

SOAP 2026

ANNUAL MEETING

SOAP
Society for Obstetric
Anesthesia and Perinatology

MONTRÉAL, QUÉBEC, CANADA  LE WESTIN MONTREAL

APRIL 29-MAY 3, 2026

SOAP 2026 SYLLABUS

#SOAPAM2026





SYLLABUS

SOAP 58th Annual Meeting

From Discovery to Delivery:
Bridging Research and Clinical Care
in Obstetric Anesthesia

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Welcome to Montréal!

On behalf of the SOAP Board of Directors and the 2025–2026 Annual Meeting and Live Events Committee, we are delighted to welcome you to Montréal for the **SOAP 58th Annual Meeting**.

This year's meeting continues SOAP's tradition of bringing together clinicians, scientists, educators, and trainees dedicated to advancing the care of mothers and babies around the world. Through collaboration, innovation, and shared expertise, we aim to translate new discoveries into meaningful improvements in obstetric anesthesia and perinatal care.

The 2026 Annual Meeting promises an engaging and dynamic scientific program featuring cutting-edge educational sessions, interactive workshops, and opportunities to connect with colleagues from across the globe. Attendees will enjoy many of SOAP's most anticipated traditions!

We are especially pleased to feature a **Keynote Address by Dr. Beverley Orser**, whose pioneering work in anesthetic pharmacology and patient safety has profoundly influenced modern anesthetic practice. The program will also include the **Fred Hehre Lecture delivered by Dr. Valerie Arkoosh**, a physician and health policy leader whose work has focused on improving maternal health and healthcare systems. In addition, the meeting will feature the prestigious **Ostheimer Lecture by Dr. Richard Monks**, one of SOAP's most distinguished educational traditions, celebrating innovation and excellence in obstetric anesthesia. Finally, the meeting will open with the always exciting **Gertie Marx Research Competition**, which highlights outstanding trainee research and the future leaders of our specialty.

Of course, the SOAP Annual Meeting is not only about outstanding science and education—it is also about community. We look forward to gathering together for some of SOAP's favorite traditions outside the lecture halls, including the **SOAP FUN Run**, a wonderful opportunity to start the day with colleagues while enjoying Montréal, and the **Party with a Purpose**, a special event that brings our community together in support of maternal health initiatives around the world.

When you're not immersed in the meeting's educational sessions, Montréal offers a vibrant and unforgettable setting. Known for its rich culture, historic architecture, and exceptional culinary scene, Montréal blends European charm with North American energy. Wander through the cobblestone streets of **Old Montréal**, visit the stunning **Notre-Dame Basilica**, or enjoy the cafés, markets, and festivals that make this city one of North America's most beloved destinations.

The SOAP Annual Meeting is more than a conference—it is a gathering of a passionate community committed to improving the lives of mothers, babies, and the clinicians who care for them. We hope this meeting sparks new ideas, strengthens collaborations, and inspires continued progress in our field.

We are thrilled to welcome you to Montréal and look forward to an inspiring and memorable meeting.

Sincerely,



Daniel Katz, MD
*Annual Meeting and Live Events
Committee, Chair*



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SOAP President

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Thank You, Planning Committees

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With special thanks to members of the following subcommittees who volunteered their time and expertise to the planning of the 58th Annual Meeting.

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Special thanks are due to Michaela Farber, MD, MS, chair of the Abstract Review Subcommittee, and the dedication of these volunteers who reviewed hundreds of abstracts to help in creating the educational program.
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Program Information

ACCME Accreditation and Designation Statements



Jointly provided by the American Society of Anesthesiologists and Society for Obstetric Anesthesia and Perinatology.

Accreditation Statement

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of American Society of Anesthesiologists and (name of joint provider). The American Society of Anesthesiologists is accredited by the ACCME to provide continuing medical education for physicians.

Physician Continuing Education

The American Society of Anesthesiologists designates this live activity for a maximum of 24.75 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Optional Workshops

International Symposium: French Symposium

The American Society of Anesthesiologists designates this live activity for a maximum of 4.00 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Trauma Informed Care Workshop

The American Society of Anesthesiologists designates this live activity for a maximum of 2.00 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Research Symposium

The American Society of Anesthesiologists designates this live activity for a maximum of 3.00 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

POCUS Workshop

The American Society of Anesthesiologists designates this live activity for a maximum of 3.00 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Focused Cardiac Ultrasound (TTE) Refresher Workshop

The American Society of Anesthesiologists designates this live activity for a maximum of 2.00 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

IARS/IJOA Workshop

The American Society of Anesthesiologists designates this live activity for a maximum of 2.75 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Neuraxial Block Workshop

The American Society of Anesthesiologists designates this live activity for a maximum of 2.50 AMA PRA Category 1 Credit(s)[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

2026 SOAP Annual Meeting

About This Meeting

Advancements in obstetric anesthesiology research are rapidly transforming our understanding of maternal and fetal care. However, translating these discoveries into improved clinical outcomes remains a significant challenge. Bridging the gap between scientific innovation and bedside application requires collaboration among researchers, clinicians and educators to ensure that emerging evidence is effectively integrated into practice. The Society for Obstetric Anesthesiology and Perinatology (SOAP) 2026 Annual Meeting seeks to foster this translation by highlighting cutting-edge research, evidence-based implementation strategies, and real-world clinical applications. Through shared dialogue and multidisciplinary engagement, the meeting aims to accelerate the movement of research from bench to bedside, ultimately enhancing the safety and quality of care for mothers and newborns.

Target Audience

This meeting is intended for Anesthesiologists, Anesthesiologists Assistants, CRNAs, Nurses, Resident/Fellows, and Medical Students interested in the recent advances in obstetric anesthesia and the application of these advances to their practice.

Mission of the SOAP Annual Meeting and Live Events Committee

The mission of the AMLE Committee is to provide anesthesiologists, obstetricians, and other physicians and members of related allied health specialties with the knowledge that will reinforce past learning as well as disseminate new concepts, practices, and skills involving anesthesia and analgesia for the pregnant patient.

Participation in the SOAP 58th Annual Meeting

Attendance is open to all health practitioners, provided that they have registered for the meeting. CME credit will only be offered to those with an MD, DO or equivalent.

Educational Format

CME activities may include the following formats: plenary sessions, debates, lectures, poster discussions, oral abstracts, problem-based learning, and skill-set workshops.

Annual Meeting Objectives

At the completion of this conference the participants should be able to:

1. Identify and summarize current advances in obstetric anesthesiology research with potential for translation into clinical practice.
2. Discuss barriers and facilitators to implementing evidence-based research findings in obstetric anesthesia.
3. Evaluate strategies to integrate translational research principles into quality improvement and patient safety initiatives.
4. Describe methods to foster collaboration between researchers and clinicians that enhance the translation of evidence into bedside care.
5. Apply an evidence-informed framework when developing or updating clinical protocols to improve maternal and neonatal outcomes.

Special Needs Statement

The American Society of Anesthesiologists and the Society for Obstetric Anesthesia and Perinatology are committed to making its activities accessible to all individuals and fully comply with the legal requirements of the Americans with Disabilities Act and the rules and regulations thereof. If you are in need of an accommodation, please do not hesitate to submit a description of your needs in writing to membership@soap.org.

Disclosure Policy

The American Society of Anesthesiologists remains strongly committed to providing the best available evidence-based clinical information to participants of this educational activity and requires an open disclosure of any potential conflict of interest identified by our faculty members. It is not the intent of the American Society of Anesthesiologists to eliminate all situations of potential conflict of interest, but rather to enable those who are working with the American Society of Anesthesiologists to recognize situations that may be subject to question by others. All disclosed conflicts of interest are reviewed by the educational activity course director/chair to ensure that such situations are properly evaluated and, if necessary, resolved. The American Society of Anesthesiologists educational standards pertaining to conflict of interest are intended to maintain the professional autonomy of the clinical experts inherent in promoting a balanced presentation of science. Through our review process, all American Society of Anesthesiologists CME activities are ensured of independent, objective, scientifically balanced presentations of information. Disclosure of any or no relationships will be made available for all educational activities.

How to Receive CME Credit

To receive credit, participants must access the ASA Education Center, review the meeting information, and complete the evaluation. Further instructions will be emailed to each participant immediately prior to and after the activity.

Disclaimer Statement

The information provided at this accredited activity is for continuing education purposes only and is not meant to substitute for the independent medical judgment of a healthcare provider relative to diagnostic and treatment options of a specific patient's medical condition.

Meeting Workshops

Workshops

International Symposium – French Symposium

For the first time, the Association des anesthésiologistes du Québec (AAQ) and the Collège d'Anesthésie-Réanimation en Obstétrique (CARO) unite in an unprecedented Francophone collaboration, enriched by the Société Marocaine d'Anesthésie Réanimation and the President of the Moroccan Club of Obstetric Anesthesiologists. Organized by the Society for Obstetric Anesthesia and Perinatology (SOAP) in Montréal, this landmark initiative celebrates excellence, inclusion, diversity, and shared expertise, advancing obstetric anesthesia through a truly global Francophone alliance. Explore the potential for international collaborations in research, education, and clinical practice in obstetric anesthesia. Network with leading professionals and foster cross-border partnerships. Enhance your global perspective and contribute to the advancement of the field in this enriching symposium.

Focused Cardiac Ultrasound (TTE) Refresher Workshop

This hands-on workshop is for practitioners with some experience in basic TTE that wish to refresh their skills and learn doppler techniques useful to the non-cardiologist. Standard and advanced TTE-windows will be practiced on patient models including doppler applications relevant to the OB-anesthesiologist. Attendees will learn how to estimate cardiac output, SVR, differentiate states of shock, assess diastolic function, pulmonary artery pressures and review learned techniques in presented Obstetric-related cases. Workshop and performed scans are recognized part of the ASA-diagnostic POCUS certificate program.

Trauma-Informed Care for Optimal Outcomes

This immersive and interactive workshop covers the basics of trauma-informed and collaborative care in the obstetric setting. This program utilizes various learning platforms to present the material: didactic lectures introduce psychological trauma and its relevance in the peripartum period, in addition to communication strategies for optimal outcomes; case exploration in small groups will address perspective taking and management of acute stress responses; simulation exercises will allow participants to reinforce their new skills in a variety of challenging scenarios. Time will be allocated for final debriefing, questions, self-care, and reflection prior to completion of the workshop.

Point-of-Care Ultrasound (POCUS)

This workshop includes online FAST (Focused Assessment with Sonography for Trauma), Airway-, and Gastric-, precourse to be completed prior to attending this workshop. POCUS workshop covering Gastric-, Neuraxial-, Airway-, and FAST(abdominal) ultrasound. The focus of the workshop will be hands-on training on patient models with brief, 10-15 minutes lectures on each topic.

Neuraxial Block Workshop

We've all been there, the difficult neuraxial technique. A number of characteristics that may make neuraxial anesthesia difficult are associated with medical and surgical complexities that make successful neuraxial technique all the more critical. The main thrust of this workshop is to expose obstetric anesthesia providers to a variety of tools to improve success with difficult neuraxial techniques. Through a variety of stations, attendees will have hands-on experience with mixed reality neuraxial trainers, mixed reality pterygopalatine ganglion ultrasound image acquisition and live models for ultrasound acquisition.

Sessions

Best Case Reports

This live presentation highlights some of the most well-written and interesting case reports submitted to the Annual Meeting. Cases were selected to represent a wide range of topics from various institutions and are sure to foster lively discussions among the panelists. There will be author and audience participation, via virtual chat function, to encourage interactive discussion. This engaging session will be moderated by Dr. Sharon Reale.

Best Paper Competition

This curated session includes presentations from the top rated and most impactful research abstracts submitted this year. Presenters compete for the title of SOAP Annual Meeting Best Paper via presentations and a question-and-answer session. This competition will be moderated by Dr. Ruth Landau Research Abstract Subcommittee Chair and distinguished researchers in the obstetric anesthesiology field.

Case Reports Sessions

These moderated sessions, scheduled for Thursday, Saturday, and Sunday, are designed to highlight educationally valuable case reports submitted and presented by obstetric anesthesiology fellows and residents across the country. There will be opportunities to participate and ask questions regarding some of the most challenging clinical scenarios our presenters have encountered.

Research Abstracts Sessions

These moderated sessions, scheduled for Thursday, Saturday, and Sunday, showcase the state-of-the-art research being conducted in obstetric anesthesia.

Oral Presentations

Oral presentations of diverse, high-quality and hand-selected peer-reviewed scientific research related to obstetric anesthesia will be presented in sessions on Thursday, Saturday, and Sunday, followed by a moderated question-and-answer session. Thursday's session will be moderated by Sharon Reale, MD, Mary Yurashevich, MD, and Adam Wendling, MD, Saturday's session will be moderated by Mark Norris, MD and Jessica Sheeran, MD and Sunday's session moderators will be Elizabeth Lange, MD and Katie Clark, MD.

Gertie Marx Research Competition

Named in memory of obstetric anesthesia pioneer Gertie Marx, this research competition highlights the best quality research performed by our trainees (medical students, residents, and fellows). Six presenters will compete in this judged competition, moderated by Dr. Lisa Leffert and judged by Dr. David Berman, Dr. Jill Mhyre, Dr. Carolyn Weiniger, Dr. Alex Butwick, and Dr. Anton Chau.

Fred Hehre Lecture

This session offers reflections from a renowned member of the obstetric anesthesia community, which bring insights into scope of practice changes over time and focuses on what matters most to the art and science of obstetric anesthesia practice. This year's Fred Hehre lecturer will be obstetric anesthesia legend Dr. Valerie Arkoosh.

Gerard W. Ostheimer Lecture

Always a highlight and one of the most highly anticipated sessions of the meeting, the Gerard W. Ostheimer lecture is a review of important, relevant, and practice-changing literature related to obstetric anesthesia, obstetrics, perinatology, and allied medical disciplines that was published in the preceding calendar year (2025). This digestible synthesis of the literature analyzes the clinical impact of published works and latest evidence-based advances in the field of obstetric anesthesia. This year's Ostheimer lecturer will be Dr. David Monks.

SOAP Distinguished Service Award Presentation & Awards Ceremony

Join us as we honor Dr. Mark Zakowski, 2026 recipient of SOAP's highest honor, the 2026 Distinguished Service Award. Dr. Zakowski will be introduced by Dr. Lawrence Tsen. This session will also include Dr. Ron George, SOAP President, announcing recipients of the Gertie Marx and Best Paper Competitions, Teacher of the Year Awards, Research in Education, Frederick P. Zuspan Award, Patient Safety Award, and the Diversity and Inclusivity Award. Don't miss it!

Keynote – Expanding Access to Safe and Equitable Anesthesia Care

The keynote presentation is Dr. Beverley Orser. Beverly Orser, MD is an internationally recognized leader in anesthesiology research, perioperative neuroscience, and patient safety. Dr. Orser has consistently bridged scientific discovery and clinical application. Her keynote will highlight how rigorous research can directly inform anesthetic practice, improve patient outcomes, and shape the future of obstetric and perioperative care.

President's Panel: Beyond the Evidence - Implementing Research into Everyday Obstetric Anesthesia Practice

The session will be moderated by Dr. Ron George and including panelists Mark Neuman, MD; Ruth Landau, MD; Jill Mhyre, MD; Cynthia Wong, MD; Beverley Orser

OAA: An Outsiders View of the Abstracts at SOAP

Dr. Nuala Lucas will provide an international perspective on the case reports and research abstracts presented at the SOAP Annual Meeting. She will highlight key themes, emerging trends, and insights, offering attendees a broader, global context for the work showcased.

SOAP/SOCCA Panel: Crashing Postpartum: Navigating Hemodynamics in the First 24 Hours

The panel will include "Point-of-Care Ultrasound to Guide Volume and Cardiac Assessment" by Ioannis Angelidis, MD, MSPH, "Fluid Shifts and Vasoplegia: The First 12–24 Hours Postpartum" by Bushra W. Taha, MD, "Postpartum Hypotension: Diagnosing the Underlying Cause" by Megan Hicks, MD

ASA Update: Addressing the Current Anesthesiology Workforce Shortage

SOAP is honored to host Dr. Patrick Giam, President, American Society of Anesthesiologists, for an update on the work of the ASA. SOAP President Dr. Ron George will provide the introduction.

Clinical Track / Sol Shnider Clinical Track**Tracking Maternal Mortality: From Dada Collection to Impact**

This session is presented by Dr. Kokila Thenuwara, MD; Holly Ende, MD; LaToya Mason, MD; Michaela Farber, MD.

Updates in Obstetric Hemorrhage

This session will be moderated by Dr. Leziga Obiyo and paneled by Dr. Naida Cole, Dr. Jessica Ansari, and Dr. John Kowalczyk. Topics include: Risk Factors, Update in Uterotonics, Calcium, and TXA/TEG.

Anesthetic Management of Fetal Interventions

This session will be moderated by Dr. Mark Rollins and paneled by Dr. Dave Berman and Dr. Sebastian Seifert.

Translating Research into Practical Applications: Retrofitting Evidence for your Private Practice Setting

This session is moderated by Dr. Feyce Peralta and will cover clinically relevant reviews and updates for important topics including "Implementing these Evidence-Based Clinical Care Practices will have the Highest Impact on maternal outcomes in your private practice setting" presented by Dr. Laurie Chalifoux, "Systems-Based Changes to Elevate Safety and Reduce Maternal Morbidity in our Smaller Communities," presented by Dr. Jeanette Bauchat, and "How to Prepare Young Anesthesiologists to assume the role of change agent on Labor and Delivery and Beyond as they move from Academics to the Private Sector," presented by Dr. Megan Rosenstein.

Update on Reproductive Health Access

This session will be presented by Dr. John Markley.

No U-turn on Equity: Navigating Resistance and Retaining Progress

This session will be moderated by Dr. Allison Lee, and paneled by Dr. Kokila Thenuwara and Dr. James Damron.

SOAP Research Network Symposium

The third iteration of the SOAP Research Network Symposium provides the opportunity to present research proposals to SOAP's network of research experts, who will provide constructive feedback on rigor, relevance, methodology, ethics, feasibility, and fundability of research ideas and discuss opportunities for potential project collaborators. This is an excellent opportunity to receive constructive feedback with the goal of everyone in the SOAP research community supporting everyone's excellent research!

SOAP 2026 PROGRAM SCHEDULE

THURSDAY, APRIL 30

- 7:00am – 9:00am Continental Breakfast in Expo Hall
Grande Place (8th Floor)
- 7:00am – 8:00am Special Interest Group Roundtable Discussions
Grande Place (8th Floor)
- 7:00am – 8:00am International Attendee Meet-Up
Beaver Hall (8th Floor)
- 8:00am – 8:10am Opening Remarks
Montréal (11th Floor)
Ron George, MD, FRCPC – SOAP President
- 8:10am – 9:40am Gertie Marx Research Competition
Montréal (11th Floor)
Moderator: Lisa Leffert, MD
Judges: David Berman, MD; Carolyn Weiniger, MB ChB; Alex Butwick, MD; Jill Mhyre, MD; Anton Chau, MD
- Magnesium Sulfate and Postpartum Hemorrhage: A Target Trial Emulation with Dose-Response Analysis - Mahesh Challapalli, BS
 - Factors Associated with Conversion from Neuraxial to General Anesthesia for Cesarean Delivery: Mixed-Effects Analysis from the Multicenter Perioperative Outcomes Group - Daniel F. Berenson, MD, PhD
 - Immune Dysregulation in Uterine Atony Could Suggest New Ways to Treat Postpartum Hemorrhage - Payton Marshall, MD, PhD
 - Gestational Thrombocytopenia and Risk of Postpartum Hemorrhage and Severe Maternal Morbidity: A Population-Based Analysis - Samuel Rafla, MD
 - Geographic Validation of an Automated, Electronic Medical Record-Enabled Postpartum Hemorrhage Prediction Model - Susannah S. Oster, BS
 - Defining Representation of Anesthesiologists on State Maternal Mortality Review Committees: A Report from the SOAP State Representatives Program - McKenzi I. Thompson, MPH
 - Patient-reported pain, pressure, and intraoperative analgesic use during cesarean delivery: a prospective descriptive study - Alexander Morris, BS
 - Cesarean Delivery Mortality Rate in Eastern Africa: Data from a Multi-Country Cohort - Lily Y. Bai
- 9:40am – 10:20am Break with Exhibitors
Grande Place (8th Floor)
- 10:30am – 11:10am Keynote: Expanding Access to Safe and Equitable Anesthesia Care
Montréal (11th Floor)
Beverley Orser, MD
- 11:10am – 12:00pm President's Panel: Beyond the Evidence - Implementing Research into Everyday Obstetric Anesthesia Practice
Montréal (11th Floor)
Moderator: Ron George, MD, FRCPC

Thursday, April 30 - Continued

Panelists: Beverley Orser, MD; Ruth Landau, MD; Jill Mhyre, MD; Mark Neuman, MD; Cynthia Wong, MD

12:00pm – 1:00pm LUNCH ON YOUR OWN

12:00am – 1:00pm Sponsor Lunch (NO CME) – pre-registration required
BD – *Ste-Antoine (9th Floor)*

1:00pm – 5:00pm CONCURRENT: International Symposium: French
Fortifications (9th Floor)

- 1:00pm – 2:00pm
Acide tranexamique, coagulopathie, microangiopathie thrombotique (Tranexamic acid, coagulopathy, thrombotic microangiopathy) - AS Bouthors, MD (France), Sandra Lesage, MD (Quebec)
- 2:00pm – 3:00pm
Bien-être maternel et anesthésie obstétricale / optimisation anesthésique et troubles psychiques maternels (Maternal well-being and obstetric anesthesia / anesthesia optimization and maternal mental health) - MP Bonnet, MD (France), Anne Lavoie, MD (Quebec)
- 3:00pm – 4:00pm
Anesthésie générale pour césarienne en 2026 (General anesthesia for cesarean delivery in 2026) - Lionel Bouvet, MD (France), Valérie Zaphiratos, MD (Quebec)
- 4:00pm – 5:00pm
Échographie en anesthésie obstétricale (Ultrasound for obstetric anesthesia) - Adnane Berdai, MD (Morocco), Fatine Karkri, MD (Quebec)

1:00pm – 1:30pm ASA Updates: Addressing the Current Anesthesiology Workforce Shortage
Montréal (11th Floor)
Patrick Giam, MD
ASA President

1:30pm – 2:15pm Fred Hehre Lecture
Montréal (11th Floor)
Intro: Grace Lim, MD
Speaker: Valerie Arkoosh, MD, MPH

2:15pm – 2:45pm Break with Exhibitors
Grande Place (8th Floor)

2:45pm EXPO HALL CLOSES FOR THE DAY

2:45pm – 5:45pm Breakout Session: Case Reports & Oral Research Presentations – **NO CME**
Breakout Session: Research Abstracts – **NO CME**

Case Reports Room 1: McGill (8th floor)**Oral Research Presentations Group 1: 2:45 PM – 3:45 PM**

1. Association between Systolic and Diastolic blood pressure and lung water in patients with preeclampsia – a point-of-care USG-based observational study - Shreya Goswami MD

Thursday, April 30 - Continued

2. Women's short-term recall of their multidimensional labor pain, experienced just prior to epidural insertion, is reliable 20-30 minutes after receiving neuraxial pain relief - Pamela Angle MD FRCPC MSc (oxon)
3. Pregnancy-related outcomes in patients with pulmonary hypertension: a multicenter retrospective cohort study - Braydon Bak MB,BCh,BAO
4. Preeclampsia with Severe Features: How Do We Track Severe Features? - Kristen Harris
5. Lead contamination in donated packed red blood cells: implications for intrauterine transfusions and neonates receiving transfusions - Olivia Nelson MD
6. Experiences of trauma after delivery in critically ill obstetric patients: a case-control qualitative pilot study -Yael Sarig

Case Reports Room 1: McGill (8th floor)

Oral Research Presentations Group 2: 3:45 PM – 4:45 PM

1. New gadgets at Labor floor: A preliminary comparison of ROTEM Sigma, ROTEM Delta and Clauss Fibrinogen for the Obstetric Patients - Aymen Alian MD, MSc, MBBCh
2. Early Thromboelastographic Phenotypes in Severe Postpartum Hemorrhage: A Multicenter Observational Cohort Study - Grace Lim MD MSc MBA
3. Association of general anesthesia with postpartum hemorrhage following cesarean delivery among patients who did not attempt labor: a single-center retrospective study -Isabella Hardej BS
4. Impact of Postpartum Hemorrhage on Early Recovery After Cesarean Delivery - Jeroen De Haes MD, EDAIC, EDIC
5. Optimal Programmed Intermittent Epidural Bolus Volume of Ropivacaine and Dexmedetomidine in Dural Puncture Epidural Technique for Labor Analgesia: A Biased-Coin Up-and-Down Sequential Allocation Study - Yongxin Liang
6. Risk of General Anesthesia for Cesarean Delivery by Race: Results from Multicenter Perioperative Outcomes Group (MPOG) Registry - Alexander Butwick, MS, MBBS

Case Reports Room 1: McGill (8th floor)

Case Reports: 4:45 PM – 5:45 PM Challenging Acuity

1. ECMO is in the Birth Plan: Peripartum Management of Severe Pulmonary Hypertension Requiring Preterm Cesarean Delivery - Ian Funk MD
2. Placenta Accreta Syndrome with Iliac Artery Invasion - Brooke Freese MD
3. Surprise! A Sneaky Invasion of the Bladder by Uterus Causing Massive Hemorrhage - Anwesa Basa BS
4. When Seconds Matter: Emergent ECMO Cannulation for Cardiac Arrest in the Setting of Life-Threatening Amniotic Fluid Embolism - Chelsea Holbrook MD
5. Ante In Extremis: Acute Management of Prepartum Amniotic Fluid Embolism - Connor McElwee MD
6. Life-Threatening Peripartum Cardiomyopathy (PPCM) in a Previously Healthy Parturient - Interplay Between Genetic Susceptibility and Pregnancy-Related Stress - Lauren McHenry MD
7. Anesthetic Considerations for Cesarean Delivery and Type A Aortic Dissection Repair in a patient with Marfan Syndrome - Kelley Smith MD

Thursday, April 30 - Continued

8. Pulseless Pregnancy: Navigating Cesarean Delivery with an LVAD Christopher Mukasa MD
9. Lipid Emulsion Use During Maternal Cardiac Arrest with Suspected Amniotic Fluid Embolism - Alex Hydock MD
10. Management of Cocaine-Induced Type A Aortic Dissection at 30 Weeks Gestation- Lucas Steele MD

2:45pm – 5:45pm Breakout Session: Case Reports – **NO CME**

Case Reports Room 2A: Ste- Hélène (8th floor)**Potpourri: 2:45 PM – 3:45 PM**

1. It Takes a Village: A Multidisciplinary Approach to a Complex Case of Placenta Accreta Spectrum - Tyler King MD
2. Transversus Abdominis Plane Catheters for Opioid-Free Analgesia Following Cesarean Delivery in a Patient with Mast Cell Activation Syndrome - Brian Vickers MD
3. Beyond the Expected: Anesthetic Management of an Elderly Parturient with Triplet Gestation - Kelechi Anyaehie MD, MPH
4. Amniotic Fluid Embolism: Early detection and aggressive treatment leading to a good outcome - Shobana Bharadwaj MBBS
5. Navigating the Hemodynamic Stress Test: Successful Pregnancy in a Paced Fontan Patient with Situs Inversus - Erin Ross DO
6. General Anesthesia for Cesarean Delivery in a Parturient with Pre-eclampsia and New-Onset Complete Heart Block - Shobana Bharadwaj MBBS
7. Multidisciplinary Management of a Parturient with Recent SCAD-Induced STEMI for Combined Cesarean Delivery and Myomectomy - Feras Alhourani MD, MBA
8. A Case Report of Takotsubo Cardiomyopathy in Pregnancy: When Form Reflects Dysfunction - Trenton Dawson MD
9. Navigating the Mitochondrial Maze: A Case Report of Emergent Cesarean Delivery Following Labor Induction in a Patient with Leigh Syndrome - Nancy Greenspon MD
10. Management of a Parturient with a History of Thoracic Sympathetic Ganglion Ablation - Alaya Bodepudi MD

Case Reports Room 2A: Ste- Hélène (8th floor)**Respiratory Challenges: 3:45 PM – 4:45 PM**

1. Management of a Previa Patient with Severe Aortic Valve Endocarditis with Aortic Valve Insufficiency, Requiring VV-ECMO for Bronchospastic Respiratory Failure - Ian Funk, MD
2. A Case of Peripartum Decompensated Nonischemic Cardiomyopathy with Real-Time Hemodynamic Demonstration of Postpartum Autotransfusion and Early Right Heart Failure Management - Caroline Miller
3. Peripartum Cardiomyopathy: A Rare Cause of Acute Heart Failure in Pregnancy Alexis Toy DO
4. Anesthetic Management of Labor Analgesia in a Pregnant Woman with Heart Failure with Reduced Ejection Fraction, Thromboembolism and Morbid Obesity - Ashka Surve MBBS MD
5. Prolonged Hospital Course complicated by Pulmonary Hypertension, Congestive Heart Failure, and Tracheostomy during Pregnancy - Sydney Labat MD
6. BMI 104 with Shortness of Breath and Active Lower Extremity Thrombus Cesarean Section - Ashley Del Bianco DNAP, CRNA
7. When Neuraxial Is the Only Safe Airway: Managing a Non-Intubatable Parturient with Myasthenia Gravis and Anticoagulation - Gabrielle Migliozi MD

Thursday, April 30 - Continued

8. High risk delivery in a patient with significant hemoptysis: a neuraxial strategy supported by inhaled tranexamic acid - Kenneth Nguyen DO
9. A Breath of Fresh Air: Considerations for Parturients with Idiopathic Tracheal Stenosis - Natalie Campbell MD
10. Shortness of Breath... Pleural Effusion... Anterior Mediastinal Mass... Stage IV Lymphoma - Susanne Rupert MD

Case Reports Room 2A: Ste- Hélène (8th floor)**Coagulopathy: Congenital and Iatrogenic (4:45 PM – 5:45 PM)**

1. Isolated Hypofibrinogenemia in an Obstetric Patient - Xavier Cortez MD
2. Spinal Anesthesia for Cesarean Section Delivery in a Primigravida with Type 3 Von Willebrand Disease - Hayley Turnbow DO
3. When Pregnancy's Prothrombotic State Is Not Enough: Refractory Acquired Hemophilia A - Jacob Selph MD
4. Navigating Neuraxial Risk in Bernard–Soulier Syndrome: An Evidence-Informed Obstetric Approach - Daniel Ratushnyak MD
5. Obstetric Anesthesia Without Neuraxial: Management of Rare Platelet Disorders - Nicole Russell MD
6. Neuraxial Anesthesia after Intradialytic Heparin: A Knowledge Gap in Pregnant Patients with ESRD - Bethany Lutter MD
7. Use of Fondaparinux for DVT prophylaxis in High Risk Obstetric Patients with Heparin Allergy - Miles Sullivan MD
8. Pulmonary Hypertension, Prostacyclin Analogs, and Platelet Function: A Case Series - Daniel Webster MD
9. Obstetric Anesthesiology at the Forefront: Management of Submassive Saddle Pulmonary Embolism for Safe Vaginal Delivery - Mariana Acosta MD
10. Peripartum Management of a Parturient with a History of Truncus Arteriosus and Mechanical Aortic Valve on Warfarin - Margaret Duval, MD

Case Reports Room 2B: Ste- Hélène (8th floor)**Potpourri: 2:45 PM – 3:45 PM**

1. Peripartum management of Hypodysfibrinogenemia: A Case Report - Christine Ha MD
2. Gravid Hysterectomy Treatment for Bleeding Placenta Accreta with Concomitant Factor V Leiden-Associated Pulmonary Embolism - Damon Wallace MD
3. Plasminogen Activator Inhibitor Deficiency in Pregnancy - Michael Vogel DO
4. When The Best Laid Plans Go Awry: Peripartum Management of Type 2B von Willebrand Disease - Adanna Ekekwe BS
5. Intravenous Thrombolysis Following Epidural Placement and Removal - Antanina Voit MD
6. A Multidisciplinary Approach to Cesarean Delivery in a Patient with Hypertrophic Cardiomyopathy and Amide Local Anesthetic Allergy - Dillon Patel MD
7. Anesthetic Considerations of Severe Mitral Stenosis in the Peripartum Period - Emma Stoltz MD
8. Ebstein Anomaly in the Parturient: Management Considerations - Robert Guidangen MD
9. Anesthetic Management of a Cesarean Section with Severe Mitral Stenosis and Pulmonary Hypertension - Coleman Harber MD

Thursday, April 30 - Continued**Case Reports Room 2B: Ste- Hélène (8th floor)****Call for ECMO! (3:45 PM – 4:45 PM)**

1. ECMO for resuscitation of a patient with an amniotic fluid embolism - Ani Chilingirian MD
2. Seconds to Deliver: Maternal Arrest and Resuscitative Cesarean Delivery in Suspected Amniotic Fluid Embolism - Brianna Hidreth MD
3. Regional Anesthesia with Extracorporeal Membrane Oxygenation (ECMO) Backup and Remifentanyl Infusion for Cesarean Delivery and Mediastinal Biopsy in a Parturient with a Large Anterior Mediastinal Mass - Vinay Khare MBBS
4. Triple (Threat) Therapy: Acute Exacerbation of Pulmonary Hypertension During Cesarean Delivery - A Case Report - Jessica White MD
5. Obesity and ECMO Challenges in Postpartum Code Blue Fiona Chambers
6. Peripartum Decompensation in a Patient with History of Septal Myectomy for Hypertrophic Obstructive Cardiomyopathy - Lauren Brown MD
7. From Postpartum Hemorrhage to Cardiac Arrest: Multidisciplinary Management With VA-ECMO - Anne Bryden MD
8. Anesthetic Management of Repeat Cesarean Delivery in a Patient Supported by a HeartMate 3 Left Ventricular Assist Device - Kevin Bennett MD
9. Veno-Arterial ECMO for Cardiac Arrest and Severe Hypoxia from Pulmonary Edema Associated with Massive Transfusion caused by Necrotizing Chorioamnionitis -Anika Tanwani MD
10. Multi-system Crises and Postpartum Hemorrhage Requiring ECMO and Subsequent Neurosurgical Intervention – Storm Alexander, BA

Case Reports Room 2B: Ste- Hélène (8th floor)**A TRAP and many EXITS - FETAL HOUR (4:45 PM – 5:45 PM)**

1. Making rarity routine: anesthetic and systems approach to TRAP sequence laser ablation in a smaller center Jessica Bonilla, DO
2. An Early EXIT - Andrea Fritz MD, MPH
3. Dynamic Maternal Anesthetic Strategies in a Complex Fetal Airway during an Ex-Utero Intrapartum Treatment - Sanaz Bayani MD
4. Anesthetic Management of High-Risk EXIT for Fetal CHAOS in Preterm Labor With Suspected Concealed Abruptio - Austin Zheng MD Candidate
5. Simulation-based Interprofessional team training to prepare for Ex Utero Intrapartum Treatment-to-Airway for fetal neck mass - Darragh O'Reilly MBBS, MSc, FCAI
6. The EXIT Procedure and Considerations for the Obstetric Anesthesiologist -Lilly Fang MD
7. Ex-Utero Intrapartum Treatment (EXIT) for Parturient with Maternal Hyperthyroidism and Goiter Complicated by Fetal Goiter and Potential Fetal Airway Obstruction - Sayo McCowin MD, PhD
8. Balancing the Lifeline: Anesthetic Management of Uterine Relaxation During an EXIT Procedure for Treacher Collins Syndrome - Noorul Asyikeen Kasim Anaesthetist
9. Integrated Ex-Utero Intrapartum Treatment and Postnatal Resection of Giant Cervical Teratoma: Anesthetic Management Across the Perinatal Continuum - Marina Noia MD
10. Application of finger guided blindly vision orotracheal intubation in resuscitation of neonatal asphyxia - Mingjun Xu

Thursday, April 30 - Continued**Case Reports Room 3: Beaver Hall (8th floor)****Triple A: Airway, Angioedema, Anaphylaxis (2:45 PM – 3:45 PM)**

1. Pregnancy Risk Assessment and Anesthetic Management for Oocyte Retrieval in a Patient with Severe Airway Pathology - Elana Kreiger-Benson MD
2. Airway Management Planning for Delivery in a Parturient with Congenital Mandibular Hypoplasia: A Case Report- Maria Santa Cruz DO
3. Prepared Before the Push: Peripartum Management in a Parturient with Gorlin and Sotos Syndromes and a Known Difficult Airway- Sophia Jacob MD
4. Navigating a High-Risk Airway in an Obstetric Patient: A Case of Venolymphatic Malformation - Desby Cheribin
5. Serial Assessment of the Airway in a Single Parturient: Transnasal Endoscopic Laryngoscopy, Mallampati Evolution, and Multidisciplinary Collaboration - Daniel Conti MD
6. Successful Use of Continuous Chloroprocaine Epidural Analgesia for Labor in a Patient With Confirmed Lidocaine Allergy- Maegan Tupinio MD
7. Angioedema following Cesarean Section under General Anesthesia Damon Wallace MD
8. Anesthetic Management of Emergent Cesarean Delivery in a Patient with Hereditary Angioedema Type III - Lamiya Rahman BA
9. Peripartum Management of Progesterone Hypersensitivity: A Multidisciplinary Approach to Catamenial Anaphylaxis in Pregnancy - Sunitarani Kucharlapati MD
10. Suspected Intravenous Carboprost Administration Mimicking Anaphylaxis and Severe Preeclampsia During Cesarean Delivery: A Case Report - Jacelyn Lever MD, PhD

Case Reports Room 3: Beaver Hall (8th floor)**Heart: Congenital and Valve Challenges: 3:45 PM – 4:45 PM**

1. Cesarean Delivery in a Parturient with Severe MS, PH, and VSD: A Case Report – Connor Crowe
2. Right Heart, Wrong Time: Severe Tricuspid Regurgitation During Labor - Jacob Davis MD
3. Anesthetic Management for Cesarean Delivery in a Parturient with Severe Bicuspid Aortic Stenosis and Left Ventricular Hypertrophy: A Case Report – Melika Hajykarim, BS
4. Anesthetic Considerations for Mitral Valve Replacement During Pregnancy - Kelley Smith MD
5. Emergent cesarean section in a parturient with an unbalanced atrioventricular (AV) canal defect status post complete repair - Alexia Gagliardi MD
6. Caesarean section in Rheumatic Heart Disease with simultaneous severe Mitral Stenosis, moderate Mitral Regurgitation and Pulmonary Hypertension - Reda Hafiane
7. Midnight VACTERL Challenge: A Complicated Cesarean Delivery After Dark Emily Bliss MD
8. Management of Cesarean Delivery in a Patient with Fontan Physiology - Kevin Rivera MD
9. Anesthetic Management of a Parturient with Single-Ventricle Physiology and Congenitally Corrected Transposition of the Great Vessels during Cesarean Delivery - Emily Breland Edwards MD

Thursday, April 30 - Continued**Case Reports Room 3: Beaver Hall (8th floor)****PDPH: Management and Morbidity (4:45 PM – 5:45 PM)**

1. Navigating the Nuances: A Case of Post Dural Puncture Headache Followed by Massive Cerebral Venous Sinus Thrombosis - Jean-Paul Russo MPH
2. Clinical Course and Management of Pneumocephalus Complicated by Postdural Puncture Headache After Labor Epidural Anesthesia: Update in Management - Samuel Sobarzo
3. Aborted Epidural Blood Patch in an Obstetric Patient With Undiagnosed Lumbar Spinal Stenosis and Epidural Lipomatosis- Briel Lee MD
4. Beyond post-dural puncture headaches: Subdural hematomas after neuraxial placements - Emily Styslinger MD, MPH
5. Cortical Vein Thrombosis Presenting After Apparent Resolution of Post-Dural Puncture Headache Following Epidural Blood Patch - Juliana Kruthof MD, MSc, FRCPC
6. More Than Just Air: A Case of Pneumocephalus, PDPH, & CVT - Niketu Patel MD
7. Murphy's Law in Neuraxial Anesthesia: A Case of Iatrogenic Pneumocephalus After Repeat Epidural Blood Patch - Anna Wright MD
8. Cerebral Venous Sinus Thrombosis Following Suspected Post-Dural Puncture Headache After Neuraxial Labor Analgesia - Adrienne Clark MD
9. Epidural Blood Patch Through an Epidural Catheter - Jennifer Garcia MD
10. Fluoroscopic Evidence of Retrograde Contrast Spread from the Epidural to Subarachnoid Space During an Epidural Blood Patch in an Obstetric Patient - Charlotte Bloom DO

Case Reports Room 3: Beaver Hall (8th floor)**Uterine Rupture!: 2:45 PM – 3:45 PM**

1. Unusual Presentation of Uterine Rupture - Silvia Chiang MD
2. From Spontaneous Unscarred Uterine Rupture With Occult Retroperitoneal Hematoma To Upper Extremity Phlegmasia Cerulea Dolens: A Cascade Of Coagulopathy And Paradoxical Thrombosis - Francinni Mambrini Pires Rego MD
3. Early Gestational Uterine Rupture: A Rare Anesthetic Emergency at 13 Weeks - Chloe Abbott
4. Spontaneous Uterine Rupture In An Unscarred Primigravida: Diagnostic Challenges Under Epidural Analgesia - Charlene Wun Kuk, MS
5. Posterior Uterine Rupture: Pain as Presenting Symptom - Abigail Cantwell MD
6. Severe Pain and Diagnostic Pitfalls: Two Cases of Uterine Rupture in a Scarred Uterus - Borislava Pujic MD
7. A case of uterine rupture requiring emergent cesarean delivery in a patient with minimal risk factors - Hanna Mandl MD
8. Conservative management of uterine rupture after Vaginal Birth After Cesarean - Flavia Dumitrascu MB BCH BAO
9. A Case of Uterine Rupture in a Patient with Sickle Cell Disease - Margaret Duval MD

Case Reports Room 3: Beaver Hall (8th floor)**Chiari and Other Neuraxial Challenges: 3:45 PM – 4:45 PM**

1. Neuraxial Anesthesia for Cesarean Delivery in a Parturient with Spinal Epidural Lipomatosis and Chiari I Malformation: A Case Report - Paulina Blanc, DO
2. Planned General Anesthesia for Cesarean Delivery in Parturient with Chiari Malformation - Victoria Buckman MD

Thursday, April 30 - Continued

3. Anesthetic management of a parturient with Ebstein anomaly and Tethered cord syndrome: A Case Report - Shu Zhao MD
4. Tethered Spinal Cord Precluding Neuraxial Anesthesia in a Parturient with Congenitally Corrected Transposition of the Great Arteries - Manrit Gill MD
5. Anesthetic Management of Cesarean Delivery in a Patient With Prior Tethered Cord Release - Madisen Faulkner MD
6. Interstitial Fluid Mimicking Cerebral Spinal Fluid Leak After Epidural Catheter Removal: A Case Report - Praeophayom Clarke, Nicole Cho, Zakery Dabbagh
7. Management of Accidental Dural Puncture and Intrathecal Catheter- No CSF return? A Clinical Conundrum - Karen Izquierdo MD
8. Cerebrospinal Fluid Cutaneous Fistula Following Uncomplicated Neuraxial for Labor Analgesia: A Case Report - Paulina Blanc, DO
9. Pneumocephalus Following Combined Spinal-Epidural for Labor Analgesia - Chelsi Flanagan DO, MPH
10. Pneumocephalus without obvious dural puncture in a laboring patient with prior lumbar discectomy - Austin Burrows MD

Case Reports Room 3: *Beaver Hall (8th floor)*

Pharmacology Challenges: 4:45 PM – 5:45 PM

1. Reversible Cerebral Vasoconstriction Syndrome Following Methylergonovine Maleate Administration During Cesarean Delivery - Carolina Aravera MD
2. Intravenous Methylergonovine Maleate during Cesarean Section: A Case Series Riley - Hales MD MBA
3. Is Nitrous Oxide Contraindicated in Patients with MTHFR Gene Mutations? Kaylea Gunn MD
4. Perioperative Considerations for an Obstetric Patient with Allergies to Lidocaine and Bupivacaine - Damon Wallace MD
5. Anesthetic Challenges in GLUT-1 Deficiency: A Case Report and Review of Perioperative Considerations - Xiao Lu Zhang DO, PhD
6. Gaucher Disease in Pregnancy: Anesthetic and Peripartum Considerations in a High-Risk Parturient - Jacob Weber MD
7. Navigating Labor Analgesia in SAPHO Syndrome: A Case of Intrathecal Pump Associated Complexity - Katrina Kerolus MD
8. Withdrawal From Medetomidine-Adulterated Fentanyl During Pregnancy: A Case Report - Chloe Kern MD, MAS
9. Dilutional Danger in Labor: Oxytocin Exacerbation of Severe Peripartum Hyponatremia - Sophia Wu MD
10. Peripartum Management of Carbamoyl Phosphate Synthetase I Deficiency: A Case Across Two Pregnancies - Antanina Voit MD

2:45pm – 5:45pm

Breakout Session: Research Abstracts – **NO CME**

Research Abstracts Room 1: *Palais (8th floor)*

Recovery: Morbidity, Depression: 2:45 pm – 3:45 pm

1. Association between Severe Perioperative Surgical Morbidity with Cesarean Delivery and Postpartum Readmission - Alexander Butwick, MBBS, FRCA, MS
2. Severe Maternal Morbidity and Comorbidity Burden Among Transgender and Gender Nonconforming Birthing Patients - Jil Decker, MD
3. Hospital Variation in Severe Perioperative Surgical Morbidity Associated with Cesarean Delivery - Alexander Butwick, MBBS, FRCA, MS

Thursday, April 30 - Continued

4. Association Between Postoperative Opioid Exposure and Postpartum Depressive Symptoms Following Cesarean Section- Josephine Reed BS
5. Association of Perinatal Mood and Anxiety Disorders With Anesthesia-Related Complications in Cesarean Delivery Hospitalizations -Anna St. Denis
6. Outcomes after positive postpartum depression screening at 4–8 weeks: a single US center retrospective cohort study - Aleesha Jethwa MBBS, BMedSci, MSED
7. Association of Patient Anxiety and Time of Delivery with Duration of Urinary Catheterization Following Cesarean Delivery Under Neuraxial Anesthesia: A Prospective Cohort Study - Aislynn Sharrock BA (Hons), MScR Candidate

Research Abstracts Room 1: Palais (8th floor)**Potpourri (3:45 pm – 4:45 pm)**

1. Inherited Bleeding Disorders Carry a High Hemorrhage Burden: A Retrospective Cohort Study in a Large Healthcare System (2015-2025) - Yalda Toofan MS, MD
2. Optimizing hemodynamics and analgesia for patients undergoing caesarean delivery with spinal anesthesia in a limited resource setting - Kimberly Mendoza MD, PhD, MPH
3. Anesthetic Perspectives and Practices Toward Procedural Abortion: A Survey of Society for Obstetric Anesthesia and Perinatology Members - John Markley MD, PhD
4. Results from the Making Every Baby Count Initiative in Four Regional Hospitals in Ghana - Medge Owen MD
5. Long-Acting Intrathecal Opioids Decrease Postoperative Opioid Requirements following Scheduled Cesarean Hysterectomy for Placenta Accreta Spectrum - Damon Wallace MD
6. Analgesic efficacy of transversalis fascia plane block for post-caesarean pain management. A systematic review and meta-analysis - Jocelyn Wang
7. Apgar score according to neonates' race and associations with skin-to-skin initiation and resuscitative interventions - Charlotte Thompson BA

Research Abstracts Room 1: Palais (8th floor)**Potpourri #2: 4:45 pm – 5:45 pm**

1. Incidence Of Postpartum Hemorrhage and Related Risk Factors: A Retrospective Study -Monica Siaulys PhD MD
2. A single-center retrospective analysis of inadequate neuraxial anesthesia for postpartum tubal ligation - Mindy Kim BS
3. Association of patient and clinical characteristics with successful external cephalic version: a single-center retrospective study - Danielle Sader MD
4. Two doses of antepartum betamethasone reduces airway complications in neonates compared to 1 dose in 32-36 week population - Andrew Warburton MD
5. Prevalence of Peripartum Anemia and Iron Deficiency Anemia at Delivery in a Large Urban Safety-Net Cohort - Jean-Paul Russo MPH
6. Failure Mode and Effects Analysis of Iron Deficiency Anemia Management in Pregnancy: Identifying High-Priority Risks for Obstetric and Perinatal Care - Jean-Paul Russo MPH
7. Impact of Postpartum Hemorrhage on Quality of Recovery After Vaginal Delivery - Jeroen De Haes MD, EDAIC, EDIC

Thursday, April 30 - Continued**Research Abstracts Room 2: Viger (8th floor)****Making Epidurals Better: 2:45 pm – 3:45 pm**

1. The Effect of Painful Contractions on Time Perception during Epidural Placement for Labor Analgesia - Katherine Hatter MD
2. Impact of a Spring-Loaded Epidural Syringe on the Learning Curve of Labor Epidural Placement in Anesthesia Residents: A Quasi-Randomized Controlled Trial - Noor Raheel MD, MPH
3. Association between opiate use disorder and physician provided epidural boluses for labor analgesia - Amnon Berger, MD, PhD
4. Making Labor Epidural Analgesia Better: A Quality Improvement Project: Part 3 - Wei Ni Zhou BA
5. Reducing Labor Epidural Failure Through Targeted Interventions: A Quality Improvement Initiative - Beth Clayton, DNP, CRNA
6. Prepare to Fail? The impact of developing an institutional protocol on improving confidence in the management of the failing epidural - Darragh O'Reilly MBBS, MSc, FCAI
7. Pain with Labor Epidural Analgesia (PLEA): A Scoping Review - Christine Ha, MD
8. Factors Associated with Unintended Dural Puncture (UDP) and Failed Neuraxial Anesthesia in Obstetric Anesthesia: Targeting Anesthesia Residency Quality Improvement - Manuel Vallejo, MD, DMD, FASA

Research Abstracts Room 2: Viger (8th floor)**Recovery: Pain, Sleep, Anxiety: 3:45 pm – 4:45 pm**

1. Burden of chronic postsurgical pain after caesarean delivery on maternal quality of life: a systematic review - Samira Alwahabi BS
2. Chronic Pain in Pregnancy: Implications for Labour Outcomes and Peripartum Anesthetic Management - Manuela Morgan
3. Prevalence and Association of Postpartum Pain According to the Anesthetic Technique Used: a Retrospective Study - Monica Siaulys, PhD, MD
4. A systematic review and meta-analysis to determine the minimal clinically significant difference for Obstetric Quality of Recovery 10 scores - Moe Takenoshita BSc, MBBChir, MRCS
5. Association between Sleep Duration and Vagal Activity during the Postpartum Period: Insights from Wearable Digital Health - Marie-Louise Meng, MD
6. Development of adapted postpartum PROMIS sleep disturbance (PROMIS+PP-SD) and sleep-related impairment (PROMIS+PP-SRI) item banks - Moe Takenoshita BSc, MBBChir, MRCS
7. Predictors of delayed urinary catheter removal following enhanced recovery after cesarean delivery: a retrospective cohort study - Sunti Barahi MD, FRCPC

Research Abstracts Room 2: Viger (8th floor)**Leadership: Operations and Research: 4:45 pm – 5:45 pm**

1. Fate of Survey Research Presented at the Society for Obstetric Anesthesia and Perinatology Annual Meetings (2015–2019) - Markus Gulilat MD, PhD
2. Cost awareness of common neuraxial anesthesia medications and materials among obstetric anesthesia providers: A cross-sectional survey-based pilot study - Leah Han
3. Health System Resilience During the COVID-19 Pandemic: A Multicenter Analysis of Cesarean Delivery Efficiency - Sherry Wu BA
4. Reducing practice variability in obstetric anesthesia in a private hospital through a structured, team-based implementation of SOAP Centers of Excellence recommendations - Eliane Soares MD

Thursday, April 30 - Continued

5. Workplace-related Reproductive Hazards, Exposures and Mitigation Strategies for Anesthesiologists who are Pregnant and/or Conceiving: A Scoping Review - Namhee Kim
6. IJOA at a Glance: a digital information tool to enhance engagement and rapid knowledge dissemination for obstetric anesthesiologists - Eliane Soares MD
7. Publication Rate of Research Abstracts Selected for Oral Research Presentations at the Society of Obstetric Anesthesia and Perinatology Annual Meetings (2015-2019) - Kaitlin Nelson BSc, MSc

Research Abstracts Room 3: Ramezay (8th floor)**Uterotonics and TXA: 2:45 pm – 3:45 pm**

1. Uterotonic Practices During Cesarean Delivery – A Survey of the Society for Obstetric Anesthesia and Perinatology Centers of Excellence - Alva Powell MD
2. Effect of Sequential Tranexamic Acid Timing Strategies on Postpartum Hemorrhage After Cesarean Delivery: A Multi-Phase Quality Improvement Evaluation - Ruhi Patil BS
3. Optimizing Oxytocin Delivery: Comparing IV and IM routes in cesarean delivery - Philip A Feinberg MD, PhD
4. The Origin Sites for Uterine Contractions in Pregnant Mice - David Combs MD PhD
5. Can a tablet do the job? The effect of oral calcium on maternal plasma concentration - Lauren Blake MD, MHS
6. Prophylactic vs Therapeutic Tranexamic Acid for Cesarean Delivery with PPH and Hemorrhage Outcomes: A Multicenter Retrospective Cohort Study - Lillian Liao MD, MS
7. Clinical Efficacy of Carbetocin as Primary Uterotonic in High-Risk Cesarean Deliveries: A Retrospective Case Series from a Brazilian Public Tertiary Center francinni mambrini - Pires Rego MD

Research Abstracts Room 3: Ramezay (8th floor)**Patient Voices: 3:45 pm – 4:45 pm**

1. Language-based disparities in obstetric blood transfusion: a retrospective cohort study - Lauren Blake MD, MHS
2. Evaluation of Patient-Reported Outcomes Measurement Information System (PROMIS)-29 v2.1 for Postpartum Women - Fernanda Septimio Lanza Oliveira, MD
3. Food for Thought: Patient Perspectives on Diet During Labor with Epidural Analgesia - Mahathi Kosaraju
4. Patient-centered care during neuraxial placement and operating room preparation for cesarean delivery: allowing support people in the operating room - Sebastian Seifert MD
5. Factors affecting Patient Satisfaction with Labor Pain Management: A Qualitative Analysis of Patient Interviews - Bansri Doshi MS
6. Patient Satisfaction and Preference Valuation in Neuraxial Labor Analgesia Across a Diverse Population - Diana Ruiz BS
7. Cesarean Deliveries under Unplanned General Anesthesia: A Qualitative Thematic Analysis of Patient Perspectives - Mariah Johnson BSc (Hons)

Research Abstracts Room 3: Ramezay (8th floor)**Pain Control: 4:45 PM – 5:45 PM**

1. Utilization of Multimodal Analgesia after Cesarean Delivery with Neuraxial Anesthesia Following Enhanced Recovery and ACOG updated Guidelines - Alana Davidson

Thursday, April 30 - Continued

2. Effects of a Multimodal Analgesic Approach on Opioid Exposure Among Vaginal Delivery Patients: A Retrospective Study - Tyler Chau BS
3. Utilization of Multimodal Analgesia after Cesarean Delivery with General Anesthesia 2018-2023 - Alana Davidson
4. Intravenous methadone vs intravenous hydromorphone for analgesia following cesarean delivery under general anesthesia: a retrospective study - Breta Awuku MD
5. Postoperative Opioid Use and Pain After Repeat Cesarean Delivery: A Within-Patient Retrospective Cohort Study - Briel Lee MD
6. Intravenous methadone versus intrathecal morphine for analgesia following cesarean delivery: a randomized clinical trial - Catherine Gao MD
7. A Single-Center Feasibility Study of a Single Pain Skills Session (Empowered Relief®) for Postpartum Pain at 6 Weeks after Cesarean Delivery - Aleesha Jethwa MBBS, BMedSci, MSED

5:45pm – 7:45pm Welcome Reception
Grande Place (8th Floor)

7:45pm DINNER ON YOUR OWN

FRIDAY, MAY 1

6:30am – 8:30am Continental Breakfast in Expo Hall
Grande Place (8th Floor)

6:30am – 8:00am Special Interest Group Roundtable Discussions in Expo Hall
Grande Place (8th Floor)

7:00am – 7:30am Medical Student/Resident/Fellow Meet-Up
McGill (8th Floor)

7:00am – 8:00am CRNA Meet-Up
Ste- Hélène (8th Floor)

7:00am – 8:00am Mentoring Academy Meetup
Beaver Hall (8th Floor)

8:00am – 9:00am AA Meet-Up
Ste- Hélène (8th Floor)

8:00am – 8:10am Opening Remarks
Montréal (11th Floor)
Dan Katz, MD – Annual Meeting & Live Events Committee Chair

8:10am – 8:20am SOAP/FAER MRTG Update: An introductory overview, emphasizing rationale, objectives, planned methods, and anticipated outcomes
Montréal (11th Floor)
Brittany Burton, MD

Friday, May 1 - Continued

- 8:20am – 9:20am Tracking Maternal Mortality: From data collection to impact
Montréal (11th floor)
Panelists: Kokila Thenuwara, MD; Holly Ende, MD; LaToya Mason, MD; Michaela Farber, MD
- 9:20am – 10:00am Break with Exhibitors
Grande Place (8th Floor)
- 10:00am – 11:00am Awake and in Pain: Addressing a Crisis in Obstetric Anesthesia
Montréal (11th floor)
Moderator: Caitlin Sutton, MD
Panelists: Alex Butwick, MD; Heather Nixon, MD; Cristina Wood, MD; Tracey Vogel, MD
- 11:00am – 12:00pm SNAP TALKS: Are you convinced it is broken? How do you fix it?
Montréal (11th floor)
- When to replace the epidural when transitioning to cesarean delivery (should we revisit the safety of spinal) - Tiffany Angelo, MD
 - When to convert to General Anesthesia - Sharon Reale, MD
 - Adjuncts to spinal/epidural anesthesia during Cesarean Delivery - Brendan Carvalho, MD
- 12:00pm – 1:00pm LUNCH ON YOUR OWN - **Exhibit Hall Closes for the Day**
- 12:00pm – 1:00pm Sponsor Lunch (NO CME) – pre-registration required
RIVANNA – *Ste-Antoine (9th Floor)*
- 1:00pm – 4:00pm CONCURRENT: SOAP Research Network Symposium
Fortifications (9th Floor)
- 1:00pm – 2:00pm CONCURRENT: SOAP/SOCCA Panel
Montréal (11th Floor)
Crashing Postpartum: Navigating Hemodynamics in the First 24 Hours
- Point-of-Care Ultrasound to Guide Volume and Cardiac Assessment
Ioannis Angelidis, MD, MSPH
 - Fluid Shifts and Vasoplegia: The First 12–24 Hours Postpartum
Bushra W. Taha, MD
 - Postpartum Hypotension: Diagnosing the Underlying Cause
Megan Hicks, MD
- 2:00pm – 3:00pm CONCURRENT: Updates in Obstetric Hemorrhage
Montréal (11th floor)
Moderator: Leziga Obiyo, MD
Panelists: Holly Ende, MD; Naida Cole, MD; Jessica Ansari, MD; John Kowalczyk, MD
- 3:00pm – 4:00pm CONCURRENT: Anesthetic Management of Fetal Interventions
Montréal (11th floor)
Moderator: Mark Rollins, MD
Panelists: Dave Berman, MD; Caitlin Sutton, MD
- 7:00pm – 9:00pm SOAP EF Fundraising Event – Ticket Required
Le Salon Richmond
550 Rue Richmond, Montréal, QC H3J 2R9, Canada

SATURDAY, MAY 2

- 6:30am – 8:30am Continental Breakfast in Expo Hall
Grande Place (8th Floor)
- 7:00am – 8:30am Special Interest Group Roundtable Discussion
Grande Place (8th Floor)
- 8:00am – 11:00am WORKSHOP: POCUS (fee & preregistration required)
Fortifications (9th floor)
Moderator: Cristian Arzola, MD
Faculty: Brinda Kamdar, MD; Naveed Siddiqui, MD; Evan Wild, MD; Fabricio Zasso, MD; Naida Cole, MD; Leziga T. Obiyo, MD; Javier Cubillos, MD; Ana Sjaus, MD
- 8:00am – 9:30am Breakout Session: Case Reports & Oral Research Presentations – **NO CME**
Room 1: McGill (8th floor)
Breakout Session – 1: Oral Research Presentations
1. General Anesthesia, Pain During Cesarean Delivery, and Their Intersection With Patient Satisfaction: An Exploratory Study To Help Refine General Anesthesia As a Quality Metric - Kerwin Wang BA
 2. Intraoperative Pain During Cesarean Delivery and Perinatal Mood and Anxiety Disorders – Rachel Pinkhasov, BS
 3. Intraoperative Pain During Cesarean Delivery – A Survey of Practice in Centers of Excellence (COE), as designated by the Society for Obstetric Anesthesia and Perinatology (SOAP) - Jace Battrell MD, MSMP
 4. Pressure experience during cesarean delivery: risk factors, management, and patient satisfaction - Scott Kelly BS
 5. Intrathecal dexmedetomidine and visceral sensations and pain during cesarean delivery: a prospective patient-reported outcome study - George Ghafari BS
 6. Analysis of Adjuvant Medication Use During Cesarean Delivery Under Neuraxial Anesthesia -Tauras Vucianis BS
 7. Associations between patient preferred language and real-time reported pain experienced during cesarean delivery - Alyson Sato BS
 8. A Descriptive Study of Retrospective Data to Define the Incidence and Severity of Intraoperatively Recorded Pain Scores in Patients Undergoing Cesarean Delivery Under Neuraxial Anesthesia - Heather Nixon MD
 9. Self-Reported Pain, Pressure, and Satisfaction During Cesarean Delivery in Patients with Spanish as Preferred Language - Stephanie Wong BA
 10. Intraoperative pain during cesarean delivery and impaired quality of recovery: a retrospective cohort study - Darragh O'Reilly MBBS, MSc, FCAI
- 8:00am – 9:30am Breakout Session: Case Reports – **NO CME**
Case Reports Room 2A: Ste- Hélène (8th floor)
Cardio Obstetric Challenges (8:00 am – 8:45 am)
1. Reflections on 2 high-risk cardio-obstetrical patients - Ali Mubarki, MD
 2. Anesthetic Considerations Of Cardiomyopathy In The Periparum Period - Emma Stoltz MD
 3. Peripartum anesthetic considerations for patients with high-risk congenital heart disease - Braydon Bak MB,BCh,BAO
 4. Anesthetic Management of a PArturient with Co-arctation of Aorta and Noonan Syndrome Undergoing Cesarean Section: A Case Report - Ashka Surve MBBS MD

Saturday, May 2 - Continued

5. Early Recognition and Anesthetic Implications of Pericardial Effusion in Pregnancy - Kayla Walker BS
6. Anesthetic Management of a Patient with Rheumatic Heart Disease Undergoing Cesarean Delivery - Tyler Austin MD
7. Anesthetic Management for the Pregnant Patient with a Moderate-sized Right Ventricle Pericardial Effusion - Lucas Steele MD

Case Reports Room 2A: Ste- Hélène (8th floor)

Coagulation, Hemorrhage, And Hemoglobin (8:45 am – 9:30 am)

1. Successful Embolization of Spontaneous Uterine Artery Rupture Following Vaginal Delivery - Haylee Bergstrom MD
2. When Expectations Mislead: Anchoring Bias in Postpartum Hemorrhage - Margaret Lund MD
3. Anesthetic Considerations in an Obstetric Patient with Hemoglobin Casper Complicated by Moyamoya - Damon Wallace MD
4. Thromboelastography-Guided Neuraxial Anesthesia in a Parturient with Delta Storage Pool Disease - Thaha Afridi
5. When Collagen and Clotting Fail: Catastrophic Postpartum Hemorrhage in a Patient with Ehlers–Danlos Syndrome and Functional Platelet Disorder - Nicholas Mangano
6. Perioperative Management of a Pregnant Patient with Hereditary Spherocytosis - Katina Kasscieh MD

Case Reports Room 2B: Ste- Hélène (8th floor)

Ethics (8:00 am – 8:45 am)

1. Respecting Autonomy at the Edge of Risk: Cesarean Refusal Following Prior Uterine Rupture - Megan Howell DO
2. Ethical Challenges in Obstetric Anesthesia: Managing Medically Indicated Cesarean Delivery in the Setting of Acute Psychosis - Emma James Barksdale MD
3. Ethical and Logistical Challenges during Emergent Cesarean Delivery for an Incarcerated Patient with HELLP Syndrome and Schizophrenia - Shreya Goswami MD
4. A Preventable Delay: Cesarean Scar Ectopic Pregnancy Complicated by Restrictive Reproductive Policy - Jil Decker MD
5. Ethical Considerations in Acutely Intoxicated Obstetric Patients - Safwat Choudhury MD
6. Peripartum Management of Acute Psychosis - Katherine Rosecrance MD

Case Reports Room 2B: Ste- Hélène (8th floor)

Critical Decisions (8:45 am – 9:30 am)

1. Ruptured Hepatocellular Adenoma in Pregnancy: Navigating Maternal-Fetal Conflict - Miriam Griffin MD, MSCR
2. When Magnesium Masquerades: Complexity in Obstetric Anesthesia - Vivienne Pham, BS
3. Balancing Relative Contraindications: Epidural Anesthesia in a Pregnant Patient with Cardiac and Hepatic Dysfunction - Anna Bragg MD
4. Paternal Malignant Hyperthermia and Risk to Susceptible Fetus During Maternal Anesthesia - Monika Martinek MD

Saturday, May 2 - Continued

5. A Triple Threat at the Incision: Severe Pulmonary Hypertension, Impending Thyroid Storm, and Preeclampsia with Severe Features in Cesarean Delivery - Saheb Dhillon MD
6. A Pivot in Plans: Preeclampsia and PPRM in a Patient with PAH - Andrea Fritz MD, MPH
7. Pregnancy-Preserving Management of a Uterine Artery Pseudoaneurysm - Justine Lewis MD

Case Reports Room 3A: Beaver Hall (8th floor)**Cesarean Delivery, Unusual Issues (8:00 am – 8:45 am)**

1. Decompensated Cirrhosis in Pregnancy Complicated by Placental Abruption - Silvia Chiang MD
2. Cesarean Delivery in a Parturient with Refractory Epilepsy and Neurosyphilis - Mohammad Nawaz MD
3. Anesthetic Management of a Morbidly Obese Parturient Requiring Preterm Delivery due to Severe-Range Hypertension - Maria Santa Cruz DO
4. Delivery Management in Marfan Syndrome with Aortic Root Dilation and Failed Combined Spinal-Epidural - Colette Jones
5. Anesthetic Considerations for Cesarean Delivery in a Patient with History of Antepartum Hemicraniectomy - Jeremy Altman MD
6. Intentional Minimalism: Anesthetic Choice for Cesarean Section in Patients with Myotonic Dystrophy - Katherine Fortson, MD

Case Reports Room 3A: Beaver Hall (8th floor)**Misc Hematology (8:45 am – 9:30 am)**

1. Second Trimester Abortion Complicated by Atypical Hemolytic Uremic Syndrome - Elizabeth McCarthy MD, PhD
2. Management Considerations in a Parturient Patient with BENTA Disease Daniel Stevens MD
3. Thinking Outside the Epidural Space: Labor Analgesia in a Patient With PNH and Prior TBI - Briel Lee MD
4. Anesthetic management of a parturient with May-Hegglin anomaly Reagan Hattaway MD
5. Needles, Numbers, and Nuance: Two Cases of Neuraxial Anesthesia in FXI Deficiency - Fatine Karkri MD
6. Anesthetic decision-making under diagnostic uncertainty in suspected pregnancy-associated thrombotic microangiopathy with intrauterine fetal demise - Shingo Tanaka MD
7. Neuraxial Denied: Anesthetic Management of Severe Pancytopenia and Presumed Myelodysplastic Syndrome in a Patient with Superimposed Preeclampsia - Nicholas Mangano

Case Reports Room 3B: Beaver Hall (8th floor)**Complex Cesarean (8:00 am – 8:45 am)**

1. Anesthetic Management for an EXIT Procedure in a Parturient With Fetal Cervical Teratoma - Xinhao Liu MD/PhD
2. Successful management of extended cesarean section and hysterectomy with neuraxial blockade - Flavia Dumitrascu MB BCh BAO
3. Case Report: Emergent Total Colectomy for Toxic Megacolon During Pregnancy - Katherine Dunshee DO
4. Case Report: Anesthetic Management for Cesarean Delivery in a Pancreas-Kidney Transplant Recipient with Renal Graft Failure - Parth Rajguru DO

Saturday, May 2 - Continued

5. Third Trimester Polytrauma after High Speed MVC: A Lesson in Triage - Nilang Shah MD
6. A case of acute kidney injury following resuscitative endovascular balloon occlusion of the aorta for management of postpartum hemorrhage due to partial placenta previa - Mana Takizawa MD
7. Recurrent Severe Postpartum Abdominal Complications After Cesarean Delivery - Kristen Harris

Case Reports Room 3B: Beaver Hall (8th floor)**Complex Accreta (8:45 am – 9:30 am)**

1. Anesthetic Management of Cesarean Delivery in a Heterotopic Twin Pregnancy with Extrauterine Placenta Percreta - Adam Wendling, MD
2. Anaesthetic considerations in rudimentary horn twin pregnancy with placenta accreta - a case report - Suji Pararajasingam FRCA
3. A Case of Collaterals – Extensive Cervical and Vaginal Varices in a Placenta Accreta Case - Jennifer Garcia MD
4. Placenta Percreta involving the bladder requiring massive transfusion protocol - Andrew Tseng DO, MPH
5. What Caused the Bleed - Placenta Accreta in the Setting of Factor V Leiden - Miranda Marcucci DO
6. Coordinated Multidisciplinary Management of Placenta Percreta With Cervical Invasion - Neveada Raventhiranathan MD
7. General Anesthesia for Cesarean Delivery Complicated by Placenta Accreta and Fetal Omphalocele - Xinhao Liu MD/PhD

8:00am – 9:30am

Breakout Session: Research Abstracts – **NO CME****Research Abstract Room 1: Palais (8th floor)****Hemorrhage: Transfusion (8:00 am – 8:45 am)**

1. Blood Transfusion Protocol Significantly Reduces Blood Product - Kristen Harris
2. Association of patient characteristics with blood loss during planned cesarean hysterectomy for placenta accreta spectrum: a single-center study - Michael Hofkamp, MD
3. Platelet dysfunction in postpartum hemorrhage and transfusion approaches assessed in a microfluidic platform - Emily Mihalko PhD
4. Quantra QStat Characteristics in Obstetrics versus a Cardiac Surgery Control Group - Austin Smith MD
5. Effect of intraoperative uterine artery embolization on transfusion requirements during cesarean section for suspected placenta previa and placenta accrete spectrum - Yoon Ji Choi

Research Abstract Room 1: Palais (8th floor)**Efficiency, Education, Access (8:45 am – 9:30 am)**

1. Optimizing Obstetric Pre-Admission Unit Efficiency and Enhancing Patient Experience through an AI-Powered Chatbot - Mostafa Abbasi Dezfouly MD, Bsc
2. Understanding Public Interest in Epidural Anesthesia for Labor: A 10-Year Google Trends Study - Tarick Ahmad BS
3. Online Patient Resources for Cesarean Delivery: Are Pain and Anesthesia Prioritized in Education? - Kalli Fautsc

Saturday, May 2 - Continued

4. Accuracy and Quality of Social Media YouTube, TikTok, and Facebook on Cesarean Anesthesia - Yoojin Kang MD
5. Patterns of intravenous access used for labor and delivery at Society for Obstetric Anesthesia and Perinatology Centers of Excellence – a cross-sectional survey study - Lauren De La Ossa MD

Research Abstracts Room 2: *Viger (8th floor)*

Refining Hemorrhage Management (8:00 am – 8:30 am)

1. Impact of Maternal Vulnerability on Hemorrhage Severity in Placenta Accreta Spectrum at a High-Volume Referral Center - Ross Bakhtari, MD, MPH
2. Preoperative Risk Stratification in Suspected Placenta Accreta Spectrum - Emily Boyd MD
3. Revisiting the Adoption of a Hemorrhage Bundle at a Single Tertiary Center: A Delphi Survey Assessment of Compliance and Continued Barriers to Implementation - Yalda Toofan MS, MD
4. Timing is everything: An evaluation of best practices for quantitation of blood loss after vaginal delivery - Pin Jung Cheng MD
5. Real-Time Risk Prediction of Postpartum Hemorrhage: An Online Tool for the Labor & Delivery Time Course - Mahesh Challapalli BS

