



**Harvard Medical School  
Curriculum Vitae**

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**Place of Birth:** Tenali, Andhra Pradesh, India

**Education**

1976	M.B.B.B.	Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), University of Madras, India
1981	M.D.	JIPMER, University of Madras, India (Anesthesiology)
2007-2008	Certificate	Harvard Business School, Brigham and Women's Physician Leadership Program
2011		Brigham and Women's Leadership Negotiation training

**Postdoctoral Training**

1977 Compulsory rotating Internship, JIPMER, Pondicherry, India  
 1978-1981 Anesthesia resident, JIPMER, India  
 1993-1994 Internship at MetroWest Medical Center, Framingham, MA, USA  
 1994-95, 1996-98 Anesthesia resident, Brigham and Women's Hospital (BWH), Harvard Medical School, Boston, MA  
 1994-95, 1996-98 Clinical Fellow in Anesthesia, Harvard Medical School, Boston, MA  
 1998 Fellow in Obstetric Anesthesia, Brigham and Women's Hospital, Harvard Medical School, Boston, MA (6 months)

### **Faculty Academic Appointments**

1981-1982 Senior Registrar, JIPMER, Pondicherry, India  
 1986-1993 Associate Lecturer, University of West Indies, Barbados  
 09/1998-12/1998 Instructor of Anaesthesia, Harvard Medical School, Boston, MA  
 01/1999-12/2002 Assistant Professor of Anaesthesia, Harvard Medical School, Boston, MA  
 2003-present Associate Professor of Anaesthesia, Harvard Medical School, Boston, MA

### **Appointments at Hospitals/Affiliated Institutions**

1981-1982 Senior Resident in Anesthesiology, JIPMER, Pondicherry, India  
 1982-1983 Anesthesiologist, McKenzie Hospital, Guyana Mining Enterprise, Linden, Guyana, South America  
 1983-1985 Senior Registrar in Anesthesia, Queen Elizabeth Hospital, Barbados, West Indies  
 1985-1993 Attending Anesthesiologist, Queen Elizabeth Hospital, Barbados, West Indies  
 1995-1996 Attending Anesthesiologist, Queen Elizabeth Hospital, Barbados, West Indies  
 1998- Staff Anesthesiologist, Brigham and Women's Hospital, Boston, MA  
 2008-2010 Clinical Director, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA  
 2010-2017 Vice Chairman, Clinical Affairs, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA  
 09/01/2014- Interim Chair, Anesthesiologist-In-Chief, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital  
 06/01/2015 Implementation of CRICO mandated Simulation training programs for anesthesia residents and staff, as well as surgical residents in group training. Stratus Center for medical Simulation. Brigham and women's Hospital.  
 2016-  
 2017- Overseeing the implementation OSCE (Objective Structured Clinical Evaluation) Applied Examination for the residents.

### **Other Professional Positions**

1990 Consultant, Government of St Lucia  
 2007-present External Reviewer for promotions at various universities such as the University of Pittsburg and University of Massachusetts  
 2012 (June) External Examiner, D.M. Anesthesiology Program, June examinations, University of West Indies, Cave Hill Campus, Barbados  
 2012 (December) External Examiner, D.M. Anesthesiology Program, December examinations, University of West Indies, Cave Hill Campus, Barbados  
 2013- present Visiting Professor, Ramachandra Anesthesia Continuing Education (RACE) 2013, Sri Ramachandra University (an affiliate of Harvard International), Porur, Chennai,

2013- present	India Consultant, Department of Surgery, Dana-Farber Cancer Institute
2015 (June)	External Examiner, D.M. Anesthesiology Program, December examinations, University of West Indies, Cave Hill Campus, Barbados
2015 (December)	External Examiner, D.M. Anesthesiology Program, December examinations, University of West Indies, Cave Hill Campus, Barbados

## **Major Administrative Leadership Positions**

### **Local**

1982-1983	Chief of Intensive Care Unit, Linden Hospital, Guyana Mining Enterprise Hospital, Guyana, South America
1989-1993	Senior Consultant, Queen Elizabeth Hospital, Barbados, West Indies
2006-2008	Associate Clinical Director, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA
2008- present	Member of Faculty Board, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA
2008-2010	Clinical Director, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA
2010- 2017	Vice Chairman, Clinical Affairs, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA
2014- 2016	Anesthesiology Lead, Epic implementation, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA
09/01/2014- 06/01/2015	Interim Chair, Anesthesiologist-In-Chief, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital

## **Committee Service**

### **Local**

1982-1983	Intensive Care Committee. Chief person responsible for establishing a four bed Intensive Care Unit at Linden, Guyana Mining Enterprise Hospital, Linden, Guyana
1985-1993	Advisor for recruiting personnel to the Department of Anesthesia from Overseas, Queen Elizabeth Hospital, Barbados, West Indies
1987-1993	Advisor to the Committee responsible for refurbishing operating rooms and establishment of Intensive Care Unit under World Bank loan in Barbados, Queen Elizabeth Hospital, Barbados, West Indies
1988-1993	Intensive Care Nurses Training Committee - Teacher/Examiner, Queen Elizabeth Hospital, Barbados, West Indies
1988-1993	Advisor to the Hospital Equipment Purchase Committee (Anesthesia), Queen Elizabeth Hospital, Barbados, West Indies
2000-2005	Transfusion Committee Member, Brigham and Women's Hospital, Boston, MA
2003-2005	Director, Clinical Competency, Faculty Development, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA
2005-2006	Brigham and Women's Physicians Organization Award Selection Committee, Brigham and Women's Hospital, Boston, MA
2005- present	Member of Staff Recruiting Committee, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA

2008- present	Post Anesthesia Care Unit Reconstruction Planning Committee, Brigham and Women's Hospital, Boston, MA
2008- present	Surgical operating rooms Infection Control Committee, Brigham and Women's Hospital, Boston, MA
2008- present	Clinical Practice Committee, Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA
2008- present	Information Systems Committee, Brigham and Women's Hospital, Boston, MA
2008- present	Post Anesthesia Care Leadership Committee, Brigham and Women's Hospital, Boston, MA
2008- present	First Case on Time Start (FCOT) Committee, Operating Room, Brigham and Women's Hospital, Boston, MA
2008- present	Operating Room Committee, Brigham and Women's Hospital, Boston, MA
2008- present	Operating Room Capacity Committee, Brigham and Women's Hospital, Boston, MA
2008- present	Operating Room Steering Committee, Brigham and Women's Hospital, Boston, MA
2009- present	Hybrid OR Steering Committee, Brigham and Women's Hospital, Boston, MA
2009- present	Operating Room Executive Committee, Brigham and Women's Hospital, Boston, MA
2009- present	PIMS – Electronic Medical Records Implementation Committee, Brigham and Women's Hospital, Boston, MA
2009-2010	Perioperative Governance Committee, Brigham and Women's Hospital, Boston, MA
2010-present	Drug Policy and Executive Committee, Brigham and Women's Hospital, Boston, MA
2013- present	Clinical Lead for Epic Implementation, Brigham and Women's Hospital, Boston, MA
2014	Anesthesia Lead for Epic Implementation, Brigham and Women's Hospital, Boston, MA

### **Professional Societies**

1978-1993	Member, Indian Society of Anaesthetists
1983- present	Member, Barbados Society of Anaesthetists
1985- present	Member, National Association of Critical Care Medicine, India
1987-1994	Member, Association of Anaesthetists of Gr. Britain and Ireland
1994- present	Member, American Society of Anesthesiologists (ASA)
1994- present	Member, International Anesthesia Research Society
1994- present	Member, Massachusetts Society of Anesthesiologists
1998- present	Member, Society of Obstetric Anesthesia and Perinatology (SOAP)
2002-07	Appointed by the President Elect of ASA to the Subcommittee on Equipment, Monitoring and Engineering Technology to oversee the implementation of the goals of the Society
2008-	Appointed by the President Elect of ASA to the Subcommittee on Patient Safety and Practice Management to oversee the implementation of the goals of the Society
2008-10	Chairman of SOAP website task force
2010-	Media Committee, SOAP
2012- present	Life Member, National Association of Obstetric Anesthesiologists, India
2015	Nominated to be the Scientific Advisor for the 8 <sup>th</sup> National Conference of the Association of Obstetric Anesthesiologists and 1 <sup>st</sup> World Obstetric Anesthesiology Congress, India
2016	Nominated to be the Scientific Advisor for the 9 <sup>th</sup> National Conference of the Association of Obstetric Anesthesiologists, Mumbai, India

## **Grant Review Activities**

- 2013 Peer Reviewer for the Research Training Fellowship for Healthcare Professionals 2013, HPF-2013-458, University of Cork
- 2015 NIH Grants: Peer Reviewer for NIH.gov grants on capnography related projects under Surgical Sciences, Biomedical Imaging and Bioengineering, National Institute of Sciences, Bethesda, MD, USA.

## **Editorial Activities**

### **Ad Hoc Reviewer**

- 1996- present Consultant Reviewer, Capnography related articles for Journal of Anesthesia and Analgesia
- 2002 Referee, European Journal of Anaesthesiology
- 2002- present Reviewer, Capnography related articles for Journal of Anesthesiology
- 2002- present Referee, Journal of Postgraduate Medicine
- 2007- present Referee, Journal of Chest
- 2007- present Reviewer, Journal of Surgical Laparoscopy, Endoscopy and Percutaneous Techniques
- 2007- present Reviewer, International Journal of Obstetric Anesthesia
- 2008- present Reviewer, Journal of Clinical Anesthesia
- 2008- present Reviewer, Indian Journal of Medical Sciences
- 2008- present Reviewer, Journal Simulation in Health
- 2008-present Reviewer, Journal of Minerva Anesthesiologica
- 2008 Reviewer, Journal Clinical Anatomy
- 2009 Reviewer, British Medical Journal – Childhood Diseases
- 2011- present Reviewer, Journal of Cardiovascular Surgery
- 2011- present Reviewer, Journal of Cardiovascular Anesthesia
- 2012- present Reviewer, Journal of Critical Care Medicine
- 2013- present Reviewer, Journal of Pediatrics

### **Other Editorial Activities**

- 2001-2002 Guest Editor, Journal of Anesthesia And Analgesia

### **Honors and Prizes**

- 1981 Indian Society of Anaesthetists (Pondicherry Branch) medal for Outstanding Anesthesia Resident.
- 1992 British Journal of Anesthesia International Scholarship for the year 1992
- 1997 Foundation of Anesthesia Education and Research (FAER) scholar 1997
- 2002 Awards in Excellence presented by the Faculty of Brigham and Women's Hospital, Department of Anesthesiology, Perioperative and Pain Medicine for outstanding contribution.
- 2002 Special Award presented by the Postgraduate Assembly in Anesthesiology for exhibit entitled "Education in the new millennium" at the Annual Meeting held in New York, December 6<sup>th</sup> – 10<sup>th</sup>, 2002
- 2004 Teacher of the Year Award, Department of Anesthesiology, Perioperative and Pain, Brigham and Women's Hospital, Boston, MA

- 2004 Clinical Innovation Award, Brigham and Women's Physician Organization (BWPO). This award is presented to the outstanding contributions to the Brigham and Women's clinical community in the area of clinical innovation.
- 2008 Brigham and Women's Hospital and Harvard Business School Leadership Certification
- 2009 Third Prize for "3-D Understanding of thoracic epidural placement", American Society of Anesthesiology (ASA) Scientific Exhibit, New Orleans, LA, USA
- 2010 Mentee (fellow Neeti Sadana, MD) won first prize SOAP Gertie Marx award for my investigation entitled "Traditional versus New Transfusion Protocol for Obstetrics. Which is Better?"
- 2011 Third Prize for "3-D – A novel, simple video model for YouTube", American Society of Anesthesiology (ASA) Scientific Exhibit, Chicago, USA
- 2011 Partners in Excellence Team Award for Face Transplant Team presented by Partners Health Care, Boston, MA
- 2012 Two day workshop in "Change Acceleration Process" conducted by Center of Clinical Excellence, Brigham and Women's Hospital, Boston, MA
- 2012 Awarded Annual Oration Lecture and Citation at the 5<sup>th</sup> National Association of Obstetric Anaesthesiologists, New Delhi, India
- 2013 Partners in Excellence Team Award for the work on the Perioperative Safety Committee presented by Partners Health Care, Boston, MA
- 2014 Vijaylakshmi Kamat Memorial Oration Medal, Ramachandra Anesthesia Continuing Education, Chennai, India
- 2015 Awarded plaque in recognition of service as Department Interim Chairman  
*"We thank you for  
 hearing our concerns and ideas,  
 keeping an open door, mind and heart,  
 offering a reassuring voice of reason,  
 leading during a time of difficulty,  
 communicating with honesty and care,  
 advocating for our better future,  
 inspiring us to embrace change,  
 and keeping a sense of humor.*
- With deepest gratitude and admiration,  
 Department of Anesthesiology, Perioperative and Pain Medicine  
 Brigham and Women's Hospital"*
- 2015 Awards in Excellence, Presented annually by the faculty of Brigham and Women's Hospital's Department of Anesthesiology, Perioperative and Pain, Boston, MA in appreciation for outstanding contributions
- 2016 Indian Society of Anesthesiologists, Nashik, India. The plaque reads "In recognition of your tireless efforts to worthy cause and your willingness to share your experience with the delegates and the participants"
- 2017 Distinguished Clinician Award by Brigham and Women's Hospital, to recognize the most accomplished and most widely recognized practicing physicians on the BWH staff.

## **Report of Funded and Unfunded Projects**

### **Funding Information**

#### **Past**

1998-2000	Do rapidly administered intermittent epidural boluses provide better labor analgesia? Abott Inc. PI
1998-2000	Arterial and end tidal CO <sub>2</sub> difference during laparoscopic surgery in pregnancy Anesthesia Research Foundation Co-PI
1999-2000	Thromboelastography in patients receiving warfarin prophylaxis and epidural analgesia PI: Hepner Role: Co-PI
1999-2001	Thromboelastography in parturients receiving magnesium Haemoscope Inc. PI
1999-2002	In vitro fertilization induced changes in coagulation using thromboelastography Haemoscope Inc. Co-PI
2000-2002	Duration of the supine position after an epidural blood patch. PI: Hepner Role: Co-PI
2002-2004	General anesthesia for cesarean delivery. What is the etiology? PI: Hepner Role: Co-PI
2003	Complementary and alternative medicine use in patients undergoing In-vitro Fertilization procedures. PI: Tsen Role: Co-PI
2003-2005	How does amniotic fluid affect coagulation? Haemoscope Inc. PI
1999-2005	Website - Capnography and Pain free birthing Funded by self PI
2003-2004	Evaluation of a Novel Whole Blood Platelet Function Test in Parturients PI
2004-2005	How do Pregnant Women obtain Information about Pain Relief Methods for Labor and Delivery? A Survey PI
2004-2005	Anesthetic Considerations in Fetal Surgery PI
2004-2006	Arterial to End-tidal Carbon Dioxide Differences during Anesthesia of Thoracoscopic Surgery PI
2005-2006	Correlation between transcutaneous CO <sub>2</sub> monitoring and arterial PaCO <sub>2</sub> Sentec AG PI
2005-2007	Evaluation of novel capnography techniques Cardiopulmonary Technologies, Inc.

