

Curriculum Vitae

Name: Robert Edward Freundlich
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Education

09/2002 - 05/2005 B.A. in German Literature from Johns Hopkins University, Baltimore, Maryland
06/2005 - 05/2007 M.S. in Biotechnology from Johns Hopkins University, Baltimore, Maryland
07/2006 - 05/2010 M.D. from Baylor College of Medicine, Houston, Texas
03/2018 - 08/2019 M.S.C.I. in Clinical Investigation from Vanderbilt University Medical Center, Nashville, Tennessee

Training

06/2010 - 06/2011 Internship from University of Michigan Medical Center, Ann Arbor, Michigan
07/2011 - 06/2012 Post-Doc Research in Clinical informatics from University of Michigan Medical Center, Ann Arbor, Michigan
07/2012 - 06/2015 Residency in Anesthesiology from University of Michigan Medical Center, Ann Arbor, Michigan
07/2015 - 06/2016 Fellowship in Critical Care Medicine from University of Michigan Medical Center, Ann Arbor, Michigan

Licensure and Certification

06/2010 - 01/2017 Medical License, MI Medical License of Michigan United States (4301096147)
06/2011 - 01/2017 Medical License, OH Medical License of Ohio United States (097725)
08/2015 - Present Medical License, TN Medical License of Tennessee United States (53490)
05/2016 - Present Board Certification, American Board of Anesthesiology Primary Certification United States (55442)
08/2016 - Present Board Certification, American Board of Anesthesiology, Critical Care Medicine Subspecialty Certification (55442)
09/2016 - Present Board Certification, Basic Echocardiography, National Board of Echocardiography
06/2017 - Present Medical License, KY Medical License of Kentucky United States (50312)
06/2017 - Present Credential, Epic Physician Builder Certification (Physician Builder)
08/2017 - Present Credential, Epic Physician Builder - Analytics Certification
08/2017 - Present Credential, Epic Physician Builder - Orders Certification
02/2020 - Present Certification, Emerging Leaders, Vanderbilt Owen School of Business of Tennessee United States

Academic Appointments

07/2016 - Present Assistant Professor of Anesthesiology, Vanderbilt University (Nashville, Tennessee)
07/2017 - Present Assistant Professor of Biomedical Informatics, Vanderbilt University (Nashville, Tennessee)

Hospital Appointments

07/2017 - Present Clinical Staff, Jennie Stuart Medical Center (Hopkinsville, Kentucky)

Professional Organizations

2011 International Anesthesia Research Society
2011 American Society of Anesthesiologists
2011 Society for Technology in Anesthesia
2011 - 2016 Michigan Society of Anesthesiologists
2011 - 2016 Washtenaw County Medical Society

2012	American Medical Association
2012 - 2016	Michigan State Medical Society
2013	Society for Head and Neck Anesthesia
2015	Society of Critical Care Medicine
2015	American College of Chest Physicians
2016	Early-Stage Anesthesiology Scholars, Southern Regional Representative
2016	Society of Cardiovascular Anesthesiologists
2016	Society of Anesthesia and Sleep Medicine
2016	American Medical Informatics Association
2018	Society of Thoracic Surgeons, Associate Member

Professional Activities

Intramural

N/A	Vanderbilt Anesthesiology Clinical Research Advisory Committee, Anesthesiology
07/2016 - Present	Anesthesiology Research Executive Committee, Anesthesiology, Member
07/2016 - 02/2018	Bedside Surveillance Committee
11/2018 - Present	Vanderbilt Data Science Institute

Extramural

N/A	Reviewer for BMJ Case Reports
N/A	Reviewer for Anesthesia and Analgesia Case Reports
N/A	Reviewer for Journal of Andrology
N/A	Reviewer for BMJ Quality and Safety
N/A	Reviewer for Journal of Clinical Monitoring and Computing
07/2011 - Present	Perioperative Clinical Research Committee, Anesthesiology
03/2012 - Present	Reviewer for Anesthesia and Analgesia
03/2013 - Present	Reviewer for Journal of Clinical Anesthesia
10/2016 - 05/2018	Early Stage Anesthesiology Scholars, Executive Committee, Southern Regional Representative
10/2016 - Present	ASA Abstract Review Subcommittee on Outcomes and Database Research, American Society of Anesthesiologists, Selected to serve on the abstract review subcommittee for outcomes and database research for the 2017-19 annual meetings.
01/2017 - Present	Reviewer for BMC Research Notes
01/2017 - Present	Reviewer for Anesthesiology
03/2017 - Present	Reviewer for Critical Care Nurse
04/2017 - Present	Reviewer for Journal of Medical Systems
07/2017 - Present	IARS Annual Meeting Session Proposal Review Panel Committee, Anesthesiology, IARS 2018, 2019, 2020, 2021 Annual Meeting Session Proposal Review Panel Committee Member
09/2017 - Present	IARS Session Host Committee, IARS, Member of IARS 2018 Annual Meeting Session Host Committee, Member
02/2018 - Present	Merit Reviewer, Patient-Centered Outcomes Research Institute, PCORI Merit Reviewer, Merit Reviewer
02/2018 - Present	Early Career Reviewer, National Institutes of Health
04/2018 - Present	Reviewer for British Journal of Anaesthesia
06/2018 - 07/2020	ASA Abstract Review Subcommittee on Critical Care, Anesthesiology, Member of ASA Abstract Review Subcommittee on Critical Care, Member
09/2018 - Present	Reviewer for BMJ Open Quality
10/2018 - Present	Reviewer for Applied Clinical Informatics
02/2019 - Present	Review Committee, Anesthesiology, Invited Member
02/2019 - Present	Reviewer for Annals of the American Thoracic Society
03/2019 - Present	Reviewer for A & A Practice
05/2019 - Present	Reviewer for Biomedical Informatics Insights
08/2019 - Present	Reviewer for Chest
10/2019 - 10/2021	ASA Committee on Electronic Media and Information Technology, Anesthesiology, ASA Committee on Electronic Media and Information Technology member
10/2019 - 11/2019	Special Emphasis Panel/Scientific Review Group, Anesthesiology, 2020/01 ZDA1 GXM-A (17) R - Blockchain Technology to Improve SUD Care, Co-Chair, SBIR/STTR grant reviewer

