Stanford



Steven L. Shafer, MD

Professor of Anesthesiology, Perioperative and Pain Medicine (Adult MSD) at the Stanford University Medical Center, Emeritus

Multispecialty Anesthesiology

NIH Biosketch available Online Curriculum Vitae available Online

Bio

BIO

My professional interests are data modeling, the clinical pharmacology of intravenous anesthetic drugs, and publication policy and ethics. Since March I have been modeling the COVID-19 pandemic. The R code is freely available at https://github.com/StevenLShafer/COVID19/. My daily updates are distributed by e-mail. Those interested in receiving the updates are welcome to contact me at steven.shafer@stanford.edu.

My work in pharmacology includes studies of many of the intravenous opioids and hypnotics used in anesthetic practice. My focus has been mathematical models that characterize drug behavior. These range from conventional pharmacokinetic and pharmacodynamic models, inverse models (used to drive target controlled infusion systems), Bayesian models (used to handle model uncertainty), models of drug interaction, and models of receptor function that help elucidate mechanisms of drug action. My most recent work has explored whether neural networks offer any benefits over the standard engineering models used in pharmacokinetics and pharmacodynamics.

I have worked to bring these models to clinicians, investigators, and trainees. Thirty years ago I placed the program STANPUMP ("STANford infusion PUMP") in the public domain. STANPUMP was an open source software platform for Target Controlled Infusions of anesthetic drugs, as well as the pharmacokinetic engine for most, and perhaps all, commercialized TCI systems worldwide. More recently I have developed stanpumpR, an R implementation of pharmacokinetic algorithms for many of the common perioperative drugs. stanpumpR can be accessed at www.stanpumpR.io. The source code for stanpumpR is available at www.github.com/stevenlshafer/stanpumpr.

My work in publication policy and ethics follows my 10 years as Editor-in-Chief of Anesthesia & Analgesia. From 2006-2016 we uncovered two of the most prolific serial academic fraudsters in history: Joachim Boldt and Yoshitaka Fujii. I finished my term as EIC with the unenviable record of retracting more papers for research fraud than any previous editor of any journal, ever. This led to a lasting interest in publication policy and ethics. In collaboration with others I continue to develop statistical models to detect fraud, and serve on multiple editorial boards to offer guidance on publication policy and ethics.

I developed an interested in the role of clinical pharmacology to criminal law following my testimony on behalf of the State of California in the trial of Conrad Murray for the death Michael Jackson. I continue to provide pro bono testimony in criminal cases involving anesthetic drugs.

ACADEMIC APPOINTMENTS

- Emeritus Faculty-Med Ctr Line, Multispecialty Anesthesiology

HONORS AND AWARDS

- Fellowship by Election, The Royal College of Anaesthetists (2003)
- Bernard H. Eliasberg Medal, Mt. Sinai Medical Center, New York, NY (2006)
- Ellis Gillespie Lecture, Australian and New Zealand College fo Anaesthetists (2008)
- Rank Visiting Lecturer, Royal College of Anaesthetists (2008)
- Virginia Apgar Lecture, Department of Anesthesiology, Columbia University (2008)
- FAER Honorary Research Lecture, American Society of Anesthesiologists (2008)
- Corresponding Member, German Society of Anaesthesiology and Intensive Care Medicine (2009)
- Stephen J. Prevoznik Lecture, Department of Anesthesiology, University of Pennsylvania (2009)
- Ralph Waters Visiting Professor, Department of Anesthesiology, University of Wisconsin (2009)
- Leon Goldberg Lecture, University of Chicago (2010)
- Lifetime Achievement Award, International Society of Anaesthetic Pharmacology (2011)
- Terry Davidson Plenary Lecture, Israel Society of Anesthesiologists (2011)
- Honorary Fellow, College of Anaesthetists of Ireland (2012)
- Sir Ivan Magill Inaugural Lecture, College of Anaesthetists of Ireland (2012)
- Honorary Member, German Society of Anaesthesiology and Intensive Care Medicine (2013)
- David M. Little Prize, Anesthesia History Association (2013)
- Gold Medal, Royal College of Anaesthetists (2013)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Chair, Anesthesia Advisory Panel on Sedasys, Ethicon Endo-Surgery (2003 - 2007)
- Editor-in-Chief, Anesthesia and Analgesia (2006 - 2016)
- Member, Committee on Drug Disposition, American Society of Anesthesiologists (1992 - 1999)
- Chair, Committee on Drug Disposition, American Society of Anesthesiologists (2000 - 2005)
- Member, NIGMS Pharmacological Sciences Review Committee (1993 - 1997)
- Member, Department of Veterans Affairs Merit Review Committee for Alcoholism and Drug Dependence (1995 - 1999)
- Member, FDA Anesthetic and Life Support Drugs Advisory Committee (2002 - 2004)
- Chair, FDA Anesthetic and Life Support Drugs Advisory Committee (2004 - 2006)
- Member, Academy of Anesthesia Mentors (2004 - present)
- Expert Reviewer, California Medical Board (2012 - present)
- Editor, Clinical Pharmacokinetics (1996 - 1997)
- Associate Editor, Anesthesiology (1998 - 1999)
- Editor, Anesthesiology (2003 - 2005)
- Associate Editor, Clinical Pharmacology and Therapeutics (1998 - 2008)
- Associate Editor, Journal of Pharmacokinetics and Biopharmaceutics (2000 - 2006)
- Incoming EIC, Anesthesia and Analgesia (2005 - 2006)
- Member, International Editorial Board, British Journal of Anaesthesia (2006 - present)
- Member, Advisory Board, Journal of Anesthesia (2009 - present)