2006-2009 PI  
 Low Platelets in Pregnancy. How Low is Good Enough?  
 PI  
 2006-2009 Oxytocin versus calcium for uterine tone enhancement following cesarean delivery  
 PI: Tsen  
 Role: Co-PI  
 2006-2010 Comparison of activated clotting time, thromboelastogram, and Anti-Xa assay in  
 detecting decline of therapeutic concentration of enoxaparin  
 PI  
 2008-2010 Evaluation of non-invasive physiological parameters during aortic cross clamping  
 Respronics Inc.  
 PI  
 2008-2010 Prediction hypotension during spinal anesthesia from preoperative PI and PVI  
 noninvasive pulse oximetry variables  
 Masimo Technology, Inc  
 PI  
 2009-2010 Coagulation Profile of the Blood used for Epidural Blood Patch  
 PI  
 2009-2011 Evaluation of Non-Invasive Physiological Parameters during Aortic Cross Clamping  
 Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and  
 Women's Hospital, Boston, MA  
 PI  
 2010-2011 Traditional versus New Transfusion Protocol for Obstetrics. Which is Better?  
 PI  
 2010-2011 Evaluation of SpHb Monitor for Obstetrics  
 Masimo Technology, Inc  
 PI  
 2011-2012 Evaluation of cardiac output changes following labor epidural and combined spinal  
 epidural anesthesia  
 Interdepartmental and intradepartmental funds, Brigham and Women's Hospital,  
 Boston, MA  
 PI  
 2011-2013 Cardiac output differences in obese and non obese pregnant patients  
 To determine cardiac output changes during labor in obese and non obese pregnant  
 patients as co-investigator  
 Departments of Obstetrics/Gynecology and Anesthesiology, Perioperative and Pain  
 Medicine, Brigham and Women's Hospital, Boston, MA  
 \$7,500  
 PI

**Current**

2012-08/2015 To determine cardiac output monitoring during caesarean delivery under spinal  
 anesthesia will change our clinical practice of using Vasopressors  
 Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and  
 Women's Hospital, Boston, MA  
 \$7,500  
 PI  
 2014-09/2015 Evaluation of non-invasive respiratory monitoring versus capnography in patients



receiving intravenous sedation.

Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA

PI

2014-09/2015

Does maternal fever during labor analgesia has any relationship with maternal ventilation?

Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA

PI

2015-

Music during labor epidural placement and patient satisfaction

Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, MA

PI

### **Report of Local Teaching and Training**

#### **Formal Teaching of Residents, Clinical Fellows and Research Fellows (post-docs):**

1998 - present	Monthly resident and fellow lectures, Obstetrics rotations	Brigham & Women's Hospital
	January	
	Lecture 1: Thromboelastography (TEG)	1 hour
	Lecture 2: Morbidly Obese Parturients	1 hour
	February	
	Lecture 1: Airway in Pregnancy	1 hour
	Lecture 2: Thromboelastography (TEG)	1 hour
	March	
	Lecture 1: Airway in Pregnancy	1 hour
	Lecture 2: Thromboelastography (TEG)	1 hour
	April	
	Lecture 1: Airway in Pregnancy	1 hour
	Lecture 2: Morbidly Obese Parturients	1 hour
	May	
	Lecture 1: Airway Management in Pregnancy	1 hour
	Lecture 2: Thromboelastography (TEG)	1 hour
	June	
	Lecture 1: Airway in Pregnancy	1 hour
	Lecture 2: Thromboelastography (TEG)	1 hour
	July	
	Lecture 1: Airway in Pregnancy	1 hour
	Lecture 2: Thromboelastography (TEG)	1 hour
	August	
	Lecture 1: Airway in Pregnancy	1 hour
	Lecture 2: Morbidly Obese Parturients	1 hour
	September	
	Lecture 1: Airway in Pregnancy	1 hour
	Lecture 2: Morbidly Obese Parturients	1 hour

October	Lecture 1: Airway Management in Pregnancy	1 hour
	Lecture 2: Morbidly Obese Parturients	1 hour
November	Lecture 1: Airway Management in Pregnancy	1 hour
	Lecture 2: Morbidly Obese Parturients	1 hour
December	Lecture 1: Airway Management in Pregnancy	1 hour
	Lecture 2: Thromboelastography (TEG)	1 hour

2010-2014	Preparatory Oral Examinations Outgoing residents and fellows	Massachusetts General Hospital 5 hours
2013, 2014	'Morbidly Obese Parturients' Annual resident lecture	Brigham & Women's Hospital 1 hour

### **Clinical Supervisory and Training Responsibilities**

1999- present	Supervision of Obstetric Anesthesia Fellows in Operating Rooms, Brigham and Women's Hospital, Boston, MA	4 days per week
2004- present	Supervision of HMS Medical Students in Operating Rooms, Brigham and Women's Hospital, Boston, MA	4 days per week
2004- present	Supervision of Residents in Operating Rooms, Brigham and Women's Hospital, Boston, MA	4 days per week
2008- present	Instructor, Advanced Cardiac Life Support (ACLS), Brigham and Women's Hospital, Boston, MA	Minimum of 4 times per year

### **Formal Teaching of Peers (e.g., CME and other continuing education courses)**

2000	Lecture: "How to make your epidurals work", Harvard Medical School (HMS) Regional Anesthesia Update, Royal Sonesta Hotel, Cambridge, Boston, MA
2012, 2013, 2014, 2015	Course Director for annual Harvard Airway Workshop, HMS Harvard Anesthesia update, Fairmont Copley, Course conducted at Stratus Center, Brigham and Women's Hospital, Boston, MA

### **Formally Supervised Trainees**

1984-1986	Mark Crawford MD, Anesthesiologist in Chief, The Hospital for Sick Children, Toronto, Canada. Career Mentor in Barbados.
1987-2014	Yasodananda Kumar MD, Professor Anesthesia, University of West Indies, Barbados Campus Career Mentor: Peer reviewed publications. Currently editing a book on Anesthesia Equipment jointly.
1988-1991	Michael Fakoory MD, Head of the Department, Queen Elizabeth Hospital, Barbados. Career Advisor and Mentor in Barbados.
1999	You N. Wu MD. Lutherville Timonium, MD

- Supervised the effect of Hetastarch on coagulation. Abstract, Anesthesiology SOAP suppl 1999.
- 1999-2005 Miriam Harnett, MD. Consultant, University of Cork, Ireland. Supervisor of clinical training and research studies, resulting in 5 subsequent peer reviewed publications.
- 1999-2001 Murat Kaynar MD, Associate Professor, University of Pittsburgh, PA  
Mentor: Projects published as peer review papers.
- 2000-2001 Oladiran Amosu MD, Fayetteville, GA  
Supervised a project: Cerebral oxygenation during cesarean delivery. Anesthesiology Suppl 2000.
- 1999-2000 Paul Nelson, MD, Anesthesiologist, Austin, Texas  
Supervisor: Can epidural saline promote recovery from spinal anesthesia. Anesthesiology Suppl 2000.
- 2000-2001 Rachel Ferrhagar MD, Consultant Anesthesiologist, Galway University Hospital, Galway, Ireland.  
Clinical supervisor for Fellowship and mentor for a chapter in Churchill Davidson's Text Book of Anesthesia.
- 2000 Malov Stanislov, MD, Pain Attending, Towson, MD  
Supervisor for study: Do rapidly administered intermittent epidural boluses provide better labor analgesia? Anesthesiology Suppl 2000.
- 2001 Chandrasekhar S. Assistant Professor, Baylor College of Medicine. Houston, Texas  
Mentor for the study: Airway changes in labor using acoustic technology. Peer reviewed and published in Anesthesiology.
- 2002 David Hepner MD. Associate Professor, Harvard Medical School  
Study advisor: Effect of supine position duration on the headache relief following epidural blood patch. Anesthesiology 2002 Suppl.
- 2003 Vladislav Frenk MD, Private Practice, Stamford, CT  
Mentor: Regional anesthesia in parturients with low platelet counts. Anesthesiology 2003 Suppl.
- 2003 Panni SK MD. Professor of Anesthesia. University of Mississippi Hospital.  
Mentor: Peer reviewed publication.
- 2003 Maddipati Sreelata MD. Staff anesthesiologist, Kaiser Permanente Hospital, California  
Mentor for fellowship and supervised Where do our patients obtain information about labor pain relief? Anesthesiology 2003 Suppl.
- 2004 Edgar Celis, MD. Private Practitioner. Massachusetts. Clinical supervisor during fellowship and mentor to develop Spanish version of Painfreebirthing.com website.
- 2004-2007 Nollag O'Rourke FFARCSI. Staff Anesthesiologist, Cork, Ireland  
Supervisor and mentor: Quantitative and qualitative relationship of platelets in pregnancy.

- Anesthesiology 2004 Suppl.
- 2004 David Hepner MD. Associate Professor, Harvard Medical School  
Supervised a study on Indications of general anesthesia for cesarean delivery.  
Anesthesiology 2004 Suppl.
- 2004 Venkatesh Srinivasa MD. Vice Chairman, Veterans Administration Hospital, Roxbury, MA  
Supervisor and mentor for thoracic fellowship. Mentor: Arterial to end-tidal carbon dioxide difference during thoracoscopic surgery. Anesthesiology 2004 Suppl.
- 2006 Virginia Sylva RN. Nursing Coordinator of Fetal Surgery, Brigham and Women's Hospital.  
Mentor: Anesthetic, obstetric, and neonatal issues of in-utero fetal surgery.  
Anesthesiology 2006 Suppl. Published as peer reviewed article in Journal of Perinatology.
- 2007-2014 Jasmeet Oberoi MD, Cherry Hill, NJ  
Mentor: Uptodate article on 'Postoperative pain following gynecological surgery'.
- 2008 Michaela Farber, MD. Instructor in Anesthesia, Harvard Medical School, Brigham and Women's Hospital.  
Advisor for clinical studies with 1 peer reviewed publications (American Journal of Obstetrics and Gynecology). During her fellowship, my mentored project won the Gertie Marx Best Paper Award at the Annual Meeting of the Society of Obstetric Anesthesia and Perinatology.
- 2009 Karen Mitchell MD. Anesthesiologist, Washington DC  
Mentor: Use of PVI in the prediction of hypotension following spinal anesthesia. SOAP presentation.
- 2009 Miha Podovei, MD. Instructor in Anesthesia, Harvard Medical School, Brigham and Women's Hospital.  
Advisor for clinical studies. Published two chapters.
- 2010 Neeti Sadana MD. Anesthesiologist, Parkland Memorial Hospital, Dallas, Texas  
Mentor: Traditional versus new transfusion protocol for obstetric hemorrhage. Which is better. Won Gertie Marx Award for the best paper.
- 2010 Samuel Galvagno MD. Assistant Professor, John Hopkins, Baltimore, MD  
Mentor: Chapter: Capnography in Intensive care units.
- 2011 Lorraine Chow MD. Staff Anesthesiologist, University of Calgary, Canada  
Mentor: Comparison of disposable and nondisposable sensors for measuring hemoglobin noninvasively. SOAP 2011.
- 2012 Stephanie Yacoubian MD. Instructor, Harvard Medical School, Brigham and Women's Hospital.  
Mentor: Cardiac output changes in following epidural and combined spinal epidural analgesia for labor and delivery. SOAP 2012.

- 2013 Hans Sviggum, MD. Assistant Professor, Mayo School of Medicine. Clinical supervisor during fellowship. Mentor during his fellowship and advisor to publication in the Journal of Perinatology.
- 2013 Anthony Chau, MD. Fellow, Harvard Medical School, Brigham and Women's Hospital. Clinical supervisor during fellowship. Mentor and advisor to research projects. The study results presented at Annual meeting of Society of Obstetric Anesthesia and Perinatology. Advisor to the manuscript preparation under way.
- 2013 Dinesh Jagannathan MD, Private Practice, Chennai, India. Staff Anesthesiologist, UMASS Medical Center, MA  
Mentor: Chapters and peer reviewed publication
- 2013 Sagarika Ponnuru MD, Dallas, Texas  
Mentor: Chapter on Capnography for Intensive Care Nursing text book
- 2014 Joshua Vacanti MD, Instructor Harvard Medical School, Brigham and Women's Hospital, Boston, MA  
Mentor: Operating room Efficiency and processes. Peer reviewed publication
- 2014-15 Lynn Choi, MD, Clinical Fellow, Brigham and Women's Hospital, Boston, MA  
Mentor: Is maternal temperature rise during labor analgesia a physiological process due to decreased pulmonary ventilation? Abstract accepted for Gertie Marx Research Competition, SOAP, May13-17, 2015, Colorado Springs, Colorado
- 2015 Dan drzymalalski, Clinical Fellow, Brigham and Women's Hospital, Boston, MA  
Mentor: Effect of music on labor and delivery. Abstract accepted for oral presentation, SOAP, May20-22, 2015, Boston, Massachusetts.
- 2015-16 Sujathaha Pentakota MD: Junior staff. Department of Anesthesiology, Brigham and Women's Hospital. Boston, MA.  
Mentor: Evaluation of Respiratory Monitoring Device, a novel device to measure minute ventilation.
- 2015-16 Angela Nichols, MD. Junior staff. Department of Anesthesiology, Brigham and Women's Hospital. Boston, MA.  
Mentor: Evaluation of Respiratory Monitoring Device, a novel device to measure minute ventilation.
- 2016- Alexander Blair, 4<sup>th</sup> year medical student. Analysis of Discarded Breath Samples using an NFC-modified Device.  
Mentor: Testing the device in clinical practice

### **Local Invited Presentations**

**No presentation was sponsored by outside entities**

- 1986 "Arterial to end-tidal CO<sub>2</sub> difference during general anaesthesia for tubal ligation",

