Stanford



Steven K. Howard

Professor of Anesthesiology, Perioperative and Pain Medicine, Emeritus

CONTACT INFORMATION

- **Alternate Contact**

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Bio

ACADEMIC APPOINTMENTS

- Professor Emeritus-Hourly, Anesthesiology, Perioperative and Pain Medicine

ADMINISTRATIVE APPOINTMENTS

- Chair, Clinical Competence Committee, Department of Anesthesia, (2011-2022)

HONORS AND AWARDS

- Dean's Honor Society, University of California, Santa Barbara (1983)
- Member, Alpha Omega Alpha (1986)
- Elected member, Association of University Anesthesiologists (2005)
- Excellence in Clinical Simulation Training, Education and Research Practice Award, SimLEARN -- VA National Simulation Program (2017)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, Educational Track Subcommittee on Professional Issues, American Society of Anesthesiologists (2008 - 2016)
- Member, Scientific Evaluation Committee, Anesthesia Patient Safety Foundation (2008 - 2023)
- Member, Professional Advisory Committee, Malignant Hyperthermia Association of the United States (2009 - 2022)
- Member, Editorial Board, Simulation in Healthcare (2011 - 2020)
- Member, Abstract Review Committee on Patient Safety and Practice Management, American Society of Anesthesiologists (2012 - 2016)
- Chairperson, Scientific Evaluation Committee, Anesthesia Patient Safety Foundation (2013 - 2020)
- Member, Committee on Occupational Health, American Society of Anesthesiologists (2014 - 2021)

PROFESSIONAL EDUCATION

- --, Stanford , Anesthesia (1991)
- --, Cedars-Sinai, UCLA , Internship (1988)
- MD, Chicago Medical School , Medicine (1987)

- BA, UC Santa Barbara , Pharmacology (1983)

LINKS

- Anesthesiology and Perioperative Care Service: http://www.paloalto.va.gov/anesthesiology.asp

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our laboratory is active in the study of human performance of medical personnel. We are actively involved in teaching health care personnel the techniques of crisis resource management (CRM) using realistic simulation.

My research centers on the effects of sleepiness and fatigue in medical personnel. Data from our studies reveal resident physicians to be pathologically sleepy (as tested in the sleep laboratory) during normal working conditions as well as in the post on-call condition. If the same subjects are allowed to extend night time sleep by two hours for four consecutive days they return to normal states of alertness. We have evaluated the effects of sleep deprivation on clinical performance using a realistic simulator. We are currently measuring the sleep propensity and performance of health care personnel (nurses, residents and staff physicians).

Teaching

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Anesthesia (Fellowship Program)

Publications

PUBLICATIONS

- **Pilot study to correlate objective eye-tracking data with timed subjective task completion using five local anesthetic systemic toxicity cognitive aids.** *Regional anesthesia and pain medicine*
  Joo, S. S., Mariano, E. R., Neal, J. M., Weinberg, G. L., Kou, A., Hunter, O. O., Harrison, T. K., Udani, A. D., Howard, S. K.
  2021
- **A tale of two surges: messaging app and public COVID-19 data summarize one anesthesiology practice's pandemic year in review.** *Canadian journal of anaesthesia = Journal canadien d'anesthesie*
  Leng, J. C., Tirumalai, A. A., Kou, A., Brun, C., Coffman, C., Harrison, T. K., Howard, S. K., Shum, C., Hammons, A., Mariano, E. R.
  2021
- **Clinical Uses and Impacts of Emergency Manuals During Perioperative Crises.** *Anesthesia and analgesia*
  Goldhaber-Fiebert, S. N., Bereknyei Merrell, S., Agarwala, A. V., De La Cruz, M. M., Cooper, J. B., Howard, S. K., Asch, S. M., Gaba, D. M.
  2020; 131 (6): 1815–26
- **An ultrasound-guided fascia iliaca catheter technique does not impair ambulatory ability within a clinical pathway for total hip arthroplasty.** *Korean journal of anesthesiology*
  Mudumbai, S. C., Kim, T. E., Howard, S. K., Giori, N. J., Woolson, S. n., Ganaway, T. n., Kou, A. n., King, R. n., Mariano, E. R.
  2020; 73 (3): 267
- **Quality of Patient Education Materials on Safe Opioid Management in the Acute Perioperative Period: What Do Patients Find Online?** *PAIN MEDICINE*
  Kumar, G., Jaremko, K. M., Kou, A., Howard, S. K., Harrison, T., Mariano, E. R.
  2020; 21 (1): 171–75
- **A Multidisciplinary Perioperative Intervention to Improve Positive Airway Pressure Adherence in Patients With Obstructive Sleep Apnea: A Case Series.** *A&A practice*
  Wong, J. K., Rodriguez, E. M., Wee-Tom, B., Lejano, M., Kushida, C. A., Howard, S. K., Memtsoudis, S. G., Mariano, E. R.
  2019

