analysis** *ANESTHESIOLOGY*  
Pichler, L., Poeran, J., Zubizarreta, N., Cozowicz, C., Sun, E. C., Mazumdar, M., Memtsoudis, S. G.  
2018; 129 (4): 689-699
- **Intraoperative analgesic regimens and surgical duration after spine surgery Response** *NEUROSURGICAL FOCUS*  
O'Connell, C., Sun, E., Ratliff, J. K., Veeravagu, A.  
2018; 45 (3)
- **Treating Chronic Pain: Is Buprenorphine the (or Even an) Answer?** *ANESTHESIA AND ANALGESIA*  
Sun, E. C., Mao, J., Anderson, T.  
2018; 127 (2): 336-337
- **Cost-benefit Analysis of Maintaining a Fully Stocked Malignant Hyperthermia Cart versus an Initial Dantrolene Treatment Dose for Maternity Units** *ANESTHESIOLOGY*  
Ho, P. T., Carvalho, B., Sun, E. C., Macario, A., Riley, E. T.  
2018; 129 (2): 249-259
- **Preoperative depression, lumbar fusion, and opioid use: an assessment of postoperative prescription, quality, and economic outcomes.** *Neurosurgical focus*  
O'Connell, C. n., Azad, T. D., Mittal, V. n., Vail, D. n., Johnson, E. n., Desai, A. n., Sun, E. n., Ratliff, J. K., Veeravagu, A. n.  
2018; 44 (1): E5
- **A matched case-control comparison of hospital costs and outcomes for knee replacement patients admitted postoperatively to acute care versus rehabilitation.** *Journal of anesthesia*  
Tse, B. K., Walters, T. L., Howard, S. K., Kim, T. E., Memtsoudis, S. G., Sun, E. C., Kou, A., Graham, L., King, R., Mariano, E. R.  
2017
- **Lack of Association Between the Use of Nerve Blockade and the Risk of Postoperative Chronic Opioid Use Among Patients Undergoing Total Knee Arthroplasty: Evidence from the MarketScan Database.** *Anesthesia and analgesia*  
Sun, E. C., Bateman, B. T., Memtsoudis, S. G., Neuman, M. D., Mariano, E. R., Baker, L. C.  
2017
- **Hospitals with briefer than average lengths of stays for common surgical procedures do not have greater odds of either re-admission or use of short-term care facilities.** *Anaesthesia and intensive care*  
Dexter, F., Epstein, R. H., Dexter, E. U., Lubarsky, D. A., Sun, E. C.  
2017; 45 (2): 210-219
- **"Opt Out" and Access to Anesthesia Care for Elective and Urgent Surgeries among U.S. Medicare Beneficiaries.** *Anesthesiology*  
Sun, E. C., Dexter, F., Miller, T. R., Baker, L. C.

2017; 126 (3): 461-471

- **Into the Wilderness?: The Growing Importance of Nonoperating Room Anesthesia Care in the United States.** *Anesthesia and analgesia*  
Lu, A. C., Wald, S. H., Sun, E. C.  
2017; 124 (4): 1044-46
- **In Response.** *Anesthesia and analgesia*  
Sun, E. C., Bateman, B. T., Memtsoudis, S. G., Neuman, M. D., Mariano, E. R., Baker, L. C.  
2017
- **Chronic Opioid Use After Surgery: Implications for Perioperative Management in the Face of the Opioid Epidemic.** *Anesthesia and analgesia*  
Hah, J. M., Bateman, B. T., Ratliff, J. n., Curtin, C. n., Sun, E. n.  
2017; 125 (5): 1733-40
- **Lack of Association Between the Use of Nerve Blockade and the Risk of Persistent Opioid Use Among Patients Undergoing Shoulder Arthroplasty: Evidence From the MarketScan Database.** *Anesthesia and analgesia*  
Mueller, K. G., Memtsoudis, S. G., Mariano, E. R., Baker, L. C., Mackey, S. n., Sun, E. C.  
2017
- **Readmissions to Different Hospitals After Common Surgical Procedures and Consequences for Implementation of Perioperative Surgical Home Programs.** *Anesthesia and analgesia*  
Dexter, F. n., Epstein, R. H., Sun, E. C., Lubarsky, D. A., Dexter, E. U.  
2017
- **The Effect of "Opt-Out" Regulation on Access to Surgical Care for Urgent Cases in the United States: Evidence from the National Inpatient Sample** *ANESTHESIA AND ANALGESIA*  
Sun, E., Dexter, F., Miller, T. R.  
2016; 122 (6): 1983-1991
- **In the United States, "Opt-Out" States Show No Increase in Access to Anesthesia Services for Medicare Beneficiaries Compared with Non-"Opt-Out" States.** *A & A case reports*  
Sun, E. C., Miller, T. R., Halzack, N. M.  
2016; 6 (9): 283-285
- **Does the Modifier "QZ" Accurately Reflect Independent Nurse Anesthetist Practice: And Why Does It Matter?** *A & A case reports*  
Sun, E.  
2016; 6 (7): 220-221
- **No Significant Association between Anesthesia Group Concentration and Private Insurer Payments in the United States** *ANESTHESIOLOGY*  
Sun, E. C., Dexter, F., Macario, A., Miller, T. R., Baker, L. C.  
2015; 123 (3): 507-514
- **Concentration In Orthopedic Markets Was Associated With A 7 Percent Increase In Physician Fees For Total Knee Replacements.** *Health affairs (Project Hope)*  
Sun, E., Baker, L. C.  
2015; 34 (6): 916-21
- **Does the Declining Lethality of Gunshot Injuries Mask a Rising Epidemic of Gun Violence in the United States?** *JOURNAL OF GENERAL INTERNAL MEDICINE*  
Jena, A. B., Sun, E. C., Prasad, V.  
2014; 29 (7): 1065-1069
- **Mortality Among High-Risk Patients With Acute Myocardial Infarction Admitted to US Teaching-Intensive Hospitals in July A Retrospective Observational Study** *CIRCULATION*  
Jena, A. B., Sun, E. C., Romley, J. A.  
2013; 128 (25): 2754-?
- **Firearm Legislation and Gun-Related Fatalities** *JAMA INTERNAL MEDICINE*  
Jena, A. B., Sun, E. C., Prasad, V.  
2013; 173 (21): 2011