First Caribbean Anesthetists Conference, Barbados

- 1986 “Halothane and topical cocaine/epinephrine: Is it safe in nasal surgery?”, First Caribbean Anesthetists Conference, Barbados
- 1986 “Compensation for stress in marathon runners”, First Caribbean Anesthetists Conference, Barbados
- 1986 “Can compressed air/oxygen replace N<sub>2</sub>O/oxygen in general anaesthesia?”, First Caribbean Anesthetists Conference, Barbados
- 1987 “Low dose ketamine for dilatation and curettage”, Second Caribbean Anesthetists Conference, Barbados
- 1987 “A review of arterial to end-tidal carbon dioxide tension difference during pregnancy”, Second Caribbean Anesthetists Conference, Barbados
- 1987 “Multicenter drug trial of ‘Diprivan’, a new intravenous induction agent by ICI Limited, UK”, Second Caribbean Anesthetists Conference, Barbados
- 1987 Lecture: “Capnography”, Department of Anesthesia, JIPMER, Pondicherry, India
- 1987 “Assessment of Bain circuit in obese patients”, Second Caribbean Anesthetists Conference, Barbados
- 1987 “Carotid sinus hypersensitivity. A case report.”, Second Caribbean Anesthetists Conference, Barbados
- 1988 Anesthesia Budget. Expenditure involved in staffing anesthesia department at Queen Elizabeth Hospital, Barbados. Third Caribbean Anesthetists Conference, Barbados
- 1988 “Changes in serum potassium following Diprivan and succinylcholine” Third Caribbean Anesthetists Conference, Barbados
- 1992 “The computerized auditing of disposable anaesthetic equipment and anaesthetic drugs”, Deuxieme Journees Internationales d'anesthesie-reanimation. Conference held in Martinique
- 1993 “Monitoring a ventilated patient”. Fourth Barbados Society of Anaesthetists Conference, Barbados
- 1993 “Cost evaluation for use of Isoflurane in low flow circuit with air and oxygen”, Fourth Barbados Society of Anaesthetists Conference, Barbados
- 1993 “Total intravenous anaesthesia for day care surgery using propofol and diclofenac”, Fourth Barbados Society of Anaesthetists Conference, Barbados
- 1993 “Fibreoptic bronchoscopy in management of difficult airway”, Fourth Barbados Society of Anaesthetists Conference
- 1996 Grand Rounds: “Capnography in Clinical Practice”

- Brigham and Women's Hospital, Boston, MA
- 1997 Grand Rounds: "Capnography"  
Brigham and Women's Hospital, Boston, MA
- 1998 Clinical Conference on "Spinal after for failed epidural analgesia in Obstetrics"  
Brigham and Women's Hospital, Boston, MA
- 1998 Grand Rounds: "Airway in pregnancy is as important to Obstetricians as to Anesthesiologists"  
Brigham and Women's Hospital, Boston, MA
- 02/1998-07/1998 12 sessions of high risk weekly Obstetric Anesthesia rounds  
Brigham and Women's Hospital, Boston, MA
- 1998 Grand Rounds: "Capnography in clinical practice"  
Brigham and Women's Hospital, Boston, MA
- 1998- present 15 sessions per year of clinical conferences/problem based learning sessions and lectures to Obstetric Anesthesia residents and fellows at afternoon conferences  
Brigham and Women's Hospital, Boston, MA
- 1999 Grand Rounds: "Coagulation issues in Obstetrics"  
Brigham and Women's Hospital, Boston, MA
- 1999 Grand Rounds: "Capnography"  
Brigham and Women's Hospital, Boston, MA
- 2000 Grand Rounds: "Capnography"  
Brigham and Women's Hospital, Boston, MA
- 2001 Grand Rounds: "Understanding Capnography via web"  
Beth Israel Deaconess Medical Center, Boston, MA
- 2001 Grand Rounds: "Learning Capnography via web"  
Brigham and Women's Hospital, Boston, MA
- 2002 Grand Rounds: "Capnography: What one should know" Massachusetts General Hospital, Boston, MA
- 2002 Clinical Conference: "Anesthesia outside operating room"  
Brigham and Women's Hospital, Boston, MA
- 2002 Clinical Conference: "Air in the epidural space"  
Brigham and Women's Hospital, Boston, MA
- 2002 Grand Rounds: "Capnography: What one should know"  
Brigham and Women's Hospital, Boston, MA
- 2003 Clinical conference on Anesthesia in the MRI suite for peritracheal mass ablation

- Brigham and Women's Hospital, Boston, MA
- 2003 Grand Rounds: "Physiology of Capnography"  
Brigham and Women's Hospital, Boston, MA
- 2004 Grand Rounds: "A whip of nitrogen or grain of salt"  
Brigham and Women's Hospital, Boston, MA
- 2006 Grand Rounds: "Laparoscopic surgery in pregnancy"  
Brigham and Women's Hospital, Boston, MA
- 2007 Grand Rounds: "Introduction to Capnography"  
Brigham and Women's Hospital, Boston, MA
- 2008 Grand Rounds: "Essentials of monitoring during sedation" for the Nurses of  
Endoscopy, Brigham and Women's Hospital, Boston, MA
- 2008 Grand Rounds: "Introduction of Capnography to Respiratory Therapists"  
Brigham and Women's Hospital, Boston, MA
- 2008 Grand Rounds: "Tip of Iceberg. Critical Obstetric Nursing"  
Critical Care Nursing, Brigham and Women's Hospital, Boston, MA
- 2009 Grand Rounds: "Effect of carbon dioxide pneumoperitoneum on the baby"  
Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and  
Women's Hospital, Boston, MA
- 2009 Grand Rounds: "Physiology of Laparoscopy – Should we be using vasopressin?"  
Center of Infertility and Reproductive Surgery  
Brigham and Women's Hospital, Boston, MA
- 2012 Grand Rounds: "Capnography in Clinical Practice"  
Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and  
Women's Hospital, Boston, MA
- 2013 Grand Rounds: "Capnography outside the operating rooms"  
Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and  
Women's Hospital, Boston, MA
- 2013 Grand Rounds: "Laparoscopic surgery in pregnancy"  
Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and  
Women's Hospital, Boston, MA
- 2015 Grand Rounds: "What are the Physiology and Anesthetic/Obstetric Implications of  
Morbidly Obese Pregnant Patients?"  
Department of Anesthesiology, Newton-Wellesley Hospital, Newton, MA
- 2016 Grand Rounds: "Capnography – Where is it after three decades? It is everywhere"  
Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and  
Women's Hospital, Boston, MA



## **Report of Regional, National and International Invited Teaching and Presentations**

### **Invited Presentations and Courses**

#### **Regional**

##### **No presentation was sponsored by outside entities**

- 2010                    “Application of Capnography in organ harvesting and transplant”, New England Organ Bank, Newton, MA
- 2011                    Grand Rounds: “Operating Room Efficiency Matrix”  
Department of Anesthesiology, University of Massachusetts Medical School, Worcester, MA.
- 2015                    Grand Rounds: “Optimal Maternal and Neonatal Outcome: How to Achieve our Common Goal”  
“How to Optimize your Labor Analgesia”  
Departments of Obstetrics and Gynecology, and Anesthesiology, University of Massachusetts Medical School, Worcester, MA.
- 2016                    “Capnography for Emergency Medical Services (EMS)”  
Boston EMS Paramedic Refresher, Boston, MA
- 2016                    “Thromboelastography Guided Resuscitation:  
Trauma, Emergency Surgery, & Surgical Care, Massachusetts General Hospital, Boston, MA
- 2016                    Capnography – Exploiting the Benefits inside and outside the operating rooms, Veterans Administration Hospital, Roxbury, MA

#### **National**

##### **No presentation was sponsored by outside entities**

- 1998                    Lecture: “Capnography in Clinical Practice”, University of Medical and Dental School, New Jersey
- 2000                    Lecture: “Capnography. What one should know”, University of Texas Medical Branch, Galveston, Texas
- 2001                    Lecture: “Capnography in Clinical Practice”, University of Medical and Dental School, New Jersey

- 2001 “General anesthesia for cesarean delivery. The status of current resident training and experience”, SOAP, San Diego, California
- 2002 Demonstration of the patient educational website on [www.painfreebirthing.com](http://www.painfreebirthing.com)  
34<sup>th</sup> Annual meeting of Society of Anesthesiologists and Perinatology Conference, Hilton Head, South Carolina
- 2002 “How do we educate our patients about Obstetric Anesthesia?” (Animated Website: - [www.painfreebirthing.com](http://www.painfreebirthing.com) ). (SOAP), Hilton Head, South Carolina
- 2002 [www.painfreebirthing.com](http://www.painfreebirthing.com) Scientific Exhibit. American Society of Anesthesiologists Annual Meeting, Orlando, Florida.
- 2002 [www.capography.com](http://www.capography.com) and [painfreebirthing.com](http://painfreebirthing.com): Innovative teaching methods. Scientific Exhibit. The New York State Society of Anesthesiologists Postgraduate Assembly, New York
- 2003 Moderator, Subcommittee on Equipment, Monitoring and Engineering Technology, ASA Annual Meeting, Atlanta, GA
- 2003 Three case discussions on Obstetric Anesthesia practice, ASA Panel case discussion, San Francisco, CA
- 2003 Duke University Anesthesiology Department, NC  
Grand rounds lectures:  
“Capnography”  
“Anesthesia for laparoscopic surgery in pregnancy”
- 2003 Texas Anesthesia Society Conference, Texas  
Lectures:  
“Predicting Difficult Airway in Obstetrical Patient”  
“The Role of Capnography in the Recognition and Management of Esophageal Intubation”  
“Educating Parturients About Their Anesthetic Options”
- 2004 “Capnography and its applications”, Street Level Airway Conference, Fortworth, Texas
- 2004 “Obstetric Anesthesia education – From labor rooms to the United Nations and World”, (SOAP), Ft Myers, Florida
- 2004 Moderator, Subcommittee on Equipment, Monitoring and Engineering Technology, 99<sup>th</sup> ASA Annual Meeting, San Francisco, CA
- 2005 “Capnography (CO<sub>2</sub> monitoring) is no longer the domain of anesthesiologists” CME meeting of JIPMER Alumni Association of North America, Sponsored by CME Department of Victory Memorial Hospital, New York
- 2005 Invited Professor, Pain Management and Sedation. The Cardinal Health Center for Medication Safety and Clinical Improvement. San Diego, California
- 2005 Moderator, Subcommittee on Equipment, Monitoring and Engineering Technology, ASA Annual Meeting, Philadelphia, PA

- 2007 Moderator, Subcommittee on Equipment, Monitoring and Engineering Technology, 102<sup>nd</sup> ASA Annual Meeting, New York, NY
- 2009 Moderator for “Practice Safety and Management”, ASA 2009, New Orleans, Louisiana  
2009 3-D Understanding of thoracic epidural placement”, Scientific Exhibit .American Society of Anesthesiology (ASA) Scientific Exhibit, New Orleans, LA
- 2010 “How to obtain maximum benefit from Capnography in clinical practice”, Department of Anesthesiology, University of Florida College of Medicine, Jacksonville, FL  
2010 Breakfast with Experts, Society of Obstetric Anesthesiology and Perinatology San Antonio, Texas
- 2010 Moderator for “Practice Safety and Management”, ASA 2010, Atlanta, GA
- 2011 “What is new in our understanding of obstetric airway that could change our general anesthetic practice?”, Cincinnati Anesthesiology Society Meeting, Cincinnati, OH
- 2011 “Capnography – How to get best use of it”, Anesthesiology and Intensive Care, University of Cincinnati, OH
- 2011 Moderator for “Practice Safety and Management”, ASA, Chicago, IL
- 2011 A novel, simple video model for YouTube”, American Society of Anesthesiology (ASA) Scientific Exhibit, Chicago, IL
- 2011 “You did what?”, Best Case Reports of the Meeting SOAP, 43<sup>rd</sup> Annual Meeting, Las Vega, NV
- 2012 Moderator for “Practice Safety and Management”, ASA 2012, Washington, DC
- 2012 Capnography during sedation – Covidian Lecture ASA 2012, Washington, DC
- 2012 Best Case Reports. session on discussing important case reports, SOAP, Monterey, CA
- 2013 “Special Considerations for Anesthesiologists”, Global Health on OB/GYN course, Harvard Medical School, Boston, MA
- 2013 Moderator for “Practice Safety and Management Poster Session”  
Moderator for Oral Presentation – “Practice Safety and Management”, ASA 2013, San Francisco, CA
- 2014 “Capnography: Where are we in 2014?”  
“Pregnancy Related Airway Changes: What did we learn to influence our practice?” , Grand Rounds, Visiting professor lectures, Medical University of South Carolina, Charleston, South Carolina
- 2014 “Advisor Live: Safe opioid use - Strategies for reducing adverse events and related harm”, Advisor Live meeting, Premier Inc.

- 2014 “Capnography – Exploiting the Benefits”, Grand Rounds  
 “Clinical Applications of Capnography – Waveform Analysis”, Resident Lecture Discussion, Cleveland Clinic, Cleveland, OH
- 2014 “Respiratory Monitoring in Anesthesia and Critical Care”, Second Annual Perioperative & Critical Care Monitoring and Therapy Conference and Workshops, Pittsburgh, PA
- 2014 Scientific Exhibition ASA 2014  
 “Safety of epidural catheter insertion: inability to thread epidural catheters a, provocative hypothesis”  
 Moderator for the scientific abstracts  
 Moderator for Oral Presentation – “Practice Safety and Management”, ASA 2014 Annual Meeting, New Orleans, LA.
- 2016 ‘Capnography – How do we get maximum information about patient’  
 “Obstetric Airway – What did we learn?”  
 Department of Anesthesiology ,  
 Mount Sinai St Luke's, Mount Sinai Roosevelt Hospitals New York, NY.
- 2017 12<sup>th</sup> Annual Pediatric Sedation Outside the OR Conference, San Francisco, CA
- 2017 Moderator, Medically Challenging Cases. Neuro anesthesia  
 Moderator, Medically Challenging Cases. Obstetric Anesthesia  
 American Society of Anesthesiologists Annual Meeting, Boston, MA.