- **A short, sustainable intervention to help reduce day of surgery smoking rates among patients undergoing elective surgery** *JOURNAL OF CLINICAL ANESTHESIA*
  Coffman, C. R., Howard, S. K., Mariano, E. R., Kou, A., Pollard, J., Boselli, R., Kangas, S., Leng, J.
  2019; 58: 35–36

- **Outcomes of Ambulatory Upper Extremity Surgery Patients Discharged Home with Perineural Catheters from a Veterans Health Administration Medical Center** *PAIN MEDICINE*
  King, R., Mariano, E. R., Yajnik, M., Kou, A., Kim, T., Hunter, O. O., Howard, S. K., Mudumbai, S. C.
  2019; 20 (11): 2256–62

- **Patient education and engagement in postoperative pain management decreases opioid use following knee replacement surgery** *PATIENT EDUCATION AND COUNSELING*
  Yajnik, M., Hill, J. N., Hunter, O. O., Howard, S. K., Kim, T., Harrison, T., Mariano, E. R.
  2019; 102 (2): 383–87

- **Quality of Patient Education Materials on Safe Opioid Management in the Acute Perioperative Period: What Do Patients Find Online?** *Pain medicine (Malden, Mass.)*
  Kumar, G., Jaremko, K. M., Kou, A., Howard, S. K., Harrison, T. K., Mariano, E. R.
  2019

- **Are Case Volume and Facility Complexity Level Associated With Postoperative Complications After Hip Fracture Surgery in the Veterans Affairs Healthcare System?** *CLINICAL ORTHOPAEDICS AND RELATED RESEARCH*
  Wong, J. K., Kim, T., Mudumbai, S. C., Memtsoudis, S. G., Giori, N. J., Howard, S. K., Oka, R. K., King, R., Mariano, E. R.
  2019; 477 (1): 177–90

- **Outcomes of Ambulatory Upper Extremity Surgery Patients Discharged Home with Perineural Catheters from a Veterans Health Administration Medical Center.** *Pain medicine (Malden, Mass.)*
  King, R. n., Mariano, E. R., Yajnik, M. n., Kou, A. n., Kim, T. E., Hunter, O. O., Howard, S. K., Mudumbai, S. C.
  2019

- **Peripheral nerve blocks are not associated with increased risk of perioperative peripheral nerve injury in a Veterans Affairs inpatient surgical population.** *Regional anesthesia and pain medicine*
  Yajnik, M. n., Kou, A. n., Mudumbai, S. C., Walters, T. L., Howard, S. K., Edward Kim, T. n., Mariano, E. R.
  2019; 44 (1): 81–85

- **Peripheral nerve blocks are not associated with increased risk of perioperative peripheral nerve injury in a Veterans Affairs inpatient surgical population** *REGIONAL ANESTHESIA AND PAIN MEDICINE*
  Yajnik, M., Kou, A., Mudumbai, S. C., Walters, T. L., Howard, S. K., Kim, E., Mariano, E. R.
  2019; 44 (1): 81–85

- **A Pilot Project Using Eye-Tracking Technology to Design a Standardised Anaesthesia Workspace.** *Turkish journal of anaesthesiology and reanimation*
  Hanhan, J., King, R., Harrison, T. K., Kou, A., Howard, S. K., Borg, L. K., Shum, C., Udani, A. D., Mariano, E. R.
  2018; 46 (6): 411-415

- **A Pilot Project Using Eye-Tracking Technology to Design a Standardised Anaesthesia Workspace** *TURKISH JOURNAL OF ANAESTHESIOLOGY AND REANIMATION*
  Hanhan, J., King, R., Harrison, T., Kou, A., Howard, S. K., Borg, L. K., Shum, C., Udani, A. D., Mariano, E. R.
  2018; 46 (6): 411–15

- **Patient education and engagement in postoperative pain management decreases opioid use following knee replacement surgery.** *Patient education and counseling*
  Yajnik, M., Hill, J. N., Hunter, O. O., Howard, S. K., Kim, T. E., Harrison, T. K., Mariano, E. R.
  2018

- **Are Case Volume and Facility Complexity Level Associated With Postoperative Complications After Hip Fracture Surgery in the Veterans Affairs Healthcare System?** *Clinical orthopaedics and related research*
  Wong, J. K., Kim, T. E., Mudumbai, S. C., Memtsoudis, S. G., Giori, N. J., Howard, S. K., Oka, R. K., King, R., Mariano, E. R.
  2018

- **Use of an Emergency Manual During an Intraoperative Cardiac Arrest by an Interprofessional Team: A Positive-Exemplar Case Study of a New Patient Safety Tool** *JOINT COMMISSION JOURNAL ON QUALITY AND PATIENT SAFETY*

Merrell, S., Gaba, D. M., Agarwala, A., Cooper, J. B., Nevedal, A. L., Asch, S. M., Howard, S. K., Goldhaber-Fiebert, S. N.
2018; 44 (8): 477–84