- **Community-Acquired Pneumonia and Proton Pump Inhibitors** *JOURNAL OF GENERAL INTERNAL MEDICINE*  
Jena, A. B., Sun, E., Goldman, D.  
2013; 28 (7): 874-875
- **Confounding in the Association of Proton Pump Inhibitor Use With Risk of Community-Acquired Pneumonia** *JOURNAL OF GENERAL INTERNAL MEDICINE*  
Jena, A. B., Sun, E., Goldman, D. P.  
2013; 28 (2): 223-230
- **Behind-the-Counter Statins: A Silver Bullet for Reducing Costs and Increasing Access?** *HEALTH SERVICES RESEARCH*  
Sood, N., Sun, E., Zhuo, X.  
2012; 47 (1): 174-187
- **A Reexamination of the Costs of Medical R&D Regulation.** *Forum for health economics & policy*  
Philipson, T. J., Sun, E. n., Goldman, D. n., Jena, A. B.  
2012; 15 (2): 1-28
- **Do We Need the FDA? Improving the Regulation of Pharmaceutical Products** *Regulation vs Litigation:Persepectives from Economics and Law*  
Philipson, T. J., Sun, E. C., Goldman, D. P.  
edited by Kessler, D., Shleifer, A.  
University of Chicago Press.2011
- **Can an Acute Pain Service Be Cost-Effective?** *ANESTHESIA AND ANALGESIA*  
Sun, E., Dexter, F., Macario, A.  
2010; 111 (4): 841-844
- **An economic evaluation of the war on cancer** *JOURNAL OF HEALTH ECONOMICS*  
Lakdawalla, D. N., Sun, E. C., Jena, A. B., Reyes, C. M., Goldman, D. P., Philipson, T. J.  
2010; 29 (3): 333-346
- **The Value of Specialty Oncology Drugs** *HEALTH SERVICES RESEARCH*  
Goldman, D. P., Jena, A. B., Lakdawalla, D. N., Malin, J. L., Malkin, J. D., Sun, E.  
2010; 45 (1): 115-132
- **The Contributions of Improved Therapy and Earlier Detection to Cancer Survival Gains, 1988-2000** *Forum for Health Economics & Policy*  
Sun, E. C., Jena, A. B., Lakdawalla, D. N., Goldman, D. P.  
2010; 13 (2)
- **Health and Wealth Disparities in the United States**  
Philipson, T. J., Jena, A. B., Sun, E. C.  
American Enterprise Institute Press.2010
- **Medicare Part D After 2 Years** *AMERICAN JOURNAL OF MANAGED CARE*  
Joyce, G. F., Goldman, D. P., Vogt, W. B., Sun, E., Jena, A. B.  
2009; 15 (8): 536-544
- **Is the food and drug administration safe and effective?** *JOURNAL OF ECONOMIC PERSPECTIVES*  
Philipson, T. J., Sun, E.  
2008; 22 (1): 85-102
- **Cost-benefit analysis of the FDA: The case of the prescription drug user fee acts** *JOURNAL OF PUBLIC ECONOMICS*  
Philipson, T., Berndt, E. R., Gottschalk, A. H., Sun, E.  
2008; 92 (5-6): 1306-1325
- **Drug licenses: A new model for pharmaceutical pricing** *HEALTH AFFAIRS*  
Goldman, D. P., Jena, A. B., Phillipson, T., Sun, E.  
2008; 27 (1): 122-129
- **Salivary gland cancer in the United States** *CANCER EPIDEMIOLOGY BIOMARKERS & PREVENTION*  
Sun, E. C., Curtis, R., Melbye, M., Goedert, J. J.

1999; 8 (12): 1095-1100

- **Epidemiology of squamous cell conjunctival cancer** *CANCER EPIDEMIOLOGY BIOMARKERS & PREVENTION*  
Sun, E. C., Fears, T. R., Goedert, J. J.  
1997; 6 (2): 73-77