Research Abstracts Room 2: *Viger (8th floor)*

Leadership: Education For All (8:45 am – 9:30 am)

1. Eating in Labor: A Cross-Sectional Survey of Obstetric Providers via Social Media - Shelby Crants, MD
2. Content and Consistency of Informed Consent for Neuraxial Labour Analgesia: A Prospective Observational Study - Juliana Kruthof, MD, MSc, FRCPC
3. Staff Culture of Respectful Care in Antenatal and Postpartum Units: A Qualitative Concept Elicitation Study - Moe Takenoshita, BSc, MBBChir, MRCS
4. Novel Education Image to Improve Recognition and Reporting of an Urgent Maternal Warning Sign: A Pilot Study - Shayna Levine, MD

Research Abstracts Room 3: *Ramezay (8th floor)*

POCUS (8:00 am – 8:30 am)

1. Examining the gastric emptying half-time of water versus carbohydrate beverage in early labor in patients with epidurals - Stefan Rodriguez, MD
2. Incidence of pulmonary interstitial syndrome and it's correlation with N-terminal pro-B-type natriuretic peptide in preeclamptic women with severe features: A Prospective cohort study - Aswini Kuberan, MD, DNB
3. Comparison of Patient-Perceived and Ultrasound-Defined Midline in Parturients: Implications for Neuraxial Anesthesia - Payton Gore, MD
4. Teaching an Ultrasound-Guided Median Interspinous In-Plane Approach for Spinal Anesthesia in Obese Parturients – Charlene Wun Kuk, MS
5. Ultrasound assessment of gastric contents in patients with epidural analgesia in advanced labor or requiring cesarean delivery- Saranya Lertkovit, MD

Research Abstracts Room 3: *Ramezay (8th floor)*

PDPH (8:45 am – 9:30 am)

1. AI-assisted comparison of institutional protocols with 2024 SOAP/ASRA consensus report on post-dural puncture headache: a multi-institution analysis - Alexander Peres, MD, MSc

Saturday, May 2 - Continued

2. Lost in Translation: Limited English Proficiency and Suboptimal Management of Postdural Puncture Headache - Meeseo Lee, BA
3. Management of Postdural Puncture Headache: Continuity of Care, But For How Long? A Mixed-Methods Quality Initiative Study - Emma Rahilly, BS
4. Nebulized Dexmedetomidine for Post-Dural Puncture Headache after Cesarean Delivery: A Systematic Review - Hassan Kiani, MSc
5. Fluoroscopic versus Conventional Epidural Blood Patch for Post-Dural Puncture Headache in Obstetrics: A Retrospective Cohort Study of Efficacy - Rachel Pinkhasov, BS

9:30am – 10:45am

Best Case Reports

Montréal (11th floor)

Moderator: Sharon Reale, MD

1. Tiny Spine, Tall Challenges : A Case Report of Cesarean Delivery in Spondyloepiphyseal Dysplasia - Fatine Karkri, MD
2. Extreme Sustained Hemorrhage during Cesarean-Hysterectomy for PAS: Blood Product Stewardship, Precision Coagulation Management, and Interdisciplinary Communication -Manuel A. Fierro, MD
3. The Alarm That Never Sounded: Epidural Pump Failure Resulting in Pneumorrhachis - Eliezer Mendelev, MD
4. Successful Avoidance of Ventricular Tachycardia Using Combined Spinal-Epidural Anesthesia for Cesarean Section in a Patient with Catecholaminergic Polymorphic Ventricular Tachycardia - Momoko Kobayashi
5. Obstetric Management and Anesthesia Considerations in Huntington's Disease - Lucas Steele, MD
6. Chloroprocaine laboring epidural for parturient with history of anaphylaxis to amide local anesthetic - Spencer Hansen
7. Anesthetic Management of a Parturient with Cowden Syndrome and Lhermitte-Duclos Disease - Allison A. Mootz, MD
8. High Pressures, High Stakes: Anesthetic Management of Cesarean Delivery in a Patient with Severe Pulmonary Arterial Hypertension Requiring Mechanical Circulatory Support - Daniel F. Berenson, MD, PhD
9. Bridging the Knowledge Gap: The Role of Obstetric Anesthesiologists in a Case of Pulmonary Alveolar Proteinosis - Jace R. Battrell, MD, MSMP
10. Pituitary hemorrhage in patient after uncomplicated repeat cesarean delivery - Makela Stankey, MD

10:45am – 11:45am

Best Paper Research Competition

Montréal (11th floor)

Moderator: Ruthi Landau

Judges/Panelists: Allison Lee, MD; Brandon Togioka, MD; Paloma Toledo, MD; Cynthia Wong, MD; David Arnolds, MD

1. Inflammation Sensitizes Term Human Myometrium to Somatostatin-Mediated Contractility via Somatostatin Receptor Type 2 (SSTR2) - Anuradha Baishnob, HBSc
2. Proteomic Investigation of Myometrium from Pregnant Women with Class III Obesity - Joseph Park
3. Systemic Immune Signatures Predict Successful Induction of Labor: A Single-Cell Mass Cytometry Prospective Cohort Study - Kazuo Ando, MD, PhD

Saturday, May 2 - Continued

4. Incidence of general anesthesia for cesarean delivery according to urgency: Prospective multinational multicenter observational study of 31 European countries, 9,989 cases -Carolyn Weiniger, MB ChB
5. The Dural Puncture Epidural Technique Reduces Labor Epidural Failure Rate: Causal Inference from Electronic Health Records - Daniel F. Berenson, MD, PhD
6. Impact of Tranexamic Acid Rate of Administration on Maternal Blood Pressure: A Prospective, Randomized, Double-Blind, Non-Inferiority Trial - Juliana Kruthof, MD, MSc, FRCPC

11:30am – 1:30pm	WORKSHOP: FTTE (Focus Transthoracic Echocardiography) Refresher <i>Fortifications (9th floor)</i> Moderator: Clemens Ortner, MD Faculty: Raffaella Fantin, MD; Alexandra Nicholas, MD; Cristian Arzola, MD; Mohamed Eissa, MD; Juan Francisco Morales, MD; Jean M. Carabuena, MD
12:00pm – 1:00pm	LUNCH ON YOUR OWN
12:00pm – 1:00pm	Sponsor Lunch (NO CME) – pre-registration required Cerus – <i>Ste-Antoine (9th Floor)</i>
1:00pm – 1:45pm	SOAP Awards <i>Montréal (11th Floor)</i> • Best Research Paper • Gertie Marx • Teacher of the Year • Best Case Report • Diversity & Inclusivity Award • Patient Safety Award/APSF • Research in Education Award • Frederick P. Zuspan Award • Mentoring Excellence Award • Center of Excellence • SOAP/Kybele International Outreach Grant • SOAP Diversity & Inclusivity Mentored Grant
1:45pm – 2:00pm	SOAP Distinguished Service Award <i>Montréal (11th floor)</i> Intro: Lawrence Tsen, MD – 2025 Recipient Speaker: Mark Zakowski, MD
2:00pm – 3:00pm	Gerard W. Ostheimer Lecture <i>Montréal (11th floor)</i> Intro: Emily Sharpe, MD Speaker: David Monks, MD
3:00pm - 4:00pm	Break in Expo Hall
3:00pm – 5:15pm	Breakout Session: Case Reports - NO CME Case Reports Room 1: McGill (8th floor) Can't Do A Neuraxial? (3:00 pm – 4:00 pm) 1. When Neuraxial is a No-No: General Anesthesia for a Parturient with Heart Failure and Cerebral Midline Shift - Taylor Catalano MD

Saturday, May 2 - Continued

2. Screening and Anesthetic Management of Hereditary Hemorrhagic Telangiectasia in Parturients -Nicholas Cirrone MD
3. Urgent Cesarean Delivery in a Patient with Charcot-Marie-Tooth Disease, Scoliosis, and Preeclampsia -Elise Costa MD
4. Wired for Success: Labor Analgesia in a Patient with a Sacral Nerve Stimulator - Rohini Loke MD
5. Gluteal Augmentation: A Contraindication for Neuraxial Anesthesia? - Erik McKee MD
6. Combined Spinal-Epidural for Cesarean Delivery in Complex Congenital Heart Disease and Recent Stroke: A Case Report - Deval Jhaveri DO
7. A Multidisciplinary, Multi-operator Approach to Neuraxial Anesthesia in Parturient with BMI of 101 kg/m² - Dipti Punjabi
8. From Triage to Delivery Planning: Management After Massive Pulmonary Embolism - Mohammad Nawaz MD
9. Neurofibromatosis Type 1 in Pregnancy: Implications for Delivery Planning - Margaret Lund MD
10. Anesthetic Approach and Delivery Planning in Peripartum Aneurysmal Subarachnoid Hemorrhage Sanjana Dayananda MD

Case Reports Room 1: McGill (8th floor)

Strange Conditions (4:00 pm – 5:15 pm)

1. Anesthetic Management of Cesarean Delivery in a Parturient With Glycogen Storage Disease Type IIIa and Multisystem Involvement- Alexander Meshel MD
2. Multidisciplinary care in Vascular Ehlers Danlos Syndrome Pregnancy - Shreya Dey MD
3. Factor VII deficiency and Remifentanyl use - David Nguyen MD, MS
4. Balancing Maternal Risk in Refractory Immune Thrombocytopenic Purpura: Safety & Systems Errors with Remifentanyl Patient-Controlled Analgesia for Labor Analgesia - Kimberly Pelosa MD
5. Weathering the Sympathetic Storm: A Precisely Orchestrated Cesarean Delivery as a Therapeutic Strategy for Refractory Paroxysmal Sympathetic Hyperactivity in a Parturient - Emilie Cohn MD
6. Avoiding Pheochromocytoma Crisis During Delivery in a Parturient with a Large Tumor and Lynch Syndrome - Julio-Santiago Perez MD
7. Multidisciplinary Approach to Electroconvulsive Therapy in a Pregnant Patient - Olga Diomede MD, MS
8. Challenges during labor anesthesia in a patient with Klippel-Trenaunay syndrome - Andrew Lee MD
9. Diastematomyelia in Pregnancy: Implications for Neuraxial Anesthesia - Elizabeth Cifuentes MD
10. Remifentanyl-induced fetal heart rate changes during labor in a patient with active malaria and thrombocytopenia: a case report - Walter Taylor MD

Case Reports Room 2A: Ste- Hélène (8th floor)

Pulmonary Morbidity (3:00 pm – 4:00 pm)

1. Anesthesia and Multidisciplinary Management in a High-Risk Obstetric Patient with Severe Pulmonary Disease Undergoing Cesarean Delivery - Damon Wallace MD
2. Navigating the Danger Zone: Cesarean Delivery in a Patient with Idiopathic Pulmonary Hypertension - Jeroen De Haes MD, EDAIC, EDIC
3. Urgent Cesarean Delivery in a Patient with Newly Diagnosed Pulmonary Hypertension at 34 Weeks - Paxton Walton MS
4. Peripartum anesthetic management of a patient after heart-lung transplant Laura Nerb MD

Saturday, May 2 - Continued

5. Anesthetic Management of a Pregnant Patient with Post-Radiation Supraglottic Stenosis Undergoing Laser Excision - Alva Powell MD
6. A Case Report: Trial of Labor in a Parturient with Fibrosing Mediastinitis and Superior Vena Cava Syndrome - Christa Saelinger MD
7. Managing cesarean delivery complicated by severe pulmonary arterial hypertension secondary to newly diagnosed conotruncal ventricular septal defect - Vrinda Shukla MD
8. Prolonged Neuromuscular Weakness Following Emergent Cesarean Delivery Revealing Undiagnosed Pseudocholinesterase Deficiency - Ola Shana MD
9. Perioperative Anesthetic Management of Pulmonary Hypertension: A Case Report - Kimberly Hughes MD
10. Intervention for Grade 3 Subglottic Stenosis in the Third Trimester: A Case Report - Hannah Schmucker MD

Case Reports Room 2A: Ste- Hélène (8th floor)

Dilemmas In Labor (4:00 pm – 5:00 pm)

1. Persistent labor pain that should trigger alarm, not a repeat bolus - Bilal Qarni DO
2. My Legs Fell Asleep and They Won't Wake Up! Managing HNPP During Labor and Delivery - Joshua Hamburger MD
3. Labor pain management of a parturient with Friedreich ataxia, cardiomyopathy, super morbid obesity and challenging lumbar epidural catheter placement, a case report - Ashka Surve MBBS MD
4. Anesthetic Management of Super-Obese Parturients: A Two-Case Series -Xiao Lu Zhang DO, PhD
5. Management of Cramp Fasciculation Syndrome During Childbirth - Garrett Buechner MD
6. Multidisciplinary Management of Labor and Neuraxial Anesthesia in a Parturient with Complex Cardiac and Hematologic Disease- Carter Pacheco
7. Labor in Pregnant Patient with Epidermolysis Bullosa Stephanie Nguyen-Abella DO
8. Knot at our Hospital-Case Reports - William Obrecht MD
9. Presentation of Atypical Hemolytic Uremic Syndrome in a Peripartum Patient - Michael Yakobi-Shvili MD
10. Percutaneous Umbilical Blood Sampling and Intrauterine Transfusion in the Setting of Fetal-Maternal Hemorrhage - Coleman Harber MD

Case Reports Room 2B: Ste- Hélène (8th floor)

Tricky Cesareans (3:00 pm – 4:00 pm)

1. Anesthetic management of a patient with achondroplasia undergoing cesarean delivery: A Case Report - Shreya Majagi MD
2. Single shot spinal anesthesia with intrathecal dexmedetomidine for an emergent 10th cesarean delivery: a case report - Sandy Kim MD
3. Cesarean Delivery for Autonomic Dysreflexia with Synovial Sarcoma of T7 Causing Pathologic Burst Fracture - Timothy Hellerer
4. Emergent intraoperative intraosseous catheterization during cesarean delivery in a morbidly obese parturient with sudden loss of intravenous access - Sarah Baum MD
5. Difficult surgical exposure imposes additional hemorrhage risks: a case of extra-uterine bleeding postpartum - Janet Kim MD
6. Buying Time in Obstetric Anesthesia: Emergent REBOA for Life-Threatening Postpartum Hemorrhage - Anastazia Gilman-Hood MD
7. Delayed Postpartum Hemorrhage Requiring Multisite Intervention: The Essential Role of Obstetric Anesthesiology - Gabrielle Migliozi Doctor of Medicine

Saturday, May 2 - Continued

8. Management of a parturient with severe pre-eclampsia complicated by hypokalemic periodic paralysis - Alan George MSc, MBChB
9. A case of undifferentiated shock and hypoxemic respiratory failure in a pregnant patient with placenta previa and vasa previa - Hanna Mandl MD
10. Anesthetic challenges of a cesarean delivery for a parturient with neurofibromatosis type 1 and an ICD - Susan Stanley, MD
11. Cesarean Delivery in a Patient with Severe Peripartum Cardiomyopathy – Ashley Thomson, MD

Case Reports Room 2B: *Ste- Hélène (8th floor)*

Oncology and Neuromuscular (4:00 pm – 5:00 pm)

1. Labor Epidural in a Patient with Amyotrophic Lateral Sclerosis - Riley Hales MD MBA
2. Peripartum Management of a Parturient with Bilateral Renal Angiomyolipomas and Lymphangioliomyomatosis Complicated by Pulmonary Gel-Foam Embolization and Recurrent Pneumothorax - Isaiah Coleman Sr. MD
3. Severe Hemoperitoneum After Transvaginal Oocyte Retrieval in a Patient With Advanced Rheumatoid Arthritis: An Anesthetic Challenge- Borislava Pujic MD
4. Anesthetic considerations for a patient presenting at term with newly diagnosed lymphoma complicated by large pelvic mass and neurologic deficits - Jennifer LaPier MD
5. Anesthesia In Parturients With Disproportionate Skeletal Dysplasia Complicated By Lumbar Disc Herniation And Spinal Stenosis - Abigayle Castine MD, MS
6. Neuraxial Anesthesia for a Parturient with a Spinal Cord Tumor - Chinwendu Amazu
7. Impact and Anesthetic Considerations of Breast Cancer in the Pregnant Patient - William Grant DO, MEd, BSN
8. From needle phobia to neuraxial success: a multi-disciplinary, patient-centered approach for cesarean delivery complicated by spinal muscular atrophy Autumn Lupotsky MD
9. Management of a Parturient with a Full-Term Extrauterine Abdominal Pregnancy and Large Overlying Ovarian Cyst- Lucy Xu MD
10. Peripartum Considerations in a Patient with New Diagnosis of Acute Lymphoblastic Leukemia (ALL) - Rex Michitsch DO

Case Reports Room 3A: *Beaver Hall (8th floor)*

Preeclampsia and Coagulopathy (3:00 PM - 4:00 PM)

1. Anesthetic Management of Spontaneous Hepatic Rupture in HELLP Syndrome - Fatemeh Ashtari MD
2. Refractory Postpartum Hypertension and Status Epilepticus Secondary to Eclampsia With PRES: An Anesthetic and Critical Care Challenge - Hanna Campbell
3. Social Barriers and Postpartum Safety: Managing Preeclampsia with Severe Features Amid Real-World Constraints - Erin Brandon DNAP, CRNA
4. Catastrophic postpartum sequelae of severe preeclampsia with HELLP syndrome following cesarean delivery - Paul Francois MD
5. A Series of Unfortunate Events in Preeclampsia and HELLP Syndrome - Kyle Kellett
6. No Platelets, No Problem: Management of Cesarean Delivery in a Patient with Refractory ITP in the Setting of Pre-Eclampsia with Severe Features - Rachel Pedreira MD, MS
7. Intrauterine fetal demise (IUFD) complicated by Disseminated Intravascular Coagulation (DIC) leading to ischemic stroke with hemorrhagic transformation - Abdal-Aziz El-Hussain MD
8. Disseminated Intravascular Coagulation Following Intrauterine Fetal Demise: A Case Report - Elizabeth Gray DO

Saturday, May 2 - Continued

9. Pregnancy-Associated Thrombotic Thrombocytopenic Purpura Presenting as Severe Thrombocytopenia With Fetal Compromise - A. Taylor Thomas MD, MPH
10. Fibrinogen Replacement in Postpartum Hemorrhage due to Uterine Atony - Christine Daly MD, MS

Case Reports Room 3A: *Beaver Hall (8th floor)*

Challenging Blocks (4:00 pm – 5:00 pm)

1. Quadratus lumborum peripheral nerve catheter for refractory abdominal pain due to a degenerating fibroid in a pregnant patient. - Riddhi Patodia DO
2. Bilateral continuous rectus sheath blocks for post-operative pain management after caesarean section in a parturient with osteochondrodysplastic dwarfism: a case report -Mrinmoyee Kalasikam BA
3. Management of a Postpartum Patient with an Entrapped Epidural Catheter - Sigal Israilov MD
4. Simultaneous Intravascular Migration and Knot Formation of an Epidural Catheter: A Rare Mechanical Complication - Austin Martindale MD
5. Transnasal topical sphenopalatine ganglion block for temporary symptom relief in two parturients with mild to moderate post-dural puncture headache who either declined or deferred epidural blood patch- Kiyoyuki Miyasaka BS MS MD PhD
6. A Bundle of Joy and a Bundle of Nerves: Safe Epidural Placement in a Pregnant Patient with a Schwannoma - Kaitlyn Dempsey MD
7. Getting ahead of the pain: prophylactic epidural blood patch in a patient with substance use disorder - Bryanna Buchman MD
8. Rare Neuraxial Complication in Obstetric Anesthesia: Cerebrospinal Fluid-Cutaneous Fistula -Nana Yaa Kwansa
9. Multimodal Analgesia for Postoperative Pain Control in Patient with Opioid Tolerance Stefan Rodriguez MD
10. When Pain Relief Causes Pain: Morphine-Induced Sphincter of Oddi Spasm During Preterm Labor Margaret Akey BS

Case Reports Room 3B: *Beaver Hall (8th floor)*

Call A Consult! (3:00 PM - 4:00 PM)

1. New Post-conceptional Diagnosis of Marfan, Bicuspid Aortic Valve, and Ascending Aorta Dilation: Case Considerations and Multidisciplinary Management Through Pregnancy and Delivery - Iryna Chugaieva MD
2. Through the Looking Glass: Anesthetic Challenges in Mirror Syndrome Samantha Smith MD
3. Peripartum cardiomyopathy: Point-of-Care Ultrasound Utilization and Anesthetic Considerations - Shobana Bharadwaj MBBS
4. Laser Ablation for Idiopathic Subglottic Stenosis in Pregnancy: Should Continuous Fetal Monitoring be the Standard of Care? - Erik Ovrom MD
5. Paralysis, Pregnancy, and the Delivery Plan: Navigating Anesthesia in Atypical Guillain-Barré Syndrome - Sanaz Bayani MD
6. Peripartum Anesthetic Management of Severe Stiff Person Syndrome: Anticipatory Planning in a High-Risk Parturient- Vinay Khare MD
7. Anesthesia for Anterior Mediastinal Mass in Pregnancy: Anesthetic Management and Considerations - Zenobia Faussett MD
8. Dual Presentation of Severe Pre-Eclampsia and Fungemic Endocarditis in the Parturient - Liz James MD
9. Eye Enucleation for Endophthalmitis in Pregnancy - Ketty Consuegra MD

Saturday, May 2 - Continued

Case Reports Room 3B: Beaver Hall (8th floor)**Blood, Platelets, Vessels (4:00 pm – 5:00 pm)**

1. Beyond Preeclampsia: A Case of Sickle Cell Disease, Hemolysis, and Prolonged Expectant Management in Pregnancy - Chante Strong MD
2. Crisis Averted: A Multidisciplinary Approach to Sickle Cell Disease in Pregnancy - Meghna Jayaraman MD
3. Anesthetic Management of a Patient with Known Sickle Cell Disease Presenting with Acute Chest Syndrome and Preeclampsia with Severe Features Requiring Cesarean Delivery: A Case Report - Noel Cercizi BA
4. Challenges in Diagnosis and Management of Sickle Cell Disease and HELLP - Claire Herzog MD
5. Anesthetic Management of a Preeclamptic, Morbidly Obese Parturient With Von Willebrand Disease: A Case Report - Isabella Griffay MD
6. Platelet-sparing peripartum hemostatic management in Glanzmann thrombasthenia: prophylactic rFVIIa plus tranexamic acid for planned vaginal delivery Raffaella Fantin Dr
7. Placental Vascular Malformation: A High-Risk Cesarean Delivery - Erica Chemtob MD
8. Cerebral Vasoconstriction Syndrome in Peripartum Patient- Meron Teklu BA
9. When Dialysis Meets Delivery: Anesthetic and Multidisciplinary Challenges in a Pregnant Patient with Type 1 Diabetes, End-Stage Renal Disease on Intensive Dialysis, and Chronic Hypertension - Nicholas Mangano
10. Multidisciplinary Management and High-Risk Cesarean Delivery in Mosaic Turner Syndrome with Complex Aortic Pathology: A Case Report - Payton Gore MD
11. Peripartum Management of Hypodysfibrinogenemia – Rachel Brock MD

3:00pm – 5:15pm

Breakout Session: Research Abstracts – **NO CME****Research Abstracts Room 1: Palais (8th floor)****Cardiac and Misc (3:00 pm – 4:00 pm)**

1. Peripartum Cardiomyopathy Increases the Risk of Venous Thromboembolism and Coagulopathy: A Complex Physiology of Hemostatic Morbidity - Jeffrey Lee, MD
2. Contemporaneous reported clinical outcomes of pregnancy in maternal cardiac patients: a systematic review - Cheryl Achary FRCA
3. Anesthetic management in cardiac surgery during pregnancy: a 16-year clinical study of 138 patients - He Jing, MD
4. Avoidance of Long-Acting Neuromuscular Blocking Agents Decreases the Risk of Postoperative Pulmonary Complications in Pregnant Patients Undergoing Fetoscopic Myelomeningocele Repair - Claire Naus, MD
5. Rethinking Reversal: Sugammadex Use During Pregnancy in Nonobstetric Surgery - Kalli Fautsch, MD
6. Beyond Severe Maternal Morbidity: Exploring Reasons for ICU Transfer during Delivery Hospitalizations - Alana Davidson
7. Arrival Physiology and Racial Disparities in Pregnant Trauma: A National Analysis - Alina Siddiqui, MD

Research Abstracts Room 1: Palais (8th floor)**Potpourri (4:00 pm – 5:15 pm)**

1. Ankle Blood Pressure as a Predictor of Neonatal Outcomes in Obese Women Undergoing Cesarean Delivery (CD) under Spinal Anesthesia (SAB) - Srima Konduru, BS
2. Prevalence and Severity of Anemia in Term Pregnant Women Admitted for Delivery: A Retrospective Study - Monica Siaulys, PhD, MD

Saturday, May 2 - Continued

3. Cesarean Delivery in a Patient with Severe Peripartum Cardiomyopathy - Ashley Thomson, MD
4. A retrospective analysis of neuraxial anesthesia failures for postpartum tubal ligation procedures: could umbilical sparing be to blame? - Caroline Thomas, MD
5. Optimizing Anesthetic Practice for Cervical Cerclage: A Quality Improvement Study - Cecilia Uong, MD
6. Trends in Neuraxial Dosing for Cervical Cerclage at a Large Academic Medical Center - Catharine Keim, MD
7. Hypopituitarism in pregnancy does not increase the risk of PPH despite disruption to oxytocin axis - Alexander Meshel, MD

Research Abstracts Room 2: *Viger (8th floor)*

High Risk and Crisis Management(3:00 pm – 4:00 pm)

1. Frequency, Characteristics, and Management of Parturients with Fontan Circulation Delivering with Anesthesia: A Multicenter Retrospective Cohort Analysis - Kate Frost, MD
2. Outcomes of Temporary Mechanical Circulatory Support in Peripartum Patients with Amniotic Fluid Embolism – Fariha Hanif, BS, MPH
3. Emergency Surgery in Pregnancy Isn't the Catastrophe We Fear: Outcomes After 55 Emergent Non-Obstetric Cases - Christopher Mukasa, MD
4. Identifying timepoints of critical communication breakdown in the care of obstetric patients: A cross-sectional cohort survey-based study - Jordan Francke, MD, MPH
5. Maternal Outcomes by Mode of Delivery in Pregnant Patients with Valvular Heart Disease: A Retrospective Cohort Study - Heather Acuff, MD, PhD
6. Risk Factors for Neonatal Acidosis Among Patients with Umbilical Cord Prolapse: a Single Center Study - Hannah Berland, MD

Research Abstracts Room 2: *Viger (8th floor)*

Rare Conditions (4:00 pm – 5:15 pm)

1. Anesthetic Management for Parturients with Klippel-Trenaunay Syndrome: A Case Series -Amanda Ruiz, MD
2. Inhibiting TRPV4 ameliorated the hyperalgesia in sciatic nerve injury-induced neuropathic pain via restraining the SGCs activation - Mingjie Mao
3. Acute Fatty Liver of Pregnancy Increases Postpartum Hemorrhage and ICU Admission: Implications for Peripartum Anesthesia - Edward Sutanto, BS
4. Anesthetic and Obstetric Outcomes in Pregnant Individuals with Sickle Cell Disease: A Retrospective Observational Study at a Tertiary Academic Center - Margarita Blajeva, MD, MBA, FCAI
5. Failed Induction of Labor Rates in Class Three Obesity: A Retrospective Study - Hannah Schmucker, MD
6. Postpartum Plasma-Derived Exosomes Confer Mitochondrial Stabilization and Neuroprotection against Ischemic Stroke - Creed Stary, MD, PhD

Research Abstracts Room 3: *Ramezay (8th floor)*

Patient Voices 2 (3:00 pm – 4:00 pm)

1. Recovery and mental health outcomes in patients with placenta accreta spectrum after cesarean delivery under neuraxial anesthesia - Noor Raheel MD, MPH
2. Humanizing the Cesarean Experience: Standardizing Trauma-Informed, Patient-Centered Care in the Obstetric Operating Room. Darragh O'Reilly MBBS, MSc, FCAI

Saturday, May 2 - Continued

3. "I didn't think it was what my story would be": A qualitative analysis of maternity patients' experiences in critical care - Anna Stout
4. Birth experiences of stigma and discrimination amongst critically ill pregnant patients: a prospective case-control patient-reported outcome pilot study - Craig Thomas
5. Critical Care Obstetrics (CCOB) Program Year One: Risk Stratification and Outcomes for Patients who Received Care on Labor and Delivery (L&D) and Those Transferred to an Intensive Care Unit (ICU) - James Conwell DO
6. VOICE-ICU: Voices of Obstetric Intensive Care Experiences - Informing Care and Unit Design: A Scoping Review - Kyeisha Laurence BS
7. A New Interdisciplinary Patient Support Tool to reduce psychological trauma amongst women undergoing urgent or emergency cesarean sections: Results from a Modified Delphi study- Pamela Angle MD FRCP C MSc (oxon)

Research Abstracts Room 3: Ramezay (8th floor)

Cesarean Delivery and other Surgery (4:00 pm – 5:15 pm)

1. Perioperative Efficiency for Cesarean Delivery Differs by Care Model: A Comparison of Community and Academic Hospitals - Sherry Wu BA
2. Dynamic Machine Learning Model for Prediction of Unplanned Intrapartum Cesarean Delivery Risk in Patients with Neuraxial Labor Analgesia - Nancy Greenspon MD
3. Comparing the Effects of Sitting Duration and Lateral Positioning on Hemodynamics and Neonatal Outcomes During Spinal Anaesthesia for Elective Caesarean Section - Raghvendra Singh MBBS, MD
4. The effect of prophylactic low-dose norepinephrine infusion on perioperative hypothermia during cesarean section: a retrospective cohort study - Rimu Suzuki RN MSN
5. Feasibility of Maintaining Maternal Systolic Blood Pressure $\geq 90\%$ Baseline During Elective Cesarean Delivery Under Spinal Anesthesia and Association with Neonatal Outcomes: A Retrospective Cohort Study - Anna Wilkinson MBChB BMSc FRCA
6. The Pannus Retention System and Hypotension during Cesarean Section; an Observational Study - Ashir Bansal MD
7. Association of patient and clinical characteristics with successful vaginal birth after cesarean delivery: a single-center retrospective study - Hannah Berland MD

5:15pm Educational Programming Adjourns for the Day

5:30pm DINNER ON YOUR OWN

SUNDAY, MAY 3

6:30am – 9:00am Coffee Service
Grande Place (8th Floor)

7:00am – 7:30am Special Interest Group Roundtable Discussions
Grande Place (8th Floor)

8:00am – 10:45am CONCURRENT: IARS/IJOA Peer Review Workshop
Ville Marie (9th floor)
Moderator: Jill Mhyre, MD
Faculty: Ashraf Habib, MD; Ruth Landau, MD; Caroline Weiniger, MB ChB

Sunday, May 3 - Continued

8:00am – 9:30am Breakout Session: Oral Research Presentations - **NO CME**

Room 1: *McGill (8th floor)*

1. Development and Evaluation of a Low-Cost 3D-Printed Scoliosis Neuraxial Training Model - Man Kuan, Lei, MD
2. Development of an EMR-Embedded Obstetric Anesthesia Quality Dashboard - Christine McKenzie, MD
3. Escape Room for Inter-professional Complex Obstetric Care - Felicia Rustandy, MD
4. A Novel Ultrasound-Compatible Lumbar Simulation Jacket: Impact on Ultrasound and Palpation Skills Among Anesthesiology Residents - Katherine Chan, MD
5. Between Promise and Practice: Provider Challenges in Adopting AI for Clinical Workflows – Sadaf Tayafeh, MSc
6. Implementation of a Virtual Reality Neuraxial Masterclass In Medical Education For Trainees - Catharine Keim, MD
7. Visualizing Intrathecal Drug Spread With a 3D-Printed Spine Model: Effects of Trendelenburg and Pre-Supine Sitting Duration – Austin Zheng
8. Development of a Virtual Reality Educational Module Using a Scoliosis Patient-Specific Three-Dimensional Model - Catharine Keim, MD

8:00am – 9:30am Breakout Session: Case Reports - **NO CME**

Case Reports Room 2A: Ste- Hélène (8th floor)

OB Emergencies (8:00am – 9:30am)

1. Spontaneous Coronary Artery Dissection in the Third Trimester - Shobana Bharadwaj, MBBS
2. Preeclampsia and Spontaneous Coronary Artery Dissection: A Rare Cause of Postpartum Myocardial Infarction - Fatemeh Ashtari, MD
3. Anesthetic Management of Scheduled Cesarean Delivery in a Patient With Pregnancy-Associated Spontaneous Coronary Artery Dissection - Stefan Rodriguez, MD
4. Cesarean Delivery in a Patient with History of Unprovoked Spontaneous Coronary Artery Dissection - Fallon Babcock, MD
5. Intraoperative Discovery of Massive Hemoperitoneum from Subcapsular Liver Hematoma in a Patient with Preeclampsia and Intrauterine Fetal Demise - Abhinav Prasad, MD
6. New-onset Peripartum Cardiomyopathy with Focal Pulmonary Edema Masked as Pneumonia Leads to Acute Decompensation in Labor Necessitating Urgent Cesarean Delivery - Payton Marshall, MD, PhD
7. Intraoperative Decompensation with Placenta Percreta Requiring Aortic Compression and Emergent Conversion to General Anesthesia: A Case Report - Anna Pham
8. Seizure is the Great Masquerader in the Peripartum Period - Patricia Rusli, MD
9. Suspected Amniotic Fluid Embolism During Vaginal Delivery of Dichorionic Diamniotic Twins Under Epidural Anesthesia – Storm Alexander, BA
10. Cesarean Section for Parturients with Ascending Aortic Aneurysm: Two Case Reports with Anesthetic Recommendations - Amy Yan, MD
11. Anesthetic Management for Emergent Cesarean Delivery in the Setting of Acute Infective Endocarditis and a Right Atrial Mass - Mariana Acosta, MD
12. Eclamptic Seizure at the Time of Neuraxial Anesthesia for Scheduled Cesarean Delivery - Niharika Gupta, MD

Sunday, May 3 - Continued**Case Reports Room 2B: Ste- Hélène (8th floor)****Neurovascular Challenges (8:00am – 9:30am)**

1. Functional Neurologic Disorder Mimicking Stroke in the Immediate Postpartum Period - Niharika Gupta MD
2. Vascular malformations near the spine highlight the importance of outpatient pre-delivery planning in a high-risk obstetric anesthesia clinic - Rachel Pedreira MD, MS
3. Management of Delivery in a Parturient with Vascular Ehlers Danlos Syndrome - Sarah Baum MD
4. Against All Odds: Successful Pregnancy in a Patient with Autotransplanted Kidneys and Spinal Arteriovenous Malformation: a case report - Alison Williams
5. Use of lumbar ultrasound in neuraxial anesthesia for a pregnant patient with Klippel-Trenaunay syndrome: a case report - Alfonso Wildner, MD
6. Epidural Labor Analgesia in a Parturient With Neurofibromatosis Type 1 - Xinhao Liu MD/PhD
7. Inflammatory Polyneuropathy Following Neuraxial Labor Analgesia in a Patient with Chiari I Malformation - Katherine Fortson MD
8. When the Pressure Breaks: Pituitary Apoplexy in the Setting of Pre-Eclampsia Anthony Fraga MD
9. Blue Rubber Bleb Nevus Syndrome in Pregnancy: A Case Report- Jeremy Latham MD
10. Balancing Maternal and Fetal Risk: Preterm Cesarean to Facilitate Neurosurgical Resection of a Giant Craniopharyngioma - Akansha Tarun MD
11. Through A Vascular Minefield - Cesarean Delivery Under Spinal Anesthesia - Keerthana Jayabalan MBBS, MD,DNB
12. Pulmonary and Vertebral Arteriovenous Malformation in Pregnancy with Hereditary Hemorrhagic Telangiectasia: A Case Report - Ashka surve MBBS MD

Case Reports Room 3A: Beaver Hall (8th floor)**Elevated ICP (8:00am – 9:30am)**

1. Anesthetic Management of a Pregnant Patient with Elevated Intracranial Pressure - Christopher Keenan MD
2. Postpartum Reversible Cerebral Vasoconstriction Syndrome Concurrent with Pre-eclampsia After Cesarean Delivery: Balancing Conflicting Goals - Anna Wilkinson MBChB BMSc FRCA
3. Delivering Under Pressure: A Parturient with Intracranial Hemorrhage - Rechna Korula MD, MS
4. Anesthetic Management of Vaginal Delivery in a Pregnant Patient with Symptomatic Intracranial Meningioma - Gabriella Shayani
5. When the Aqueduct Is Closed: Anesthetic Decision-Making for Cesarean Delivery in Non-Communicating Hydrocephalus - Margarita Blajeva MD, MBA, FCAI
6. Mind Blowing Connections: A Case Report On The Management Of A Ruptured Arteriovenous Malformation During Pregnancy - Andrea Monica Lee MD, MBA
7. Increased ICP in the Parturient with Alport Syndrome - Brannon Broussard MD
8. Posterior Reversible Encephalopathy Syndrome in the Setting of Preeclampsia, Substance Use, and Peripartum Cardiomyopathy Following Cesarean Delivery -Reshu Chandra MD Candidate
9. Neuraxial Anesthesia for Cesarean Delivery in a Parturient with New-Onset Seizure and Intracranial Meningioma - Isabella Valente MD
10. Post-dural Puncture Headache Complicated by Intracranial Hemorrhage: Case Report - Jennifer Guevara MD
11. Peri-Cesarean Seizure in a High-Risk Parturient: An Anesthesia Case Study - Alice Coombs, MD

Sunday, May 3 - Continued

12. Diagnostic Challenges of Postpartum Headache after Neuraxial Analgesia in a Parturient with a Reported History of Idiopathic Intracranial Hypertension - Nicolas Ferry MD

Case Reports Room 3B: *Beaver Hall (8th floor)*

Room 3B: Arrhythmias, Aicds, And Pacemakers (8:00am – 9:30am)

1. Anesthetic Management of Cesarean Delivery in a Parturient with Congenital Long QT Syndrome and an Implantable Cardioverter-Defibrillator - Nicolas Ferry MD
2. Wolf-Parkinson-White Syndrome and a Scheduled Cesarean Delivery in a Pregnant Patient - Tayyaba Saeed MDE
3. Balancing Risk and Benefit: Dexmedetomidine for a pregnant patient with refractory tachyarrhythmia - Reda Hafiane
4. Neuraxial Anesthesia for Cesarean Delivery in a Patient with Brugada Syndrome: A Case Report and Systematic Review - Andrew Woodman MD, PhD
5. Peripartum Anesthetic Management of a Patient with Pacemaker-Induced Cardiomyopathy - Simran Patel MD
6. Anesthetic Challenges in a Parturient with history of Peripartum Cardiomyopathy status post AICD Implantation, and Morbid Obesity: A Case Report - Nithya Narayana, BS
7. Continuous Spinal Anesthesia for Cesarean Delivery in a Parturient with Severe Cardiomyopathy, Pulmonary Hypertension, and Wolff–Parkinson–White Syndrome - Marcos Latimer-Fantauzzi MD
8. Mobitz Type II AV Block in a Healthy Cesarean Delivery Srija Konduru BS
9. Anesthesiologic Considerations in a Parturient with Brugada Syndrome and Immune Thrombocytopenia - Thomas Quisenberry MD
10. New Onset Complete Heart Block In A Parturient With Corrected Tetralogy Of Fallot - Shobana Bharadwaj MBBS
11. Peripartum Cardiovascular Collapse Following Cesarean Delivery in a Parturient with Severe Biventricular Failure and Pulmonary Hypertension - Emily Breland Edwards MD

8:00am – 9:30am

Breakout Session: Research Abstracts – **NO CME**

Research Abstracts Room 1: *Palais (8th floor)*

Labor Analgesia Challenges and Tips (8:00am -9:30am)

1. Pain-Selective Epidural Analgesia:Isobolographic Analysis of Lidocaine and Chloroprocaine - Hussam Shehabi, MD
2. Assisted Reproductive Technology Is Not Associated With Satisfaction With Labor Epidural Analgesia - Chinami Tone
3. Neuraxial Anesthesia in Parturients With Syphilis: Safety and Short-Term Outcomes - Antanina Voit, MD
4. Management of Accidentally Disconnected Labour Epidural Catheters: A Canadian Modified-Delphi Consensus Study - Ilana Sebbag, MD
5. A Surrogate Evaluation of Dura Proximity Across Loss-of-Resistance Techniques During Combined Spinal–Epidural Analgesia: A Prospective Cohort Study - Javiera Vargas, MD, MSc
6. Comparative Study of the Onset Time of Labor Analgesia Initiated with Epidural Technique with Lidocaine vs Dural Puncture Epidural Technique with Bupivacaine: a Prospective, Randomized Clinical Trial - Xinzhong Chen, MD
7. Epidural catheter insertion depth of 4 cm versus 5 cm for labor analgesia: a double-blind randomized trial - William Turner, BMBS

Sunday, May 3 - Continued**Research Abstracts Room 2: Viger (8th floor)****Cesarean Delivery Quality (8:00am – 9:30am)**

1. Management of indwelling labor epidural catheters for intrapartum cesarean delivery: a single-center retrospective study - Sahithi Puvvala BS
2. Racial and Ethnic Disparities in Modes of Anesthesia for Cesarean Delivery Among American Indian and Alaskan Native Patients - Melissa Torbey MHA
3. A Survey Study to Assess Patient Opinions of Anxiolysis Prior to Neuraxial Anesthesia for Cesarean Delivery - Patrick Hesketh MD
4. Comparison of Enhanced Recovery after Surgery Protocol and Standard Protocol for Cesarean Delivery: a Two-center, Double-blind, Randomized Controlled Trial - Sherry Wu
5. Patterns of postoperative nausea and vomiting prophylaxis in patients undergoing cesarean delivery: a multicenter retrospective cohort study - Allison Dear BS
6. Effect of energy drink on body temperature during combined spinal-epidural anesthesia for elective Cesarean delivery: A noninferiority randomized controlled trial - Jie Zhou, MD, MBA, FASA
7. Effect of Standardization of Care on Racial and Ethnic Disparities in Pain Management After Cesarean Delivery - Kelley Smith MD
8. Association between guideline-compliant prophylaxis and the incidence of post-operative nausea and vomiting in patients undergoing Cesarean Delivery: a multicenter retrospective cohort study - Allison Dear BS

Research Abstracts Room 3: Ramezay (8th floor)**Preeclampsia (8:00am – 9:30am)**

1. A High-Precision Machine Learning Approach Comparing AGT/VASN Ratio and sFlt-1/PIGF for Severe Preeclampsia Diagnosis: A Case-Control Study - Xiao Lu Zhang, DO, PhD
2. Eclampsia Is a Perioperative Emergency: Delays to Magnesium and Anesthetic/ICU Utilization in a Timestamped Multi Hospital Electronic Health Record Cohort - Zara Adamou, MD
3. Sleep Trajectories During Pregnancy and Postpartum: Insights from Digital Health on Cardiovascular Health and Preeclampsia - Alana Davidson,
4. Evaluation of Myocardial Function and Metabolism in Patients with Early Onset Preeclampsia with Severe Features - Adrienne Shami, MD PhD
5. Puerperal Cerebrovascular Complications of Preeclampsia with Severe Features: A Case Series on Anesthetic Management - Victoria Brookshire, MD, MPH
6. Blunted Autonomic Adaptation in Preeclampsia: A Prospective Digital Biomarker Study - Marie-Louise Meng, MD
7. Loss of EV-miR-125a-5p in CSF may permit local sFLT1-mediated neurovascular injury in severe pre-eclampsia - David Melton, MD/PhD
8. Physical Activity and Total Sleep Levels in Patients with Cardiovascular Risk Factors Using the Oura Ring - Alana Davidson, BS

9:30am – 10:00am OAA: An Outsiders View of the Abstracts at SOAP

Montréal (11th Floor)

Nuala Lucas, MD

Sunday, May 3 - Continued

- 10:00am – 12:30pm WORKSHOP: Block Workshop! Difficult Neuraxial, Fascial Plane, Occipital, and Pterygopalatine Ganglion (*fee & pre-registration required*)
Fortifications (9th floor)
Moderator: Adam Wendling, MD
Faculty: Soleil Schutte, MD; Julie-Ann Thompson, MD; Linda Le-Wendling, MD; Svetlana Chembrovich, MD
- 10:00am 11:30am Translating Research into Practical Applications: Retrofitting evidence for your private practice setting
Montréal (11th floor)
Moderator: Feyce Peralta, MD
Panelists: Jeanette Bauchat, MD; Laurie Chalifoux, MD; Megan Rosenstein, MD
- 11:30am – 12:00pm **Anesthesia for abortion care: The role of the OB anesthesia team**
Montréal (11th floor)
John Markley, MD
- 12:00pm – 1:00pm No U-turn on Equity: Navigating Resistance and Retaining Progress
Montréal (11th floor)
Moderator: Allison Lee, MD
Panelists: Kokila Thenuwara, MD; James Damron, MD
- 1:00pm SOAP 2026 ANNUAL MEETING ADJOURNS



SOAP 2026 Annual Meeting

April 30 – May 3, 2026 | Montreal, Canada

Jointly provided by the American Society of Anesthesiologists and
Society for Obstetric Anesthesia and Perinatology

Target Audience

This activity is intended for anesthesiologists, anesthesiologists' assistants, CRNAs, residents/fellows and medical students.

Accreditation Statement

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of American Society of Anesthesiologists and Society for Obstetric Anesthesia and Perinatology. The American Society of Anesthesiologists is accredited by the ACCME to provide continuing medical education for physicians.

Physician Continuing Education

Overall Conference

The American Society of Anesthesiologists designates this live activity 17.25 *AMA PRA Category 1 Credit(s)*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Optional Workshops

International Symposium: French Symposium

The American Society of Anesthesiologists designates this live activity for a maximum of 4.00 *AMA PRA Category 1 Credit(s)*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Trauma Informed Care Workshop

The American Society of Anesthesiologists designates this live activity for a maximum of 2.00 *AMA PRA Category 1 Credit(s)*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Research Symposium

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POCUS Workshop

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This activity offers up to 24.75 CME credits, of which 24.75 credits contribute the patient safety CME component of the American Board of Anesthesiology's redesigned Maintenance of Certification in Anesthesiology™ (MOCA®) program, known as MOCA 2.0®.

Please consult the ABA website, www.theABA.org, for a list of all MOCA 2.0 requirements.

- Overall Conference: 17.25
- International Symposium: French Symposium: 4.0
- Trauma Informed Care Workshop: 2.0
- Research Symposium: 3.0
- POCUS Workshop: 3.0
- FTTE Workshop: 2.0
- IARS/IJOA Workshop: N/A
- Neuraxial Block Workshop: 2.5

Overall Conference Learning Objectives

- Summarize current advances in obstetric anesthesiology research with potential for translation into clinical practice.
- Discuss barriers and facilitators to implementing evidence-based research findings in obstetric anesthesia.
- Evaluate strategies to integrate translational research principles into quality improvement and patient safety initiatives.
- Describe methods to foster collaboration between researchers and clinicians that enhance the translation of evidence into bedside care.
- Apply an evidence-informed framework when developing or updating clinical protocols to improve maternal and neonatal outcomes.

Planner, Faculty and Staff Disclosure

Name	Role	Relevant Financial Relationships
Thomas T. Klumpner, MD	Planner/Reviewer	Researcher: GE Healthcare and BioIntellisense, Inc.
Adam Wendling, MD	Planner/Reviewer	Researcher: Hemosonics
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Tracey M Vogel MD FASA	Faculty/Teacher/Author	Owner: The Empowerment Equation, LLC Consultant: NOMA.AI
Dr. Alexander Butwick MBBS, FRCA, MS	Planner/Reviewer	Researcher: BD
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Brice Gaudilliere, Md PhD	Faculty/Teacher/Author	Advisor/Consultant:
Chawla LaToya Mason, MD, FASA	Faculty/Teacher/Author	Consultant: Covidient;
Brandon Togioka, MD	Faculty/Teacher/Author	Researcher: Guidestar Medical Devices, Merck & Co, Geogia Pacific, Vena Vitals (all funds were distributed to Oregon Health and Science University)
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Adnane Berdai, MD, PhD	Faculty/Teacher/Author	Consultant/Advisor/Speaker: LFB, PROMOPHARM S.A.

All relevant financial relationships for this activity have been mitigated.

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Program Material

Thursday, April 30, 2026

Opening Remarks

Speaker: Ron George, MD, FRCPC – SOAP President

Gertie Marx Research Competition

Moderator: Lisa Leffert, MD

Judges: David Berman, MD; Carolyn Weiniger, MB ChB; Alex Butwick, MD; Jill Mhyre, MD; Anton Chau, MD

1. Magnesium Sulfate and Postpartum Hemorrhage: A Target Trial Emulation with Dose-Response Analysis - Mahesh Challapalli, B.
2. Factors Associated with Conversion from Neuraxial to General Anesthesia for Cesarean Delivery: Mixed-Effects Analysis from the Multicenter Perioperative Outcomes Group - Daniel F. Berenson, MD, PhD
3. Immune Dysregulation in Uterine Atony Could Suggest New Ways to Treat Postpartum Hemorrhage - Payton Marshall, MD, PhD
4. Gestational Thrombocytopenia and Risk of Postpartum Hemorrhage and Severe Maternal Morbidity: A Population-Based Analysis - Samuel Rafla, MD
5. Geographic Validation of an Automated, Electronic Medical Record-Enabled Postpartum Hemorrhage Prediction Model - Susannah S. Oster, BS
6. Defining Representation of Anesthesiologists on State Maternal Mortality Review Committees: A Report from the SOAP State Representatives Program - McKenzi I. Thompson, MPH
7. Patient-reported pain, pressure, and intraoperative analgesic use during cesarean delivery: a prospective descriptive study - Alexander Morris, BS
8. Cesarean Delivery Mortality Rate in Eastern Africa: Data from a Multi-Country Cohort - Lily Y. Bai

Keynote: Expanding access to safe and equitable anesthesia care

Speaker: Beverley Orser, MD

President's Panel: Beyond the Evidence – Implementing Research into Everyday Obstetric Anesthesia Practice

Moderator: Ron George, MD, FRCPC

Panelists: Beverley Orser, MD; Ruth Landau, MD; Jill Mhyre, MD; Mark Neuman, MD; Cynthia Wong, MD

ASA Updates – Addressing the Current Anesthesiology Workforce Shortage

Speaker: Paul Giam, ASA President

Fred Hehre Lecture

Intro: Grace Lim, MD, MSc, MBA

Speaker: Valerie Arkoosh, MD, MPH

SOAP 2026

ANNUAL MEETING

MONTREAL, QUEBEC, CANADA LE WESTIN MONTREAL

Magnesium Sulfate and Postpartum Hemorrhage

A Target Trial Emulation with Dose-Response Analysis APRIL 29-MAY 3, 2026

Maresh Challapalli BA, Andrew Warburton MD, Benjamin Hyers MD, Daniel Katz MD

Department of Anesthesiology - Montefiore Medical Center
Department of Anesthesiology - Icahn School of Medicine at Mount Sinai

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

1

Background

MgSO₄: Standard of Care

- Gold standard for eclampsia prophylaxis since 1925
- Maggie Trial (2002): 58% seizure risk reduction, but no secondary association with increased risk of post-partum hemorrhage
- Parkland regimen: 4-6g load + 1-2g/hr maintenance

The Safety Concern

- MgSO₄ is a smooth muscle relaxant & Ca²⁺ antagonist
- Theoretical risk: inhibits myometrial contractility → uterine atony → PPH
- Observational/Retrospective research as recent as 2023 published in *JAFNM* showing connection between administration and dosage of magnesium with post-partum hemorrhage

Our Hypothesis

Recent observational / retrospective finding an MgSO₄ - PPH association fail to adequately control for the near perfect between magnesium administration and preeclampsia, which itself is an independent risk factor for PPH.

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2

Study Design

Data Source

MMIC-IV (2011-2022)
Beth Israel Deaconess Medical Center
22,011 L&D admissions → 1801 with preeclampsia

Outcome

Primary: PPH (ICD-10 O72.0, O72.1), Uterine Inertia
Secondary: Dose-response using restricted cubic splines on propensity score matched cohort

Causal Framework

Target trial emulation via Clone-Censor-Weight (CCW)
Two-arm design: magnesium received vs. never received
Stabilized inverse probability of censoring weights (IPCW) estimated with gradient boosting

Covariates Included

Baseline covariates: age, gender, race, insurance, weight, height, BMI, history of preeclampsia diagnosis, pre-L&D oxytocin exposure, pre-L&D magnesium exposure, hours in hospital before L&D

Time-varying covariates (1-hour intervals): cumulative oxytocin dose (mcL), cumulative magnesium dose (gm), misoprostol administration (binary), hemoglobin (g/dL), hematocrit (%), platelet count, white blood cell count, red cell distribution width

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3

Confounding by Indication

Why previous retrospective analyses overestimate the MgSO₄-PPH association

Addressing Confounding: 3 Restricted Cohorts

- Short Pre-L&D Stay (<24 hrs)**
Limits confounding from prolonged antepartum hospitalization and accumulated interventions.
- Long Pre-L&D Stay (≥24 hrs)**
Tests whether extended hospitalization and disease severity drive the observed association.
- Preeclampsia Only**
Directly addresses confounding by indication → isolates MgSO₄ effect within its primary clinical population.

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4

Study Population

Table 2. Association of Magnesium Sulfate with Postpartum Hemorrhage

	N	MgSO ₄ Rate, %	PPH Rate, %	Crude Analysis			Trial Emulation			
				OR	95% CI	P	OR	95% CI	P	
Cohort A (<24 hr pre-L&D)	21,341	2.6	17.8	7.4	2.70	2.15 - 3.37	<0.001	1.17	1.09 - 1.25	<0.001
Cohort B (≥24 hr pre-L&D)	670	22.2	18.1	10.2	1.85	1.18 - 3.24	0.009	1.17	0.86 - 1.58	0.32
Cohort C (Preeclampsia only)	1,801	29.2	20.0	14.0	1.53	1.17 - 2.00	0.002	1.13	0.95 - 1.34	0.17
All L&D admissions	22,011	3.2	17.9	7.5	2.68	2.20 - 3.27	<0.001	1.18	1.10 - 1.25	<0.001

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FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

5

Dose-Response Analysis

Restricted cubic splines

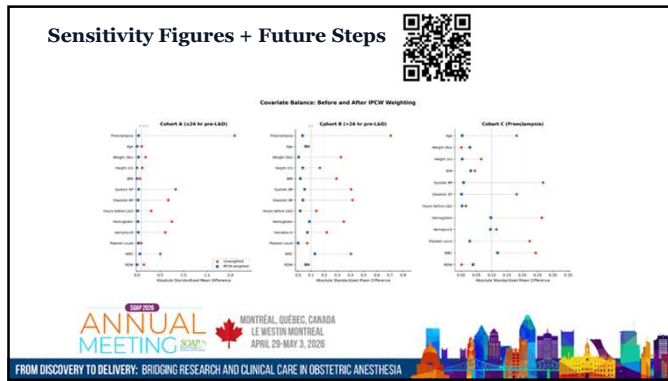
Magnesium Cumulative Dose-Response and PPH Risk (Adjusted for L&D Length of Stay)

No dose-dependent increase in PPH risk across the standard therapeutic range (40-80g)

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FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

6



7

Conclusions

- 1 We were able to recreate the increased association between $MgSO_4$ and PPH seen in previous observational / retrospective studies. However across both cohorts, unadjusted ORs of 1.95 and 1.53 (both significant) dropped to 1.17 and 1.13 (both non-significant) after correct modeling adjustment
- 2 No dose-dependent increase in PPH risk, even at cumulative exposures consistent with the standard Parkland regimen. Low-dose regimens are not necessary to mitigate bleeding.
- 3 These findings reinforce the safety profile from the Maggie Trial and support the continued use of standard neuroprotective dosing protocols for preeclampsia.

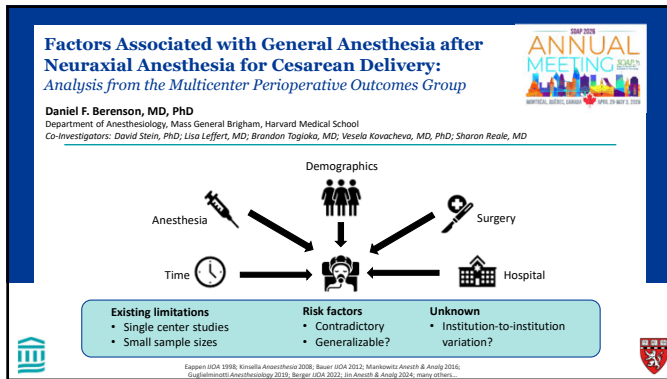
Thank you

Mahesh Challoo | Andrew Warburton | Daniel Katz

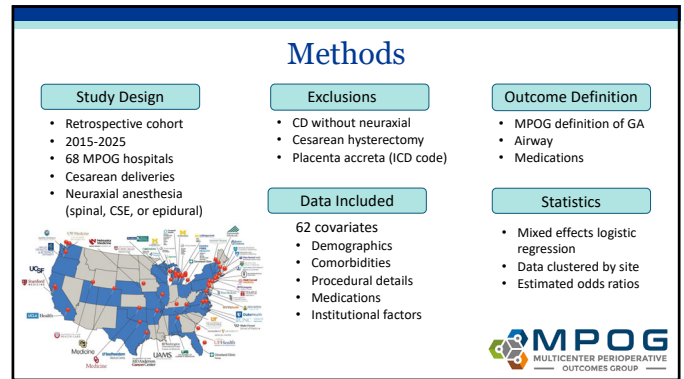
ANNUAL MEETING SCARLETT MONTREAL, QUEBEC, CANADA LE WESTON MONTREAL APRIL 29-MAY 3, 2026

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

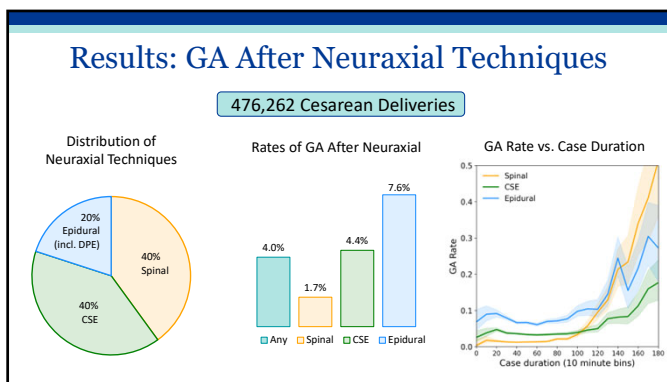
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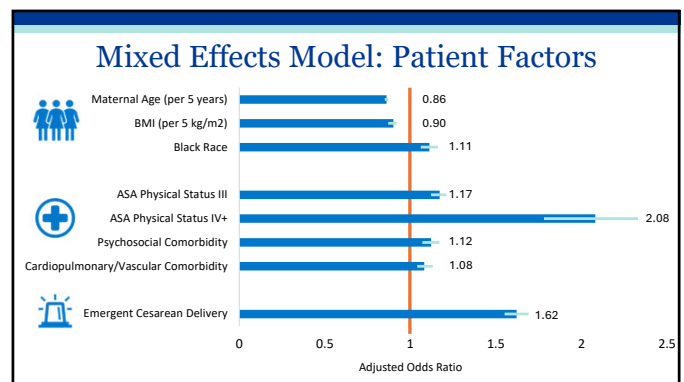
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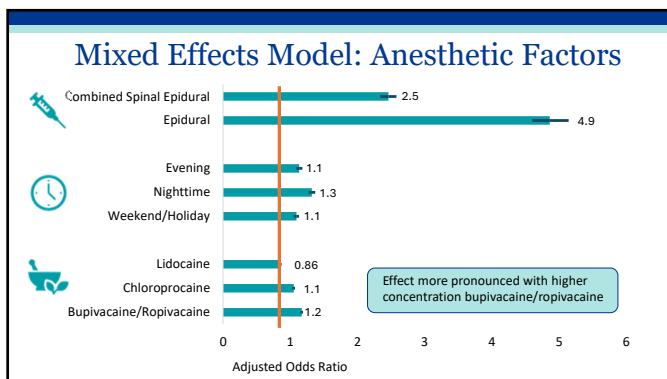
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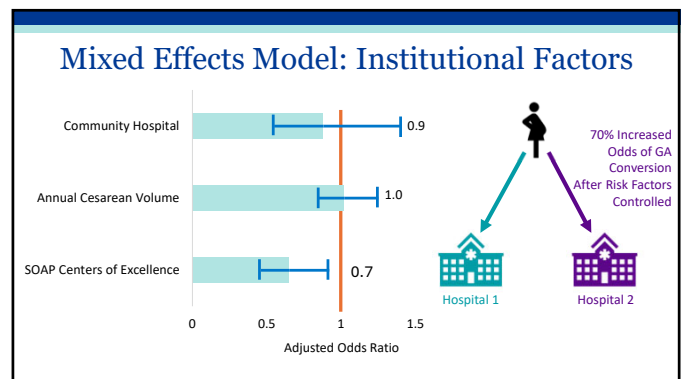
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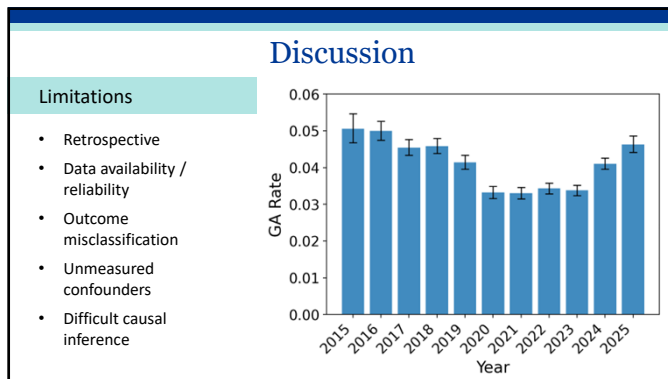
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7

Conclusion

Summary

- Rate of GA after neuraxial: 4.0%
- Large sample size → defined risk factors
- Spinal < CSE < Epidural
- SOAP COE < Non-SOAP COE
- Significant unattributable risk

Where do we go from here?

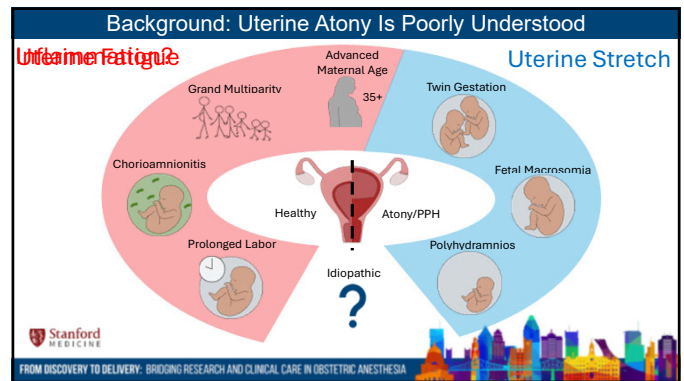
- Is GA being performed for the right reasons?
- How do we define appropriate GA?
- How do we measure appropriate GA?
- How can we set goals to optimize practice?

Co-Investigators:
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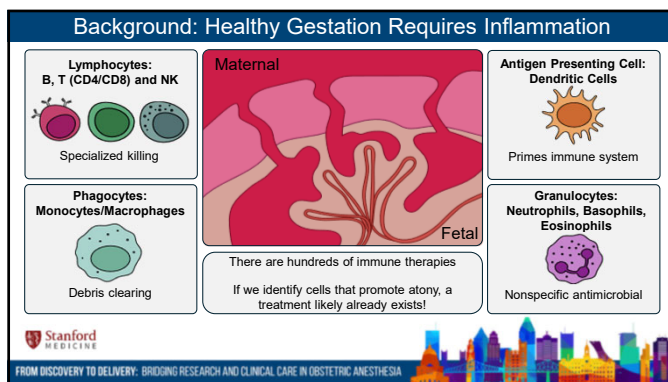
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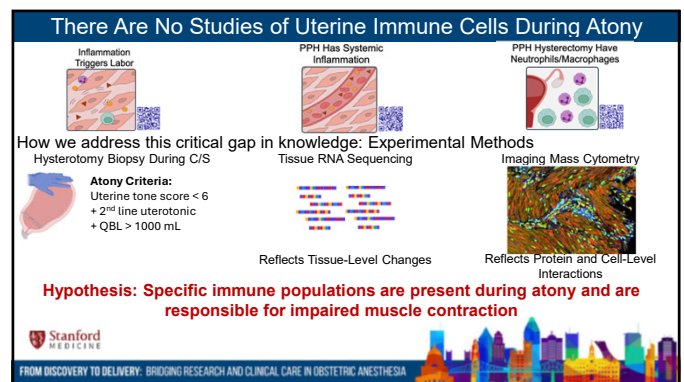
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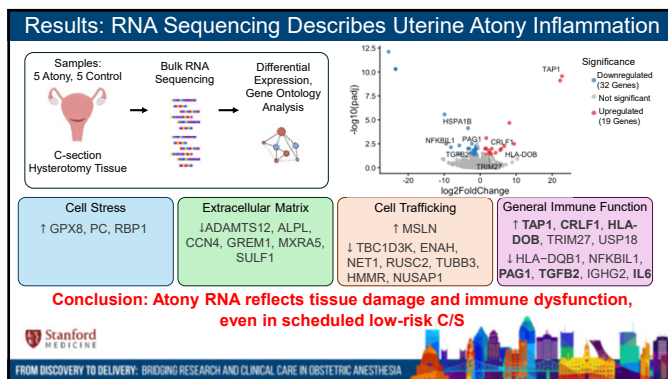
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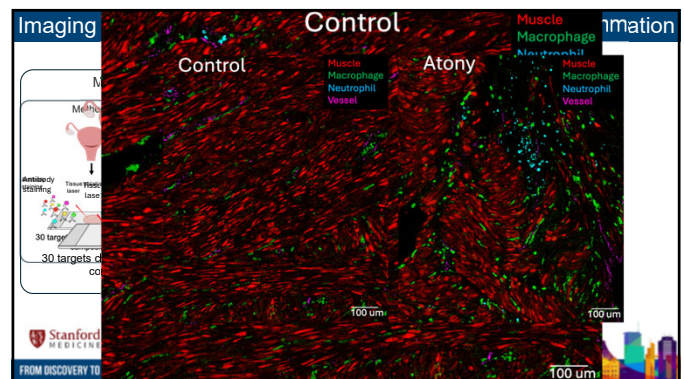
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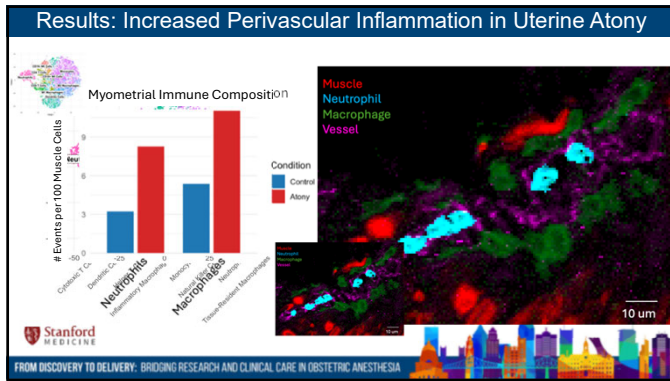
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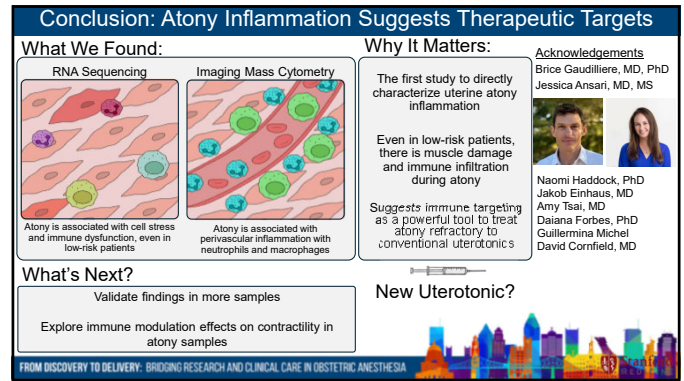
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8

Gestational Thrombocytopenia and Risk of Postpartum Hemorrhage and Severe Maternal Morbidity: A Population-Based Analysis

Samuel Rafla MD, Andrew Warburton MD, Alexander Tran, Daniel Katz MD
Department of Anesthesiology, Icahn School of Medicine at Mount Sinai



1

Disclosures

I have no disclosures



2

Gestational Thrombocytopenia (GT)

Affects **5-11%** of pregnant women and it is most common etiology of thrombocytopenia during pregnancy

ACOG statement 2019 - "...women with gestational thrombocytopenia are **not at risk of maternal or fetal hemorrhage or bleeding complications**"

Rottenstreich et al. (2022) found that patients with mild GT were at **increased risk** of peripartum hemorrhage



3

Study Objectives

- To evaluate the **association between gestational thrombocytopenia and adverse maternal outcomes** (postpartum hemorrhage, severe maternal morbidity)
- To assess if these **outcomes differed** across different populations (socioeconomic status)



4

Methods

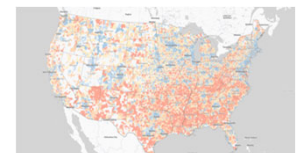
- Identified cases of GT via ICD-10 codes between 2016-2020 from the **New York State Inpatient Database (SID)** from the Healthcare Cost and Utilization Project (HCUP)
- Population: 982,819 **in-hospital deliveries without preeclampsia**, 17,696 of which had **gestational thrombocytopenia**
- 1:4 propensity score matching performed to **isolate GT's role in adverse maternal outcomes** (controlled for known risk factors for PPH and SMM including low socioeconomic status)
- Primary outcomes: **PPH, transfusion, severe maternal morbidity**



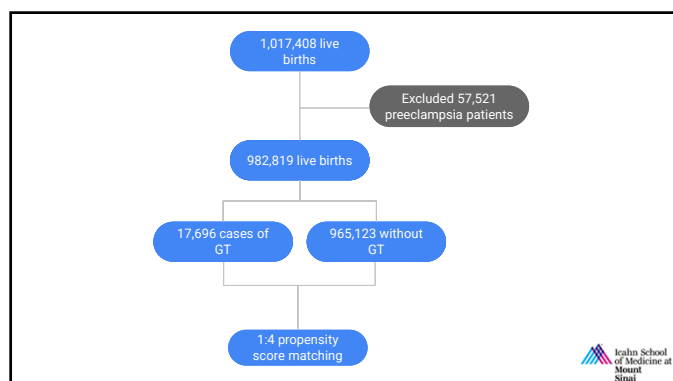
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Distressed Community Index (DCI)

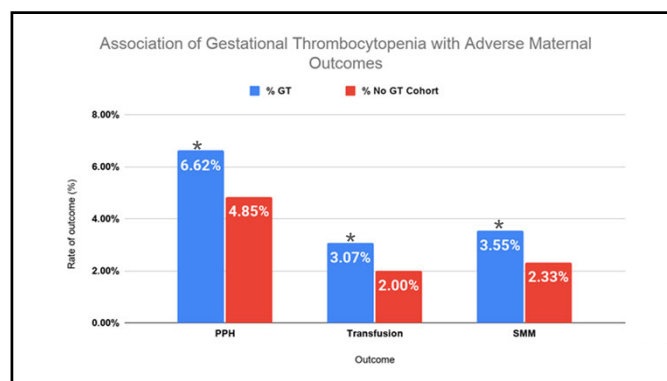
- Zip code level** composite measure of **economic distress**
- Scores **0-100 across 7 categories** that capture poverty, education, housing instability, unemployment
- Higher scores mean more distress**
- Allowed us to control for **neighborhood-level disadvantages** during our propensity matching



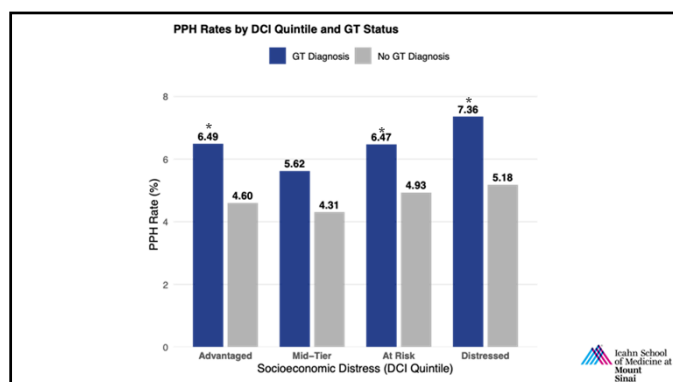
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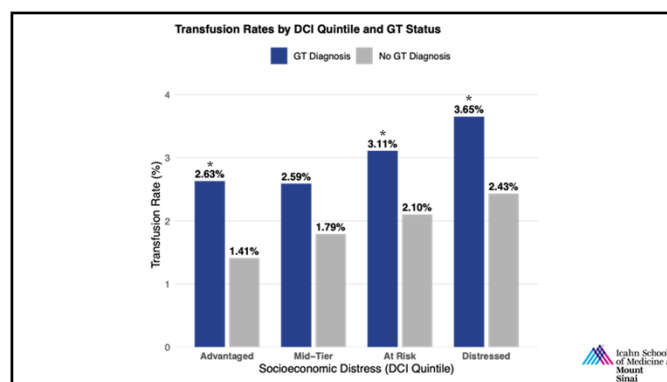
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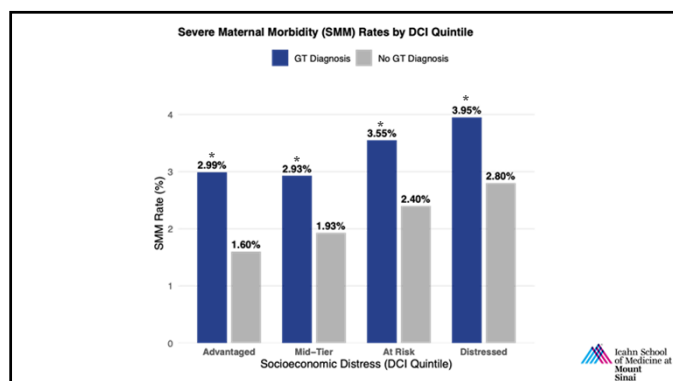
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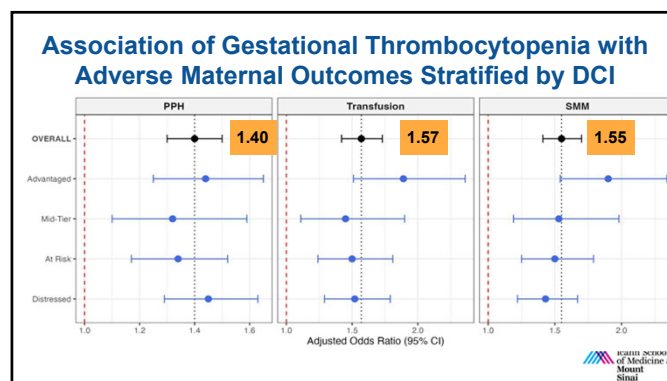
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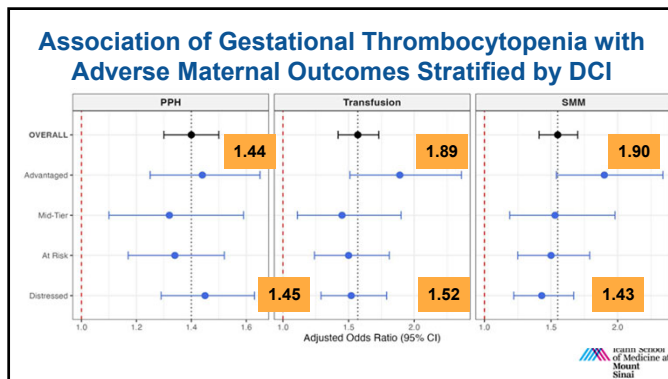
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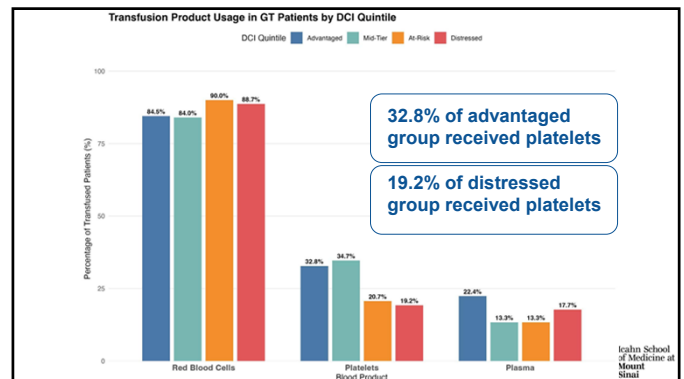
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14

Discussion

- GT seems to be associated with **higher rates of PPH, transfusion, and severe maternal morbidity**
- This seems to persist **across DCI quintiles**
- Patients from less distressed zip codes still have **increased rates of PPH and severe maternal morbidity** despite receiving **more platelets**
- More studies need to be performed to further investigate the **mechanism of these differences** as well as help **risk stratify** morbidity based on platelet count



15

References

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- Provan, Drew, Roberto Stasi, Adrian C. Newland, et al. "International Consensus Report on the Investigation and Management of Primary Immune Thrombocytopenia." *Blood* 115, no. 2 (2010): 168-86. <https://doi.org/10.1182/blood-2009-06-225565>.
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16

Geographic Validation of an Automated, Electronic Medical Record-Enabled Postpartum Hemorrhage Prediction Model

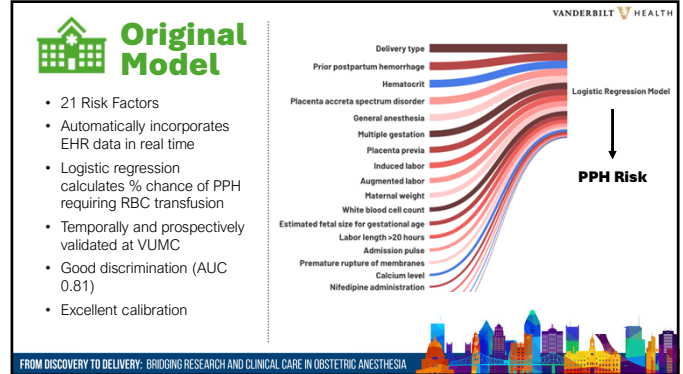
Susannah Oster BS, Ryan Moore MS, Henry Domenico MS, Trent Bryson MD, Sujanya Narayanan BS, Holly B. Ende MD

- Postpartum hemorrhage (PPH) is a major and usually preventable cause of maternal morbidity and mortality
- Early and accurate prediction may prevent severe outcomes
- Artificial intelligence can improve prediction but requires extensive validation
- Aim: to geographically validate a PPH prediction model which previously showed good discrimination at a single academic medical center



FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

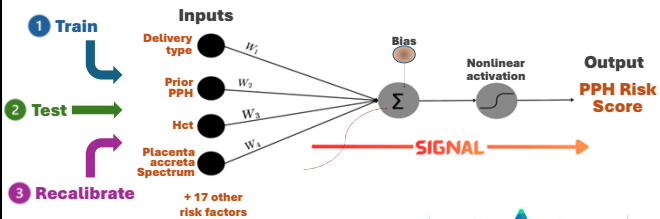
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FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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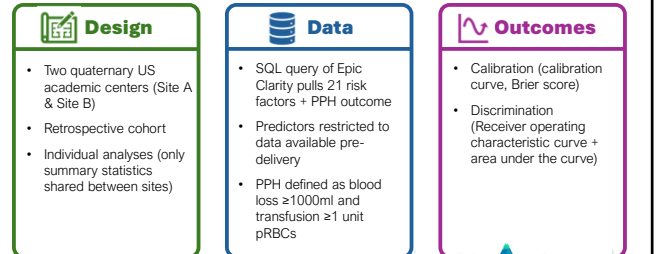
LOGISTIC REGRESSION



FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

3

METHODS

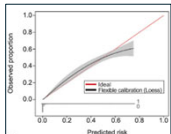


FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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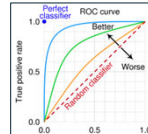
OUTCOME MEASURES

Calibration



How closely do predicted probabilities match actual observed PPH rates?