- **Using eye tracking technology to compare the effectiveness of malignant hyperthermia cognitive aid design** *KOREAN JOURNAL OF ANESTHESIOLOGY*
  King, R., Hanhan, J., Harrison, T., Kou, A., Howard, S. K., Borg, L. K., Shum, C., Udani, A. D., Mariano, E. R., ADAPT Anesthesiology-Directed Ad
  2018; 71 (4): 317–22
- **Using eye tracking technology to compare the effectiveness of malignant hyperthermia cognitive aid design.** *Korean journal of anesthesiology*
  King, R. n., Hanhan, J. n., Harrison, T. K., Kou, A. n., Howard, S. K., Borg, L. K., Shum, C. n., Udani, A. D., Mariano, E. R.
  2018
- **Perioperative ACLS/Cognitive Aids in Resuscitation.** *International anesthesiology clinics*
  Wen, L. Y., Howard, S. K.
  2017; 55 (3): 4-18
- **Implementation of clinical practice changes by experienced anesthesiologists after simulation-based ultrasound-guided regional anesthesia training.** *Korean journal of anesthesiology*
  Kim, T. E., Ganaway, T., Harrison, T. K., Howard, S. K., Shum, C., Kuo, A., Mariano, E. R.
  2017; 70 (3): 318-326
- **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
- **Randomized comparison of popliteal-sciatic perineural catheter tip migration and dislocation in a cadaver model using two catheter designs.** *Korean journal of anesthesiology*
  Steffel, L., Howard, S. K., Borg, L., Mariano, E. R., Leng, J. C., Kim, T. E.
  2017; 70 (1): 72-76
- **Staging Evaluation and Response Criteria Harmonization (SEARCH) for Childhood, Adolescent and Young Adult Hodgkin Lymphoma (CAYAHL): Methodology statement.** *Pediatric blood & cancer*
  Flerlage, J. E., Kelly, K. M., Beishuizen, A., Cho, S., De Alarcon, P. A., Dieckmann, U., Drachtman, R. A., Hoppe, B. S., Howard, S. C., Kaste, S. C., Kluge, R., Kurch, L., Landman-Parker, et al
  2017
- **Preliminary Experience Using Eye-Tracking Technology to Differentiate Novice and Expert Image Interpretation for Ultrasound-Guided Regional Anesthesia.** *Journal of ultrasound in medicine : official journal of the American Institute of Ultrasound in Medicine*
  Borg, L. K., Harrison, T. K., Kou, A. n., Mariano, E. R., Udani, A. D., Kim, T. E., Shum, C. n., Howard, S. K.
  2017
- **Comparative Echogenicity of an Epidural Catheter and 2 New Catheters Designed for Ultrasound-Guided Continuous Peripheral Nerve Blocks.** *Journal of ultrasound in medicine : official journal of the American Institute of Ultrasound in Medicine*
  Moy, D. M., Kim, T. E., Harrison, T. K., Leng, J. C., Carvalho, B. n., Howard, S. K., Shum, C. n., Kou, A. n., Mariano, E. R.
  2017
- **Virtual reality distraction decreases routine intravenous sedation and procedure-related pain during preoperative adductor canal catheter insertion: a retrospective study.** *Korean journal of anesthesiology*
  Pandya, P. G., Kim, T. E., Howard, S. K., Stary, E. n., Leng, J. C., Hunter, O. O., Mariano, E. R.
  2017; 70 (4): 439–45
- **The Perioperative Surgical Home model facilitates change implementation in anesthetic technique within a clinical pathway for total knee arthroplasty.** *Healthcare (Amsterdam, Netherlands)*
  Mudumbai, S. C., Walters, T. L., Howard, S. K., Kim, T. E., Lochbaum, G. M., Memtsoudis, S. G., Kain, Z. N., Kou, A., King, R., Mariano, E. R.
  2016; 4 (4): 334-339
- **A comparison of strength for two continuous peripheral nerve block catheter dressings.** *Korean journal of anesthesiology*
  Borg, L., Howard, S. K., Kim, T. E., Steffel, L., Shum, C., Mariano, E. R.
  2016; 69 (5): 506-509