## **International**

### **No presentation was sponsored by outside entities**

- 1989 Lecture: “Arterial to End-tidal CO<sub>2</sub> difference in pregnancy”, Department of Anaesthesia, Mater Hospital, Dublin, Ireland
- 1990 “End-tidal carbon dioxide estimations in pregnancy”, 39th Indian Society of Anaesthetists Conference
- 1992 Lecture: “Physiology and clinical applications of Capnography”, Department of Anesthesia, Maricopa Medical Center, Phoenix, Arizona
- 1997 Lecture: “Clinical overview of Desflurane and its economic viability for developing island nations”, Invitation by Zeneca Pharmaceuticals and Department of Anaesthesia, Queen Elizabeth Hospital, University of West Indies, Barbados, West Indies
- 1999 Lecture: “Monitoring coagulation disorders using thromboelastography”, Anesthesiologists of Bombay, India
- 1999 Lecture: “Thromboelastography in Pregnancy”, Addressed to Obstetricians of Bombay, Oberoi Towers, Bombay, India

- 1999 Lecture: “Monitoring coagulation disorders using thromboelastography”, Anesthesiology and Cardiac surgery of Grant Hospital, Bombay, India
- 2001 Lecture: “Capnography. Web based lecture using animations”, Department of Anesthesiology, JIPMER, Pondicherry, India
- 2002 Invited guest faculty. Indian Society of Anesthesiologists, Coimbatore, India  
Lectures:  
“Capnography in laparoscopic surgery”  
“Anesthesia for laparoscopic surgery during pregnancy”
- 2003 “What is new in Obstetric Anesthesia?” Invited Guest Lecturer for invited audience comprising all Senior Professor and division chiefs in the state of Andhra Pradesh, India. Organized by Hyderabad Anesthesia group, Hyderabad, India
- 2004 Ramachandra Anesthesia Continuing Education (RACE) 2004. Sponsored by Department of Anesthesia, Ramachandara Medical College, Madras, India  
Lectures:  
“Capnography”  
“Perioperative management of thyroid surgery”  
“Case discussion: Parturient with critical mitral stenosis for cesarean delivery”
- 2006 Invited Professor, Introduction of Desflurane in leading Indian Medical centers in India: Escorts Heart Institute and Research, Gangaram Hospital, Delhi
- 2006 Invited Professor, Inaugural oration: “Capnography-Evolution, Evaluation & Utility”, World Anesthesia Day Celebration, October 14<sup>th</sup>, North Eastern Mumbai Anesthesiologists Association Conference (NEMAACON), Mumbai, India
- 2006 “Airway assessment and Airway Workshop”, NEMAACON, Mumbai, India
- 2006 “Complications of laparoscopic surgery”, NEMAACON, Mumbai, India
- 2006 “Management of hypotension during Obstetric Anesthesia”, NEMAACON, Mumbai, India
- 2006 “Complications of laparoscopic surgery”, Visiting Professor Lecture at grand rounds, Nizam’s Institute of Medical Sciences, Hyderabad, India
- 2006 Moderator, Subcommittee on Equipment, Monitoring and Engineering Technology, ASA Annual Meeting, Quebec, Canada
- 2007 Ramachandra Anesthesia continuing Education (RACE) 2007. Sponsored by Department of Anesthesia, Ramachandara Medical College, Madras, India  
Lectures:  
“What is new in Obstetric Anesthesia”  
“Breakfast session on Obstetric Anesthesia and analgesia”
- 2007 Visiting Professor to Christian Medical College, Vellore, India  
Lectures:  
“Capnography and its clinical applications”

- “Obstetric Anesthesia – a comprehensive review”
- 2007 “Management of hypotension during Obstetric Anesthesia”, Visiting Professor Lecture, Nizam’s Institute of Medical sciences, Hyderabad, India
- 2007 “Physiology of Capnography”, Visiting Professor Lecture, Care Group of Hospitals, Hyderabad, India
- 2007 “Physiology of Capnography”, Visiting Professor Lecture, Nizam’s Institute of Medical Sciences, Hyderabad, India
- 2007 “Bridging the gap between obstetricians and anesthesiologists”, Visiting Professor Lecture to obstetricians in the city of Hyderabad, Rainbow Hospital, India
- 2008 “Capnography – physics, physiology, and clinical interpretations”, Ramachandra Anesthesia Continuing Education (RACE) 2008, Sri Ramachandra Medical Deemed University, Chennai, India
- 2008 “Anesthetic management of patients with antepartum hemorrhage coming for LSCS”, Ramachandra Anesthesia Continuing Education (RACE) 2008, Sri Ramachandra Medical Deemed University, Chennai, India
- 2008 Breakfast session: “Obstetric analgesia”, Ramachandra Anesthesia Continuing Education (RACE) 2008, Sri Ramachandra Medical Deemed University, Chennai, India
- 2008 “What is new in Obstetric Anesthesia?”, National Conference of Indian Society of Study of Pain, Christian Medical College, Vellore, India
- 2008 “Antepartum hemorrhage and management”, Visiting Professor Lecture, Nizam’s Institute of Medical Sciences, Hyderabad, India
- 2008 “Clinical applications of Capnography”, Visiting Professor Lecture, Care Group of Hospitals, Hyderabad, India
- 2008 “Capnography in current anesthetic practice”, Indian Society of Anesthesiologists State Conference, Coimbatore, India
- 2008 “Obstetric Anesthesia – Whatever you want to know”, Breakfast session, Indian Society of Anesthesiologists State Conference, Coimbatore, India
- 2008 “Obstetric Anesthesia – What is new? ”, Indian Society of Anesthesiologists State Conference, Coimbatore, India
- 2008 “Capnography in clinical practice”, Visiting Professor Lecture, Vijayawada branch of Indian Society of Anesthesiologists, Vijayawada, India
- 2008 “Capnography in current anesthetic practice”, Visiting Professor Lecture, Nizam’s Institute of Medical Sciences, Hyderabad, India
- 2008 Northeast Mumbai Anesthesia Association Conference NEMAACON, World Ether Day

Celebrations 2008, Mumbai, India

Lectures:

“Anesthesia - major advances and future expectations.

“What is new in Anesthesia and how it is going to impact our future practice?”

“Double Lumen Tubes. Demystified”

“Ask the experts: Obstetric Anesthesia and Analgesia”, One of the two experts from United States

“Neurological complications following Obstetric Anesthesia and analgesia”

Airway Workshop:

“Airway assessment”

“Unexpected difficult airway”

“Hands on teaching on training: Video laryngoscopes”

- 2008 “What is New In Anesthesia and How It Is Going To Impact Our Future Practice”  
Visiting Professor Lecture, Care Group of Hospitals, Hyderabad, India
- 2008 Moderator for “American Society of Anesthesiologists Guidelines on Obstetric Anesthesia as applicable to Indian conditions and circumstances”, World Ether Day Celebrations, Hyderabad Anesthesia Society, Hyderabad, India
- 2009 “Obstetric Analgesia – Principles”, Breakfast session, Ramachandra Anesthesia Continuing Education (RACE) 2008, Sri Ramachandra Medical Deemed University, Chennai, India
- 2009 “Recent Advances in Gas Monitoring”, Focus session, Ramachandra Anesthesia Continuing Education (RACE) 2008, Sri Ramachandra Medical Deemed University, Chennai, India
- 2009 “Obstetric Analgesia”, Indian Society of Anesthesiologists (Guntur), Guntur, India
- 2009 Interactive Session: “Obstetric Analgesia and Perinatology”, Fernandez Hospital Hyderabad, India
- 2009 Participated several discussions sessions with anesthesiologists and obstetricians, Visiting Professor (VIP visitor), Ahmadi Hospital, Kuwait Oil Company, Kuwait
- 2009 “Capnography – Principles and Applications”, Faculty of Anaesthesia, Kuwait Institute of Medical Specialization, Kuwait
- 2009 “Morbidly Obese Pregnant Patient”, Ahmadi Hospital, Kuwait Oil Company, Kuwait
- 2009 “New developments in Anesthesiology that can impact future practice”, Ahmadi Hospital, Kuwait Oil Company, Kuwait
- 2009 “How to Make Obstetric Anesthesia Safe? Lessons Learned from CMACH”, Kasturba Medical University, Anesthesia Postgraduate Academic Program, Manipal, India
- 2009 “Preeclampsia and Obstetric Hemorrhage – Problem Based Learning”, Kasturba Medical University, Anesthesia Postgraduate Academic Program, Manipal, India

- 2009 “Measurement techniques and clinical applications of Capnography”, Indian Society of Anesthesiologists Annual Meeting, Chennai, India
- 2009 Moderator for “Anesthesia for emergency cesarean delivery in a patient with Multivalvular disease”, Indian Society of Anesthesiologists Annual Meeting Chennai, India
- 2009 “Physiology of Laparoscopy”, Guntur Medial College, NTR University Guntur, India
- 2010 Mumbai Anesthesiologists Conference 2010, Mumbai, India  
Lectures:  
“Understanding low flow Anesthesia”  
“Renal protection during Anesthesia”  
“Tackling difficult Obstetric airway”  
“The right monitors and how to get best out of it”  
“Ask the experts – Anesthesia for Endoscopy”  
“Ask the experts – Obstetric clinical problems”
- 2010 “How to get maximum benefit from Capnography”, Qatar Health – Anesthesia Track Doha, Qatar
- 2010 “Obstetric airway – Why is it difficult and how to manage an airway crisis?”, Qatar Health – Anesthesia Track, Doha, Qatar
- 2011 “Obstetric airway? What is new?”, Indian Society of Anesthesiologists, Guntur Branch Guntur, India
- 2011 “Obstetric airway. What did we learn from our experience?”, Department of Anesthesiology, Nizam Institute of Medical Sciences, Hyderabad, India
- 2011 “Obstetric airway? How does it change with labor?”, Axon Anesthesiology Associates, Hyderabad, India
- 2011 “What did we learn from obstetric airway that is applicable to routine clinical anesthetic practice”, Indian Society of Anesthesiologists, Vijayawada, India
- 2011 “Obstetric airway – What is new?”, Jawaharlal Institute of Postgraduate Medical Education and Research. Pondicherry, India
- 2011 “Is Obstetric airway really difficult?”, Fourth All India Obstetric Anesthesia Conference, Hyderabad, India
- 2011 “PDPH – Sequelae and management”, Fourth All India Obstetric Anesthesia Conference, Hyderabad, India
- 2011 Kuwait Anesthesia Refresher Courses, Kuwait City, Kuwait  
“What is new in Capnography”  
“What is new in Obstetric Anesthesia”  
“Operating room efficiency. Is it possible?”  
“How to make epidurals work”



- “Morbidly obese pregnant women”
- 2011 Airway work shop at Indian Society of Anesthesiology annual meeting, Mumbai, India
- 2011 Indian Society of Anesthesiology annual meeting, Mumbai, India  
Lectures:  
“What is new in Capnography for 2011”  
“Recent advances in airway devices”  
“Recent advances in Obstetric Anesthesia”
- 2011 South of Ireland Annual Scientific Meeting  
“Capnography: Where are we in 2011?”  
“Difficult Airways in Obstetrics: Risk and Management?”
- 2012 “Capnography: How to make best use of it”, Department of Anesthesiology, Queen Elizabeth Hospital, University of West Indies, Barbados
- 2012 “How is America Board of Anesthesiology examinations different from University of West Indies”, Anesthesiology Examiners Meeting, University of West Indies, Barbados
- 2012 5<sup>th</sup> National Conference, Association of Obstetric Anesthesiologists, New Delhi, India  
Lectures:  
“How to setup an Obstetric Analgesia unit for Labor and Delivery”  
Oration Lecture: “Obstetric Epidurals: Is ensuring patient safety the most difficult task?”  
Moderator: “Obstetric Labor Analgesia: Does education of anesthesia residents suffer in general anesthesia training?”  
“Labor Analgesia: Discussion on random topics” Breakfast session
- 2012 Mumbai Anaesthesiologists Society (MASCON) 2012 – Basics and Beyond, World Anaesthesia Day CME & Congress, Mumbai, India  
Obstetric Anesthesia Workshop: “Labor epidurals: How do I do it?”  
Panel Discussion: “Better be safe than sorry”  
Lectures:  
“Operating room efficiency”  
“Physiology of Laparoscopy”  
“Capnography: How to get the most of it”  
“When things go wrong in Obstetric Anesthesia...treading a safe path”
- 2013 Visiting Professor, Ramachandra Anesthesia Continuing Education (RACE) 2013, Sri Ramachandra University, Porur, Chennai, India  
Lectures:  
“Clinical diagnosis using capnography”  
“Bleeding parturient for emergency LSCS”
- 2013 Lecture on “Morbidly obese pregnant women” Anesthetic implications, One-day Visiting Professor, Ramachandra University, Porur, Chennai, India
- 2013 “What did we learn from obstetric airway that is applicable to routine clinical anesthetic practice?”, Chinese Society of Anesthesiologists 21<sup>st</sup> Annual Meeting, Meijiang Convention and Exhibition Center, Tianjin, China

- 2013 Advisory Role to implement futuristic operating room functionality, Tianjin Chest Hospital, Tianjin, China
- 2013 6<sup>th</sup> National Conference, Association of Obstetric Anesthesiologists, Managalore, India  
 “Workshop: Labor analgesia: How to troubleshoot epidurals”  
 “Moderator: Poster session and selection of best poster of the meeting”
- 2013 21st Annual Meeting of Chinese Society of Anesthesiology (SCA) 2013, China  
 “What Did We Learn From Obstetric Airway That is Applicable to Routine Clinical Anesthetic Practice?”
- 2013 47th Annual Turkish Anesthesia and Reanimation Society Meeting, Antalya, Turkey  
 “Obstetric Anesthesia: When Things Go Wrong...Treading a Safe Path”  
 “Capnography: How to get the most from it?”
- 2013 Tata Memorial Centre (TMC) National Conference, Mumbai, India  
 “ Expanded Uses of Capnography”  
 “Sedation should not be given during fiberoptic intubation of a difficult airway”  
 “ASA 2013 Difficult Airway Algorithm –What has changed?”  
 “Patient with a difficult airway for caesarean section”  
 “Pregnancy related airway changes - What did we learn to change our practice?”  
 “Over view of Videolaryngoscopes”
- 2013 Salmaniya Medical Complex, Arabian Gulf University, Bahrain  
 “Capnography: How do I use in clinical practice”
- 2014 Ramachandra Anesthesia Continuing Education (RACE), Chennai, India  
 “The future of anesthesia is in your hands: What are your obligations?”  
 “Invasive airway access”
- 2014 Media Committee Meeting, SOAP 46<sup>th</sup> Annual Meeting, Toronto, Ontario, Canada
- 2014 Unanticipated difficult airway, “Cannot Ventilate, Cannot Intubate”  
 “Severe PIH with airway edema for emergency LSCS”, Videolaryngoscopy  
 Demonstration, Ramachandra Advanced Airway Life Support in Association with All India Difficult Airway Association and A Difficult Airway Society of United Kingdom  
 Chennai, India
- 2014 Thematic session – “Safe Motherhood: Minimizing anesthesia-related maternal morbidity and mortality”  
 “Myths, controversies and your questions”  
 “Troubleshooting in labor analgesia”, 7<sup>th</sup> National Conference of the Association of Obstetric Anesthesiologists, Varanasi, India
- 2014 “Capnography: What should you know?”  
 “How to ensure safety of Obstetric Anesthesia”  
 “Management of Obstetric hemorrhage”, Association of Anesthesiologists in Rajahmundry representing three medical schools, Rajahmundry, India