Discrimination



Does the model differentiate between patients with and without PPH?

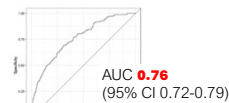
FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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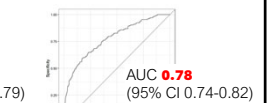
SITE A RESULTS

Cohort
n = 13,419
168 (1.3%) PPH

Original Model

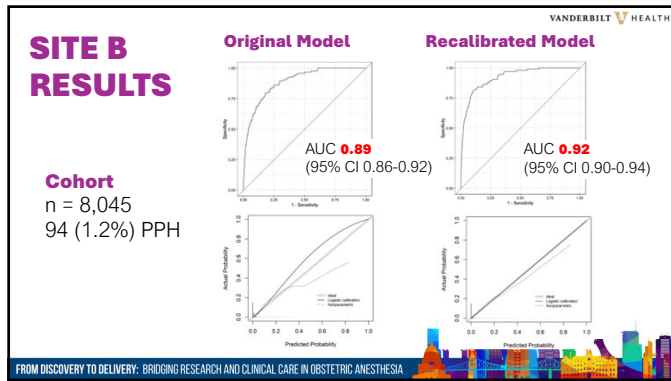


Recalibrated Model

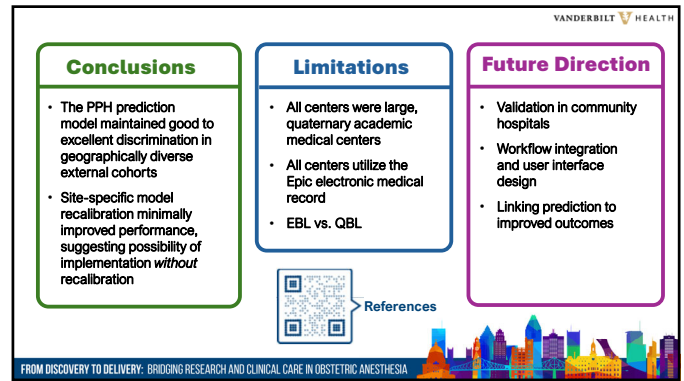


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6



7



8

Defining Representation Of Anesthesiologists On State Maternal Mortality Review Committees: A National Assessment

SOAP 2024 ANNUAL MEETING
MONTREAL, QUEBEC, CANADA | APRIL 19-20 MAY 3, 2024

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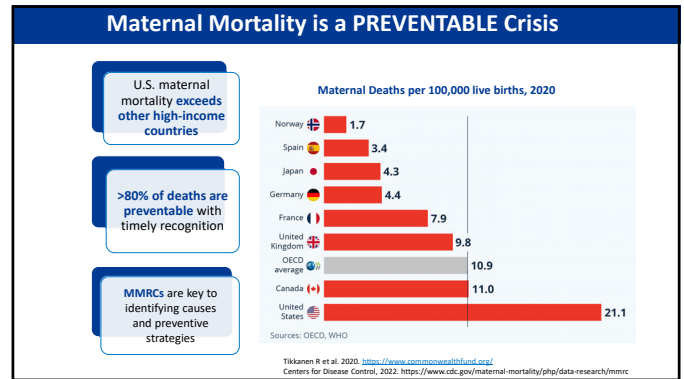
HOWARD UNIVERSITY
College of Medicine

THE UNIVERSITY OF MISSISSIPPI
MEDICAL CENTER

Mass General Brigham

HARVARD
MEDICAL SCHOOL

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Maternal Mortality Review Committees

- State-level maternal death review
- Multidisciplinary, CDC-funded
- Identify causes; assess preventability
- Generate actionable recommendations

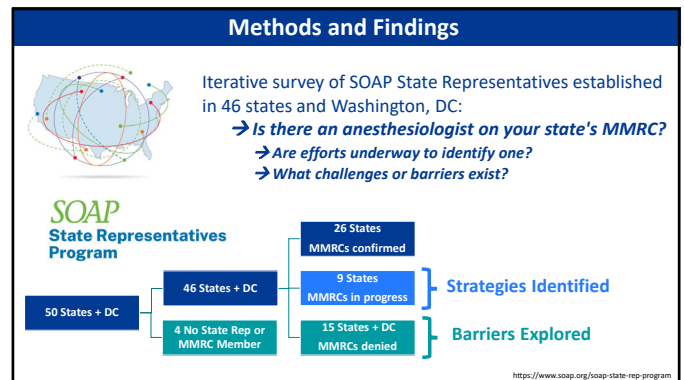
Hypothesis: Although MMRCs are designed to be multidisciplinary, they may lack adequate representation from anesthesiologists.

Study Objective

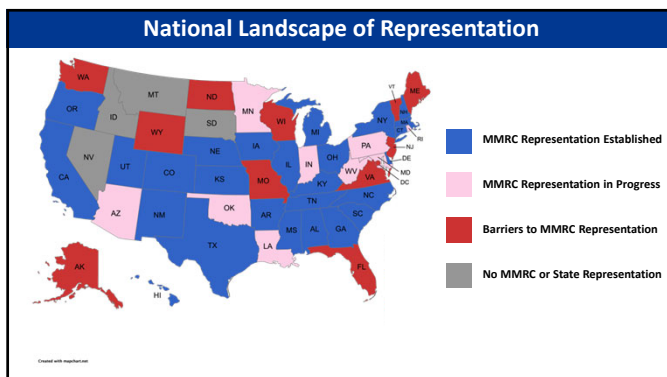
- Evaluate state-level anesthesiologist representation on MMRCs
- Identify barriers to participation
- Assess national trends via SOAP State Representatives Program

Centers for Disease Control, 2024. <https://www.cdc.gov/maternal-mortality/php/mmrc>

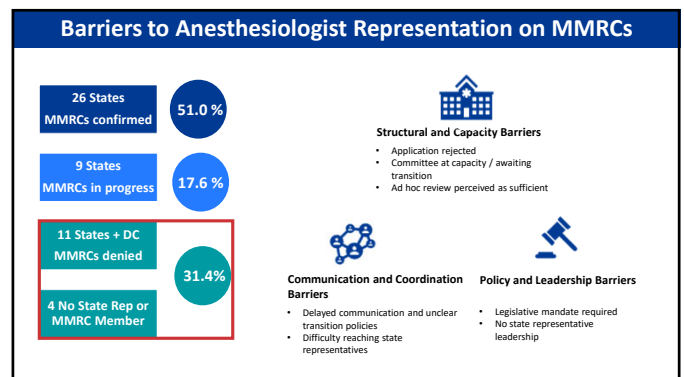
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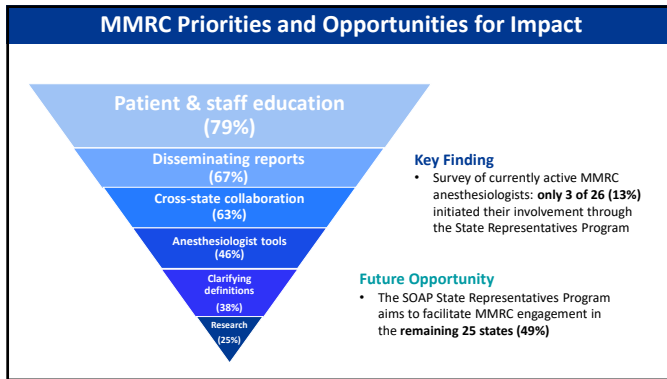
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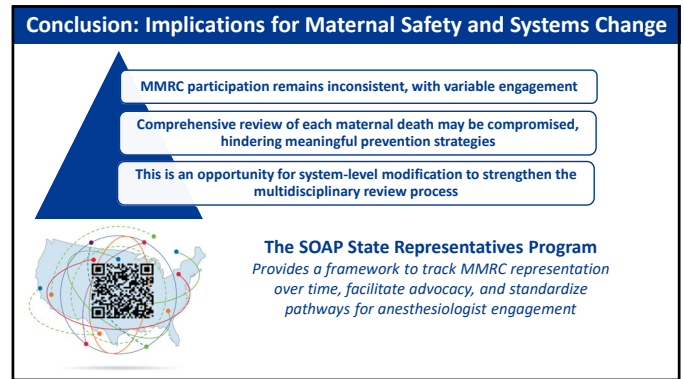
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8



Pain, pressure, and patients' desire for additional analgesia during cesarean delivery

A cross-sectional, survey-based, descriptive study

Alexander "Sascha" Morris,
Scott Kelly, Stephanie Wong, George Ghafari,
Jean Guglielminotti, Ruth Landau

Department of Anesthesiology,
Columbia University Medical Center

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Background

Intraoperative pain during cesarean delivery is recognized as a major obstetric anesthesia complication

- The reported incidence varies widely (2% to 36%).
- A previous study at our institution reported 11.5% with a "mismatch" between reported pain and analgesic supplementation.
- The most recent multi-center study reported 7.6%.
- Reported incidence depends on definition and assessment method.
- No prior studies have distinguished pain from other uncomfortable sensations ("pressure") with severity grading.
- Patient preferences for addressing these sensations remain unexplored.
- What do women actually want when experiencing discomfort?**

Pain during cesarean delivery: A patient-related prospective observational study assessing the incidence and risk factors for intraoperative pain and intravenous medication administration. *Anesthesiology* 2016; 124: 104-110.

ANESTHESIOLOGY
Incidence of Pain during Cesarean Delivery with Neuraxial Anesthesia: An International, Prospective Cohort Study
James J. O'Connell, MD, PhD, David Clark, MD, Marc Van Nieuwenhuysse, MD, PhD, et al.
Pain during cesarean delivery: A patient-related prospective observational study assessing the incidence and risk factors for intraoperative pain and intravenous medication administration. *Anesthesiology* 2016; 124: 104-110.

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Objectives & methods

Objectives

- Determine the incidence and severity of both pain and pressure during cesarean delivery.
- Assess patients' desire for additional medication to address these sensations.
- Describe medication administration.

Hypothesis

- Pressure would be common, but patients would not necessarily want to receive medication for every instance of discomfort.
- Type and severity of sensation would influence medication preferences.

Study design

- Cross-sectional patient-reported outcomes study.
- Continuous recruitment from May to November 2025.
- Academic center and satellite hospital.
- English and Spanish survey offered.

Inclusion criteria

- All categories of cesarean delivery (scheduled, urgent/emergent, and intrapartum).
- All types of neuraxial anesthesia (spinal/CSE, epidural).
- Completed survey within 48h.

Exclusion criteria

- Not Spanish or English-speaking.
- Planned general anesthesia (from the start).
- Complex surgery (e.g. cesarean-hysterectomy).
- Fetal or neonatal demise.

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Outcome measures

Patient-Reported Outcomes

- Survey:** 23 multiple choice and free response questions.
- Pain severity:** 4-point Likert (none, mild, moderate, severe).
- Pressure severity:** 4-point Likert (none, mild, moderate, severe).
- Patient preferences:** adequacy of pain management, desire for additional analgesia.
- Patient satisfaction** with anesthesia care.

EMR Data

- General: demographics, medical history.
- Obstetric: level of cesarean delivery urgency.
- Anesthesia: type, medication administration, conversion to general anesthesia.

Statistical Analysis

- Outcomes: intraoperative pain, pressure, management preferences.
- Results: expressed as count (%) or median [interquartile range].
- Significance: calculated with ANOVA.

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Demographic & obstetric data (n=1005)

- Academic main campus n = 790 (78.6%)
- Satellite community hospital n = 215 (21.4%)
- Median age: 34 years [29;38]
- Median body mass index: 32 kg/m² [28;36]
- Preferred language English/Spanish: 73.3%/26.7%
- White: 23.2%, Black: 14%, Asian: 4.4%, other/unknown or declined to report: 47.3%
- Hispanic: 54.5%, not Hispanic: 36.8%, unknown or declined to report: 8.7%
- Anxiety: 13.4%, depression: 11.1%
- Substance use disorder: 1.4%, chronic opioid use: 0.3%
- Diabetes: 3.8%, gestational diabetes: 12.1%
- Preexisting hypertension: 8.6%, gestational hypertension/preeclampsia: 15.8%
- Scheduled cesarean delivery: 43.9%
- Urgent cesarean delivery (with no labor): 18.1%
- Intrapartum cesarean delivery: 38.0%

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Pain & pressure

"How strongly did you feel..."

- Sharp pain: n=63 (6.3%, 95% CI 4.9, 8.0)
- Pressure: n=850 (84.7%, 95% CI 82.3, 86.8)
 - Pressure but no pain: n = 788 (92.7%)

	Sharp pain during cesarean delivery			
	None (n=940)	Mild (n=28)	Moderate (n=17)	Severe (n=18)
Pressure during cesarean				
None (n=153)	148 (14.8%)	2 (0.2%)	1 (0.1%)	2 (0.2%)
Mild (n=481)	457 (45.6%)	16 (1.6%)	4 (0.4%)	4 (0.4%)
Moderate (n=287)	268 (26.7%)	6 (0.6%)	8 (0.8%)	5 (0.5%)
Severe (n=82)	67 (6.7%)	4 (0.4%)	4 (0.4%)	7 (0.7%)

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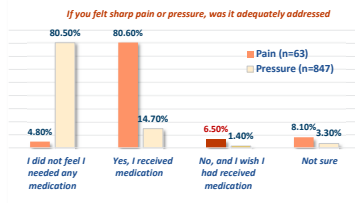
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Medication & desire for additional analgesia

- IV analgesia administration (fentanyl, morphine, ketamine, dexmedetomidine): n=133 (13.2%)
- Midazolam: n=59 (5.9%)
- Conversion to general anesthesia: n=5 (0.05%)

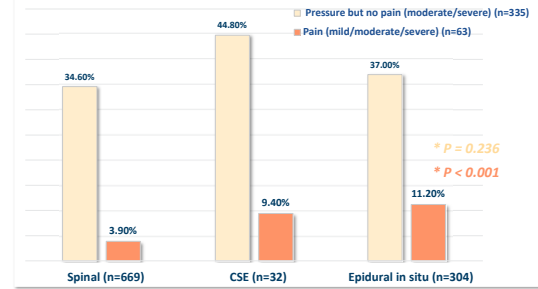


Overall satisfaction with pain medication received during cesarean delivery (n=1005)

- 97.5% satisfied
- Wanted more meds n=15 (1.5%)
- Wanted to go to sleep n=3 (0.3%)
- Wish they did not go to sleep n=3 (0.3%)

7

Anesthesia type: pain or pressure



8

Conclusions, limitations, & next steps

- First study to qualify and distinguish pain from pressure alongside patient preferences.
- Pressure was nearly universal (84.7%), though few indicated they would have wanted more medication (1.4%).
- Severe pain occurred in 1.8%, with overall 6.3% reporting any pain; of these 6.5% would have wanted more meds.
- IV analgesic medications were given to 13.2% of patients, with conversion to general anesthesia in 5 cases (0.05%).
- Spinal anesthesia was associated with lower pain rates; epidural anesthesia with higher rates.

Limitations:

- There is still no consensus on how to assess and record patient-reported pain.
- We did not ask women about their comfort.
- We addressed sensations and patients' desires for treatment in the moment. However, we recorded pain, pressure, desire for analgesic medication and satisfaction with anesthesia care within 48 hours.

Clinical implications and next steps:

- Continue to assess and address pain and pressure as important patient experiences.
- Offer medication for any sensation, even when it is "just pressure".
- Engage patients in shared decision-making.



9

Acknowledgements



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Columbia University Medical Center



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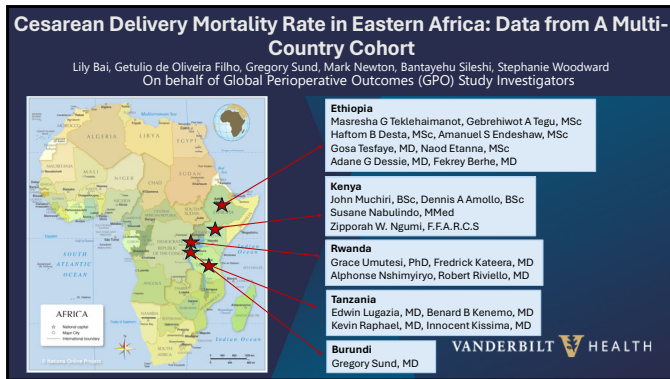


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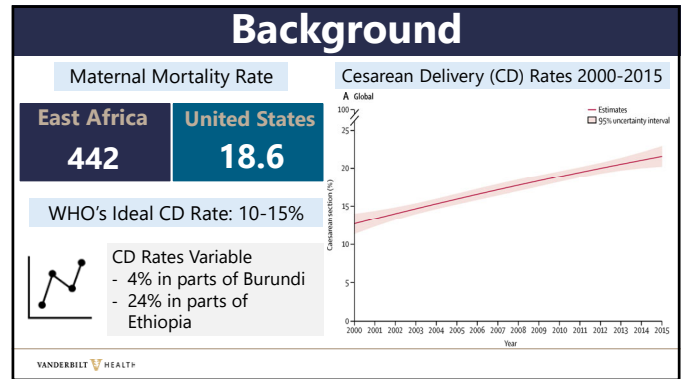


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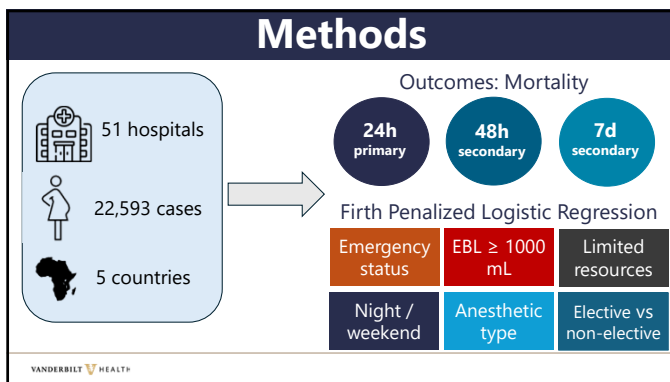
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3

Demographics

C Section Indications	Alive N= 21,716	Unknown N=769	24 hour mortality N= 108
Elective	8,269 (38.1%)	246 (32%)	33 (30.6%)
Failure to Progress	4,782 (22%)	133 (17.3%)	31 (28.7%)
Fetal Distress	2,817 (13%)	101 (13.1%)	9 (8.3%)
Bleeding	2,267 (10.4%)	33 (4.3%)	19 (17.6%)
Pre-Eclampsia / Eclampsia	2,947 (13.6%)	243 (31.6%)	16 (14.8%)
Abnormal Presentation	184 (0.8%)	6 (0.8%)	0
Uterine rupture/ Pre Rupture	39 (0.2%)	1 (0.1%)	0
Twin Pregnancy	70 (0.3%)	0	0
Unknown	341 (1.6%)	6 (0.8%)	0

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4

Results: Mortality

	Burundi N=730	Ethiopia N=3,137	Kenya N=10,037	Rwanda N=3,091	Tanzania N=5,598	Total N=22,593
24-hours						
Alive	715 (97.9%)	2,822 (90.0%)	9,541 (95.1%)	3,045 (98.5%)	5,593 (99.9%)	21,716 (96.1%)
Death	3 (0.4%)	47 (1.5%)	51 (0.5%)	2 (0.1%)	5 (0.1%)	108 (0.5%)
Missing	12 (1.6%)	268 (8.5%)	445 (4.4%)	44 (1.4%)	0	769 (3.4%)
48-hours						
Alive	706 (96.7%)	1,584 (50.6%)	9,132 (91%)	3,037 (98.3%)	—	14,470 (64%)
Death*	4 (0.5%)	50 (1.6%)	58 (0.6%)	4 (0.10%)	12 (0.2%)	121 (0.5%)
Missing	20 (2.7%)	1,503 (47.9%)	847 (8.4%)	50 (1.6%)	—	8,002 (35.4%)
7-days						
Alive	—	1,575 (51.2%)	5,586 (55.7%)	1,067 (34.5%)	—	8,232 (36.4%)
Death*	5 (0.7%)	55 (1.8%)	60 (0.60%)	4 (0.13%)	14 (0.3%)	138 (0.6%)
Missing	—	1,507 (48%)	4,391 (43.7%)	2,020 (65.4%)	—	14,223 (63%)

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Results: Perioperative Risk Factors

	Odds Ratio (OR)	95% CI	P value
24-hours			
Limited Resources	2.13	1.16-3.61	0.02
Emergency Case	1.84	1.14-3.15	0.01
EBL greater than 1,000ml	2.33	1.32-3.86	<0.01
48-hours			
EBL greater than 1,000ml	2.53	1.47-4.12	<0.01
7-days			
Emergency Case	2.24	1.42-3.71	<0.01
EBL greater than 1,000ml	1.89	1.08-3.14	0.03

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Discussion

24-hour mortality: 0.5% or 4.78 per 1,000 cases



Emergency Surgery → less time to prepare and optimize patient



Estimated Blood Loss > 1,000ml → Significant at **all 3 time points**



Lack of Resources → provider reported, context-dependent

Limitations:

- Does not include vaginal delivery
- Missing follow-up data
- Lack data on key obstetric and hospital factors

Future Directions:

- Complication data
- Further data collection for completeness
- Facility-level assessment

References



VANDERBILT HEALTH

7

Cesarean Delivery Mortality Rate in Eastern Africa: Data from A Multi-Country Cohort

Lily Bai, Getulio de Oliveira Filho, Gregory Sund, Mark Newton, Bantayehu Sileshi, Stephanie Woodward



51 hospitals



22,593 cases



5 countries

A Priori Predictors

Emergency status

EBL > 1000 mL

Night / weekend

Anesthetic type

Limited resources

Elective vs non-elective

24-Hour Mortality Rate:
4.78 per 1,000 cases



Emergency case



EBL > 1000ml



Limited Resources

VANDERBILT HEALTH

8

Magnesium Sulfate and Postpartum Hemorrhage: A Target Trial Emulation with Dose-Response Analysis

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Co-Authors: Benjamin M. Hyers, MD - Icahn School of Medicine at Mount Sinai

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Abstract :

INTRODUCTION

Magnesium sulfate is standard therapy for eclampsia prophylaxis, yet its mechanism as a smooth muscle relaxant raises theoretical concerns about uterine atony and postpartum hemorrhage (PPH).¹⁻² Observational studies have reported conflicting associations, with some identifying magnesium as an independent risk factor for PPH while others attribute this to confounding.³⁻⁴ We applied target trial emulation with deep learning-based causal inference to evaluate whether magnesium sulfate causally increases PPH risk in women with preeclampsia.

METHODS

Using MIMIC-IV (2011–2022), we identified 827 Labor & Delivery admissions at Beth Israel Deaconess Medical Center. The primary analysis included 827 patients with preeclampsia (409 magnesium-treated, 418 untreated). Time zero was L&D admission; the outcome was immediate PPH (ICD-10: O72.0, O72.1). Time-varying propensity scores were estimated using a Long Short-Term Memory (LSTM) neural network incorporating baseline covariates and time-varying labs and medications. Stabilized inverse probability of treatment weights (IPTW) were applied to estimate treatment effects. A secondary dose-response analysis among treated patients used restricted cubic splines to model cumulative dose.

RESULTS

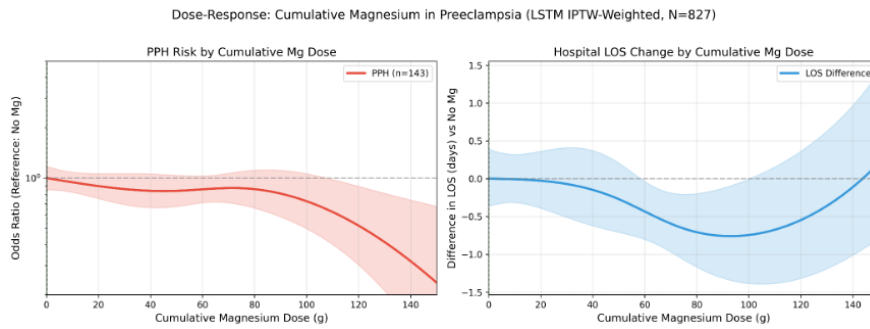
In the general obstetric population, magnesium appeared to increase PPH risk (crude OR 5.97; IPTW-adjusted OR 5.90). However, when restricted to patients with preeclampsia, this association disappeared (crude OR 1.01; adjusted OR 1.04, 95% CI 0.46–2.08). Magnesium-treated patients had higher baseline severity, including higher rates of placental abruption (6.1% vs. 2.6%, $p=0.022$) and severe maternal morbidity (18.6% vs. 4.8%, $p<0.001$). Among treated patients (mean cumulative dose 63.0g), dose-response analysis revealed no dose-dependent increase in PPH risk across the therapeutic range.

DISCUSSION

The apparent association between magnesium sulfate and postpartum hemorrhage in our study likely reflects confounding by indication rather than a true causal effect. Although IPTW adjustment yielded a significant odds ratio, we attribute this to positivity violations rather than a genuine treatment effect. After restricting to patients with preeclampsia, magnesium was not associated with increased hemorrhage risk. Furthermore, no dose-response relationship was observed, with only the expected protective effect seen at therapeutic dosing. These findings suggest that the observed association is mediated through the

relationship between preeclampsia and postpartum hemorrhage rather than a direct effect of magnesium sulfate.

References: 1. Meltzer SJ, Auer J. Physiological and pharmacological studies of magnesium salts—I. General anaesthesia by subcutaneous injections. *Am J Physiol.* 1905;14(4):366-388.
2. Lazard EM. A preliminary report on the intravenous use of magnesium sulphate in puerperal eclampsia. *Am J Obstet Gynecol.* 1925;9(2):178-188.



Factors Associated with Conversion from Neuraxial to General Anesthesia for Cesarean Delivery: Mixed-Effects Analysis from the Multicenter Perioperative Outcomes Group

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Abstract : Introduction

Neuraxial anesthesia (NA) is commonly preferred to general anesthesia (GA) for cesarean delivery (CD), due to reduced maternal and neonatal morbidity and mortality^{1,2}. We hypothesized that the likelihood of conversion from NA to GA is influenced by patient factors, block characteristics, and institutional attributes, and that there is significant variability in rates of GA across institutions.

Methods

We conducted a retrospective cohort study of CDs among patients with primary NA who delivered in Multicenter Perioperative Outcomes Group (MPOG)-affiliated hospitals between 2016 and 2025. Our primary outcome was a validated MPOG quality metric for conversion from NA to GA in CD. Covariates included patient demographics and comorbidities, case timing, anesthetic techniques and medications, delivery volume, and SOAP Center of Excellence (COE) status. We constructed a mixed-effects generalized linear model to quantify sources of variation in rates of GA across hospitals.

Results

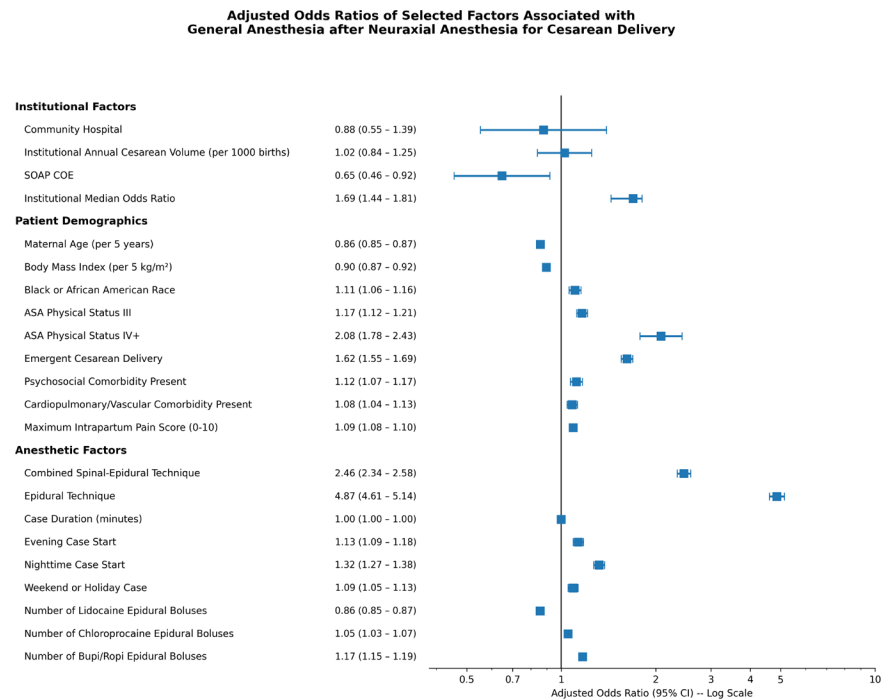
Across 68 MPOG sites, 476,262 CDs met inclusion criteria, of which 40.2% utilized spinal, 39.7% combined spinal epidural (CSEs), and 20.2% epidural anesthesia. Rates of GA after NA across institutions ranged from 1.2% to 30.3% (median 4.0%). Comparing two randomly chosen hospitals, delivery at the one with higher GA rate was on average associated with a 69% increase in the odds of GA (median odds ratio (OR) 1.69 (95% confidence interval (CI), 1.44 – 1.81)). Selected ORs are shown in the Figure. SOAP COE designation was protective against GA (OR 0.65, 95% CI 0.46 – 0.92). Notable patient factors associated with GA after NA included Black race compared to White race (OR 1.11, 95% CI 1.06 – 1.16), ASA physical status 3 (OR 1.17, 95% CI 1.12 – 1.21) or 4+ (OR 2.08, 95% CI 1.78 – 2.43) compared to 2, and emergency delivery (OR 1.62, 95% CI 1.55 – 1.69). Higher age (OR 0.86 per 5 year increment, 95% CI 0.85 – 0.87) and body mass index (BMI) (OR 0.90 per 5 unit increment, 95% CI 0.87 – 0.92) were associated with lower odds of GA. Anesthetic risk factors for GA included epidural (OR 4.87, 95% CI 4.61 – 5.14) or CSE (OR 2.46, 95% CI 2.34 – 2.58) compared to spinal anesthesia, nighttime delivery (OR 1.32, 95% CI 1.27 – 1.38), and greater number of epidural local anesthetic boluses during labor (OR 1.17 per bolus, 95% CI 1.15 – 1.19).

Conclusion

Hospital rates of GA after NA for CD are highly variable, and this is not fully explained by measurable patient or institutional factors. Lower odds of GA at SOAP COE institutions may reflect practice patterns

that reduce avoidable GA. Higher odds of GA after epidural or CSE versus spinal anesthesia (potentially reflecting differences between intrapartum and scheduled CD), in Black patients, and at nighttime highlight opportunities to improve analgesia and equity. Our results can inform ongoing conversations regarding scenarios where conversion to GA is warranted.

- References:** 1. Apfelbaum *Anesthesiology* 2016
2. Guglielminotti *Anesthesiology* 2019



THURS – GMRC – 03

Immune Dysregulation in Uterine Atony Could Suggest New Ways to Treat Postpartum Hemorrhage

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Presenting Author's Institution: Department of Anesthesia, Perioperative, and Pain Medicine, Stanford University School of Medicine - Stanford, California

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Senior Author: Jessica R. Ansari, MD, MS – Assistant Professor, Division of Obstetric Anesthesiology and Maternal Health, Department of Anesthesia, Perioperative, and Pain Medicine Stanford University School of Medicine

Abstract :

Introduction: Uterine atony remains the leading cause of postpartum hemorrhage (PPH). Prior studies have linked global inflammation and atony, but the mechanism and specific dysregulated immune pathways are unknown.^{1,2} We used RNA sequencing followed by high-dimensional proteomic imaging to assess transcriptional changes and immune infiltration in myometrium from nonlaboring patients with severe atony and matched controls. We hypothesized that inflammatory pathways and immune cell infiltration would be upregulated in atonic myometrium. Identifying these pathways could reveal new PPH therapeutic targets.

Methods: Myometrial biopsies were collected from hysterotomy sites during cesarean delivery. Samples were independently frozen for RNA, fixed in formalin for protein imaging, or cultured for smooth muscle cell isolation. 3 experiments were conducted: First, 5 cases of atony from various race/ethnicity, age, and gestational age were selected with 5 case matched non atonic controls for RNA sequencing. Next, to evaluate inflammatory pathways in muscle cells only, an additional 7 atonic and 14 control patients were selected, and uterine smooth muscle cells isolated from the myometrium were cultured prior to RNA sequencing. Finally, to test the hypotheses generated from the RNA sequencing experiments that immune cells would infiltrate the myometrium of patients with uterine atony, a fixed myometrial tissue sample from a patient with severe PPH secondary to atony was compared to a case-matched control to image and label immune cells *in situ* using imaging mass cytometry (IMC) with antibody-metal tags.

Results: Bulk tissue RNA sequencing identified 51 significantly different genes in atony vs control tissue. Genes regulating immune cell antigen processing and presentation were strongly upregulated in uterine atony. This observation was validated in the second RNA dataset representing different patients and cultured uterine smooth muscle cells. IMC imaging showed marked immune cell infiltration in the myometrium of the patient with uterine atony. There was upregulation of activated neutrophils, tissue resident macrophages, and monocytes in the atony sample, which invade deeper into the tissue away from endovascular structures.(Fig. 1)

Discussion: These studies suggest immune pathways are dysregulated in uterine atony leading to infiltration of immune cells deep into the myometrium, resulting in inflammatory changes. These findings are important and justify further research to define the mechanisms of immune dysregulation; this may open the door for targeted immunotherapies as uterotonic medications and PPH therapies. In future studies we will increase the number of IMC samples, conduct single cell multi-omic studies, and ultimately test whether immunomodulators improve myometrial contractility in samples from patients with uterine atony.

References:

1. J Perinat Med. 2022;51(2):219-232
2. J Reprod Immunol. 2024;165:104299

[Figure_ Immune dysregulation in uterine atony could suggest new ways to treat postpartum hemorrhage.pdf](#)

Gestational Thrombocytopenia and Risk of Postpartum Hemorrhage and Severe Maternal Morbidity: A Population-Based Analysis

Presenting Author: Samuel Rafla, MD

Presenting Author's Institution: Icahn School of Medicine at Mount Sinai - New York, New York **Co-Authors:**

Alexander Tran, BS - Icahn School of Medicine at Mount Sinai

Andrew Warburton, M.D. - Icahn School of Medicine at Mount Sinai

Senior Author: Daniel Katz, M.D. – Associate Professor, Icahn School of Medicine at Mount Sinai

Abstract :

Background: Postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide, highlighting the need for early risk stratification.¹ Gestational thrombocytopenia (GT) is the most common cause of thrombocytopenia in pregnancy and may result from physiologic hemodilution and increased platelet clearance.² The American College of Obstetricians and Gynecologists notes that GT generally does not increase maternal bleeding risk; however, a recent study found that patients with mild GT (100,000–150,000/ μ L) had significantly higher rates of PPH than women with normal platelet counts.^{3,4} We aimed to evaluate the association between GT and adverse maternal outcomes and whether these outcomes differed by race and insurance status.

Methods: We used the New York State Inpatient Database (SID) from the Healthcare Cost and Utilization Project (HCUP), 2016–2020, and the Distressed Community Index (DCI). GT was identified using ICD-10 codes D69.6 and D69.59. Propensity score matching was used to match patients with and without GT while controlling for demographic and insurance differences. Maternal outcomes included PPH, transfusion, severe maternal morbidity (SMM), and non-transfusion SMM.

Results: Among 377,114 pregnancies, 6,503 (1.7%) had GT. After matching, GT was associated with higher odds of PPH (aOR 3.48; 95% CI 3.05–3.98), transfusion (aOR 2.69; 95% CI 2.21–3.27), SMM (aOR 3.82; 95% CI 3.21–4.55), and non-transfusion SMM (aOR 7.19; 95% CI 5.25–9.85). Compared with White race, Black race was associated with higher odds of PPH, transfusion, SMM, and non-transfusion SMM. Asian/Pacific Islanders were associated with higher odds of transfusion, SMM, and non-transfusion SMM. Hispanics were associated with higher odds of transfusion and SMM. There were no significant differences based on insurance status.

Conclusion: Gestational thrombocytopenia was independently associated with higher odds of postpartum hemorrhage, transfusion, and severe maternal morbidity, suggesting that GT may not be as clinically benign as traditionally perceived. These findings support incorporating GT into peripartum hemorrhage risk stratification and preparedness strategies. Persistent racial disparities in maternal outcomes—particularly among Black, Asian/Pacific Islander, and Hispanic patients—underscore the need for equity-focused interventions alongside clinical risk assessment.

References:

1. Hematology 2020;2020:542
2. Blood 2010;115:168
3. Obstet Gynecol 2019;133:e181

4. J Matern Fetal Neonatal Med 2022;35:8426

Table 1. Adjusted Odds of Adverse Maternal Outcomes Based on Gestational Thrombocytopenia Diagnosis, Race, and Insurance^a

Gestational Thrombocytopenia		PPH		Transfusion		SMM		Non-Transfusion SMM	
		aOR (95% CI)	P-value	aOR (95% CI)	P-value	aOR (95% CI)	P-value	aOR (95% CI)	P-value
Gestational Thrombocytopenia	No Dx	(reference)	(reference)	(reference)	(reference)	(reference)	(reference)	(reference)	(reference)
	Dx	3.48 (3.05, 3.98)	<0.001	2.69 (2.21, 3.27)	<0.001	3.82 (3.21, 4.55)	<0.001	7.19 (5.25, 9.85)	<0.001
Race	White	(reference)	(reference)	(reference)	(reference)	(reference)	(reference)	(reference)	(reference)
	Black	1.26 (1.06, 1.49)	0.008	2.66 (2.06, 3.44)	<0.001	2.40 (1.94, 2.96)	<0.001	2.22 (1.64, 3.01)	<0.001
	Hispanic	1.07 (0.89, 1.28)	0.473	1.57 (1.18, 2.10)	0.002	1.42 (1.12, 1.80)	0.004	1.31 (0.93, 1.85)	0.129
	Asian / Pacific Islander	1.20 (0.96, 1.50)	0.109	1.59 (1.12, 2.28)	0.010	1.52 (1.13, 2.03)	0.005	1.55 (1.02, 2.34)	0.039
	Native American	0.47 (0.06, 3.57)	0.468	NC	0.953	NC	0.950	NC	0.948
	Other	1.24 (1.03, 1.49)	0.026	1.74 (1.29, 2.34)	<0.001	1.72 (1.35, 2.19)	<0.001	1.77 (1.26, 2.50)	0.001
Insurance	Private Insurance	(reference)	(reference)	(reference)	(reference)	(reference)	(reference)	(reference)	(reference)
	Medicaid/Medicare	0.88 (0.77, 1.01)	0.065	1.09 (0.89, 1.34)	0.395	1.06 (0.89, 1.25)	0.522	0.89 (0.70, 1.14)	0.359
	Self-pay	0.72 (0.37, 1.40)	0.335	0.80 (0.29, 2.20)	0.660	0.92 (0.42, 2.02)	0.838	1.34 (0.53, 3.39)	0.531
	Other	0.80 (0.38, 1.67)	0.549	1.19 (0.43, 3.30)	0.745	0.94 (0.37, 2.37)	0.899	0.73 (0.18, 3.03)	0.663

^aPPH = Postpartum Hemorrhage, SMM = Severe Maternal Morbidity

^{NC}Model unable to be fit due to non-convergence

Geographic Validation of an Automated, Electronic Medical Record-Enabled Postpartum Hemorrhage Prediction Model

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Co-Authors: Trent D. Bryson, MD - University of Texas Southwestern

Henry Domenico, MS - Department of Biostatistics, Vanderbilt University Medical Center

Ryan P. Moore, MS - VUMC

Sujanya Narayanan, BS - Vanderbilt University School of Medicine

Senior Author: Holly B. Ende, MD – Associate Professor, Vanderbilt University Medical Center

Abstract :

Introduction Postpartum hemorrhage (PPH) is a significant cause of maternal morbidity and mortality, and prediction may decrease preventable adverse events. Multiple national organizations have published

risk assessment tools that categorize patients as low, medium, or high risk of PPH;¹ however, risk prediction models may provide greater discrimination and improve predictive ability.² We recently published a PPH prediction model that can be coded into the electronic medical record to produce automated risk predictions in real-time.³ We tested the accuracy of this model at two other quaternary medical centers in the United States.

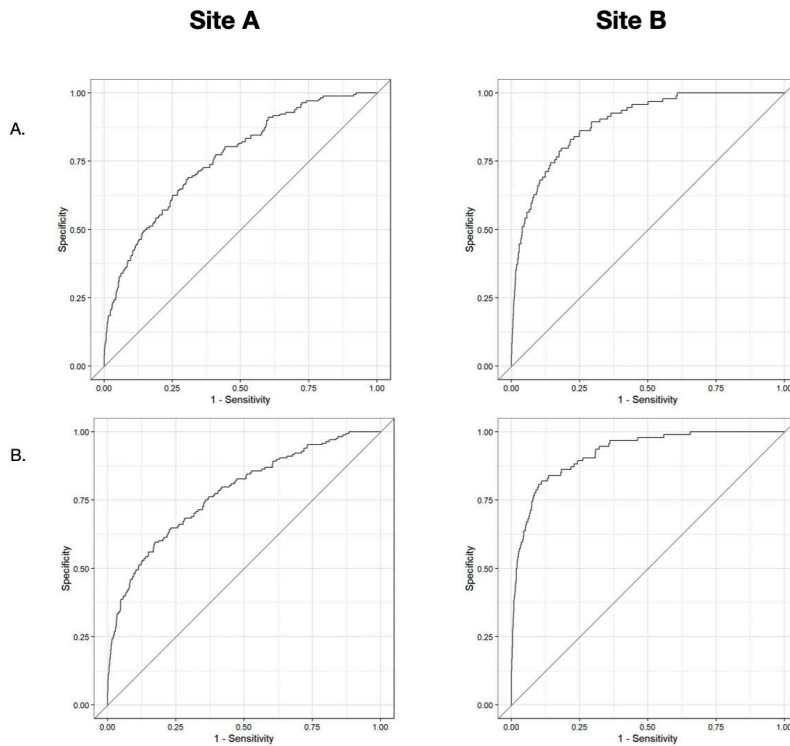
Methods Details of the original model development and temporal validation have been previously published.³ Following IRB approval at two academic centers (Site-A; Site-B), we retrospectively collected data on 21 risk factors included in the prediction model. All data must have been present in the patient record prior to the time of vaginal or cesarean delivery. PPH was defined as blood loss $\geq 1,000$ ml with transfusion of ≥ 1 unit of packed red blood cells during the delivery encounter. Patient risk of PPH was estimated using a logistic regression model, with variables (in order of importance): delivery type, prior PPH, hematocrit, placenta accreta spectrum disorder, general anesthesia, multiple gestation, placenta previa, induced labor, augmented labor, maternal weight, white blood cell count, estimated fetal size for gestational age, labor length > 20 hours, admission pulse, premature rupture of membranes, calcium level, nifedipine administration, hypertensive disorder of pregnancy, terbutaline administration, platelet count, and placental abruption. Performance of the model was assessed using area under the receiver operating characteristics (ROC) curve (AUC) with a 95% confidence interval (CI), as well as visual examination of calibration curves.

Results Overall, 13,419 subjects were included in the Site-A cohort (168 [1.3%] with PPH), and 8,045 subjects were included in the Site B cohort (94 [1.2%] with PPH). The original model performance was maintained in the two geographic validation cohorts—Site-A AUC 0.76 (95% CI: 0.72-0.79) and Site-B AUC 0.89 (0.86-0.92) (Fig. 1A). The model also maintained good calibration at both centers. When refit to the local population, AUC further improved—Site-A AUC 0.78 (95% CI: 0.74-0.82) and Site-B AUC 0.92 (0.90-0.94) (Fig. 1B).

Conclusion Our previously published logistic regression model maintained good to excellent discrimination for PPH when applied to external cohorts from geographic areas remote from its development. This provides promising data to support widespread generalizability of the model; however,

all sites were quaternary medical centers. Future work is needed to test the performance of the model in additional practice types such as smaller community hospitals.

References: 1. *Obstet Gynecol.* 2018;134(6):1308-1316
2. *BJOG.* 2021 Jan;128(1):46-53
3. *Obstet Gynecol.* 2024 Jul 1;144(1):109-117



Defining Representation of Anesthesiologists on State Maternal Mortality Review Committees: A Report from the SOAP State Representatives Program

Presenting Author: McKenzi I. Thompson, MPH

Presenting Author's Institution: Howard University College of Medicine - Washington, District of Columbia

Co-Authors: Chawla L. Mason, MD, FASA - University of Mississippi Medical Center

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Abstract :

Background: Maternal mortality in the United States (US) remains a major public health crisis, with rates exceeding those of other high-income countries (1). Over 80% of pregnancy-related deaths are preventable with timely recognition and appropriate response (2). State Maternal Mortality Review Committees (MMRCs) are multidisciplinary groups that identify cause, preventability, and disparities in maternal deaths to guide prevention strategies (3). In 2023, the Society for Obstetric Anesthesia and Perinatology (SOAP) launched the State Representatives Program (SRP), a national network of obstetric anesthesiologists assessing anesthesiologist representation on MMRCs (4). We hypothesized that anesthesiologist representation is limited and sought to evaluate state-level representation and perceived barriers.

Methods: States with SOAP State Representatives (SR) but uncertain MMRC status were contacted through the SOAP SR directory (5) to complete a survey. Participants verified their role as an SR, MMRC member, or both, and reported barriers to MMRC involvement. Descriptive statistics were used.

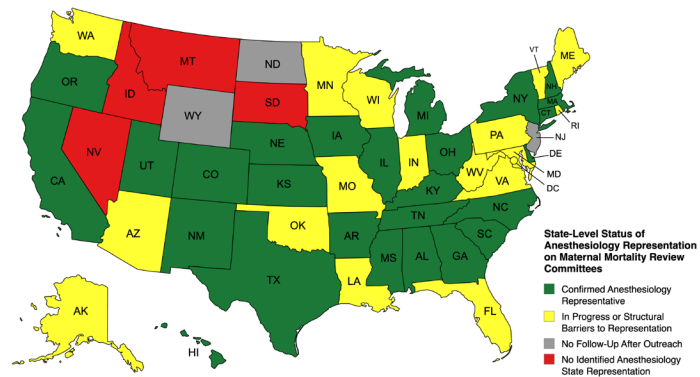
Results: Out of 50 states and Washington, DC, 19 had anesthesiologist MMRC representatives; 4 lacked an SR or MMRC and were excluded. Among 28 states surveyed, 25 SRs responded (89%) (Figure). Seven of 25 (28%) confirmed an active anesthesiologist MMRC member, while 18 (72%) reported no representation. Of these 18 states, 9 (50%) initiated MMRC contact without barriers; 2 requested SOAP endorsement. Five (28%) reported barriers, including preference for ad hoc anesthesia consultation, pending member transitions, delayed responses, and unclear processes. Four (22%) were formally denied participation due to legislative limits or leadership restructuring. In the 3 non-responding states, no anesthesiologist MMRC member was identified. Collectively, MMRC representation is lacking in 21 of 51 states (41%).

Conclusion: Despite the urgency of US maternal mortality and national investment in surveillance by MMRCs, obstetric anesthesiologists remain inconsistently represented. We identified barriers including logistical delays in onboarding, difficulty identifying the appropriate committee contact, and state-level policies limiting expansion of committee membership. Anesthesiologists bring critical perspective to maternal death reviews for the development of meaningful prevention strategies. Our finding of a national deficit of obstetric anesthesiologist MMRC representation will facilitate further advocacy with a focus on identified barriers. The SOAP SRP provides a network to track progress over time.

References:

1. Tikkanen R et al. Commonwealth Fund 2020
2. CDC. Pregnancy-Related Deaths: Data from MMRCs in 36 U.S. States, 2017–2019. CDC 2022
3. CDC. Maternal Mortality Review Committees (MMRCs). CDC

4. Society for Obstetric Anesthesia and Perinatology (SOAP). SOAP
5. Society for Obstetric Anesthesia and Perinatology (SOAP). SOAP State Representative Program. SOAP



Created with mapchart.net

Patient-reported pain, pressure, and intraoperative analgesic use during cesarean delivery: a prospective descriptive study

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Jean R. Guglieminotti, MD/PhD - Columbia University Irving Medical Center; Department of Anesthesiology

Scott Kelly, BS - Columbia University Vagelos College of Physicians and Surgeons

Stephanie Wong, BA - Columbia University Vagelos College of Physicians and Surgeons

Senior Author: Ruthi Landau, MD – Virginia Apgar Professor, Columbia University

Abstract:

Introduction

In the largest prospective cohort study on intraoperative pain during cesarean delivery (CD), 7.6% of patients reported pain; however, visceral sensations such as pressure or tugging, analgesia supplementation, and patients' desire for additional analgesia were not assessed.¹ Studies have shown a mismatch between patients' experience of pain and IV medication supplementation.^{2,3} We therefore designed a study to better characterize the sensations felt during CD and patients' desire for additional IV medication. We hypothesized that the type of sensation experienced (pressure vs. pain) would differentially influence patients' desire for medication.

Methods

In this prospective survey study conducted in two affiliated hospitals (May-Nov 2025), English- and Spanish-speaking patients undergoing all categories of CD under neuraxial anesthesia were enrolled. Within 48h of CD, patients completed a 23-item survey assessing intraoperative pain and pressure (none, mild, moderate, severe) and desire for additional medication. Other data were extracted from the EMR. Outcomes included intraoperative pain, pressure, and preferences for addressing these sensations. Results are expressed as count (%).

Results

There were 1,005 patients enrolled; 66% received spinal anesthesia, 3.2% CSE, and 30.2% epidural extension for intrapartum CD. Incidence of pain (mild, moderate, or severe) was 5.3% (n=63), with 18/63 (28.6%) severe pain; 81.0% of these received intravenous or epidural analgesic supplementation and 6.3% (n=4) indicated they would have wanted more medication. Incidence of pressure (mild, moderate, or severe) was 84%, (n=851) with 82/851 (9.6%) severe pressure; 14.7% of these received intravenous or epidural analgesic supplementation with 1.4% (n=12) wanting more. IV analgesia rate was 13.2% (n=133), and general anesthesia conversion rate was 0.5% (n=5).

Discussion

This is the first study characterizing degree of both pain and pressure during CD and desire for additional medication for these sensations. The overall proportion of patients reporting pain was low, with few patients wanting more medication – even among women experiencing severe pain. Regarding pressure, though often experienced (84%), most did not indicate a desire for more medication, consistent with our hypothesis. Definitions of pain can differ, though a contributing factor to the relatively low reported incidence of pain may be the granular questions regarding discomfort, ranging from mild pressure and tugging to severe pain, allowing patients to more accurately describe their experience. These findings provide a novel patient-centered description of the intraoperative experience during CD and establish a framework for future analyses examining risk factors, communication, and targeted analgesic interventions.

References: 1. *Anesthesiology* 2025; PMID 41284721

2. *Anesthesiology Critical Care and Pain Medicine* 2024; PMID 37865217
3. *European Journal of Pain* 2022; PMID 34448323

[SOAP PDCD Descriptive Table.pdf](#)

THURS – GMRC – 08

Cesarean Delivery Mortality Rate in Eastern Africa: Data from a Multi-Country Cohort

Presenting Author: Lily Y. Bai

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Senior Author: Stephanie K. Woodward, MD – Assistant Professor, Vanderbilt University Medical Center

Abstract :

Introduction:

Maternal mortality rates (MMR) following cesarean delivery (CD) remain disproportionately high in low-resource settings, including East Africa (1,2). Compared to vaginal delivery, CDs are associated with higher maternal and fetal morbidity and mortality (3,4). Beyond obstetric indications, perioperative conditions may substantially influence maternal outcomes. Analysis of CD outcomes and risk factors have been limited due to paper charting, lack of central data collection tools, and loss of patient follow-up.

Methods:

We conducted a retrospective observational study of cesarean deliveries that occurred from 2014 – 2025, using data from 51 hospitals across five East African countries: Burundi, Rwanda, Tanzania, Ethiopia, and Kenya, as part of the Global Perioperative Outcomes study.

Our primary outcome was 24-hour postoperative maternal mortality. Secondary outcomes included 48-hour and 7-day mortality rates. Firth penalized logistic regression was used to create mortality models, which identified factors that were associated with mortality at each time point. Model performance was assessed using penalized likelihood ratio tests and area under the curve (AUC).

Results:

Among 22,593 cesarean deliveries, 24-hour maternal mortality occurred in 108 patients. Among those with available postoperative follow up, an additional 13 deaths occurred by 48 hours, and an additional 17 deaths occurred by 7 days postoperatively. For 24-hour mortality, lack of standardized perioperative resources (odds ratio (OR): 2.13, 95% confidence interval (CI): 1.16–3.61), estimated blood loss (EBL) >1000ml (OR 2.33, 95% CI: 1.32–3.86), and emergency surgery (OR: 1.84, 95% CI: 1.14–3.15) were statistically significantly associated with death. In 48-hour mortality, EBL > 1000ml remained significantly associated with death (OR 2.5, 95% CI 1.47–4.12). In 7-day mortality, emergency surgery (OR 2.24, 95% CI: 1.42–3.71) and EBL >1000ml (OR: 1.89, 95% CI: 1.08–3.14) were significantly associated with higher mortality. Model discrimination was modest but consistent across time points (AUC 0.57–0.67).

Conclusion:

Early maternal mortality following cesarean delivery in this multi-country East African cohort was predominantly driven by hemorrhage, emergency surgery, and perioperative resource

limitations, all of which represent actionable targets for intervention. Strengthening emergency case preparedness and standardized postpartum hemorrhage algorithms, including administration of uterotonics and blood products, may offer substantial opportunities to reduce preventable maternal deaths in Eastern Africa.

References:

1. PMID: 30929893
2. PMID: 30879511
3. PMID: 18307481
4. PMID: 15121564



1



2

Summary

1. Understand key historical developments that have impacted the anesthesia workforce.
2. Examine the example of the anesthesia workforce in Canada.
3. Identify strategies to increase access to anesthesia care.

3

Disclosures: "my perspective"

Professor, Chair, TAHSN: Department of Anesthesiology & Pain Medicine, Temerty Faculty of Medicine, University of Toronto

ACUDA: 17 Chairs of Departments of Anesthesia in Canada

CAGA: ACUDA, CAS, CFPC, Society of Rural Physicians of Canada

FPA in rural regions of Canada

4

Oh Canada!

- 41.5 million people
- *Canada Health Act* – Equitable access to medically necessary hospital and physician services
- Canadians living in rural and remote regions, including Indigenous peoples have limited access to care and poorer health outcomes
- Rurality correlates with mortality



5

Equitable Access to Anesthesia Services

Red Deer Regional Hospital dealing with anesthesiologist shortage

Apr 9, 2021 / 1:18 AM

Add anesthesiologists to Quebec's labour shortage list, association says

Three hundred anesthesiologists have agreed to increase their workloads in Quebec hospitals.

Rural Canadians face greater disparities from lack of anesthesia care, doctors say

Apr 9, 2021 / 1:18 AM

Calls for national strategy as one B.C. practitioner says lack of anesthesiologists is 'pandemic problem'

Poor health workforce planning is costly, risky and inequitable

Ivy Bourgeois PhD, Sarah Simkin MD MSc, Caroline Chamberland-Rowe MSc

■ CMAJ 2019; October 22;191(16):E1147-8. doi:10.1503/cmaj.191245

6

Impacts Patients



Shayena Currie (right) with her son Tristan, newborn daughter Octavia, sister Chelsea Currie, (left), and her mom, Shannon Dickson at Cariboo Memorial Hospital. Monica Lamb-Yonaki photo

Williams Lake Tribune, 2019

7

Maternal Morbidity in Rural Canada

Higher Overall Risk: Women in rural areas have roughly a **15% higher adjusted risk** of death or severe maternal morbidity compared to those in urban areas.

Eclampsia, Obstetric Embolism, Uterine Rupture: Risk is nearly **twice as high** for rural women (adjusted OR 1.96).

Postpartum Transfusions: Blood transfusion rates are significantly higher among rural patients (595.6 per 100,000 deliveries vs. 512.1 in urban areas).

Lisonkova et al., CMAJ 2016

8

"Where you live should not determine whether you live."

-Bono

9

Drivers of Increased Demand and Complexity



Sicker, More Elderly Patients

The patient population is more complex than 30 years ago, requiring more intricate care.



Expanded Role: The Perioperative Physician

Anesthesiologists are now involved in patient care from several days BEFORE a procedure to several days AFTER it, not just the day of surgery.



Rise of NORA

Non-Operating Room Anesthesia (NORA)—care outside the traditional OR (e.g., interventional radiology, endoscopy)—now accounts for 40% of the work.



Work-Life Balance

Complex, longer workdays lead some physicians to reduce their overall working days, further exacerbating the shortage.

10

MADE IN CANADA



FABRIQUÉ AU CANADA

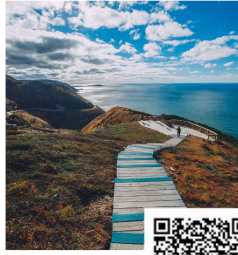
11

Alberta: all "approved jurisdictions" under RC and CFPC will now be eligible for full licensure immediately without RC/CFPC exam.

British Columbia: CRNAs

12

A roadmap for building a workforce for anesthesia services in rural and remote regions of Canada



Symposium on Anesthesia Care and Pain Medicine in Rural and Remote Regions of Canada
November 20 & 21, 2020



SCAN TO DOWNLOAD

13

Recommendations



Patient-centered discussions



Evidence-based decision making



Data-driven strategic planning



Trusting relationships that support specialist-generalist networks

14

CIHI + Canadian Health Workforce Network



SCAN TO VISIT THE CIHI WEBSITE



15

Anesthesia workforce in Canada: Three different providers



Specialists



Family physicians

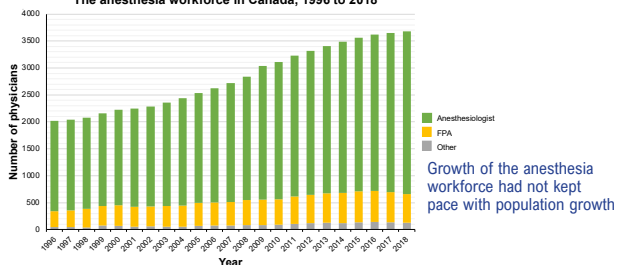


Other physicians

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1.8-fold increase in Canadian anesthesia workforce 1996-2018

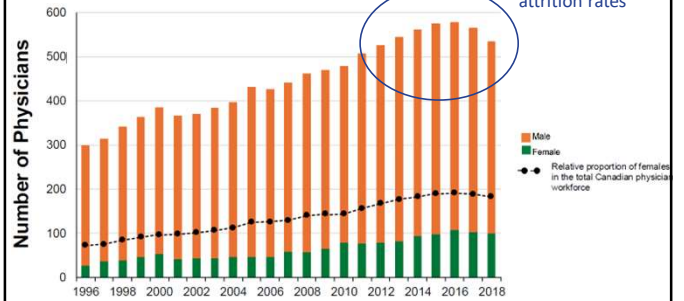
The anesthesia workforce in Canada, 1996 to 2018



Simkin et al., Anesthesia & Analgesia, (2023)

17

Family Physician Anesthetists



18

Province/Territory	Number of FPAs (% of workforce)
Ontario	16%
Alberta	15%
British Columbia	18%
Manitoba	10%
Saskatchewan	9%
Yukon	75%
Nova Scotia	<5
Prince Edward Island	<5
New Brunswick	0
Newfoundland	0
Total	534

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Workforce entry and attrition, 2010 to 2019					
Year	Anesthesiologists		Family Practice Anesthesia		
	Entrants	Exits	Entrants	Exits	
	Anesthesia specialty training*	Full retirement** (%)	Via FPA training***	Total (% IMG)	Attrition from anesthesia service (%)
2010	91	39 (2%)	16	70 (23%)	49 (11%)
2011	87	44 (2%)	29	67 (25%)	53 (12%)
2012	113	68 (3%)	12	68 (34%)	44 (9%)
2013	120	60 (3%)	4	64 (28%)	59 (12%)
2014	114	55 (2%)	21	71 (28%)	67 (13%)
2015	120	67 (3%)	15	75 (44%)	57 (11%)
2016	114	71 (3%)	10	72 (29%)	91 (17%)
2017	121	90 (3%)	18	58 (26%)	91 (17%)
2018	143	94 (4%)	20	47 (36%)	115 (21%)

20

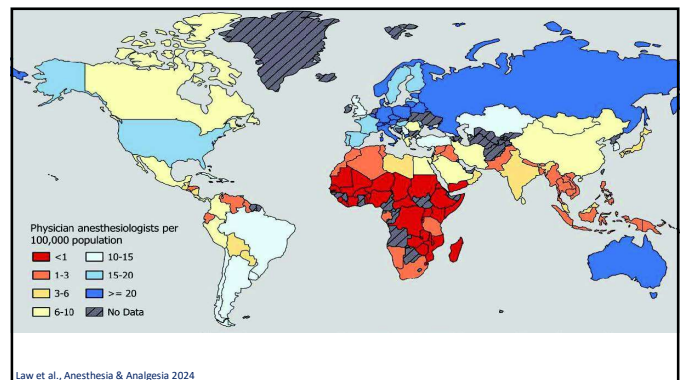
Flexperts not experts needed.

Rural is not small urban.

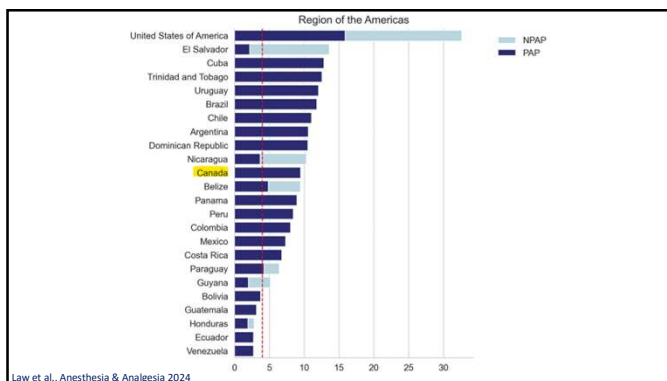
In Canada, the difference between rural and remote is a snowstorm.

CRNs?

21

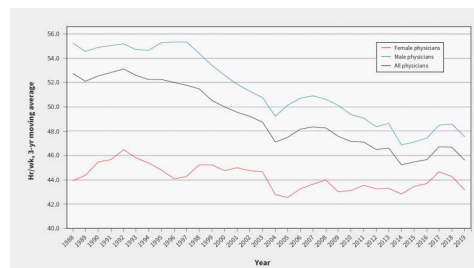


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Long-term trends in the work hours of physicians in Canada



24

Population age and changes in physician work hours (1987-2020)

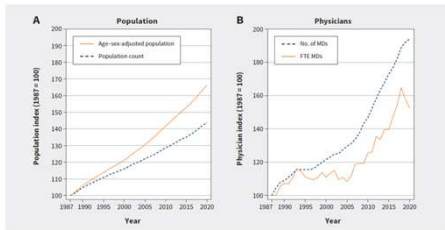


Figure 1: (A) Unadjusted and age-sex-adjusted population count, and (B) absolute and FTE physician numbers in Canada from 1987 to 2020. Note: FTE = full-time equivalent.

Rabiul et al., CMAJ 2023

25

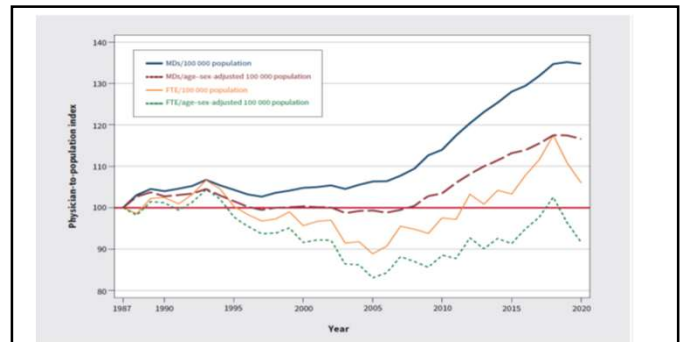
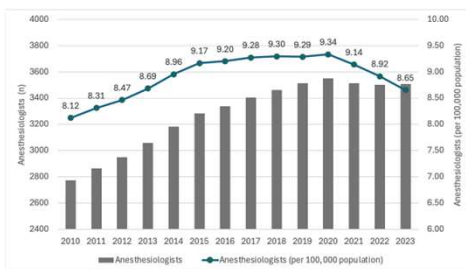


Figure 3: Physicians per capita, adjusted and unadjusted (index 1987 = 100, red solid line). Note: FTE = full-time equivalent.