- **Emergency Manual Uses During Actual Critical Events and Changes in Safety Culture From the Perspective of Anesthesia Residents: A Pilot Study.** *Anesthesia and analgesia*
  Goldhaber-Fiebert, S. N., Pollock, J., Howard, S. K., Bereknyei Merrell, S.
  2016; 123 (3): 641-649
- **Availability and Readability of Online Patient Education Materials Regarding Regional Anesthesia Techniques for Perioperative Pain Management.** *Pain medicine*
  Kumar, G., Howard, S. K., Kou, A., Kim, T. E., Butwick, A. J., Mariano, E. R.
  2016
- **An ultrasound-guided fascia iliaca catheter technique does not impair ambulatory ability within a clinical pathway for total hip arthroplasty.** *Korean journal of anesthesiology*
  Mudumbai, S. C., Kim, T. E., Howard, S. K., Giori, N. J., Woolson, S., Ganaway, T., Kou, A., King, R., Mariano, E. R.
  2016; 69 (4): 368-375
- **Feasibility of eye-tracking technology to quantify expertise in ultrasound-guided regional anesthesia** *JOURNAL OF ANESTHESIA*
  Harrison, T. K., Kim, T. E., Kou, A., Shum, C., Mariano, E. R., Howard, S. K.
  2016; 30 (3): 530-533
- **Design and Implementation of a Perioperative Surgical Home at a Veterans Affairs Hospital.** *Seminars in cardiothoracic and vascular anesthesia*
  Walters, T. L., Howard, S. K., Kou, A., Bertaccini, E. J., Harrison, T. K., Kim, T. E., Shafer, A., Brun, C., Funck, N., Siegel, L. C., Stary, E., Mariano, E. R.
  2016; 20 (2): 133-140
- **Comparative-Effectiveness of Simulation-Based Deliberate Practice Versus Self-Guided Practice on Resident Anesthesiologists' Acquisition of Ultrasound-Guided Regional Anesthesia Skills.** *Regional anesthesia and pain medicine*
  Udani, A. D., Harrison, T. K., Mariano, E. R., Derby, R., Kan, J., Ganaway, T., Shum, C., Gaba, D. M., Tanaka, P., Kou, A., Howard, S. K.
  2016; 41 (2): 151-157
- **Can bedside patient-reported numbness predict postoperative ambulation ability for total knee arthroplasty patients with nerve block catheters?** *Korean journal of anesthesiology*
  Mudumbai, S. C., Ganaway, T., Kim, T. E., Howard, S. K., Giori, N. J., Shum, C., Mariano, E. R.
  2016; 69 (1): 32-36
- **Comparative Effectiveness of Two Ultrasound-Guided Regional Block Techniques for Surgical Anesthesia in Open Unilateral Inguinal Hernia Repair** *JOURNAL OF ULTRASOUND IN MEDICINE*
  Steffel, L., Kim, T. E., Howard, S. K., Ly, D. P., Kou, A., King, R., Mariano, E. R.
  2016; 35 (1): 177-182
- **Improving Mastery Learning With Comparative Effectiveness.** *Academic medicine : journal of the Association of American Medical Colleges*
  Udani, A. D., Mariano, E. R., Howard, S. K.
  2016; 91 (6): 752
- **Comparative Effectiveness of Two Ultrasound-Guided Regional Block Techniques for Surgical Anesthesia in Open Unilateral Inguinal Hernia Repair.** *Journal of ultrasound in medicine : official journal of the American Institute of Ultrasound in Medicine*
  Steffel, L., Kim, T. E., Howard, S. K., Ly, D. P., Kou, A., King, R., Mariano, E. R.
  2015
- **Evaluation of a Standardized Program for Training Practicing Anesthesiologists in Ultrasound-Guided Regional Anesthesia Skills.** *Journal of ultrasound in medicine*
  Mariano, E. R., Harrison, T. K., Kim, T. E., Kan, J., Shum, C., Gaba, D. M., Ganaway, T., Kou, A., Udani, A. D., Howard, S. K.
  2015; 34 (10): 1883-1893
- **Simulation as a New Tool to Establish Benchmark Outcome Measures in Obstetrics** *PLOS ONE*
  Kurrek, M. M., Morgan, P., Howard, S., Kranke, P., Calhoun, A., Hui, J., Kiss, A.
  2015; 10 (6)
- **Comparison of catheter tip migration using flexible and stimulating catheters inserted into the adductor canal in a cadaver model.** *Journal of anesthesia*
  Webb, C. A., Kim, T. E., Funck, N., Howard, S. K., Harrison, T. K., Ganaway, T., Keng, H., Mariano, E. R.

2015; 29 (3): 471-474

- **A retrospective comparative provider workload analysis for femoral nerve and adductor canal catheters following knee arthroplasty** *JOURNAL OF ANESTHESIA*
  Rasmussen, M., Kim, E., Kim, T. E., Howard, S. K., Mudumbai, S., Giori, N. J., Woolson, S., Ganaway, T., Mariano, E. R.
  2015; 29 (2): 303-307

- **A pilot study to assess adductor canal catheter tip migration in a cadaver model** *JOURNAL OF ANESTHESIA*
  Leng, J. C., Harrison, T. K., Miller, B., Howard, S. K., Conroy, M., Udani, A., Shum, C., Mariano, E. R.
  2015; 29 (2): 308-312

- **Comparative Effectiveness of Infraclavicular and Supraclavicular Perineural Catheters for Ultrasound-Guided Through-the-Catheter Bolus Anesthesia.** *Journal of ultrasound in medicine*
  Harrison, T. K., Kim, T. E., Howard, S. K., Funck, N., Wagner, M. J., Walters, T. L., Curtin, C., Chang, J., Ganaway, T., Mariano, E. R.
  2015; 34 (2): 333-340

- **Crisis Management in Anesthesiology**
  edited by Gaba, D. M., Fish, K. J., Howard, S. K., Burden, A. R.
  Elsevier.2015

- **Simulation in teaching regional anesthesia: current perspectives.** *Local and regional anesthesia*
  Udani, A. D., Kim, T. E., Howard, S. K., Mariano, E. R.
  2015; 8: 33-43