- 2014 6<sup>th</sup> Anesthesia & Critical Care (ACC) Conference, Ministry of Health, The State of Kuwait  
 “Laparoscopic Surgery in Pregnancy”  
 “What Did We Learn from Obstetric Airway That is Applicable to Routine Clinical Anesthetic Practice?”  
 “Morbidly obese anesthesia – Morbidly obese pregnant woman”  
 “Obstetric Analgesia: “How do I succeed in providing labor analgesia to meet expectations of the parturient?”  
 “Exit procedure: What is it and when is this indicated?”  
 “Massive transfusion: New Protocol: Are we on the right track”
- 2014 62<sup>nd</sup> Annual National Conference of Indian Society of Anesaesthesiologists, Madurai, India  
 “Yesterday’s Luxury – Today’s Necessity: End Tidal Carbon Monoxide Monitoring During Conscious Sedation”  
 “Safety and Obstetrics Anesthesia”
- 2015 CARE/Rainbow/Axon Group Hospitals, Hyderabad, India  
 “Intrauterine Fetal Surgery – Anesthetic Implications”
- 2015 Ramachandra Anesthesia Continuing Education (RACE), Ramachandra University, Chennai, India  
 “Pulse Oximetry and Capnography”  
 “Management of a Patient with Massive Blood Loss”
- 2015 8<sup>th</sup> National Conference of Association of obstetric Anaesthesiologists, 1<sup>st</sup> World obstetric Anaesthesia Congress, Hyderabad, India  
 Moderator of panel discussion, Global Practices – Local Applicability – Thematic Panel on Labour Analgesia & Beyond  
 “Labour Analgesia – Overview”  
 Expert Panel, LA techniques: Video demonstration and interaction with the expert panel  
 “Trouble shooting – Making your block safe and effective”  
 “Audience demand – Questions!”  
 “Convinced for regional, now has Wet Tap and PDPH!”
- 2015 Geetanjali Medical College & Hospital (GMCH), Udaipur (Rajasthan), India (Boston GMCH CME)  
 “Operating room efficiency matrix”  
 “Traditional versus new transfusion protocols for obstetric hemorrhage. Which is better?”  
 “What did we learn from obstetric airway studies that can be applied to our clinical practice?”  
 “Preeclampsia (HELLP) – Panel discussion”
- 2015 Department of Anesthesiology, Critical Care and Pain Medicine, Salzburg General Hospital, Paracelsus Medical University (PMU), Salzburg, Austria.  
 Grand rounds lecture: “Capnography: The current status.”
- 2015 The International Symposium - Obstetric Anesthesia - Effect on Mother and Newborn. Budapest, Hungary.  
 “Is maternal temperature rise during neuraxial labor analgesia a physiological process due

to decreased pulmonary ventilation?”

- 2016 Ramachandra Anesthesia Continuing Education (RACE), Sri Ramachandra University, Porur, Chennai, India  
“Labor analgesia in a morbidly obese parturient”  
“Malignant hyperthermia”
- 2016 Indian Society of Anesthesiologists, Nasik, India. (CME Workstation & Obstetric Anesthesia)  
“ Understanding ETCO<sub>2</sub>. Tip for an Anesthesiologist”  
“Anesthetic management of patient with Antepartum hemorrhage coming for LSCS. How do I do it?”  
“Anesthesia for laparoscopic surgery in pregnancy”  
“Moderator: Case discussion to seek your opinion”
- 2016 The 13<sup>th</sup> International Annual Meeting of Indonesian Society of Obstetric Anesthesia, Indonesian Society of Regional Anesthesia and Pain Medicine – The 5<sup>th</sup> Indonesian Society of Critical Care Anesthesiologists Congress, Jakarta, Indonesia  
Invited Speaker  
“Laparoscopic Surgery in Pregnancy”  
“Safety and Obstetric Anesthesia”  
“Operating Room Efficiency Matrix”  
“What Did We Learn from Obstetric Airway That is Applicable to Routine Clinical Anesthetic Practice”
- 2016 32<sup>nd</sup> International Annual Conference, Egyptian Anesthesia 2016, Egyptian Society of Anesthesiologists, Cairo, Egypt.  
Chairperson, Session VI: Obstetric Anaesthesia  
Invited Speaker Lectures  
“Laparoscopic Surgery in Pregnancy”  
“Morbidly Obese Pregnant Woman”
- 2016 10<sup>th</sup> Conference of Obstetric and Gynecological Anesthesia, Beijing, China.  
“Morbidly Obese Pregnant Women”
- 2016 25<sup>th</sup> Indian Society of Anesthesia Conference (ISCON, AP), Kurnool, AP, India  
“Minimizing Anesthesia Related Maternal Morbidity and Mortality”  
“Capnography – What we have learnt from past 30 years”
- 2016 9<sup>th</sup> National Conference of Association of Obstetric Anesthesia, AOA-MASCON 2016, Mumbai Anesthesiologists Society, Leelavati Hospital & Research Centre, Bandra, India.  
Obstetric Anesthesia Work Shop  
“Labor Analgesia: Primum Nocere”  
“Labor Analgesia- Safety First”  
“Why Difficult Airway is More Difficult in Obstetric Patients?”  
Panel Discussion: “Labor analgesia”  
Panel Discussion: “How do we practice in private practice settings?”

- 2016 64<sup>th</sup> Indian Society of Anesthesia National Annual Meeting (ISACON 2016), Ludhiana, Punjab, India.  
 Labor Analgesia Workshop  
 “Equipment for labor analgesia”  
 Expert Panel: “Case scenarios”  
 “Managing Controversies of in labor analgesia”  
 “Capnography – Practical Implications”  
 “Pearls for success in labor analgesia practice”
- 2016 Postgraduate Institute of Medical Education and Research, Chandigarh, India  
 “The goal of the obstetricians and anesthesiologists is same (Optimum maternal and neonatal outcome) – How to achieve it?”
- 2017 Ramachandra Anesthesia Continuing Education (RACE), Sri Ramachandra University, Porur, Chennai, India  
 “Monitoring in Anesthesia”  
 “Physiology of CO<sub>2</sub> Transport”  
 “Difficult Airway in Obstetrics- Current guidelines”
- 2017 Kovai Medical Center and Hospital, Coimbatore, India  
 “Obstetric Anaesthesia”
- 2017 64<sup>th</sup> Annual Meeting of Japanese Society of Anesthesiologists, Kobe, Japan  
 “Three decades of capnography”  
 “What did we learn from obstetric airway?”  
 Invited Lectures
- 2017 10<sup>th</sup> National Conference of Association of Obstetric Anaesthesiologists, Bengaluru, India  
 Faculty  
 “Why some mothers bleed and some don’t?”  
 “Obstetric anesthesia: How, where, and when it can go wrong?”
- 2017 21<sup>st</sup> Alexandria Anaesthesia and Intensive Care Conference, Alexandria Society of Anaesthesia and Intensive Care (ASAIC), Alexandria University, Egypt  
 Speaker:  
 “Capnography in ICU”  
 “Obstetric Anaesthesia in Morbid Obese”  
 “The Role of ICU in Pregnant Subjects”  
 Chairperson:  
 Obstetric Anesthesia and Intensive Care
- 2017 19<sup>th</sup> Annual Maharashtra State Anaesthesia Convention, Indian Society of Anaesthesiologists (ISACON), Nanded, India  
 Keynote Speaker  
 “Making Obstetric Anesthesia Safer: What are the options we have?”
- 2017 26<sup>th</sup> Annual Conference of Indian Society of Andhra Pradesh, Indian Society of Anaesthesiologists (ISACON AP), Kakinada, India

## “Capnography”

### The presentations below were sponsored by Covidien.

- 2012 “Capnography: Where we should head?”, Covidien – ASA Annual meeting on ‘Revealing a More Complete Picture – Putting the Power of Capnography and Pulse Oximetry with the Respiration Rate into your Hands’, Washington, DC
- 2014 “Capnography: Where are we now? Where are we heading?” Covidien Canadian Association of Anesthesia meeting, St-John’s, Newfoundland, Canada

### Report of Clinical Activities and Innovations

#### Current Licensure and Certification

- 1978 Full Medical practice license in India
- 1982 Full Medical practice license in Guyana
- 1983 Full Medical practice license in Barbados
- 1992 ECFMG certification
- 1993 FLEX certification
- 1996 Commonwealth of Massachusetts, Board of Registration and Discipline in Medicine
- 1999 American Board of Anesthesiology Certification
- 2006-present Advanced Cardiac Life Support Instructor
- 2007 Advanced Trauma Life Support
- 2007 WMD/Hazardous Material Response course
- 2007 Crisis Resource Management for Academic Anesthesiologists

#### Practice Activities

- |               |  |   |   |
|---------------|--|---|---|
| 1981-1982     | Adult, Pediatric, and Obstetric Anesthesia                                       | JIPMER, Pondicherry, India                      | 5 days per week with occasional weekends  |
| 1982-1983     | Adult, Pediatric, and Obstetric Anesthesia                                       | McKenzie Hospital                               | 5 days per week with occasional weekends  |
| 1983-1996     | Adult, Pediatric, and Obstetric Anesthesia                                       | Queen Elizabeth Hospital, Barbados, West Indies | 5 days per week with occasional weekends  |
| 1998- 2013    | Thoracic and Vascular Anesthesia   | Brigham & Women’s Hospital, Boston, Ma          | 2 days per week with occasional weekends  |
| 1998- present | Obstetric Anesthesia and Anesthesia for Interventional and Endoscopic procedures | Brigham & Women’s Hospital, Boston, Ma          | 1998-2007 2 days per week with occasional weekends<br>2008-present 3 days per week with occasional weekends |

#### Clinical Innovations

- 1982-1983 Establishment of Intensive Care Unit, Linden, Guyana, South America

I established a four-bed Intensive Care Unit at Guyana Mining Enterprise Limited Hospital, Linden, Guyana to serve the local community. The Intensive Care Unit was inaugurated by the Health Minister of Guyana and dedicated to the community. The local newspaper carried the new story of its development. I trained nurses via theory and practical teaching sessions. The unit successfully treated patients with Myasthenia Gravis, surgical, and medical patients.

1986

**Flow requirements for Bain breathing circuit during anaesthesia for Caesarean section**

This is the first study to determine the flow rates required during general anesthesia for cesarean delivery using Bain breathing system to maintain normocarbida of pregnancy rather than in advertently lowering the maternal arterial carbon dioxide. The results of this study helps clinicians to avoid unintentional hypocarbida that can decrease uterine artery blood flow (Canadian Journal of Anaesthesia, 33(5):583-7).

1986

**End-tidal carbon dioxide tension reflects arterial carbon dioxide tension**

This is the first study to show that end-tidal carbon dioxide tension reflects arterial carbon dioxide tension. The clinical impact of this study is prevention of hyperventilation resulting in lower arterial carbon dioxide tension that could result in decreased uterine blood flow. This study also showed that negative arterial to end-tidal gradients can occur in pregnant women. Although once considered impossible to occur, negative gradients do occur during anesthesia in pregnant women. A physiological explanation is provided based on the pregnancy induced changes in respiratory and cardiovascular physiology (Anaesthesia, 41:698-70). The occurrence of negative arterial to end-tidal gradients has been subsequently confirmed by many investigators, and they offer the explanation provided from our work.

1987

**End-tidal carbon dioxide tension in the post partum period**

A subsequent study in post partum women also confirmed that the respiratory physiology in the immediate postpartum period is similar to that during pregnancy (Anaesthesia, 42:482-6).

1987

**Cause of decreased arterial to end-tidal carbon dioxide difference in pregnant women**

For the first time, the cause of the decreased arterial to end-tidal carbon dioxide difference in pregnant women was determined to be due to a decrease in alveolar dead space during pregnancy (Canadian Journal of Anaesthesia, 34(4):373-6).

1987-1993

**Innovative improvement in Barbados**

During my anesthesia practice in Barbados, I was the key member to address several vital problems that are unique and inherent to small developing nations. To mention few, the disposable components of anesthesia machines were imported into Barbados. An unpredictable shortage of disposable equipment led to cancellation of

cases. We created a database of all anesthesia equipment using DBASE software to track the use of disposables. An order was placed as soon as a critical number was reached for each component. This resulted in enormous savings as the items were ordered on an as needed basis in order to prevent excessive stocking. Barbados is a high humidity environment. When we installed oxygen concentrators in lieu of oxygen cylinders of piped oxygen supply, excessive water vapor condensed along the pipelines and made way into anesthesia machines. We designed innovative water traps along the oxygen pipelines to trap water vapor, and this solved the issue. I reviewed specific inherent problems of small developing nations and proposed solutions in a peer reviewed article 'Anesthesia in Barbados'. I was a key member during the rebirthing phase of an entire operating room complex spearheaded by the Ministry of Health in conjunction with the World Bank. The design concepts and innovative changes mentioned above are still in existence, and the anesthesia staff in Barbados acknowledges my contribution even to this date.

### **Should air-oxygen replace nitrous oxide-oxygen in general anaesthesia.**

During my tenure in Barbados, we were confronted with a shortage of nitrous oxide on the island. At the time, it was customary to cancel cases due to fear of awareness if anesthesia is given without nitrous oxide. Therefore, a study was conducted to demonstrate that nitrous oxide can be safely omitted during routine anesthesia without fear of producing awareness. Performing general anesthetic procedures without nitrous oxide has become a norm of today. (*Anaesthesia*, 1987, 42(6):609-12).