Rabiul et al., CMAJ 2023

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Fellows RCPSC



Can J Anesth, in press

27

Ontario



28

Age

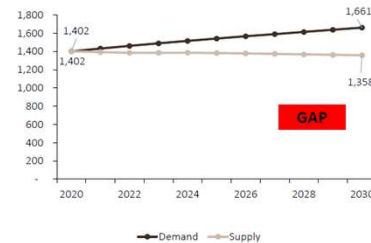


In 2021, the average age of an anaesthesiologist in Ontario was 50.2 and 12.0% were between the ages of 65 and 74. [OPHRDC]

Ontario

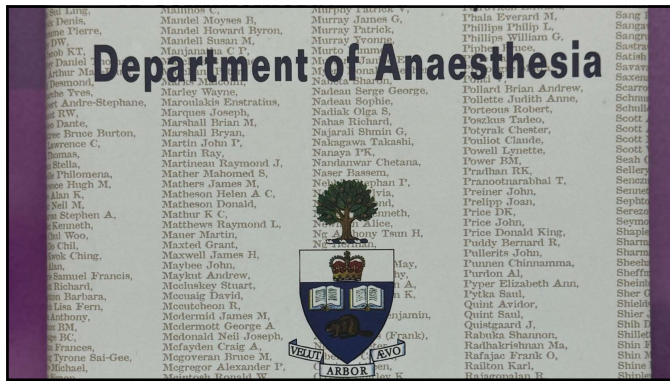
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Modelling: 2020 to 2030

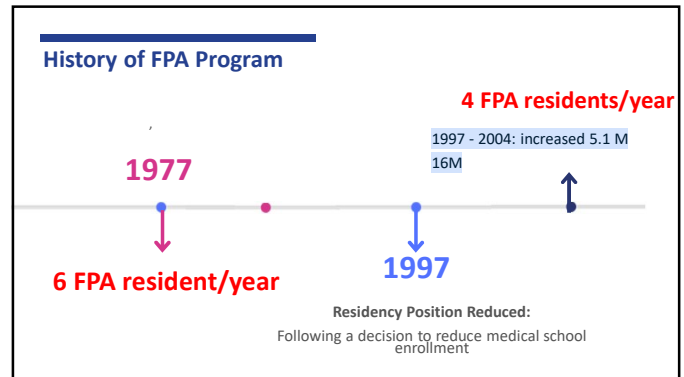


Ontario

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33



bit.ly/imgpathways

- Retrain Fellows as Faculty (180 per year at U of T)
- RC exam preparation tutorials (8 per group x 2)
- Rounds to support current fellows and future alumni
- Reducing the barriers to navigating licensure through the various provinces (seminars and collation of information)

Orser et al., Can J Anesth, 2024

34

Reimagining Models of Care



Dr. Colin McCartney
Sunnybrook Health Sciences Centre



Dr. Sylvie Aucoin
The Ottawa Hospital & Ontario's Anesthesiologists



Philip Lau
Sunnybrook Health Sciences Centre

35

Advocating for Solutions: Key Initiatives

- Anesthesia Workforce Planning Committee (Jan 2025):** Formed to work with stakeholders, including Ontario Health, to find solutions for access, quality, safety, and value in anesthesia care.
- Primary Focus:** Further development and organization of a Team-Based Anesthesia Care model (TBAC)—a physician-led model utilizing anesthesia assistants.
- Government Acknowledgment:** TBAC was included in the 2024-28 Physician Services Agreement arbitration award (released September 2024).
- MOH/OMA Committee:** The Ministry of Health agreed to form a committee to develop recommendations for expanding anesthesiologist supervision of anesthesia extenders beyond the current model.

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Why it Matters:

- Career interests are shaped by clinical exposure and residents have limited exposure to northern practice
- Understanding healthcare accessibility and cultural safety is fundamental to being a competent physician
- Inspire residents to incorporate rural or remote practice into their careers and continue contributing to communities
- Partnership with northern and rural communities allows for co-learning/bilateral learning opportunities

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43

Impact of Community-Based Training

Health Education Workforce Impact Study (HEWIS)

WHAT WORKS

Rurally focussed undergraduate medical education at the Northern Ontario School of Medicine University

Ross, Brian M. PhD; Newbery, Sarah MD, MEd; Cameron, Erin PhD; French, Margaret MPH

Author Information @

Canadian Journal of Rural Medicine 30(23p 101-102, Apr-Jun 2025, | DOI: 10.4703/cjrm.cjrm_84_24 @

51.3%

of NOSM University graduates have stayed in Northern Ontario to practice

Canadian Journal of Rural Medicine Apr-Jun 2025, 30(23p 101-102
https://www.ajcanadent.ca/research/health-research-groups/health

44

44

Institutional Impact



- Serve as a scalable model for other specialties
- Strengthen U of T's leadership in distributed medical education
- Advance U of T's commitment to social accountability and provincial health equity
- Contribute to better recruitment and retention in northern Ontario

45

45

UofT FPAs

- University hosts new FPA Problem Rounds
- FPA trauma and pain residency boot camp
- FPA residents to Iqaluit,
- Locum coverage
- **Encourage CAS to support FPA CME**

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Take aways



1. The cause of the anesthesia workforce shortage is multifactorial.
2. Consider rural anesthesia care as a focus for equity seeking groups including SOAP.
3. 3Rs: Retain, Recruit, Reimagine models of care

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SCAN OR CODE FOR MORE INFO
Or visit: bit.ly/impaways

Thank you

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French International Symposium Thursday, April 30, 2026

Acide tranexamique et coagulopathies obstétricales

Tranexamic acid and Obstetric coagulopathy

AS Bouthors (France)

Sandra Lesage (Québec)

ANNUAL MEETING SCM

MONTREAL, QUEBEC, CANADA
LE WESTIN MONTREAL
APRIL 29-MAY 3, 2026

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

1

Anne-Sophie
Bouthors

France

Hôpital Jeanne de
Flandre
Université de Lille

Pas de conflit d'intérêt

Caro
Collège d'Anesthésie Association en Obstétrique
caro-college.fr

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

2

Sandra Lesage

Québec

CHU Sainte Justine
Université de Montréal

Pas de conflit d'intérêt

HYPER BRIGHT

RADAR À BULLSHITEUX

Y JASE PIS Y CONTE FULL DE JOKES
NEZ FIN ET OREILLES FINES
LE SOURIRE ÉTAMPÉ
DANS LA FACE

DES YEUX TOUT L'TOUR DE LA TÊTE
LE COMPAS DANS L'OEIL

A SAUVÉ LES FESSES À EN MASSE
DE SES COLLÈGUES, MAIS Y SE
PÊTE PAS LES BRETTELLES AVEC CA

SU A COCHE POUR
INTUBER ET GÉRER LES
CHIRURGIENS GOSSEUX
CALME LE PONPON DES
ÉNERVÉS

A PAS D'MISÈRE À PRENDRE SES
MAINS POUR REMPLACER PLEIN
DE PATENTES PIS DE COSSINS
(TÂTER, EFFOUSER, GRATTER)

A BEN DU
RETIENT BIEN
RÉVEILLE SON INHALO QUI
COGNE DES CLOUS

VITE SUR SES PATINS
NIAISE PAS AVEC LA PUCK

TAPE DU PIED POUR ÉVITER
DE PÉTER SA COCHE

D'après ABBOTT the ideal anesthetist (QUÉBEC)

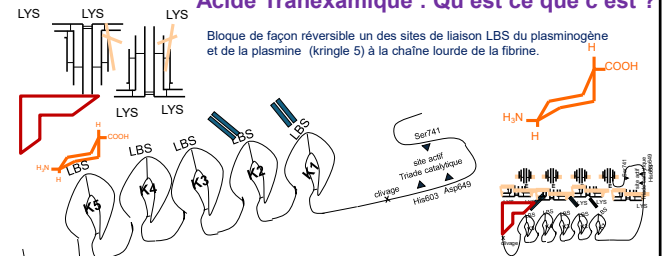
C'TUNE P1, TABAAAR...NOUCHE !

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

3

Acide Tranexamique : Qu'est ce que c'est ?

Bloque de façon réversible un des sites de liaison LBS du plasminogène et de la plasmine (kringle 5) à la chaîne lourde de la fibrine.



Ce mécanisme prévient la fibrinolyse et inhibe la génération de la plasmine

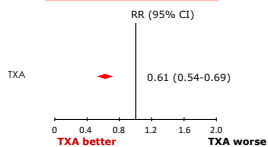
- > Diminue la lyse de la fibrine donc la production des D-dimères.
- > Réduit la production des PAP
- > N'agit pas sur la génération de plasmine activée par l'uPA.

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Critères cliniques d'efficacité : Trauma + chirurgie

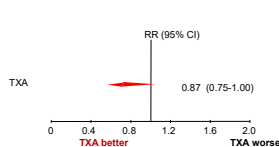
- > Réduit le saignement et le besoin transfusionnel en chirurgie hémorragique et dans le trauma.
- > Aussi bien en curatif qu'en prophylactique, par IV ou en topic
- > Réduit la mortalité dans le trauma si administré avant la 3^{ème} heure
- > Sans EII en particulier thromboemboliques

Reduced need for transfusion



Mc Cormack Drugs 2012; 72: 585-617

Reduced mortality



CRASH-2 trial Lancet 2010;376:23-32.

5

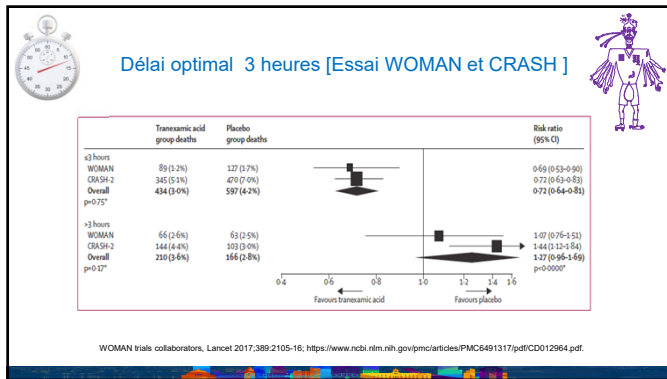
Acide Tranexamique En obstétrique

- Quand ?
- Pour qui ?

Mais aussi

- Comment ?
- Quelle dose ?
- Quelles précautions ?

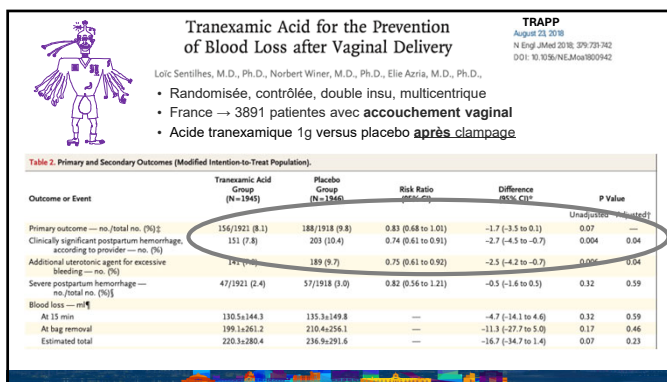
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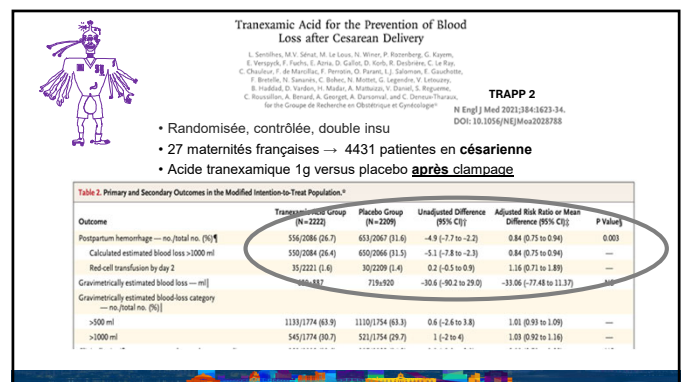
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**En prévention -
Ça fonctionne?
Pour qui?
Quand le donne-t-on?**

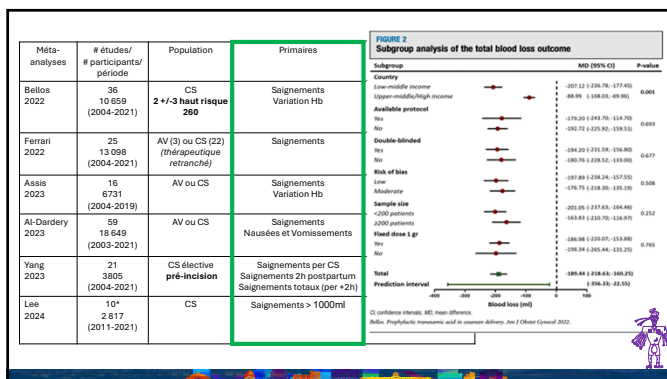
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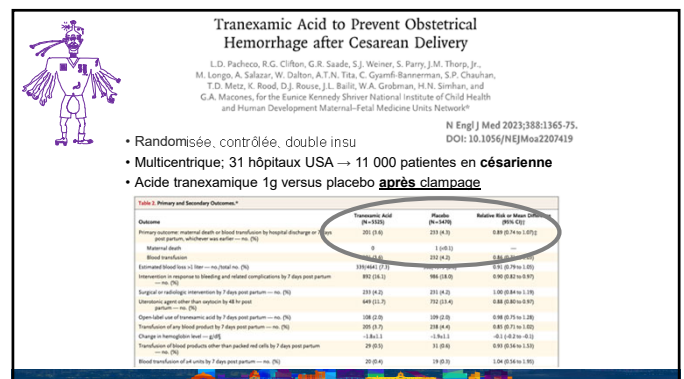
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TXA : élément à part entière de la stratégie primaire pour l'HPP

- Programme d'amélioration de la détection et des pratiques primaires dans 4 pays Kenya, Nigeria, South Africa, and Tanzania (80 hopitaux, 210,132 patients).

Fig 2 The MOTIVE care bundle intervention

Réduction du risque de PPH >1000mL, laparotomie de sauvetage ou décès
 > 1.6% gpe intervention versus 4.3% gpe standard RR 0.40; [0.32 to 0.50] p<0.001.

Forbes et al. Implementation Science (2023) 18:1. Galois L, et al. N Engl J Med. 2023;389(1):11-21.

25

Chez toutes les HPP ? Ou seulement si coagulopathie ?
La coagulopathie prédit la sévérité de l'HPP

En présence d'une HPP de plus 500mL, 4 signes prédisent la sévérité de l'évolution

- Le haut débit de saignement >150mL /10 minutes
- Tachycardie et paleur
- Chute hémoglobine >2 g/dL avant remplissage
- Coagulopathie (FG <2 g/L)

Diagnostiquer précocement la coagulopathie

Rezan Abdul-Kadir et al. Transfusion 2014; Hofer S et al. EJA 2022;37;1-10

26

Mais y a-t-il plusieurs coagulopathies obstétricales ?

- ❖ Composante principale : baisse du fibrinogène par
 - ❖ Perte de facteurs dans le saignement
 - ❖ Dilution
 - ❖ Excès de génération de thrombine (CIVD)
 - ❖ Excès de génération de plasmine (hyperfibrinolyse)
- ❖ Prédit l'évolution sévère de l'HPP et aggrave le saignement
- ❖ Est très variable dans sa fréquence, son intensité, ses composantes et son évolution.
- ❖ Intérêt des tests viscoélastiques pour la détecter, établir le diagnostic et suivre l'efficacité du traitement.

Bell SF, et al. European Journal of Anaesthesiology. 2022;37:1-10
 Bell SF, et al. Int J Obstet Anesth. 2021;47:102983.
 HAS Recommendations 2022 Gestion du capital sanguin

27

La coagulopathie aigüe obstétricale (CAO)

= hypo/dysfibrinogénolyse + hyper/dysfibrinolyse

- ❖ HPP: 20%,
- ❖ Embolie amniotique: 100%, HRP avec mort foetale (IIIB): 100%¹
- ❖ La coagulopathie est une entité à part entière, indépendante du volume du saignement

Bell SF, et al. Int J Obstet Anesth. 2021;47:102983.
 De Lloyd L, et al. JTH 2023;21(4):862-79
 Collins P.W. et al doi:10.1182/bloodadvances.2024015514

28

La coagulopathie obstétricale aigüe : une entité à part entière parfois indépendante du saignement
 Césarienne programmée
 Arrêt circulatoire transitoire après naissance, perte de connaissance, Saignement 180mL.

Ducloy-Bouthors AS, M Gonzalez-Estevéz et al. submitted

29

La coagulopathie aigüe obstétricale : une entité à part entière

Embolie amniotique suspectée :

- monitoring, prélèvement
- Support inotrope : Noradrenaline
- Alerte de ECMO et banque sang
- Cell saver
- Sulprostone,
- Ballon intrautérin (HPP: 580mL)
- ROTEM

à 1000 fois la normale

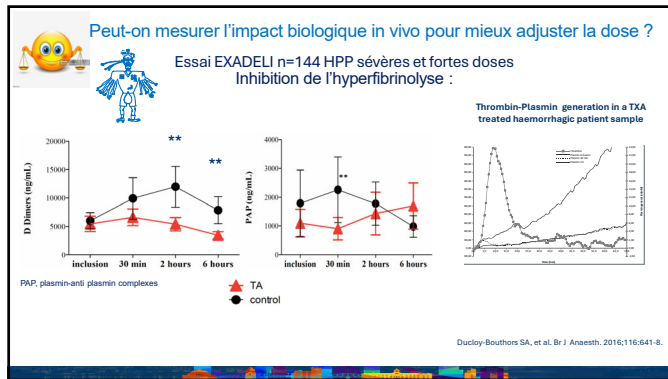
- TP ↓ de plus de 50%
- Fibrinogène ↓ de 4,5 à 0,7g/L
- D-dimers ↑
- Factor V ↓ à 36%
- ↑ retardée des monomères de fibrine

CAO Majeure

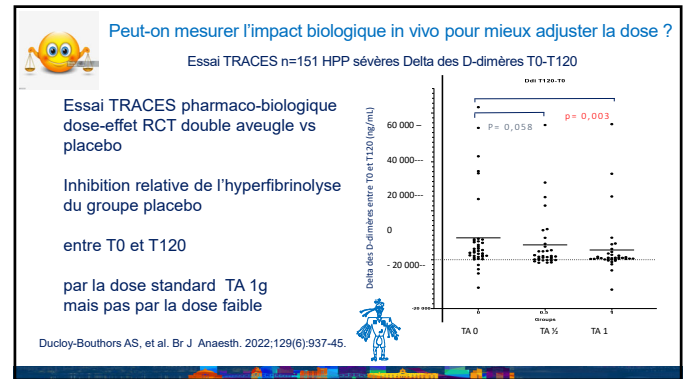
- Hyperfibrinolyse majeure
- Avant début du saignement
- 3g acide tranexamique
- 9g Fibrinogène concentrés,
- 5 PFC

Ducloy-Bouthors AS, Max Gonzalez-Estevéz et al. submitted

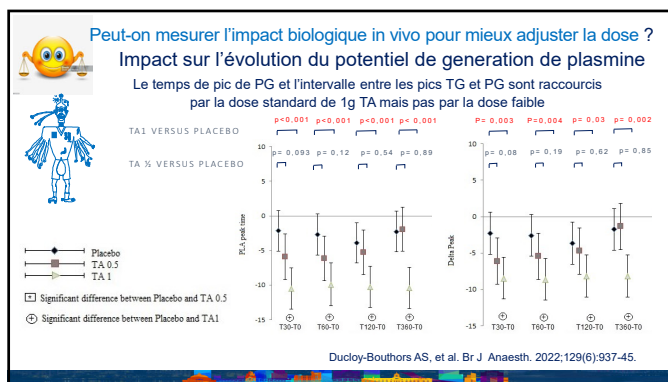
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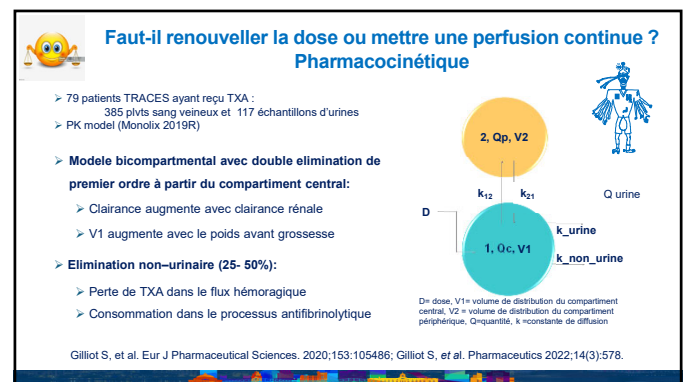
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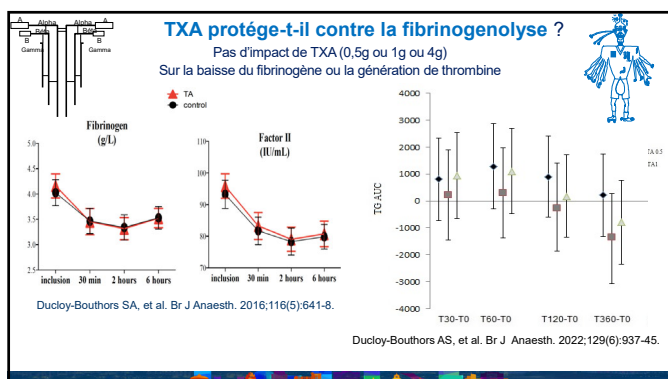
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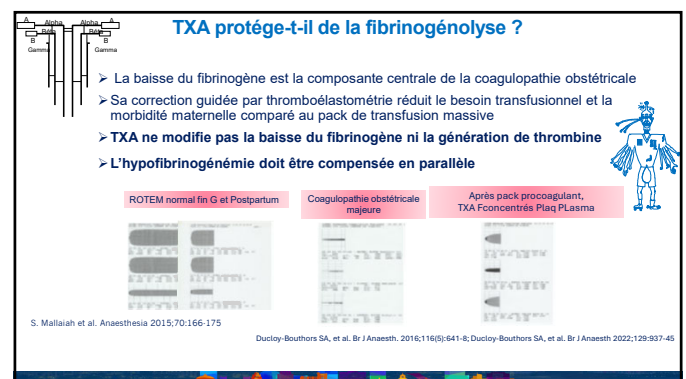
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Bien-être maternel et anesthésie obstétricale : optimisation anesthésique et santé mentale maternelle

- Dr MP Bonnet (France) & Dre Anne Lavoie (Québec)

SOAP 2026 ANNUAL MEETING MONTREAL, QUEBEC, CANADA LE WESTIN MONTREAL APRIL 29-MAY 3, 2026 FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

3

Dilvagation(s)

- Aucun conflit d'intérêt

4

Objectifs

- Reconnaître & comprendre l'enjeu de la santé mentale maternelle
- Identifier les facteurs de risque pertinents en anesthésie obstétricale
- Mettre en place une prise en charge protectrice et proactive

SOAP 2026 ANNUAL MEETING MONTREAL, QUEBEC, CANADA LE WESTIN MONTREAL APRIL 29-MAY 3, 2026 FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

5

Santé mentale maternelle : un enjeu de société

PHOTO: INTERVIEW LA PRESSE
Son nouveau bébé retrouvé en garage est après 34 semaines de gestation sur le pas de leur porte.
diversité.ca

Les enquêteurs tentent de comprendre les circonstances entourant l'abandon d'un bébé à Longueuil ont reçu plus d'une vingtaine d'informations au cours des 48 dernières heures, indique le Service de police de l'agglomération de Longueuil (SPAL).

Publié le 9 oct. 2025

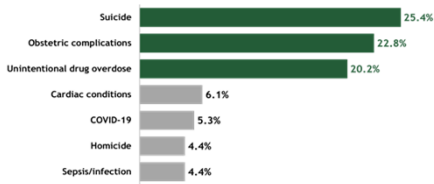
PHOTO: INTERVIEW LA PRESSE
Un nouveau-né abandonné dans cet abri à été retrouvé mardi.

Un nouveau-né a été retrouvé sans vie dans un abribus, à Longueuil, lundi au petit matin, alors que la température avoisinait les 3 °C. La mère de 33 ans a été arrêtée quelques heures plus tard. L'événement a profondément bouleversé les habitants du quartier.

Mis à jour le 27 oct. 2025

6

Mortalité maternelle : SUICIDE (2019-2023)



Note: There are 43 additional pregnancy-related deaths that did not fall into the above categories.

JAMA Network Open 2025

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7

Pourquoi l'anesthésie doit faire partie de la solution?

- L'anesthésie intervient précisément quand la charge émotionnelle, la douleur et la perte de contrôle sont maximales

Facteurs de risque :

- Travail, Césarienne en urgence, Douleur aiguë sévère, Hémorragie, conversion en AG

Eisenach et al. Pain 2008

Orbach-Zinger et al. J Clin Anesth 2019

Dekel et al. Clin Psychol Rev 2017

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8

Événements peripartum et DPP

- La sévérité de la douleur aiguë après l'accouchement prédit la douleur persistante et la dépression post-partum.
- La douleur postopératoire plus intense après césarienne est associée à davantage de symptômes dépressifs et traumatiques.
- Le vécu de naissance traumatique est fortement lié au PTSD post-partum.

Eisenach et al. Pain 2008

Orbach-Zinger et al. J Clin Anesth 2019

Dekel et al. Clin Psychol Rev 2017

ANNUAL MEETING SCAP²⁰²⁵

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9

Où peut-on avoir de l'impact?

- Objectif : convertir un moment critique en opportunité de prévention
- Repérer : patients à risque
- Stabiliser : communiquer et valider
- Orienté : référence selon le risque
- Réparer : revoir

Kounanis et al. Anesth Analg 2023

ACOG CPG No. 4, 2023

USPSTF, JAMA Feb. 2019

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10

Projet pilote au CHUM, Dre Hélène Guay

- Étude observationnelle, multidisciplinaire
- n = 100, population grossesse à risque élevé (GARE)
- Dépistage DPP échelle d'Édinburg au suivi post-partum
- Stratification du risque
- Prise en charge selon le risque

ANNUAL MEETING SCAP²⁰²⁵

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12

Analgésie insuffisante : données contradictoires

REVIEW



Long-term effects of neuraxial analgesia

Rachel J. Kearns^{a,b}, Malcolm A. Broom^{a,b} and Dominique N. Lucas^a 2024

ANNUAL MEETING SCAP 2024
MONTREAL, QUEBEC, CANADA
LE WESTIN MONTREAL
APRIL 29-MAY 3, 2025

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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Urgence

- Peur et anxiété, sentiment de perte de contrôle
- Dexmedetomidine?

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Anesthésie Générale

- Douleur
- Urgence, peur, traumatisme
- Peau à peau, allaitement (ocytocine)
- (eg) AG TIVA CS élective : vidéo de la naissance avec peau à peau

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Ocytocine

Current Psychiatry Reports (2023) 25:803–808
<https://doi.org/10.1007/s11928-022-01471-3>



Breastfeeding and Postpartum Depression: A Review of Relationships and Potential Mechanisms

Erin J. Henshaw¹

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Oxytocine, BMC Pregnancy and Childbirth

Oxytocin treatment at birth accelerates an epigenetic shift in the oxytocin receptor gene in the maternal brain

Allison M. Perkeybile^{1*}, William M. Kenkel², Jason R. Yee³, Rebecca E. Waugh¹, Travis S. Lillard⁴, Craig F. Ferris⁵, C. Sue Carter¹ and Jessica J. Connelly¹

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Conclusions

- Enjeu de santé majeur, cause de mortalité maternelle #1
- Facteurs de risque & dépistage
- Anesthésie : tout pour désamorcer l'encrage du « traumatisme »
 - Para-sympathique pharmacologique, bienveillance dans les soins, technique neuraxiale, suivi si AG
- Approche multidisciplinaire
 - Références pour patientes à très haut risque (ATCD psychiatriques)
 - Patientes vulnérables

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ANNUAL MEETING 

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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ANNUAL MEETING
MONTREAL, QUEBEC, CANADA APRIL 29-MAY 3, 2026

Anesthésie générale pour césarienne en 2026

Lionel BOUVET
Hôpital Femme Mère Enfant
Hospices Civils de Lyon
France

HCL HOSPICES CIVILS DE LYON
Lyon1 Université
Caro Collège Français d'Anesthésie Obstétricale

1

Contexte Français

- 445 maternités en France, activité = 98 à 5459 naissances par an
- 200 maternités avec activité < 1000 naissances / an
- 280 maternités < 1500 naissances / an
- Anesthésiste **dédié à la maternité dans 25% des établissements**
- IADE dédié à la maternité dans 5% des établissements**
- Accouchement voie basse : **82,7 % analgésie péridurale en France**

Drees Statistique publique de la santé et des solidarités
ENQUÊTE NATIONALE PÉRINATALE Rapport 2021

2

En France : >95% des césariennes sous anesthésie péri-médullaire (péridurale ou rachianesthésie)



≈ 40 % sous anesthésie péridurale
≈ 60 % sous rachianesthésie

ENQUÊTE NATIONALE PÉRINATALE Rapport 2021

3

ENQUÊTE NATIONALE PÉRINATALE Rapport 2021

Moins de 5% des césariennes sous AG en France

Anesthésistes de moins en moins confrontés à la pratique de l'anesthésie générale en obstétrique

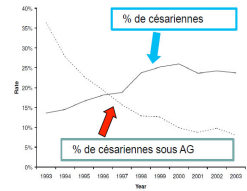


Figure 1 Rate of caesarean section (percentage of mothers) and percentage of caesarean section under general anesthesia (percentage of mothers) 1993-2005

Rahman K. Anaesthesia 2005; 60: 166-171

4

CAUSES	2013-2015						2016-2018									
	n = 42 jours			43-365 jours			n = 42 jours			43-365 jours						
	n	%	PM	n	%	PM	n	%	PM	n	%	PM				
Causes obstétricales directes	152	51,5	4,2	10	15,2	111	42,4	4,6	93	47,0	4,0	6	6,8	50	36,4	4,2
Hémorragie par rupture de grossesse ectopique	4	2,0	0,2	0	0,0	4	1,5	0,2	3	1,5	0,1	0	0,0	3	1,1	0,1
Hémorragies obstétricales	21	10,7	0,9	1	1,5	22	8,4	0,9	20	10,1	0,9	0	0,0	20	7,4	0,9
Atonie utérine	4	2,0	0,2	0	0,0	4	1,5	0,2	3	1,5	0,1	0	0,0	3	1,1	0,1
Rupture utérine	2	1,0	0,1	0	0,0	2	0,8	0,1	5	2,5	0,2	0	0,0	5	1,8	0,2
Placenta circulaire et basilaire	5	2,6	0,2	0	0,0	5	1,9	0,2	7	3,5	0,3	0	0,0	7	2,6	0,3
Placenta accréto/pervorte	2	1,0	0,1	0	0,0	2	0,8	0,1	2	1,0	0,1	0	0,0	2	0,7	0,1
Placenta previa	2	1,0	0,1	0	0,0	2	0,8	0,1	0	0,0	0,0	0	0,0	0	0,0	0,0
Hémorragie rétroplacentaire	4	2,0	0,2	1	1,5	5	1,9	0,2	2	1,0	0,1	0	0,0	2	0,7	0,1
Cause non précisée	2	1,0	0,1	0	0,0	2	0,8	0,1	0	0,0	0,0	0	0,0	1	0,4	0,0
Embolies artérielles	29	14,2	0,9	19	14,2	10	3,9	0,9	21	7,7	0,9	0	0,0	21	7,7	0,9
Thrombo-embolies veineuses	17	8,1	0,4	17	8,1	8	3,1	0,4	19	7,0	0,8	0	0,0	19	7,0	0,8
Autres décès	2	1,0	0,1	0	0,0	2	0,8	0,1	1	0,4	0,0	0	0,0	1	0,4	0,0
Complications d'anesthésie	15	7,4	0,4	15	7,4	6	2,3	0,2	13	4,8	0,6	0	0,0	13	4,8	0,6
Cardiopathie du puerperium	0	0,0	0,0	0	0,0	0	0,0	0,0	5	2,5	0,2	1	1,4	2	0,7	0,1
Autres décès	1	0,5	0,0	1	1,5	2	0,8	0,1	0	0,0	0,0	1	1,4	6	2,2	0,2
Chorioncarion	1	0,5	0,0	1	1,5	2	0,8	0,1	0	0,0	0,0	0	0,0	0	0,0	0,0
Complication d'un acte de chirurgie obstétricale	1	0,5	0,0	0	0,0	1	0,4	0,0	0	0,0	0,0	1	1,4	1	0,4	0,0
Autres	4	2,0	0,2	0	0,0	4	1,5	0,2	5	2,5	0,2	0	0,0	5	1,8	0,2

1999 – 2018
21 décès liés à l'anesthésie
Taux 0,1 à 0,2 / 100 000 naissances
15 AG / 4 ALR / 2 autres complications
Gestion des VAS / Inhalation
Allergies (succinylcholine)

Moins de 5% des accouchements sous AG !

Rapports CNEIM

5

ANESTHESIOLOGY

Adverse Events and Factors Associated with Potentially Avoidable Use of General Anesthesia in Cesarean Deliveries

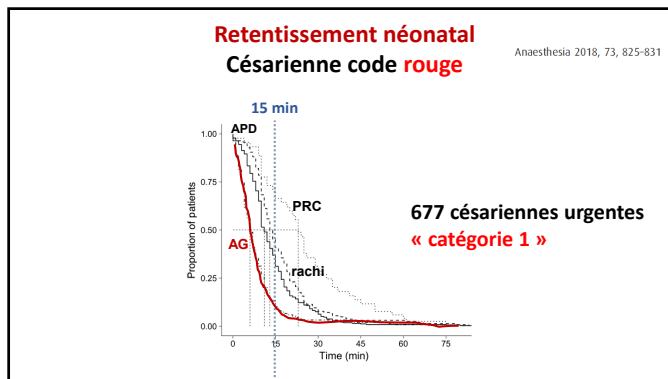
John Sugerman, MD, PhD, MPH, Rishi Laxkar, MD, PhD, Rishi Laxkar, MD, PhD
Anesthesiology 2016; 126:1012-22

Analyse rétrospective des événements indésirables des césariennes sans indication d'AG entre 2003 et 2014 (n = 26 431)

Table 3. Adverse Events in the 466,014 Cesarean Deliveries without a Recorded Clinical Indication for General Anesthesia in the State Inpatient Database for New York 2003-2014

	Neuraxial Anesthesia (N = 439,583)	General Anesthesia (N = 26,431)	Crude OR (95% CI)	P Value*	Adjusted OR† (95% CI)	P Value*
Death or cardiac arrest (missing = 2)	27 (0.6 per 10,000)	—§	—§	0.096	2.44 (0.67-9.09)	0.18
Anesthesia-related complications	2,540 (57.8 per 10,000)	217 (82.1 per 10,000)	1.42 (1.24-1.64)	< 0.001	1.62 (1.42-1.86)	< 0.001
Severe anesthesia-related complications (missing = 2)	118 (2.7 per 10,000)	18 (6.8 per 10,000)	2.54 (1.55-4.17)	< 0.001	2.86 (1.74-4.64)	< 0.001
Surgical site infections	2,812 (64.0 per 10,000)	342 (129.4 per 10,000)	2.04 (1.82-2.28)	< 0.001	1.74 (1.52-2.00)	< 0.001
Venous thromboembolic events	311 (7.1 per 10,000)	31 (11.7 per 10,000)	1.66 (1.15-2.40)	0.009	1.92 (1.23-2.97)	0.004

6



7

Operating room-to-incision interval and neonatal outcome in emergency caesarean section: a retrospective 5-year cohort study[®]

Anaesthesia 2018, 73, 825-831

E. Palmer,^{1,2} S. Ciechanowicz,¹ A. Reeve,³ S. Harris,^{3,4} D. J. N. Wong² and P. Sultan^{3,4}

677 femmes analysées

Apgar ≥ 7 à 5 min

	Univariate		Multivariate	
	Odds ratio (95%CI)	p value	Odds ratio (95%CI)	p value
Anaesthetic technique; epidural top-up = 1.00				
Spinal	2.25 (0.70-9.90)	0.21	1.96 (0.88-13.67)	0.11
General	0.26 (0.12-0.55)	< 0.0001	0.28 (0.11-0.68)	< 0.01
Body mass index; normal = 1.00				
Underweight	0.59 (0.16-3.38)	0.50	0.45 (0.11-3.12)	0.33
Overweight	1.11 (0.47-3.07)	0.82	1.51 (0.6-4.41)	0.41
Obese	0.36 (0.15-1.08)	0.05	0.43 (0.16-1.34)	0.12
Age; by each year	0.99 (0.93-1.05)	0.83	1.00 (0.94-1.07)	0.94
Parity ≥ 1 ; parity 0 = 1.00	0.63 (0.32-1.32)	0.21	0.84 (0.38-1.94)	0.67
Delivery in hours (08:00-18:00 h); out-of-hours delivery = 1.00	0.81 (0.41-1.61)	0.55	0.71 (0.34-1.47)	0.35
Gestational age; by each week	1.13 (1.05-1.22)	< 0.0001	1.08 (0.99-1.18)	0.06
Operating room-to-incision interval; quartiles; 0-6 min = 1.00				
6-10 min	1.24 (0.42-3.87)	0.70	0.87 (0.28-2.81)	0.80
10-13 min	0.92 (0.33-2.47)	0.86	0.50 (0.17-1.47)	0.21
13-20 min	1.87 (0.61-6.33)	0.28	0.86 (0.25-3.21)	0.82
20-87 min	1.32 (0.46-3.86)	0.60	0.41 (0.25-3.21)	0.14

8

SFAR, Caro, CNGF, CHSP, Société Française d'Anesthésie et de Réanimation, Société Française d'Obstétrique, Société Française de Pédiatrie

Recommandation professionnelle
Organisation de l'Anesthésie-Réanimation Obstétricale

RP 3.5 – (accord fort) : il est recommandé aux équipes d'obstétrique et d'anesthésie réanimation d'établir un code de communication permettant une définition claire du degré d'urgence de l'intervention.

Tableau 6. — Césarienne code rouge et orange — Pertinence des indications

CODE COULEUR	
ADAPTÉ	= 80 %
EXCESSIF	= 18 %
INSUFFISANT	2 %

Césariennes urgentes non programmées : intérêt des codes couleur pour la gestion optimale des urgences obstétricales

Non elective caesarean section: use of a color code to optimize management of obstetric emergencies

KEY WORDS : CAESARIAN SECTION, EMERGENCY MEDICINE

Benoît-Charles RUDIGGOS*, Cyril HUSSOUD*, Lisa DELECOUR*, Thomas THEVENET*, Corinne DUPONT*

Bull. Acad. Natle Med., 2014, 198, n° 6, 1123-1140, séance du 24 juin 2014

9

Abuse-t-on des césariennes en extrême urgence ?
Are we overusing of crash c-section procedure?

F. Bloc*, O. Dupuis*, J. Massardier*, P. Gaucherand*, M. Doret*, M. Doret*

Résultats. — Trente-huit césariennes « code rouge » ont été réalisées représentant 2,3 % des accouchements et 9,1 % des césariennes. Les indications de césarienne « code rouge » ont été confirmées dans 12 cas et rejetées dans 13 cas. Les avis étaient discordants dans les 13 autres cas. Le délai décision-naissance moyen était de 10,8 minutes.

35 % d'indication excessive... dont 2 AG

Journal de Gynécologie Obstétrique et Biologie de la Reproduction (2010) 39, 133-138

10

SFAR, Facteurs Humains en Santé

RECOMMANDATIONS DE PRATIQUES PROFESSIONNELLES

De la Société Française d'Anesthésie et de Réanimation (SFAR)
En association avec le Groupe Facteurs Humains en Santé (GHS)

FACTEURS HUMAINS EN SITUATIONS CRITIQUES

Human factors in critical situations

2022

Césarienne en urgence sous AG = situation critique

R1.2 – Les experts suggèrent que l'équipe soignante en situation de crise utilise une communication sécurisée et standardisée afin d'améliorer la morbi-mortalité et de limiter l'incidence des événements indésirables.

Avis d'experts (accord fort)

Enjeu de communication et préparation en équipe

gèrent de réaliser un briefing
es de l'équipe, le climat de

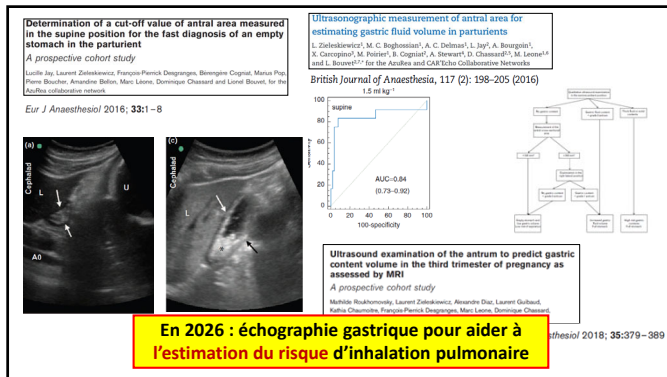
Avis d'experts (accord fort)

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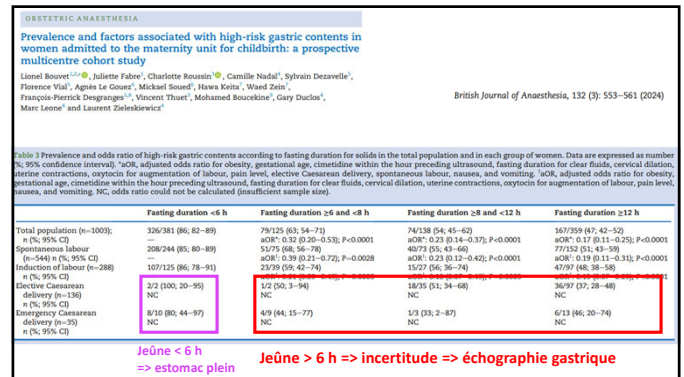
Quelles indications en 2026 ?

- Contre-indication absolue à l'ALR
 - refus, infection au site de ponction, trouble hémostasie, hypertension intracrânienne, instabilité hémodynamique, hémorragie maternelle sévère
- Césarienne en extrême urgence sans cathéter APD en place (?)
- Certaines cardiopathies
- En cours de césarienne si échec d'anesthésie périmédullaire

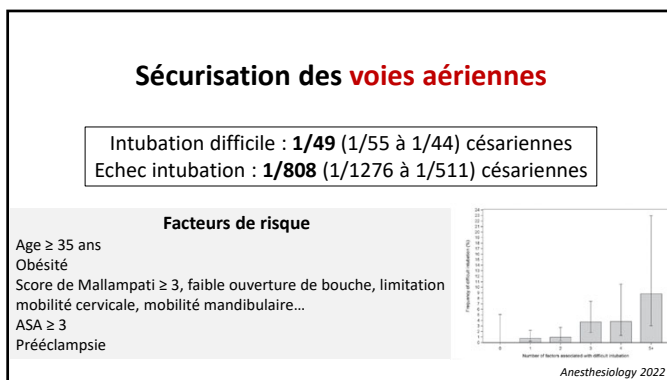
12



19



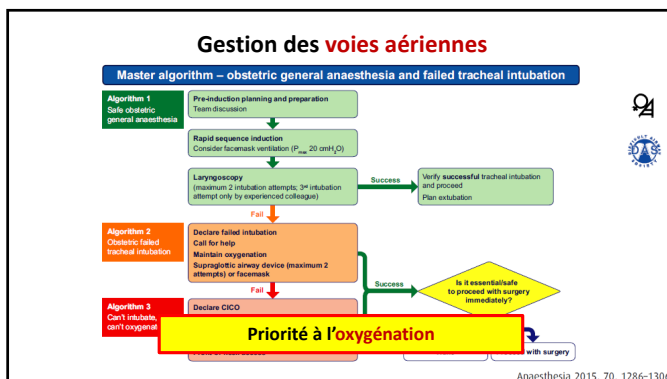
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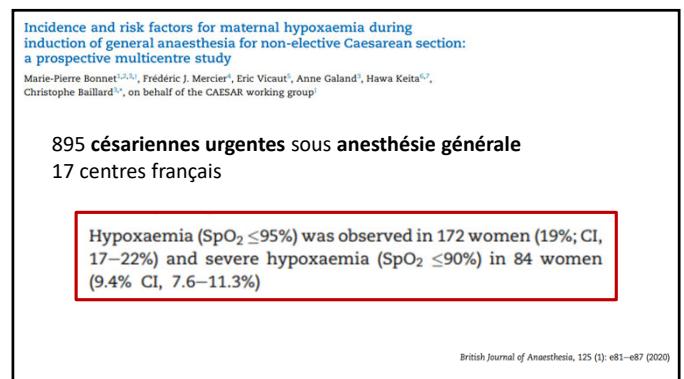
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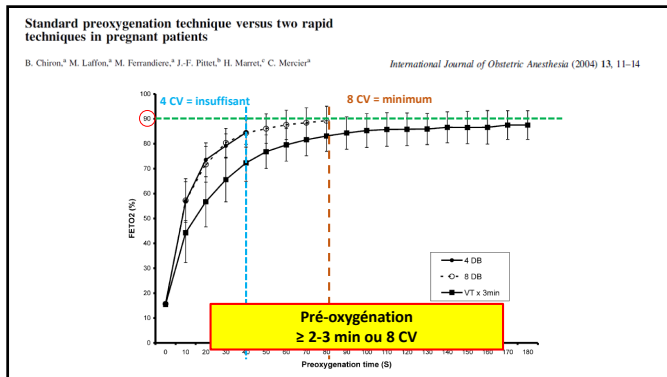
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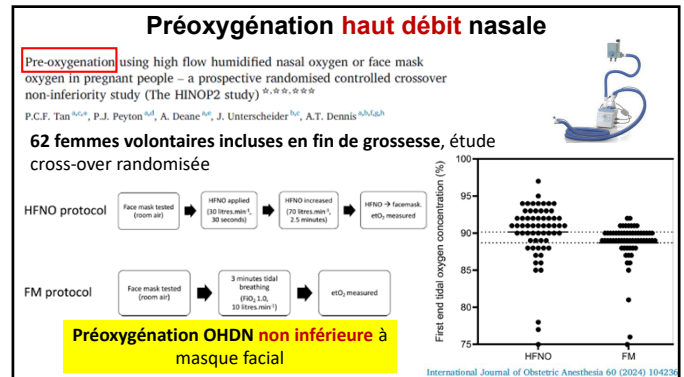
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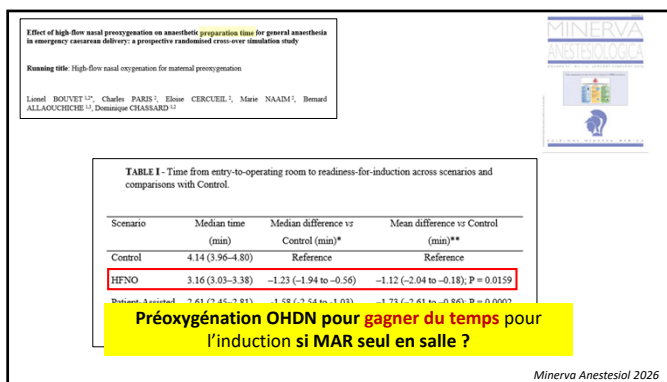
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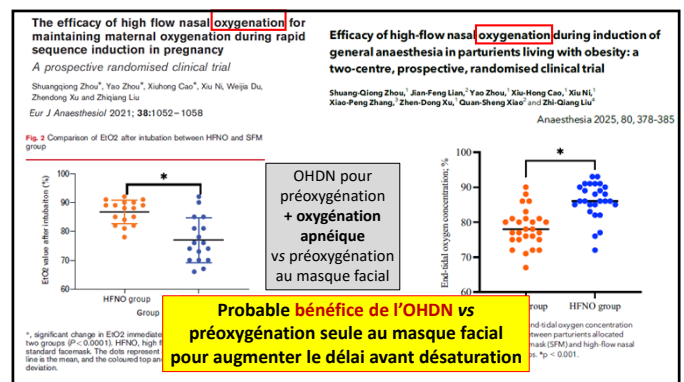
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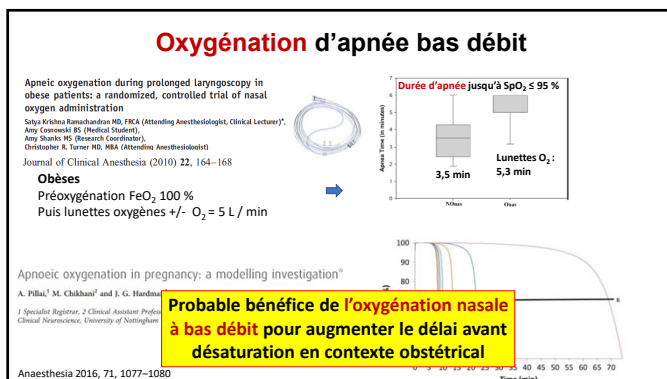
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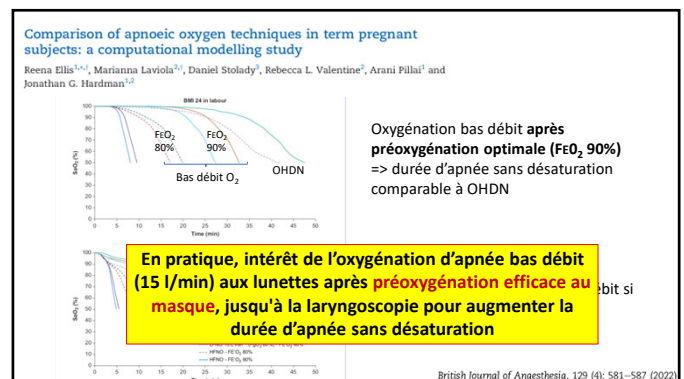
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28



29



30

CA du CARO 2026 (13 répondants)

- 50% lunettes O₂
- 75% vidéolaryngoscope 1^{ère} intention
- 85% propofol, 15% thiopental
- 92% succinylcholine
- 30% opiacé à l'induction
- 50% pression cricoïdienne

Membres du Conseil d'Administration du CARO

31

Ventilation d'apnée

Risque d'insufflation gastrique et reflux ?

Obstetric Anaesthetists' Association and Difficult Airway Society guidelines for the management of difficult and failed tracheal intubation in obstetrics^{*}

Insufflation gastrique

Ventilation au masque peut être envisagée à l'induction avec
Pression insufflation < 20 cmH₂O
Manœuvre de Sellick

Intérêt de l'échographie gastrique préalable

Bouvet et coll., Anesthesiology 2014

32

Vidéolaryngoscopie

Comparison of videolaryngoscopy and direct laryngoscopy for tracheal intubation in obstetrics: a mixed-methods systematic review and meta-analysis

Ryan Howie, MBChB, FRCA, D. Desire Onuochet, MBBS, FRCA, New-Ling Harrison, MBBS, FRCA, Noel Desai, MBChB, FRCA

Study or Subgroup	VLS Events	Total	Weight	M-H, Fixed, 95% CI	
Arora et al, 2014	19	40	19.5%	1.00 [0.43, 2.30]	
Bagle et al, 2019, C-MAC	19	60	56	28.2%	1.04 [0.97, 1.11]
Bagle et al, 2019, SWS	16	59	56	28.0%	1.00 [0.92, 1.09]
Toker et al, 2019	10	48	50	24.3%	1.04 [0.97, 1.11]

4 RCT, n = 428
9 études observationnelles
35 cas rapportés

Observational studies and case reports underline the role of videolaryngoscopy as a primary choice when difficulty with tracheal intubation is expected or as a rescue modality in difficult or failed intubations.

Conclusions Evidence for the utility of videolaryngoscopy continues to evolve but supports its increased adoption in obstetrics where videolaryngoscopes should be immediately available for use as a first-line device.

Can J Anesth/Can Anesth (2021)

33

Vidéolaryngoscopie

Obstetric Anaesthetists' Association and Difficult Airway Society guidelines for the management of difficult and failed tracheal intubation in obstetrics^{*}

A videolaryngoscope should be immediately available for all obstetric general anaesthetics.

Anaesthesia 2015, 70, 1286-1306

34

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Membres du Conseil d'Administration du CARO

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Étude française

895 césariennes urgentes sous AG

Table 4 Airway management in general anaesthesia for non-elective CS (n = 895 women). Data are presented as n (%).

	n (%)
Direct laryngoscopy: first attempt	
Operators	
Nurse anaesthetist	415 (46.4)
Senior anaesthetist	141 (15.7)
Resident anaesthetist	339 (37.9)
Cormack and Lehane classification	
1	571 (75.2)
2	130 (17.1)
3	43 (5.7)
4	15 (2)
Difficult intubation [†]	40 (4.5)
Operators	
Nurse anaesthetist	4 (1)
Senior anaesthetist	36 (25.5)
Resident anaesthetist	0
Successful tracheal intubation	
Direct laryngoscopy (multiple attempts)	8 (20)
Gum elastic bougie	28 (70)
Videolaryngoscopy	2
Fastrach [®]	1
Fibreoptic bronchoscopy	1
Failed intubation (laryngeal mask)	5 (0.56)

British Journal of Anaesthesia, 125 (1): e81-e87 (2000)

36

Dispositif supraglottique



The LMA Supreme™ in 700 parturients undergoing Cesarean delivery: an observational study
Utilisation du LMA Supreme™ chez 700 parturientes accouchant par césarienne: une étude observationnelle

Wei Yu Yao, MBBS, SM, Yang Li, MBBS, BSc
Bin Long Song, MBBS, Yumei Lin, MBBS, Alex Tung Hong Su, MBBS

Can J Anaesth 2012; 59:648-654

RESULTS: Fourteen studies with 2236 patients compared SGA and endotracheal intubation. Overall, there was **no statistically significant difference in first-attempt success rate** (OR = 1.92; 95% CI, 0.85–4.32; $P = 0.10$; $P = .44$). There was **no clinically significant difference in time to insertion** (WMD = -15.80 seconds; 95% CI, -25.30 to -6.31 seconds; $P = 1.00$; $P = .001$). Similarly, there was **no difference in any adverse event rate** except sore throat which was reduced with the use of an SGA (OR = 0.16; 95% CI, 0.08–0.32; $P = 53\%$; $P < .001$).
CONCLUSIONS: Despite the reasonable insertion success rate and safety profile of SGAs demonstrated in this meta-analysis, the analysis remains underpowered and therefore inconclusive. At present, further studies are required before the use of an SGA as the first-line airway for an elective CD can be recommended. (Anesth Analg 2020;131:1092–101)

Chinese Medical Journal | February 20, 2017 | Volume 130 | Issue 4

37

Table 1. Characteristics of Difficult and Failed Intubations in Obstetric Patients Undergoing General Anesthesia for Cesarean Delivery, 2004 to 2019

Characteristics	Difficult Intubations, No. (%)	Failed Intubations, No. (%)
Total	295 (2.0)	18 (0.1)
Criteria for difficult intubation		
Cormack-Lehane view grade III or IV*	259 (87.8)	8 (44.4)
Requiring three or more attempts at intubation†	48 (16.3)	3 (16.7)
Flexible bronchoscopy attempted after previous failed laryngoscopy		
Supraglottic airway attempted	12% géré avec masque laryngé	100% succès masque laryngé
Surgical airway attempted		
Approach to management		
Failed direct laryngoscopy (if attempted)‡	19% échec laryngo	100% échec laryngo/vidéolaryngo
Failed video laryngoscopy (if attempted)§	32% échec vidéolaryngoscope	
Facemask ventilation Han scale 3 or 4		
Complications		
Aspiration noted	1 (0.3)	1 (5.6)
Dental injury		
Pharyngeal injury		
Cardiac arrest		
Intubation		

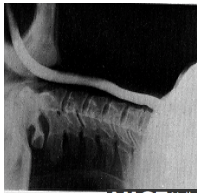
*Cormack-Lehane view recorded in 68.3% of patients undergoing general anesthesia for cesarean delivery. †Number of intubation attempts recorded in 63.5% of patients undergoing general anesthesia for cesarean delivery. ‡Direct laryngoscopy attempted in 255 difficult intubations and 14 failed intubations. §Video laryngoscopy attempted in 81 difficult intubations and 10 failed intubations.

Anesthesiology 2022

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Pression cricoïdienne

Sellick BA, The Lancet 1961;2: 404-406



NICE National Institute for Health and Care Excellence

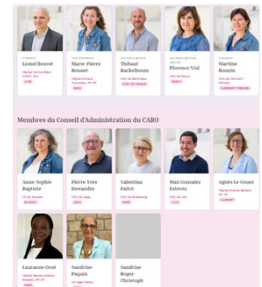
1.4.20 Include pre-oxygenation, cricoid pressure and rapid sequence induction in general anaesthesia for caesarean birth to reduce the risk of aspiration. [2004, amended 2011]

Last updated: 30 June 2025

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- 92% succinylcholine
- 30% opiacé à l'induction



40

Quel hypnotique ?

GENERAL ANAESTHESIA FOR OPERATIVE OBSTETRICS
With Special Reference to the use of Thiopentone and Succinylcholine

R. J. HANSEN, J. R. BROWNE*, M. E. TONNELLI and R. F. KNOTT
The Obstetric Unit, St. Mary's Hospital, Portsmouth

Brit. J. Anaesth. (1959), 31, 152

- 1960: thiopental = drogue de référence pour l'anesthésie au quotidien

- 2026 ? Propofol ?

- Dose, manipulation dans le contexte urgence ?

Unsettled weather and the end for thiopental? Obstetric general anaesthesia after the NAP5 and MBRACE-UK reports

Anaesthesia 2015, 70, 375-392

Absence de maîtrise du thiopental relevé dans les facteurs de sous optimalité dans rapport mortalité UK



41

5th National Audit Project (NAP5) on accidental awareness during general anaesthesia: summary of main findings and risk factors*

J. J. Pandey¹, J. J. Andros², D. G. Bogod³, J. M. Hitchman⁴, W. R. Jordan⁵, N. Luzzo⁶, J. H. Mackay⁷, A. F. Nimmo⁸, K. O'Donnell⁹, E. P. O'Sullivan¹⁰, S. G. Patel¹¹, J. H. K. G. Palmer¹², F. Poon¹³, J. J. Radcliffe¹⁴, N. R. J. Sanyal¹⁵, H. E. Torrance¹⁶, M. Wang¹⁷, J. Hainworth¹⁸ and T. M. Cook¹⁹ on behalf of the Royal College of Anaesthetists and the Association of Anaesthetists of Great Britain and Ireland



Risque mémorisation x 10 en contexte obstétrical

Attention dose insuffisante de thiopental : 5 mg/kg minimum

Favouring use of thiopental	Favouring use of propofol
Well-known to generations of anaesthetists, who are all familiar with propofol [14]	Thiopental relatively unfamiliar to the current, most junior generation of anaesthetists, who are all familiar with propofol [14]
Relatively cardiostable	Evidence of overdosage of thiopental in MBRACE-UK report [18]
Longer lasting than propofol so less likely to be associated with awareness	Evidence of underdosage of thiopental in NAP5 report [6]
More known about its fetal effects than propofol	No evidence that propofol has more adverse neonatal effects than propofol [17]
	Risk of thiopental-antibiotic syringe-swap [24]
	Thiopental requires pre-mixing before administration
	Thiopental more expensive (£5.75 (£7.36; \$8.72)) than propofol (£3.07 (£3.93; \$4.65)) [25]
	Thiopental in short supply [26]

Anaesthesia 2015, 70, 375-392

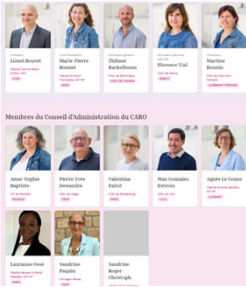
42

Rapid-sequence induction was used in all the cases [Thiopental (n=650; 73%)] was the hypnotic drug most often used, with wide variability between maternity hospitals (from 16% to 95%). Propofol was used in 235 women (26%), whereas etomidate or ketamine was the preferred hypnotic agent for nine and one cases, respectively. Suxamethonium was given in all cases but six who received rocuronium.

British Journal of Anaesthesia, 125 (1): e81–e87 (2020)

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43

Entretien de l'anesthésie

Propofol ou halogénés ?

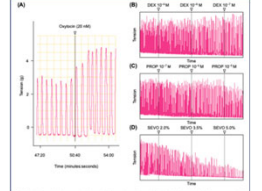
Objectifs :

- anesthésie suffisamment profonde
- stabilité hémodynamique maternelle
- faible impact sur le tonus utérin
- faible impact environnemental

=> Plutôt en faveur du propofol + monitoring de la profondeur d'anesthésie

Review Article
The role of total intravenous anaesthesia for caesarean delivery
Y. Metodiev^{a,b}, D.N. Lucas^b

International Journal of Obstetric Anaesthesia 51 (2022) 103548




44

The carbon footprint of general anaesthesia in adult patients: a multicentre observational comparison of intravenous and inhalation anaesthetic strategies in 35,242 procedures

Mathieu Berrati^{a,*}, Philippe Coville^b, Thomas Brieussel^c, Manon Roche^d, Anne Remacle^e, Marc Lenoir^f, Anne-Claire Lukaszewicz^g, Lionel Bouvet^h and Laurent Zdzienickaⁱ

Table 3 Purchasing, consumption data, and carbon footprint (CO₂e) for total intravenous anaesthesia (TIVA), target-controlled inhalation anaesthesia (TCIA), and manually optimised sevoflurane strategies for patients under general anaesthesia. CO₂e, carbon dioxide equivalent.

	TIVA strategy n=10 717		TCIA strategy n=7207		Manually optimised sevoflurane strategy n=15 461	
	Quantity	CO ₂ e, tonnes	Quantity	CO ₂ e, tonnes	Quantity	CO ₂ e, tonnes
Sevoflurane (250-ml bottle)	18	1.8	407	41.6	1227	125.3
Propofol (l)	1099	6.1	144.1	0.8	479.3	2.6
Syringes and pumps	50	0.001	7207	0.2	23 963	0.6
20-ml syringes	21 960	1.4	0	0	0	0
50-ml syringes		0.14		0		0
Syringe pump electricity		0.4		0		0
Total CO ₂ e, tonnes		9.4		42.5		128.4
CO ₂ e per intervention, kg		0.9		5.9		8.3
CO ₂ e per hour, kg		0.4		3.1		3.8

British Journal of Anaesthesia, 134 (6): 1620–1627 (2025)

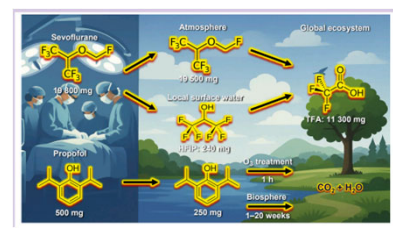
45

Environmental harm from anaesthesia: the importance of clinical realism and chemical persistence

Alain F. Kalmar^{a,b,c}, Laurent Zdzienicka^d, David Grimaldi^e, Jasper M. Kampman^{f,g} and Steffen Rex^h

Table 1 Cradle-to-grave CO₂e emissions of anaesthetics per gram of active pharmaceutical ingredient (API) and per typical 1-h case (±1 vial for injectables; sevoflurane/desflurane at 2 L min⁻¹ fresh gas flow). Global warming potential (GWP) is shown over 20- and 100-y horizons, with total emissions per dose (g CO₂-eq).

	g CO ₂ -eq amount per g API	g CO ₂ -eq
Lidocaine ^a	29	200-mg vial 6
Ropivacaine ^a	36	200-mg vial 7
Bupivacaine ^a	23	75-mg vial 2
Ketamine ^a	140	500-mg vial 70
Propofol ^a	21	500-mg vial 11
Excipients for propofol ^a	3006	500-mg vial 220
Desflurane/desflurane ^b	922	200-μg vial 0.6
Sevoflurane (GWP ₂₀) ^{c,d}	922	13 ml (19.8 g) 18 225
Sevoflurane (GWP ₁₀₀) ^{c,d}	419	13 ml (19.8 g) 8 286
Desflurane (GWP ₂₀) ^{c,d}	7722	39 ml (57.1 g) 441 196
Desflurane (GWP ₁₀₀) ^{c,d}	2894	39 ml (57.1 g) 179 055

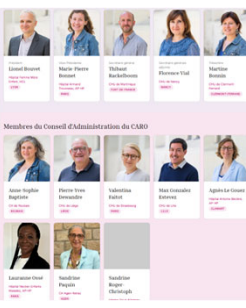


BJA Open, 16 (C): 100490 (2025)

46

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Quel myorelaxant ?

Délai d'action court

Début d'action facilement identifiable

Pas d'effet sur la consommation d'oxygène

Durée d'action

Facilement réversible par antagoniste

Faible transfert placentaire

Pas d'effet cardiovasculaire

Pas de risque d'hyperthermie maligne

Pas d'effet secondaire en cas de myopathie

Dose facilement calculée

Succinylcholine ou rocuronium ?

48

Quel myorelaxant ?

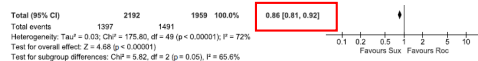
Rocuronium vs. succinylcholine for rapid sequence intubation: a Cochrane systematic review⁶⁷

D. T. T. Tran,^{1,2} E. K. Newton,^{2,3} V. A. H. Mount,⁴ I. S. Lee,⁵ C. Mansour,⁷ G. A. Wells,⁶ and J. J. Perry^{6,7}



Conditions d'intubation

Conclusion 2017 : succinylcholine > rocuronium



Pas de différence si dose rocuronium = 0,9 mg/kg - 1,2 mg/kg

Anaesthesia 2017, 72, 765-777

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Low-Dose or High-Dose Rocuronium Reversed with Neostigmine or Sugammadex for Cesarean Delivery Anesthesia: A Randomized Controlled Noninferiority Trial of Time to Tracheal Intubation and Extubation

For Shouac, MD, PhD¹; Milan Adams, MD, PhD¹; Dagnar Sedlitz, MD, PhD¹; Simon Paele, MD, PhD²; Peter Jansz, MD, PhD³; Ivana Barilova, MD, PhD⁴; Martin Prochazka, MD, PhD⁵; Josef Kucka, MD⁶; Roman Stoudek, MD⁷; Ivana Barilova, MD⁸; Martina Kozmanova, MD⁹; Tereza Hanzlikova, MD¹⁰; Pavel Holcman, MD¹¹; Zuzana Hrdlicka, MD, PhD¹²; Martina Kuchova, MD¹³; Jana Franciskova, MD¹⁴; Lenka Osem Pechova, MD¹⁵; Janina Holcova, MD¹⁶; and Pavel Sedlitz, MD, PhD¹⁷

Anesth Analg 2016;122:1536-45

	Propofol 2 mg/kg + rocuronium 1 mg/kg		succinylcholine 1 mg/kg		Difference in means (95% CI)*
	ROC group (n = 120)	Median (minimum-maximum)	SUX group (n = 120)	Median (minimum-maximum)	
Time from induction to first wave on ETCO ₂ (curve 18)	Mean (SD) 87 (28)	85 (34-200)	Mean (SD) 84 (36)	78 (33-284)	2.9 (-5.3 to 11.2)

Conditions d'intubation comparables

	ROC group (n = 131)		SUX group (n = 127)		P [†]
	Mean (SD)	Median (minimum-maximum)	Mean (SD)	Median (minimum-maximum)	
Weight (g)	2864 (823)	3010 (560-4280)	3082 (741)	3125 (900-5140)	0.07
Umbilical artery pH					0.36
1 min Apgar					0.007
<7	17	13	4	3	0.008
5 min Apgar					0.07
<7	7	5	1	1	0.07

1 mg/kg rocuronium non inférieur à 1 mg/kg succinylcholine

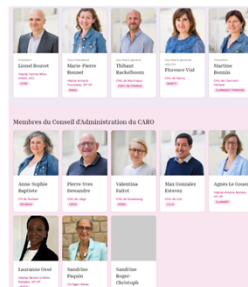
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Opioides à l'induction

17 études, n = 987

Remifentanyl 0,5-1 µg/kg ou 2-3 µg/kg/h
ou Alfentanil 7-10 µg/kg
ou Fentanyl
vs Placebo

In conclusion, induction opioids are effective sympathetic agents. Remifentanyl and alfentanil appear to be safe and without a significant effect on Apgar scores.

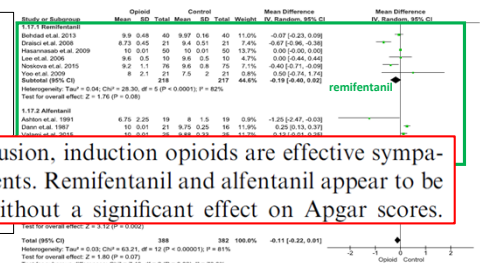


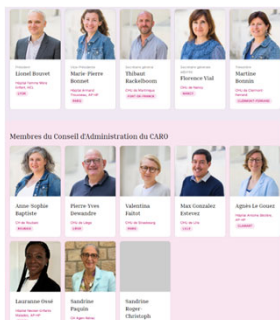
Fig. 4 Forest plot of comparison Apgar scores at five minutes

UOA 2019

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Prise en charge de la patiente avec une pré-éclampsie sévère
 Guidelines for the management of women with severe preeclampsia
 2020

R5.2 – En cas d'anesthésie générale chez des femmes ayant une pré-éclampsie sévère, il est probablement recommandé au cours de l'induction de l'anesthésie, d'injecter un morphinique ou un agent antihypertenseur, afin de limiter les conséquences hémodynamiques de l'intubation trachéale.

GRADE 2+ (Accord FORT)

R5.3 – Il est probablement recommandé d'utiliser en première intention un bolus de 0,5 µg/kg de remifentanyl dans cette indication. L'alfentanil et l'esmolol représentent des alternatives thérapeutiques.

GRADE 2+ (Accord FORT)

54

Prise en charge de la douleur après césarienne

- Prise en charge **similaire à toute chirurgie** « la césarienne est une chirurgie comme une autre »
- Enjeu particulier** en contexte obstétrical
- Le socle
 - analgésie multimodale systématique : paracétamol, AINS, néfopam, tramadol, morphine orale = autorisés si allaitement
- Blocs : TAP / carré des lombes / infiltrations cicatricielles

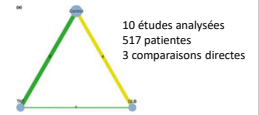
Journal de Gynécologie Obstétrique et Biologie de la Reproduction 2015;44:1111-1117

55

TAP ou bloc du carré des lombes ?

Quadratus lumborum block vs. transversus abdominis plane block for caesarean delivery: a systematic review and network meta-analysis*

K. El-Boghdady,^{1,2} N. Desai,^{1,2} S. Halpern,¹ L. Blake,³ P. M. Odeh,⁴ S. Bampoe,⁵ B. Carvalho,¹ and P. Sultan¹



Consommation de morphine dans les 24 h

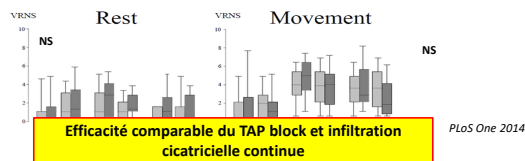
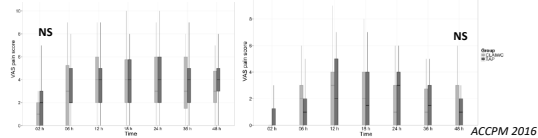
(a)	
Control	QLB
17.00 (4.71 to 29.29; -13.14 to 47.14)	4.89 (-9.02 to 18.80; -26.21 to 35.99)
21.89 (12.17 to 31.61; -6.92 to 50.70)	TAP block

Pas de différence entre TAP bloc et bloc du carré des lombes sur la consommation de morphine dans les 24 h

Anaesthesia 2021, 76, 393-403

56

TAP ou infiltration cicatricielle ?