12/2019 - 12/2019	Special Emphasis Panel, Anesthesiology, Member, Special Emphasis Panel/ Scientific Review Group 2020/01 ZDA1 GXM-A (24) R meeting, America's Startups and Small Businesses Build Technologies to Stop the Opioid Epidemic, Reviewer
07/2020 - 07/2020	NIH-NIDA, Anesthesiology, 2020/08 ZDA1 GXM-A (03) R

Teaching Activities

08/2016 - 08/2016	Weekly Echocardiography Conference: Physics of Ultrasound, Lecturer, MCE
09/2016 - 09/2016	Critical Illness Integrated Science Course: Basic Transesophageal Echocardiography Exam, Lecturer, CELA, 9/15/2016
09/2016 - 09/2016	Critical Illness Integrated Science Course: Basic Transesophageal Echocardiography Exam, Lecturer, CELA, September 8th
10/2016 - 10/2016	Cardiac Dysfunction and Hemodynamic Monitoring, Lecturer, MCE 3161, CVICU medical students
11/2016 - 11/2016	Critical Illness Integrated Science Course: Basic TEE Exam, Lecturer, CELA, 11/11/2016
11/2016 - 11/2016	Critical Illness Integrated Science Course: Basic TEE Exam, Lecturer, CELA, 11/4/2016
02/2017 - 02/2017	Basics of Bedside TTE, Lecturer, Total 1.5 hours of teaching time
07/2017 - 07/2017	Intern bootcamp machine checkout exam: Machine Checkout Exam, Small Group Facilitator, PACU, Machine Checkout Exam for Intern Bootcamp
07/2017 - 08/2017	Foundations of the Profession: Introductory Session, Small Group Facilitator, Vanderbilt, Foundations of the Profession, introductory session
08/2017 - 08/2017	Sedation and Anesthesia for Procedures: Cook Course, Lecturer, CELA, 8/15/17
09/2017 - 09/2017	Critical Care Skills Week: Airway Management, Lecturer/SIM facilitator, CELA
10/2017 - 2017	ISC Critical Illness: Journal Club, Small Group Facilitator, ISC: Critical Illness Journal Club
10/2017 - 10/2017	ISC Critical Illness: Case Based Learning Facilitator, Small Group Facilitator
10/2017 - 10/2017	ISC Critical Illness: Case Based Learning, Small Group Facilitator
10/2017 - 10/2017	ISC Critical Illness: Valve Physiology/Pathophysiology and Management, Lecturer
12/2017 - 12/2017	Pulmonary Dysfunction and Basic Ventilation Modes: Pulmonary Dysfunction and Basic Ventilation Modes, Lecturer, MCE
09/2018 - Present	Critical Care Skills Week: Basic TEE Exam, Lecturer, CELA
09/2018 - Present	ASA Poster Practice Session, Moderator
06/2019 - Present	June Bootcamp: Simulation for June Bootcamp - Basic Troubleshooting, CELA
08/2019 - Present	Foundations of Health Information Technology: Computer programs and Systems
08/2019 - 12/2019	Foundations of Health Information Technology Course Co-Director, ACI 6111-01 This course will provide a strong foundation for understanding the current state and key topics in health information technology. Students will begin with a review of computer programs and systems, and then build on top of this framework detailed information on the structure of health care data and the architecture of supporting systems. Data exchange, interoperability and data networks will be covered, along with key concepts for data security and privacy. Students will utilize multiple modalities of digital learning, and will participate in projects at different points during the course. Health information technology skills and knowledge will be assessed incrementally throughout the course.
09/2019 - Present	Foundations of Health Information Technology: Health Care Data I
09/2019 - Present	Foundations of Health Information Technology: Health Care Data II
09/2019 - Present	SCCM ICU Liberation Conference: CAM-ICU for Non-Ventilated Patients, CELA
09/2019 - Present	Foundations of Health Information Technology: Security and Privacy I
09/2019 - Present	Foundations of Health Information Technology: Security and Privacy II
10/2019 - Present	Foundations of Health Information Technology: Health Care Data III
10/2019 - Present	Foundations of Health Information Technology: Data Manipulation
10/2019 - Present	Foundations of Health Information Technology: Data Networks
10/2019 - Present	Foundations of Health Information Technology: Data Sharing
11/2019 - Present	Foundations of Health Information Technology: Systems Architectures
11/2019 - Present	Foundations of Health Information Technology: Data Analysis
11/2019 - Present	Cardiovascular Intensive Care & Hemodynamic Monitoring, Lecturer, MCE
12/2019 - Present	Foundations of Health Information Technology: Student Presentations, Lecturer

Research Supervision / Mentorship

07/2016 - Present	Dorothee Mueller Vanderbilt University Medical Center, Current Position: Assistant Professor of Anesthesiology. (Post-doc Fellow, Research)
07/2016 - 06/2017	Matthew Stansbury North Dakota, Current Position: Private Practice. (Post-doc Fellow, General Mentorship)
07/2016 - 06/2017	Patrick McConville North Carolina, Current Position: Private Practice. (Post-doc Fellow, Research)
06/2017 - 08/2017	Micah Harris (Undergraduate, Research)
07/2017 - Present	Jeremy Walco Vanderbilt University Medical Center, Current Position: Assistant Professor. (Post-doc Fellow, Research)
07/2017 - Present	Melissa Bellomy Vanderbilt University Medical Center, Current Position: Fellow. (Resident, Research)
07/2017 - 06/2018	Joshua Hozella Current Position: Private Practice. (Post-doc Fellow, Research)
06/2018 - 08/2018	Chelsie Dietz William Beaumont Oakland University, Current Position: Medical Student. (Medical Student, Research)
07/2018 - Present	Christina Boncyk Vanderbilt University Medical Center, Current Position: Assistant Professor. (Faculty, Research)
07/2018 - Present	Christina Jelly Vanderbilt University Medical Center, Current Position: Assistant Professor of Anesthesiology. (Post-doc Fellow, Research)