1990

### **Consultant, Government of St. Lucia**

A part of a two member team invited by the Government of St. Lucia for investigating bizarre cases of post-anaesthesia facial swelling in several patients. A systematic interview of anaesthesiologists, nurses and technicians was conducted in addition to examination of anaesthetic practice, sterilization of non-disposable equipment and anaesthesia machines. The problem was traced to airways and non-disposable endotracheal tubes; the airways were sterilized using cidex for 30 minutes, which was followed by inadequate water washing and soaking (approx. 10 min). The problem was easily rectified by thorough washing, rinsing, and soaking in water twice the duration of glutaraldehyde contact.

1999

### **Dual capnography facilitates detection of a critical perfusion defect in an individual lung**

For the first time, the concept of dual capnography was described and employed during anesthesia to evaluate the ventilation/perfusion status of each lung. A simple sampling technique of expired gases from each lung facilitates the assessment of ventilation/perfusion status of each lung independently (*Anesthesiology*, 90(1):302-4). This helps physicians to identify a major pulmonary perfusion defect in a lung.

2000

### **Respiratory and cardiovascular physiology in pregnant women undergoing laparoscopic surgery**

The need to address respiratory and cardiovascular physiology in pregnant women



undergoing laparoscopic surgery became a necessity due to concerns of fetal compromise. Based on earlier studies in pregnant ewes, it was suggested that arterial blood gas measurements were required for pregnant women undergoing laparoscopic surgery for the fear of hypercarbia and consequent acidosis that is detrimental to the fetus. Our study was the first to prove that arterial blood gas analysis is not necessary and end-tidal carbon dioxide monitoring is sufficient enough to monitor arterial carbon dioxide as it closely reflects arterial carbon dioxide. Because of this critical finding, anesthesiologists are confident enough to provide anesthesia for laparoscopic surgery in pregnant women using end-tidal carbon dioxide as a guide to predict arterial carbon dioxide levels in order to ensure fetal safety (Anesthesiology, 93(2):370-3).

2000

### **Defining segments and phases of a time capnogram**

I was the key member to initiate and develop a standard nomenclature to demarcate various components of capnograms. This nomenclature was deemed necessary for future clinical communication and research and is now adapted by many, including the Nunn's Respiratory Physiology and the 2014 8<sup>th</sup> Edition of Miller's Anesthesia textbook. The study paper highlights the limitations of the current capnography devices and provides suggestions for the future direction of research and improvements. The concept of superimposing respiratory flow rate waveforms over capnograms to delineate the components of capnograms is already being implemented in some newer capnography devices (Anesth Analg., 91(4):973-7).

2001

### **Hemodynamics during laparoscopic surgery in pregnancy**

In order to address physician's uncertainty of cardiac output changes during laparoscopic surgery in pregnancy, we studied the hemodynamic changes during these procedures. We proved that the decreases in cardiac output is similar (30% decrease) in pregnant as well as non-pregnant subjects undergoing laparoscopic surgery; however, ephedrine boluses were required to maintain blood pressures within the pre-induction blood pressure range (Anesth Analg., 93(6):1570-1).

2001

### **Website: [www.Capnography.com](http://www.Capnography.com)**

My website on capnography has been designed, produced, and maintained, with no sponsorship, to provide a complete review on end-tidal carbon dioxide monitoring during anesthesia and intensive care. This educational website for anesthesiologists, clinicians, medical care providers, emergency ambulance personnel, engineers, medical students and manufacturers is freely accessible to professionals all over the world. It's an "All-In-One" on capnography using several animations designed, frame by frame, by me to explain underlying physical and physiological concepts of capnography in addition to highlighting clinical applications. The website has many downloadable modules that professionals seek my permission to use in their hospital or institutional teaching curriculum. The site that has over 450,000 visits annually and is ranked first or second of 330,000 results on all web search engines. My continuous commitment to educating professionals includes periodically updating the site, answering email queries, and initiating discussions on the future of capnography in technology and applications.

Capnography.com has been reviewed in many prominent anesthesiology and non-anesthesiology journals in the United States and Europe including the journal of Anesthesiology (October 2001), British Journal of Anesthesia (October 2001), Journal of Neurosurgical Anesthesiology (October 2001), and Canadian Journal of Anesthesia (April 2003). It has been summarized as a great teaching contribution on capnography. For example, Professor Elizabeth Frost of the Mt. Sinai School of Medicine, New York wrote in the *Journal of Neurosurgical Anesthesiology*, "It is an effective teaching tool for all residents and helpful for the clinician who wishes to better understand the disease process that generates abnormal waveforms. I believe that a candidate for the oral board examinations might well find that 15 minutes spent at this site shortly before the interview proves invaluable." Dr. C.J.R. Parker of the Royal Liverpool University Hospital, England, made the following comments in the *British Journal of Anaesthesia*: "There is lot of material on this site, and it is impossible to list all the good things. It will be a learning resource for students – and I will be recommending it. It may also become a forum for specialists. A web publisher can reach a potentially vast readership, and has the opportunity to create something quite different from a book, with the possibilities of animation and of interaction."

Capnography.com was also reviewed in this nation's premiere anesthesia journal in the *Journal Anesthesiology* by Dr. J.M. Cusick, Director of Anesthesiology, at Luke Air Force Base, Arizona and edited by Professor James C. Eisenach of Wake Forest University Hospital as follows: "Dr. Bhavani Shankar Kodali has put forth great effort to produce the equivalent of a capnography textbook and made it freely available on the Internet. The site provides a complete review of end-tidal carbon dioxide monitoring during anesthesia and intensive care. In addition, his website provides animated graphics that are not possible to produce in a textbook and can greatly facilitate learning and therefore is recommended to students. Capnography.com is truly an 'all-in-one' for the subject of capnography."

Unsolicited accolades are left on the feedback page thanking me for providing such extensive and comprehensive information on capnography on the web for free. Some examples of unsolicited feedback include the following.

"I am creating an educational power point to test for competency in Capnography for our facility. I would like to get permission to use some of the images in your presentations. Thank you."

"Excellent lecture for my residents and staff that need to learn about capnography for sedation. I would like to print out your powerpoint to give to my residents, if that would be OK. It has your name on it, and I would not claim it as my lecture...just want to be able to print it out 4 per page so they have something to take notes on. Thanks, Dr Bronk"

"Brilliant site, previously used it for my part 1 ANZCA exam 2 years ago. Now using it for my final prep. first time at the new look edition of your site today."

"I am a Nursing Lecturer at Deakin University Melbourne Australia. I

teach in the Post Graduate Nursing Masters program, particularly in the critical care nursing stream. I am putting together a PowerPoint audiovisual lecture for our post graduate students and am writing to request permission to use your fantastic animations of capnogram waveforms for educational purposes. I would have this available only to the students in our course in a secure site and of course acknowledge your work as yours. A link to your website would also be included in the lecture. If you are happy for me to use this material, could you please write back to this address? I do appreciate your time. Kind regards Gabby Burdeu”

“Dear Dr. Kodali

I hope you are well. I wonder if you could settle a query for us, please? I have just set a test for our anaesthesia residents and asked them about the physical principles underlying measurement of CO<sub>2</sub> in respired gases. All of them came back and described the Beer-Lambert Law. At first I thought they were just getting confused with pulse oximetry, but the more I mulled it over, the more I thought that the B-L law might actually be involved, and, on searching the www, a number of sites do say that the B-L law is used in capnography. However, the senior anaesthetists here continue to disagree, so we thought we'd consult the 'God of capnography'!

Any help very gratefully appreciated.

Best wishes

Derek

Derek Flaherty BVMS, DVA, DipECVAA, MRCA, MRCVS, FHEA  
Professor of Veterinary Anaesthesia and Analgesia

RCVS and European Specialist in Veterinary Anaesthesia Head of  
Veterinary Anaesthesia, Small Animal Hospital School of Veterinary  
Medicine, Bearsden Road, Glasgow”

In addition to rave journal reviews and accolades from visitors to website, the site has been selected to be presented at society meetings and has received awards. The site was presented at the ASA annual meeting in 2001 and the Post Graduate Assembly at the New York Society of Anesthesiologists in 2002. The New York State Society of Anesthesiologists recognized the site with the Special Award at the 2004 annual meeting. Also, I received the Clinical Innovation Award from Brigham and Women's Hospital Physician's Organization (BWPO). Brigham and Women's Hospital also recognized my contributions. When capnography became popular during CPR, BWH reached out to me to develop a HealthStream training program for medical residents. I also provided a similar CPR teaching module on my website for the benefit of all medical professionals.

2001

### **Effect of magnesium on coagulation in parturients with preeclampsia**

Magnesium is known to affect the coagulation process, and magnesium is commonly

used in women with preeclampsia. This study showed that magnesium as used in preeclamptic women does not alter coagulation and therefore is safe to administer regional anesthesia. This study used thromboelastography to study coagulation (Anesth Analg, 92(5):1257-60).

2002-present

**Website:** [www.painfreebirthing.com](http://www.painfreebirthing.com)

Designed, programmed, produced, and maintain an innovative website for pregnant women on pain free child birth options. This is the first site to use computer animation graphics to explain concepts of pain free child birth, side effects, and complications. The patients can access the information at home or in the labor and delivery suites equipped with computer internet. This patient educational website has been demonstrated at several professional conferences, notably the annual SOAP meeting in 2006. Since then, the site has been translated into eleven languages. Translation of three more languages is in progress. Many educational institutions and private practice groups refer their patients to this website. Furthermore, some institutions request permission to use my material on their patient educational websites. The SOAP provides a link to this site on their patient education module. The British Journal of Anesthesia reviewed this website as a comprehensive resource on methods of labor analgesia.

To quote, "Two years ago, we surveyed mothers who had received an epidural in labour to find out where they obtained information about the procedure. Most cited 'magazines' and 'friends/family'; <3% had used the internet to find out about methods of pain relief in labour. Today, a far greater proportion of mothers-to-be have ready access to the internet. This has been accompanied by a proliferation of websites dedicated to providing information to mothers about methods of pain relief in labour: over 71 900 according to google.co.uk. The top ranked sites vary in quality enormously from the blatantly commercial to those produced by charitable organizations dedicated to providing independent information for mothers-to-be. Most of the latter take a fairly straightforward 'glossy magazine' approach to discussing the 'pros' and 'cons' of analgesic options, but do not go into too much detail. One notable exception is [www.manbit.com/obstetspain/default.htm](http://www.manbit.com/obstetspain/default.htm), which contains much useful information especially 'in defence of epidurals'. However, this site is quite technical in nature and is more suitable for anaesthetic trainees than their patients. [www.painfreebirthing.com](http://www.painfreebirthing.com) addresses this 'gap' in the market by providing a fully comprehensive resource for those who wish to gain a fuller understanding of obstetric anaesthesia written in layman's language. This site has the highest credentials, having been written by the academic department of the Brigham and Women's Hospital in Boston, Massachusetts, USA. It immediately sets itself aside from other websites by asking the user to 'agree' to terms and conditions of use before being allowed entry into the rest of the site. This device, familiar to anyone who has downloaded software, adds an authoritative feel to the website and emphasizes the serious nature of the learning contract between author and reader".

2005

**Effect of amniotic fluid on coagulation and platelet function in pregnancy: an evaluation using thromboelastography**

Because there was abundance of confusion on the mechanism of how amniotic fluid

produces severe hemorrhage in pregnant women, we set out to prove that amniotic fluid is a strong procoagulant and results in consumption coagulopathy rather than excessive fibrinolysis. Furthermore, the study stresses that amniotic fluid embolism is always associated with an altered coagulation profile. If coagulation is normal, it may rule out amniotic fluid embolism. (*Anaesthesia*, 60(11):1068-72)

2006-present

### **Mandated capnography for reimbursement for laparoscopic surgeries in India**

For years, I have been advocating the use of capnography for monitoring during anesthesia as a means to enhance patient safety. I'm particularly passionate about making capnography a standard in anesthesia in my home country India and have dedicated a significant amount of my non-clinical time to educate anesthesia colleagues and administrators in India to recognize the value of capnography. These efforts paid dividends as many institutions now use capnography, even in the setting of small private practices. As a testimony to this, the State Government of Andhra Pradesh issued a notification that anesthesia and surgical fees will not be reimbursed if capnography and pulse oximetry are not used (India, Government of Andhra Pradesh Order, AST/775/F25/dated, September 2011). Currently, the President of the Indian Society of Anesthesiologists is pursuing the Government of India to issue duty-free status to capnography related equipment.

2008

### **Airway changes during labor**

This is the first study to show that labor is associated with airway changes in both visible and concealed portions of upper airway. This has relevance in the clinical management of pregnant women presenting for anesthesia during later stages of labor, or in the immediate postpartum period (*Anesthesiology*, 108(3):357-62). The significance of this study was highlighted in the editorial that accompanied this study. The editor of the journal *Anesthesiology* republished this paper as 'Advancing Medicine in Anesthesiology' in the last issue of the same year as he thought the study findings may change future clinical practice.

2008

### **Shapiro Work Room**

I was instrumental in establishing a work room in the Shapiro Area, the central location in the operating room (OR) complex, so that staff can obtain items expeditiously in case of emergency. The initial design approved prior to me taking over as Clinical Director did not have a provision for the above work room. Considerable forethought went into this project realizing the future needs of the clinicians performing complicated cases. Years later, the benefits are still appreciated by all.

2008

### **Anesthesia PACU office**

During the infrastructural design of the Post Anesthesia Care Unit (PACU), there was no plan for an Anesthesiology office. I negotiated for a redesign to include space for this office which allows anesthesiologists in charge of the PACU to be present at all times ensuring patient safety.

2008

### **Anesthesia Command Center**

The Anesthesiology Floor Leader is in charge and responsible for overseeing the flow of cases across the entire operating room complex and outside of the operating rooms (about 60 locations). To facilitate this role, there has to be a continuous flow of information regarding the status of each case in these areas. I instituted an Anesthesia Command Center (ACC) with Central Monitoring Screens so that the Anesthesiology Floor Leader can see at a glance the status of each case as it progresses. Furthermore the system notifies the call status of each anesthesiologist, and this is critical in effective staff deployment.

2008

### **Pipeline restructure**

Prior to my intervention, for more than 70 years, the oxygen and nitrous oxide pipelines hung from the ceiling onto the floor to be attached to the anesthesia machines. For decades, the anesthesiologists were stepping over the pipelines to cross to the other side. I asked special pendants to be installed to the wall so all the pipelines and electrical conduits go overhead to the anesthesia machines. One of the senior surgeons, who has been at the Brigham and Women's Hospital for a long time, remarked that this is the best intervention he has observed in the operating room during his entire stay at this Institution.