57

Guidelines

PROSPECT guideline for elective caesarean section: updated systematic review and procedure-specific postoperative pain management recommendations

Pre-operatively

- Intrathecal long-acting opioid (e.g. morphine 50-100 µg or diamorphine up to 300 µg) (Grade A). Epidural morphine 2-3 mg or diamorphine up to 2-3 mg may be used as an alternative, for example, when an epidural catheter is used as part of a combined spinal-epidural technique (Grade A)
- Oral paracetamol (Grade A)

Intra-operative after delivery

- Intravenous paracetamol if not administered pre-operatively (Grade A)
- Intravenous non-steroidal anti-inflammatory drugs (Grade A)**
- Intravenous dexamethasone (Grade A)**
- If intrathecal morphine not used, local anaesthetic wound infiltration (single-shot) or continuous wound infusion and/or regional analgesia techniques (fascial plane blocks such as transversus abdominis plane blocks and quadratus lumborum blocks) (Grade A)**

Postoperative

- Oral or intravenous paracetamol (Grade A)
- Oral or intravenous non-steroidal anti-inflammatory drugs (Grade A)
- Opioid for rescue or when other recommended strategies are not possible (e.g. contra-indications to regional anaesthesia) (Grade D)
- Analgesic adjuncts include transcutaneous electrical nerve stimulation (Grade A)

Surgical technique

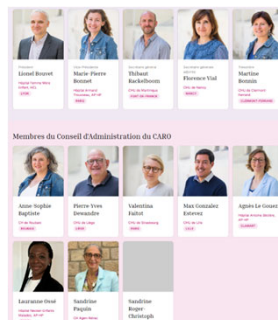
- Joel-Cohen incision (Grade A)
- Non-closure of peritoneum (Grade A)
- Abdominal binders (Grade A)

Anaesthesia 2022, 76, 665-680

58

CA du CARO 2026 (13 répondants)

- 50% lunettes O₂
- 75% vidéolaryngoscope 1^{ère} intention
- 60% pression cricoïdienne
- 85% propofol, 15% thiopental
- 40% TIVA envisagé pour entretien
- 92% succinylcholine
- 30% opiacé à l'induction
- 90% TAP bloc**



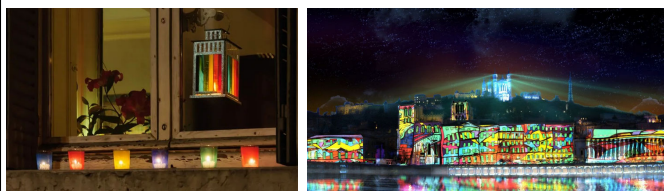
Conclusions

- Hétérogénéité** du contexte de réalisation l'AG pour césarienne en France
- Hypoxémie fréquente** => oxygénation d'apnée
- Vidéolaryngoscope** à disposition
- Pression cricoïdienne** ?
- Propofol** de plus en plus utilisé => TIVA envisageable
- Préparation en équipe** / communication / facteurs humains
- Situation à **risque de dépression** du post-partum
 - suicide = 1^{ère} cause de mortalité maternelle à 1 an en France
 - enjeu d'accompagnement de ces patientes

59

60

Merci !



Lyon, Fête des Lumières, 8 décembre

61

Prochain congrès national du
CARO : 5 et 6 juin 2026

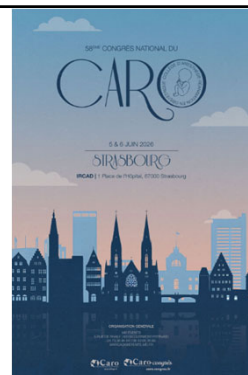
Diabète et grossesse

Santé numérique en ARO

Troubles psychologiques en péri-
partum

caro-college.fr

caro-congres.fr



62



1. All anesthetic and analgesic drugs can transfer into breastmilk; however, only small amounts are present in very low concentrations which are considered clinically insignificant.
2. Opioids and/or their metabolites may transfer in slightly higher levels into breastmilk; therefore, steps should be taken to lower opioid requirements by adding other classes of analgesics when appropriate and avoiding drugs that are more likely to transfer (i.e., have a higher RID).
3. Because pain interferes with successful breastfeeding, patients should not avoid pain medicines after surgery. Despite an excellent safety record, breastfeeding persons who require opioid pain medicines should monitor for potential signs of sedation: difficult to wake and/or slowed breathing. Additional consideration for when to resume breastfeeding postoperatively should be given to patients with neonates or infants at high risk for apnea (e.g. prematurity).²
4. When possible, spinal or epidural anesthesia consisting of local anesthetic and a long-acting opioid, should be used for cesarean delivery to reduce overall post-operative pain medication requirements.
5. Patients should resume breastfeeding as soon as desired after surgery¹¹ because anesthetic drugs appear in such low levels in breastmilk. It is not recommended that patients "pump and dump" and rather they should "sleep and keep"¹³.

63

Decision-to-birth interval for unplanned and emergency caesarean birth

Category 1 caesarean birth is when there is immediate threat to the life of the woman or fetus, and category 2 caesarean birth is when there is maternal or fetal compromise which is not immediately life-threatening.

- 1.4.3 Perform category 1 caesarean birth as soon as possible, and in most situations within 30 minutes of making the decision. [2011, amended 2021]
- 1.4.4 Perform category 2 caesarean birth as soon as possible, and in most situations within 75 minutes of making the decision. [2011, amended 2021]
- 1.4.5 Take into account the condition of the woman and the unborn baby when making decisions about rapid birth. Be aware that rapid birth can be harmful in certain circumstances. [2011]

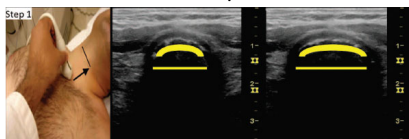
64

Auscultation versus Point-of-care Ultrasound to Determine Endotracheal versus Bronchial Intubation A Diagnostic Accuracy Study

Davidson Harcourt, MD, Ethan Frank, B.S., Robert Houghton, B.S., John Schilling, B.S.,
Katherine M. Cameron, MD, Esther Davis, B.S., Joseph D'Amato, MD, Michael Cameron, MD, PhD

ANESTHESIOLOGY 2016; 124:1012-20

Augmentation du diamètre trachéal = positionnement trachéal



Gonflage du ballonnet

Échographie cervicale

Gain de temps d'apnée en cas d'IOT œsophagienne détectée précocement?
Diminution du risque d'inhalation si IOT œsophagienne détectée avant ventilation ?
Faisabilité ?

65



1



Anesthésie générale pour césarienne en 2026

Valerie Zaphiratos MSc, MD, FRCPC
CHU Sainte-Justine

CHU Sainte-Justine
Le centre hospitalier
universitaire mère-enfant
Université de Montréal



FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

2



Objectif

- Décrire les approches modernes en matière de choix des agents anesthésiques, de gestion contemporaine des voies aériennes et de stratégies de prise en charge de la douleur postopératoire lors de la césarienne sous anesthésie générale.



FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

3



Plan

- Les indications pour l'AG lors de césarienne
- Complications de l'AG
- La préparation
- L'induction
- Le maintient
- Analgésie post-opératoire
- Simulation



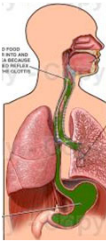

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

4



5

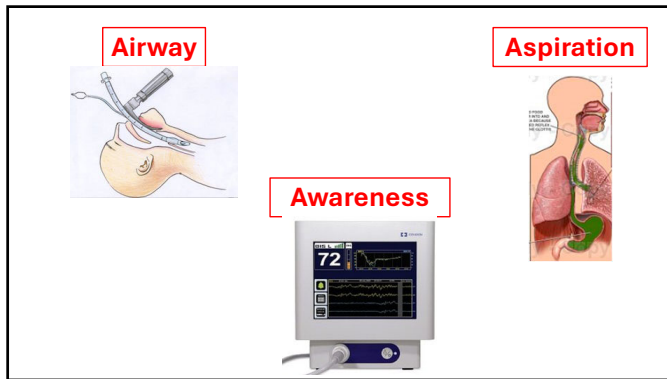
↑ Mortalité avec AG vs neuraxiale






D'Angelo R. Anesthesiology 2007; 106: 1082-4

6



7

ANESTHESIOLOGY

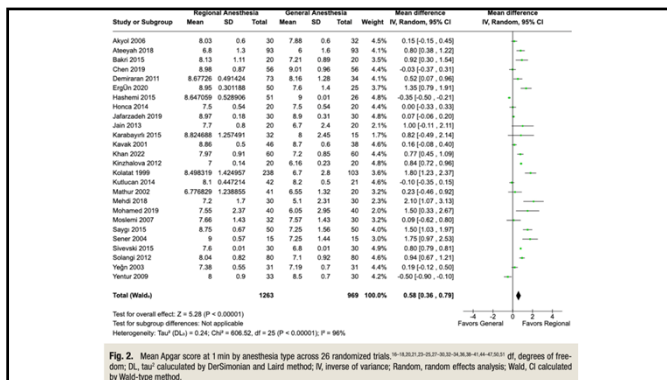
Neonatal Outcomes with Regional *versus* General Anesthesia for Cesarean Delivery: A Meta-analysis of Randomized Controlled Trials

36 études incluses
3456 nouveau-nés
15 pays
43% Anesthésie générale
57% Anesthésie neuraxiale

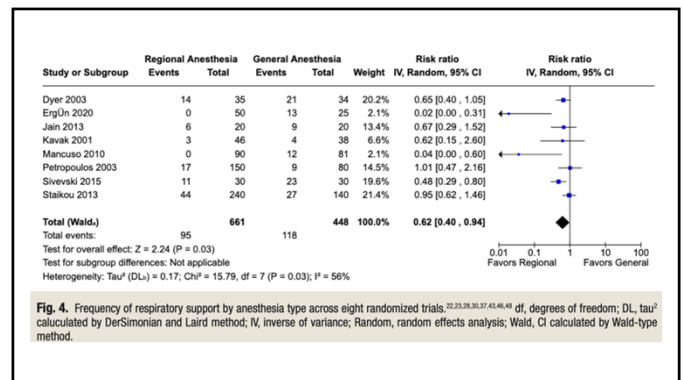
Sarah Langer, M.D., Grace Lim, M.D., M.Sc.,
Yue Qiu, M.D., Jingyuan Biesch, D.O.,
Mark D. Neuman, M.D., M.Sc.

ANESTHESIOLOGY 2026; 144:325-36

8



9



10

Questionnaire anesthésique en urgence (AG)

- AMPLÉ
- Airway
- IV
- Monitoring (inhalo 1)
- Oxygénation (inhalo 2)
- Cœur fœtal (infirmière OB)
- Attend les champs ...

11

Questionnaire anesthésique en urgence (AG)

- AMPLÉ
- Airway
- IV
- Monitoring (inhalo 1)
- Oxygénation (inhalo 2)
- Cœur fœtal (infirmière OB)
- Attend les champs ...

12

Questionnaire anesthésique en urgence (AG)

• En attendant les champs avant AG . . .

- Anti-émétiques (ex: métoclopramide, ondansétron)
- Antacides (ex: anti-H2 (famotidine))
- Antibiotiques (ex: céfazoline (lentement))
- Lidocaïne IV
- Rocuronium IV en pré-curarisation



Préoxygénation

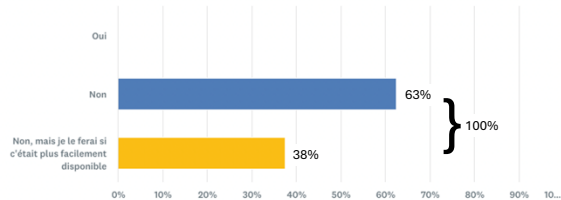


13

14

Utilisez-vous du HFNO (high flow nasal oxygen - ex: optiflow) lors de la préoxygénation de césarienne sous AG?

Answered: 16 Skipped: 0



15

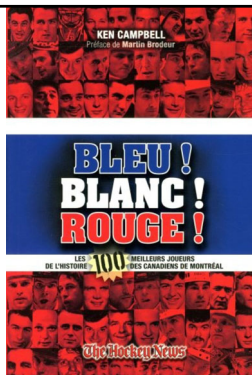
Efficacy of high-flow nasal oxygenation during induction of general anaesthesia in parturients living with obesity: a two-centre, prospective, randomised clinical trial

Anaesthesia 2025, 80, 378-385

Shuang-Qiong Zhou,¹ Jian-Feng Lian,² Yao Zhou,¹ Xiu-Hong Cao,¹ Xiu Ni,¹ Xiao-Peng Zhang,³ Zhen-Dong Xu,¹ Quan-Sheng Xiao² and Zhi-Qiang Liu⁴

16

Induction



17



18

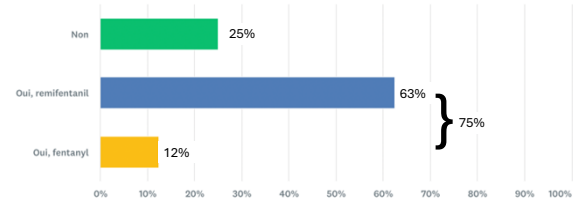
Opiacés à l'induction?



19

Utilisez-vous un opiacé lors de l'induction de l'AG pour césarienne?

Answered: 16 Skipped: 0



20

Avant le clampage

Avantages:

- Prévenir pic adrénérurgique maternel
- Diminuer la douleur à l'intubation et l'incision
- Diminuer le risque d'éveil en potentialisant les agents d'induction



21

Après le clampage

Avantages:

- Éviter l'impact respiratoire sur le nouveau-né
- Éviter la gestion médicale invasive chez le nouveau-né



22

Opioids should be given before cord clamping for caesarean delivery under general anaesthesia

International Journal of Obstetric Anesthesia (2016) 28, 76–82

Report of a debate held at the Canadian Anesthesiologists Society, Annual Meeting, Ottawa, Canada, June 2015



23

General anesthesia for caesarean section

REVIEW

Curr Opin Anesthesiol 2015, 28:240–246

On the basis of available literature, we strongly advise the use of remifentanyl in preeclamptic and other high-risk patients for whom marked haemodynamic fluctuations are dangerous. It is however mandatory to anticipate neonatal resuscitation when remifentanyl is used.

24

General anesthesia for caesarean section

REVIEW

Curr Opin Anesthesiol 2015, 28:240–246

In healthy parturients, the routine use of remifentanyl for the induction of anaesthesia is more controversial. However, this can be supported, as it may reduce the incidence of maternal awareness and improve maternal haemodynamic stability. If the mandatory managing of brief infant respiratory depression cannot be guaranteed in the local situation, remifentanyl in healthy parturients should be avoided

25

Doses?



1 mcg/kg (50-100 mcg IV)

0.5 mcg/kg (sans HTA)
1 mcg/kg (prééclampsie)



26



27



+/-



28

Hypnotics as induction agents for general anesthesia in cesarean section patients: updated systematic review and meta-analysis of randomized controlled trials

Journal of Anesthesia (2025) 39:948–975

Sohieb Hedawy¹ · Eman E. Labeed² · Shahed Aldalahmeh³ · Ahmed Elswaf¹ · Ghadeer M. AlManaseer⁴ · Mohamed Ashraf Shehab⁵ · Ahmed Menshaw⁶

- Propofol vs Thiopental:
 - sgf
- Propofol vs Kétamine:

29



30

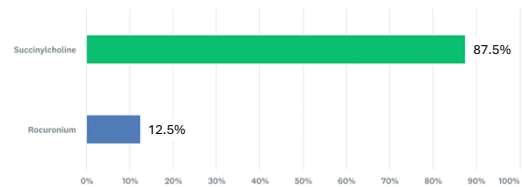
Succinylcholine ou Rocuronium?



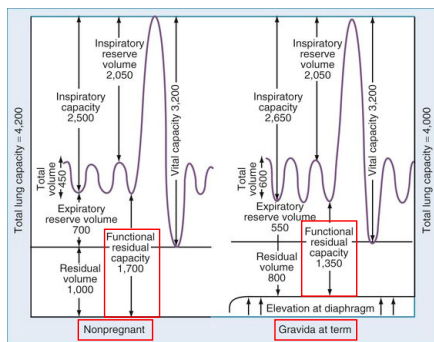
31

Préférez-vous utiliser succinylcholine ou rocuronium lors de l'induction de l'AG pour césarienne?

Answered: 16 Skipped: 0



32



33

Surgical conditions with rocuronium versus suxamethonium in cesarean section: a randomized trial

J. Bláha,^{a,†} P. Nosková,^{a,†} K. Hlínecká,^b V. Krakovská,^c V. Fundová,^a T. Bartošová,^a P. Michálek,^a M. Střiteský^a

Table 2 Times from induction of anesthesia to end of surgery; and induction characteristics.

	Rocuronium group n=45		Suxamethonium group n=45		Difference in means	P-value
	Mean	Median	Mean	Median		
Induction – delivery interval (s)	268.4 (72.9)	265 (223–330)	275.6 (63.4)	267 (239–400)	–7.2 (–39.5 to 19.3)	0.62
Induction – intubation interval (s)	105.8 (33.7)	108 (77–134)	67.6 (32.1)	63 (50–133)	38.2 (24.4 to 52.0)	<0.001
Incision – delivery interval (s)	146.6 (68.3)	130 (99–179)	196.2 (50.7)	201 (167–277)	–49.7 (–74.8 to –24.4)	0.0002
Intubation – incision interval (min)	15.8 (6.9)	15 (4–43)	11.7 (6.4)	10 (3–29)	4.1 (0.4 to 7.8)	0.061
Length of surgery (min)	39.3 (8.9)	39 (27–53)	39.4 (9.6)	38 (26–54)	0.1 (–4.0 to 3.8)	0.976
End of surgery to extubation (min)	5.2 (4.6)	4 (0–13)	8.8 (5.8)	8 (2–19)	–3.5 (–5.8 to 1.4)	0.002
SRSD (points)	3.73 (0.53)	4 (3–5)	2.77 (0.55)	3 (2–4)	1.0 (–0.01 to 0.20)	<0.001
Blood loss (mL)	533 (76)	500 (500–600)	538 (98)	500 (500–650)	–5 (–38 to 28)	0.859
Thiopental (mg/kg)	4.7 (0.16)	4.7 (4.5–5.1)	4.7 (0.21)	4.7 (4.5–5.3)		0.471
Muscle relaxant dose (mL/kg)	0.092 (0.01)	0.093 (0.090–0.106)	0.095 (0.09)	0.094 (0.09–0.106)		0.072
Muscle relaxant dose (mg/kg)	0.55 (0.05)	0.56 (0.54–0.65)	0.95 (0.04)	0.94 (0.9–1.1)		0.177

Data are presented as mean (SD) or median (range). Difference between the groups is expressed as median (95% confidence interval). SRSD: Surgical rating scale for delivery.

International Journal of Obstetric Anesthesia (2020) 41, 14–21

34

Surgical conditions with rocuronium versus suxamethonium in cesarean section: a randomized trial

J. Bláha,^{a,†} P. Nosková,^{a,†} K. Hlínecká,^b V. Krakovská,^c V. Fundová,^a T. Bartošová,^a P. Michálek,^a M. Střiteský^a

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Data are presented as mean (SD) or median (range). Difference between the groups is expressed as median (95% confidence interval). SRSD: Surgical rating scale for delivery.

International Journal of Obstetric Anesthesia (2020) 41, 14–21

35

SYSTEMATIC REVIEW

Open Access

Intubation conditions and neonatal outcomes with rocuronium versus suxamethonium in cesarean sections: A systematic review and meta-analysis

BMC Anesthesiology (2025) 25:476

Atef A. Hassan¹, Mohamed A. Khalafallah², Noha Rami Ismail³, Esraa Meshawry⁴, Abdulrhman Mady⁵, Moaz Abouelmagd⁶, Amr Meshawry⁷ and Ahmed Meshawry^{7*}

- 6 études, 1122 patientes
- Rocuronium 1 mg/kg, sauf 1 étude 0.6 mg/kg
- Sch 1 mg/kg, sauf 1 étude 1.5 mg/kg

36

Induction au clampage du cordon

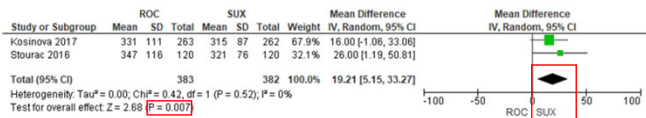


Fig. 2 Meta-analysis of time from induction to clamping the umbilical cord (s).

BMC Anesthesiology (2025) 25:476

37

Score Apgar à 1 min

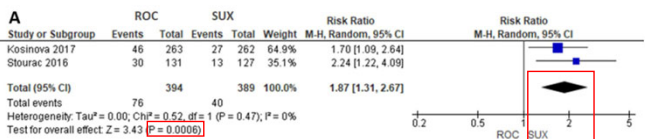
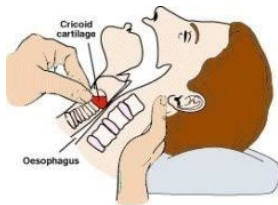


Fig. 5 A) 1-minute Apgar score.

BMC Anesthesiology (2025) 25:476

38

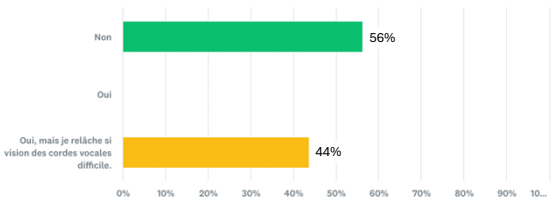
Pression cricoïdienne (Sellick)



39

Utilisez-vous le Sellick lors de séquence rapide pour césarienne sous AG?

Answered: 16 Skipped: 0



40

Cricoid Pressure Controversies

Narrative Review

ANESTHESIOLOGY 2017; 126:738-52

M. Ramez Salem, M.D., Arjang Khorasani, M.D., Ahed Zeidan, M.D., George J. Crystal, Ph.D.

41

Non-inferiority randomized controlled trial comparing CricOid pressure and para-laryngeal pressure in parturients undergoing cesarean delivery: NiCOP trial

International Journal of Obstetric Anesthesia 59 (2024) 103997

M. Gupta ^a, D. Jain ^{a,*}, K. Jain ^a, K. Gandhi ^a, A. Arora ^b

42

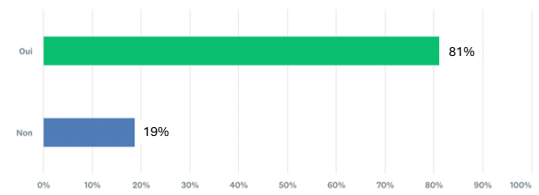
Intubation



43

Utilisez-vous le VL en première intention pour intubation lors de l'AG pour césarienne?

Answered: 16 Skipped: 0



44

Intubation

45

Obstetric Anaesthetists' Association and Difficult Airway Society guidelines for the management of difficult and failed tracheal intubation in obstetrics^{2*}

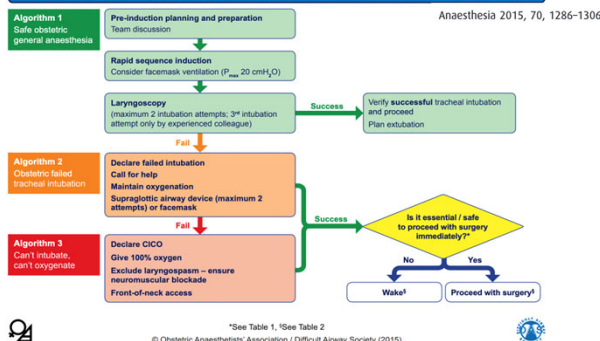
Anaesthesia 2015, 70, 1286-1306

M. C. Mushambi,¹ S. M. Kinsella,² M. Popat,³ H. Swales,⁴ K. K. Ramaswamy,⁵ A. L. Winton⁶ and A. C. Quinn^{7,8}

46

Master algorithm – obstetric general anaesthesia and failed tracheal intubation

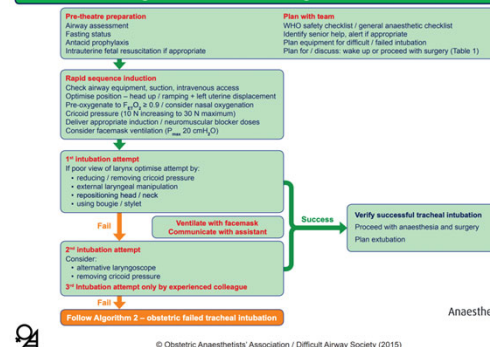
Anaesthesia 2015, 70, 1286-1306



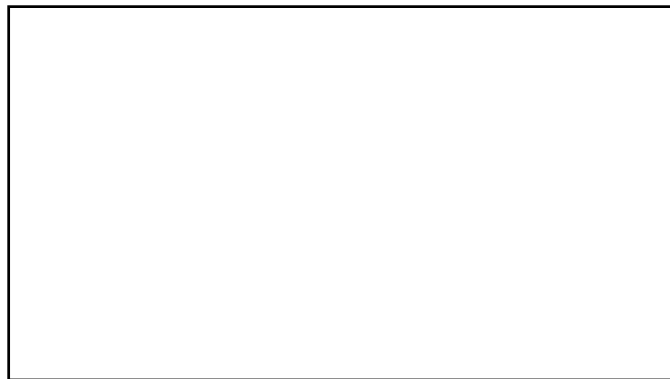
47

Algorithm 1 – safe obstetric general anaesthesia

Anaesthesia 2015, 70, 1286-1306



48



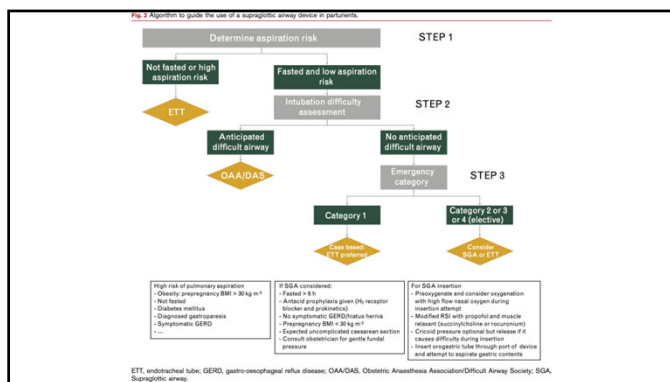
49

The role of supraglottic airway devices for caesarean section under general anaesthesia. A scoping literature review with a proposed algorithm for the appropriate use of supraglottic airway devices for caesarean sections

Urvi Sanganeer*, Karen Jansen*, Nuala Lucas and Marc Van de Velde

Eur J Anaesthesiol 2024; 41:668–676

50



51

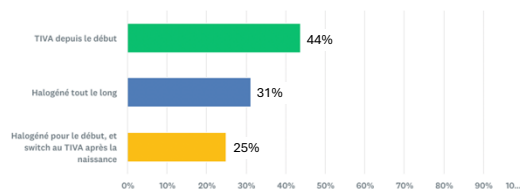
Maintenance



52

Quand vous avez du temps ou des ressources pour la préparation à l'AG, préférez-vous TIVA ou halogénés pour le maintient de l'anesthésie?

Answered: 16 Skipped: 0



53

Maintenance

- Halogénés 1 MAC avant naissance
- Diminue à 0.75 MAC après naissance car risque d'atonie utérine
- Ajout d'un/des adjuvant(s):
 - Protoxyde 50% avec O₂ (N°/V°)
 - Propofol ou TIVA
 - Midazolam
 - Opiacé
 - Dexmedetomidine



54

Efficacy of dexmedetomidine in suppressing cardiovascular and hormonal responses to general anaesthesia for caesarean delivery: a dose-response study

International Journal of Obstetric Anesthesia (2012) 21, 222-229

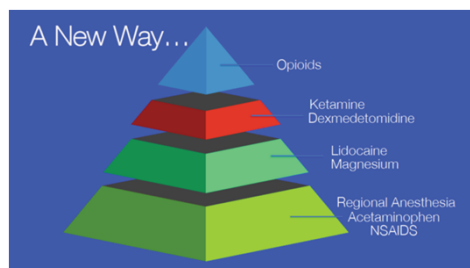
Dexmedetomidine for Sedation in the Parturient With Respiratory Failure Requiring Noninvasive Ventilation
Respir Care 2012;57(11):1967-1969.

Intravenous dexmedetomidine as an adjunct for labor analgesia and cesarean delivery anesthesia in a parturient with a tethered spinal cord
International Journal of Obstetric Anesthesia (2009) 18, 258-261

Dexmedetomidine for awake fiberoptic intubation in a parturient with spinal muscular atrophy type III for cesarean delivery
International Journal of Obstetric Anesthesia (2009) 18, 403-407

55

Analgésie post-opératoire

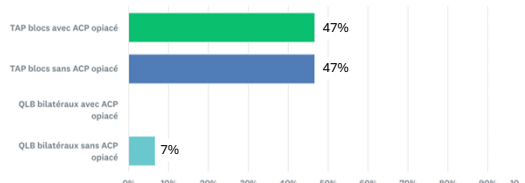


Koeppke et al. Perioperative Medicine (2018) 7:16

56

Comment gérez-vous la douleur post-opératoire suite à césarienne sous AG si morphine neuraxiale n'est pas possible? (pas de cathéter épidural)

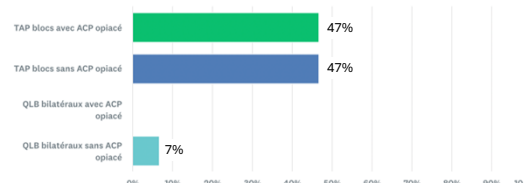
Answered: 15 Skipped: 1



57

Comment gérez-vous la douleur post-opératoire suite à césarienne sous AG si morphine neuraxiale n'est pas possible? (pas de cathéter épidural)

Answered: 15 Skipped: 1 = Pas de bloc, pas d'ACP



58

Guidelines

PROSPECT guideline

Anaesthesia 2022, 76, 665-680

Recommendations

- 1 Implement strategies to minimise systemic opioid utilisation and develop individualised or stratified post-discharge opioid prescribing practices to reduce unnecessary opioid analgesic consumption after elective caesarean section.
- 2 Add intrathecal morphine 50-100 µg or diamorphine 300 µg to spinal anaesthesia. Epidural morphine 2-3 mg or diamorphine 2-3 mg may be used as an alternative, for example, when an epidural catheter is used as part of a combined spinal-epidural technique.
- 3 Prescribe paracetamol and a non-steroidal anti-inflammatory drug (NSAID) administered after delivery and continued regularly postoperatively.
- 4 Administer a single dose of intravenous (i.v.) dexamethasone after delivery in the absence of contraindications.
- 5 Consider a single injection of local anaesthetic infiltration, continuous wound local anaesthetic infusion and/or fascial plane blocks, if intrathecal morphine is not used.
- 6 Use a surgical technique that includes the Joel-Cohen incision, non-closure of the peritoneum and abdominal binders.
- 7 Consider the use of transcutaneous electrical nerve stimulation as an analgesic adjunct.

59

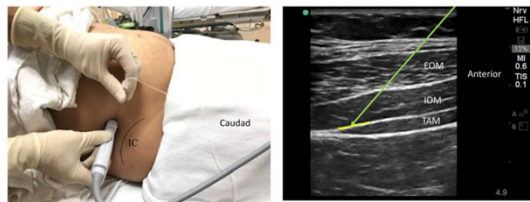
Society for Obstetric Anesthesia and Perinatology: Consensus Statement and Recommendations for Enhanced Recovery After Cesarean

Anesth Analg 2021;132:1362-77

- | | | |
|-----------------------------------|---|--|
| (6) Initiate multimodal analgesia | <p>Neuraxial long-acting opioid</p> <p>Example:</p> <ul style="list-style-type: none"> • IT morphine 50-150 µg or • Epidural morphine 1-3 mg <p>Nonopioid analgesia started in OR unless contraindicated:</p> <ol style="list-style-type: none"> 1. Ketorolac 15-30 mg IV after peritoneum closed 2. APAP IV after delivery or orally, per os before or after delivery <p>Consider local anesthetic wound infiltration or regional blocks such as TAP or QLB if neuraxial morphine is not administered</p> | <ul style="list-style-type: none"> • Use neuraxial doses consistent with SOAP Center of Excellence criteria Link: bit.ly/2li8GBE • Nonopioid analgesia is ideally started before the onset of pain • Rectal APAP may be an alternative but has lower bioavailability • The role of wound infiltration and other regional blocks for postcesarean pain should be considered in select cases, for example, in women who could not receive neuraxial morphine, or other multimodal analgesia regimen components, or patients at risk for severe pain |
|-----------------------------------|---|--|

60

Transversus Abdominis Plane (TAP) bloc



Current Anesthesiology Reports (2019) 9:479–487

61

Transversus abdominis plane block for analgesia after Cesarean delivery: a systematic review and meta-analysis

Basem M. Mishriky, MD · Ronald B. George, MD
Ashraf S. Habib, MBCh

Can J Anesth/J Can Anesth (2012) 59:766–778

In conclusion, this systematic review and meta-analysis suggests that TAP block significantly improved postoperative analgesia in women undergoing CD who did not receive ITM, and it is therefore recommended in those patients. The value of TAP block in patients receiving ITM and its comparison with ITM remains less clear and should be investigated in future studies.

62

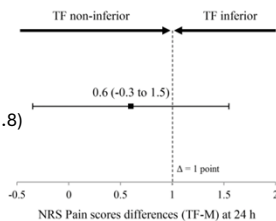
Transversus abdominis plane block combined with intrathecal fentanyl versus intrathecal morphine for post-caesarean analgesia: a randomized non-inferiority clinical trial

Sun-Kyung Park , ¹Youngwon Kim , ¹Hansol Kim , ²Jin-Tae Kim 
Reg Anesth Pain Med 2025;0:1–7.

EVA mobilisation à 24 h:

TAP 5.4 (SD 2.4)

Morphine (75 mcg) IT 4.8 (SD 1.8)



63

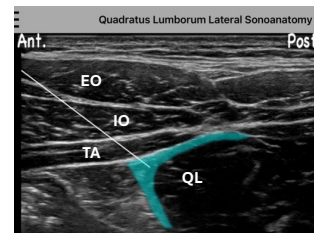
Quadratus lumborum block for postoperative pain after caesarean section

A randomised controlled trial

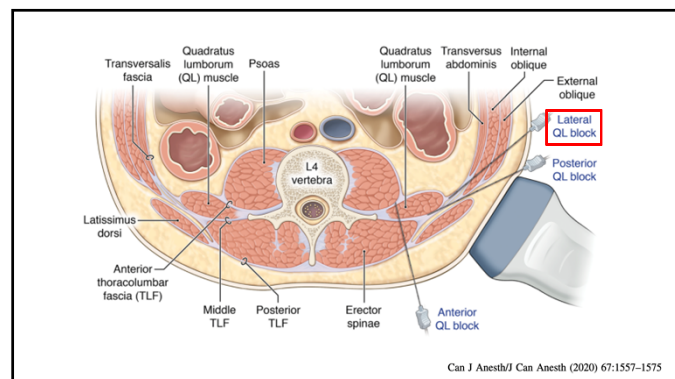
Rafael Blanco, Tarek Ansari and Emad Girgis

Eur J Anaesthesiol 2015; 32:812–818

QLB

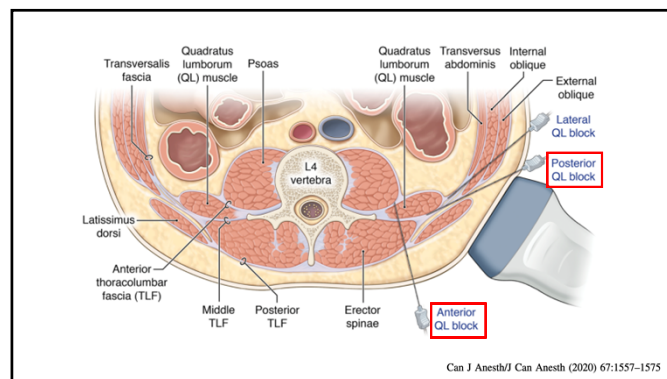


64



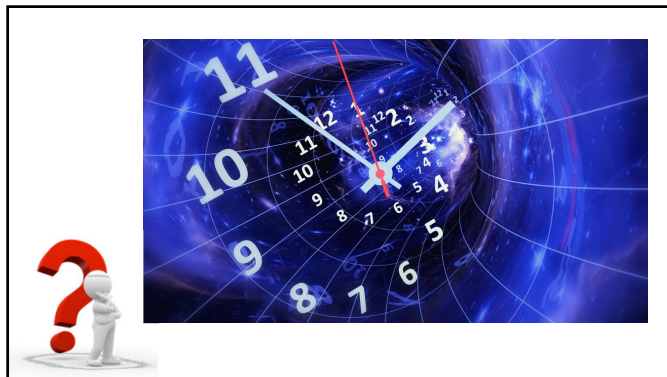
Can J Anesth/J Can Anesth (2020) 67:1557–1575

65



Can J Anesth/J Can Anesth (2020) 67:1557–1575

66



67

Quadratus lumborum block vs. transversus abdominis plane block for caesarean delivery: a systematic review and network meta-analysis*

Anaesthesia 2021, 76, 393-403

K. El-Boghdady,^{1,2} N. Desai,^{1,2} S. Halpern,³ L. Blake,⁴ P. M. Odor,⁵ S. Bampoe,⁵ B. Carvalho⁶ and P. Sultan⁷

- 31 études
- 2188 patientes
- 50% ont inclut Morphine IT
- Outcome 1^o : consommation de morphine IV à 24 h
- Résultats: QLB et TAP blocs sont efficaces sans Morphine IT
- Avec Morphine IT, bénéfice de l'ajout d'un bloc = incertain

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ANESTHESIOLOGY

Postoperative Analgesic Effectiveness of Quadratus Lumborum Block for Cesarean Delivery under Spinal Anesthesia

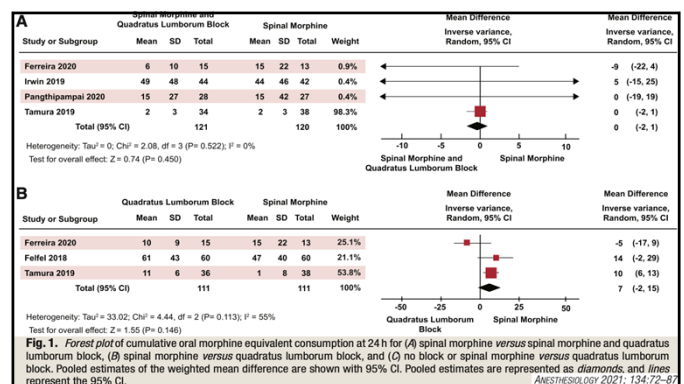
A Systematic Review and Meta-analysis

Nasir Hussain, M.D., M.Sc., Richard Brull, M.D., F.R.C.P.C., Tristan Weaver, M.D., Meiqin Zhou, M.D., Michael Essandoh, M.D., Faraj W. Abdallah, M.D., M.Sc.

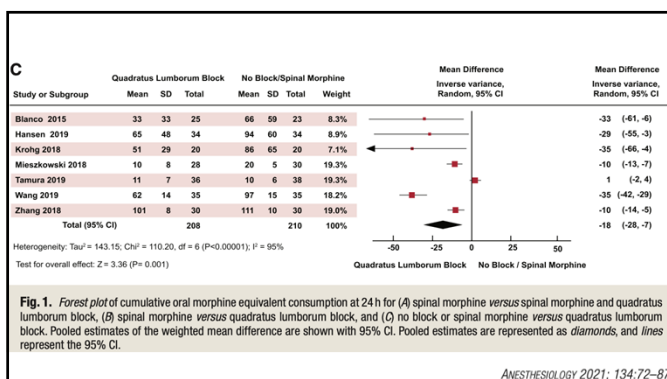
ANESTHESIOLOGY 2021; 134:72-87

- 12 études RC
- 924 patientes
- QLB vs Morphine IT
- Outcome 1^o: Total de Morphine PO sur 24 h

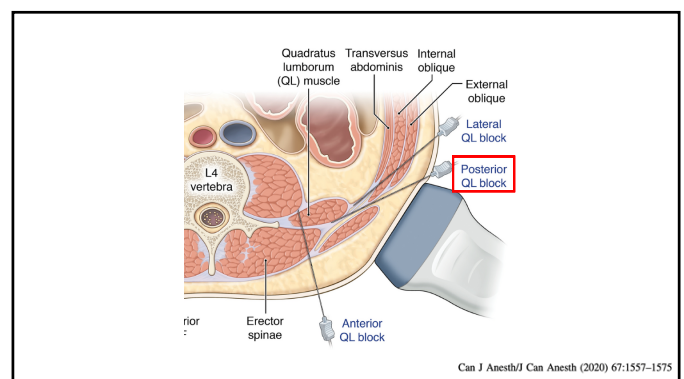
69



70



71



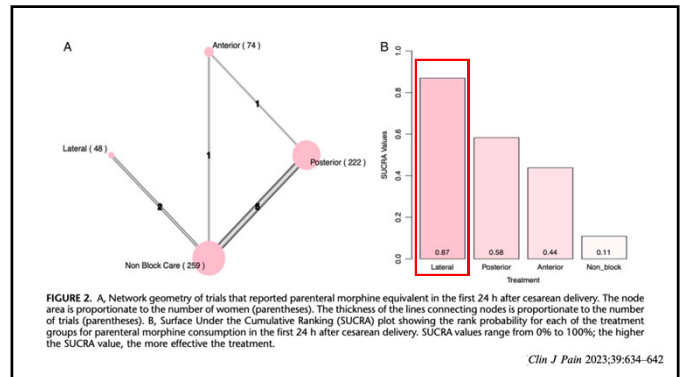
72

Efficacy of Different Approaches of Quadratus Lumborum Block for Postoperative Analgesia After Cesarean Delivery A Bayesian Network Meta-analysis of Randomized Controlled Trials

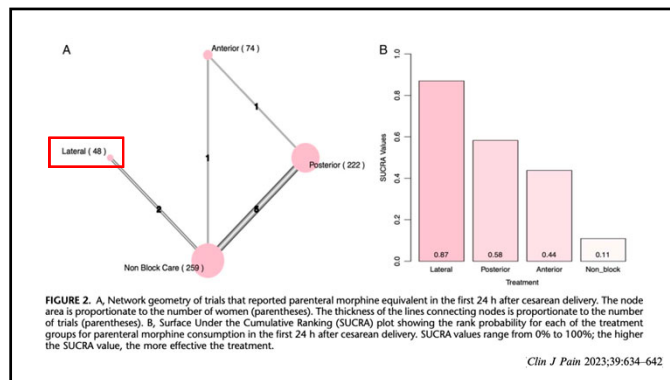
Narinder P. Singh, MD,* Jeetinder K. Makkar, MD,† Samanyu Koduri,‡
and Preet Mohinder Singh, MD§
Clin J Pain 2023;39:634-642.

- 13 études RC
- 890 patientes
- Toute approche QLB vs placebo
- Outcome 1^{er}: Total de Morphine IV sur 24 h

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74



75

ASRA PAIN MEDICINE
50th Annual Regional Anesthesiology and Acute Pain Medicine Meeting
May 1-3, 2025 | Orlando, Florida | #ASRASPRING25

Abstract: 6866
Scientific Abstracts > Regional Anesthesia

Comparison of Intrathecal Morphine, Lateral QLB, & Their Combination for Post-Cesarean Analgesia & Recovery: A Randomized Trial

Vishal Uppal, Valerie Zaphiratos, Victoria Allen, Ana Sjaus, Aaron Shepherd, Ariane Clairoux, Rami Issa, Dolores McKeen
Dalhousie University

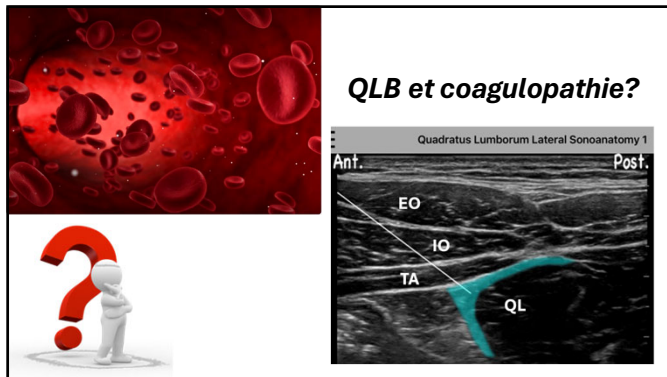
76

QLB vs Morphine IT		QLB (n = 18)	ITM (n = 21)	mean difference	95% CI	t-test P- value	MW p- value
Measure	mean (sd)	mean (sd)					
Resting Pain Score (at 6h)	1.4 (1.8)	4.3 (3.0)	-2.9	-4.5, -1.3	<.001	.003	
Coughing Pain Score (at 6h)	3.4 (2.8)	5.1 (3.3)	-1.7	-3.6, 0.3	.102	.120	
Resting Pain Score (at 24h)	1.5 (1.7)	2.2 (1.6)	-0.7	-1.8, 0.3	.161	.110	
Coughing Pain Score (at 24h)	4.2 (2.4)	5.4 (2.2)	-1.2	-2.7, 0.3	.111	.177	
Worst Pain Score (at 24h)	5.4 (2.5)	7.0 (1.9)	-1.6	-3.0, -0.1	.037	.074	
Resting Pain Score (at 48h)	1.32 (1.5)	1.1 (1.3)	0.3	-0.7, 1.2	.575	.698	
Coughing Pain Score (at 48h)	4.3 (2.2)	4.1 (1.8)	0.3	-1.1, 1.6	.697	.597	
Worst Pain Score (at 48h)	4.6 (2.5)	5.1 (2.4)	-0.5	-2.2, 1.2	.572	.587	
Oxycodone Consumption (at 24h)	4.7 (7.6)	12.6 (15.7)	-7.9	-15.9, 0.03	.051	.095	
Oxycodone Consumption (at 48h)	5.3 (5.62)	17.4 (25.9)	-12.1	-24.1, -0.2	.050	.219	
Satisfaction with Pain Control	8.6 (1.18)	7.6 (2.8)	1.0	-0.4, 2.4	.137	.497	

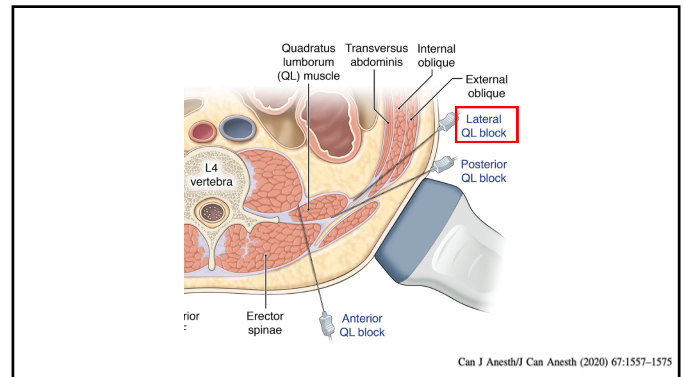
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Measure	ITM (n = 21)	ITM + QLB (n = 19)	mean difference	95% CI	t-test p-value	MW p-value
Quality of Recovery (at 24h)	172.6 (14.2)	176.6 (11.6)	-3.9	-12.2, 4.3	.341	.423
Quality of Recovery (at 48h)	183.0 (10.6)	181.6 (11.5)	1.3	-5.9, 8.6	.710	.789
Resting Pain Score (at 6h)	4.3 (3.0)	1.0 (1.0)	3.3	1.3, 4.8	<.001	.001
Coughing Pain Score (at 6h)	5.1 (3.3)	2.1 (1.7)	3.0	1.4, 4.7	<.001	.002
Resting Pain Score (at 24h)	2.2 (1.6)	1.6 (1.7)	0.6	-0.4, 1.6	.243	.198
Coughing Pain Score (at 24h)	5.4 (2.2)	4.63 (2.1)	0.8	-0.6, 2.1	.279	.335
Worst Pain Score (at 24h)	7.0 (1.8)	5.2 (2.1)	1.8	0.6, 3.1	.006	.009
Resting Pain Score (at 48h)	1.1 (1.3)	1.6 (1.7)	-0.5	-1.5, 0.5	.298	.353
Coughing Pain Score (at 48h)	4.1 (1.8)	4.0 (2.5)	0.05	-1.4, 1.5	.947	.699
Worst Pain Score (at 48h)	5.1 (2.43)	5.3 (2.05)	-0.2	-1.6, 1.3	.801	.775
Oxycodone Consumption (at 24h)	12.6 (15.7)	4.7 (7.5)	7.9	0.04, 15.7	.049	.095
Oxycodone Consumption (at 48h)	17.4 (25.9)	13.5 (23.0)	3.9	-12.3, 20.0	.631	.478
Satisfaction with Pain Control	7.57 (2.8)	8.3 (1.6)	-0.7	-2.2, 0.7	.326	.695

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79



80

Posterior Quadratus Lumborum Block for Labor Analgesia: A Case Report

Johanna Blair de Haan, MD, Subhan Tabba, BS, MBA, Linden O. Lee, MD, Semhar Ghebremichael, MD, Sudipta Sen, MD, Daniel Shoham, MD, and Nadia Hernandez, MD
A&A Practice. 2020;14:e01193.

CASE REPORT
 A 27-year-old, gravida-6, total parity-4, premature births-0, abortions-1, living children-4 (G6P4014), 85 kg, 160-cm tall parturient with Hemophilia A and no history of cesarean

81

Dexamethasone pour la douleur post-op?

82

Society for Obstetric Anesthesia and Perinatology: Consensus Statement and Recommendations for Enhanced Recovery After Cesarean

Anesth Analg 2021;132:1362–77.

(6) Initiate multimodal analgesia

Neuraxial long-acting opioid Example:
 • IT morphine 30–150 µg
 or
 • Epidural morphine 1–3 mg
 Nonopioid analgesia started OR unless contraindicated

1. Ketorolac 15–30 mg IV at peritoneum closure
2. APAP 1 g after delivery orally, per os before discharge

Consider local anesthetic wound infiltration or regional blocks such as TAP or QLB if neuraxial morphine is not administered

- Use neuraxial doses consistent with SOAP Center of Excellence criteria Link: bit.ly/2li8GBc
- Nonopioid analgesia is ideally started before the onset of pain
- Rectal APAP may be an alternative but has lower bioavailability
- The role of wound infiltration and other regional blocks for postcesarean pain should be considered in select cases, for example, in women who could not receive neuraxial morphine, or other multimodal analgesia regimen components, or patients at risk for severe pain

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(5) IONV/PONV prophylaxis

- Prophylactic vasopressor infusion (see above) to decrease hypotension-associated IONV
- Address uterine exteriorization and abdominal saline irrigation with surgeon
- Combination of at least 2 prophylactic IV antiemetics with different mechanisms of action. Examples:
 - 5HT₃ antagonist (eg, ondansetron 4 mg)
 - Glucocorticoid (eg, dexamethasone 4 mg)
 - D2 receptors antagonist (eg, metoclopramide 10 mg)

IONV/PONV is a major stressor for the mother and should be avoided, bearing in mind the different etiologies

- Limiting/avoid uterine exteriorization which is associated with IONV and delayed bowel function recovery
- Abdominal saline irrigation may worsen IONV and PONV
- Dexamethasone is effective for PONV and not IONV due to delayed onset of action
- Metoclopramide is effective for IONV but not PONV

Anesth Analg 2021;132:1362–77

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Guidelines	Recommendations
PROSPECT guideline Anaesthesia 2022, 76, 665-680	- Implement strategies to minimise systemic opioid utilisation and develop individualised or stratified post-discharge opioid prescribing practices to reduce unnecessary opioid analgesic consumption after elective caesarean section. - Add intrathecal morphine 50-100 µg or diamorphine 300 µg to spinal anaesthesia. Epidural morphine 2-3 mg or diamorphine 2-3 mg may be used as an alternative, for example, when an epidural catheter is used as part of a combined spinal-epidural technique. - Prescribe paracetamol and a non-steroidal anti-inflammatory drug (NSAID) administered after delivery and continued regularly postoperatively. - Administer a single dose of intravenous (i.v.) dexamethasone after delivery in the absence of contraindications. - Consider a single injection of local anaesthetic infiltration, continuous wound local anaesthetic infusion and/or fascial plane blocks, if intrathecal morphine is not used. - Use a surgical technique that includes the Joel-Cohen incision, non-closure of the peritoneum and abdominal binders. - Consider the use of transcutaneous electrical nerve stimulation as an analgesic adjunct.

85

Impact of perioperative dexamethasone on postoperative analgesia and side-effects: systematic review and meta-analysis	British Journal of Anaesthesia 110 (2): 191-200 (2013)
N. H. Waldron, C. A. Jones, T. J. Gan, T. K. Allen and A. S. Habib*	
45 études 5796 patientes ↓ score de douleur et ↓ opiacés à 2h et 24h ↓ d'analgésie en rescue ↑ temps avant la première demande d'analgésique ↓ de temps en salle de réveil - Pas de ↑ des infections ou guérison de plaie	Dexamethasone 8 mg IV = dose la plus courante dans ces études

86

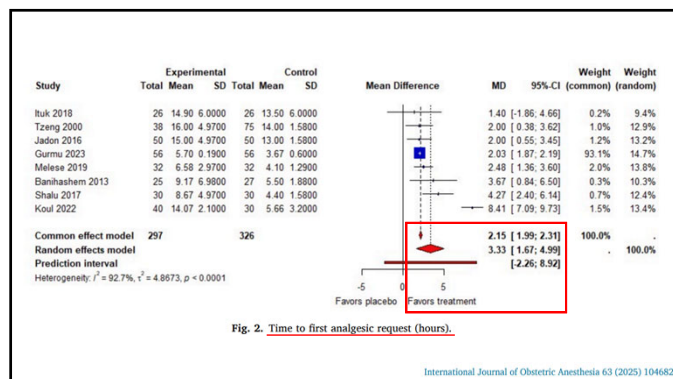
Anaesthesia 2023, 78, 1170-1179	
Correspondence	
PROSPECT guideline for elective caesarean section: an update	
Singh NP, Makkar JK, Yadav N, Goudra BG, Singh PM. The analgesic efficacy of intravenous dexamethasone for post-caesarean pain. <i>European Journal of Anaesthesiology</i> 2022; 39: 498-510.	13 études RC 2000-2019
[2] confirm our recommendation of administering a single dose of dexamethasone. Intravenous dexamethasone was associated with reduced pain scores, longer times to first analgesic request and reduced rescue opioid consumption.	

87

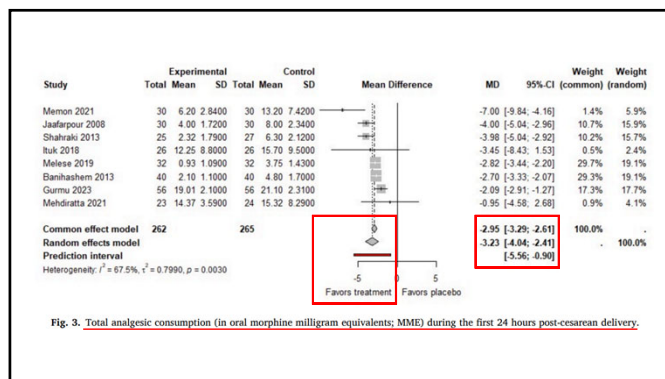
Efficacy and safety of intravenous administration of dexamethasone on post-caesarean delivery pain: a systematic review and meta-analysis of current literature	International Journal of Obstetric Anesthesia 63 (2025) 104682
Dimitrios Ioannopoulos ^a , Zoi Tsani ^b , Eleni Chatsiou ^c , Eleni Arnaoutoglou ^d , Georgia Tsaousi ^e	
17 études RC 1327 patientes - Dose la plus courante: Dexamethasone 8 mg IV	



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89



90



91

Table 1 Characteristics of included studies, by timing of IV dexamethasone administration					Table 1 Characteristics of included studies, by timing of IV dexamethasone administration				
Study ID	Patients	Study Arms	Type of anesthesia	Postoperative analgesia regimen	Study ID	Patients	Study Arms	Type of anesthesia	Postoperative analgesia regimen
Prior to cesarean delivery					After umbilical cord clamping				
Wu 2007 ²³	n=120	DEX 8 mg vs. DROF vs. DEX 4 mg + DROF vs. placebo	Spinal (BUP)	DIC 75 mg IM - PRN	Jadavpour 2008 ¹³	n=80	DEX 8 mg vs. placebo	Spinal (LIDO)	DIC 75 mg or PETH 50 mg
Cardoso 2013 ²⁴	n=70	DEX 10 mg vs. placebo	Spinal (BUP)	TRAM 100 mg - PRN	Inuk 2018 ¹⁷	n=52	DEX 8 mg vs. placebo	Spinal (BUP, ENT, MOR)	Ketorolac 30 mg IV every 6 hours, OXY 5 mg + acetaminophen 325 mg PO PRN or MOR IV PRN
Basirhashem 2013 ²⁵	n=52	DEX 8 mg vs. placebo	Spinal (LIDO)	MOR IV - PRN	Shahraki 2013 ¹⁴	n=60	DEX 8 mg vs. placebo	Epidural (BUP)	MOR 4 mg PRN
Jadon 2016 ²⁶	n=100	DEX 8 mg vs. placebo	Spinal (BUP)	DIC 75 mg IM PRN or combined PZT 30 mg + PMT 25 mg IM PRN	Post-cesarean delivery Wang 2001 ¹⁵	n=175	DEX 2.5mg vs. DEX 5 mg vs. DEX 10 mg vs. placebo	Epidural (LIDO)	TNX 20 mg IV PRN
Shah 2017 ²⁷	n=60	DEX 8 mg vs. placebo	Spinal (BUP)	TRAM 100 mg IV - PRN	Treng 2000 ²⁸	n=113	DEX 8 mg vs. DROF vs. placebo	Epidural (LIDO)	DIC 75 mg IM PRN
Melrose 2019 ²⁸	n=64	DEX 0.1 mg/kg vs. placebo	Spinal (BUP)	DIC and TRAM IV - PRN	Nortcliffe 2003 ²⁹	n=90	DEX 8 mg vs. DROF vs. placebo	Epidural (BUP, ENT, MOR)	DIC 100 mg COD 300 mg + acetaminophen 500 mg PRN
Mehdizadeh 2021 ³⁰	n=47	DEX 8 mg vs. placebo	Spinal (BUP)	FNT IV, OXY 5 mg/10 mg PO, MOR IV - PRN	Unidentified Magel 2018 ³¹	n=129	DEX 16 mg IV vs DEX 16 mg SC vs. placebo	Spinal (BUP, ENT)	MOR IV PRN
Memon 2021 ³²	n=60	DEX 8 mg vs. placebo	Spinal (BUP)	DIC 75 mg IV - PRN					
Koel 2022 ³³	n=120	DEX 8 mg vs. BETA vs. placebo	Spinal (BUP)	DIC 75 mg IV - PRN					
Gurusu 2023 ³⁴	n=112	DEX 8 mg vs. placebo	Spinal	Not reported					

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Efficacy and safety of intravenous administration of dexamethasone on post-cesarean delivery pain: a systematic review and meta-analysis of current literature

Dimitrios Ioannopoulos^a, Zoi Tsani^b, Eleni Chatsiou^c, Eleni Arnaoutoglou^d, Georgia Tsaousi^e

operatively. Specifically, studies applying opioid-based analgesic protocols presented a greater variation in the analgesic effect of dexamethasone vs. NSAIDs alone or a multimodal analgesic approach, a fact that can be mainly attributed to the opioid-sparing effect of dexamethasone.^{46,56} Furthermore, our findings indicate that analgesia consisting mainly of NSAIDs is less affected by the addition of dexamethasone, probably due to the overlapping anti-inflammatory mechanisms.

International Journal of Obstetric Anesthesia 63 (2025) 104682

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Dexamethasone for Postoperative Pain After Cesarean Delivery Under Neuraxial Anesthesia.

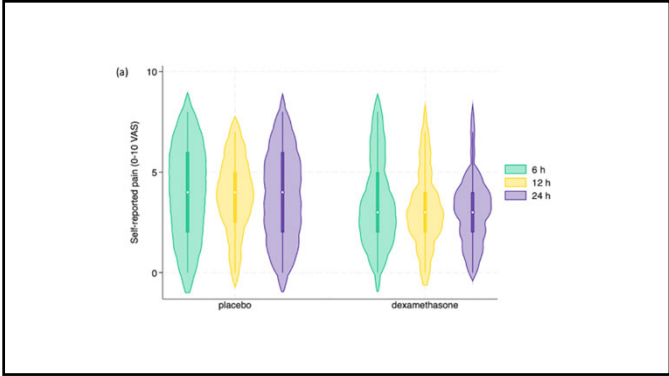
Jade Yacoub Hanna^{1,2}, Ana Sjaus³, Anthony Sultan⁴, Christina Lamontagne^{1,5}, Sandra Lesage⁶, Chantal Crochetière⁶, Valerie Zaphiratos^{1,5}

1. Azrieli Research Centre, CHU Sainte-Justine Hospital, Montreal, QC, Canada.
2. Medical student, University of Montreal, QC, Canada
3. Department of Anesthesia, Dalhousie University, IWK Health Centre, Halifax, Canada
4. Department of Anesthesia, McGill University Health Centre (MUHC), Montreal, QC, Canada
5. Department of Anesthesia, CHU Sainte-Justine Hospital, University of Montreal, QC, Canada

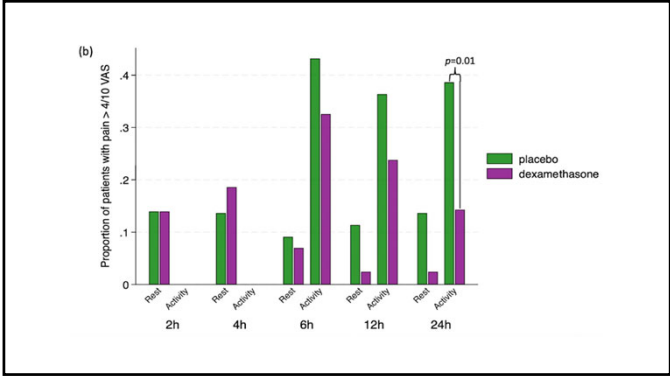
100 patientes
Randomisée contrôlée
Dexa 8 mg IV vs placebo
Analgésie multimodale
Issu 1^{er} douleur 6h post-op à la mobilisation

Ottawa 2026
CAS 2026
JUNE 5-7

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95



96

Dexamethasone pour la douleur post-op?

- Dexamethasone 8 mg IV post-naissance
- Pas d'impact décrit sur les infections et la guérison
- Acceptation du fait que la glycémie pourrait augmenter chez DB
- Peut-on prédire toutes les femmes qui sont à risque de douleur sévère?
- Pourquoi ne pas mettre toutes les chances du bord de la femme?

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Sommaire – AG pour CS au Québec



- AG pour CS rare au Québec
- 3 A du risque d'AG: Airway, Aspiration, Awareness
- HFNO peu utilisé car peu disponible, surtout en urgence
- Opiacés donnés à l'induction
- Agent d'induction: 1 choix = Propofol
- Succinylcholine demeure le curare préféré malgré Sugammadex
- Sellick 50/50
- VL préféré vs DL
- Maintient aléatoire
- TAP blocs +/- ACP opiacé pour analgésie post-op

98

Questions/ Commentaires



99

Voir pour mieux anesthésier:

Échographie **gastrique** et **neuraxiale** en obstétrique

Fatine Karkri, MD
Fellow en Anesthésie obstétricale
Stanford University School of Medicine

Symposium Francophone – SOAP 2026
Jeudi 30 avril 2026

Université de Montréal Anesthésiologie

Stanford MEDICINE Obstetric Anesthesia
Anesthesiology, Perioperative and Pain Medicine

ANNUAL MEETING



1

Conflit d'intérêt

Aucun






2

Objectifs

1. Comprendre et appliquer l'**échographie gastrique** pour l'évaluation du risque d'aspiration en obstétrique.
2. Démontrer l'utilisation préprocédurale de l'**échographie neuraxiale** pour améliorer le repérage anatomique et la réussite des techniques neuraxiales en obstétrique.
3. Intégrer ces techniques d'échographie dans l'algorithme décisionnel en **anesthésie obstétricale**.

Université de Montréal Anesthésiologie

Stanford MEDICINE Obstetric Anesthesia
Anesthesiology, Perioperative and Pain Medicine

ANNUAL MEETING

3

Cas clinique

- F39 G3P2 @ 37 sem
- ATCD césariennes x2 (2014, 2016)
- Début de contractions utérines à la maison il y a 3 heures
- Dernier repas il y a 6 heures
- Césarienne semi-urgente annoncée par l'obstétricienne... elle vous dit que la patiente réclame une AG!

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Cas clinique

"Docteur, pouvez-vous m'endormir pour ma césarienne SVP?"

Les anesthésistes ont eu beaucoup de difficulté à piquer mon dos les dernières fois, ça leur a pris plus de 30 minutes!

Je ne veux absolument pas revivre ça."



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Plan

- Échographie gastrique
- Échographie neuraxiale
- Formation

1. Indications
2. Acquisition
3. Interprétation
4. Implications en obstétrique
5. Limites

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ÉCHOGRAPHIE GASTRIQUE

7

Références principales

ASRA pain medicine narrative review and expert practice recommendations for gastric point-of-care ultrasound to assess aspiration risk in medically complex patients undergoing regional anesthesia and pain procedures

Échographie gastrique au chevet et évaluation du risque d'aspiration : un compte rendu narratif

8

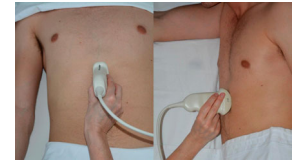
Indications

- Jeûne incertain
- **Urgence**
- Vidange gastrique possiblement retardée
 - Diabète
 - Obésité
 - **Grossesse**
 - Agoniste GLP-1
- Nutrition entérale
- **Reflux gastro-oesophagien**

9

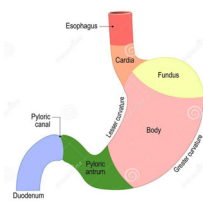
Technique d'acquisition

- Sonde curvilinéaire de basse fréquence (3-5 MHz)
- Positionnement du patient:
 1. Décubitus dorsal (DD)
 2. **Décubitus latéral droit (DLD)**
- Région épigastrique, plan sagittal
- Balayer la sonde de la région sous-costale gauche à la région sous-costale droite
- Identifier l'antré de l'estomac



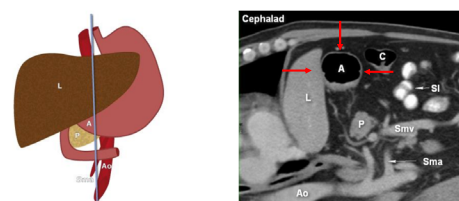
10

Importance du DLD



11

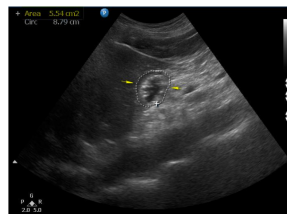
Anatomie



12

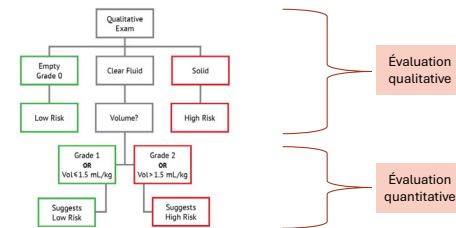
Mesure de la surface transversale

1. Identifier l'antré en DLD
2. Geler l'image entre 2 contractions péristaltiques
3. Tracer l'antré (incluant la séreuse de l'estomac)



13

Évaluation du risque d'aspiration



14

Évaluation qualitative (grade antral)

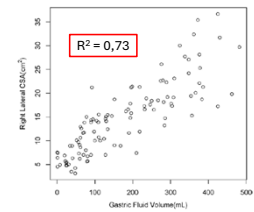
SOLIDE - PRÉCÔCE	 Céphalé	VIDE	 Skin R L A Sma Ao
SOLIDE - TARD	 Céphalé	SOLIDE - PRÉCÔCE	 Skin R L A Sma Ao
LIQUIDE - PRÉCÔCE	 Céphalé	SOLIDE - TARD	 Skin R L A Sma Ao
LIQUIDE - TARD	 Céphalé	LIQUIDE - PRÉCÔCE	 Céphalé

**Plat et affaissé
Rond / Ovoidé
"Bull's eye" / "Target sign"
Grade 0 = Vide en DD+DLD
Grade 1 = vide en DD, liquide en DLD
Grade 2 = liquide en DD+DLD**

15

Évaluation quantitative

Validation of a Mathematical Model for Ultrasound Assessment of Gastric Volume by Gastroscopic Examination



16

Évaluation quantitative

Right Latent CSA (cm²)	30	35	40	45	50	55	60	65	70	75	80
2	25	35	45	55	65	75	85	95	105	115	125
3	35	45	55	65	75	85	95	105	115	125	135
4	45	55	65	75	85	95	105	115	125	135	145
5	55	65	75	85	95	105	115	125	135	145	155
6	65	75	85	95	105	115	125	135	145	155	165
7	75	85	95	105	115	125	135	145	155	165	175
8	85	95	105	115	125	135	145	155	165	175	185
9	95	105	115	125	135	145	155	165	175	185	195
10	105	115	125	135	145	155	165	175	185	195	205
11	115	125	135	145	155	165	175	185	195	205	215
12	125	135	145	155	165	175	185	195	205	215	225
13	135	145	155	165	175	185	195	205	215	225	235
14	145	155	165	175	185	195	205	215	225	235	245
15	155	165	175	185	195	205	215	225	235	245	255
16	165	175	185	195	205	215	225	235	245	255	265
17	175	185	195	205	215	225	235	245	255	265	275
18	185	195	205	215	225	235	245	255	265	275	285
19	195	205	215	225	235	245	255	265	275	285	295
20	205	215	225	235	245	255	265	275	285	295	305
21	215	225	235	245	255	265	275	285	295	305	315
22	225	235	245	255	265	275	285	295	305	315	325
23	235	245	255	265	275	285	295	305	315	325	335
24	245	255	265	275	285	295	305	315	325	335	345
25	255	265	275	285	295	305	315	325	335	345	355
26	265	275	285	295	305	315	325	335	345	355	365
27	275	285	295	305	315	325	335	345	355	365	375
28	285	295	305	315	325	335	345	355	365	375	385
29	295	305	315	325	335	345	355	365	375	385	395
30	305	315	325	335	345	355	365	375	385	395	405

$$\text{VOLUME (ML)} = 27.0 + 14.6 \times \text{RIGHT-LAT CSA} - 1.28 \times \text{AGE}$$

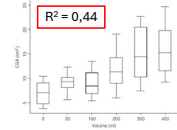
17

Right Latent CSA (cm²)	30	35	40	45	50	55	60	65	70	75	80
2	25	35	45	55	65	75	85	95	105	115	125
3	35	45	55	65	75	85	95	105	115	125	135
4	45	55	65	75	85	95	105	115	125	135	145
5	55	65	75	85	95	105	115	125	135	145	155
6	65	75	85	95	105	115	125	135	145	155	165
7	75	85	95	105	115	125	135	145	155	165	175
8	85	95	105	115	125	135	145	155	165	175	185
9	95	105	115	125	135	145	155	165	175	185	195
10	105	115	125	135	145	155	165	175	185	195	205
11	115	125	135	145	155	165	175	185	195	205	215
12	125	135	145	155	165	175	185	195	205	215	225
13	135	145	155	165	175	185	195	205	215	225	235
14	145	155	165	175	185	195	205	215	225	235	245
15	155	165	175	185	195	205	215	225	235	245	255
16	165	175	185	195	205	215	225	235	245	255	265
17	175	185	195	205	215	225	235	245	255	265	275
18	185	195	205	215	225	235	245	255	265	275	285
19	195	205	215	225	235	245	255	265	275	285	295
20	205	215	225	235	245	255	265	275	285	295	305
21	215	225	235	245	255	265	275	285	295	305	315
22	225	235	245	255	265	275	285	295	305	315	325
23	235	245	255	265	275	285	295	305	315	325	335
24	245	255	265	275	285	295	305	315	325	335	345
25	255	265	275	285	295	305	315	325	335	345	355
26	265	275	285	295	305	315	325	335	345	355	365
27	275	285	295	305	315	325	335	345	355	365	375
28	285	295	305	315	325	335	345	355	365	375	385
29	295	305	315	325	335	345	355	365	375	385	395
30	305	315	325	335	345	355	365	375	385	395	405

18

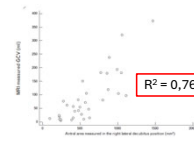
Validation de modèle mathématique

Gastric ultrasound in the third trimester of pregnancy: a randomised controlled trial to develop a predictive model of volume assessment*



$$\text{Volume (mL)} = -327.1 + 215.2 \times \log(\text{CSA})$$

Ultrasound examination of the antrum to predict gastric content volume in the third trimester of pregnancy as assessed by MRI

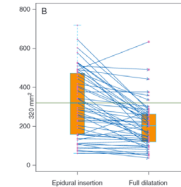


$$\text{Volume (mL)} = 0.18 \times \text{CSA}_{\text{DLD}} + 0.11 \times \text{CSA}_{\text{LPOES}} - 62.4$$

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Physiologie

Ultrasonographic evaluation of gastric content during labour under epidural analgesia: a prospective cohort study



1. Persistance de motilité gastrique post-épidurale
2. Faisabilité de l'échographie gastrique en obstétrique

20

Simplicité

Diagnostic accuracy of a simple qualitative ultrasound assessment for the diagnosis of high-risk gastric contents in the parturient. A prospective observational cohort study

Méthode de référence



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Simplicité

Diagnostic accuracy of a simple qualitative ultrasound assessment for the diagnosis of high-risk gastric contents in the parturient. A prospective observational cohort study

Méthode simplifiée



Sensibilité 97%
Spécificité 96%

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Limites

Opérateur-dépendant

Images non concluantes
~2-3%

Modèles quantitatifs imparfaits

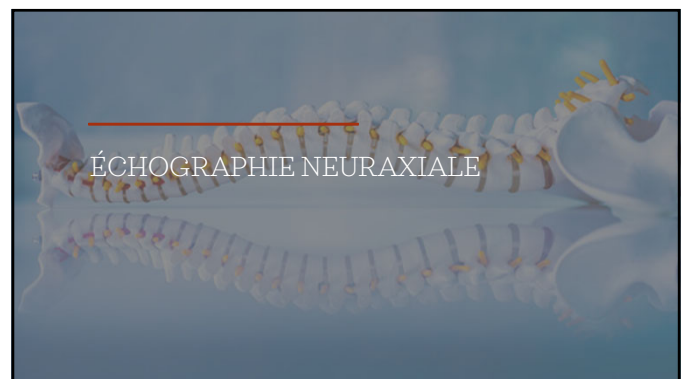
ATCD chirurgie gastrique/Hernie hiatale

Courbe d'apprentissage

Matériel & temps requis

Ne remplace pas le jugement clinique

23



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Référence principale

Cochrane Library

Ultrasound guidance versus anatomical landmarks for neuraxial anaesthesia in adults (Review)

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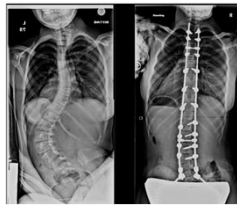
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Indications

- Pathologie du rachis
 - Scoliose
 - Chirurgie du rachis avec instrumentation
 - Autres pathologies osseuses
- Repères anatomiques peu fiables
 - Obésité
- ATCD technique difficile / échec
- Enseignement



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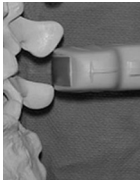
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INDICATIONS — ACQUISITION — INTERPRÉTATION — ORTHÉTIQUE — LIMITES

26

Technique d'acquisition

- Équipement
 - Sonde curvilinéaire de basse fréquence (3-5 MHz)
 - Marqueur
 - +/- gaine stérile
- Positionnement du patient
 - Assis vs DL
 - Dos courbé



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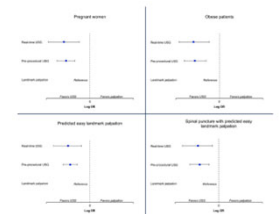
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INDICATIONS — ACQUISITION — INTERPRÉTATION — ORTHÉTIQUE — LIMITES

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Échorepérage vs Échoguidage?