Other Significant Activities

10/2016	Oral Session Moderator, ASA 2016 Annual Meeting: Oral Session Moderator for an Outcomes Research Session at the 2016 ASA Annual Meeting
11/2016	AMIA 2016 Annual Meeting Abstract Reviewer: Abstract Reviewer for American Medical Informatics Association 2016 Annual Meeting
10/2017	Oral Podium Session Moderator, 2017 ASA Annual Meeting: Information Management and Database Research
10/2017	ASA 2017 Annual Meeting Abstract Reviewer: Abstract reviewer for the 2017 American Society of Anesthesiologists Annual Meeting
11/2017	AMIA 2017 Annual Meeting Abstract Reviewer: Abstract reviewer for 2017 American Medical Informatics Annual Meeting
10/2018	ASA 2018 Poster Session Moderator:
10/2018	ASA 2018 Annual Meeting Abstract Reviewer:
11/2018	AMIA 2018 Annual Meeting Abstract Reviewer: AMIA 2018 Annual Meeting Abstract Reviewer
11/2018	MedInfo 2019 Annual Meeting Abstract Reviewer: Abstract reviewer for the MedInfo 2019 Annual International Meeting (Lyons, France)
01/2019	STA 2019 Annual Meeting Abstract Co-Chair:
11/2019	Medical Director, Vanderbilt Anesthesiology Perioperative Informatics Research:
01/2020	STA 2020 Annual Meeting Co-Chair: Co-Chair for the Annual Meeting, along with Dr. Clyde Matava from Toronto

Grants and Funding

Grant number unavailable IARS Development of a Dynamic Risk Prediction Model for Postoperative Assisted Ventilation Role: Principal Investigator	Robert E. Freundlich (PI)	N/A
Grant number unavailable VICTR High Flow Nasal Cannula to Prevent Reintubation in High-Risk Cardiac Surgery Patients Role: Principal Investigator Total Cost: \$500.00	Robert E. Freundlich (PI)	N/A
Grant number unavailable FAER Development of a Dynamic Risk Prediction Model for Postoperative Assisted Ventilation Role: Principal Investigator	Robert E. Freundlich (PI)	N/A
Grant number unavailable	Robert E. Freundlich (PI)	01/2017 - 01/2017

VICTR

Development of a Real-Time Predictive Model for Postoperative Respiratory Decompensation in Non-Intensive Care Unit Patients.

Microgrant funded via CTSA award No. UL1TR000445 from the National Center for Advancing Translational Sciences

Role: Principal Investigator

Total Cost: \$500.00

COVMOPO0525 Lisa Weavind (PI) 01/2017 - 11/2017
Medtronic
Medtronic IPI study
Role: Co-Investigator
Total Cost: \$527,000.00

Grant number unavailable Robert E. Freundlich (PI) 08/2017 - 07/2018
NIH-CTSA-KL2
Development of a Dynamic Risk Prediction Model for Postoperative Assisted Ventilation
Role: Principal Investigator
Total Cost: \$110,000.00

Grant number unavailable Robert E Freundlich (PI) 07/2018 - 07/2020
NIH
Development of a Dynamic Risk Prediction Model for Postoperative Assisted Ventilation
Role: Principal Investigator
Total Cost: \$270,000.00

1 R18 HS026616-01 Dan France (PI) 09/2018 - Present
AHRQ
Cancer Patient Safety Learning Laboratory(CaPSLL)
Role: Co-Investigator
Total Cost: \$2,499,992.00

K23HL148640 Robert E. Freundlich (PI) 07/2019 - Present
NIH
Reducing Reintubation Risk in High-Risk Cardiac Surgery Patients with High-Flow Nasal Cannula
Role: Principal Investigator

Honors / Awards

2013	Resident Scholar, Foundation for Anesthesia Education and Research
2013	Resident Abstract Award Finalist, International Anesthesia Research Society
2015	Clinician-Scientist Translational Anesthesiology Research Trainee, University of Michigan, Department of Anesthesiology
06/2015	Peter J. Cohen Resident Research Award, University of Michigan, Department of Anesthesiology
2017	Elliott Newman Society
2017	Benjamin H. Robbins Society
02/2018	Recommended article, F1000 Prime, "Complications Associated with Mortality in the National Surgical Quality Improvement Program Database" was identified as a recommended article by F1000 Prime
05/2018	Award for Excellence in Research Related to Anesthesiology and Perioperative Medicine, Vanderbilt University Medical Center, Best Poster Presentation, 14th Annual Research Symposium

Publications

Peer Reviewed Publications

Research Articles

1. Marton Andras, Clark Christopher C, Srinivasan Ramya, **Freundlich Robert E**, Narducci Sarjeant Amy A, Meyer Gerald J. Static and dynamic quenching of Ru(II) polypyridyl excited states by iodide. *Inorganic chemistry* 2006 January;45(1) PMID: 16390077.