2007-2008

### **Improved Anesthesia Technician work force**

Instituted a reliable anesthesia technician work force by revising the anesthesia technician's job description and training them to help anesthesiologists start cases in a timely manner. The previous anesthesia technician group was not effectively trained therefore contributing to inefficiencies. Presently, the anesthesia technicians set the room ready to commence anesthesia induction.

2007-2017

### **Build up non-OR anesthesia locations to par with operating room standards**

The percentage of volume of cases being performed outside the operating room (OR) complex is increasing rapidly. One of my successful assignments is to bring all out of the operating room (OOR) locations to par with that of ORs. This has also resulted in the development of internal standards for anesthesia systems layout that is also being used in the proposed 'Building of the Future'. This standardization of OOR locations has resulted in many Anesthesiologists volunteering to work OOR without hesitation.

2008-2017

### **Novel Improvements in Anesthesia Service Infrastructure:**

- Improved the availability of CMACs (37 videolaryngoscopes) in the operating room as well as outside OR locations
- Organized the availability of CMACs and capnography monitoring to all codes (may be first in the country).
- Ensure that all non-OR cases have nursing coverage similar to OR standards
- Assist in streamlining preoperative preparation of non-OR cases (work in progress)
- With the collaboration of Hospital and Anesthesia departments, I took the initiative to remodel anesthesia call rooms, which were neglected for 20

years, for on-call residents and staff.

- 2008-2011      Established and implemented the Perioperative Information Management System (PIMS) project and facilitate training of 250 anesthesia staff and residents in PIMS from 2009 to 2011.
- 2009-2011      Established anesthesia services to Advanced Multimodality Image Guided Operating Suite (AMIGO), first of its kind in the nation.
- 2009-present      **Mission to enhance obstetric anesthesia in India**

Another important goal of mine is to improve obstetric anesthesia in India. To this end, I have given numerous lectures, participated in countless discussions, and lead many training workshops. I regularly participate in the annual ‘Anesthesia Continuing Education for Residents Conference’ for approximately 900 residents at the Ramachandra Medical University (an affiliate of Harvard International) in Chennai, India, and in 2014, I gave the lecture ‘The future of anesthesia is in your hands: What are your obligations?’ at the Vijaylakshmi Kamat (former HMS faculty) Memorial Oration Lecture at the University. The University conferred me with ‘Visiting Professorship’ status and title recognizing my contribution to educational teaching programs for anesthesiology residents. Honoring my contribution to obstetric anesthesia and anesthesia monitoring and safety, the Association of Obstetric Anesthesiologists in India awarded me with the ‘Citation and Oration Medal’ at the 2012 New Delhi Annual Meeting. Additionally, I have been nominated to be the Scientific Advisor for the 2015 8<sup>th</sup> National Conference of the Association of Obstetric Anesthesiologist and 1<sup>st</sup> World Obstetric Anesthesiology Congress, India.

Recently, I published a peer reviewed article entitled ‘Establishing an obstetric neuraxial service in low-resource areas’ which highlights important issues that are essential to practice safe obstetric anesthesia. These principles can be applied all over the world to enhance safe obstetric anesthesia. (Int J Obstet Anesth. 2014; 23(3):267-273).

- 2011      **Improved collegial relations between nursing staff and anesthesia department members**

Masterminded a systematic approach to improve the relationships between members of the nursing and anesthesia departments to foster a harmonious working environment. In the long run, better relations and interpersonal behavior help improve overall OR efficiency. This team-building activity was initiated in 2011 with an annual get-together for breakfast. The nursing leadership recognized this novel team-building activity by adding a second get-together breakfast in September inviting new CA1s to make them feel at ease during residency commencement at Brigham and Women’s Hospital.

- 2012-2017      **New OR Complex**

I am currently a key participant in the designing phase of the new OR complex to be

built in the next five years. I have provided several suggestions to improve the patient flow and addressed several shortcomings of the past.

2013 **Capnography outside of operating rooms. Clinical Concept Commentary.**

Realizing the value of capnography outside of the operating rooms, I wrote a clinical concepts commentary explaining underlying applications of capnography OORs to anesthesiologists as well clinicians and other clinical care providers (*Anesthesiology*, 118:192-201). As *Anesthesiology* recognized the value of this contribution, the editor made this clinical commentary available free to all readers from the date of publication. As per the *Anesthesiology.org* website (December 2<sup>nd</sup>, 2014), this paper is **ranked #1 or #2** in the most viewed category in *Anesthesiology* journal since 1999.

2013 **Teaching modules on ‘Capnography outside of operating rooms’**

I also made available teaching modules explaining the role of capnography during sedation and cardiopulmonary resuscitation (CPR) on *Capnography.com*. These PowerPoint teaching modules can be downloaded for internal use in any Institution.

2013-2016 **Clinical Lead for EPIC implementation**

I'm the Clinical Lead for EPIC implementation for anesthesiology services in the operating rooms in BWH as well as satellite locations Foxboro and Faulkner Hospitals. Given the size of our department of over 300 members, this enormous project requires in-depth planning and execution.

2014 **Improving first case on time (FCOT) and first case in operating room (FCIR) starts**

Our study ‘Variability of Subspecialty-Specific Anesthesia-Controlled Times at Two Academic Institutions’ highlights the variations in Anesthesia-Controlled Times for each surgical specialty (*J Med Syst.*, 38:11). These times are vital in the computation of the first case on time (FCOT) starts in a tertiary teaching center. The results enabled us to adjust FCOT based on each specific specialty. This was necessary since every specialty has different needs and preparations for intended surgery. This study benefitted us to understand delays in FCOTs, and I am a key member helping our institution achieve FCIR and FCOT targets close to institutional targets. As of March 2014, we are at FCIR to 88% and FCOT to 71% (up from 34% four to five years ago). This was done by encouraging anesthesia colleagues to achieve targets and receiving feedback from many members of the department. This way, every individual feels they are a key member of the entire process and are enabling to reach the set targets. The results were presented and also published for the benefit of other institutions (*J Med Syst.*, 38:11).

2014 **Successful Strategies for the Reduction of Operating Room Turnover Times in a Tertiary Care Academic Medical Center**



This study analyzes multidisciplinary factors decreasing turn over time (TOT). Operating room TOT is a complex process, and decreasing TOT is equally complex. We studied this process in depth, including sustainability of changes that decrease TOT (J Surg Res., 187:403-11). Some initiatives we studied helped to decrease TOT. We are currently in the process of implementing changes to attain sustainable improvements in decreasing TOT. The resulting article from this study was added to the comprehensive OR management bibliography ([www.FranklinDexter.net/bibliography\\_TurnoverTimes.htm](http://www.FranklinDexter.net/bibliography_TurnoverTimes.htm)).

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Consulting, on-line education, and the comprehensive OR management bibliography, [www.FranklinDexter.net](http://www.FranklinDexter.net)

2014

### **Transfusion Ratios for Postpartum Hemodilutional Coagulopathy: an In Vitro Thromboelastographic Model**

The current trend is to use high plasma to RBC ration during hemorrhage in trauma and major surgical patients associated with bleeding. Obstetric hemorrhage is no exception to this rule and therefore this strategy of high plasma to RBC ratio has been adapted in many institutions including ours. However, there is no prospective or laboratory studies to validate this hypothesis. We were the first to analyze this in an in-vitro study. This study shows that 1:1:1 RBC:Plasma:Platelets are more efficacious than the conventional 3:1 RBC:Plasma only in the presence of adequate platelet numbers. What is usually considered an adequate number of platelets, 50,000 / $\mu$ L, is not adequate during hemorrhage and transfusions, and a platelet count closer to 100,000/  $\mu$ L may be optimal. This study was an editor's pick in the *American Journal of Obstetrics and Gynecology*.

2016

### **Combined Anesthesia / Surgical / Nursing Simulations**

After observing surgical operating room environments for 40 years, I have realized that mutual communication and respect among key groups is sparse. This is a universal observation I have made throughout my long career across different continents. This is most likely due to clinicians' lack of understanding that ultimately team work results in successes rather than the general 'all because of me' myth. Moreover, medical curriculums do not include lessons on mutual respect and team behavior. A lack of team work and mutual respect has led to poor outcomes in surgical and medical practices. The CRICO organization also firmly believes that the lack of communication and mutual respect among care providers impedes the ability to function as one entity. I firmly believe that this training must occur during the residency training period. Therefore, I spearheaded a mission of facilitating simulation sessions where surgical and anesthesia residents, along with nurses participate jointly at the Stratus Center of Brigham and Women's Hospital. This methodology promotes mutual respect, close loop communication, and team work among care providers very early in their training. Moreover, the team that participates in simulation exercises could be the same team that is involved in an actual crisis in the Institution. Two sessions were completed successfully and

tremendously positive feedback was the result. Further sessions will determine its ultimate success.

2016

**Improved collegial relations between nursing staff and anesthesia department members has led to including surgeons to the casual breakfast get-together sessions.**

This year, realizing the benefit of the casual breakfast sessions started in 2011, the Chief Nursing Officer and Chairmen of Surgery and Anesthesiology have decided to extend the casual meeting between nurses and anesthesiologists to include surgeons. This is probably one of the greatest success stories fostering team work at Brigham and Women's Hospital. I hope that other Institutions in the world follow this process of fostering mutual respect and team work.

20152017

**Medical Simulations**

Up until 2015, all residents and staff of Brigham and Women's Hospital obtained their simulation training at Center for Medical Simulation, Boston. In 2015, the leadership decided to initiate simulation training at the Stratus Center for Medical Simulation, Brigham and Women's Hospital. After obtaining instructor training for Medical Simulation Instructor, I oversaw the development of curriculum for residents, and staff. Currently, all residents and fellows obtain their requisite training mandated by CRICO insurance at Stratus Center under my leadership. Last year we have developed curriculum to integrate surgical residents and operating room nurses. The underlying thinking is that surgical residents should also be trained during residency to master the skills of crisis resource management so that these tools are used when they become independent leaders and propagate the learned tools to their subordinates. I oversee the deployment of a team of instructors to over 40 sessions a year. I also participate in many such sessions as Instructor.

**Clinical Instructor Activities**

- |              |  |
|--------------|--|
| 2008-present | Instructor, Advanced Cardiac Life Support (ACLS), Brigham and Women's Hospital, Boston, MA |
| 2014         | Simulation Instructor Certification, The Institute for Medical Simulation, NYSIM, NY       |

**Report of Technological and Other Scientific Innovations**

I developed a novel way of learning and understanding thoracic and obstetric epidural using 3-D technology with two other co-investigators. This was presented at ASA Annual meeting in 2009 and 2011. In both instances, 3<sup>rd</sup> prize was awarded in the Scientific Exhibits Category. The novel aspect of the later presentation is the ability to view these 3D learning capabilities using YouTube media.

**Report of Education of Patients and Service to the Community**

**Activities**

- |      |  |
|------|--|
| 1984 | Medical Coordinator for First International Barbados Marathon run, Barbados. |
|------|--|

Member of emergency medical team providing emergency care to participants of initial events of “International Marathon runner” competition in Barbados. Emergency care was necessary for several visitors who were extensively dehydrated due to lack of acclimatization to tropical climate. In later years, better acclimatization by the participants to tropical climate, and training of emergency physicians to provide care, did not require anaesthesia group participation.

## **Educational Material for Patients and the Lay Community**

### **Books, monographs, articles and presentations in other media**

- 1992 Key participant in Public Education, Government Information Service of Barbados Anesthesia Video Film for Government Of Barbados: Participated in a short video film on “Educating the public regarding Anesthesia”. This TV program was televised on the Island’s television network twice so far.
- 2002- present [www.painfreebirthing.com](http://www.painfreebirthing.com) Designed, programmed, produced, and maintain an innovative website for pregnant women on pain free child birth options. See ‘Clinical Innovations’ for more information.
- 2007 ETV Network, Hyderabad, India  
Television interview on Obstetric Anesthesia: Participated in a TV interview on “Educating the public regarding pain free labor and delivery” Can be viewed at [www.painfreebirthing.com](http://www.painfreebirthing.com).
- 2008 Public Television Program “Good Morning Barbados” on pain free birthing to provide public with information on pain relief options during childbirth. Barbados

### **Patient educational material**

Kodali, BS, (2002-present). [www.painfreebirthing.com](http://www.painfreebirthing.com).  
Designed, programmed, produced, and maintain an innovative website for pregnant women on pain free child birth options. This is the first site to use computer animation graphics to explain concepts of pain free child birth, side effects, and complications. The patients can access the information at home or in the labor and delivery suites equipped with computer internet. This patient educational website has been demonstrated at several professional conferences, notable the annual SOAP meeting in 2006. Since then, the site has been translated into eleven languages. Translation of three more languages is in progress. Many educational institutions and private practice groups refer their patients to this website. The SOAP provides a link to this site on their patient education module. The British Journal of Anesthesia reviewed this website as a comprehensive resource on methods of labor analgesia.

*www.painfreebirthing.com* addresses a gap in the market by providing a fully comprehensive resource for those who wish to gain a fuller understanding of obstetric anaesthesia written in layman’s language. This site has the highest credentials, having been written by the academic department of the Brigham and Women’s Hospital in Boston, Massachusetts, USA. It immediately sets itself aside from other websites by asking the user to ‘agree’ to terms and conditions of use before being allowed entry into the rest of the site. This device, familiar to anyone who has downloaded software, adds an authoritative feel to the website and emphasizes the serious nature of the learning contract between author and reader”.

## Report of Scholarship

### Peer reviewed publications, monographs, and editorials

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## Non-peer reviewed scientific or medical publications/materials in print or other media Reviews

### Chapters

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### Books/Textbooks for the medical or scientific community

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### Letters to the Editor

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### **Professional Educational Materials or Reports, in print or other media**

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### **Thesis**

**Kodali, BS**. Oxygen saturation of hemoglobin after general anesthesia using IPPR. [dissertation] University of Madras, in partial fulfillment for the degree of MD, 1981.

### **Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings**

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### **Narrative Report:**

**My Area of Excellence is Clinical Expertise, Clinical Research and Innovation with Significant Supporting activities in Administration and Institutional service and Special Merit in Education.**

I currently serve as Interim Chair while simultaneously fulfilling my duties as an Attending Anesthesiologist and Vice Chair of Clinical Affairs for the Department of Anesthesiology, Perioperative and Pain Medicine at Brigham & Women's Hospital and an Associate Professor at Harvard Medical School. My experience encompasses 39 years in clinical anesthesia, 30 years in research, and 13 years in administrative leadership roles. I enthusiastically promote myself in the areas of clinical excellence, academic excellence, patient education, research, and administration and receive numerous honors and accolades in recognition of my unwavering commitment and invaluable contributions to anesthesiology.