- **A randomized comparison of long-axis and short-axis imaging for in-plane ultrasound-guided popliteal-sciatic perineural catheter insertion** *JOURNAL OF ANESTHESIA*
  Kim, T. E., Howard, S. K., Funck, N., Harrison, T. K., Walters, T. L., Wagner, M. J., Ganaway, T., Mullens, J., Lehnert, B., Mariano, E. R.
  2014; 28 (6): 854-860

- **Value of expert systems, quick reference guides and other cognitive aids.** *Current opinion in anaesthesiology*
  Wen, L. Y., Howard, S. K.
  2014; 27 (6): 643-8

- **Value of expert systems, quick reference guides and other cognitive aids** *CURRENT OPINION IN ANESTHESIOLOGY*
  Wen, L. Y., Howard, S. K.
  2014; 27 (6): 643-648

- **A Pilot In Vitro Evaluation of the "Air Test" for Perineural Catheter Tip Localization by a Novice Regional Anesthesiologist** *JOURNAL OF ULTRASOUND IN MEDICINE*
  Johns, J., Harrison, T. K., Steffel, L., Howard, S. K., Kim, T. E., Kou, A., Mariano, E. R.
  2014; 33 (12): 2197-2200

- **A randomized comparison of proximal and distal ultrasound-guided adductor canal catheter insertion sites for knee arthroplasty.** *Journal of ultrasound in medicine*
  Mariano, E. R., Kim, T. E., Wagner, M. J., Funck, N., Harrison, T. K., Walters, T., Giori, N., Woolson, S., Ganaway, T., Howard, S. K.
  2014; 33 (9): 1653-1662

- **In response.** *Anesthesia and analgesia*
  Goldhaber-Fiebert, S. N., Howard, S. K.
  2014; 118 (6): 1389-1390

- **Continuous Adductor Canal Blocks Are Superior to Continuous Femoral Nerve Blocks in Promoting Early Ambulation After TKA.** *Clinical orthopaedics and related research*
  Mudumbai, S. C., Kim, T. E., Howard, S. K., Workman, J. J., Giori, N., Woolson, S., Ganaway, T., King, R., Mariano, E. R.
  2014; 472 (5): 1377-1383

- **Implementing emergency manuals: can cognitive AIDS help translate best practices for patient care during acute events?** *Anesthesia and analgesia*
  Goldhaber-Fiebert, S. N., Howard, S. K.
  2013; 117 (5): 1149-1161

- **An In Vitro Study to Evaluate the Utility of the "Air Test" to Infer Perineural Catheter Tip Location** *JOURNAL OF ULTRASOUND IN MEDICINE*
  Kan, J. M., Harrison, T. K., Kim, T. E., Howard, S. K., Kou, A., Mariano, E. R.
  2013; 32 (3): 529-533

- **A Randomized Comparison of Long- and Short-Axis Imaging for In-Plane Ultrasound-Guided Femoral Perineural Catheter Insertion** *JOURNAL OF ULTRASOUND IN MEDICINE*
  Mariano, E. R., Kim, T. E., Funck, N., Walters, T., Wagner, M. J., Harrison, T. K., Giori, N., Woolson, S., Ganaway, T., Howard, S. K.
  2013; 32 (1): 149-156

- **Preliminary Study of Ergonomic Behavior During Simulated Ultrasound-Guided Regional Anesthesia Using a Head-Mounted Display** *JOURNAL OF ULTRASOUND IN MEDICINE*
  Udani, A. D., Harrison, T. K., Howard, S. K., Kim, T. E., Brock-Utne, J. G., Gaba, D. M., Mariano, E. R.
  2012; 31 (8): 1277-1280

- **External Validation of Simulation-Based Assessments With Other Performance Measures of Third-Year Anesthesiology Residents** *SIMULATION IN HEALTHCARE*
  Mudumbai, S. C., Gaba, D. M., Boulet, J. R., Howard, S. K., Davies, M. F.
  2012; 7 (2): 73-80

- **The Study of Factors Affecting Human and Systems Performance in Healthcare Using Simulation** *SIMULATION IN HEALTHCARE*
  LeBlanc, V. R., Manser, T., Weinger, M. B., Musson, D., Kutzin, J., Howard, S. K.
  2011; 6: S24-S29

- **Feasibility of an internet-based global ranking instrument.** *Journal of graduate medical education*
  Mudumbai, S. C., Gaba, D. M., Boulet, J., Howard, S. K., Davies, M. F.
  2011; 3 (1): 67-74

- **Use of Medical Simulation to Explore Equipment Failures and Human-Machine Interactions in Anesthesia Machine Pipeline Supply Crossover** *ANESTHESIA AND ANALGESIA*
  Mudumbai, S. C., Fanning, R., Howard, S. K., Davies, M. F., Gaba, D. M.
  2010; 110 (5): 1292-1296

- **Coordination Patterns Related to High Clinical Performance in a Simulated Anesthetic Crisis** *ANESTHESIA AND ANALGESIA*
  Manser, T., Harrison, T. K., Gaba, D. M., Howard, S. K.
  2009; 108 (5): 1606-1615