PROFESSIONAL EDUCATION

- Post-Doctoral, Stanford University , Clinical Pharmacology (1987)
- Residency, University of Pennsylvania , Anesthesiology (1986)
- MD, Stanford University , Medicine (1983)
- AB, Princeton University , Biology (1978)

LINKS

- COVID-19 models: https://github.com/StevenLShafer/COVID19
- stanpumpR source code: https://github.com/StevenLShafer/stanpumpR
- stanpumpR: https://steveshafer.shinyapps.io/stanpumpr

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Pharmacokinetics and pharmacodynamics of intravenous anesthetics, including drug interactions and continuous measures of drug effect; model-based drug development; target controlled drug delivery; advanced models of drug behavior.

Publications

PUBLICATIONS

- **Effects of sedative doses of propofol, dexmedetomidine, and fentanyl on memory and pain in healthy young adults: A randomized controlled single-blind crossover study using functional magnetic resonance imaging at 7 Tesla.** *Anesthesiology*
  Vogt, K. M., Simmons, M. A., Reddy, S. N., Burlew, A. C., Kozdron, C. N., Lavage, D. R., Wang, S., Pryor, K. O., Shafer, S. L., Ibrahim, T., Aizenstein, H. J., Reder, L. M., Ibinson, et al
  2025
- **Plasma pharmacokinetics of intravenous and intranasal oxytocin in nonpregnant adults.** *British journal of anaesthesia*
  Shafer, S. L., Ririe, D. G., Miller, S., Curry, R. S., Hsu, D. T., Sullivan, G. M., Eisenach, J. C.
  2025
- **Safety and Efficacy of Vocacapsaicin for Management of Postsurgical Pain: A Randomized Clinical Trial.** *Anesthesiology*
  Shafer, S. L., Teichman, S. L., Gottlieb, I. J., Singla, N., Minkowitz, H. S., Leiman, D., Vaughn, B., Donovan, J. F.
  2024
- **The evolution of pharmacokinetics** *BRITISH JOURNAL OF ANAESTHESIA*
  Shafer, S. L.
  2020; 124 (6): 664–65
- **Carfentanil: une arme de destruction massive.** *Canadian journal of anaesthesia = Journal canadien d'anesthesie*
  Shafer, S. L.
  2019
- **Non-steady State Modeling of the Ventilatory Depressant Effect of Remifentanil in Awake Patients Experiencing Moderate-to-severe Obstructive Sleep Apnea.** *Anesthesiology*
  Doufas, A. G., Shafer, S. L., Rashid, N. H., Kushida, C. A., Capasso, R.
  2018
- **Artificial Intelligence for Everyone** *ANESTHESIOLOGY*
  Gambus, P., Shafer, S. L.
  2018; 128 (3): 431–33
- **Narrative Review of Statistical Reporting Checklists, Mandatory Statistical Editing, and Rectifying Common Problems in the Reporting of Scientific Articles.** *Anesthesia and analgesia*