2. Mohamed O, **Freundlich R E**, Dakik H K, Grober E D, Najari B, Lipshultz L I, Khera M. The quantitative ADAM questionnaire: a new tool in quantifying the severity of hypogonadism. International journal of impotence research 2010 January;22(1) PMID: 19657348 PMCID: PMC2834355.
3. Moskovic Daniel J, **Freundlich Robert E**, Yazdani Parvin, Lipshultz Larry I, Khera Mohit. Subcutaneous implantable testosterone pellets overcome noncompliance in adolescents with Klinefelter syndrome. Journal of andrology 2012 July;33(4) PMID: 21940986.
4. **Freundlich Robert E**, Grondin Louise, Tremper Kevin K, Saran Kelly A, Kheterpal Sachin. Automated electronic reminders to prevent miscommunication among primary medical, surgical and anaesthesia providers: a root cause analysis. BMJ quality & safety 2012 October;21(10) PMID: 22773892.
5. **Freundlich Robert E**, Barnet Caryn S, Mathis Michael R, Shanks Amy M, Tremper Kevin K, Kheterpal Sachin. A randomized trial of automated electronic alerts demonstrating improved reimbursable anesthesia time documentation. Journal of clinical anesthesia 2013 March;25(2) PMID: 23333782.
6. Mathis Michael R, Naughton Norah N, Shanks Amy M, **Freundlich Robert E**, Pannucci Christopher J, Chu Yijia, Haus Jason, Morris Michelle, Kheterpal Sachin. Patient selection for day case-eligible surgery: identifying those at high risk for major complications. Anesthesiology 2013 December;119(6) PMID: 24108100.
7. Mashour George A, Sharifpour Milad, **Freundlich Robert E**, Tremper Kevin K, Shanks Amy, Nallamothu Brahmajee K, Vlisides Phillip E, Weightman Adam, Matlen Lisa, Merte Janna, Kheterpal Sachin. Perioperative metoprolol and risk of stroke after noncardiac surgery. Anesthesiology 2013 December;119(6) PMID: 23612244.
8. Kheterpal Sachin, Healy David, Aziz Michael F, Shanks Amy M, **Freundlich Robert E**, Linton Fiona, Martin Lizabeth D, Linton Jonathan, Epps Jerry L, Fernandez-Bustamante Ana, Jameson Leslie C, Tremper Tyler, Tremper Kevin K,. Incidence, predictors, and outcome of difficult mask ventilation combined with difficult laryngoscopy: a report from the multicenter perioperative outcomes group. Anesthesiology 2013 December;119(6) PMID: 24071617.
9. **Freundlich Robert E**, Newman Jessica W, Tremper Kevin K, Mhyre Jill M, Kheterpal Sachin, Sanford Theodore J, Tait Alan R. The impact of a dedicated research education month for anesthesiology residents. Anesthesiology research and practice 2015; 2015: PMID: 25653678 PMCID: PMC4309211.
10. **Freundlich Robert E**, Duggal Neal M, Housey Michelle, Tremper Tyler T, Engoren Milo C, Kheterpal Sachin. Intraoperative medications associated with hemodynamically significant anaphylaxis. Journal of clinical anesthesia 2016 December;35: PMID: 27871567.
11. **Freundlich Robert E**, Maile Michael D, Hajjar Mark M, Habib Joseph R, Jewell Elizabeth S, Schwann Thomas, Habib Robert H, Engoren Milo. Years of Life Lost After Complications of Coronary Artery Bypass Operations. The Annals of thoracic surgery 2017 June;103(6) PMID: 27938887.
12. Kruger Grant H, Shanks Amy, Kheterpal Sachin, Tremper Tyler, Chiang Chi-Jung, **Freundlich Robert E**, Blum James M, Shih Albert J, Tremper Kevin K. Influence of non-invasive blood pressure measurement intervals on the occurrence of intra-operative hypotension. Journal of clinical monitoring and computing 2017 September;32(4) PMID: 28965158.
13. Berman Mitchell F, Iyer Nikhil, Freudzon Leon, Wang Shuang, **Freundlich Robert E**, Housey Michelle, Kheterpal Sachin,. Alarm Limits for Intraoperative Drug Infusions: A Report From the Multicenter Perioperative Outcomes Group. Anesthesia and analgesia 2017 October;125(4) PMID: 28759483.
14. **Freundlich Robert E**, Freundlich Katherine L, Drolet Brian C. Pagers, Smartphones, and HIPAA: Finding the Best Solution for Electronic Communication of Protected Health Information. Journal of medical systems 2017 November;42(1) PMID: 29177600.
15. **Freundlich Robert E**, Maile Michael D, Sferra Joseph J, Jewell Elizabeth S, Kheterpal Sachin, Engoren Milo. Complications Associated With Mortality in the National Surgical Quality Improvement Program Database. Anesthesia and analgesia 2018 July;127(1) PMID: 29324497.
16. Clark CL, Weavind LM, Nelson SE, Wilkie J, Conway J, **Freundlich RE**. Nursing Attitudes Toward Continuous Capnographic Monitoring of Floor Patients. BMJ Open Quality 2018 August;7(3) PMID: 30246157.
17. Huerta LE, Wanderer JP, Ehrenfeld JM, **Freundlich RE**, Rice TW, Semler MW. Validation of a Sequential Organ Failure Assessment Score using Electronic Health Record Data. Journal of medical systems 2018 September;42(10) PMID: 30218383.
18. **Freundlich Robert E**, Nelson Sara E, Qiu Yuxuan, Ehrenfeld Jesse M, Sandberg Warren S, Wanderer Jonathan P. A retrospective evaluation of the risk of bias in perioperative temperature metrics. Journal of clinical monitoring and computing 2018 December; PMID: 30536125.
19. **Freundlich R E**, Walco J P, Mueller D M, Wanderer J P, Rothman B S, Shotwell M S, Sandberg W S, Pandharipande P P, Weavind L M. Prospective randomised trial of the Integrated Pulmonary Index™ in low-acuity inpatients. British journal of anaesthesia 2018 December;121(6):1375-1377. PMID: 30442270.