- **Improvement in coronary anastomosis with cardiac surgery simulation** *JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY*
  Fann, J. I., Caffarelli, A. D., Georgette, G., Howard, S. K., Gaba, D. M., Youngblood, P., Mitchell, S., Burdon, T. A.
  2008; 136 (6): 1486-1491

- **Trauma training in simulation: Translating skills from SIM time to real time** *66th Annual Meeting of the American-Association-for-the-Surgery-of-Trauma*
  Knudson, M. M., Khaw, L., Bullard, M. K., Dicker, R., Cohen, M. J., Staudenmayer, K., Sadjadi, J., Howard, S., Gaba, D., Krummel, T.
  LIPPINCOTT WILLIAMS & WILKINS.2008: 255–63

- **Adaptive coordination in cardiac anaesthesia: a study of situational changes in coordination patterns using a new observation system** *ERGONOMICS*
  Manser, T., Howard, S. K., Gaba, D. M.
  2008; 51 (8): 1153-1178

- **Using the rapid response system to provide better oversight of patient care processes.** *Joint Commission journal on quality and patient safety / Joint Commission Resources*
  Moore, M. S., Howard, S. K., Lighthall, G.
  2007; 33 (11): 695-?

- **Cognitive aids in a simulated anesthetic crisis - Response** *ANESTHESIA AND ANALGESIA*
  Harrison, T. K., Manser, T., Howard, S. K., Gaba, D. M.
  2007; 104 (5): 1293-1293

- **Improving alertness and performance in emergency department physicians and nurses: The use of planned naps** *ANNALS OF EMERGENCY MEDICINE*
  Smith-Coggins, R., Howard, S. K., Mac, D. T., Wang, C., Kwan, S., Rosekind, M. R., Sowb, Y., Ballise, R., Levis, J., Gaba, D. M.
  2006; 48 (5): 596-604

- **Use of cognitive aids in a simulated anesthetic crisis** *ANESTHESIA AND ANALGESIA*
  Harrison, T. K., Manser, T., Howard, S. K., Gaba, D. M.
  2006; 103 (3): 551-556

- **Re: The impact of sleep deprivation on product quality and procedure effectiveness in a laparoscopic physical simulator.** *American journal of surgery*
  Nevarez, M. D., Howard, S. K.
  2006; 192 (1): 139-?

- **Clinicians' recognition of the Ohmeda Modulus II plus and Ohmeda Excel 210 SE anesthesia machine system mode and function.** *Simulation in healthcare*
  Sowb, Y. A., Howard, S. K., Raemer, D. B., Feinstein, D., Fish, K. J., Gaba, D. M.
  2006; 1 (1): 26-31

- **So many roads: facilitated debriefing in healthcare.** *Simulation in healthcare*
  Dismukes, R. K., Gaba, D. M., Howard, S. K.
  2006; 1 (1): 23-25

- **Clinicians' recognition of the Ohmeda Modulus II Plus and Ohmeda Excel 210 SE anesthesia machine system mode and function** *Simulation in Healthcare*
  Sowb, Y., Howard SK, Raemer DB, Feinstein D, Fish KJ, Gaba DM
  2006; 1 (1): 26-31

- **So many roads: Faciltiated debriefing in healthcare** *Simulation in Healthcare*
  Dismukes, R., Gaba DM, Howard SK
  2006; 1 (1): 23-25

- **Sleep deprivation and physician performance: why should I care?** *Proceedings (Baylor University. Medical Center)*
  Howard, S. K.
  2005; 18 (2): 108-112

- **Sleep propensity and performance: Evaluating a brief protocol in health care providers** *19th Annual Meeting of the Associated-Professional-Sleep-Societies*
  Howard, S. K., Smith-Coggins, R., Nevarez, M., Sohoni, A., Gaba, D., Rosekind, M.
  AMER ACAD SLEEP MEDICINE.2005: A133–A133

- **Measuring sleep onset: Comparing the standard versus an experimental montage** *19th Annual Meeting of the Associated-Professional-Sleep-Societies*
  Howard, S. K., Smith-Coggins, R., Nevarez, M., Sohoni, A., Gaba, D., Rosekind, M.
  AMER ACAD SLEEP MEDICINE.2005: A324–A325

- **Preparing physicians for the real world - Dr. Howard responds** *CANADIAN MEDICAL ASSOCIATION JOURNAL*
  Howard, S. K.
  2004; 171 (7): 709-710

- **Validation of simulation-based training in neonatal resuscitation: Use of heart rate variability as marker for mental workload** *Annual Meeting of the Pediatric-Academic-Societies*
  Murphy, A. A., Kaegi, D. M., Gobble, R., Dubin, A., Howard, S. K., Gaba, D. M., Sowb, Y. A., Halamek, L. P.
  NATURE PUBLISHING GROUP.2004: 353A–353A

- **Trainee fatigue: Are new limits on work hours enough?** *CANADIAN MEDICAL ASSOCIATION JOURNAL*
  Howard, S. K., Gaba, D. M.
  2004; 170 (6): 975-976