Dexter, F., Shafer, S. L.
2017; 124 (3): 943-947

- **Calculating the probability of random sampling for continuous variables in submitted or published randomised controlled trials** *ANAESTHESIA*
  Carlisle, J. B., Dexter, F., Pandit, J. J., Shafer, S. L., Yentis, S. M.
  2015; 70 (7): 848-858
- **Publication Bias, Retrospective Bias, and Reproducibility of Significant Results in Observational Studies** *ANESTHESIA AND ANALGESIA*
  Shafer, S. L., Dexter, F.
  2012; 114 (5): 931-932
- **Shadow of Doubt** *ANESTHESIA AND ANALGESIA*
  Shafer, S. L.
  2011; 112 (3): 498-500
- **You Will Be Caught** *ANESTHESIA AND ANALGESIA*
  Shafer, S. L.
  2011; 112 (3): 491-493
- **The need for a journal policy on intrathecal, epidural, and perineural administration of non-approved drugs** *PAIN*
  Eisenach, J. C., Shafer, S. L., Yaksh, T.
  2010; 149 (3): 417-419
- **Consent Contraindicated?** *SCIENCE*
  Yaksh, T. L., Eisenach, J. C., Shafer, S. L.
  2010; 328 (5974): 45-45
- **Mathematical Modeling of the Pain and Progress of the First Stage of Nulliparous Labor** *Annual Meeting of the American-Society-of-Anesthesiologist*
  Debiec, J., Conell-Price, J., Evansmith, J., Shafer, S. L., Flood, P.
  LIPPINCOTT WILLIAMS & WILKINS.2009: 1093–1110
- **Additivity versus synergy: A theoretical analysis of implications for anesthetic mechanisms** *ANESTHESIA AND ANALGESIA*
  Shafer, S. L., Hendrickx, J. F., Flood, P., Sonner, J., Eger, E. I.
  2008; 107 (2): 507-524
- **Is synergy the rule? A review of anesthetic interactions a producing hypnosis and immobility** *ANESTHESIA AND ANALGESIA*
  Hendrickx, J. F., Eger, E. I., Sonner, J. M., Shafer, S. L.
  2008; 107 (2): 494-506
- **In silico pharmacogenetics of warfarin metabolism** *NATURE BIOTECHNOLOGY*
  Guo, Y. Y., Weller, P., Farrell, E., Cheung, P., Fitch, B., Clark, D., Wu, S. Y., Wang, J. M., Liao, G. C., Zhang, Z. M., Allard, J., Cheng, J., Nguyen, et al
  2006; 24 (5): 531-536
- **In silico genetics: Identification of a functional element regulating H2-E alpha gene expression** *SCIENCE*
  Liao, G. C., Wang, J. M., Guo, J. S., Allard, J., Cheng, J., Ng, A., Shafer, S., Puech, A., McPherson, J. D., Foernzler, D., Peltz, G., Usuka, J.
  2004; 306 (5696): 690-695
- **Pharmacodynamic interaction between propofol and remifentanil regarding hypnosis, tolerance of laryngoscopy, bispectral index, and electroencephalographic approximate entropy** *ANESTHESIOLOGY*
  Bouillon, T. W., Bruhn, J., Radulescu, L., Andresen, C., Shafer, T. J., Cohane, C., Shafer, S. L.
  2004; 100 (6): 1353-1372
- **Mixed-effects modeling of the intrinsic ventilatory depressant potency of propofol in the non-steady state** *Annual Meeting of the American-Society-of-Anesthesiologists*
  Bouillon, T., Bruhn, J., Radu-Radulescu, L., Andresen, C., Cohane, C., Shafer, S. L.
  LIPPINCOTT WILLIAMS & WILKINS.2004: 240–50
- **A model of the ventilatory depressant potency of remifentanil in the non-steady state** *ANESTHESIOLOGY*
  Bouillon, T., Bruhn, J., Radu-Radulescu, L., Andresen, C., Cohane, C., Shafer, S. L.