20. **Freundlich RE**, Bulka CM, Wanderer JP, Rothman BS, Sandberg WS, Ehrenfeld JM. A Prospective Investigation of the Operating Room Time-Out Process. *Anesthesia and Analgesia* 2019 February.
21. Qiu Y, **Freundlich RE**, Nelson SE, Clark C, Ehrenfeld JM, Wanderer JP. Using a National Representative Sample to Evaluate the Integrity of the 30-day Surgical Mortality Metric. *Journal of Medical Systems* 2019 February.
22. Wood CB, Shinn JR, Rees AB, Patel PN, **Freundlich RE**, Smith DK, McEvoy MD, Rohde SL. Existing Predictive Models for Postoperative Pulmonary Complications Perform Poorly in a Head and Neck Surgery Population. *Journal of Medical Systems* 2019 August.
23. Colquhoun DA, Shanks AM, Kaples SR, Shah N, Saager L, Vaughn MT, Buehler K, Burns ML, Tremper KK, **Freundlich RE**, Aziz M, Kheterpal S, Mathis MR. Considerations for integration of perioperative electronic health records across institutions for research and quality improvement: the approach taken by the Multicenter Perioperative Outcomes Group (MPOG). *Anesthesia and Analgesia* 2019 September;130(5).
24. Clifton C, **Freundlich RE**, Sain C, Grant B, Wanderer J. Mobility Assessment Tool May Be an Efficient Method of Triaging Elective Surgical Patients. *Journal of Clinical Anesthesia* 2019 September.
25. Dunham WC, Weinger MB, Slagle J, Shah AS, Absi TS, Shotwell MS, Beller M, Thomas E, Vnencak-Jones CL, **Freundlich RE**, Wanderer JP, Sandberg WS, Kertai MD. CYP2D6 genotype-guided metoprolol therapy in cardiac surgery patients: Rationale and design of the Pharmacogenetic-guided Metoprolol Management for Postoperative Atrial Fibrillation in Cardiac Surgery (PREEMPTIVE) Pilot study. *Journal of Cardiothoracic and Vascular Anesthesia* 2019 September.
26. Mathis MR, Naik BI, **Freundlich RE**, Shanks AM, Heung M, Kim M, Burns ML, Rangrass G, Engoren MC, Saager L, Tremper KK, Kheterpal S. Preoperative Risk and the Association between Hypotension and Postoperative Acute Kidney Injury. *Anesthesiology* 2019 October.
27. **Freundlich RE**, Li G, Grant B, St. Jacques P, Sandberg WS, Ehrenfeld JM, Shotwell MS, Wanderer JP. Patient Satisfaction Survey Scores are not an Appropriate Metric to Differentiate Performance Among Anesthesiologists. *Journal of Clinical Anesthesia* 2020 April.
28. Jelly CJ, Ende H, **Freundlich RE**. Terminology, Communication, and Information Systems in Non-Operating Room Anaesthesia in the COVID-19 Era. *Current Opinions in Anesthesiology* 2020 May.
29. Bellomy ML, Engoren M, Martin B, Shi Y, Shotwell MS, Hughes C, **Freundlich RE**. The attributable mortality of postoperative bleeding exceeds the attributable mortality of postoperative venous thromboembolism. *Anesthesia and Analgesia* 2020 May.
30. Engoren M, Seelhammer T, **Freundlich RE**, Maile MD, Sigakis MJG, Schwann TA. A comparison of Sepsis-2 (SIRS based) to Sepsis-3 (SOFA based) definitions – A multicenter retrospective study. *Critical Care Medicine* 2020 May.

Review Articles

1. **Freundlich Robert E**, Kheterpal Sachin. Perioperative effectiveness research using large databases. *Best practice & research. Clinical anaesthesiology* 2011 December;25(4) PMID: 22099915.
2. **Freundlich Robert E**, Ehrenfeld Jesse M. Anesthesia information management: clinical decision support. *Current opinion in anaesthesiology* 2017 December;30(6) PMID: 28938302.
3. **Freundlich Robert E**, Ehrenfeld Jesse M. Perioperative Information Systems: Opportunities to Improve Delivery of Care and Clinical Outcomes in Cardiac and Vascular Surgery. *Journal of cardiothoracic and vascular anesthesia* 2018 June;32(3) PMID: 29229258.
4. Mueller DA, **Freundlich RE**. Review of Essentials of Shock Management—a Scenario-Based Approach. *Anesthesia and Analgesia* 2019 March.

Editorials

1. **Freundlich R E**, Ehrenfeld J M. Quality metrics: hard to develop, hard to validate. *British journal of anaesthesia* 2017 July;119(1) PMID: 28974060.
2. Bellomy Melissa L, **Freundlich Robert E**. Hyperglycemia and Elevated Lactate in Trauma: Where Do We Go From Here?. *Anesthesia and analgesia* 2018 March;126(3) PMID: 29461323 PMID: PMC5835398.
3. **Freundlich Robert E**, Pandharipande Pratik, Ehrenfeld Jesse M. A Call for Electronic Health Record-based Data Sharing for Clinical Trials in Critical Care. *Journal of medical systems* 2018 May;42(7) PMID: 29802451.
4. **Freundlich R E**, Boncyk C S. Clearly-defined outcomes improve the quality of health outcomes research. *British journal of anaesthesia* 2019 January;122(1):14-16. PMID: 30579392.
5. Boncyk CS, Jelly CA, **Freundlich RE**. The Blessing and the Curse of the Administrative Database. *Annals of the American Thoracic Society* 2019 June.

Case Reports

1. **Freundlich R E**, Hawes L T, Weldon S A, Brunicardi F C. Laparoscopic repair of an incarcerated right indirect sliding inguinal hernia involving a retroperitoneal ileum. Hernia : the journal of hernias and abdominal wall surgery 2011 April;15(2) PMID: 20165969.
2. Joseph John R, **Freundlich Robert Edward**, Abir Mahshid. Ruptured subcapsular liver haematoma following mechanically-assisted cardiopulmonary resuscitation. BMJ case reports 2016 February;2016: PMID: 26838302 PMCID: PMC4746549.
3. An S Sandy, Henson C Patrick, **Freundlich Robert E**, McEvoy Matthew D. Case report of high-dose hydroxocobalamin in the treatment of vasoplegic syndrome during liver transplantation. American journal of transplantation : official journal of the American Society of Transplantation and the American Society of Transplant Surgeons 2018 June;18(6) PMID: 29573551.

Letters

1. **Freundlich Robert E**, Wanderer Jonathan P, Ehrenfeld Jesse M. Building Big Datasets: Do Not Forget the EMR. Anesthesia and analgesia 2017 April;124(4) PMID: 28212218.
2. Kiefer Jesse, **Freundlich Robert E**. Confounding variables impacting the association between duration of veno-arterial extracorporeal life support and mortality. Critical care (London, England) 2017 August;21(1) PMID: 28764805 PMCID: PMC5539615.
3. **Freundlich Robert E**, Kingeter Adam J. When Managing Patients with Left Ventricular Assist Devices Undergoing Noncardiac Surgery, Less Is Not More. Anesthesiology 2017 November;127(5) PMID: 29040105.
4. **Freundlich RE**, Wanderer JP, Ehrenfeld JM. Clinical Decision Support Tools Need to Improve More Than Just Process Outcomes. Anesthesiology 2018 February.
5. **Freundlich Robert E**, Lopez Marcos G, Kingeter Adam J. Not All Calcium Formulations Are Alike. Anesthesia and analgesia 2018 February;126(2) PMID: 29189270.
6. **Freundlich RE**, Wanderer JP, Rothman BS, Sandberg WS, Ehrenfeld JM. In response to Time-Out and Distraction: Performing Checklists After the Plane Has Taken Off. Anesthesia and Analgesia 2019 June.
7. Li G, Wanderer JP, **Freundlich RE**. Temporal Trends Need to be Assessed. Anesthesiology 2020 April.