- **Use of a fully simulated intensive care unit environment for critical event management training for internal medicine residents** *CRITICAL CARE MEDICINE*

Lighthall, G. K., Barr, J., Howard, S. K., Gellar, E., Sowb, Y., Bertacini, E., Gaba, D.
2003; 31 (10): 2437-2443

- **Simulation study of rested versus sleep-deprived anesthesiologists** *ANESTHESIOLOGY*
  Howard, S. K., Gaba, D. M., Smith, B. E., Weinger, M. B., Herndon, C., Keshavacharya, S., Rosekind, M. R.
  2003; 98 (6): 1345-1355
- **Emergency medicine crisis resource management (EMCRM): Pilot study of a simulation-based crisis management course for emergency medicine** *ACADEMIC EMERGENCY MEDICINE*
  Reznek, M., Smith-Coggins, R., Howard, S., Kiran, K., Harter, P., Sowb, Y., Gaba, D., Krummel, T.
  2003; 10 (4): 386-389
- **The culture of safety: results of an organization-wide survey in 15 California hospitals** *QUALITY & SAFETY IN HEALTH CARE*
  Singer, S. J., Gaba, D. M., Geppert, J. J., Sinaiko, A. D., Howard, S. K., Park, K. C.
  2003; 12 (2): 112-118
- **Fatigue in anesthesia - Implications and strategies for patient and provider safety** *ANESTHESIOLOGY*
  Howard, S. K., Rosekind, M. R., Katz, J. D., Berry, A. J.
  2002; 97 (5): 1281-1294
- **Patient safety: Fatigue among clinicians and the safety of patients** *NEW ENGLAND JOURNAL OF MEDICINE*
  Gaba, D. M., Howard, S. K.
  2002; 347 (16): 1249-1255
- **The risks and implications of excessive daytime sleepiness in resident physicians** *ACADEMIC MEDICINE*
  Howard, S. K., Gaba, D. M., Rosekind, M. R., Zarcone, V. P.
  2002; 77 (10): 1019-1025
- **Do naps during the night shift improve performance in the emergency department?**
  Smith-Coggins, R., Howard, S., KWAN, S., Wang, C., Rosekind, M., Sowb, Y., Balise, R., Gaba, D.
  AMER ACAD SLEEP MEDICINE.2002: A116–A117
- **Use of a high fidelity patient simulator to teach crisis resource management to internal medicine residents rotating through the ICU: A formative evaluation case study.**
  Fischer, M., Howard, S., Geller, A.
  SPRINGER.2002: 224–224
- **Time for a new paradigm in pediatric medical education: Teaching neonatal resuscitation in a simulated delivery room environment** *PEDIATRICS*
  Halamek, L. P., Kaegi, D. M., Gaba, D. M., Sowb, Y. A., Smith, B. C., Smith, B. E., Howard, S. K.
  2000; 106 (4)
- **Simulators in anesthesiology education** *ANESTHESIA AND ANALGESIA*
  Gaba, D. M., Howard, S., Smith, B., Weinger, M. B.
  1999; 89 (3): 805-806
- **Effect of mental stress on heart rate variability: Validation of simulated operating and delivery room training modules**
  Kaegi, D. M., Halamek, L. P., Van Hare, G. F., Howard, S. K., Dubin, A. M.
  NATURE PUBLISHING GROUP.1999: 77A–77A
- **Factors influencing vigilance and performance of anesthetists.** *Current opinion in anaesthesiology*
  Howard, S. K., Gaba, D. M.
  1998; 11 (6): 651-657
- **Behavioral evidence of fatigue during a simulator experiment**
  Howard, S. K., Keshavacharya, S., Smith, B. E., Rosekind, M. R., Weinger, M., Gaba, D. M.
  LIPPINCOTT WILLIAMS & WILKINS.1998: U975–U975
- **Assessing the fidelity of the simulated delivery room for neonatal resuscitation.**
  Kaegi, D. M., Halamek, L. P., Howard, S. K., Smith, B. E., Gaba, D. M., Sowb, Y. A.
  AMER ACAD PEDIATRICS.1998: 767–68