2003; 99 (4): 779-787

- **Using the time of maximum effect site concentration to combine pharmacokinetics and pharmacodynamics** *ANESTHESIOLOGY*
  Minto, C. F., Schnider, T. W., Gregg, K. M., Henthorn, T. K., Shafer, S. L.
  2003; 99 (2): 324-333
- **Cephalad movement of morphine and fentanyl in humans after intrathecal injection** *ANESTHESIOLOGY*
  Eisenach, J. C., Hood, D. D., Curry, R., Shafer, S. L.
  2003; 99 (1): 166-173
- **Efficient trial design for eliciting a pharmacokinetic-pharmacodynamic model-based response surface describing the interaction between two intravenous anesthetic drugs** *ANESTHESIOLOGY*
  Short, T. G., Ho, T. Y., Minto, C. F., Schnider, T. W., Shafer, S. L.
  2002; 96 (2): 400-408
- **Propofol dosing regimens for ICU sedation based upon an integrated pharmacokinetic-pharmacodynamic model** *ANESTHESIOLOGY*
  Barr, J., Egan, T. D., Sandoval, N. F., Zomorodi, K., Cohane, C., Gambus, P. L., Shafer, S. L.
  2001; 95 (2): 324-333
- **Response surface model for anesthetic drug interactions** *Meeting of the American-Society-of-Anesthesiologists*
  Minto, C. F., Schnider, T. W., Short, T. G., Gregg, K. M., Gentilini, A., Shafer, S. L.
  LIPPINCOTT WILLIAMS & WILKINS.2000: 1603–16
- **The influence of age on propofol pharmacodynamics** *ANESTHESIOLOGY*
  Schnider, T. W., Minto, C. F., Shafer, S. L., Gambus, P. L., Andresen, C., Goodale, D. B., Youngs, E. J.
  1999; 90 (6): 1502-1516
- **Population pharmacokinetics of midazolam administered by target controlled infusion for sedation following coronary artery bypass grafting** *ANESTHESIOLOGY*
  Zomorodi, K., Donner, A., Somma, J., Barr, J., Sladen, R., Ramsay, J., Geller, E., Shafer, S. L.
  1998; 89 (6): 1418-1429
- **Population pharmacodynamics of midazolam administered by target controlled infusion in SICU patients after CABG surgery** *ANESTHESIOLOGY*
  Somma, J., Donner, A., Zomorodi, K., Sladen, R., Ramsay, J., Geller, E., Shafer, S. L.
  1998; 89 (6): 1430-1443
- **Cerebrospinal fluid pharmacokinetics and pharmacodynamics of intrathecal neostigmine methylsulfate in humans** *American-Society-of-Anesthesiologists Annual Meeting*
  Shafer, S. L., Eisenach, J. C., Hood, D. D., Tong, C. Y.
  LIPPINCOTT WILLIAMS & WILKINS.1998: 1074–88
- **The influence of method of administration and covariates on the pharmacokinetics of propofol in adult volunteers** *ANESTHESIOLOGY*
  Schnider, T. W., Minto, C. F., Gambus, P. L., Andresen, C., Goodale, D. B., Shafer, S. L., Youngs, E. J.
  1998; 88 (5): 1170-1182
- **Pharmacokinetics and pharmacodynamics of remifentanil .2. Model application** *ANESTHESIOLOGY*
  Minto, C. F., Schnider, T. W., Shafer, S. L.
  1997; 86 (1): 24-33
- **A comparison of spectral edge, delta power, and bispectral index as EEG measures of alfentanil, propofol, and midazolam drug effect** *CLINICAL PHARMACOLOGY & THERAPEUTICS*
  Billard, V., Gambus, P. L., Chamoun, N., Stanski, D. R., Shafer, S. L.
  1997; 61 (1): 45-58
- **Influence of age and gender on the pharmacokinetics and pharmacodynamics of remifentanil .1. Model development** *ANESTHESIOLOGY*
  Minto, C. F., Schnider, T. W., Egan, T. D., Youngs, E., Lemmens, H. J., Gambus, P. L., Billard, V., Hoke, J. F., Moore, K. H., Hermann, D. J., Muir, K. T., Mandema, J. W., Shafer, et al
  1997; 86 (1): 10-23
- **Remifentanil versus alfentanil - Comparative pharmacokinetics and pharmacodynamics in healthy adult male volunteers** *ANESTHESIOLOGY*