Efficacy and safety of ultrasound-guided versus landmark-guided neuraxial puncture: a systematic review, network meta-analysis and trial sequential analysis of randomized clinical trials



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INDICATIONS — ACQUISITION — INTERPRÉTATION — ORTHÉTIQUE — LIMITES

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Étapes

- 1 Identification de la ligne médiane
- 2 Identification des apophyses épineuses
- 3 Évaluation de la rotation du rachis
- 4 Estimation de la profondeur du complexe postérieur

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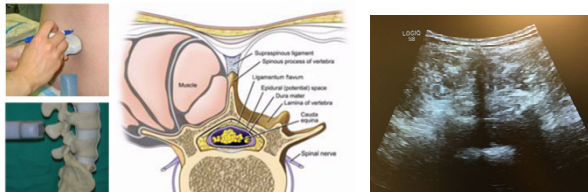
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1. Identification de la ligne médiane – Transverse



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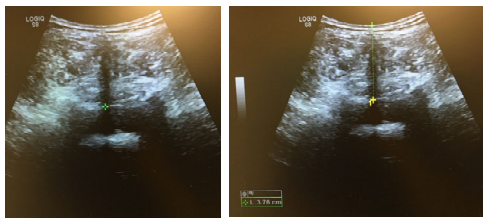
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4. Estimation de la profondeur du complexe postérieur



Échographie peut sous-estimer 2° à compression des tissus

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Table 1 continued

Study	Year	Country	Sample Size (n)	Success Rate (%)	First Pass Success (%)	Duration (min)	Complications	Notes
Chen et al., 2014	2014	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2015	2015	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2016	2016	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2017	2017	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2018	2018	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2019	2019	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2020	2020	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2021	2021	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2022	2022	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2023	2023	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2024	2024	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2025	2025	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2026	2026	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2027	2027	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2028	2028	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2029	2029	China	100	95	95	10.5	0	Ultrasound guidance
Chen et al., 2030	2030	China	100	95	95	10.5	0	Ultrasound guidance

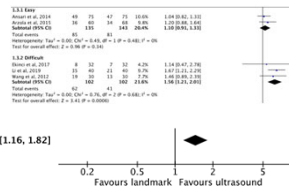
OR, combined oral and IV, 95% CI, non-inferiority test, OR, non-inferiority test

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Bénéfices

Conventional landmark palpation vs. preprocedural ultrasound for neuraxial analgesia and anaesthesia in obstetrics – a systematic review and meta-analysis with trial sequential analyses

- ↑ Taux de succès au 1^{er} passage
- = Durée de la procédure
- ↓ Lombalgie postpartum
- ↓ CPPD



Total (95% CI) 620 633 100.0% 1.46 [1.16, 1.82]
 Total events 379 266
 Heterogeneity: $\tau^2 = 0.11$; $\chi^2 = 43.26$, $df = 12$ ($P < 0.0001$); $I^2 = 72\%$
 Test for overall effect: $Z = 3.29$ ($P = 0.0010$)
 Test for subgroup differences: $\chi^2 = 8.73$, $df = 3$ ($P = 0.03$), $I^2 = 65.6\%$

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Bénéfices

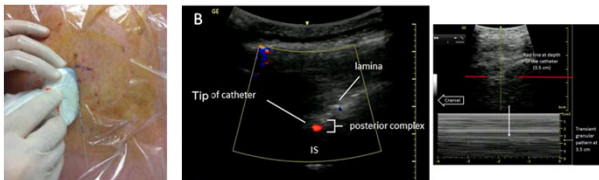
Ultrasound guidance versus anatomical landmarks for neuraxial anaesthesia in adults (Review)

- ↓ Nombre de tentatives (0.41)
- ↓ Durée de la procédure (34 sec)
- ↑ Taux de succès au 1^{er} passage
- = Satisfaction
- = Échec technique
- ? Douleur procédurale
- ? Effets secondaires

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Confirmation

L'utilisation du Doppler couleur et de l'échographie en mode M afin de confirmer l'emplacement d'un cathéter péridural – une série de cas rétrospective



41

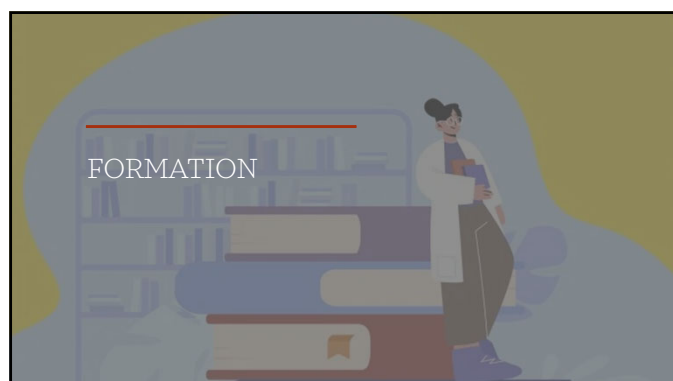
Limites

- Impact clinique incertain
 - Hétérogénéité des études
 - Biais méthodologiques (aveugle)
- Courbe d'apprentissage
- Matériel/temps requis
- Échogénicité parfois limitée

Does Preprocedural Ultrasound Increase the First-Pass Success Rate of Epidural Catheterization Before Cesarean Delivery? A Randomized Controlled Trial

	Palpation group (n = 55)	Ultrasound group (n = 53)	P
Success at the first needle pass	33 (60%)	31 (58.5%)	>0.99
Success at the first skin puncture	48 (87.3%)	48 (90.6%)	0.81
Number of needle passes	1 (1-14)	1 (1-11)	0.99
Number of skin punctures	1 (1-3)	1 (1-3)	0.58
Duration of the epidural procedure ^a (s)	215 (114-720)	185 (57-680)	0.036
	243 ± 115	205 ± 108	0.083
Patient satisfaction ^b	4 (3-5)	4 (3-5)	0.55
Interspace of successful catheterization ^c			0.38
L2-L3	18 (33.3%)	23 (43.4%)	
L3-L4	36 (66.7%)	30 (56.6%)	

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An international survey about rapid sequence intubation of 10,003 anaesthetists and 16 airway experts[†]

- 1 question portant sur l'échographie gastrique :
 - 10,2% formés
 - 13,8% connaissent un collègue formé
- Selon 16 « airway experts » :
 - 7 (43,8%) pensent que tous les anesthésistes pouvant faire une ISR doivent être formés en échographie gastrique
 - Nécessité de validation et consensus ++

Table 6 Key topics identified for further research and consensus.

Aspect of practice	Suggested topics for further research or consensus
Gastric decompression	The use of nasogastric tubes in patients with and without intestinal obstruction before anaesthesia The use of gastric ultrasound to monitor strategies for gastric decompression Consensus on gastric tube handling

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Apprentissage – Échographie gastrique

Anesthesiologists' learning curves for bedside qualitative ultrasound assessment of gastric content: a cohort study

Taux de succès
 > 90% : 24 échographies
 > 95% : 33 échographies

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Apprentissage – Échographie neuraxiale

CUSUM method for construction of trainee spinal ultrasound learning curves following standardised teaching

Identification de l'espace intervertébral (A)
 → 5 échographies
 Mesure de la profondeur du complexe postérieur (B)
 → 10 échographies
 Identification du site d'insertion idéal
 → 55 échographies
 Durée : 163 secondes

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Formation continue

ASRA PAIN MEDICINE
 Introduction to Perioperative Point-of-Care Ultrasound
 September 26-27, 2024 | Texas, Florida
 3. Ultrasound Assessment of Gastric Content (2 hours)

Mount Sinai Hospital Department of Anesthesia Perioperative Interactive Education

American Society of Anesthesiologists

Diagnostic POCUS Certificate Program
 This five-part program, designed to help you develop and demonstrate mastery of heart, lung, gastric, and FAST exam diagnostic POCUS skills, is identical for all le...

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10. Huang B, Chen C, Perletti G, et al. Ultrasound-guided versus non-ultrasound-guided regional anesthesia for cesarean section: a systematic review and meta-analysis with trial sequential analysis. *Anaesthesia*. 2021;76(6):18-32. doi:10.1111/anae.15205
11. Borel F, Fournier J, Fournier A, et al. Diagnostic accuracy of a single qualitative ultrasound assessment for the diagnosis of high-risk gastric contents in the parturient: A prospective observational cohort study. *Crit Care Anesth*. 2024;34(1):1454. doi:10.1093/critcare/ckad004
12. Borel F, Fournier J, Fournier A, et al. Diagnostic accuracy of a single qualitative ultrasound assessment for the diagnosis of high-risk gastric contents in the parturient: A prospective observational cohort study. *Crit Care Anesth*. 2024;34(1):1454. doi:10.1093/critcare/ckad004
13. Borel F, Fournier J, Fournier A, et al. Diagnostic accuracy of a single qualitative ultrasound assessment for the diagnosis of high-risk gastric contents in the parturient: A prospective observational cohort study. *Crit Care Anesth*. 2024;34(1):1454. doi:10.1093/critcare/ckad004
14. Borel F, Fournier J, Fournier A, et al. Diagnostic accuracy of a single qualitative ultrasound assessment for the diagnosis of high-risk gastric contents in the parturient: A prospective observational cohort study. *Crit Care Anesth*. 2024;34(1):1454. doi:10.1093/critcare/ckad004

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1



2

Disclosures & Objectives

- Nothing to disclose
- Objectives - Participants will learn about:
 - Anesthesia Professional Workforce Issues
 - Current State of the Anesthesia Workforce Imbalance
 - Future of the Anesthesia Provider Workforce
 - ASA Efforts to Address Workforce Imbalance

3

We are ASA: Leaders in Patient Safety

- **Mission:** Advancing the practice and securing the future
- **Vision:** A world leader improving health through innovation in quality and safety
- **Values:** Patient safety, physician-led care and scientific discovery

Strategic Pillars

1. Advocacy
2. Patient Safety, Quality & Practice Advancement
3. Educational Resources
4. Member Engagement
5. Leadership & Professional Development
6. Research & Scientific Discovery
7. Stewardship of the Society & Specialty

4

Special Thank You to SOAP Leadership

Ron George, MD, FRCPC President	Grace Lim, MD, MSc Vice President	Richard Month, MD, FASA Secretary	Mahesh Vaidyanathan, MD, MBA Treasurer	Heather C. Nixon, MD Immediate Past President

5

Special Thank You to SOAP Leadership

Directors & Chairs

- Dominique Arce, MD, MPH
- Jennifer Hoayek, MD
- Greg Palleschi, MD
- Megan Rosenstein, MD
- Pervez Sultan, MD, FRCA, MBChB
- Dan Katz, MD
- David Stahl, MD, FASA
- Jeanette Bauchat, MD, MS
- Jill Mhyre, MD
- Allison Lee, MD, MBBS, MS

6

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American Society of Anesthesiologists®

San Diego ♦ October 16–20, 2026 ♦ #ANES26

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Obstetric Anesthesia at ANESTHESIOLOGY® 2026

SOAP Panel

- Beyond Training and Surveys: System-Level Failures in Obstetric Care and What Anesthesiology Must Lead Next

Obstetric Anesthesia Sessions

- 26 Obstetric Anesthesia Sessions
- 19 Panels
- 4 Refresher Course Lectures
- 1 Connect-Learn-Continue
- 2 Fireside Chats

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Obstetric Anesthesia at ANESTHESIOLOGY® 2026

Special Thanks to:

Educational Track Subcommittee on Obstetric Anesthesia
Mark Zakowski, MD, FASA, Chair

Abstract Review Subcommittee on Obstetric Anesthesia and Perinatology
Daniel Katz, MD, Chair

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SOAP: ASA HOD-Affiliated Subspecialty Society

- SOAP-specific activities at ANESTHESIOLOGY® including a "meet-up" in the exhibit hall and a dedicated 60-minute panel.
- SOAP feedback on committee chair and committee members for designated related existing committees.
- SOAP representation on the Committee on Specialty Societies and SOAP delegate and alternate to the ASA House of Delegates.
- SOAP article in the subspecialty news section of the *ASA Monitor* online

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SOAP: ASA HOD-Affiliated Subspecialty Society

- SOAP complimentary meeting space at ANESTHESIOLOGY for any leadership, committee, or educational meetings
- SOAP can promote fellowship opportunities within obstetric anesthesia at ANESTHESIOLOGY to ASA medical and resident attendees.
- ASA lists SOAP on our website under "Related Organizations."
<https://www.asahq.org/about-asa/subspecialty-organizations>

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Addressing the Current Anesthesiology Workforce Shortage

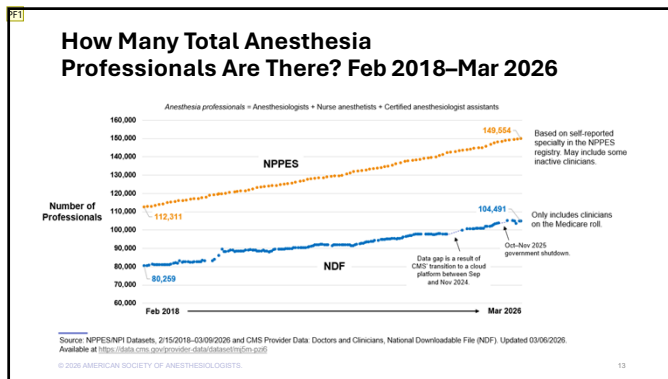
 

ANNUAL MEETING   

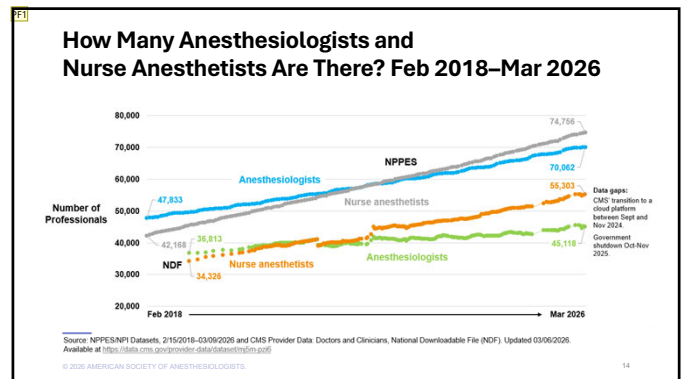
MONTREAL, QUEBEC, CANADA
LE WESTIN MONTREAL
APRIL 29-MAY 3, 2026

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

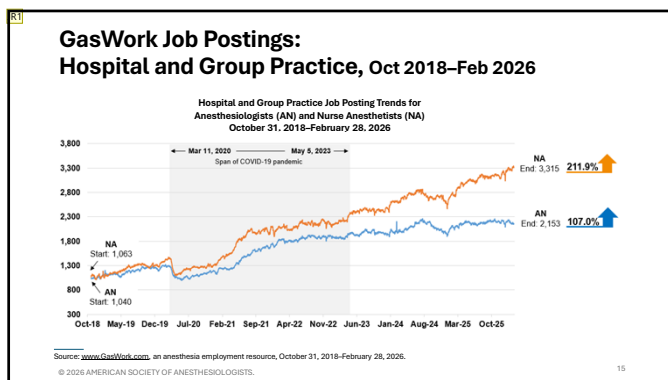
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13



14



15

ASA Workforce Initiatives

2017

- ASA's Executive Committee creates the *Center for Anesthesia Workforce Studies (CAWS)*
- CAWS leads **data-driven** workforce research to guide state and national policy

2021

- Post-COVID reports of increased pressures on an already challenged anesthesia workforce
- Rapid salary escalation for locums and non-physicians

2022 & 2023

- ASA hosts Workforce Summits I & II

2025

- Joint ASA/ASCA/SAMBA Summit **PF1**

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Workforce Summit I (2022)

Purpose

- Examine workforce challenges driven by a supply–demand imbalance
- Ground the discussion in data; define the problem clearly
- Align on priorities, solutions, and ASA's role

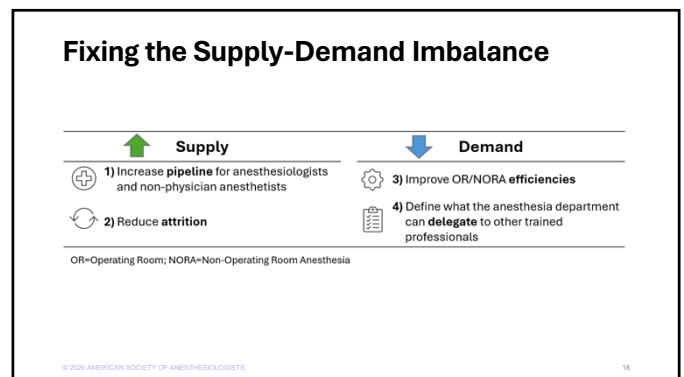
Outcome

- Shared understanding of workforce pressures
- Four workgroups launched:
 - New Training Paradigms
 - Harnessing the Workforce, incl Baby Boomers
 - OR Staffing & Efficiency
 - Anesthesiologist Utilization, NORA & Sedation Models

Anesthesia Workforce: Help! I Need Help!

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Slide 13

PF1 Does the NPPES registry reflect all the anesthesia professionals who have NPI numbers? If not, what is the source of these numbers?

Patrick Giam, MD, FASA, 2026-03-30T01:06:12.176

AB1 0 [@Jennifer Rock-Klotz] please advise

Anne Brownsey, 2026-04-02T17:44:05.745

JR1 1 Hi Dr. Giam - the NPPES is our best source of all anesthesia professionals that have an NPI. It is based on self-reporting to the NPPES, and in this dataset, represent those who have designated themselves as an anesthesia professional. Given that the information is sometimes incorrect (e.g., may include some inactive clinicians), it is likely overstated as inactive, retired, and deceased individuals are not removed in a timely manner.

Jennifer Rock-Klotz, 2026-04-03T14:42:04.377

Slide 14

PF1 Is the green line the anesthesiologists who have billed Medicare in the past 6 months? Is the blue line the CRNAs who have billed Medicare in the past 6 months?

Patrick Giam, MD, FASA, 2026-03-27T20:50:55.772

AB1 0 [@Jennifer Rock-Klotz] please see question

Anne Brownsey, 2026-04-02T17:44:25.013

JR1 1 [@Patrick Giam, MD, FASA] You are correct.

Jennifer Rock-Klotz, 2026-04-03T14:44:16.704

Slide 15

JR1 Updated as of March 2026. Double check formatting of slide footer.

Jennifer Rock-Klotz, 2026-03-23T16:30:56.175

CM1 0 [@Jennifer Rock-Klotz] are we also looking at what ASA's career center partner has for data? Mike Moran is the staff contact.

Carolyn Mensching, 2026-03-23T16:34:44.208

JR1 1 [@Carolyn Mensching] Let's keep this as is, since this is the CAWS source for "demand" of anesthesia professionals. Andy and I haven't assessed how different the career center postings are to GasWorks. But our counts are much higher than what is reported in the ASA career site.

Jennifer Rock-Klotz, 2026-03-23T16:49:53.897

Slide 16

PF1 "Joint ASA/ASCA/SAMBA Summit". Can I get an explanation of this summit? Was SOAP involved? What was discussed?

Patrick Giam, MD, FASA, 2026-03-27T20:48:34.944

AB1 0 No, SOAP was not involved, see description in notes view; if you need more detail, I'll reach out to Manny

Anne Brownsey, 2026-04-02T17:46:05.715

Slide 17

AB1 Recommend deleting, but if Dr. Giam wants to keep, defer to you

Anne Brownsey, 2026-03-23T20:04:47.459

PF1 0 I'm fine with keeping this slice.

Patrick Giam, MD, FASA, 2026-04-03T19:24:57.940

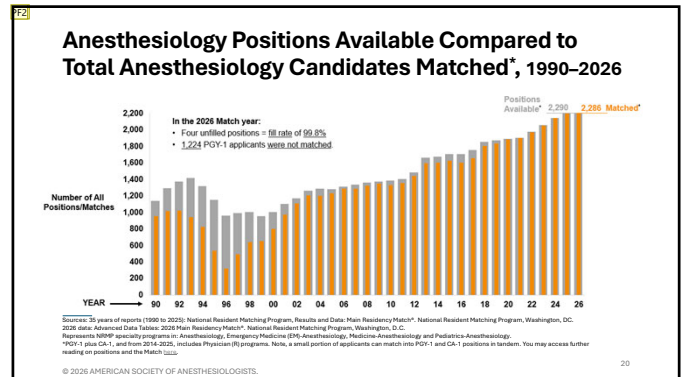
Increase Pipeline: New Training Paradigms

- Expand size of existing residencies using increased CMS GME funding. **PF2**
- Create new residencies through CMS support or hospital/practice investment
- Partner academic and community programs to grow training capacity
- Explore time-variable, competency-based training to allow earlier entry into practice. **PF3**

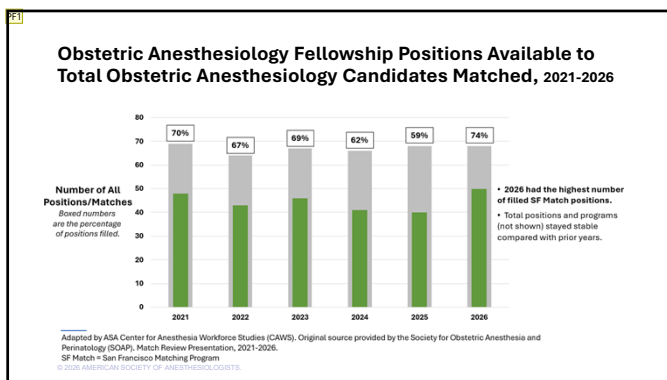
Task Force Chair: Rick Dutton, MD, MBA, FASA
Task Force Participants: Martin J. Kung, MD, Joe Szokol, MD, FASA; Tom M. McLoughlin, Jr., MD, FASA; Sherif Zafran, MD, FASA; Jonathan S. Gai, MD, MBA, MS, FASA; Robert R. Gaiser, MD, FASA

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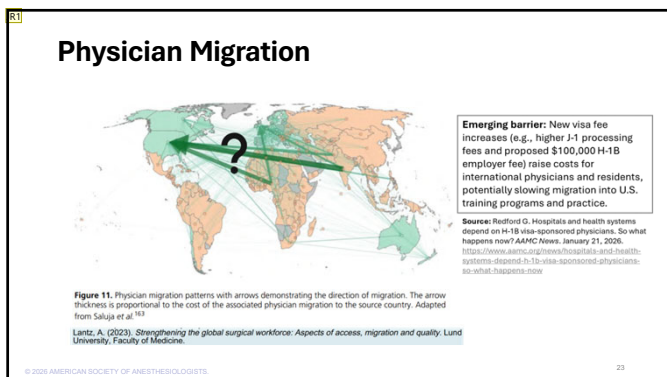
Increase Pipeline: International Resources Possible Helpful Pathways?

- Expand pathways – Increase availability of Faculty Temporary Licenses and ABA Alternative Entry Pathway slots
- Enable reciprocity – Allow certification and licensing recognition from mature systems (e.g., Canada, England, Germany, Australia)

CONCERN – May worsen global workforce shortages

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Increase Pipeline: Other Specialties

Tap into specialties with workforce surpluses or favorable economics for sedation-focused roles

- Emergency medicine
- Canadian model – FP with 1-year anesthesia residency
 - FP Anesthetists or GP Anesthetists

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Slide 19

JR1 Updated text to smart brevity format and graph is updated as of 2026 showing positions (grey fill) to matches (orange fill) bars.
Jennifer Rock-Klotz, 2026-03-23T16:44:01.537

PF2 "Expand size of existing residencies using increased CMS GME funding"
Is this actually happening? Or is CMS Funding topped out?
Patrick Giam, MD, FASA, 2026-03-27T20:54:20.803

PF3 "Explore time-variable, competency-based training to allow earlier entry into practice."

Can I get an explanation of this? Also, is this happening now, or is this theoretical at this time?

Patrick Giam, MD, FASA, 2026-03-27T20:55:01.819

JR3 0 [@Patrick Giam, MD, FASA] This slide is theoretical in that the task force from the 2022 Workforce Summit proposed this as solutions to increase the supply of anesthesiologists.
Jennifer Rock-Klotz, 2026-04-03T14:46:35.577

Slide 20

AB1 Jennifer - Please update after 2026 Match Day to reflect those numbers
Anne Brownsey, 2026-03-12T20:27:43.624

JR1 0 Updated as of 2026 match counts.
Jennifer Rock-Klotz, 2026-03-23T17:21:52.995

PF2 In 2026, I see that 2285 applicants matched for an anesthesiology residency spot. Do we know how many candidates were unable to obtain a residency spot?
Patrick Giam, MD, FASA, 2026-04-02T00:38:18.667

JR2 0 For applicants to PGY-1, PGY-2, and Physician R anesthesiology programs, we estimate that 2,034 out of 4,330 total applicants (47%) did not match. If we look at just PGY-1, 1,224 out of 3,099 applicants (40%) did not match. I have a slide that shows trends on just PGY-1 matched vs unmatched (2016-2026). I can make a slide for matched vs unmatched for PGY-1, PGY-2, and Physician R (2016-2026).

Note: NRMP's reported total applicant counts can include duplicates (i.e., applicants who match into a PGY-1 and PGY-2 in tandem), we rely on AAMC's ERAS preliminary reporting of unique applicant counts. The ERAS® preliminary applicant counts for anesthesiology programs in 2026 is 4,330 (final counts are reported in December). CAWS estimated the 2026 applicant count based on the proportion of preliminary counts to final counts in 2021 to 2025.

Jennifer Rock-Klotz, 2026-04-03T15:12:31.109

PF2 1 No need to add a new slide. The information you provided is helpful. Thanks

Slide 20 (Continued)

Patrick Giam, MD, FASA, 2026-04-03T19:27:24.835

Slide 21

PF1 Anne, what is this slide? Is this depicting OB Anesthesiology Fellowship positions? If so, is there a fellowship match for OB anesthesia? Does "SF Match" stand for Subspecialty Fellowship Match?

Patrick Giam, MD, FASA, 2026-03-23T21:36:56.365

JR1 0 [@Patrick Giam, MD, FASA] The info for this slide represents OB anesthesiology fellowship positions, and is from Dr. Stephanie Woodward who serves as a specialty director. SF Match = San Francisco Matching Program (in footnote), which is an early fellowship match system where applicants submit via SOAP. Carolyn Mensching in ASA's Resident Engagement department, thought this information would be helpful. But if you think it is not a good fit, we can remove it.

Jennifer Rock-Klotz, 2026-04-03T14:57:49.976

Slide 22

PF1 I need more information on how the international process works. Are these being affected by getting an appropriate visa? Is the licensure of International physicians a federal or state process? What about reciprocity? Is this in action, or theoretical idea only at this point?

Patrick Giam, MD, FASA, 2026-03-30T01:13:12.527

JR1 0 Like slide #17, this slide is theoretical in a solution to increase supply that the task force from the 2022 Workforce Summit proposed. They proposed that to import more anesthesiologists, changes should be made to visa laws and changes should be made to licensing and credentialing rules. See notes below the slide for further information that summarize Dr. Rick Dutton's Monitor article on the topic.

Jennifer Rock-Klotz, 2026-04-03T15:26:42.460

Slide 23

JR1 Updated to be more relevant to the current landscape of physician migration. Double check footer format.

Jennifer Rock-Klotz, 2026-03-23T15:52:58.576

Slide 24

PF1 Are primary care physicians providing sedation?

Patrick Giam, MD, FASA, 2026-03-31T00:53:56.716

AB1 0 See notes view, I think this answers your question. Jennifer did not create this slide, I believe it came from an earlier deck I worked on with Tom and Dr. Gelb.

Anne Brownsey, 2026-04-03T15:56:36.832

Training More Anesthesiologists

Scaling existing residencies

- PGY-1 expanded by > 100 positions in 2023 and 2025
 - +84 positions in 2024; +52 positions in 2026

New programs are launching nationwide (2025-2026)

- University of South Alabama Health
- Virtua Health (New Jersey)
- NYC Health & Hospitals/South Brooklyn Health
- Lehigh Valley Health Network (Pennsylvania)
- Carilion Clinic-Virginia Tech / Carilion School of Medicine
- Marshall University School of Medicine

The looming question: When is growth enough?

Source: Accreditation Council for Graduate Medical Education (ACGME), List of Newly Accredited Programs. <https://apps.acgme.org/lists/Public>
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Rapid Expansion of Nurse Anesthetist Students

Nurse Anesthesia Programs (as of March 2026)

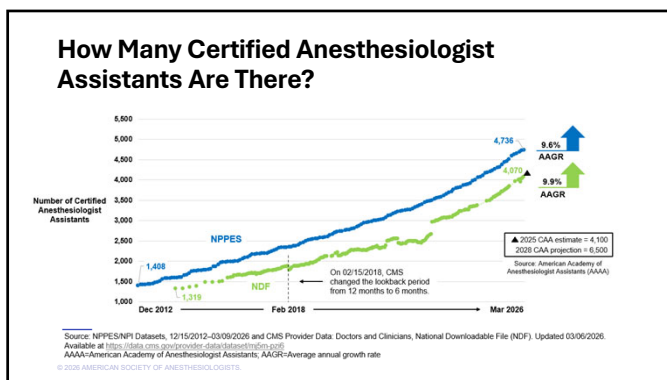
- Estimated 157 programs nationwide (up ~20% since July 2023)

CRNA Graduate Output

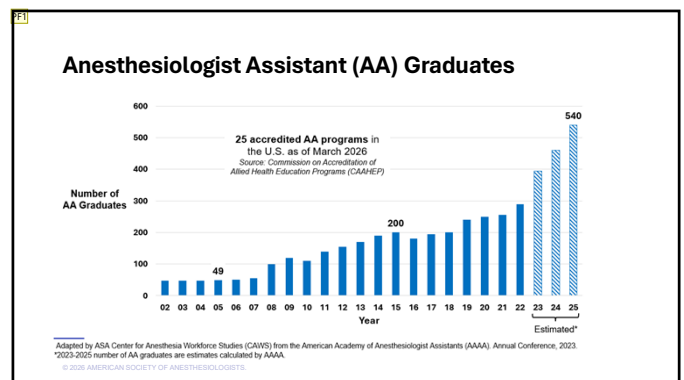
- ~3,300 new CRNAs passed the NCE in 2025
- Output rising fast: +27% NCE passers between 2021–2025
- By 2028, once new programs mature, annual NCE passers expected to reach ~3,800

Source: Brylges G. Certified Registered Nurse Anesthetists (CRNA) Talent Pool. Presentation at ASA Anesthesia Workforce Summit II, Nov 30, 2023. 9 years of reports (2021–2025). National Board of Certification and Recertification of Nurse Anesthetists. Annual NCE and SEE Report. 2026 program information: Primary research was conducted by the ASA Center for Anesthesia Workforce Studies (CAWS) through online searches and digital information gathering methods.
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Harnessing the Current Workforce Potential - Decrease Attrition

Improve recruitment and retention through identification and implementation of alternative work schedules to match provider life-work integration expectations and meet practice and community needs

- Flexible Scheduling
- Workplace Culture

Task Force Chair: Crystal C. Wright, MD, FASA
Task Force Participants: Litan Kohn, MD, MBA, FACHE, FASA, Matt Meloney, MD, FASA, John Di Capua, MD, Michael Lewis, MD, FASA, Phillip J. Richardson, MD, MBA, FACHE, FASA, Shene J. Scott, MBA, FACME
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Harnessing the Current Workforce Potential

Flexible Schedules

- Shift models that balance practice needs
 - Night float
 - Late morning start
 - Weekend only coverage

FTE Flexibility

- Incorporate job-sharing arrangements
 - 4 sharing 3 positions, 3 sharing 2 positions
 - Reduced FTE (e.g., 0.8)
- Fixed hours, no call
- Additional vacation weeks without pay

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Slide 25

JR1 Updated with 2026 positions and list of new programs listed on the ACGME website.

Jennifer Rock-Klotz, 2026-03-23T16:00:24.640

Slide 26

JR1 Updated with data as of March 2026.

Jennifer Rock-Klotz, 2026-03-23T16:15:07.158

PF1 0 Can we add some slides on the CAA programs and their workforce situation?

Patrick Giam, MD, FASA, 2026-03-23T21:38:22.382

JR1 1 Hi Dr. Giam. Please see the two slides after this one with CAA supply trends and AA graduate trends.

Jennifer Rock-Klotz, 2026-03-23T23:18:07.313

Slide 28

PF1 How many different states allow AAs to practice?

Patrick Giam, MD, FASA, 2026-03-27T21:07:10.690

JR1 0 CAA's are authorized to practice in 24 jurisdictions: 22 states, Washington, DC, and the US Territory of Guam. CAAs may practice at any Veterans Affairs facility in all 50 states.

I can include a slide with a state map from the AAAA if needed.

Jennifer Rock-Klotz, 2026-04-03T15:15:05.778

PF1 1 not necessary, but thank you

Patrick Giam, MD, FASA, 2026-04-03T19:39:14.232

Harnessing the Current Workforce Potential

Critical Elements of Workplace Engagement:

- Professional Development
- Autonomy
- Social Support/Belonging
- Civility

Independent Contractors

Workplace Culture

- Leadership a key factor
- Psychological Safety
- Camaraderie
- Measure Staff/Clinician Turnover
- Measure Staff/Clinician Satisfaction and Engagement



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Areas of Worklife Survey

- Developed by Michael Leiter
- Provide organizational context for burnout – When an “Imbalance” in expectations occurs
 - Workload
 - Control
 - Reward
 - Community
 - Fairness
 - Values
- Can be thought of as 6 factors that contribute to burnout and attrition

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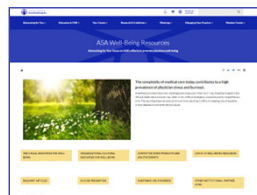
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ASA Well-Being Resources

- ASA created the Committee on Physician Well-Being in 2019
- Offers resources for a wide range of well-being needs:
 - Individual Resources
 - Organizational/Cultural Well-Being Resources
 - Committee Work Products and ASA Statements
 - Suicide Prevention
 - Substance Use Disorders
 - And links to well-being apps, podcasts, and much more

asahq.org/advocating-for-you/well-being



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Clinician Well-Being Resources

- The SafeHaven™ program offers **confidential**:
 - Peer coaching
 - Concierge services
 - Behavioral health resources
- ASA collaborates with VITAL WorkLife to deliver program services
- Yearly subscription provides confidential well-being resources for you **and** your family members



Enroll in SafeHaven today.

Learn more: asahq.org/safehaven

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Reduce Demand: Staffing and Efficiency in the OR

- Ensure effective scheduling and the appropriate use of ORs and the associated professional resources (anesthesiologists, clinical staff, and supporting staff)

Task Force Chair: Kathy Gitchink, MD, MS, FACS
Task Force Participants: Joe Szokol, MD, FASA, Jay Mesrobian, MD, MBA, FASA, Mark Hudson, MD, MBA, Mitchell Tsai, MD, FASA, Steven Schulman, MD, MBA, FASA, Patricia Mack, MD, FASA

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Staffing and Efficiency in the OR

Key Recommendations:

- Incorporate anesthesiologists in OR schedule development
- Advocate for additional staff to support the anesthesia care team (e.g., pharmacists, anesthesia technicians)
- Implement pre-procedure optimization programs to improve patient care, drive efficiency, and reduce waste

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Slide 32

PF1 Anne, after this slide, would you please add a slide showing ASA Wellness resources?

Patrick Giam, MD, FASA, 2026-03-31T02:18:47.258

AB1 0 done

Anne Brownsey, 2026-04-02T17:56:04.523

Anesthesiologist Utilization, NORA, and Sedation Models

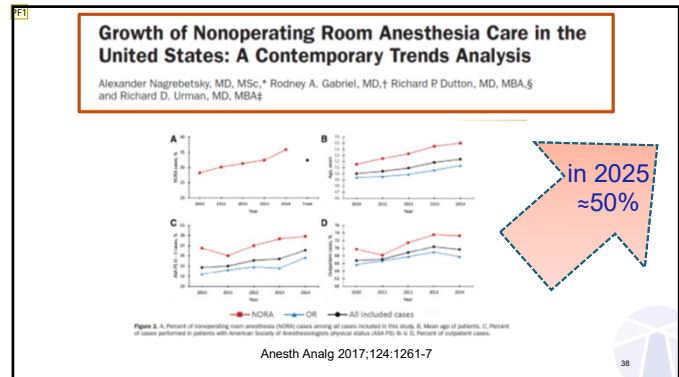
- Promote the appropriate and effective use of anesthesiologists based on patient case and surgical acuity while preserving patient safety
- Enhance the effective provision of sedation services
- Key Recommendations:**
 - The Director of Anesthesia Services, or designee, should be involved in planning for NORA services as well as the day-to-day operational management to ensure appropriate use of resources (personnel) to ensure patient safety and efficiency

Task Force Chair: Bassem Abdelmaks, MD, FASA

Task Force Participants: Mohammed Minkaj, MD, MBA, FACHE, FASA
David Martin, MD, PhD, FASA, Donald Arnold, MD, FASA, Tetian Uejima, MD, MMM, FAAP, CPHRM, Ryan M. Chadha, MD

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New ASA Recommendations for NORA Scheduling

- System-based triage of patients to anesthesiology services vs. procedural sedation
- Similar principles of capacity coordination and data analytics to drive optimization of perioperative services delivery
- Cases should be scheduled as in the main OR to facilitate integration into the electronic anesthesia record system

<https://www.asahq.org/standards-and-practice-parameters/statement-on-nonoperating-room-anesthesia-services>

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New ASA Recommendations for NORA Scheduling (continued)

- Scheduling in a manner to enable personnel assignments, improve efficiency, and provide the means to track clinicians' clinical activities
- Constant awareness of locations of all anesthesia cases
- Scheduling inpatient and outpatient complex procedures during standard resource hours to support safe care

<https://www.asahq.org/standards-and-practice-parameters/statement-on-nonoperating-room-anesthesia-services>

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ASA-Endorsed Legislation

- Endorsements and Support**
 - H.R. 2028, the Resident Education Deferred Interest (REDI) Act**
 - Permits residents to qualify for interest-free deferment on their student loans while serving in a medical or dental internship or residency program
 - S. 2439/ H.R. 4731, the Resident Physician Shortage Reduction Act**
 - Funding for 14,000 additional residency positions
 - S. 1380, the Specialty Physicians Advancing Rural Care (SPARC) Act**
 - Authorizes a loan repayment program to encourage specialty medicine physicians to serve in rural communities experiencing a shortage of specialty medicine physicians

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Can We Meet Demand? YES, but....

- It will take time.**
 - ASA will continue to advocate for increased CMS GME funding and additional residency programs
 - ASA's Center for Anesthesia Workforce Studies (CAWS) will continue to track and communicate trends
 - ASA will provide case examples and recommendations around:
 - Strategies to reduce burnout, help enhance physicians' work-life integration, and enhance the professional work environment
 - Best practices for efficient and effective staffing and scheduling in the operating room and NORA requiring anesthesia

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Slide 38

PF1 I need help understanding this slide. Is this slide saying that in 2017, NORA cases were 37% of all anesthetic cases? And 9 years later, NORA is 50% of all anesthetic cases?

Patrick Giam, MD, FASA, 2026-03-30T01:30:33.594

AB1 0 See notes, if notes don't answer your question I'll reach out to Dr. Abdelmalak

Anne Brownsey, 2026-04-02T17:57:24.844

PF1 1 Oh, I see it now. No need to contact Dr. A.

Patrick Giam, MD, FASA, 2026-04-02T18:33:30.961

The Future



ASA AFFILIATED
SUBSPECIALTY SOCIETY

ANNUAL MEETING
MONTREAL, QUEBEC, CANADA
LE WESTIN MONTREAL
APRIL 29-MAY 3, 2025

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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Multiple Forces Creating Increased Demand

- Aging population leading to more surgery
- Increasing complexity of patients and surgery/procedures requiring physician anesthesiologist expertise
- Increasing supply of proceduralists: Non-operating room anesthesia (NORA) – Gastroenterology, Interventional Radiology, and EP Cardiology

Primary Specialty	2025	% Change 2015–25
Anesthesiologist	42,049	17.4
Nurse Anesthetist	53,996	47.6
Anesthesiologist Assistant	3,762	151.5
Total Anesthesia Clinicians	99,807	35.1
Interventional Cardiology, Interventional Radiology, and Cardiac Electrophysiology	9,658	114.3
Surgical Oncology	1,298	52.7
7 Specialties with Growth > Anesthesiology but < Overall Anesthesia	30,724	21.4
10 Specialties with Growth < Anesthesiology	119,645	1.5

Source: Developed by CAWS based on CMS National Downloadable Files; clinicians billing Medicare.

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Who Will the Anesthesia Professionals Be?

- Need a sustainable global anesthesia workforce to improve outcomes
- Expand the number of specialist physicians where possible and indicated
- Not enough specialist physician anesthesiologists globally
- Non-specialist physicians an excellent alternative in rural areas, but insufficient number in most countries
- Advantages of properly trained non-physician anesthesia practitioners:
 - Shorter training in low resource environments
 - Can extend expertise of specialist physicians when working in cooperative team

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Anesthesiology Workforce Article

- Anesthesiology posted an article in June titled, "Closing the Chasm: Understanding and Addressing the Anesthesia Workforce Supply and Demand Imbalance"
- Included in August 2024, Anesthesiology
- Result of ASA workforce summits, June 2022 and November 2023
- News release garnered articles in medical trade press
- The authors spoke during a session at 2024 annual meeting in Philadelphia



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Workforce Article



Original Contribution

United States' anesthesia workdays in 2022–2023 – Implications for national workforce assessments

Franklin Dexter, MD PhD FASA^{1,2}, Richard H. Epstein, MD FASA³, Richard P. Dutton, MD MBA⁴

¹Department of Anesthesia, University of Iowa, United States of America
²Department of Anesthesiology, Perioperative Medicine and Pain Management, University of Miami, United States of America
³US Anesthesia Partners, and Department of Anesthesiology, University of Maryland School of Medicine, Large, MD, United States of America

HIGHLIGHTS

- The 2012–23 proportional increase in US anesthesia clinicians exceeded the increased cases, despite many groups reporting "shortages."
- Among all anesthesia clinicians nationwide in 2022–23, 82.2% were on regular workdays and before 1:00 PM, 23.0% to 37.0% (P < .0001) from 2013.
- 79.2% were regular workdays from 7:00 AM to 3:29 PM, 79.3% to 91.0% (P < .0001) from 2013, and 31.0% to 50.0% (P < .0001) versus 50.0%.
- Overall, nationwide anesthesia cases show workdays of less than 8 h, finishing considerably earlier than in 2013.
- The demand for daily numbers of clinicians at the start of regular workdays contributes to perceived workforce shortages.

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Anesthesiology Workforce Advocacy

Advocate for a robust and resilient anesthesia workforce

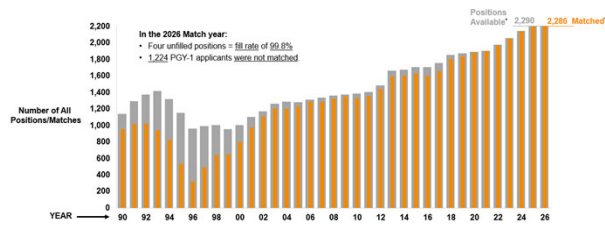
- Grow the number of federal funded residency slots
- Expand federal programs providing loan relief
- Address restrictive federal loan provisions in the OBBA

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Anesthesiology Positions Available Compared to Total Anesthesiology Candidates Matched*, 1990–2026



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We Don't Always Get This Right

- In 1994 ASA commissioned a study of future anesthesia personnel requirements from Abt Associates, Inc.
- Abt used a complex model incorporating assumptions of future efficiency and different care models
- Reported need under various scenarios; clearly stated impossibility of predicting which would come to pass
- Painted a grim picture of imminent anesthesiologist oversupply of 30%
- Worst outcome was interpretation by medical schools and students

“It’s tough to make predictions, especially about the future.”

–Yogi Berra

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We Don't Always Get This Right (continued)

THE WALL STREET JOURNAL.

1995-03-17

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Numb and Number: Once a Hot Specialty, Anesthesiology Cools As Insurers Scale Back -- Health-Care Workers Find Fewer Jobs, Lower Pay In Era of Cost-Cutting -- Working Harder for \$100,000

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Thank You

Patrick Giam, MD, FASA

ASA President

president@asahq.org

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Society for Obstetric
Anesthesia and Perinatology

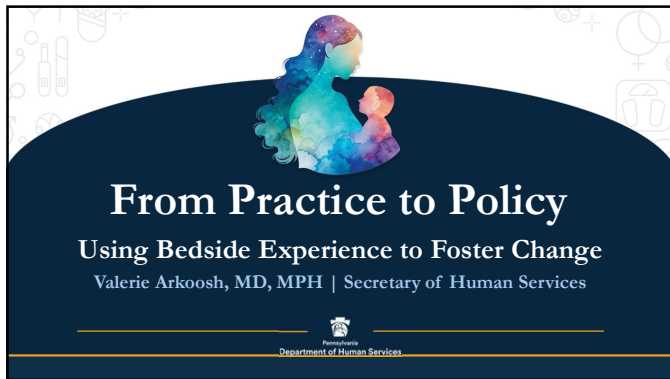
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SUBSPECIALTY SOCIETY

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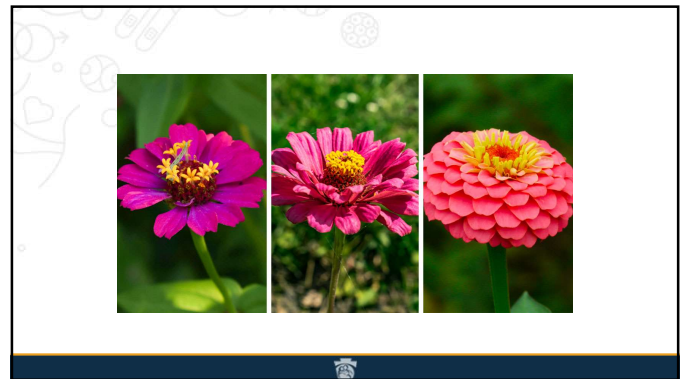
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How do we work upstream?

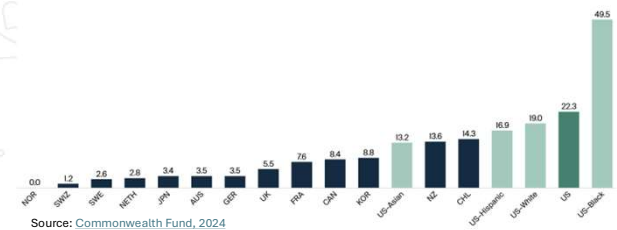
- Better utilizing our Medicaid program to support prevention and creatively remove barriers to good health, like:
 - Allowing street medicine providers to bill Medicaid to support their outreach and care delivery.
- Launching PA Navigate - a closed-loop referral system that connects health care providers with non-profits/social services across the Commonwealth
- And on March 31st, we released the Shapiro Administration's maternal health strategic action plan – Healthy Moms, Vibrant Futures



7

The United States continues to have the highest maternal death rate, with the rate for Black women by far the highest of any group.

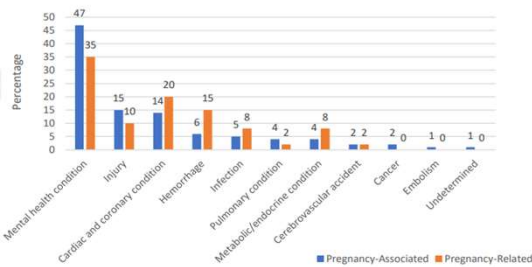
Maternal deaths per 100,000 live births



Source: Commonwealth Fund, 2024

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Percentage of Leading Causes of Death for 2021 Pregnancy-Associated and Pregnancy-related Deaths in PA (n=129)



Source: Pennsylvania Department of Health, 2025

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Healthy Moms, Vibrant Futures

- Envisions a Pennsylvania where every pregnant and birthing person has easy access to high-quality perinatal, birth and postpartum care that is:
 - Person-centered
 - Comprehensive
 - Equitable
 - Affordable
- Results in improved birth outcomes and long-term good health and wellbeing.



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Healthy Moms, Vibrant Futures

- Focuses on five identified maternal health priorities:
 - Improving detection and treatment of behavioral health conditions, including both mental health and substance use disorders;
 - Improving coordination and access to care in rural areas and maternity care deserts;
 - Increasing access to high-quality care;
 - Integrating initiatives to address health-related social needs into health care; and,
 - Expanding and diversifying the maternal health workforce



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Healthy Moms, Vibrant Futures

- Implementation of plan is underway in partnership with the Perinatal Action Collaborative (PAC)
- PAC comprised of 150 members from across Pennsylvania, diverse backgrounds and experiences
- PAC teams focused on five key areas of focus; developed 15+ actionable strategies for priorities and coordinating with local partners
- Five year grant from the United States Health Resources & Services Administration (HRSA) supporting portions of this work



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PAC Grantees

- Increasing Access to High Quality Care
 - Franklin Pediatrics
 - Services for baby AND postpartum mom
 - Fabric Health
 - Services at laundromats
- Improving rural health and maternity care deserts
 - University of Pittsburgh School of Pharmacy MOMENTUM program
- Supporting behavioral health and substance use disorder needs
 - Phia Health
 - Statewide behavioral health platform
 - Doula apprenticeship program
 - First in the United States!

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Women's Health Services Program

- Launched in 2024, funds 6 regional leads providing a diverse array of reproductive health and perinatal screenings, care, and education.
- In first two years:
 - Menstrual supplies distributed to more than 32,000 clients.
 - Diapers distributed to 25,800 clients.
 - 61,000 sexually transmitted infection tests performed, including at-home tests provided.
 - More than 12,400 pregnancy tests performed.
 - 42,520 screenings conducted for substance abuse, chronic disease, wellness.
 - Care navigation was provided to nearly 10,000 clients.
 - Education was provided to more than 2,800 clients on pregnancy, childbirth, parenting, lactation, and STIs through workshops or one-on-one consultations

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Medicaid & Healthy Moms, Vibrant Futures

- Expanding access to doula care for additional supports during pregnancy and postpartum
- Doulas serve as advocates and educators
 - Help pregnant people prioritize their needs and experience
- Shown to improve maternal health outcomes
 - Especially important for people of color
- Pennsylvania first state to secure a registered apprenticeship program for doulas

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Looking to Future: Investments in Health

- OBBBA signed into law in 2025 will create fiscal pressures on all state Medicaid programs including our own
 - More important than ever to make smart, targeted investments to address drivers of health and health care spending
- Non-clinical social determinants of health drive **up to 80 percent of health care spending**
- 1115 Waiver – pathway to support time-limited pilots for innovation in states' individual Medicaid programs.
- Governor Shapiro has proposed **\$2.8M in SFY '26-27 (\$7.5M total with federal matching funds)** to make critical investments in health and bring new tools to Pennsylvania
 - National research, local pilot programs, and lessons from other states show how new tools in our Medicaid program can reduce avoidable, expensive health care use and improve quality of life

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Investments in Health: Reentry Supports

Goal: Improve transitions to communities, fostering success and healthier outcomes.

THE OPPORTUNITY

- Serious health conditions like Substance Use Disorder (SUD) and Serious Mental Illness (SMI) lead to high rates (12x) of overdose, criminal justice involvement, and recidivism
- Bipartisan SUPPORT Act of 2018 led to a new waiver opportunity to improve reentry by leveraging federal resources through Medicaid
- Reduce overdoses, recidivism and avoidable hospital use
- Improve public safety and set returning citizens up for success

NEW TOOLS

- Reactivate Medicaid up to 90 days prior to release
- Provide **intensive case management and SUD care** that continues post-release
- Serve highest risk returning citizens with SUD, SMI, serious chronic illness, autism and those who are pregnant/recently pregnant

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Investments in Health: Reentry Supports

- Start pre-release services 90 days prior to release with a focus on:
 - Substance use disorder care
 - Intensive case management with warm handoffs to post-release, community-based care to address clinical and social needs
 - Partner with home counties
 - Reduce some of the largest barriers to success following reentry
 - Facilitate transition to Medicaid managed care plan
- Drive improvements in health outcomes:
 - Reduce overdose deaths
 - Reduce recidivism
 - Improve public safety
 - Set people up for success and a productive future back in their community.



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Investments in Health: Housing Supports

Goal: Opportunities for stable housing as a **foundation for overall health and well-being.**



THE OPPORTUNITY

- Homelessness and poor health outcomes are linked
- Housing supports focused on high-risk populations:
 - Decrease ED and hospital visits by 25-30%
 - Save \$1.30 for every \$1 spent
- We can make investments in health to support some of the highest risk, highest cost populations to improve outcomes

NEW TOOLS

- Connect people to existing housing supports and services.
- Provide help during transitions with moving expenses and necessary household items.
- Provide short-term help paying rent.
- Provide education and support to keep housing.

THE OPPORTUNITY

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- Housing supports focused on high-risk populations:
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NEW TOOLS

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- Provide help during transitions with moving expenses and necessary household items.
- Provide short-term help paying rent.
- Provide education and support to keep housing.

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Investments in Health: Housing Supports



- More than 1 million Pennsylvania households spend over 30% of their income on housing
- Statewide roadmap to increase housing supply, lower costs, and stabilize housing outcomes.
- Address rising housing instability and homelessness
- Provide pathways to housing stabilization and sustainability

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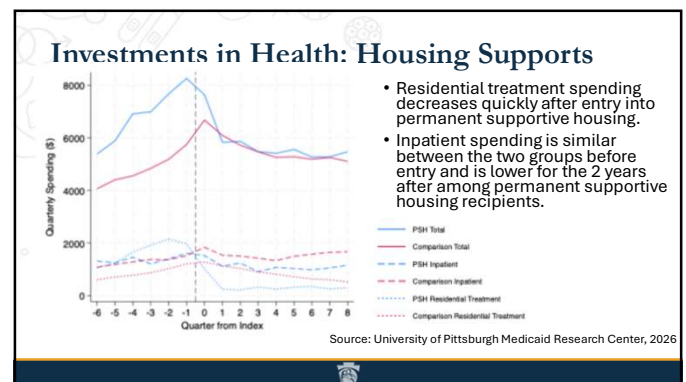
Investments in Health: Housing Supports

- Launch regional pilots including urban and rural communities – evaluate and learn before expanding**
- Focus on highest risk populations with clinical needs and experiencing homelessness
 - Serious Mental Illness, Substance Use Disorder, Pregnancy
 - Incarcerated and at risk of homelessness with one of the above conditions or a serious chronic condition
- Services focused on finding and sustaining housing
 - Case management & benefit enrollment, housing navigation, tenancy supports & eviction prevention
 - Transition supports (e.g., utilities, deposits)
 - Short-term rent support up to six months

Chronic Health Conditions:

- Active cancer with current chemotherapy or radiation treatment
- End-stage renal disease with active dialysis
- Chronic pulmonary disease requiring oxygen
- Type 1 diabetes
- Type 2 diabetes requiring at least one injectable insulin/day.

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Investments in Health: Housing Supports

- Over 12,000 Pennsylvanians are experiencing homelessness on any given day (2024)
- Our estimates indicate their medical spending is about 50% higher than otherwise similar housed individuals (\$4,463 per person per year)
 - If all were enrolled in Medicaid, this would indicate \$53.6 million in excess spending per year
- Permanent supportive housing appears to reduce spending by over \$7,400 per enrollee per year relative to those who do not receive permanent supportive housing
 - Most of this is driven by reductions in residential treatment and inpatient spending
 - Results are consistent across populations

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Investments in Health: Food is Medicine

THE OPPORTUNITY

- Food is Medicine is a widely recognized as strategy to prevent, manage and treat disease
- History of small but strong partnerships across the Commonwealth
- Data shows that programs can decrease ED and hospital visits
- We can make investments in food to support those with high-risk conditions like cancer and heart failure and support healthy pregnancies

NEW TOOLS

- Targeted short-term interventions that create a bridge through a critical high-risk period
- Focusing on medically tailored meals for up to six months
- Focus on those with food insecurity and high-risk conditions



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Investments in Health: Food is Medicine

- Build on successful pilot programs with Medicaid MCOs and health systems across the Commonwealth
- Leverage Rural Health Transformation Program opportunities related to nutrition
 - Plan to establish Community Wellness Hubs in rural communities that can drive Food is Medicine program adoption and other nutrition strategies
- Future financial pressures call for investments in health that can have health and financial benefits



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Investments in Health: Food is Medicine

- Food insecurity + high-risk conditions → poor outcomes, high cost
 - SNAP loss has been shown to drive up Medicaid spending among people with diabetes by over \$250 per month
 - Nearly half of people admitted with heart failure have **malnutrition** which is associated with higher risk of death and longer hospital stays
- Food is Medicine programs can:
 - Improve health outcomes for high-risk conditions
 - Decrease avoidable health care use (reduce hospital admissions and ED visits by 50%)
 - Reduce cost (16% median cost reduction)
 - Build relationships between nutrition and health care providers
 - Reduce food insecurity among high-risk individuals



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Investments in Health: Food is Medicine

- **Launch with urban and rural regional pilots – evaluate and learn before expanding**
- Focus on highest risk populations with diet sensitive conditions and food insecurity
 - Approved for: congestive heart failure, end stage renal disease, diabetes (including gestational diabetes), cancer with active chemotherapy
- Medically Tailored Meals for up to 6 months
 - Fully prepared meals approved by a dietitian tailored to a specific medical condition
 - Up to 14 meals per week



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Investments in Health: Food is Medicine

- North Carolina's Healthy Opportunities Pilots showed over **\$1,000 per person savings in the first year (JAMA 2025)**
 - Economic benefits to surrounding communities and farmers and critical infrastructure during a natural disaster
 - Pay off was seen within 8 months
- Food insecurity among those with diet sensitive conditions drives up spending
 - Loss of SNAP increases Medicaid spending among those with diabetes by over \$250 per month (Pitt MRC)



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Impact: A Three-legged Stool

- Public service (elected or government service)
- Research
- Advocacy



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Slide 29

AV1 [@Fogarty, Ali] Please add 3 bullets next to the stool photo:

- Public Sector / Elected office
- Research
- Advocacy

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Program Material

Friday, May 1, 2026

Opening Remarks

Speaker: Dan Katz, MD – Annual Meeting & Live Events Committee Chair

SOAP/FAER MRTG Update

An Introductory Overview, Emphasizing Rationale, Objectives, Planned Methods, and Anticipated Outcomes

Speaker: Brittany Burton, MD

Workshop (fee & pre-registration required)

Trauma Informed Care

Moderator: Tracy Vogel, MD

Faculty: Anjum Anwar, MD; Joanna Koutanis, MD; Cristina Wood, MD; Katie Seligman, MD

Tracking Maternal Mortality: From Data Collection to Impact

Panelists: Kokila Thenuwara, MD; Holly Ende, MD; C. LaToya Mason, MD; Michaela Farber, MD

Awake and in Pain: Addressing a Crisis in Obstetric Anesthesia

Moderator: Caitlin Sutton, MD

Panelists: Alex Butwick, MD; Heather Nixon, MD; Cristina Wood, MD; Tracey Vogel, MD

SNAP TALKS: Are you convinced it is broken? How do you fix it?

- When to replace the epidural when transitioning to cesarean delivery (should we revisit the safety of spinals) - Tiffany Angelo, MD
- When to convert to General Anesthesia - Sharon Reale, MD
- Adjuncts to spinal/epidural anesthesia during Cesarean Delivery - Brendan Carvalho, MD

Concurrent Sessions

SOAP Research Network Symposium

Concurrent Sessions

SOAP/SOCCA Panel

Crashing Postpartum: Navigating Hemodynamics in the First 24 Hours

- Point-of-Care Ultrasound to Guide Volume and Cardiac Assessment - Ioannis Angelidis, MD, MSPH
- Fluid Shifts and Vasoplegia: The First 12–24 Hours Postpartum - Bushra W. Taha, MD
- Postpartum Hypotension: Diagnosing the Underlying Cause - Megan Hicks, MD

Concurrent Sessions

Updates in Obstetric Hemorrhage

Moderator: Leziga Obiyo, MD

Panelists: Holly Ende, MD; Naida Cole, MD; Jessica Ansari, MD; John Kowalczyk, MD

Anesthetic Management of Fetal Interventions

Moderator: Mark Rollins, MD

Panelists: Dave Berman, MD; Caitlin Sutton, MD



Determinants of Health and Machine Learning for Healthcare Utilization in Obstetric Care

Brittany Burton, MD, MHS, MAS
 Assistant Professor *in Residence*
 Department of Anesthesiology & Perioperative Medicine
 Department of Health Policy & Management
 University of California, Los Angeles

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1

Disclosures

- No disclosures to report

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2

Why this Matters?

- Maternal mortality in the United States **increased by 144% (1999-2021)**
- Approximately 80% of pregnancy-related deaths are preventable**
- Prevention depends on timely access to care and effective care delivery
- Social determinants of health impact**
 - Access to care
 - Care utilization
 - Care delivery environments
- Social determinants of health drive inadequate health care utilization, a key pathway to preventable maternal harm**

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The Problem

What the literature shows

- Individual-level SDOH impact maternal outcomes
 - Large emphasis on race and ethnicity as proxies for SDOH
 - Focus is primarily on clinical outcomes (i.e., SMM)

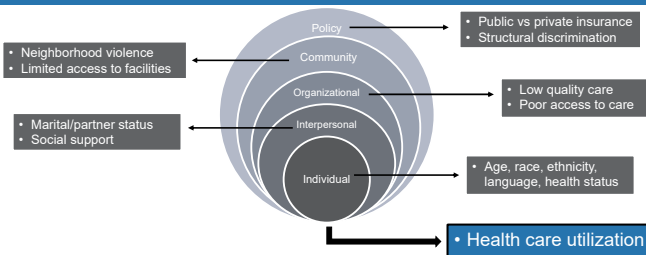
What remains understudied

- Broader multi-level SDOH (e.g., interpersonal, organizational, community, health policy)
- How barriers or healthcare are experienced
- Process measures, including healthcare utilization
 - Missing visits, delayed care, limited access to subspecialty services

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4

Conceptual Framework: Socio-Ecological Model



Policy

- Public vs private insurance
- Structural discrimination

Community

- Neighborhood violence
- Limited access to facilities

Organizational

- Low quality care
- Poor access to care

Interpersonal

- Marital/partner status
- Social support

Individual

- Age, race, ethnicity, language, health status

Health care utilization

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5

Study Rationale

Specific Aim 1

- Existing research **emphasizes individual-level risk factors** and clinical outcomes, with limited integration of multi-level SDOH
- A **conceptual framework** is needed to **characterize how determinants across** individual, interpersonal, organizational, community, and policy levels shape maternal health outcomes

Specific Aim 2

- Social barriers influence maternal outcomes through healthcare processes**, but these pathways are not well measured or understood
- Healthcare utilization represents a measurable manifestation of these barriers and an early signal of risk

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Specific Aims

Aim 1: To study the association between social determinants of health and maternal health outcomes, using national data

Aim 2: To develop a prediction model for inadequate healthcare utilization in pregnancy, using data from a large academic center

Abbreviations:
 Epic: electronic health record for UCLA
 ACS: American Community Survey
 AUC: area under the curve

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Data

- Aim 1: National & State Data (AHRQ)**
 - All-payer, representative datasets
 - Includes:
 - Patient demographics
 - Clinical diagnoses and procedures and hospital characteristics
- Aim 2: Electronic Health Record (UCLA)**
 - Detailed, longitudinal clinical data
 - Includes:
 - Perinatal healthcare utilization
 - Patient demographics, diagnoses, and procedures

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Planned Methods

- Aim 1: National & State Analyses (AHRQ)**
 - Retrospective cohort of delivery hospitalizations
 - Outcomes:
 - Severe maternal morbidity, mortality, LOS, readmission
 - Predictors:
 - Multi-level social determinants (patient, community, hospital)
 - Analyses:
 - Multilevel regression models, generalized linear models
 - Patients nested within hospitals

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Planned Methods

- Aim 2: EHR-Based Modeling (UCLA)**
 - Retrospective cohort of pregnant patients receiving care at UCLA
 - Outcome: Inadequate healthcare utilization
 - Missed visits
 - Delayed entry into prenatal care (care after first trimester)
 - Delayed or incomplete care (prolonged time between visits)
 - Subspecialty referral gaps (referral placed but not attended)
 - Predictors: Clinical, social, & demographic factors
 - Analyses: Development of prediction models with **traditional regression and machine learning**

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Anticipated Outcomes

- Determine the contribution of patient-, hospital-, and community-level factors to maternal harm
 - Inform where interventions will have the greatest impact*
- Enables proactive identification of patients at risk of inadequate use of healthcare services
 - Support earlier and more equitable intervention*
- Shifts the focus from downstream outcomes to upstream care processes that drive preventable maternal harm*

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Thank you

- SOAP-FAER
- Department of Anesthesiology & Perioperative Medicine, UCLA
- Mentors
 - Keith Norris, MD, PhD
 - Christina Han, MD
 - Maxime Cannesson, MD, PhD
 - Rodney Gabriel, MD, MAS
 - Eilon Gabel, MD
 - Mansoureh Eghbali, PhD
- Collaborators & colleagues
- Family & friends

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Maternal Mortality : From Data Collection to Impact

1

Into the Darkness

She disappeared into the darkness.
Where was she going? Who was she running from?
No suitcase, no shoes—
toes stubbed on rocks and roots.
A newborn's face, sleeping peacefully, eyes shut.
She deserves better than me. I'm no mother.
That's what they all say; it's no matter.
She steps on broken glass, blood dripping from her toe.
He is horrid, and drinking was his woe.
She had no choice until now.
She steps over shrubs and fallen boughs.
At the edge of the river—
we have failed her.
Please stop. Think. There must be a solution
before we fail her again.

2

Learning Objectives

- History and evolution of maternal mortality data collection in the US,
- Standardized process of abstracting information surrounding maternal deaths
- Maternal mortality data globally, nationally
- The anesthesiologist's role in prevention

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Speakers



Holly Ende, MD
Vanderbilt



Michaela Farber, MD
Mass General Brigham



Michelle Simon, MD
Yale



Kokila Thenuwara, MD
University of Iowa

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Disclosures

- Thenuwara – None
- Ende – Chief Medical Advisor, Vasowatch Inc.
- Simon –
- Farber –

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Timeline and evolution of MMRCs



- Turn of century**
All states mandate vital records keeping
- 1930's**
Larger cities like New York City, Philadelphia start maternal mortality review committees locally
Narrow preventative focus
- 1950s post WWII**
States form more formalized, multidisciplinary MMRCs, under state administrative codes
Greater emphasis on prevention and public health
- 2019-Present**
Modern MMRC, under Federal ERAS HM grant support
More standardized approach to prevention of maternal deaths
Emphasis on social drivers, health equity, and problems such as obesity, mental health, SUD, and

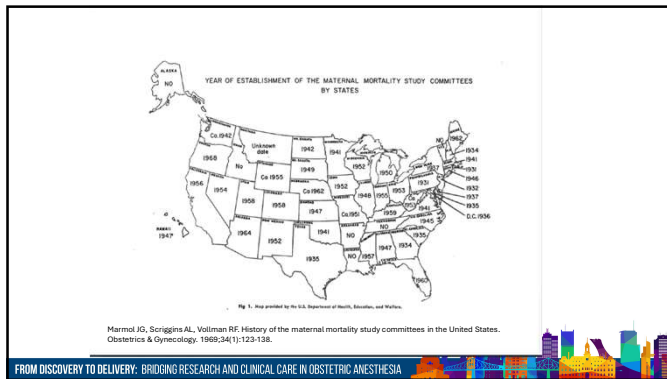
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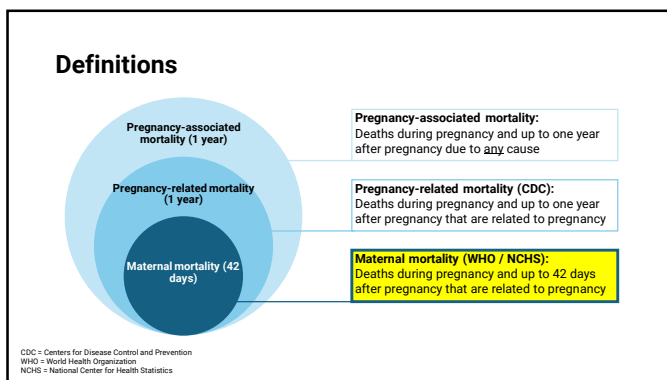


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Definitions

- Pregnancy-associated death** is the broad category covering all deaths occurring during pregnancy or within **one year** of the end of pregnancy, regardless of the cause.
- Pregnancy-related death** is a subset referring specifically to a death that occurred during pregnancy or within one year of the end of pregnancy from a cause related to or aggravated by the pregnancy or its management.
- Pregnancy-associated but not related death** refers to deaths that occurred within that timeframe but were not caused by the pregnancy, such as accidental or homicide deaths.