My clinical responsibilities include provision of anesthesia care with a sub-specialty to thoracic, vascular, and obstetric patients, especially high-risk – many of which require intrauterine fetal intervention. My anesthesia care extends beyond the main operating rooms to outside of the main operating rooms. I also provide advice to faculty and residents wherever necessary.

As an exemplary teacher and educator, I am committed to teaching residents, fellows, and junior faculty via official monthly lectures and daily clinical interactions. In addition, I have given over 170 local, regional, national, and international presentations with topics covering obstetric anesthesia, coagulation, airway physiology, airway equipment, capnography, respiratory physiology, monitoring, and operating room efficiency. Every spring, I host a 4-hour Difficult Airway course as part of the Harvard Anesthesia Update. As well as being actively involved in national and international societies and their annual meetings, I review 15 national and international journals and am an external examiner for University of West Indies' anesthesiology programs. I am also an expert reviewer for NIH.GOV grant review process for capnography related grant applications under Clinical Sciences and Biomedical Engineering.

Two educationally Significant Supporting Activities are my websites Capnography.com and Painfreebirthing.com – both designed and maintained by me. For over 25 years, I've been exploring and

promoting the value of capnography and teaching a vast number of clinicians and others around the world through lectures, publications, and my teaching website [www.capnography.com](http://www.capnography.com). I've earned the global reputation as the leading expert in capnography, and [Capnography.com](http://Capnography.com), which is equivalent to a textbook, is ranked number one on major search engines. I was instrumental in proposing a standard nomenclature for capnography that is currently used by *Nunn's Applied Respiratory Physiology*, *Miller's Anesthesia* and other leading text books. [Painfreebirthing.com](http://Painfreebirthing.com) is a patient-oriented website intended to educate patients about labor and delivery and various pain relief methods available to women during labor and delivery. Many educational institutions, including SOAP, provide a link to this site for their patients. I've received several awards honoring both of these educational endeavors.

My research interests include, but are not limited to, capnography, physiology of pregnancy, airway changes during labor, laparoscopy during pregnancy, coagulation and blood transfusion, hemodynamic changes during cesarean delivery, and operating room efficiency. A unique feature of my research is that the findings have changed our understanding of physiology and our practice. My studies were first to focus on arterial to end-tidal gradients in pregnant women, physiology of laparoscopy in pregnant women, airway changes in labor, and evaluate the efficacy of high plasma to RBC ratio for transfusions, etc. I actively continue clinical research in obstetric anesthesia and aortic cross-clamping as well as mentor fellows and residents, two of which won the prestigious 'Gertie Marx Resident Award' for their research work.

In September, 2014, my administrative duties expanded from Vice Chair of Clinical Affairs to Interim Chair of the Department. As Interim Chair, I lead all aspects of the Department's enterprise, serve as the spokesperson for anesthesia faculty and staff, and represent the Department in interactions with the hospital and practitioners throughout the state and nation. Responsibilities include overseeing faculty recruitment, appointments, and evaluation, faculty promotions, educational, clinical and research programs, mentoring leadership, fiscal planning and management, and short- and long-term strategic planning. I steered the department from a negative budget in 2014 to a positive budget surplus in 2015 by careful fiscal planning, financial negotiations and strategic changes in staff deployment during this period, and laid down a firm foundation for the new chair to build upon.

As Vice Chair of Clinical Affairs, I oversee the provision of anesthesia clinical care services, which includes 60 locations (300 staff and residents). This multifaceted job encompasses the execution of short- and long-term strategies for improving overall anesthesia services. This includes overseeing and monitoring resident's ACGME requirements of case numbers, working hours, and clinical competence. One of my major achievements is fostering better relationships between OR nurses, support staff, and anesthesiologists with bi-annual interdepartmental breakfasts. Also of note, I spearheaded two initiatives that considerably improved OR efficiency: 1) a complete overhaul of the anesthesia technician work force with revised job description supplemented with training to help anesthesiologists start cases in a timely manner, and 2) a comprehensive study of subspecialty first case on time (FCOT) starts identifying needs in order to achieve institutional targets.

Over the years, I have made other considerable clinical innovations in the field of anesthesiology. In Barbados, I modernized anesthesia infrastructure and troubleshooted problems that are inherent to small developing islands, such as high humidity affecting equipment. During my tenure at BWH, I've made several changes in infrastructure, such as equipment availability and layout, staff coverage, building anesthesia offices, command centers, and work rooms, improving standards, information management, that have lead to safer, more efficient anesthesia care. I established the nation's first anesthesia services to the Advanced Multimodality Image Guided Operating Suite (AMIGO) and established and implemented the Perioperative Information Management System (PIMS) project and staff training. Presently, I'm implementing changes to decrease turn over time (TOT) in the operating room, leading EPIC

implementation in anesthesiology services in the operating rooms in BWH, and participating in the design of the new OR complex.

My international training and commitments have afforded me a worldly wisdom that impassions me to improve global standards in anesthesia: specifically, 1) making capnography during anesthesia a standard in underdeveloped countries and 2) making obstetric anesthesia safe in India and other countries. For example, as a result of my numerous lectures, discussions, and training workshops in India, many institutions, including small private practices, now use capnography, and the government has sanctioned changes, and continues to do so, mandating the use of capnography. Because I'm recognized as an expert in obstetric anesthesia, I am regularly invited to events and workshops to bring about safety awareness, and time after time I am recognized by prestigious institutions for my contributions as an academician and clinician, like my most recent nomination as Scientific Advisor for the 2015 8<sup>th</sup> National Conference of the Association of Obstetric Anesthesiologist and 1<sup>st</sup> World Obstetric Anesthesiology Congress, India.

## **Accomplishments as Clinical Director and Vice Chairman**

1. FCOT 38 to 70%
2. Establishment of Anesthesia office in PACU
3. Establishment of Work Room in the middle of OR complex
4. Anesthesia techs – Set up room to start the cases
5. 24/7 anesthesia tech coverage
6. Video laryngoscope introduction across operating rooms, obstetric and out of the operating room areas
7. Introduction of Capnography for codes
8. Introduction of Video laryngoscope /Bronchoscopes for Codes
9. Implementation of two electronic records
10. Oversee beginning of Satellite FOXBORO clinical operations
11. Oversee beginning Satellite Faulkner Hospital operations
12. Initiated Anesthesia nursing collegial relationship processes
13. Moving all gas lines up over to ceiling in old operating rooms to facilitate unimpeded movement of personnel providing care
14. Establishment of anesthesia command center in the main operating room complex
15. Preservation of two faculty offices in OR complex
16. Establishment of two lounges for anesthesia department
17. Refurbishing call rooms at L2
18. Enhancement of Anesthesia Department corridor face look
19. Establishment of AMIGO services
20. Train OR anesthesia floor leaders and providing few of them Harvard Business School and Brigham and Women's Hospital Leadership Program to understand value based clinical care
21. Reinstatement of SRNA program, when in crisis
22. Initiation and establishment of Simulation Program of for Residents to fulfill CRICO
23. Initiation and establishment of Nursing, Surgery, and Anesthesia combined simulation program to train residents in training the value of team work and fostering interpersonal respect.
24. Anesthesia outside the operating rooms: The anesthesia equipment, anesthesia cart and backup equipment at all outside of the operating room locations have been upgraded to the same standards in the operating room. This also includes the availability of anesthesia technician, video laryngoscope, and fiber optic bronchoscope. As far as anesthesiology service is concerned, there is no difference between operating room and outside the operating room locations.



**Clinical Coverage:**

1998 to present: **Obstetric Anesthesia**

Obstetric Anesthesia daytime coverage

Weekday night calls

Weekend coverage day and night calls

Teaching and training residents and fellows during the day and night

**Thoracic Anesthesia** operating room coverage:

1998 to 2014

Out of the OR operating rooms and main ORs including AMIGO

1998 to present

## **Accomplishments as Clinical Director and Vice Chairman**

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2. Establishment of Anesthesia office in PACU
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January 19, 2017

Bhavani Kodali, MD  
Department of Anesthesiology, Perioperative and Pain Medicine

Dear Dr. Kodali:

I am writing to congratulate you on being chosen as one of Brigham and Women's Hospital Distinguished Clinicians. The Distinguished Clinician Award is designed to recognize the most valued clinicians of our Brigham and Women's Hospital (BWH) community. This honorific title is reserved for the most accomplished and most widely recognized practicing physicians on the BWH staff. Recipients were nominated by their chairs and then selected by the committee.

Please join us for an award announcement program in Bornstein on Tuesday, January 31<sup>st</sup>, 2017 at 5:00pm, followed by a reception in the Cabot Atrium.

We are all grateful for the exceptional service you provide.

Sincerely yours,

*Stan*

Stan Ashley, MD

Selection Committee members:

Stan Ashley, MD, Chair

Robert Barbieri, MD

Elizabeth Loder, MD, MPH

Joseph Loscalzo, MD

## Feedback from 10 Year Vice Chairmanship

### From the Chairman

Dear Colleagues,

After spending nearly 10 years in clinical administration, including the critical year he served as Interim Chair that set the stage for our current success, Dr. Bhavani Kodali has asked to step down from his role as the Vice Chair for Clinical Affairs. Dr. Kodali will focus his efforts on leading the CRICO premium reduction program that will be expanded from periodic crisis management simulation to include team-based exercises. He has also taken the lead on developing targeted training for our residents to help them prepare for the OSCE portion of the ABA's new Applied Examination that will begin in 2018. Over the coming months, Dr. Kodali will transition his clinical administrative responsibilities to Drs. Monica Sa Rego and Stan Shernan.

Please join me in offering your heartfelt thanks to Dr. Kodali for all he has done to help lead the Department.

Bhavani, thank you. We owe you a debt of gratitude for all you have done for us.

### From Anesthesiology Staff:

Bhavani – you have a huge number of friends at BWH and I'm proud to be one of them. Huge thanks (and a personal one) for all of your help and support and education and everything that makes you special.

Omid Farokhzad MD

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Thank you for everything that you have done and all that you do!

You're amazing clinically and administratively and I've learned so much for you in both regards.

Robert Jason Yong MD

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Nice e-mail, Bhavani, completely agree with what Jim mentions below!

We owe you a lot for stabilizing our department during the transition year.

Looking forward to working many more years with you!

David Hepner MD, Associate Director, Preanesthetic Test Center

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Best of luck Dr Kodali, thank you for all your efforts. I think you'll be awesome in whatever you do.

Lalitha Sunder Raman MD

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Bhavani, you helped us through difficult transitions. Thank you for all your hard work.

Best of luck with your new areas of focus.

Beverly Philp MD

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Thank you so much for all your help and guidance – I've always appreciated your knowledge, leadership, and clinical skills since I was a resident – looking forward to working with you on the simulation programs.

Marc Piementel MD

---

Thanks for all of your efforts- the OR is a much better place as result. I look forward to seeing great innovations in Simulation.

Dennis Orgill MD, Professor of Surgery

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Thank you for the note. It has always been an honor to work with you. I suspect I will be asking your advice often.

Robert Lekowski MD, Program Director

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Thank you for your leadership Bhavani. I am glad you will still be available for advice.

Stan Shernan MD, Director of Cardiac Anesthesia and Executive Vice Chairman

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I believe old soldier never fades away.

Jay Zhou, Director Information Services, Anesthesiology

---

A wise man's presence is always there, it never fades. You thought us tirelessly and we will continue to reach out to you for wisdom, so don't you even dare thinking that you are fading :). You have a warm place in our hearts.

Assia Valovska MD

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I can't imagine this place without you doing all that you do. You are greatly loved (yes...even by me!) and I am giving you a virtual hug right now.

Wendy Gross MD, Director of Outside the Operating Room Anesthesia

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Dear Bhavani, you will be missed. Thank you for all your hard work and endless support throughout the last years,

All the best!

Martin Zammert MD

Director of Vascular Anesthesia and Renal Transplant

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You have been such a wonderful friend, colleague, mentor and leader to us through good and challenging times! We cannot thank you enough for your shared **unfading** wisdom, experience and for "carrying the world upon your shoulders" for us!

[https://youtu.be/A\\_MjCqQoLLA](https://youtu.be/A_MjCqQoLLA)

(an interesting archive recording - the real song starts a minute later:)

Looking forward to working with you on the next adventure, my friend!

Kamen Valassakov MD, Director of Orthopedics and Regional Anesthesia

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You are a gentleman and a scholar. I am privileged to call you my colleague.

Linda Aglio MD, Director of Neuro Anesthesiology

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Bhavani - I'd say I'll miss you, but I know you'll still be around to work with and proffer advice. Instead of goodbye: Congratulations! You won't have to deal with a constant deluge of crap!

In all seriousness, I appreciate your thoughtful guidance, insight, judgment, and restraint. I'm better for having worked with you, and I hope I can continue to do so going forward.

Joshua Vacanti MD

Director of Post Anesthesia Unit and Director of Operating Rooms

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Thank you so very much for your leadership, mentorship and great support for the past many many years during the challenging and non-challenging time. Fortunately you are still immediately available for us for providing advices and so forth.

Zhilling Xiong MD

Director of General Surgery Anesthesia and Urology

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This is terrible news for me to hear. I think you must know how much respect you command from me and everybody in this department, not just for your clinical abilities but for your fairness, level-headedness, and for being a grown-up when surrounded by people behaving like children. What I also know about you (that Chuck Vacanti also recognized), is your brilliant, creative problem-solving abilities.

Philip Hartigan MD

Director of Thoracic Anesthesia and Lung Transplant

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I learned a lot from you also Bhavani, thank you for hard and stressful work!

Hugh Flanagan MD

Director of Perioperative Areas

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You have such a profound and detailed understanding of the clinical operations in our department - I will truly miss your expertise and wisdom in handling any issues which arise. I am sure we will often be in touch :-)

Sacha Beutler MD, Associate Program Director of Residency Program

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It will be our loss, indeed. Your steady hand on the tiller for the last few years has made the OR a better place. We will all miss your clinical acumen and administrative insight.

Good luck with the simulation, but I hope we continue to catch sight of you from time to time.

David Brooks MD, Associate Professor of Surgery and Surgical Liaison to Operating Rooms. Program Director of The Brigham and Women's Advanced Minimally Invasive Surgery (MIS) Fellowship