- **Use of task analysis to evaluate the effects of fatigue on performance during simulated anesthesia cases.**
  Herndon, C. N., Weinger, M. B., Smith, B. E., Howard, S. K., Rosekind, M. R., Gaba, D. M.
  LIPPINCOTT WILLIAMS & WILKINS.1998: U947–U947
- **Heart rate variability as a marker for workload during neonatal resuscitation**
  Kaegi, D. M., Halamek, L. P., Dubin, A., Howard, S.
  AMER ACAD PEDIATRICS.1998: 766–67
- **Assessment of clinical performance during simulated crises using both technical and behavioral ratings** *American-Society-of-Anesthesiologists Annual Meeting*
  Gaba, D. M., Howard, S. K., Flanagan, B., Smith, B. E., Fish, K. J., Botney, R.
  LIPPINCOTT WILLIAMS & WILKINS.1998: 8–18
- **Attitudes toward production pressure and patient safety: A survey of anesthesia residents** *JOURNAL OF CLINICAL MONITORING AND COMPUTING*
  Healzer, J. M., Howard, S. K., Gaba, D. M.
  1998; 14 (2): 145-146
- **The simulated delivery room as a laboratory for the study of human performance.**
  Halamek, L. P., Howard, S. K., Kaegi, D. M., Smith, B. E., Smith, B. C., Gaba, D. M.
  LIPPINCOTT WILLIAMS & WILKINS.1998: 167A–167A
- **Simulated anaesthetic emergencies** *BRITISH JOURNAL OF ANAESTHESIA*
  Gaba, D. M., Howard, S. K.
  1997; 79 (5): 689-690
- **Development of a simulated delivery room for the study of human performance during neonatal resuscitation**
  Halamek, L. P., Howard, S. K., Smith, B. E., Smith, B. C., Gaba, D. M.
  AMER ACAD PEDIATRICS.1997: 513–14
- **Sleep and work schedules of anesthesia residents: A national survey**
  Howard, S. K., Healzer, J. M., Gaba, D. M.
  LIPPINCOTT WILLIAMS & WILKINS.1997: A932–A932
- **Performance of well-rested vs. highly-fatigued residents: A simulator study**
  Howard, S. K., Smith, B. E., Gaba, D. M., Rosekind, M. R.
  LIPPINCOTT WILLIAMS & WILKINS.1997: A981–A981
- **Anesthetic considerations for port-access cardiac surgery**
  Siegel, L. C., Peters, W. S., STGOAR, F. G., Stevens, J. H., Pompili, M. F., Howard, S. K., Burdon, T. A., Ribakove, G. H., Mitchell, R. S.
  LIPPINCOTT WILLIAMS & WILKINS.1996: SCA79–SCA79
- **EVALUATION OF DAYTIME SLEEPINESS IN RESIDENT ANESTHESIOLOGISTS**
  Howard, S. K., Gaba, D. M., Rosekind, M. R.
  LIPPINCOTT WILLIAMS & WILKINS.1995: A1007–A1007
- **SUBJECTIVE ASSESSMENT OF SLEEPINESS AND SLEEP ONSET PERCEPTION OF RESIDENT ANESTHESIOLOGISTS**
  Howard, S. K., GABE, D. M., Rosekind, M. R.
  LIPPINCOTT WILLIAMS & WILKINS.1995: A1009–A1009
- **SITUATION AWARENESS IN ANESTHESIOLOGY** *HUMAN FACTORS*
  Gaba, D. M., Howard, S. K.
  1995; 37 (1): 20-31
- **INTERRATER RELIABILITY OF PERFORMANCE ASSESSMENT TOOLS FOR THE MANAGEMENT OF SIMULATED ANESTHETIC CRISES**
  Gaba, D. M., Botney, R., Howard, S. K., Fish, K. J., Flanagan, B.
  LIPPINCOTT WILLIAMS & WILKINS.1994: A1277–A1277
- **PRODUCTION PRESSURE IN THE WORK-ENVIRONMENT - CALIFORNIA ANESTHESIOLOGISTS ATTITUDES AND EXPERIENCES** *ANESTHESIOLOGY*

Gaba, D. M., Howard, S. K., Jump, B.
1994; 81 (2): 488-500

- **A SURVEY OF ANESTHESIOLOGISTS ATTITUDES TOWARDS PRODUCTION PRESSURES**
  Howard, S. K., Gaba, D. M., Jump, B.
  LIPPINCOTT WILLIAMS & WILKINS.1993: A1110–A1110

- **THE ROLE OF FIXATION ERROR IN PREVENTING THE DETECTION AND CORRECTION OF A SIMULATED VOLATILE ANESTHETIC OVERDOSE**
  Botney, R., Gaba, D. M., Howard, S. K., Jump, B.
  LIPPINCOTT WILLIAMS & WILKINS.1993: A1115–A1115

- **ANESTHESIOLOGIST PERFORMANCE DURING A SIMULATED LOSS OF PIPELINE OXYGEN**
  Botney, R., Gaba, D. M., Howard, S. K.
  LIPPINCOTT WILLIAMS & WILKINS.1993: A1118–A1118

- **ANESTHESIA CRISIS RESOURCE-MANAGEMENT TRAINING - TEACHING ANESTHESIOLOGISTS TO HANDLE CRITICAL INCIDENTS** *AVIATION SPACE AND ENVIRONMENTAL MEDICINE*
  Howard, S. K., Gaba, D. M., Fish, K. J., Yang, G., SARNQUIST, F. H.
  1992; 63 (9): 763-770

- **HUMAN ERROR IN ANESTHESIA FEBRUARY 26 MARCH 1, 1991 PACIFIC-GROVE, CALIFORNIA** *ANESTHESIOLOGY*
  Gaba, D., Howard, S. K.
  1991; 75 (3): 553-554

- **Conference on human error in anesthesia (meeting report).** *Anesthesiology*
  Howard S.K., Gaba D.M.
  1991: 553-554