8



9

Key Roles of MMRCs

- Comprehensive Review:** Examine pregnancy-related deaths to determine causes and determine whether they were preventable.
- Data-Driven Recommendations:** Identify trends and recommend clinical or social improvements to prevent future deaths.
- Systemic Improvement:** Focus on factors like structural racism, access to care, and quality of services to improve health outcomes.
- Diverse Input:** Include experts, including obstetricians, anesthesiologists, forensic pathologist, Psychiatry esp with Opioid Addiction expertise, nurses, midwives, doulas, social workers, EMS crew members, Police chief, domestic violence specialist, epidemiologists, abstractors, informant interviewers, HHS leaders, to ensure diverse perspectives.
- Confidentiality Protection:** Ensure the protection of data and committee proceedings, preventing them from being used for lawsuits.

<https://www.acog.org/advocacy/policy-priorities/maternal-mortality-prevention/issue-brief/maternal-mortality-review-committees>

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ERASE and the goal of standardized process of abstracting information surrounding maternal deaths

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ERASE MM

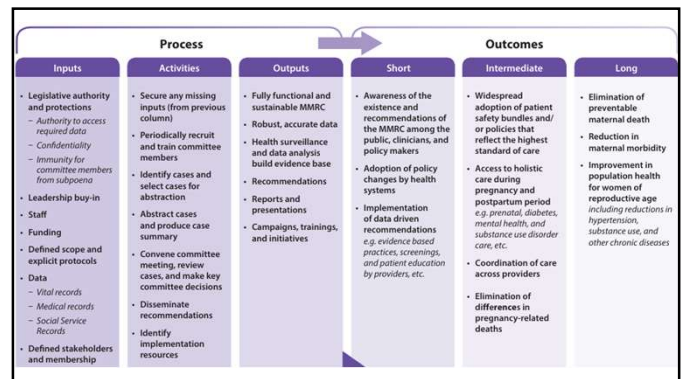
Enhancing Reviews and Surveillance to Eliminate Maternal Mortality

- National initiative launched 2019
- Supports agencies and organizations that coordinate MMRCs
- Objective = identify and characterize maternal deaths to find prevention opportunities
- Drivers → Recommended interventions → Implementation

CDC

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The diagram illustrates the MMRIA (Maternal Mortality Review Information Application) process. It begins with a photograph of a woman, Maria, playing a guitar. A speech bubble from her says "Maria, Maria". This leads to a central box labeled "MMRIA". From this central box, four arrows point to four distinct steps: "DATA ABSTRACTION" (represented by a pie chart icon), "CASE NARRATIVE DEVELOPMENT" (represented by a document icon with a pencil), "DOCUMENTATION OF COMMITTEE DECISIONS" (represented by a clipboard icon), and "ROUTINE ANALYSIS" (represented by a magnifying glass icon). These four steps then lead to a final box labeled "FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA". At the bottom of the diagram is a colorful silhouette of a city skyline.

```
graph LR; Maria[Maria, Maria] --> MMRIA[MMRIA]; MMRIA --> DA[DATA ABSTRACTION]; MMRIA --> CND[CASE NARRATIVE DEVELOPMENT]; MMRIA --> DCD[DOCUMENTATION OF COMMITTEE DECISIONS]; MMRIA --> RA[ROUTINE ANALYSIS]; DA --> FDD[FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA]; CND --> FDD; DCD --> FDD; RA --> FDD;
```

MMRIA
(Maternal Mortality Review Information Application)

Maria, Maria

DATA ABSTRACTION

CASE NARRATIVE DEVELOPMENT

DOCUMENTATION OF COMMITTEE DECISIONS

ROUTINE ANALYSIS

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

[illegible][illegible]

Key Decisions

1. Was the death pregnancy-related?
2. What was the cause of death?
3. Was the death preventable?
4. What were the critical contributing factors to the death?
5. What are the recommendations and actions that address those contributing factors?
6. What is the anticipated impact of those actions if implemented?



FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

Additional Information

1. Did obesity contribute to the death?
2. Did discrimination contribute to the death?
3. Did mental health conditions contribute to the death?
4. Did substance use contribute to the death?
5. Was the death a suicide?
6. Was the death a homicide?

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The Data



Maternal Mortality Prevention

EXPLORE THIS TOPIC

CL SEARCH



Pregnancy-Related Deaths: Data from Maternal Mortality Review Committees

FOR PUBLIC RELEASE
AUG 22, 2025

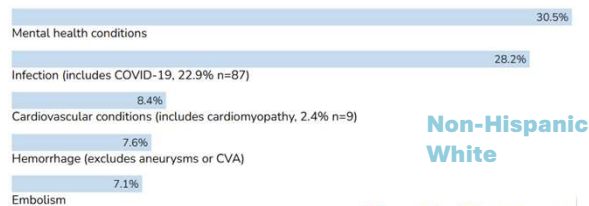
PURPOSE

Maternal Mortality Review Committees (MMRCs) are multidisciplinary committees that convene at the state or local level to comprehensively review deaths during or within a year of pregnancy (pregnancy-associated deaths). MMRCs have access to clinical and non-clinical information (e.g., vital records, medical records, social service records) to more fully understand the circumstances surrounding each death, determine whether the death was pregnancy-related, and develop recommendations for action to prevent similar deaths in the future.

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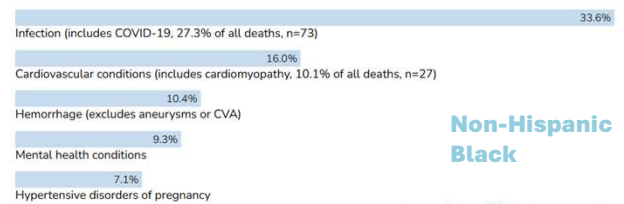
Pregnancy-Related Deaths by Race/Ethnicity



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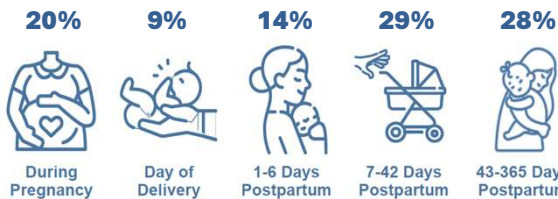
Pregnancy-Related Deaths by Race/Ethnicity



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Pregnancy-Related Deaths by Timing



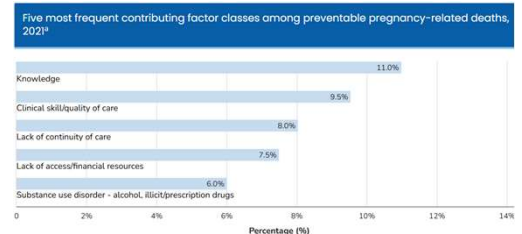
FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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Preventability

87%

Of pregnancy-related deaths in 2021 were deemed preventable



FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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Definitions: maternal death and maternal mortality ratio (MMR)

- MMR (maternal mortality ratio):** maternal deaths per 100,000 live
 - MMRate:** “the number of maternal deaths divided by person-years lived by women of reproductive age.”
 - ARR (annual rate of reduction):** calculated from MMR estimates.
- Adult lifetime risk:** probability a 15-year-old girl will eventually die from a maternal cause.

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SDG: GOOD HEALTH AND WELL-BEING

- SDG 3.1: reduce the global MMR to less than 70 per 100,000 live births by 2030.
 - No country should have an MMR more than twice the global average (equity lens).
 - Progress is assessed with modeled estimates and uncertainty; trends matter as much as point values.
- WHO report scope: “estimates and trends... between 2000 and 2023.”

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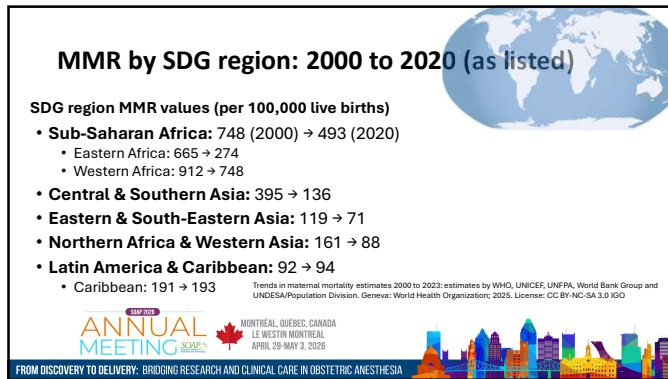
Global 2023 estimates and annual rate of reduction (ARR)

- Global MMR: 197** (UI 174–234)
- Maternal deaths: 260,000** (UI 230,000–309,000)
- ARR (2000–2023):
 - Global ARR of MMR: **1.3% (2010–2020)**
 - Needed ARR: **11.6% (2021–2030)** to meet SDG 3.1
- Progress has been uneven and too slow for SDG 2030 without acceleration.

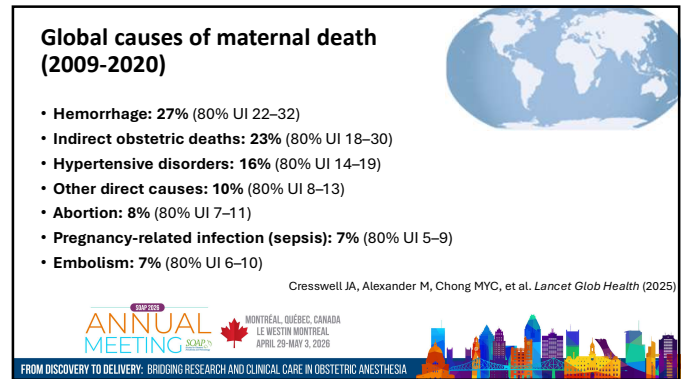
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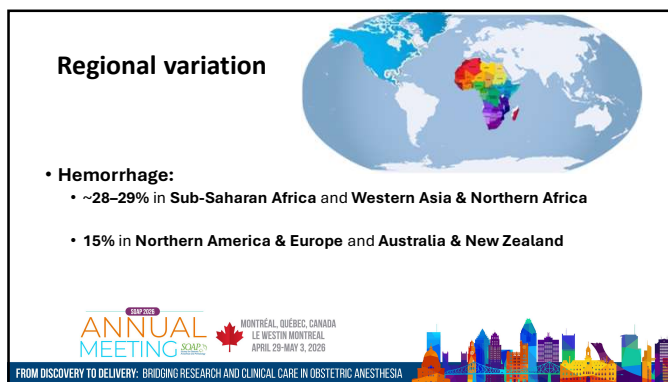
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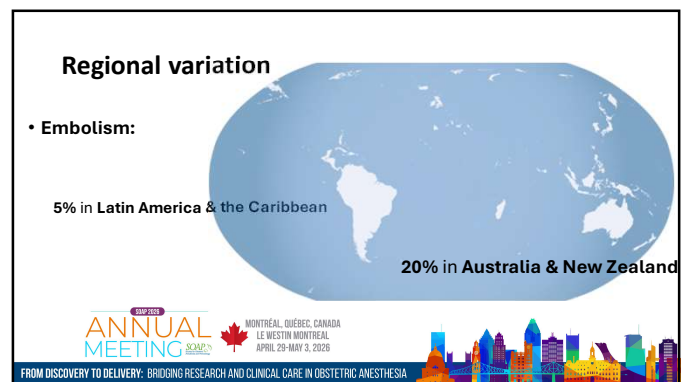
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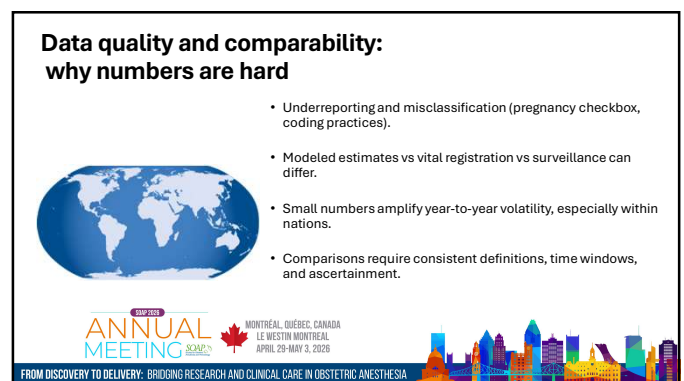
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Postpartum timing: when risk concentrates

- High risk is not limited to delivery: deaths can occur days to weeks postpartum.
- Different causes peak at different times
- Surveillance, follow-up, and care transitions must extend beyond discharge.

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U.S. national measurement:

- Different data streams:
 - vital records, hospital discharge, surveillance, and MMRC review.
- Action focus:
 - identify preventable factors and system opportunities
 - timely recognition, treatment, escalation, and follow-up



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Why MMRC findings translate to PQC/PNQIN targets?

- **MMRC** identify preventability themes and contributing factors across cases.
- **PQC/PNQIN** implementation converts themes into standardized bundles and workflows.

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MMRC findings translate to PQC/PNQIN targets

- **MMRC**
- **PQC/PNQIN**
- High-impact, common, time-sensitive targets:
 - Hemorrhage: rapid recognition, quantification, blood readiness, escalation.
 - Hypertension: standardized treatment thresholds, timely meds, postpartum follow-up.
 - Sepsis: early screening, antibiotics, source control, escalation.
- Goal: reduce variation and close known care gaps at scale.

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MMRC -> PQC dissemination

- State MMRC and PQC partners
- Priority causes/themes from MMRC:
- Key metrics:
 - Pregnancy-related mortality ratio
 - Preventable fraction
 - Top contributing factors
- Dissemination pathway: case learning -> recommendations -> hospital/QI bundle adoption.

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California: implementation focus CPQCC / CMQCC

- PQC implementation: clinical bundles, simulation, audit/feedback, equity stratification.
- Measurement:
 - Bundle adherence (hemorrhage)
 - Severe maternal morbidity (SMM) rate + trend
 - Postpartum follow-up within X days
- Next steps: sustain, spread, and monitor unintended disparities

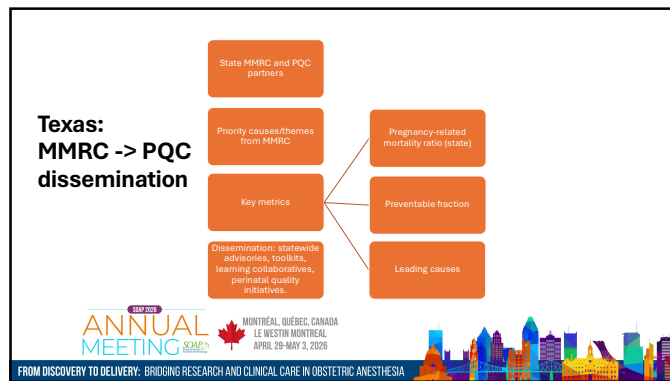


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Texas: implementation focus

- Focus on reliable recognition and escalation for hemorrhage/hypertension/sepsis
- Measurement :
 - Timely treatment for severe hypertension
 - Hemorrhage response time metrics
 - Sepsis screening compliance
- Equity: stratify outcomes and process measures; target gaps in access and follow-up.

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Louisiana: MMRC -> PQC dissemination

- State MMRC and PQC partners
- Priority causes/themes from MMRC
- Key metrics
 - Pregnancy-related mortality ratio
 - Preventable fraction
 - System contributing factors
- Dissemination: recommendations translated into hospital readiness and community follow-up pathways.

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Louisiana: implementation focus

- Implementation levers: readiness (blood, protocols), response (teams), reporting (dashboards), review (rapid-cycle learning).
- Measurement
 - Maternal safety bundle adoption coverage
 - SMM by cause group
 - Postpartum care continuity
- Goal: reduce preventable deaths through standardization and timely escalation.

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**CA vs TX vs LA
same evidence-based targets, different local implementation**

- **Common target domains (global evidence):**
 - hemorrhage, hypertensive disorders, indirect causes, sepsis

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References

- WHO/UN MMEIG. *Trends in maternal mortality 2000 to 2023*
- Cresswell JA, Alexander M, Chong MYC, et al. Global and regional causes of maternal deaths 2009–20: a WHO systematic analysis. *Lancet Glob Health*. 2025; (pages e629–e630 in provided extract).
- Maternal mortality—Fact sheet. <https://www.who.int/news-room/fact-sheets/detail/maternal-mortality>

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The anesthesiologist's role in mitigating maternal mortality

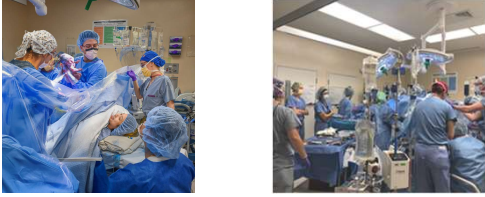


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Maternal Mortality Prevention: The Role of Anesthesiologists

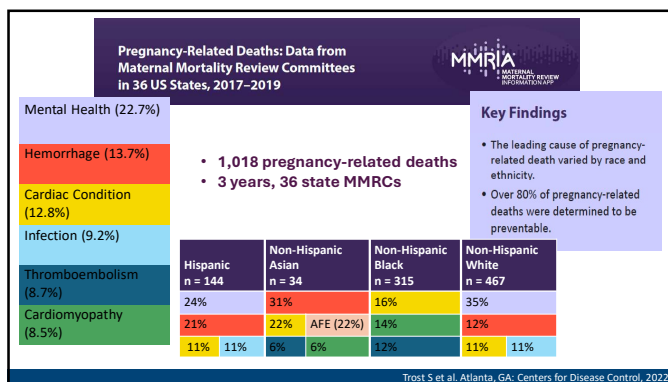


From Celebration and Surveillance ...to Resuscitation

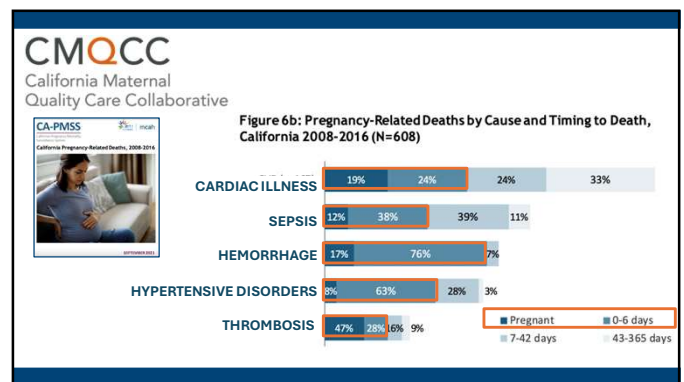
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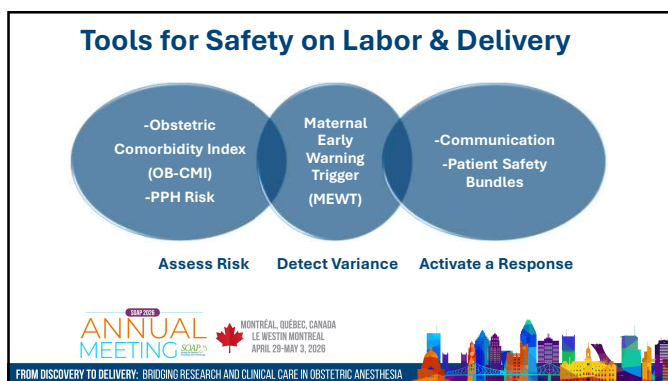
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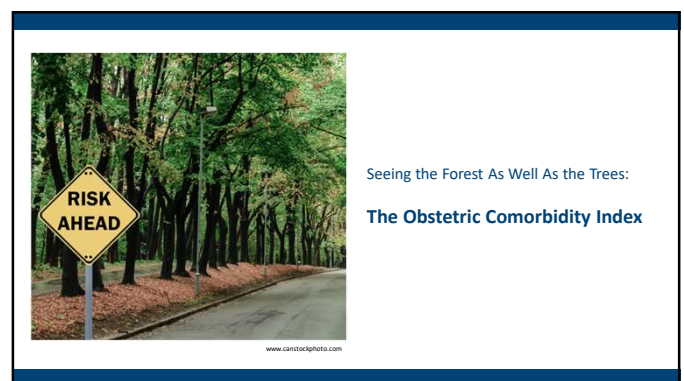
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Tools for Safety on Labor & Delivery

The diagram consists of three overlapping blue ovals arranged horizontally. The left oval contains the text '-Obstetric Comorbidity Index (OB-CMI)' and '-PPH Risk'. The middle oval contains the text 'Maternal Early Warning Trigger (MEWT)'. The right oval contains the text '-Communication' and '-Patient Safety Bundles'. The intersections between the ovals are shaded darker blue.

Assess Risk **Detect Variance** **Activate a Response**

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TOOLS & HUDDLES

Shared Labor & Delivery Planning Tool
Shared information & decision-making

Structured Team Huddles
Team participation with patient

Remember to "HUDDLE"
Standardized team meetings that occur throughout care for all laboring patients

Use the SHARED PLANNING BOARD to share care information: names, preferences, care plans, & expectations for next huddle

Elicit PATIENT PREFERENCES and clearly distinguish between birthing person, baby, & labor progress

**A Huddle that is Patient-Centered:
Team Birth**

Safe and dignified birth for all.

ARIADNE LABS

ARIADNE LABS
LABOR & DELIVERY
NURSING
NURSE MIDWIVES
OBSTETRICIANS
PHYSICIAN ASSISTANTS
RESIDENTS
STUDENTS

UNIVERSITY OF CALIFORNIA
SAN FRANCISCO
HOSPITALS & CLINICS

The diagram shows a whiteboard layout for a labor and delivery unit. It is organized into three main columns: ROOM, DATE, and GESTATIONAL AGE. The central area is divided into four sections: MY TEAM, MY PLAN, ABOUT ME, and ABOUT MY BABY. A timeline at the bottom indicates the progression of labor from Pre-labor/Early to Pushing. To the right of the whiteboard, three bullet points highlight key features: White board in labor room, Team discussion for any change in plan, and Patient-centered.

ROOM	DATE	PLANNING BOARD		GESTATIONAL AGE
MY TEAM My name: My support: OB/CNM: Nurse: Anesthesiologist:		MY PLAN Me: Baby: Labor progress: Huddle time: Anticipated next huddle:		
ABOUT ME My preferences/Good to know : About my baby:				

Pre-labor/Early → Active → Transition → Pushing ☺

- White board in labor room
- Team discussion for any change in plan
- Patient-centered

ARIADNE LABS
 ARIADNE LABS
 HARVARD MEDICAL SCHOOL
 HARVARD TCHIN

Communicating Variance

Who needs to know?

- Nursing Assistants/Nurses
- Obstetricians
- Midwives
- Obstetric anesthesiologists

Goals for Team Education

- Rationale and purpose
- Buy-in
- Identification of roles
- Ongoing education/refreshers
- Tailoring the system to your unit

BWV OBSTETRIC STAGE 1 VARIANCE PROTOCOL

- Who calls 877 — any team member can initiate 1.
- How do you call 877 — who and for what? Coordinate to activate a Stage 1 variance.
- Who will call 877 — to get approval, implement case, and prevent Stage 2.
- Who responds to 877 — Primary OB/anesth, Anesthesia TL, and NIC
- What should be the callout? — For any concerns, and any large change

Blood Product/Cell Sparing

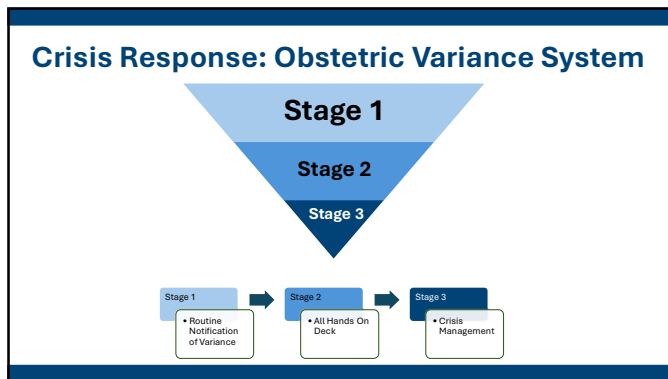
- SBP 100mmHg or CRP > 10mmHg*
- Hb < 50gpa*
- Severe headache or shortness of breath
- Adverse effects of antepartum meds
- Oliguria < 30 mL/hr for > 2hr
- Respiratory rate > 30 or < 10 per minute
- CO2 saturation < 95% on room air
- Maternal agitation, confusion, unresponsive

Blood Loss

- Operation vaginal delivery
- Placental margin, most that is simple 2nd degree
- > 500 mL CO2, after vaginal birth (an automated trigger is used to assess blood loss) > 700 mL CO2 is simple
- > 500 mL CO2, after cesarean delivery
- SBP < 100mmHg*
- Hb < 120gpa*

* If a patient is hypotensive after delivery (SBP < 90 mmHg) or hypotensive (SBP < 90 mmHg) after 2nd trimester delivery, hypotensive, call Stage 2 variance (877) > 800 113 1131 after 2nd trimester delivery

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**COUNCIL ON PATIENT SAFETY
IN WOMEN'S HEALTH CARE**
safe health care for every woman

Stage 1 OB Variance? Use Bundles to Coordinate a Response:

Venous thromboembolism
Opioid use disorder
Obstetric hemorrhage
Severe hypertension in pregnancy

<https://safehealthcareforeverywoman.org>

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Online Resources

- Consensus Statements
- Safety Bundles
- Checklists
- Crisis Management Drills

Obstetric Hemorrhage

PATIENT SAFETY BUNDLE

Obstetric Hemorrhage

Obstetric Hemorrhage

Hypertension

PATIENT SAFETY BUNDLE

Hypertension

Hypertension

<https://safehealthcareforeverywoman.org>

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Operating Room Crisis Checklists

Management of Adult Emergencies

October 2013 revision

Do not remove book from this room <<

Operating Room Crisis Checklists

Management of Adult Emergencies

October 2013 revision

Do not remove book from this room <<

Phylogia

Cardiac Arrest - Asystole/PEA

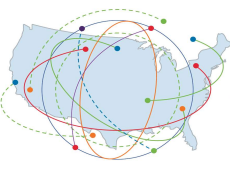
Cardiac Arrest - Asystole/PEA

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SOAP State Representatives Program

Goal 1: Build a Network and Representation

- Identify a SOAP State Rep for every state
- Connect with service chiefs in the state
- Confirm there is an OB anesthesiologist on the state MMRC



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Connect with your State Representative!



SOAP State Representative
IOWA

Kirkia Thomsen, MD
University of Iowa
kirkia.thomsen@uiowa.edu

Maternal Mortality Review Committee Representative

Kirkia Thomsen, MD



<https://www.soap.org/soap-state-rep-program>

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**Conclusions:
Anesthesiologists
And Maternal Mortality**



Thank You!
mfarber@bwh.harvard.edu

Use global risk assessment and early warning triggers to focus on patients at risk and escalate care early.

Integrate patient-centered communication and response. Enhance care with the use of bundles, checklists, and drills.

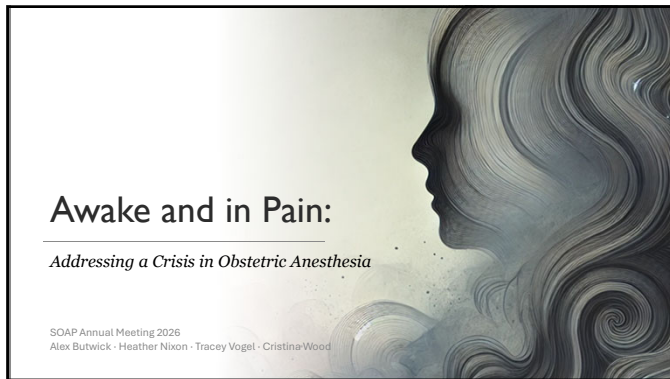
Engage with SOAP State Reps, MMRC members, PNQIN members, and each other.

ANNUAL MEETING

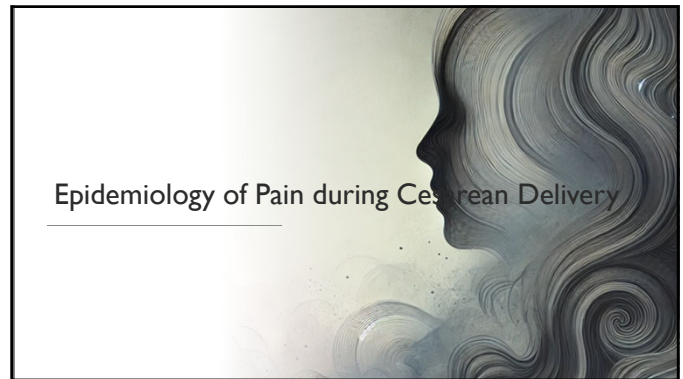
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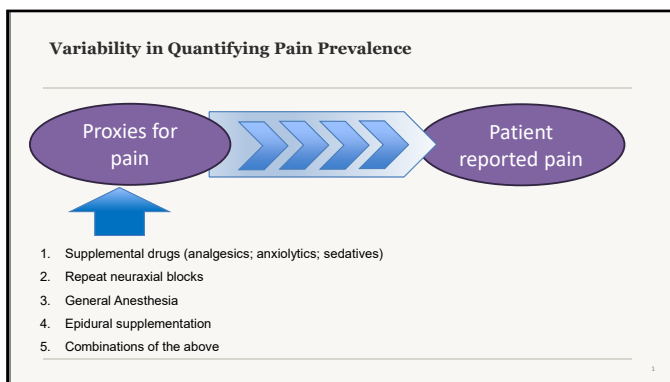




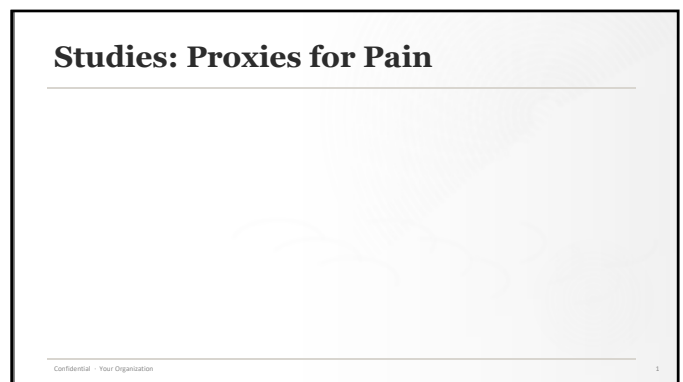
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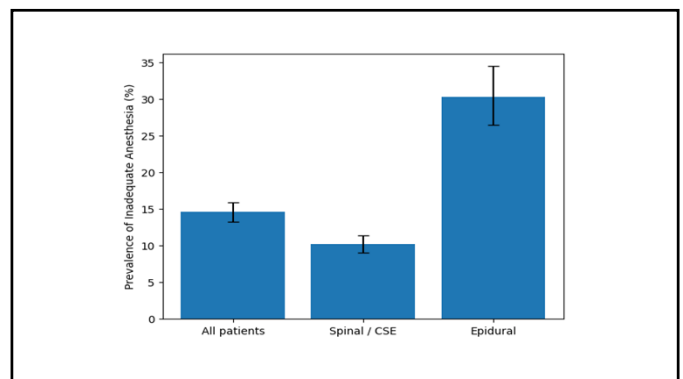


4

Anaesthesia 2022, 77, 598–604
doi:10.1111/anes.15657
Review Article
Inadequate neuraxial anaesthesia in patients undergoing elective caesarean section: a systematic review
R. Patel,¹ J. Kua,² N. Sharawi,³ M.E. Bauer,⁴ L. Blake,⁵ S. R. Moonesinghe⁶ and P. Sultan⁷

- **Data Source:** 54 RCTs (n=3497); 1984-2021
 - ≥ ED95 dosing strategies
- **Primary outcome:** Inadequate Anesthesia = GA conversion; 'abandon' or repeat block; intraoperative analgesia (no BZs); epidural top-up

5



6

Population Based Estimates

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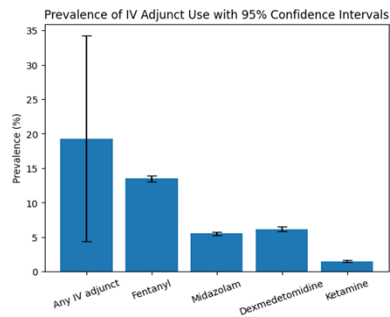
RESEARCH LETTER

Variability in Use of Intravenous Adjuncts for Cesarean Delivery under Neuraxial Anesthesia

- **Study Design:** Population-based cross-sectional study
- **Data Source:** EHR data ~ 8 US hospitals
- **Study Population:** 25,149 cesareans with neuraxial anesthesia; 01/01/20 – 01/01/25
- **Primary outcome:** Any IV adjunct

Lim. Anesthesiology 2026; 144: 237-9

8



9

Problem with proxies

10

Anaesthesia 2022, 77, 523-526

doi:10.1111/anae.15723

Editorial

What is 'genuine' failure of neuraxial anaesthesia?

S. E. R. Stanford

- Under-reporting of pain
- GA conversion ~ not sole indicator of severe breakthrough pain
- Bias
 - Observer bias
 - Misclassification bias: GA conversion not the sole indicator of severe breakthrough pain
 - Selective outcome reporting

11

Studies: Patient reported pain

Confidential - Your Organisation

1

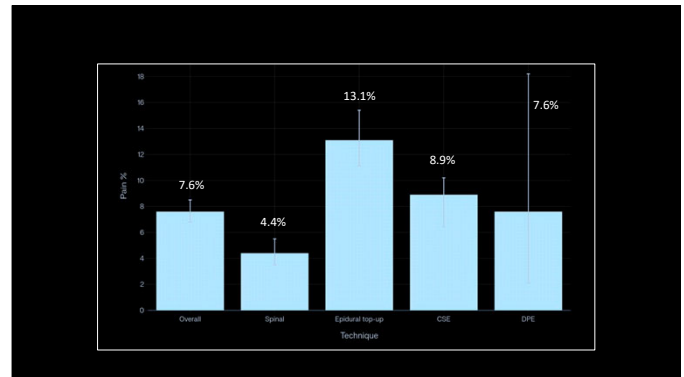
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ANESTHESIOLOGY
Incidence of Pain during Cesarean Delivery with Neuraxial Anesthesia: An International, Prospective Cohort Study

Journal: *ANESTHESIOLOGY*, Vol. 144, No. 5, October 2024, pp. 1447-1454.
 DOI: 10.1053/j.aj.2024.09.001

- Study Design:** Prospective, cross-sectional study
- Study Population:** 3,758 cesareans in 15 North American hospitals
 - 8-week study period
 - 08/2023 – 06/2024
- Primary outcome:** Pain during cesarean (Y/N)
- Secondary outcomes:** Pain score; Satisfaction with pain Rx

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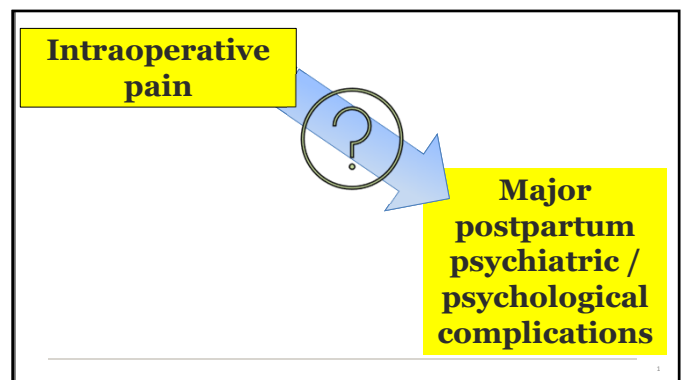
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ANESTHESIOLOGY
Incidence of Pain during Cesarean Delivery with Neuraxial Anesthesia: An International, Prospective Cohort Study

Journal: *ANESTHESIOLOGY*, Vol. 144, No. 5, October 2024, pp. 1447-1454.
 DOI: 10.1053/j.aj.2024.09.001

- Other Results:**
 - Median [IQR] pain score = 6 [4-8]
 - Dissatisfaction with pain treatment = 29/282 (10.3%)
- Limitations:**
 - Data collected 24 hr postpartum
 - Academic hospitals
 - No data – neuraxial anesthesia medications; block assessment / adequacy; Pain Rx interventions
 - Recall bias

15



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Outcomes – qualitative data

International Journal of Obstetric Anesthesia (2016) 26, 76-77
 0020-3082/\$ – see front matter © 2016 Elsevier Ltd. All rights reserved.
<http://dx.doi.org/10.1016/j.ijoa.2016.08.001>

SPECIAL ARTICLE

Failure of communication: a patient's story

Susanna E.R. Stanford,^a David G. Bogod^b

I feel pain, not pressure: a personal and methodological reflection on pain during cesarean delivery

Research Article
 Intraoperative pain during cesarean delivery: a qualitative concept elicitation study

P. Callahan^a, Z.J. Cottrell Bekomeyer^a, R. Pedreira^a, G. Michel^a, H. Sukhdeo^a, J. O'Carroll^a, B. Carvalho^a, E. Martinez^a, P. Sultan^a

^aDepartment of Anesthesiology, Perioperative and Pain Medicine, Harvard Medical School at Brigham, 75, 75A
^bUniversity College London Hospital, London, United Kingdom

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Exposure-Outcome Associations

- Very limited data
- PTSD prevalence varies¹
 - Community population: 3.1%
 - At risk population: 15.7%
- 7 meta-analyses & 1 International Study: Subjective negative maternal birth experience = PTSD risk factor¹⁻⁸

1. Grekin. Clin Psychol Rev 2014
 2. Andersen. Acta Obstet Gynecol Scand 2012
 3. Ayers. Psychol Med 2016
 4. Dekel Frontiers Psychol 2017
 5. El Founti Khism
 6. Handzelzalts. Psychol Med 2025
 7. Heyne. Clin Psychol Rev 2022
 8. Kranenburg. Int J Environ Public Health 2023

18

Anesthesia Factors - PTSD

- 1 study linking a measure incl pain with PTSD
- **Study Design:** Prospective observational cohort study - identify risk factors for PTSD
- **Population:** 280 cesarean deliveries under regional anesthesia
- **Main Findings:** Anesthetic complication (any of: severe N&V, pain from failed block; PDPH; traumatic needle insertion; neurologic injury) – 4-fold increased odds of PTSD
- **Limitations:**
 - Does not isolate pain
 - Likely underpowered
 - Outcome misclassification

Lopez. Health Qual Life Outcomes; 2017; 15:118

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Conclusion

- I. Use **patient-reported pain** over proxies in future studies
- II. Most recent estimate - **pain prevalence: 7%**
Validation in representative populations (SONAR)
- III. Qualitative data: Severe and poorly managed pain → **major postpartum emotional and psychological trauma**
- IV. Robust prospective trials – identify optimal **communication approaches**; **intrapartum pain interventions to ↓ PTSD risk/severity**

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The Conversations

Post Retrievals

21

THE RETRIEVALS Season 2

The
New York
Times **SERIAL**

22

Anesthesiologists

Long Standing Dogma

Interest in the Medical Treatments

Younger Providers - Want Tool in Communication

23

OB Team

Bias Toward Provider Based

Confused By Pressure Vs. Pain

Staunch Beliefs Concerning Fetal Effects of GA

Very Interested In Tracking Systems

Epidural Medication Administration

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Nursing

Second Victim and Lack of Empowerment

- Job Ramifications
- We had to Do It.....

Lack of Buy In

Want Language to Help Patients

Why NOT General??

25

How Can WE Change Culture.....

- Normalize Pain Assessments and Accountability
- Frank Conversations About The Risks with Nurses and OB Providers
- Speak UP Culture -----"I am concerned"
- Review YOUR Data - You May Be Surprised
- Try to Listen and Understand the "Why"

26

Where do we start?

Reframing Informed Consent Through a Trauma-Informed Lens

27

Definition of a Traumatic Event

The person was exposed to death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence, in the following way(s):

- Direct exposure
- Witnessing the trauma
- Learning that a relative or close friend was exposed to a trauma
- Indirect exposure to aversive details of the trauma, usually in the course of professional duties (e.g., first responders, medics)



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Individual Trauma as the "3 E's"

"Individual trauma results from an **event**, series of events, or set of circumstances that is **experienced** by an individual as physically or emotionally harmful or life threatening and that has lasting adverse **effects** on the individual's functioning and mental, physical, social, emotional, or spiritual well-being."

Substance Abuse and Mental Health Services Administration (SAMHSA)

29

Pain

"An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage."



- Pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors.
- Pain and nociception are different phenomena. Pain cannot be inferred solely from activity in sensory neurons.
- Through their life experiences, individual learn the concept of pain.
- **A person's report of an experience as pain should be respected.**
- Although pain usually serves an adaptive role, it may have adverse effects on function and social and psychological well-being.
- Verbal description is only one of several behaviors to express pain; inability to communicate does not negate the possibility that a human or a nonhuman animal experiences pain.

Raja SH, Carr DB, Cohen M, et al. The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises. Pain. 2020;161(1):157-167. doi:10.1097/j.pain.0000000000001919

30

Traumatic Pain

Pain that is life-threatening, or that contributes to a sense of powerlessness, loss of control and/or agency over oneself should be considered *traumatic* PDCD



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Trauma-informed Consent

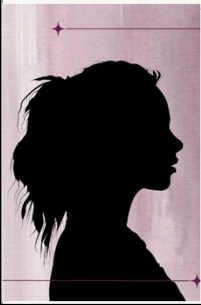


<https://www.cdc.gov/pr/infographics/trauma-informed-consent.html>

PDCD meets criteria to be defined as a relatively common complication that is often traumatic, underscoring the need for a trauma-informed approach.

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Preliminaries:



What you need to know:

1. Their preferred level of awareness for the birth
2. Fears
3. How they communicate their needs

What they need to know:

1. How you will assess overall well-being, including pain
2. You will believe them
3. You will act immediately on any reports of pain/discomfort

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Trauma-informed Consent



"Hi, I'm Dr. (Name), one of the anesthesia doctors. I'd like to talk with you about your anesthesia options. Is this a good time?" *Sit at eye level/limit distractions.*

"Is there anyone you'd like to have here with you for this conversation?" *Inquire about physical needs*

"If at any point this feels overwhelming, we can pause. My goal today is to make sure you understand your options and that we create a plan that feels both medically safe and what aligns with your values and what helps you feel safe."

"There is no one 'right' way to approach this."

"Some people feel strongly about being awake for the birth, while others prefer to be more asleep or less aware. How do you feel about things? Any past experiences -medical or otherwise-that you think might affect how you feel about this surgery?" *Explore past childbirth experiences/identify fears*

"There are a few different anesthesia options for a cesarean delivery. We can talk through the benefits and risks of each, and I will tailor things based on what matters most to you. We want you to be and feel safe during the surgery." *Explain options/minimize bias*

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Trauma-informed Consent



"I also want to talk openly about something that isn't discussed as often but is very important-what you might feel during the surgery." *Explain different sensations/establish appropriate expectations*

"If you feel anything that is painful, distressing, or not right, I want you to tell me right away. I (and/or a member of the team) will be with you the entire time, watching and checking in with you throughout the surgery."

"You will not be expected to tolerate pain. If something doesn't feel right, we will act on that immediately." *Explain interventions with pros/cons*

"How do you prefer to communicate? Some people like to speak directly, others prefer to signal or have their support person speak for them."

"We can also come up with a simple plan or phrase that helps you communicate quickly if something feels wrong."

Check understanding/invite questions
Reaffirm that "she is the expert in understanding her body and only she knows how she is feeling" and that your role is to support not only physical safety, but also to keep her psychologically safe and make sure she feels heard throughout the process.

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What if there isn't time...

Safety Trustworthiness/transparency Peer support	Keep her support person with her Speak calmly and slowly, using precision of language to maximize the ability to exchange information effectively within time-limited constraints Validate how scary this must be for her, who you are, and what you will do to keep her safe (physically and psychologically)
Collaboration/mutuality Empowerment/voice/choice	As quickly as possible, elucidate how important it is for her to be awake for the delivery If a neuraxial block is possible, explain the chance for PDCD and what you will do in this circumstance Establish a plan for how she should communicate any pain to you
Cultural, Historical and Gender Issues	Explain that your teams will utilize all general TIC principles as a universal precaution in the operating room Ask what is the most important thing to her? What is her biggest fear?

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Voice and Choice: Pre-incision

- Elicit patient preferences about communication style before surgery begins.
- Explain the difference between pressure/pulling and pain, priming the vocabulary.
- Standardize frequent intraoperative verbal check-ins (e.g., every 5-10 minutes).
- Empower patients to signal discomfort at any point.
- Music therapy
- Privacy drape for Foley placement, vaginal prep, abdominal prep

"You are the only one who can tell us what you are feeling and we will believe you."

Stanford SE et al. *Int J Obstet Anesth*. 2016 Dec;28:70-75. | Patel R et al. *Anaesthesia*. 2022 May;77(5):598-604. | ASA Statement on the Use of Adjuvant Medications and Management of Intraoperative Pain During Cesarean Delivery

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Shared Decision Making in Real Time

Shared Decision Making: A collaborative process integrating provider and patient values into care decisions as an ongoing dialogue that requires the provider to *ask* what matters rather than *assume*.

Plaatz F et al. *Anaesthesia*. 2022 | Orbach-Zinger et al., *J Clin Anesth* 2025 | Lim et al., *Int J Obstet Anesth* 2025 | Landau et al., *Anaesth Crit Care Pain Med* 2024

38

Patient Agency in the Operating Room

Agency requires two things: The ability to experience and report one's own state and the ability to make meaningful decisions based on that state.

What Undermines Agency:

- Over-sedation that compromises ability to communicate.
- Conflating analgesia, anxiolysis, and sedation, they are not interchangeable.
- Dismissing patient reports as anxiety or pressure rather than pain.

Plaatz F et al. *Anaesthesia*. 2022 May;77(5):588-597. | ASA 2024 Statement on Providing Psychological Support for Obstetric Patients

39

Statement on the Use of Adjuvant Medications and Management of Intraoperative Pain During Cesarean Delivery

Developed by: Committee on Obstetric Anesthesia
Original Approval: October 23, 2024

"Sedation is not a treatment for pain and is not a substitute for general anesthesia. Sedation should be used with caution. Consider inducing general anesthesia and securing the airway with an endotracheal tube for patients with significant intraoperative pain or discomfort."

40

What Drives IV Medication Decisions During Cesarean?

Analgesic Gap

40.6%

of analgesic requests fulfilled — pain often untreated

Over-Anxiolysis

4x

more anxiolytics than analgesics; most given without a request

Emotional Attachment

aOR 1.40

Feeling close to a patient → more likely to give medication

Protectiveness Paradox

aOR 0.71

Wanting to protect a patient → less likely to give medication

Language Concordance

aOR 0.46

Shared language → less supplementation; equity implications

Socioeconomic Bias

aOR 0.52

Higher-income patients less likely to receive IV medication

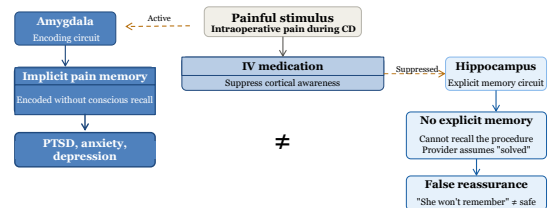
Protectiveness paradox — less patient-centered digital health — Shand & Straka Medical Center, 2024 — doi:10.1016/j.jcline.2024.111046

41

Ethical IV Medication Use

Implicit vs. explicit memory

Why amnesia ≠ analgesia — and why it matters for cesarean delivery



LeDoux J. *Cell Mol Neurobiol*. 2003 Oct;23(4-5):727-38. | Kim MC et al. *BJA Educ*. 2021 Apr;21(4):154-161.

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The Dreaded GA Decision

General anesthesia may be the right answer, but.....

- Medical safety (aspiration risk, airway, urgency)
- Patient priorities (birth presence, skin-to-skin, memory)
- Anesthetic adequacy (likelihood supplementation will suffice)
- Timing (surgery remaining, recent interventions)

There is no single right answer. There is only the right answer for this patient, at this moment, with this information.

Conversion to GA occurs in only a fraction of patients who report pain.

Sanchez J et al. Anaesth Crit Care Pain Med. 2024 Feb; 43(1):101310.

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Building Better Practice

- **Normalize Pain Assessments**
 - Routine verbal check-ins
 - ASA has proposed pain assessment as a quality metric for obstetric anesthesia
- **Avoid Crisis-Driven Decisions**
 - Place epidurals early and monitor efficacy regularly in laboring patients
 - Preoperative shared decision-making about potential pain scenarios is feasible and valued by patients
 - Anticipate patient preferences the way you anticipate a difficult airway
- **Follow Up**
 - Pain during cesarean is associated with PTSD, postpartum depression, and impaired bonding
 - Follow-up after difficult intraoperative experiences is both clinically appropriate and ethically required
 - Connect patients with mental health resources when indicated

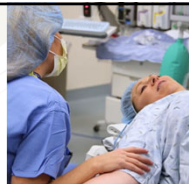
Callihan P et al. Int J Obstet Anesth. 2025 Nov;64:104748.

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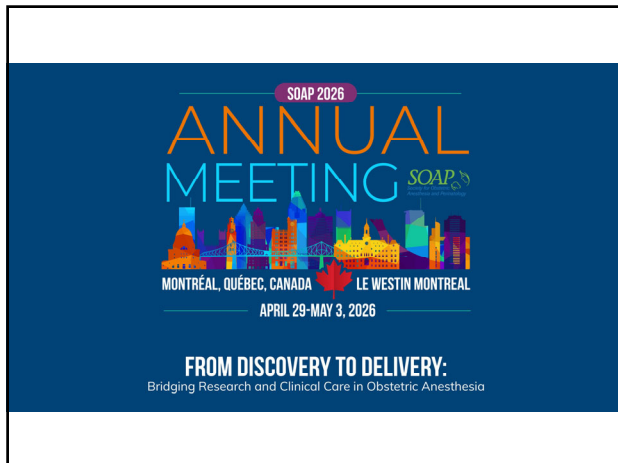
KEY PRINCIPLE: Believe the patient.

"Patients should be believed when they state that they are experiencing pain. Appropriate interventions such as administration of epidural, intravenous, or inhalational systemic anesthetic adjuvant agents should be considered for the management of intraoperative pain and the surgical procedure should be paused if possible to allow the patient's condition to improve. Subsequent surgical activity should not resume until the patient is comfortable."

-ASA Statement on Adjuvant Medications and Management of Intraoperative Pain During Cesarean Delivery, 2024.



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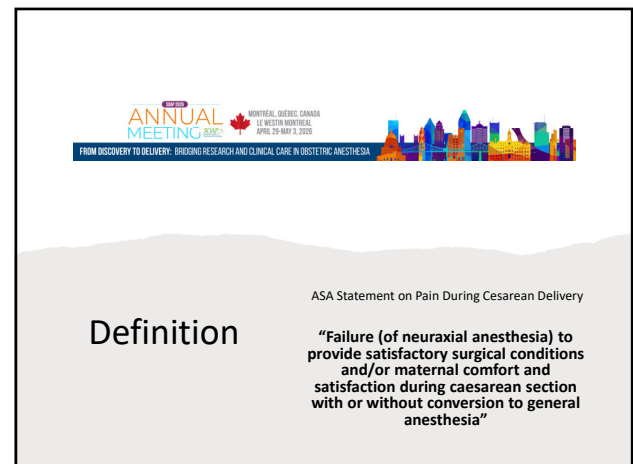
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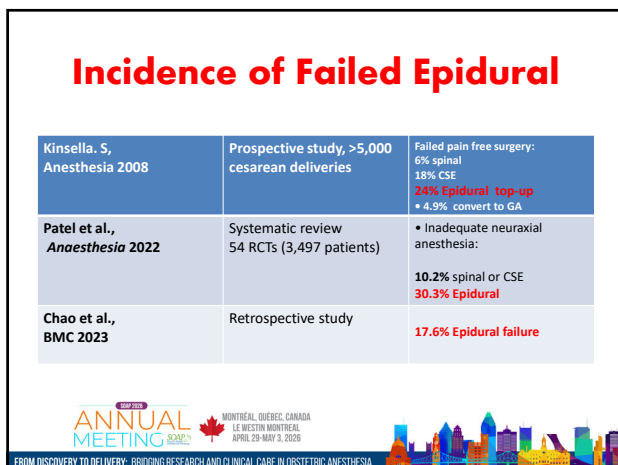
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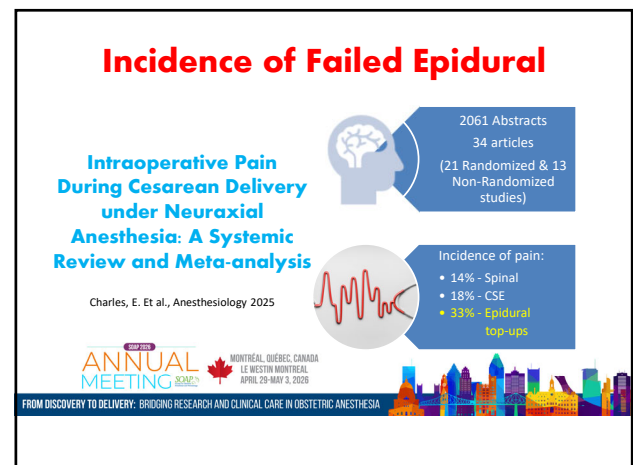
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6

Incidence of Failed Epidural

Incidence of Pain during Cesarean Delivery with Neuraxial Anesthesia: An International, Prospective Cohort Study

O'Carroll JE, Et al., Anesthesiology 2026

15 Centers: USA & Canada
3693 Patients neuraxial for CD

Elective Cesarean:
3.7% Spinal
9.2% CSE
12.2% Epidural top-ups

Non-elective:
5.7% Spinal
7.1% CSE
13.2% Epidural Top-ups

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Risk factors for Epidural Failure

Patient

- Younger age
- Low maternal weight or greater maternal height
- Duration of labor
- Opioid use disorder
- Pain during previous section

Catheter quality

- Maternal request for additional bolus
- Incomplete, patchy, unilateral block
- Clinician boluses
- Duration of catheter

Obstetric, Surgical

- Emergency / Urgent cesarean delivery
- Repeat Section
- Classical section
- Exterioration of the uterus
- Longer surgery

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Warning Signs before Topping Up

Red flags in labor

- Repeated clinician top-ups or rescue boluses
- Breakthrough pain despite apparently adequate settings
- Unilateral block, sacral sparing, or slow patchy spread
- Suspected catheter migration or short catheter depth

What to do

Prevention is key

- Assess block quality before OR entry whenever possible.
- Replace or manipulate a poorly functioning epidural during labor.
- Confirm dense bilateral surgical anesthesia before incision.

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What Should We Do if it Fails?



- Replace epidural?
- Perform spinal?
- Perform a low dose CSE?
- Intraoperative adjuncts?
- General anesthesia?

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How much time do you have???

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Should we consider a spinal?

Reliable Surgical Anesthesia

- More dense, predictable block than epidural top-up
- Lower rates of intraoperative pain vs epidural conversion
- Rapid onset compared with epidural replacement
- Avoids risks of general anesthesia in parturients

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Charles, E. Et al., Anesthesiology 2025



2061 Abstracts
34 articles
(21 Randomized & 13 Non-Randomized studies)



Incidence of pain:
• 14% - Spinal
• 18% - CSE
• 33% - Epidural top-ups

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Risks of Spinal after Epidural

High Spinal

What dose should you use?

Too much = High spinal

Too little = inadequate block or short duration of block

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Spinal anesthesia for intrapartum Cesarean delivery following epidural labor analgesia: a retrospective cohort study.

Visser, W.A. et al. Can J Anesth 2009

- 693 patients total
- 73.3% received Spinal
- 18.5% Spinal after epidural for labor
- 2.7% ELA to ESA
- 5.5% general anesthesia
- **NO difference**
Total spinal block 0%
High spinal block (0.2 vs 0.8%, $P = 0.36$)
Hypotension
Total ephedrine
Apgar scores

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Evaluation of failed and high blocks associated with spinal anesthesia for Cesarean delivery following inadequate labour epidural: a retrospective cohort study.

Einhorn, L.M., Can J Anesth 2016

- Retrospective cohort study (single center)
- 263 Spinal or CSE after failed epidural
- Primary end point = failed or high spinal
- Results: Failed Spinal: 11%
High Spinal: 3%
- Epidural top-up within 30 minutes = greatest effect for failed spinal
- Epidural fluid mistaken for CSF
- No predictors for High spinal

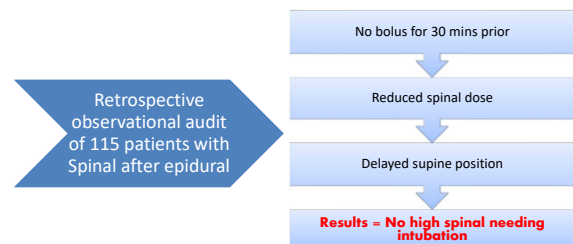
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Spinal anesthesia for cesarean section following inadequate labor epidural analgesia: a retrospective audit

Dadarkar, P., UOA 2004



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Risk for High Spinal after Epidural

Visser = 0.8%
Einhorn = 3%
Dadarkar = 0%

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What about a low-dose CSE?

1. Low dose spinal = low block, shorter duration
2. If block is not sufficient you need time to correct with epidural
3. Although CSE improves the likelihood of epidural catheter working there is no guarantee
4. If it fails, what's next?

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Is there a way to mitigate the risks of high spinal?

- Recent epidural bolus (<30-60 min)
- Large bolus (>10-15 ml LA)
- High cumulative volume greater 20- 30 ml

- Recent reviews (2024–2025) - High spinal reported even with reduced doses.
- Strong link to **recent epidural dosing + volume effect**
- BJA Education review - Mechanism: ↓ CSF volume → ↑ spread
- ASA/consensus statements Recommend **dose reduction + caution after epidural dosing**

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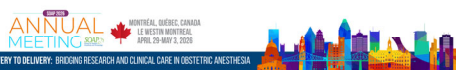
Risk Mitigation If Spinal Is Chosen

Attempt to make it safer:

- Allow time after last epidural bolus when feasible
- Consider reduced intrathecal local anesthetic dose
- Avoid spinal if recent dense epidural block present
- Prepare vasopressors, airway equipment
- Maintain continuous communication with obstetric team

ANNUAL MEETING 2025 MONTREAL, QUEBEC, CANADA LE WESTIN MONTREAL APRIL 29-MAY 3, 2025
FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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 MONTREAL, QUEBEC, CANADA
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 APRIL 29 - MAY 3, 2025
 FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

General Anesthesia

Risks:

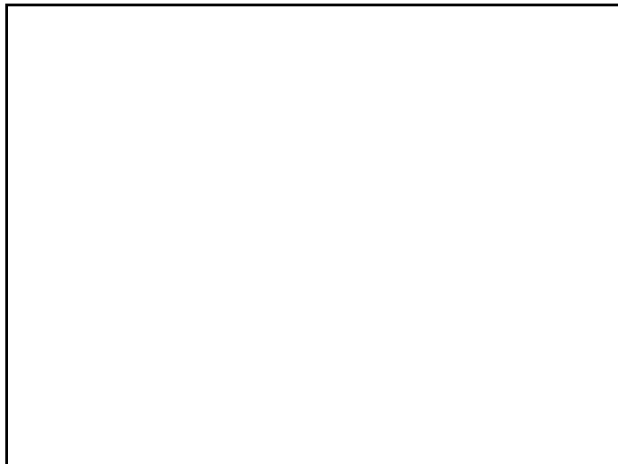
- Maternal aspiration
- Failed airway with hypoxic injury
- Awareness under general anesthesia
- Increased postpartum hemorrhage
- Worse fetal outcomes
- Worse Postoperative pain control


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Final Thought

No "One-Size-Fits-All" Answer

- Decision should be:
 - Patient-specific
 - Time-sensitive
 - Risk-aware
- Evidence supports **selective use**, not routine use



Updates on Conversion to General Anesthesia: Insights from the SOAP GA Registry

Sharon C. Reale
Fellowship Program Director
Brigham and Women's Hospital, Division of Obstetric Anesthesiology

1

Roadmap

- Preparation for the possibility of general anesthesia
- Predictors of difficult airway
- Equipment availability
- Insights from the SOAP general anesthesia registry

2



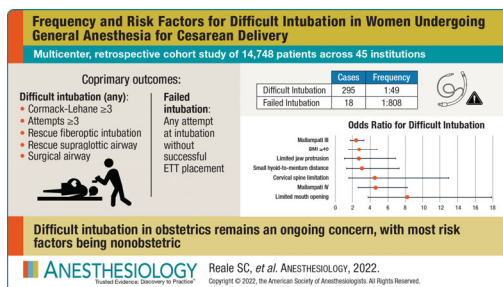
3

Patient preparation: set yourself up for success

- Positioning**
 - Ramp when needed, head at top of bed
- Jewelry**
 - Remove tongue rings, remove all metal
- Preoxygenation**
 - Start early!

Don't assume everything will go well!!

4

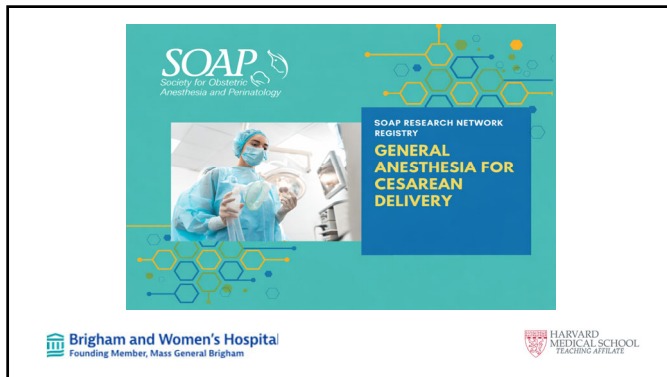


5

Availability = Safety



6



7

SOAP General Anesthesia Registry

- Patient & obstetric factors
- Provider characteristics
- Case urgency & neuraxial details
- Airway & intubation data
- Medications & outcomes

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SOAP General Anesthesia Registry

• **4,016** cases entered to date!

- 35 sites
- Data collection to finish at the end of 2026

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SOAP General Anesthesia Registry

- Wide practice variation
 - Large variability across institutions
- Timing and location matter
 - Epidural dosing timing is critical
- Institutional Differences
 - GA rates vary significantly

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Questions?

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Point-of-Care Ultrasound to Guide Volume and Cardiac Assessment; When POCUS Changes your Management Plan

Ioannis Angelidis, MD, MSPH
Assistant Professor of Obstetric and Cardiac
Anesthesia and Critical Care Medicine
University of Pittsburgh



1

No disclosures



2

Why the Immediate Postpartum Period Is a Perfect Storm for Hypotension

Hemodynamic chaos in the first minutes after delivery – Hypotension is a Diagnostic Fork in the Road.



3

Yanni Algorithm



4

Inferior Vena Cava (IVC) Assessment



Anesth Analg. 2017 Mar;124(3):753-760. The Nuts and Bolts of Performing Focused Cardiovascular Ultrasound (FoCUS) Josh M. Zimmerman, L. Bradley J. Cohen



5

Collapsible IVC

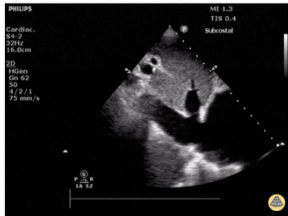


- Hemorrhage?
- Dehydration?
- Sympathectomy?



6

Plethoric IVC



- Cardiogenic Shock?
- PE?
- Severe Pre-eclampsia?
- Fluid Overload?

Confounders

- **Obesity** → poor acoustic window, underestimates variation
- **High PEEP** → artificially distends IVC, mimicking overload
- **Tachypnea** → rapid shallow breaths can exaggerate apparent collapsibility

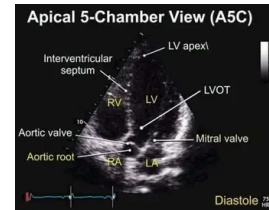


Echocardiography in TPA



7

LVOT VTI Most Powerful Single Number



8

Velocity Time Interval (VTI)

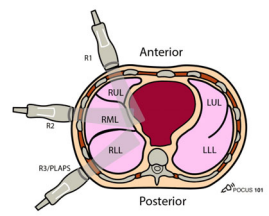
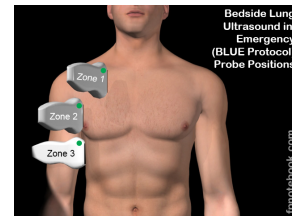


- VTI < 16 cm → low stroke volume
 - VTI > 18–20 cm → adequate forward flow
- Helps differentiate:
- Low VTI + Collapsible IVC hemorrhage
 - Low VTI + Plethoric IVC Cardiogenic Shock
 - Normal or HIGH VTI + Collapsible IVC + Hypotension Sympathectomy



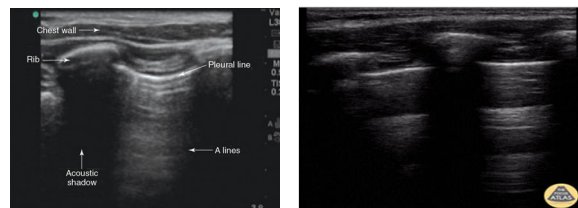
9

Lung Ultrasound



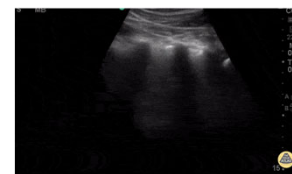
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Normal Lung Sliding



11

Focal B Lines



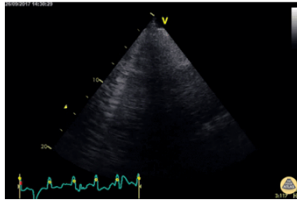
In one region/one zone, separate, NOT merging, localized abnormality

- Focal Pulmonary Edema
- Early Sepsis related injury
- Pneumonia/Aspiration



12

Confluent B Lines

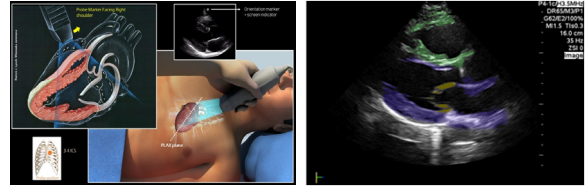


- B-lines that **merge together**, Waterfall sign" or "white curtain" appearance
- Cardiogenic Pulmonary Edema
- Severe Pre-eclampsia
- Severe Fluid Overload



13

Focused Cardiac Views: What Matters in 30 seconds



14

Hyperdynamic

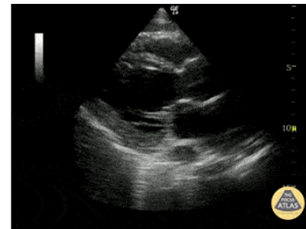


- Hemorrhage?
- Sympathectomy?
- Sepsis?



15

Poor LV Function

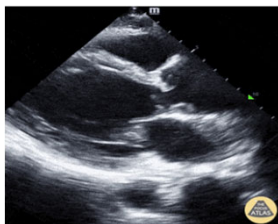


- Cardiomyopathy?
- Severe Pre-eclampsia?
- Ischemia?



16

Aortic Dissection

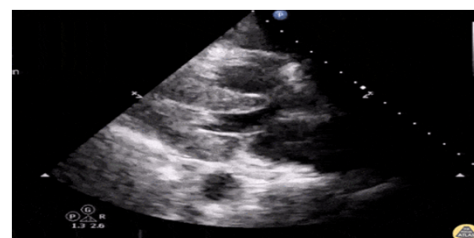


- Type A dissection
- 'Double Valve Sign'
Dissected Flap appears as a second valve



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LVOT Obstruction



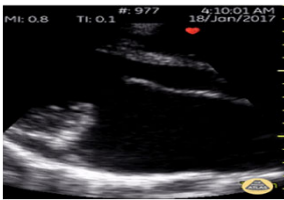
@obanesupmc



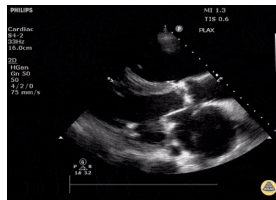
18

Stenotic Valves

Mitral Stenosis-Hockey Stick Sign

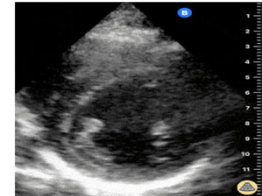


Severe Aortic Stenosis



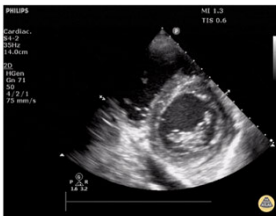
19

Parasternal Short Axis

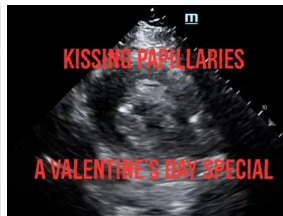


20

Reduced Function

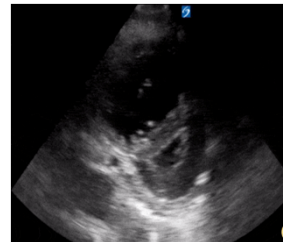


Hypovolemia/Hyperdynamic



21

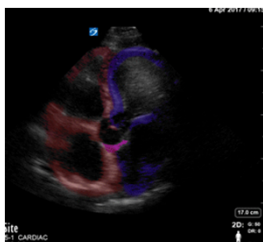
RV Strain with RV dilation and D sign



- D-Shaped LV
- IV septum flattens (High RV pressure)
- AFE? PE?
- Pulmonary HTN?

22

Apical Four Chamber

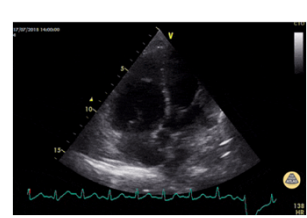


23

Takotsubo CMP



PE



24

SUMMARY

- Dry + Low VTI + A-lines → Hemorrhage
- Wet + Low VTI + Plethoric IVC → Cardiogenic Shock
- Normal Lung + High VTI → Sympathectomy
- RV Dilation and D Sign → PE, AFE



25

Thank you!

Angelidisi@upmc.edu, YKA5@pitt.edu



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Fluid Shifts & Vasoplegia: The First 12-24 Hours Postpartum

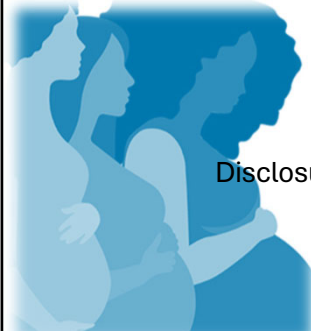
Bushra W. Taha, MD
Divisions of Obstetric Anesthesia & Critical Care Medicine
Department of Anesthesiology, Mass General Brigham
Harvard Medical School



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Disclosures – None



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Road Map

- Develop a hemodynamic framework for early postpartum instability
- Apply this framework to recognize and manage key postpartum conditions
- Understand how delivery mode impacts acute hemodynamics



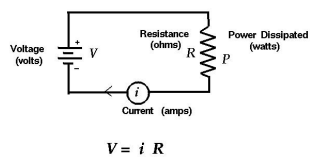
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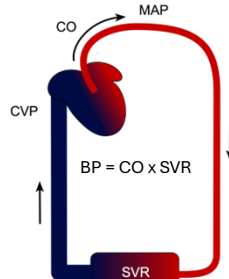
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Ohms Law



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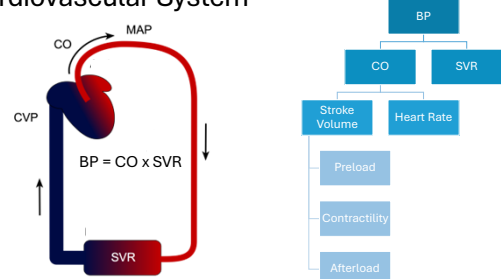
Cardiovascular System



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Cardiovascular System



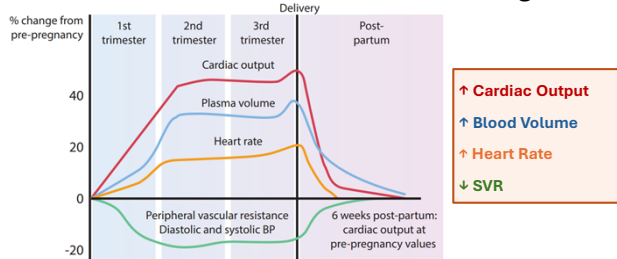
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BT1 change colors for pre/into/afterload
Taha, Bushra W.,MD, 2026-04-09T19:37:44.322

Normal Postpartum Hemodynamic Changes

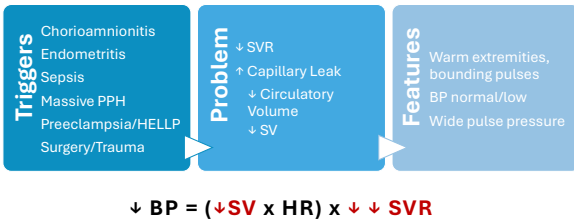
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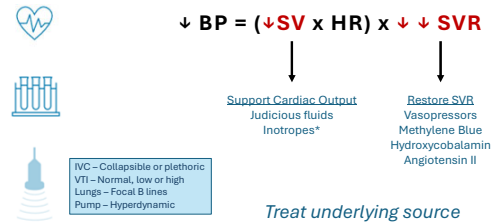
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Systemic Inflammatory Response/Sepsis

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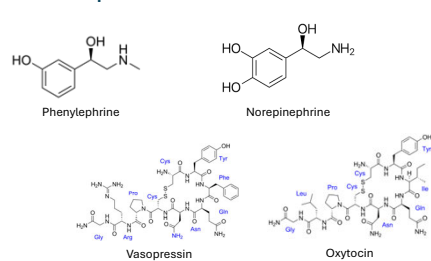
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Systemic Inflammatory Response/Sepsis

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Which pressor to choose?