Non-Peer Reviewed Publications

Book Chapters

1. Rhee AJ, Jelly C, **Freundlich RE**. Organ Transplantation. Pocket Anesthesia. Editors: Urman and Ehrenfeld. United States 2020 January;4th Edition.

Conference Proceedings

1. **Freundlich RE**, Matava C. STA 2020 Annual Meeting Recap. Society for Technology in Anesthesia. 2020 March;Austin, TX.

Presentations

Internal Grand Rounds

1. Robert E. Freundlich, MD, MS. Vanderbilt University Medical Center, Department of Anesthesiology. Nashville, Tennessee. 2017 Jan 6; Dead in Bed No More.
2. Freundlich RE. Biomedical Informatics Seminar. Department of Biomedical Informatics; Nashville, Tennessee. 2017 Oct 4; Dead in Bed No More.

Presentations at Scientific Meetings

1. Freundlich RE, Lipshultz LI, Khera M. Sexual Medicine Society of North America 2009 Fall Scientific Meeting. 2009 Nov 18; The Use of Implantable Testosterone Subcutaneous Pellets (Testopel) in Young Men with Klinefelter's Syndrome.
2. Freundlich RE, Stamatakis L, Sathyamoorthy K, Mital A, Godoy G, Lerner SP. Society of Urologic Oncology 10th Annual Meeting. 2009 Dec 2; The Effect of Body Mass Index and Other Variables on the Adequacy of Pelvic Lymphadenectomy in Patients with Urothelial Carcinoma of the Bladder.
3. Godoy G, Stamatakis L, Freundlich RE, Chen G, Mital A, Shoss J, Madden-Fuentes R, Hong B, Lerner SP. American Urological Association Annual Meeting. 2010 May 29; Changes in Pathological N-stage Associated with Extended Lymph Node Dissection and Radical Cystectomy in Patients with Urothelial Carcinoma of the Bladder.
4. Freundlich RE, Stamatakis L, Sathyamoorthy K, Mital A, Godoy G, Lerner SP. American Urological Association Annual Meeting. 2010 May 29; Factors Affecting the Adequacy of Lymph Node Yield in Extended Pelvic Lymph Node Dissection For Urothelial Bladder Cancer.

5. Godoy G, Stamatakis L, Freundlich RE, Chen G, Mital A, Shoss J, Madden-Fuentes R, Hong B, Lerner SP. American Urological Association Annual Meeting. 2010 May 29; Survival Outcomes of Patients with Grossly Positive Nodes at Radical Cystectomy for Urothelial Carcinoma of the Bladder.
6. Stamatakis L, Freundlich RE, Godoy G, Chen G, Mital A, Shoss J, Madden-Fuentes R, Lerner SP. American Urological Association Annual Meeting. 2010 May 29; Analysis of Patients with Bladder Cancer Involving Lymph Nodes Above the Common Iliac Bifurcation: is Cure Possible with Extended Lymphadenectomy?.
7. Godoy G, Stamatakis L, Freundlich RE, Chen G, Shoss J, Madden-Fuentes R, Lerner SP. South Central Section of the American Urological Association Annual Meeting. 2010 Sep 22; Is There a Stage Benefit in Performing an Extended Lymph Node Dissection During Radical Cystectomy for Urothelial Carcinoma of the Bladder?.
8. Freundlich RE, Tallman CT, Al-attar PM, Crossley H, He C, Hanauer DA, Weizer AZ, Montgomery JS, Wood DP, Smith D, Hafez KS, Lee CT. North Central Section of the American Urological Association Annual Meeting. 2011 Oct 18; Are the Results of Neoadjuvant Chemotherapy Trials Generalizable to Elder Patients with Muscle Invasive Bladder Cancer?.
9. Freundlich RE, Barnet CS, Shanks AM, Tremper KK, Kheterpal S. Society for Technology in Anesthesia Annual Meeting. 2012 Jan 18; A Randomized Trial of Automated Electronic Alerts Demonstrating Significantly Improved Anesthesia Time Documentation Accuracy and Revenue.
10. Freundlich RE, Tremper KK, Kheterpal S. Society for Technology in Anesthesia Annual Meeting. 2012 Jan 18; The Multicenter Perioperative Outcomes Group (MPOG): Why Join?.
11. Naughton N, Kheterpal S, Mathis M, Freundlich RE, Shanks AM, Chu Y, Haus J, Pannucci C. American Society of Anesthesiologists Annual Meeting. 2012 Oct 13; Major Morbidity and Mortality After Common Outpatient Surgical Procedures: A Study of Preoperative Risk Factors.
12. Woodrum D, Freundlich RE, Sigakis M, Shanks AM, Kheterpal S. American Society of Anesthesiologists Annual Meeting. 2012 Oct 13; Preoperative Predictors of Vasopressor Requirements in Patients Undergoing Adrenalectomy for Pheochromocytoma.
13. Freundlich RE, Newman JW, Tremper KK, Kheterpal S, Sanford TJ, Tait AR. American Society of Anesthesiologists Annual Meeting. 2012 Oct 13; The Impact of a Dedicated Research Month for Anesthesiology Residents.
14. Kheterpal S, Freundlich RE, Engoren M, Shanks AM, Jameson L, Paganelli W, Tremper KK. American Society of Anesthesiologists Annual Meeting. 2012 Oct 13; A multicenter evaluation of acute kidney injury incidence and recovery following major general surgery: results from the Multicenter Perioperative Outcomes Group.
15. Freundlich RE, Newman JW, Tremper KK, Kheterpal S, Sanford TJ, Tait AR. American Association of Medical Colleges Annual Meeting. 2012 Nov 2; The Impact of a Dedicated Research Month for Anesthesiology Residents.
16. Freundlich RE, Duggal N, Shanks AM, Tremper KK, Engoren M, Kheterpal S. International Anesthesia Research Society 2013 Annual Meeting. 2013 May 4; Intraoperative Medications Associated with Clinically Significant Anaphylaxis.
17. Freundlich RE, Duggal N, Shanks AM, Tremper KK, Engoren M, Kheterpal S. International Anesthesia Research Society 2013 Annual Residents' Meeting. 2013 May 4; Intraoperative Medications Associated with Clinically Significant Anaphylaxis.
18. Alva A, Freundlich RE, Tallman CT, Al-attar PM, Crossley H, He C, Hanauer D, Hussain M, Weizer AZ, Montgomery JS, Wood DP, Smith D, Hafez KS, Lee CT. American Urological Association 2013 Annual Meeting. 2013 May 4; Outcomes with Neoadjuvant Chemotherapy in Elder Patients with Muscle Invasive Bladder Cancer.
19. Kheterpal S, Healy D, Aziz M, Shanks AM, Freundlich RE, Linton F, Epps JL, Fernandez-Bustamante A, Jameson LC, Tremper KK. American Society of Anesthesiologists Annual Meeting. 2013 Oct 12; Incidence, Predictors, and Outcome of Difficult Mask Ventilation Combined with Difficult Laryngoscopy: A Report from the Multicenter Perioperative Outcomes Group.
20. Mathis M, Naughton N, Shanks AM, Freundlich RE, Pannucci C, Kheterpal S. International Anesthesia Research Society 2014 Annual Meeting. 2014 May 17; Patient Selection for Outpatient Surgery: Identifying Those at High Risk for Major Complications.
21. Freundlich RE, Newman J, Brown S, Wagner D, Ramachandran SK. American Society of Anesthesiologists Annual Meeting. 2014 Oct 11; The Incidence of Hypotension Related to Intraoperative Intravenous Clonidine Use.
22. Newman J, Freundlich RE, Brown S, Wagner D, Ramachandran SK. Midwest Anesthesia Residents' Conference 2015 Annual Meeting. 2015 May 1; The Incidence of Hypotension Related to Intraoperative Intravenous Clonidine Use.
23. Freundlich RE, Hajjar MM, Habib JR, Jewell ES, Kheterpal S, Schwann T, Habib RH, Engoren M. American Society of Anesthesiologists Annual Meeting. American Society of Anesthesiologists; San Diego, California. 2015 Oct 22; Attributable Causes of Mortality in Adult Cardiac Surgery.
24. Freundlich RE, Maile MD, Sferra JJ, Kheterpal S, Engoren M. American Society of Anesthesiologists Annual Meeting. American Society of Anesthesiologists; Chicago, Illinois.