Egan, T. D., Minto, C. F., Hermann, D. J., Barr, J., Muir, K. T., Shafer, S. L.
1996; 84 (4): 821-833

- **THE PHARMACOKINETICS OF THE NEW SHORT-ACTING OPIOID REMIFENTANIL (GI87084B) IN HEALTHY ADULT MALE-VOLUNTEERS** *ANESTHESIOLOGY*
  Egan, T. D., Lemmens, H. J., Fiset, P., Hermann, D. J., Muir, K. T., Stanski, D. R., Shafer, S. L.
  1993; 79 (5): 881-892
- **COMPUTER-CONTROLLED INFUSION OF INTRAVENOUS DEXMEDETOMIDINE HYDROCHLORIDE IN ADULT HUMAN VOLUNTEERS** *ANESTHESIOLOGY*
  Dyck, J. B., Maze, M., Haack, C., Azarnoff, D. L., Vuorilehto, L., Shafer, S. L.
  1993; 78 (5): 821-828
- **APPLICATION OF SEMILINEAR CANONICAL CORRELATION TO THE MEASUREMENT OF OPIOID DRUG EFFECT** *JOURNAL OF PHARMACOKINETICS AND BIOPHARMACEUTICS*
  Gregg, K. M., VARVEL, J. R., Shafer, S. L.
  1992; 20 (6): 611-635
- **ALGORITHMS TO RAPIDLY ACHIEVE AND MAINTAIN STABLE DRUG CONCENTRATIONS AT THE SITE OF DRUG EFFECT WITH A COMPUTER-CONTROLLED INFUSION PUMP** *JOURNAL OF PHARMACOKINETICS AND BIOPHARMACEUTICS*
  Shafer, S. L., Gregg, K. M.
  1992; 20 (2): 147-169
- **MEASURING THE PREDICTIVE PERFORMANCE OF COMPUTER-CONTROLLED INFUSION PUMPS** *JOURNAL OF PHARMACOKINETICS AND BIOPHARMACEUTICS*
  VARVEL, J. R., Donoho, D. L., Shafer, S. L.
  1992; 20 (1): 63-94
- **A SIMPLE ANALYTICAL SOLUTION TO THE 3-COMPARTMENT PHARMACOKINETIC MODEL SUITABLE FOR COMPUTER-CONTROLLED INFUSION PUMPS** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*
  Bailey, J. M., Shafer, S. L.
  1991; 38 (6): 522-525
- **PHARMACOKINETICS, PHARMACODYNAMICS, AND RATIONAL OPIOID SELECTION** *1989 ANNUAL MEETING OF THE AMERICAN SOC OF ANESTHESIOLOGISTS*
  Shafer, S. L., VARVEL, J. R.
  LIPPINCOTT-RAVEN PUBL.1991: 53–63
- **ABSORPTION CHARACTERISTICS OF TRANSDERMALLY ADMINISTERED FENTANYL** *ANESTHESIOLOGY*
  VARVEL, J. R., Shafer, S. L., Hwang, S. S., COEN, P. A., Stanski, D. R.
  1989; 70 (6): 928-934
- **TESTING COMPUTER-CONTROLLED INFUSION PUMPS BY SIMULATION** *ANESTHESIOLOGY*
  Shafer, S. L., Siegel, L. C., Cooke, J. E., Scott, J. C.
  1988; 68 (2): 261-266
- **Bioequivalence and pharmacokinetics of intravenous calcium during cesarean delivery.** *Anesthesiology*
  Ansari, J. R., Conti, D. J., Michel, G., Yarmosh, A., Cole, N. M., Shafer, S. L.
  2024
- **Modulation of Human Memory and Pain by Diverse Anesthetic Agents: A Randomized Placebo-Controlled Crossover 7 Tesla Functional MRI Study in Healthy Young Adults**
  Vogt, K., Reddy, S., Kozdron, C., Burlew, A., Shafer, S., Aizenstein, H., Reder, L., Ibinson, J., Fiez, J.
  LIPPINCOTT WILLIAMS & WILKINS.2023: 578-580
- **Resting-state Functional Connectivity Changes with Propofol, Dexmedetomidine, and Fentanyl in Healthy Young Adults: A Randomized Placebo-Controlled Comparative Study Using 7 Tesla MRI**
  Vogt, K., Burlew, A., Reddy, S., Kozdron, C., Wang, S., Shafer, S., Aizenstein, H., Ibinson, J., Fiez, J.
  LIPPINCOTT WILLIAMS & WILKINS.2023: 591-593
- **Outpatient Treatment With Gabapentin in Women With Severe Acute Pain After Cesarean Delivery Is Ineffective: A Randomized, Double-Blind, Placebo-Controlled Trial.** *Anesthesia and analgesia*

Fowler, C., Chu, A. W., Guo, N., Ansari, J. R., Shafer, S. L., Flood, P. D.
2023

- **The Effect of Night Float Rotation on Resident Sleep, Activity, and Well-Being.** *Anesthesia and analgesia*
  Ruan, A., Klein, A., Jhita, P., Hasan-Hill, N., Shafer, S. L., Flood, P. D.
  2022

- **Pilot Study of Vocacapsaicin for Treatment of Pain After Open Laparotomy**
  Teichman, S., Garza, J., Kleinman, M., Solomon, B., Stelmack, V., Leiman, D., Minkowitz, H., Solanki, D., Shafer, S., Donovan, J.
  LIPPINCOTT WILLIAMS & WILKINS.2022: S23

- **Ondansetron to reduce neonatal opioid withdrawal severity a randomized clinical trial.** *Journal of perinatology : official journal of the California Perinatal Association*
  Peltz, G., Jansson, L. M., Adeniyi-Jones, S., Cohane, C., Drover, D., Shafer, S., Wang, M., Wu, M., Govindaswami, B., Jegatheesan, P., Argani, C., Khan, S., Kraft, et al
  2022

- **Preliminary Study of Vocacapsaicin for Treatment of Pain Following Open Laparotomy Repair of Ventral Hernia**
  Teichman, S., Minkowitz, H., Leiman, D., Solanki, D., Donovan, J., Shafer, S. L.
  LIPPINCOTT WILLIAMS & WILKINS.2022: 733-734

- **Intrinsic Severity of the SARS-CoV-2 Omicron Variant.** *The New England journal of medicine*
  Shafer, S. L.
  2022

- **Editors ' Note: Ueshima H, Otake H. Addition of transversus thoracic muscle plane block to pectoral nerves block provides more effective perioperative pain relief than pectoral nerves block alone for breast cancer surgery. Br J Anaesth 2017;118:439-443** *BRITISH JOURNAL OF ANAESTHESIA*
  Hemmings, H. C., Shafer, S. L.
  2022; 128 (3): 597

- **Pharmacokinetics Police.** *Anesthesia and analgesia*
  Fisher, D. M., Shafer, S. L.
  1800; 134 (2): e7-e8

- **Chronic disabling postpartum headache after unintentional dural puncture during epidural anaesthesia: a prospective cohort study.** *British journal of anaesthesia*
  Ansari, J. R., Barad, M., Shafer, S., Flood, P.
  2021; 127 (4): 600-607

- **Percutaneous Peripheral Nerve Stimulation (Neuromodulation) for Postoperative Pain: A Randomized, Sham-controlled Pilot Study** *ANESTHESIOLOGY*
  Ilfeld, B. M., Plunkett, A., Vijjeswarapu, A. M., Hackworth, R., Dhanjal, S., Turan, A., Cohen, S. P., Eisenach, J. C., Griffith, S., Hanling, S., Sessler, D., Mascha, E. J., Yang, et al
  2021; 135 (1): 95-110

- **Design of Clinical Trials Evaluating Sedation in Critically Ill Adults Undergoing Mechanical Ventilation: Recommendations From Sedation Consortium on Endpoints and Procedures for Treatment, Education, and Research (SCEPTER) Recommendation III.** *Critical care medicine*
  Ward, D. S., Absalom, A. R., Aitken, L. M., Balas, M. C., Brown, D. L., Burry, L., Colantuoni, E., Coursin, D., Devlin, J. W., Dexter, F., Dworkin, R. H., Egan, T. D., Elliott, et al
  2021