- 2016 Oct 24; Complications Associated with Mortality in the National Surgical Quality Improvement Program Database.
25. Mathis MR, Naik B, Freundlich RE, Shanks AM, Heung M, Engoren M, Tremper KK, Kheterpal S. American Society of Anesthesiologists Annual Meeting. American Society of Anesthesiologists; Chicago, Illinois. 2016 Oct 24; Predictors and Outcomes of Postoperative Acute Kidney Injury After Non-Cardiac Surgery: A Report from the Multicenter Perioperative Outcomes Group.
 26. Freundlich RE et al. Society for Technology in Anesthesia 2017 Annual Meeting. San Diego, California. 2017 Jan 11; Complications Associated with Mortality in the National Surgical Quality Improvement Program Database.
 27. Mueller DA, Weavind L, Freundlich RE. Deutsche Anaesthesiecongress 2017. Deutsche Gesellschaft für Anästhesiologie und Intensivmedizin; Nuernberg, Germany. 2017 May 1; Demographics and Outcomes of Patients with Early versus Late Rapid Response Team Activation.
 28. Utrankar A, McConville PJ, Mueller DA, Weavind LM, Freundlich RE. American Society of Anesthesiologists Annual Meeting 2017. American Society of Anesthesiologists; Boston, Massachusetts. 2017 Oct 22; Risk Factors for Mortality and Organ Dysfunction in Patients with Multiple Rapid Response Events.
 29. Mueller DA, McConville PJ, Wanderer JP, Weavind LM, Freundlich RE. American Society of Anesthesiologists Annual Meeting 2017. American Society of Anesthesiologists; Boston, Massachusetts. 2017 Oct 24; Early Versus Late Postoperative Rapid Response Team Activation: An Analysis of Differences in Patient Characteristics.
 30. Catherine L. Clark, Liza M. Weavind, Sara E. Nelson, Jennifer Wilkie, Joel Conway, Robert E. Freundlich. Society of Critical Care Medicine 2018 Annual Meeting. Society of Critical Care Medicine; San Antonio, Texas. 2018 Feb; Nursing Attitudes Toward Continuous Capnographic Monitoring of Floor Patients.
 31. Walco JP, Freundlich RE, Mueller DA, Kingeter AJ, Lopez MG, Weavind LM. International Anesthesia Research Society Annual Meeting. International Anesthesia Research Society; Chicago, Illinois. 2018 Apr; Non-Inferiority of the Integrated Pulmonary Index (IPI) to Address Alarm Fatigue in Low-Acuity Inpatients.
 32. Robert E Freundlich, Jeremy P Walco, Dorothee Mueller, Adam Kingeter, Marcos G Lopez, Liza M Weavind. Association of University Anesthesiologists Annual Meeting. Association of University Anesthesiologists; Chicago, Illinois. 2018 Apr; Impact of Implementation of the Integrated Pulmonary Index (IPI) in Low-Acuity Inpatients.
 33. Freundlich RE, Walco JP, Mueller DA, Kingeter AJ, Lopez MG, Weavind LM. Vanderbilt Anesthesiology Research Symposium 2018. Nashville, Tennessee. 2018 May; Non-Inferiority of the Integrated Pulmonary Index (IPI) to Address Alarm Fatigue in Low-Acuity Inpatients.
 34. Mueller DA, Weavind LM, Freundlich RE. 2018 American Society of Anesthesiologists Annual Meeting. American Society of Anesthesiologists; San Francisco, California. 2018 Oct 14; Effects Of Intra-operative Estimated Blood Loss And Fluid Resuscitation On The Timing Of Postoperative Rapid Response Team Activation.
 35. Freundlich RE. Translational Science 2019. Association for Clinical and Translational Science; Washington, District of Columbia. 2019 Mar 4; Reducing Reintubation Risk in High-Risk Cardiac Surgery Patients with High-Flow Nasal Cannula.
 36. 41. Bellomy ML, Engoren MC, Lombard FW, Martin B, Shi Y, Shotwell M, Freundlich RE. International Anesthesia Research Society 2019 Annual Meeting. International Anesthesia Research Society; Montreal, Canada. 2019 May; The Attributable Mortality from Bleeding Complications Exceeds the Attributable Mortality from Thrombotic Complications.
 37. Bellomy ML, Engoren MC, Lombard FW, Martin B, Shi Y, Shotwell M, Freundlich RE. Association of University Anesthesiologists 2019 Annual Meeting. Association of University Anesthesiologists; Montreal, Canada. 2019 May; The Attributable Mortality from Bleeding Complications Exceeds the Attributable Mortality from Thrombotic Complications.
 38. Bellomy ML, Engoren MC, Lombard FW, Martin B, Shi Y, Shotwell M, Freundlich RE. Society of Critical Care Anesthesiologists 2019 Annual Meeting. Society of Critical Care Anesthesiologists; Montreal, Canada. 2019 May; The Attributable Mortality from Bleeding Complications Exceeds the Attributable Mortality from Thrombotic Complications.
 39. Freundlich RE. 2019 Research Symposium. Vanderbilt University Medical Center Department of Anesthesiology; Nashville, Tennessee. 2019 May 3; Attributable Mortality from Bleeding Exceeds the Attributable Mortality from Venous Thromboembolism.
 40. L. E. Huerta, G. E. Nelson, M. W. Semler, M. J. Noto, T. R. Talbot, J. P. Wanderer, R. E. Freundlich, C. J. Lindsell, S. K. Nwosu, T. W. Rice. ATS. ATS; 2020 May; Comparison of Standard Isolation with Targeted Isolation for Preventing Nosocomial Transmission of Methicillin Resistant Staphylococcus Aureus and Vancomycin Resistant Enterococcus: A Pilot Clinical Trial.

Medically Challenging Cases

1. Freundlich RE, Peoples ES. Midwest Anesthesia Residents' Conference 2013 Annual Meeting. 2013 Apr 26; Intraoperative Neuroleptic Malignant Syndrome.

2. Freundlich RE, Naik V, Servin MN. American Society of Anesthesiologists Annual Meeting. 2013 Oct 12; Management of Aortic Stenosis and Chest Pain in the Parturient.
3. Freundlich RE, Naik V, Servin MN. Midwest Anesthesia Residents' Conference 2014 Annual Meeting. 2014 Apr 4; Management of Aortic Stenosis and Chest Pain in the Parturient.
4. Freundlich RE, Gauger V. American Society of Anesthesiologists Annual Meeting. 2014 Oct 11; Hurler Syndrome: More than a Challenging Airway.

Invited Presentation - Local

1. Robert E. Freundlich. Vanderbilt University Anesthesiology Informatics Conference. Vanderbilt University, Department of Anesthesiology; Nashville, Tennessee. 2015 Mar 18; Challenges in Understanding Postoperative Pulmonary Complications.

Invited Presentation - National

1. Freundlich RE, Byrne M. University of Michigan Anesthesia Technology Conference. American Society of Anesthesia Technologists and Technicians; 2014 Apr 12; Cardiac Monitoring.
2. Freundlich RE. 2017 ACNP/PA Boot Camp. ACNP/PA; Nashville, Tennessee. 2017 Sep 13; LVAD Management.
3. Robert Freundlich. Society for Technology in Anesthesia Annual Meeting. Society for Technology in Anesthesia; Austin, Texas. 2020 Jan 18; Using Machine Learning to Predict Respiratory Deterioration.
4. Robert E Freundlich, Clyde Matava. Society for Technology in Anesthesia Annual Meeting. Society for Technology in Anesthesia; Austin, Texas. 2020 Jan 18; Society for Computing and Technology in Anesthesiology Panel.

Invited Presentation - International

1. Moderator. International Anesthesia Research Society Annual Meeting. International Anesthesia Research Society; Chicago, Illinois. 2018 Apr; Scholars' Program: Priorities for Developing Researchers: Perspectives from the NIH and IARS.

Panel Presentation

1. Robert E. Freundlich. American Society of Anesthesiologists 2017 Annual Meeting. ASA; Boston, Massachusetts. 2017 Oct 19; Using Predictive Analytics to Better Detect Postoperative Respiratory Decompensation.

External Grand Rounds

1. Robert E Freundlich. Biomedical Informatics Visiting Professor Lecture. University of Pennsylvania, Department of Anesthesiology and Critical Care Medicine; Philadelphia, Pennsylvania. 2018 Mar 27; Challenges in Implementing Clinical Decision Support Tools to Decrease Postoperative Pulmonary Complications.
2. Freundlich RE. Ernst-Moritz-Arndt-Universität Greifswald; Greifswald, Germany. 2018 May 7; Neue Methoden im Monitoring von ambulaten und stationären Patienten.
3. Freundlich RE. Critical Care Grand Rounds. Mayo Clinic; Rochester, Minnesota. 2018 Nov 29; Strategies to Better Predict, Detect, and Treat Postoperative Pulmonary Complication.
4. Freundlich RE. University of Miami Grant Rounds. University of Miami Department of Anesthesiology; Miami, Florida. 2019 Apr 25; Treating, Detecting, and Predicting Postoperative Respiratory Decompensation.

University Talk

1. Freundlich RE. BH Robbins Seminar. Vanderbilt University Medical Center Department of Anesthesiology; Nashville, Tennessee. 2019 Feb 7; How to Predict, Detect, and Treat Postoperative Decompensation Using Clinical Informatics Tools.