- **The Titration Paradox Turns Pharmacology Upside Down.** *Clinical pharmacology and therapeutics*
  Shafer, S. L., Stanski, D. R.
  2021

- **Bupivacaine local anesthetic to decrease opioid requirements after radical cystectomy: Does formulation matter?** *Urologic oncology*
  Schmidt, B. n., Bhambhvani, H. P., Greenberg, D. R., Prado, K. n., Shafer, S. n., Thong, A. n., Gill, H. n., Skinner, E. n., Shah, J. B.
  2020

- **Foreword** *PERSONALIZED ANAESTHESIA: TARGETING PHYSIOLOGICAL SYSTEMS FOR OPTIMAL EFFECT*

Shafer, S. L., Stanski, D. R.
edited by Gambus, P. L., Hendrickx, J. F.
2020: IX-XI

- **The evolution of pharmacokinetics.** *British journal of anaesthesia*
  Shafer, S. L.
  2020
- **Further retractions of articles by Joachim Boldt.** *British journal of anaesthesia*
  Hemmings, H. C., Shafer, S. L.
  2020; 125 (3): 409–11
- **FDA Label for Over-the-Counter Naloxone.** *The New England journal of medicine*
  Fisher, D. M., Shafer, S. L.
  2020; 383 (11): 1092–93
- **Falling Dominoes.** *Anesthesia and analgesia*
  Polaner, D. M., Shafer, S. L.
  2019; 128 (4): 613–14
- **Carfentanil: a weapon of mass destruction** *CANADIAN JOURNAL OF ANESTHESIA-JOURNAL CANADIEN D ANESTHESIE*
  Shafer, S. L.
  2019; 66 (4): 351-355
- **Falling Dominoes** *ANESTHESIA AND ANALGESIA*
  Polaner, D. M., Shafer, S. L.
  2019; 128 (4): 613–14
- **Non-steady State Modeling of the Ventilatory Depressant Effect of Remifentanil in Awake Patients Experiencing Moderate-to-severe Obstructive Sleep Apnea** *ANESTHESIOLOGY*
  Doufas, A. G., Shafer, S. L., Rashid, N., Kushida, C. A., Capasso, R.
  2019; 130 (2): 213–26
- **Opioid-induced Ventilatory Depression in Sleep Apnea: Reply.** *Anesthesiology*
  Doufas, A. G., Shafer, S. L., Henthorn, T. K.
  2019
- **Playing with dexmedetomidine pharmacokinetics!** *British journal of anaesthesia*
  Hammer, G. n., Shafer, S. L.
  2019
- **"Think. Check. Submit." to avoid predatory publishing.** *Critical care (London, England)*
  Cortegiani, A., Shafer, S. L.
  2018; 22 (1): 300
- **"Think. Check. Submit." to avoid predatory publishing** *CRITICAL CARE*
  Cortegiani, A., Shafer, S. L.
  2018; 22
- **Letter to the Editor on "Local Infiltration Analgesia With Liposomal Bupivacaine Improves Pain Scores and Reduces Opioid Use After Total Knee Arthroplasty: Results of a Randomized Controlled Trial"** *JOURNAL OF ARTHROPLASTY*
  Shafer, S. L.
  2018; 33 (8): 2694
- **Letter to the Editor on "Local Infiltration AnalgesiaWith Liposomal Bupivacaine Improves Pain Scores and Reduces Opioid Use After Total KneeArthroplasty: Results of a Randomized Controlled Trial".** *The Journal of arthroplasty*
  Shafer, S. L.
  2018
- **Writing Research Reports** *ANESTHESIA AND ANALGESIA*
  Sessler, D. I., Shafer, S.

2018; 126 (1): 330–37

- **Dr Ted Eger Obituary** *ANESTHESIA AND ANALGESIA*
  Gropper, M. A., Shafer, S. L.
  2017; 125 (6): 1829–30
- **Authorship wanting: dead or alive.** *Paediatric anaesthesia*
  Anderson, B. J., Shafer, S. L., Dare, T.
  2016; 26 (10): 949-50
- **Truth is elusive.** *Acta anaesthesiologica Scandinavica*
  Shafer, S. L.
  2016; 60 (6): 691-2
- **Plagiarism Is Ubiquitous.** *Anesthesia and analgesia*
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