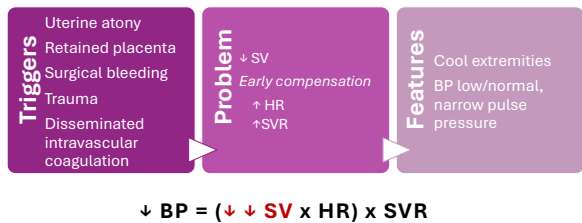


Neuraxial?
SIRS/Sepsis?

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Hemorrhage

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Slide 10

- BT1

state methylene blue, cyanokit explicitly

Taha, Bushra W.,MD, 2026-04-09T19:37:24.994
- BT2

Source control, early consideration of antibiotics

Taha, Bushra W.,MD, 2026-04-09T19:47:27.926

Hemorrhage

$\downarrow BP = (\downarrow \downarrow SV \times HR) \times SVR$

Restore Preload
Balanced resuscitation
Blood products
Crystalloids
Tranexamic acid

Support SVR
Vasopressors*

Fix source of bleeding

IVC – Collapsible
VTI – Low
Lungs – A lines
Pump – Hyperdynamic

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Capillary Leak & Fluid Overload

Triggers
Preeclampsia/HELLP
Sepsis/SIRS
Large-volume resuscitation

Problem
Variable BP
 $\uparrow/\downarrow SV$
 $\uparrow/\downarrow SVR$

Features
Tissue edema
3rd Spacing
Hypoxemia

$BP = (SV \times HR) \times SVR$

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Capillary Leak & Fluid Overload

$BP = (SV \times HR) \times SVR$

Support Cardiac Output
Diuresis
Inotropes
Mechanical Support

Support SVR
Vasopressors

Avoid blind fluid loading

IVC – Plethoric?
VTI – Low?
Lungs – Confluent B lines?
Pump – Impaired?

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Which inotrope to choose?

Epinephrine
CC(N)Cc1ccc(O)c(O)c1

Milrinone
Cc1ccc2nc(=O)c3cc(C#N)ccc3n2c1=O

Dobutamine
CC(O)c1ccc(cc1)CNCc2ccc(O)c(O)c2

Vasopressin (PVR Sparing)
C1=CC=C2C(=C1)C(=C(C=C2)N)C(=O)N3C(=O)C4C(=O)N(C(=O)C4)C3

Inhaled Epoprostenol Nitric Oxide

Mechanical Circulatory Support

LV dysfunction?
RV dysfunction?
Both?

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FLUIDS	VASOPRESSORS	DIURETICS
$\uparrow$ Preload	$\uparrow$ SVR	$\downarrow$ Preload $\downarrow$ Total Volume
True hypovolemia Capillary leak	Vasoplegia Persistent hypotension	Pulmonary Edema Normal/ $\uparrow$ BP
Pulmonary edema	Excessive SVR $\rightarrow$ $\uparrow$ Afterload	Borderline intravascular volume

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Post-Vaginal Delivery Hemodynamic Profile

+/- Neuraxial anesthesia

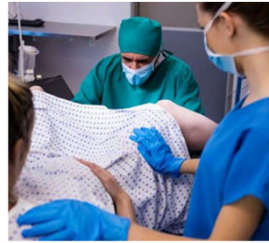
- Minimal (or no) sympathetic block
- Less iatrogenic fluid administration

Delivery factors

- Robust autotransfusion
- Decreased blood loss?

Early postpartum

- Increased HR
- Increased SV



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Post-Cesarean Hemodynamic Profile

Neuraxial anesthesia

- Sympathetic block
- Increased fluid administration

Surgical factors

- Inflammatory response
- Increased blood loss?

Early postpartum

- Low SVR
- Volume-loaded



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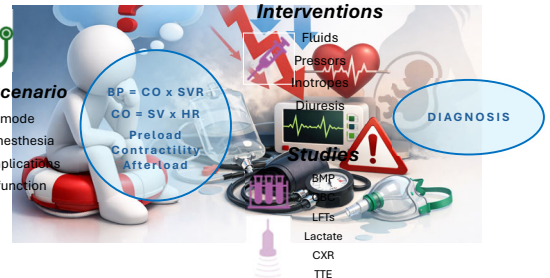
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Acute Interventions

Clinical Scenario

- Delivery mode
- Neuraxial anesthesia
- Delivery complications
- Organ dysfunction



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Thank you!

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Adapted Images
<https://drc.nasa.gov>
<https://rphyiology.com/blood-pressure/bp006>
https://static.vecteezy.com/system/resources/previews/017/402/652/non_2x/infographic-of-ultrasound-probe-including-curvilinear-and-transvaginal-transducer-for-obstetrics-and-gynecology-medical-equipment-vector.jpg
<https://www.intechopen.com/chapter/51211>
<https://madreshoy.com/wp-content/uploads/2019/11/cesarea-programada-e1572895514778.jpg>

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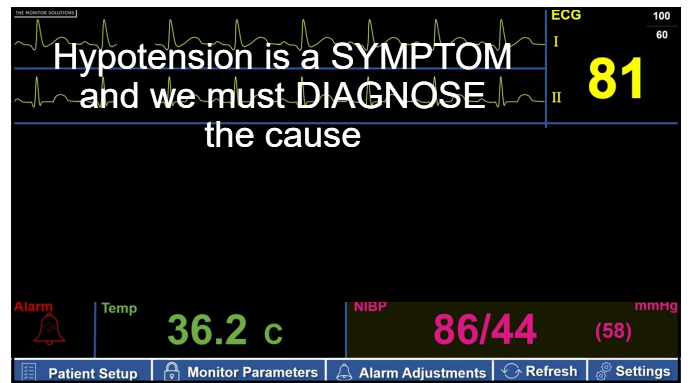
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Postpartum Hypotension

Diagnosing the Underlying Cause

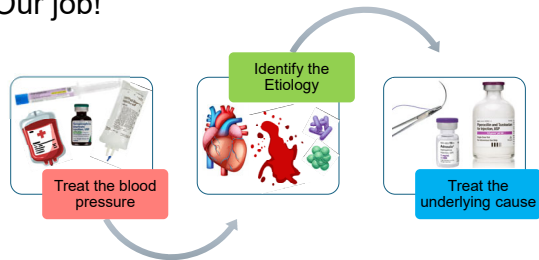
Megan H. Hicks, MD, FASA
Wake Forest University School of Medicine

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Our job!

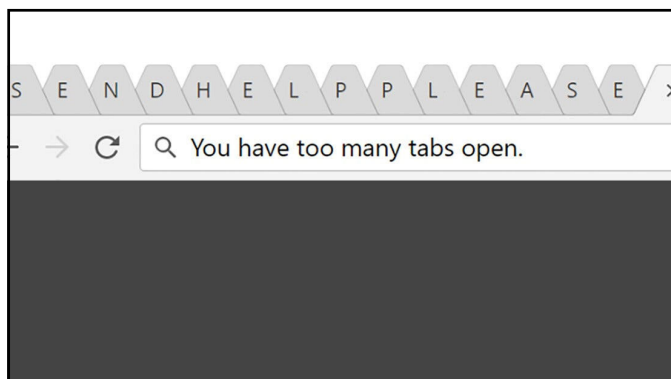


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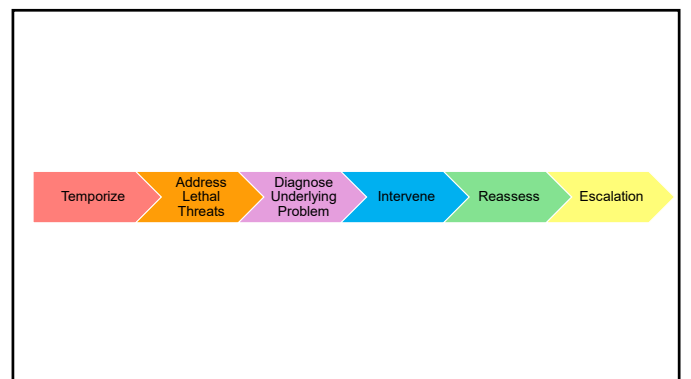
My Approach



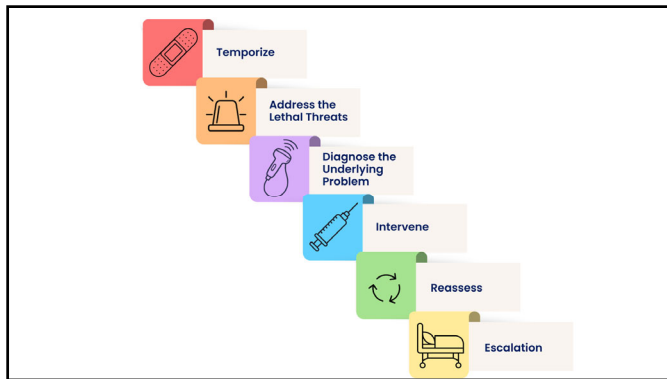
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7

The 3 Killers (Shocks) of the Parturient

- Hemorrhage
- Sepsis
- Cardiovascular Disease
 - Hypertensive Disorders
 - Cardiomyopathy (HOCM, Stress CM, Dilated CM)
 - Obstructive Shock (VAE/PE)
 - Arrhythmias

Chestnut's OB Anesthesia, 7th Edition, Chapters 39 & 44

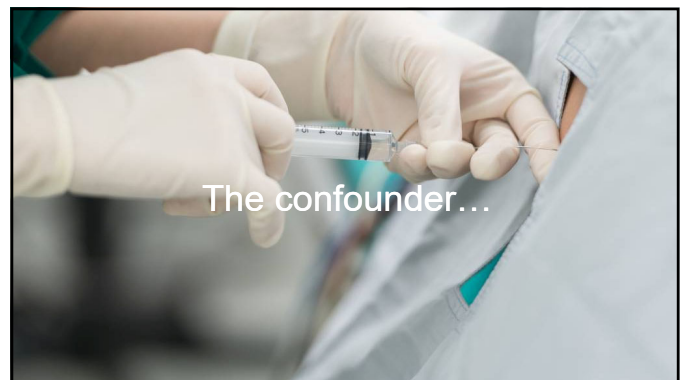
8

Other Potential Diagnoses

- Medication effect
 - Pitocin → Decreases SVR
 - Methylergonovine → High SVR (HOCM), Vasospasm
 - Carboprost → high PVR (100% increase) and PAP (125% increase); worse with bronchospasm
 - Misoprostol → uncommon, but vasospasm has been reported
- Residual Antihypertensive/Mag
- Anaphylaxis
- Bezold-Jarisch Reflex
- Sheehan's syndrome

Chestnut's OB Anesthesia, 7th Edition, Chapter 41
Am J Obstet Gynecol. 1970 Nov 1;108(5):751-760

9



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Hemorrhage

- Uterine atony
- Retained products
- Placenta Accreta Spectrum
- Pelvic Bleeding/Hematomas
- Retroperitoneal Bleeding

TONE – UTERINE ATONY
TISSUE – RETAINED PLACENTA
TRAUMA – LACERATIONS
THROMBIN – COAGULATION

OSMOSIS.org

Chestnut's OB Anesthesia, 7th Edition, Chapter 37
Matern Fetal Med. 2025 Jan;7(1)29-37.

11

Maternal Infection

Chorio • 1-6% of term deliveries • Rx: Amp/Gent or Clinda/Flagyl + Azithro	Endometritis • Up to 16% of CS deliveries	UTI • 2-7% cystitis • 25% pyelo • 17% bacteremia • <i>E. coli, Klebsiella, Enterobacter, Proteus, Gram+</i>
--	--	---

Chestnut's OB Anesthesia, 7th Edition, Chapter 36

12

Maternal Sepsis

- Fever is not required
- Key pathogens:
 - E. coli* (50% of BCx)
 - Group A Strep (20% mortality in 7 days)

Ampicillin
Gentamicin
Clindamycin

*unless respiratory or soft tissue



Address the Lethal Threats

Semin Perinatol. 2024 Nov;28(7):151976

13

Maternal Sepsis



Infection
+
End-Organ
Injury



Address the Lethal Threats

Semin Perinatol. 2024 Nov;28(7):151976

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CMQCC

California Maternal
Quality Care Collaborative

- T <36° or >38°
- HR >110
- RR >24
- WBC >15k or <4k or >10% bands

Any 2 for 15 minutes

UKOSS

UK Obstetric Surveillance System

- T <36° or >38°
- HR >100
- RR >20
- WBC >17k or <4k or >10% bands

Any 2 at 2 different times
(4h for T, HR, RR)

Semin Perinatol. 2024 Nov;28(7):151976

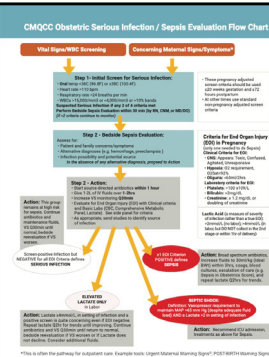
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CMQCC T

• "Two step" p

1. Screen

Positive CMQCC
Suspected Sero
infection



2b. Action

Cultures
Antibiotics within 1 h
1-2L Fluid within 1-2 h
Evaluate for
End-Organ Injury

Semin Perinatol. 2024 Nov;28(7)

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END ORGAN INJURY (EOI) IN PREGNANCY

AMS
Appears toxic,
confused,
agitated, or
unresponsive

Hypoxia
SpO2 <92%
Oxygen
requirement

Oliguria
<60mL in 2
hours

Platelets
<100 x 10⁹/L

Bilirubin
>2 mg/dL

Creatinine
>1.2 mg/dL or
doubled

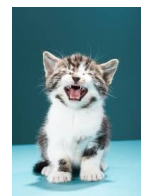
Lactate
>2 mmol/L
measure of severity
rather than EOI

Semin Perinatol. 2024 Nov;28(7):151976

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Reassessment & Escalation

- q30 vitals and q2 lactates
- ICU Transfer:
 - Ongoing resuscitation
 - Vasopressor Requirement
 - Sepsis or Septic Shock
- SOS or MEOWS scores



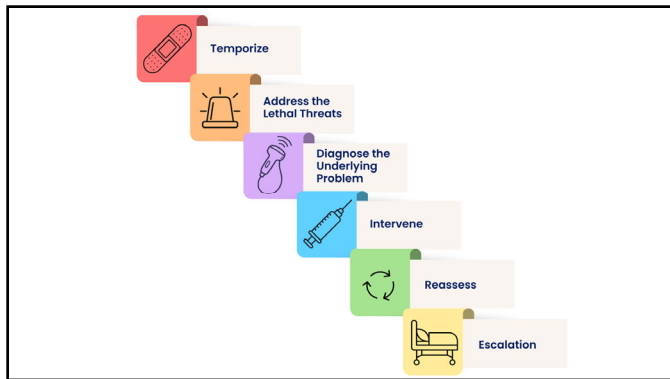
Reassess



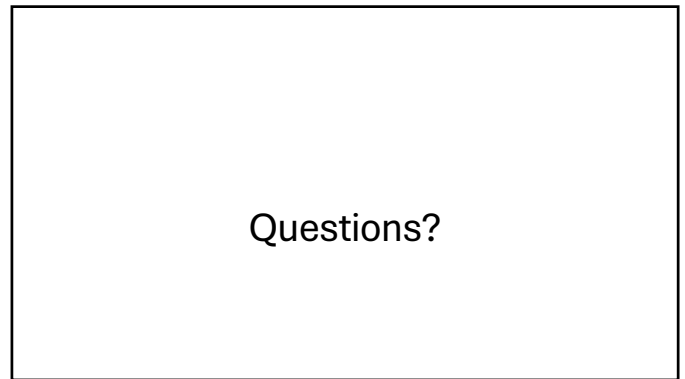
Escalation

Semin Perinatol. 2024 Nov;28(7):151976
BMC Pregnancy Childbirth. 2022 Dec 5;22:901
Obstet Gynecol Surv. 2023;78(4):237-248

18



19



20



1

Updates in Obstetric Hemorrhage

Holly B. Ende, MD (Vanderbilt University)
PPH Risk Prediction

Naida M. Cole, MD (University of Chicago)
Uterotonics

Jessica R. Ansari, MD (Stanford University)
Calcium

John J. Kowalczyk, MD (Mass General Brigham)
TXA & Viscoelastic Testing

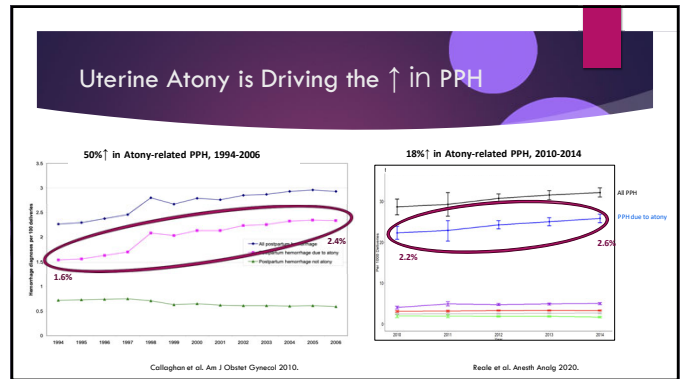
Moderator: Leziga T. Obiyo, MD, MPH
Friday, May 1, 2026

 A banner at the bottom of the slide featuring the SOAP 2026 Annual Meeting logo, a red maple leaf, and a colorful city skyline graphic. The text "FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA" is written across the bottom.

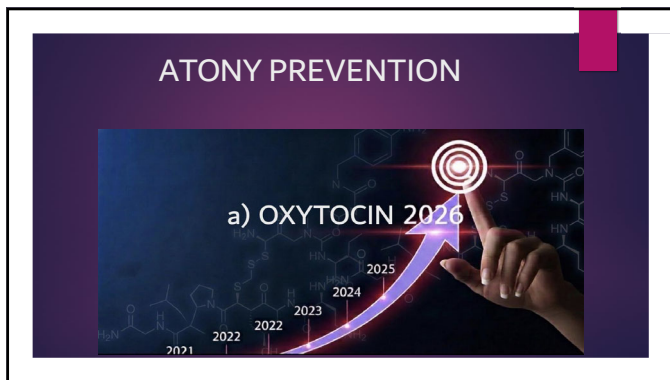
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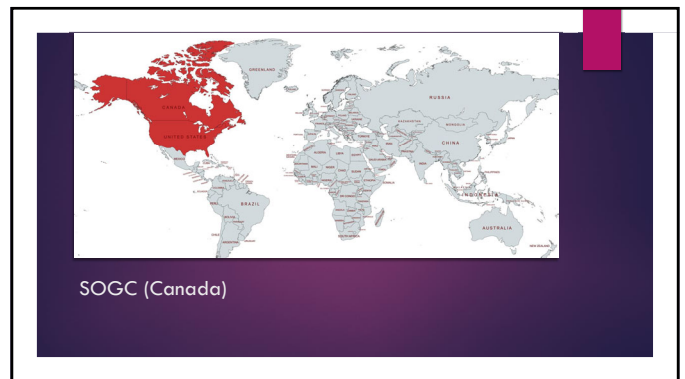
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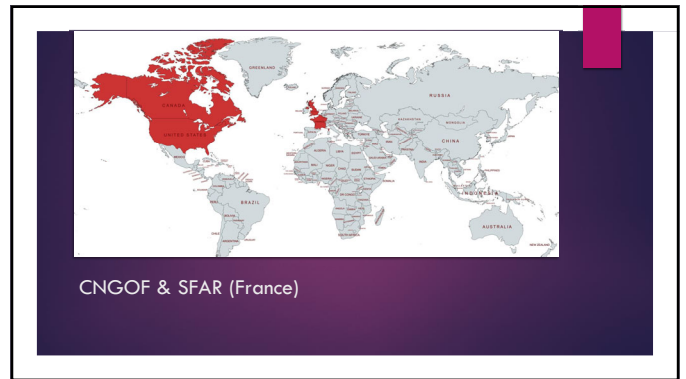


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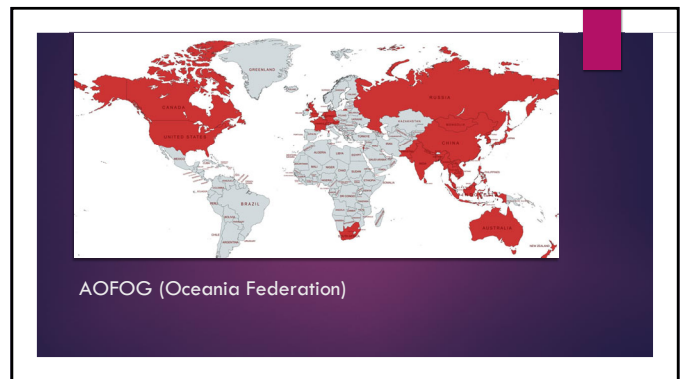
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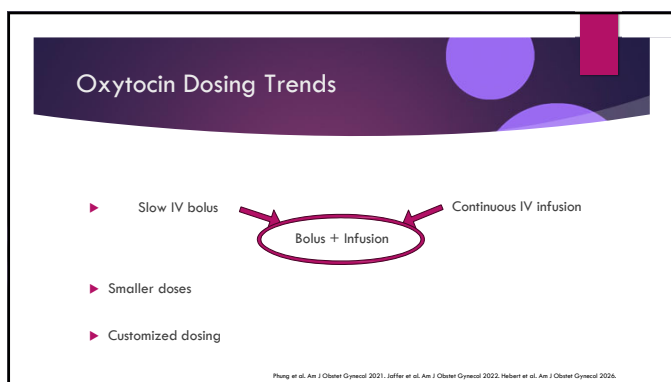
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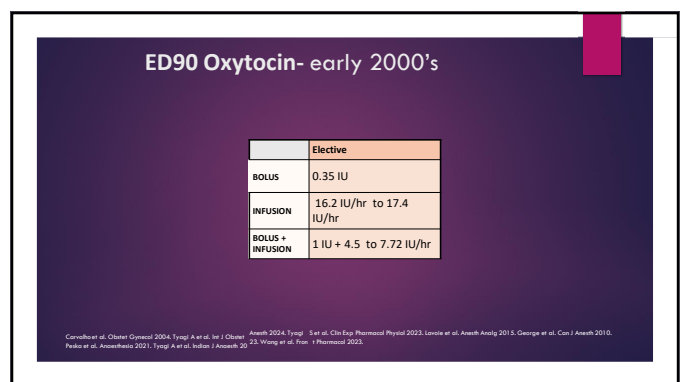
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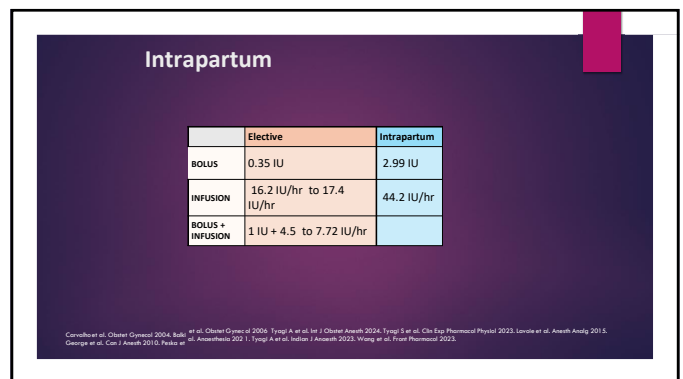
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Other HR Cohorts- 2020's

	Elective	Intrapartum	Weight-based- Elective	Twins-Elective	"Any" RF	AMA + Prior CD
BOLUS	0.35 IU	2.99 IU	0.75 IU (BMI≥40)	3.4 - 4.4 IU	4.7 IU	
INFUSION	16.2 IU/hr to 17.4 IU/hr	44.2 IU/hr	25.7 IU/hr (BMI≥ 30) or 0.29 IU/kg/hr			27.7 IU/hr
BOLUS + INFUSION	1 IU + 4.5 to 7.72 IU/hr					

Carvalho et al. *Obstet Gynecol* 2014; Babi et al. *Obstet Gynecol* 2016; Tyagi A et al. *Int J Obstet Anesth* 2014; Tyagi S et al. *Chin Res Pharmacol Physiol* 2013; Lorde et al. *Anesth Analg* 2015; George et al. *Can J Anesth* 2010; Peake et al. *Anaesthesia* 2021; Tyagi A et al. *Indian J Anaesth* 2023; Wang et al. *Front Pharmacol* 2023.

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Society for Obstetric Anesthesia and Perinatology: Consensus Statement and Recommendations for Enhanced Recovery After Cesarean

International consensus statement on the use of uterotonic agents during caesarean section

Oxytocin

Elective caesarean section

Bolus 1 IU oxytocin; start oxytocin infusion at 2.5-7.5 IU h⁻¹ (0.04-0.125 IU min⁻¹)

If uterine bleeding 2 min, give a further dose of 3 IU over 30 s

Consider second line agent early in the case of uterine atony, but avoid over-treatment and avoid second line agent

Intrapartum caesarean section

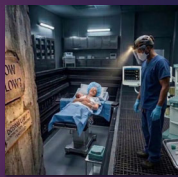
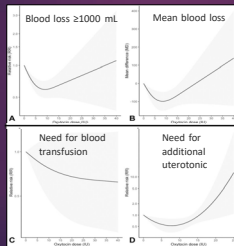
3 IU oxytocin over 30 s; start oxytocin infusion at 7.5-15 IU h⁻¹ (0.125-0.25 IU min⁻¹)

Review the patient's clinical condition before discontinuing the infusion; this will usually be between 2 h and 4 h after commencement

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How Low is Too Low?

Pooled Dose-Effect Curve for Prophylactic Oxytocin in Vaginal Deliveries



Hebert et al. *Am J Obstet Gynecol* 2008.

21

ATONY PREVENTION

b) OTHER UTEROTONICS 2026



22

Systematic Review

ajog.org

Preventing postpartum hemorrhage after cesarean delivery: a network meta-analysis of available pharmacologic agents

Danish Jaffer, MD; Preet Mohinder Singh, MD; Adam Aslam, DO; Alison G. Cahill, MD, MSc; Arvind Palanisamy, MD, FRCAC; David Thomas Monks, MChB, MSc



- ▶ 46 peer-reviewed RCTs comparing 2+ preventive uterotonics
- ▶ 1st outcomes: EBL & need for additional uterotonics
- ▶ Carbetocin probably most effective uterotonic for 1st outcomes
- ▶ Ergometrine + oxytocin, miso + oxytocin probably *inferior* in reducing EBL
- ▶ Ergometrine + oxytocin, miso + oxytocin probably *inferior* in reducing additional uterotonics
- ▶ Unable to complete analysis on side-effects b/c low incidence

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ATONY PREVENTION

c) CARBETOCIN 2026



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Carbetocin

- ▶ Unavailable in U.S.
- ▶ First approval and use in Canada and UK in 1997
- ▶ Now available in >80 countries; approved for PPH prophylaxis in CD & vaginal delivery
- ▶ t_{1/2} ~40mins so no need for subsequent infusion
- ▶ Recommended dose for all deliveries = 100 µg bolus IV or IM
 - ▶ 20 µg carbetocin noninferior to 100 µg, and to 5 IU oxytocin for uterine tone in elective CD
 - ▶ ED90 14.8 µg or 68 µg in elective CD ED90 96 µg in preeclampsia
 - ▶ ED90 121 µg in CD for arrest of labor

McDonough et al. *Anaesthesia* 2022; Zhou et al. *Can J Anaesth* 2014; Trapp A et al. *Can J Anaesth* 2016; Nguyen Lu et al. *Can J Anaesth* 2018; Dawa et al. *Anaesthesia* 2020.

25

Carbetocin vs Oxytocin

- ▶ Carbetocin is similar or better in preventing atony and blood loss in low-risk, elective and non-elective cesarean delivery
 - ▶ Maged 2024- in low-risk CD, ↓need for additional uterotonics, ↓need for transfusion, and ↓Hb drop
 - ▶ Jaffer 2022- in CD, probably ↓blood loss (clinically insignificant volume), ↓additional uterotonics
 - ▶ Onwochei 2019- in elective CD, ↓need for additional uterotonics
 - ▶ Onwochei 2020- in non-elective CD, ↓need for additional uterotonics

Maged et al. *J Obstet Gynaecol Res* 2024; Jaffer et al. *Am J Obstet Gynaecol* 2022; Onwochei et al. *Int J Obstet Anaesth* 2019; Onwochei et al. *Can J Anaesth* 2020.

26



Cochrane Database of Systematic Reviews

Uterotonic agents for preventing postpartum haemorrhage: a network meta-analysis (Review)

Gallo ID, Yunus I, Devall AJ, Podsek M, Tobias A, Price MJ, Oladapo OT, Coomarasamy A

Authors' conclusions

Most agents are effective for preventing PPH when compared with placebo or no treatment. Ergometrine plus oxytocin, and misoprostol plus oxytocin may be more effective than the current standard oxytocin. All agents, except for carbetocin, are associated with an increased risk of some side effects compared with oxytocin.



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Carbetocin- International Guidelines

Anaesthesia 2024, 74, 1300–1319

doi:10.1111/anae.16123

Guidelines

International consensus statement on the use of uterotonic agents during caesarean section

M. Heesen,¹ B. Carvalho,² J. C. A. Carvalho,³ J. J. Duvolski,⁴ E. A. Dyer,⁵ D. N. Lucas,⁶ M. McBurnick,⁷ E. Onwochei⁸ and S. M. Kimchi⁹

Alternative: carbetocin

Elective caesarean section

100 µg over ≥ 20 s.
Smaller doses (as low as 20 µg) may be sufficient; in this case, doses can be repeated if required, up to 100 µg.
Do not exceed 100 µg – if required move to second-line drug.

Intrapartum caesarean section

100 µg over ≥ 20 s.
Do not exceed 100 µg – if required move to second-line drug.

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CHAMPION Trial



THE NEW ENGLAND JOURNAL of MEDICINE

Heat-Stable Carbetocin versus Oxytocin to Prevent Hemorrhage after Vaginal Birth

Authors: Mariana Widmer, M.Sc., Cilda Piaggio, Ph.D., Thi M.H. Nguyen, Ph.D., Alfred Osofi, M.P.H., Olorunfemi O. Owa, M.D., Sujata Misra, M.D., Anil Coomarasamy, M.R.C.O.G., for the WHO CHAMPION Trial Group¹ Author Info & Affiliations

Published June 27, 2018 | N Engl J Med 2018;379:743-752 | DOI: 10.1056/NEJMoa1805489 | VOL. 379, NO. 8 Copyright © 2018



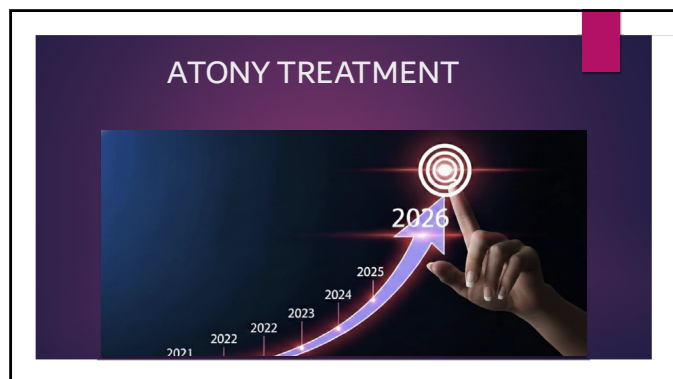
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WHO Recommends Carbetocin

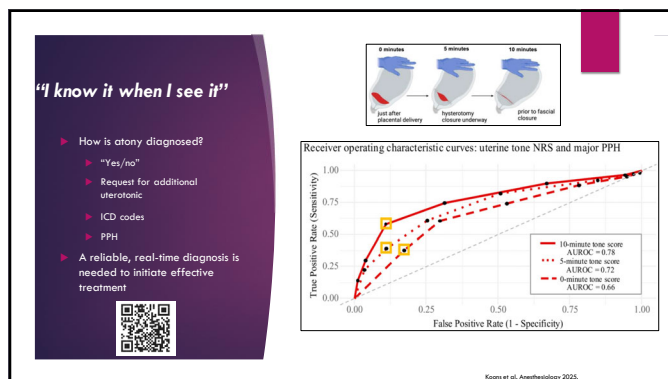


- ▶ Recommended for PPH prophylaxis "in settings where cold chain cannot be guaranteed"
- ▶ Added to WHO model list of essential medicines in 2019

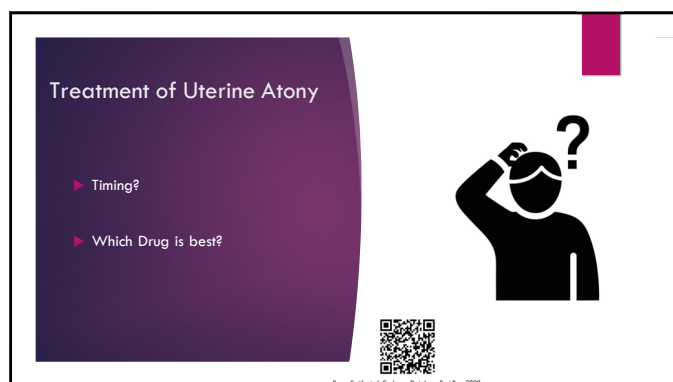
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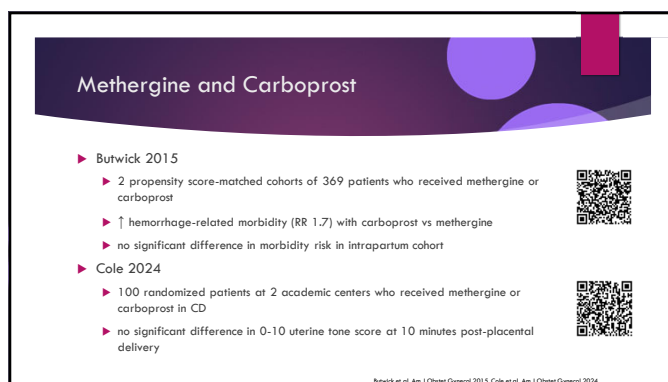
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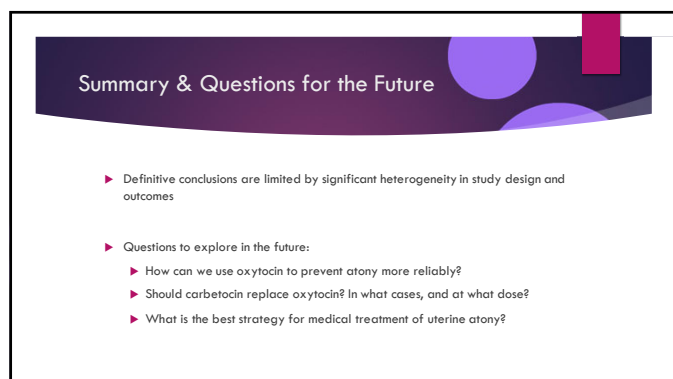
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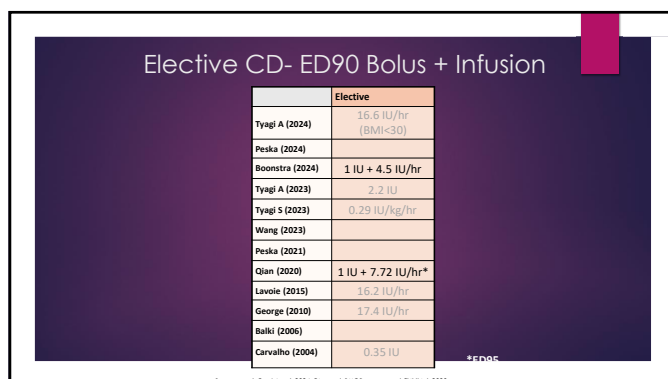
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35



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ED90 in Other High-Risk Cohorts						
	Elective	Intrapartum	Weight-based- Elective	Twins- Elective	"Any" RF	AMA + Prior CD
Tyagi A (2024)	16.6 IU/hr (BMI<30)		25.7 IU/hr (BMI≥ 30)			
Peska (2024)				3.4 - 4.4 IU		
Boonstra (2024)	1 IU + 4.5 IU/hr					
Tyagi A (2023)	2.2 IU				4.7 IU	
Tyagi S (2023)			0.29 IU/kg/hr			
Wang (2023)						27.7 IU/hr
Peska (2021)			0.75 IU (BMI≥40)			
Qian (2019)	1 IU + 7.72 IU/hr*					
Lavoie (2015)	16.2 IU/hr	44.2 IU/hr				
George (2010)	17.4 IU/hr					
Balki (2006)		2.99 IU				
Carvalho (2004)						

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Elective CD- ED90 Infusion	
	Elective
Tyagi A (2024)	16.6 IU/hr (BMI<30)
Peska (2024)	
Boonstra (2024)	
Tyagi A (2023)	2.2 IU
Tyagi S (2023)	0.29 IU/kg/hr
Wang (2023)	
Peska (2021)	
Qian (2019)	
Lavoie (2015)	16.2 IU/hr
George (2010)	17.4 IU/hr
Balki (2006)	
Carvalho (2004)	0.35 IU

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Elective CD- Bolus	
	Elective
Tyagi A (2024)	
Peska (2024)	
Boonstra (2024)	
Tyagi A (2023)	2.2 IU
Tyagi S (2023)	
Wang (2023)	
Peska (2021)	
Qian (2019)	
Lavoie (2015)	
George (2010)	
Balki (2006)	
Carvalho (2004)	0.35 IU

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Emerging evidence for calcium as a uterotonic medication

SOAP 2026
ANNUAL MEETING
MONTREAL, QUÉBEC, CANADA LE WESTIN MONTREAL
APRIL 29-MAY 3, 2026

Jess Ansari, MD, MS
Stanford University School of Medicine
Division of Obstetric Anesthesiology and Maternal Health

1

SOAP 2026 ANNUAL MEETING

No disclosures *** Will discuss off-label use of a medication ***

2

Objectives

- Review the relevant background on PPH, uterine atony, and calcium
- Critically appraise the recent RCTs investigating calcium chloride as a uterotonic
- Practical tips: my recipe for when and how to use calcium in obstetric patients

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

3

PPH is the leading global cause of maternal mortality

Each year:

- 14 million PPHs
- >70,000 maternal deaths due to PPH

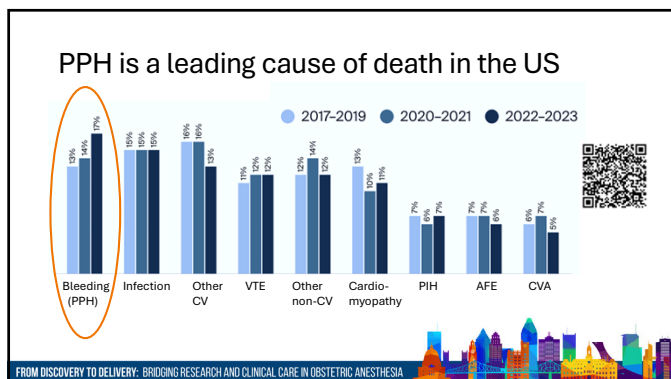
During this one-hour panel, about 10 women will die of PPH.

UNICEF data, maternal mortality ratio per 100,000 births, 2025

WHO, UNICEF, UNFPA, The World Bank Group and the United Nations Population Division, Trends in Maternal Mortality: 2000 to 2023 WHO, Geneva, 2025

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4



5

Uterine atony is the root cause of most PPH

Normal contractility: Minimal bleeding into uterine cavity, Contracted uterine smooth muscle, Compressed vessels.

Uterine atony: Brisk bleeding into uterine cavity, Atonic uterine smooth muscle, Vessels aren't compressed and bleed profusely.

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

6

It's time for new treatments

Ideally inexpensive, accessible ones

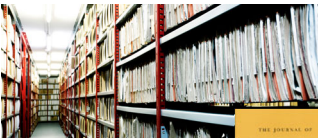
- Oxytocin**
 - denatured by heat, often not enough
- Carbetocin**
 - \$\$\$\$\$, not approved in US, same mechanism as oxytocin
- Methylergonovine**
 - \$\$\$ denatured by heat
 - Contraindicated in HTN, preeclampsia, cardiac dz
- Carboprost**
 - \$\$\$\$\$, requires refrigeration
 - Contraindicated in asthma, pulmonary disease
- Misoprostol**
 - Doesn't really work



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7

The idea: could calcium be a uterotonic?



Calcium Distribution and Exchange in the Rat Uterus

CASEY VAN BREEMEN, E. E. DANIEL, and DIANNE VAN BREEMEN

From the Department of Pharmacology, University of Alberta, Edmonton, Alberta, Canada. Dr. and Mrs. van Breemen's present address is the Department of General Physiology, University of Leicester, Leicester, England



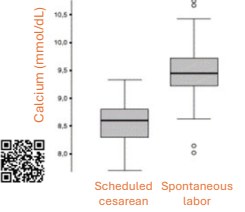
"For years, I would chip in a little calcium when the tone was poor. It somehow fell by the wayside."

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

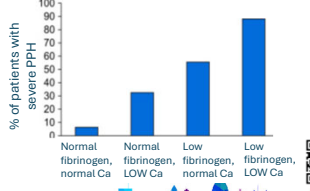
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Observational studies suggest more serum calcium might be better for uterine contractility

Patients with spontaneous labor have higher serum calcium



Lower serum ionized calcium is associated with severe PPH



FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

9

4 placebo-controlled RCTs (and counting)

Journal of Clinical Anesthesia
Supports open access

Calcium chloride for the prevention of uterine atony during cesarean delivery: A pilot randomized controlled trial and pharmacokinetic study

Ansari R, Ansari MD¹, A. El, Neil Katariga MD², Brendon Corvalan MBChB, FRCA³, Pamela Wood MD, MSc⁴, Neil Goss PhD⁵, Edward Riley MD⁶

IJOA International Journal of Obstetric Anesthesia

Research Article
Effect of prophylactic intravenous calcium gluconate on uterine atony during intrapartum cesarean delivery with spinal anesthesia: a placebo controlled, randomized clinical trial

T.L. Abirami¹, P. Radhagwa², A.K. Jha³, A. Kuberan⁴, N.S. Kuberan⁵, S. Ramachandran⁶, B. Ravichandrasekar⁷

OBSTETRICS & GYNECOLOGY ACOG

Intravenous Calcium to Decrease Blood Loss During Intrapartum Cesarean Delivery: A Randomized Controlled Trial

Ansari, Reshika R. MD, MS; Vermeulen, Alla MD, MS, MChol; Guilleminio BS; Lyell, Devindra MD; Heelin, Haley PhD; Cornfield, David N. MD; Carvalho, Brendon MBChB, FRCA; Bateman, Brian T. MD, MS

Author information: [DOI: 10.1097/AOG.0000000000000441](#)

AJOG-MFM
Randomized Clinical Trial

Role of prophylactic intravenous calcium in prevention of postspinal hypotension among women with preeclampsia undergoing cesarean delivery: a placebo controlled randomized clinical trial

Naveen Kumar Yadav, MBBS; Suman Lata, MBBS, MD; Nivedita Jha, MBBS, MS; Deepak Chakravarthy, MBBS, MD; Ajay Kumar Jha, MD, DM

10

4 placebo-controlled RCTs

Journal of Clinical Anesthesia
Supports open access

Ansari et al, 2022
40 patients undergoing cesarean delivery with 2+ risk factors for atony
Dose: 1000mg calcium chloride
Effect on blood loss: -100mL (p 0.15)

IJOA International Journal of Obstetric Anesthesia

Abirami et al, 2026
367 patients undergoing intrapartum cesarean delivery
Dose: 1000mg calcium gluconate
Effect on blood loss: -56 mL (p 0.001)

OBSTETRICS & GYNECOLOGY ACOG

Ansari et al, 2024
120 patients undergoing intrapartum cesarean after induction/ augmentation with oxytocin
Dose: 1000mg calcium chloride
Effect on blood loss: -211mL (p=0.07)

AJOG-MFM
Randomized Clinical Trial

Yadav et al, 2025
100 patients with preeclampsia on magnesium, undergoing cesarean delivery
Dose: 500mg calcium gluconate
Effect on blood loss: -66mL (p=0.004)

11

What's the take home from trial data so far?

- Calcium is well tolerated
- Calcium gluconate and calcium chloride have both been tested
 - (3g calcium gluconate == 1g calcium chloride)



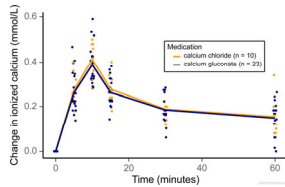
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12

Practical application: What can go wrong?

Injecting **too fast** (especially calcium chloride)

- Causes nausea, vomiting, pain, flushing, profound bradycardia
- RCTs using calcium chloride **dilute** in 60-100mL and **infuse slowly**
- If this isn't practical, **chip in calcium gluconate instead!**



As long as you give in a 3:1 ratio, calcium gluconate and calcium chloride work **exactly the same!**



13

Practical application: What can go wrong?

Horrible tissue injury from **extravasation** (calcium chloride)

- Only give through a peripheral IV we are confident is patent
- Dilute, infuse slowly, and **stop immediately if it hurts**
- If this isn't practical, use **calcium gluconate instead!**



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Why not just use calcium gluconate?



In clinical practice, we probably should reach for calcium gluconate!

Some RCTs chose to develop **safe protocols for calcium chloride** as it is:

- less expensive
- more widely available globally

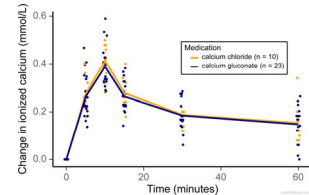
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15

Why not just use calcium gluconate?



Remember: If you give in a 3:1 ratio, calcium gluconate and calcium chloride work **exactly the same!**



FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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My recipe for calcium in clinical practice



Which patients:

- Prophylactic calcium** after cord clamping only if the patient is **high risk for uterine atony** and
 - Contraindications to uterotonic medications, or
 - Unwilling to receive blood products
- Treatment calcium** if the patient is **not responsive to oxytocin escalation**

What drug and dose: I draw up one gram at a time of **calcium gluconate** and chip in over about 3 minutes. I stop when tone is improved (often less than 3 grams) or when I have given 3 grams.

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

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What's next?

Multicenter RCTs

National and International

Intrapartum cesarean delivery
n ≈ 3000



Outcome: Major Postpartum Hemorrhage
(Transfusion, surgical intervention, ICU admission, death)



18



19

The Coagulopathy of PPH: Fibrinogen is the Sentinel Marker

- Coagulopathy complicates ~20% of massive PPH — hyperfibrinogenemia is the dominant abnormality
 - Bell 2021 (Oakes national cohort, N=60,514 maternities): hypofibrinogenemia in 17.1% of massive PPH; coagulation products given in 22.9%
- Coagulopathy is uncommon in moderate PPH (<1,500 mL) and escalates with blood loss volume — fibrinogen is the first factor to fail
- Charbit 2007 (N=129): fibrinogen at PPH diagnosis predicts progression to severe PPH
 - Fibrinogen <200 mg/dL + PPV 100% for severe PPH
 - Fibrinogen >400 mg/dL + NPV 70% for severe PPH
- Clinical implication: fibrinogen is the first, fastest, and most actionable coagulation marker in PPH

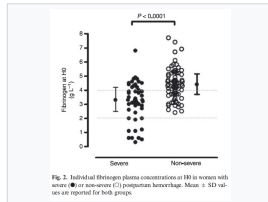


Fig. 1. Fibrinogen at time of PPH diagnosis — severe vs. non-severe (Charbit 2007)

Bell SE, et al. *Int J Obstet Anesth*. 2021. | Bell SE, et al. *Int J Obstet Anesth*. 2022. | Charbit R, et al. *J Obstet Gynaecol*. 2007 Feb.

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FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA

1

TXA for Treatment of PPH: Give It Early

Mechanism & Dosing

- Inhibits plasminogen binding to fibrin → reduces fibrinolysis
- Dose: 1 g IV over 10 minutes
 - Repeat 1 g at 30 minutes if bleeding persists
 - No benefit if given >3 hours from birth

Safety: NEVER store near neuraxial medications
Intrathecal injection causes refractory seizures and death (>50% mortality)

WOMAN Trial

N=20,080 - 193 hospitals - 27 countries

Outcome	TXA	Placebo	RR (95% CI)
Death or hysterectomy at 42 d (primary outcome)	5.3%	5.8%	0.97 (0.88-1.07) p=0.65
Death from bleeding (any time)	1.5%	1.9%	0.81 (0.65-1.00) p=0.045
Death from bleeding if TXA given <3h from birth	1.2%	1.7%	0.69 (0.52-0.91) p=0.008 ✓
Hysterectomy	3.6%	3.5%	1.02 (0.88-1.07) p=0.84

Primary endpoint negative, but death from bleeding — the outcome that matters most — is reduced by 31% when TXA is given within 3 hours.

WOMAN Trial Collaborators. *Lancet*. 2017 May.

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2

Prophylactic TXA: No Benefit Across Three Large RCTs

Trial	Setting	N	Primary Outcome	Result
TRAP (Sentinella 2016, NEJM)	Vaginal delivery (France)	4,079	PPH ≥500 mL	No difference p=0.29
TRAP2 (Sentinella 2021, NEJM)	Cesarean delivery (France)	4,551	Calculated EBL ≥1,000 mL or transfusion	+ by calculation only; no difference in transfusion or Hgb
Pacheco 2023 (NEJM)	Cesarean delivery (US, 31 sites)	11,000	Death or blood transfusion by day 7	No difference RR 0.98, p=0.11
Lancet PD Meta-Analysis (Ror 2024)	Vaginal + cesarean (global)	>35,000	Blood loss, transfusion, mortality	"Little to no difference"

Why doesn't prophylaxis work?

- Fibrinolysis is uncommon in obstetric PPH - Arnolds 2020 (Anesth Analg): only 12.7% (15/118) of PPH cases have elevated LY30 on TEG, and none had elevated LY30 on the fibrinogen channel - clot retraction is a normal artifact
- Dominant mechanism is fibrinogen utilization, not hyperfibrinolysis - TXA cannot prevent what is not occurring
- ACOG Practice Bulletin No. 183 (2017): TXA recommended for treatment of PPH - not prophylaxis

Sentinella L, et al. *N Engl J Med*. 2016 Aug. | Sentinella L, et al. *N Engl J Med*. 2021 Apr. | Pacheco LD, et al. *N Engl J Med*. 2023 Apr. | Ror K, et al. *Lancet*. 2023 Oct. | Arnolds DE, et al. *Anesth Analg*. 2020 Nov. | ACOG Practice Bulletin No. 183, 2017.

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3

VHA in PPH: Real-Time Diagnosis, Targeted Treatment

Why conventional coag labs are inadequate in PPH

- 30-60 min turnaround time — too slow for active hemorrhage
- Assess isolated factors in plasma, not whole-blood clot quality or fibrinogen function

What VHA provides

- Real-time whole-blood assessment in 10-15 minutes
- Four actionable parameters (TEG 6s / ROTEM Sigma):
 - Clot initiation (CK R / EXTEM CT)
 - Fibrinogen function (MA CFF / FIBTEM A10)
 - Platelet contribution (MA CRT / EXTEM A10)
 - Fibrinolysis (LY30 / L10)

Key Evidence (before-after study design)

Study	Key Findings
Mullaiah 2016 (Anesth Analg)	+ FFP, + platelets + fibrinogen concentrate use
Singavskikh 2016 (J Clin Anesth)	+ ICU admission + hysterectomy, + hospital LOS
McNamee 2019 (Anesth Analg)	+ FFP, + platelets, + cryo + TACO, + fibrinogen concentrate
de Lloyd 2022 (Int J Obstet Anesth)	+ blood loss ≥2,000 mL + RBC, + FFP transfusion, In fibrinogen <2 g/L subgroup: 24u RBC fell 67% +0%

Limitation: All four studies are before-and-after observational designs — no RCT evidence in obstetrics. Effect may reflect protocol adoption rather than VHA itself. Ongoing RCT (OBS UK) evidence expected.

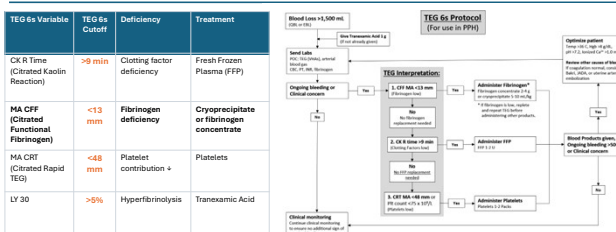
Mullaiah S, et al. *Anesthesiology*. 2016. | McNamee H, et al. *Anesthesiology*. 2019. | Singavskikh S, et al. *J Clin Anesth*. 2016. | Arnolds DE, et al. *Anesth Analg*. 2020 Nov. | de Lloyd L, et al. *Int J Obstet Anesth*. 2022 Aug.

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TEG 6s Threshold-Driven Protocol in PPH



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5

Take-Home Points

- Fibrinogen is the sentinel marker of PPH coagulopathy. It fails first, predicts progression to severe PPH, and is the primary target for replacement.
- Give TXA early — within 3 hours from birth — when PPH occurs. WOMAN trial: 31% reduction in death from bleeding when TXA given <3h. Should be given after initial medical PPH treatment has failed.
- Prophylactic TXA has no demonstrated clinical benefit. TRAP, TRAP2, and Pacheco 2023 (N=19,000 combined) show no meaningful difference in transfusion, hemorrhage-related morbidity, or mortality. ACOG PB183 recommends TXA for treatment, not prevention.
- VHA provides real-time diagnosis of coagulopathic mechanisms. Identifies fibrinogen deficiency, factor deficiency, platelet dysfunction, and hyperfibrinolysis — guiding targeted rather than empiric therapy.
- VHA-guided protocols reduce unnecessary FFP and platelet transfusion. Before-and-after studies consistently show + FFP, + platelets, and + TACO — replace what the TEG / ROTEM tell you is deficient.

WOMAN Trial Collaborators. *Lancet*. 2017 May. | Sentinella L, et al. *N Engl J Med*. 2016, 2021. | Pacheco LD, et al. *N Engl J Med*. 2023 Apr. | Ror K, et al. *Lancet*. 2023 Oct. | Arnolds DE, et al. *Anesthesiology*. 2019. | McNamee H, et al. *Anesthesiology*. 2019. | ACOG Practice Bulletin No. 183, 2017.

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6

Program Material

Saturday, May 2, 2026

Workshop (fee & pre-registration required)

POCUS

Moderator: Cristian Arzola, MD

Faculty: Brinda Kamdar, MD; Naveed Siddiqui, MD; Evan Wild, MD; Fabricio Zasso, MD; Naida Cole, MD; Leziga T. Obiyo, MD; Javier Cubillos, MD; Ana Sjaus, MD

Best Case Reports

Moderator: Sharon Reale, MD

1. Tiny Spine, Tall Challenges: A Case Report of Cesarean Delivery in Spondyloepiphyseal Dysplasia - Fatine Karkri, MD
2. Extreme Sustained Hemorrhage during Cesarean-Hysterectomy for PAS: Blood Product Stewardship, Precision Coagulation Management, and Interdisciplinary Communication - Manuel A. Fierro, MD
3. The Alarm That Never Sounded: Epidural Pump Failure Resulting in Pneumorrhachis - Eliezer Mendeleev, MD
4. Successful Avoidance of Ventricular Tachycardia Using Combined Spinal-Epidural Anesthesia for Cesarean Section in a Patient with Catecholaminergic Polymorphic Ventricular Tachycardia - Momoko Kobayashi
5. Obstetric Management and Anesthesia Considerations in Huntington's Disease - Lucas Steele, MD
6. Chloroprocaine laboring epidural for parturient with history of anaphylaxis to amide local anesthetic - Spencer Hansen
7. Anesthetic Management of a Parturient with Cowden Syndrome and Lhermitte-Duclos Disease - Allison A. Mootz, MD
8. High Pressures, High Stakes: Anesthetic Management of Cesarean Delivery in a Patient with Severe Pulmonary Arterial Hypertension Requiring Mechanical Circulatory Support - Daniel F. Berenson, MD, PhD
9. Bridging the Knowledge Gap: The Role of Obstetric Anesthesiologists in a Case of Pulmonary Alveolar Proteinosis - Jace R. Battrell, MD, MSMP
10. Pituitary hemorrhage in patient after uncomplicated repeat cesarean delivery - Makela Stankey, MD

Best Paper Research Competition

Moderator: Ruthi Landau, MD

Judges/Panelists: Allison Lee, MD; Brandon Togioka, MD; Paloma Toledo, MD; Cynthia Wong, MD; David Arnolds, MD

1. Inflammation Sensitizes Term Human Myometrium to Somatostatin-Mediated Contractility via Somatostatin Receptor Type 2 (SSTR2) - Anuradha Baishnob, HBSc
2. Proteomic Investigation of Myometrium from Pregnant Women with Class III Obesity - Joseph Park
3. Systemic Immune Signatures Predict Successful Induction of Labor: A Single-Cell Mass Cytometry Prospective Cohort Study - Kazuo Ando, MD, PhD
4. Incidence of general anesthesia for cesarean delivery according to urgency: Prospective multinational multicenter observational study of 31 European countries, 9,989 cases - Carolyn Weiniger, MB, ChB

5. The Dural Puncture Epidural Technique Reduces Labor Epidural Failure Rate: Causal Inference from Electronic Health Records - Daniel F. Berenson, MD, PhD
6. Impact of Tranexamic Acid Rate of Administration on Maternal Blood Pressure: A Prospective, Randomized, Double-Blind, Non-Inferiority Trial - Juliana Kruthof, MD, MSc, FRCPC

Workshop (fee & pre-registration required)

[Focused Cardiac Ultrasound \(TTE\) Refresher Workshop](#)

Moderator: Clemens Ortner, MD

Faculty: Raffaella Fantin, MD; Alexandra Nicholas, MD; Cristian Arzola, MD; Mohamed Eissa, MD; Juan Francisco Morales, MD; Jean M. Carabuena, MD

[SOAP Annual Awards](#)

- Best Research Paper
- Gertie Marx
- Teacher of the Year
- Best Case Report
- Diversity & Inclusivity Award
- Patient Safety Award/APSF
- Research in Education Award
- Frederick P. Zuspan Award
- Mentoring Excellence Award
- Center of Excellence
- SOAP/Kybele International Outreach Grant
- SOAP Diversity & Inclusivity Mentored Grant

[SOAP Distinguished Service Award](#)

Introduction: Lawrence Tsen, MD

Speaker: Mark Zakowski, MD

[Gerard W. Ostheimer Lecture](#)

Introduction: Emily Sharpe, MD

Speaker: David Monks, MD

Tiny Spine, Tall Challenges: A Case Report of Cesarean Delivery in Spondyloepiphyseal Dysplasia

Fatime Karkri, MD

Gillian Abir, MBChB, FRCA

Lindsey Ralls, MD

Spondyloepiphyseal Dysplasia Congenita (SEDC): Rare skeletal dysplasia

Characteristics	Anesthesia considerations
Extreme short stature Short trunk Normal or short limbs Contracted pelvis w/ ↓ intercrural measurements	Unpredictable neuraxial spread
Odontoid hypoplasia Laryngotracheal stenosis	Cervical instability Difficult airway
Progressive kyphoscoliosis w/ platyspondyly Pectus carinatum	Reduced pulmonary reserve Difficult neuraxial technique Pulmonary hypertension?
Lower limb deformities Coxa vara Genu valgum Talipes equinovarus	Difficult positioning CI to vaginal delivery

Limited literature
2 CDs → epidural
2 CDs → GA w/ awake FOB

Dr J Anesth. 2001;8(2):123-4
Anesth Analg. 1991;72(4):948-52
Indian J Anaesth. 2014;58(2):141-147
Int J Obstet Anesth. 2014;23:56-57



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1

Tiny Spine, Tall Challenges: A Case Report of Cesarean Delivery in Spondyloepiphyseal Dysplasia

Fatime Karkri, MD

Gillian Abir, MBChB, FRCA

Lindsey Ralls, MD

Patient	Anesthetic course	Postpartum course
♀ 28 y/o G1P0 Genetically confirmed SEDC Height 4' 2" (128.3 cm) Weight 128 lbs (58.1 kg) BMI 35.3 Imaging C1-C2 instability Marked thoracic kyphoscoliosis Chiari I (neurosurgery cleared) Limited hip abduction after prior bilateral hip surgeries Elective CD at 38+2 weeks	Ultrasound-guided CSE Hyperbaric bupivacaine 0.75% 0.8 mL Fentanyl 15 mcg Morphine 100 mcg Bilateral sensory level to T2 within 7 min Transient dysphagia Preserved hand strength ↑ surgical discomfort near end Epidural top-up + IV analgesia QBL 741 mL	New-onset preeclampsia with SF Tx MgSO4 Discharged POD5  Fig 1. Sagittal MRI of the spine showing marked thoracic kyphoscoliosis with vertebral flattening

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Tiny Spine, Tall Challenges: A Case Report of Cesarean Delivery in Spondyloepiphyseal Dysplasia

Fatime Karkri, MD

Gillian Abir, MBChB, FRCA

Lindsey Ralls, MD

After neurosurgical clearance, in patients with extreme short stature, a **low-dose CSE** can be effective, but:

1. Risk of high spinal block remains
→ Monitor closely for evolving neurologic signs
2. Rostral opioid migration (hydrophilic > lipophilic) could manifest with dysphagia without motor involvement
→ Monitor closely for airway compromise
3. Expect shorter block duration
→ Ensure a **functional epidural** catheter for top-up anesthesia

Multidisciplinary planning is essential:
Anesthesiology, neurosurgery, obstetrics, neonatology

Neuraxial ultrasound guidance is highly useful when surface landmarks are unreliable

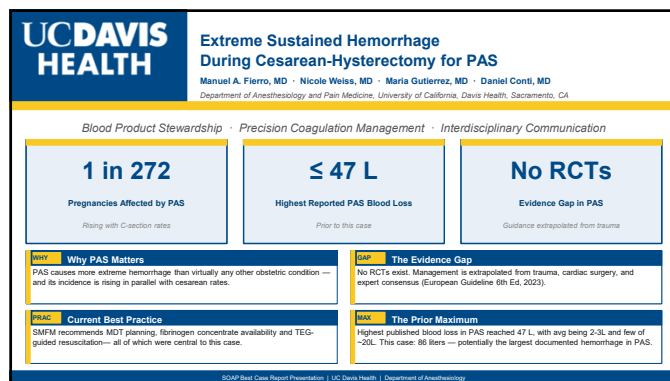
Individualize risk-benefit analysis & maintain close neurologic monitoring

With careful **planning**, **neuraxial ultrasound** guidance and reliable **epidural backup**, **low-dose CSE** may be a safe anesthetic strategy for CD in selected SEDC patients

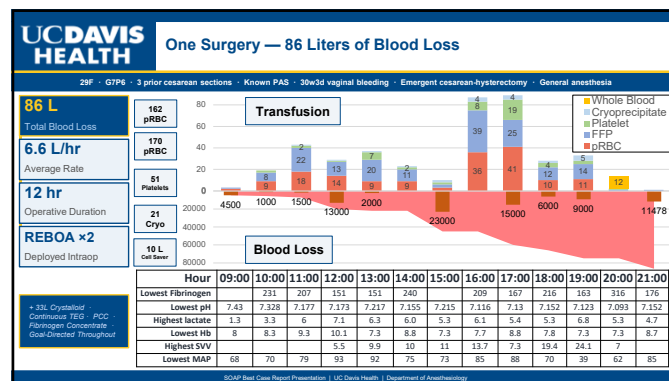
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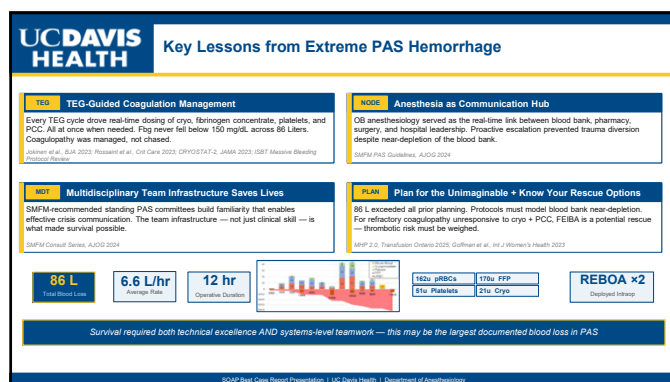
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1



2



3

The Alarm That Never Sounded: Epidural Pump Failure Resulting in Pneumorrhachis

Eliezer Mendeliev, MD, Sonia Ristov, MD, Jennifer N. Tripi, MD

Background

- Pneumorrhachis (PR) is the presence of air within the spinal canal
- While rare, may occur after inadvertent accidental dural puncture and use of air with LOR
- No published cases describe a **disabled epidural pump "air-in-line"** alarm as etiology
- Presentations range from asymptomatic to severe neurologic compromise
- Symptoms are nonspecific and may mimic post-dural puncture headache, labor-related pain, or epidural failure
- CT most sensitive** imaging modality; MRI to evaluate associated spinal cord injuries or underlying pathology

Pneumorrhachis Symptoms

Source: Original image created using Google Gemini

1

Case

Timeline

- Epidural placed**: Intermittently inadequate analgesia
- Clinician boluses**: Temporary effective pain relief
- Bag exchange**: To trial higher concentration
- Failure identified**: Unprimed tubing delivering air
- Treatment Started**: Oxygen, therapy and bedrest, CT imaging

- Background**: 20-year-old laboring patient without significant PMH had elective labor epidural placed
- Symptoms**: upper back and neck discomfort, poor labor analgesia that improved with clinician boluses
- CT Imaging**: gas tracking throughout epidural space on CT head/neck
- Neurologic exam**: normal without focal deficits
- Treatment**: oxygen, bed rest and acetaminophen led to symptom resolution within 48 hours

Unprimed Epidural Pump

Sagittal and transverse CT scans showing entrained epidural air

2

Teaching Points

Recognition

- Consider PR when epidural analgesia is ineffective and symptoms are atypical.
- Headache, neck pain, and back pain are nonspecific; neurologic deficits are often absent.
- CT imaging** is highly sensitive for intraspinal gas and can establish the diagnosis quickly.

Management

- Conservative Management**:
 - Serial neurologic examinations
 - Bed rest
 - Analgesics
 - Supplemental oxygen to accelerate air resorption
 - Few reports of hyperbaric oxygen use in severe cases
- Neurosurgery consultation** if there is cord compression or evolving neurologic dysfunction.

Prevention is Key!

- Prime epidural tubing** before pump initiation and after bag changes.
- Do not disable "air-in-line" alarms** without a clear risk mitigation plan and provider awareness.
- Epidural pump design should **default alarms to ON**, visibly display a disabled status, and use appropriate sensitivity.

References:

- Quaranta T, et al. Traumatic pneumorrhachis: a case report. *World Neurology*. 2015;6(1):1-4.
- Devita MJ, et al. Pathogenesis, diagnosis and management of pneumorrhachis. *Int J Gynaecol Obstet*. 2006;95(1):10-14.

3

Successful Avoidance of Ventricular Tachycardia Using Combined Spinal-Epidural Anesthesia in a CPVT Patient

Momoko Kobayashi Department of Obstetric Anesthesia, Saitama Medical Center, Saitama Medical University

BACKGROUND

- Catecholaminergic polymorphic ventricular tachycardia is a rare inherited arrhythmogenic disorder. ¹⁾
- Most commonly caused by *RyR2* gene mutations. ¹⁾
- Stress-related endogenous catecholamine surges trigger bidirectional or polymorphic VT. ¹⁾
- Prevalence is 1 in 10,000 with onset typically in childhood. Reports of CPVT during pregnancy remain extremely limited. ²⁾
- Anesthetic management must strictly suppress catecholaminergic and sympathetic surges to prevent life-threatening VT or VF.

First report of an intra-patient comparison demonstrating ventricular tachycardia triggered by general anesthesia versus successful avoidance of VT using neuraxial Anesthesia.

FIGURE 1. Comparison of normal RyR2 function (Panel A) and mutated RyR2 function (Panel B). Panel A shows normal calcium release and reuptake. Panel B shows a leaky channel causing diastolic calcium release and arrhythmia. Below the diagrams are ECG traces showing normal sinus rhythm and a polymorphic VT episode.

1

Successful Avoidance of Ventricular Tachycardia Using Combined Spinal-Epidural Anesthesia in a CPVT Patient

Momoko Kobayashi Department of Obstetric Anesthesia, Saitama Medical Center, Saitama Medical University

THE CASE

36-year-old, G2P1. Diagnosed with CPVT at age 8 following familial screening ; positive for an *RyR2*

Medication ; carvedilol (20 mg/day) and flecainide (150 mg/day)

Previous cesarean delivery ; under general anesthesia , VT during both tracheal intubation and extubation.

A repeat cesarean section at 37 weeks

Sequential Combined Spinal-Epidural

Local anesthetic dose was reduced by 50% (hyperbaric bupivacaine 6 mg).

To avoid airway-related sympathetic stimulation while minimizing hemodynamic fluctuation.

Management

- Invasive arterial pressure monitoring
- Continuous landiolol infusion (1–2 µg/kg/min)
- not to use ephedrine or norepinephrine
- Slow oxytocin infusion (5 U over 5 min).

Preparedness: External defibrillator pads

Antiarrhythmic medications (amiodarone)

min, mmHg, %

HR, ABP(S), ABP(D), Sat

Outcome

Healthy infant delivered successfully (Apgar 8/9 ; UAph 7.30).

The patient was discharged on postoperative day 6.

No intraoperative or postoperative VT occurred.

2

Successful Avoidance of Ventricular Tachycardia Using Combined Spinal-Epidural Anesthesia in a CPVT Patient

Momoko Kobayashi Department of Obstetric Anesthesia, Saitama Medical Center, Saitama Medical University

	Case 1	Case 2 ²⁾	Case 3 ²⁾	Case 4 ⁴⁾	Case 5 ⁵⁾	Case 6 ⁶⁾	Case 7 ⁷⁾
Age at delivery	36	34	33	27	17	19	27
Gestational week	37	N.A.	N.A.	40	38	30	38
Parity	1	N.A.	N.A.	0	0	0	1
Age at CPVT diagnosis	8	6	12	12	12	9	13
Diagnostic modality	Genetic mutation	Genetic mutation	Genetic mutation	Genetic mutation	Electrophysiological study	Genetic mutation	N.A.
Treatment	β-blocker and flecainide	β-blocker	β-blocker	β-blocker	β-blocker / ICD	β-blocker, propafenone / ICD	β-blocker
Mode of delivery	eICS	eICS	eICS	LEA→emCS (NRFS)	eICS	LEA	eICS
Anesthetic technique	seqCSEA	GETA+ EA	GETA+EA	to be remarked	SA	EA	seqCSEA
VT during delivery	No	2 VT episodes intubation+ peritoneal manipulation	No	No	No	No	No
Remarks	The previous CS ; 2 VT episodes GETA	Remifentanyl ; 1.8→0.7 γ Dexmedetomidine	Remifentanyl ; 2.6→0.8 γ	Induced Labor	Midazolam Morphine H1 blocker	PROM	H1 blocker

OUR APPROACH

- Sequential combined spinal-epidural with 50% dose reduction: rational strategy
- Avoided intubation/extubation sympathetic stimulation; minimized hemodynamic fluctuation.
- Case reviews support neuraxial techniques when feasible.

1. J. J. V. et al. (2015) Catecholaminergic polymorphic ventricular tachycardia: A review of the clinical presentation, diagnosis, and management. *Heart Rhythm*, 12(1), 1-10.

2. J. J. V. et al. (2016) Catecholaminergic polymorphic ventricular tachycardia: A review of the clinical presentation, diagnosis, and management. *Heart Rhythm*, 13(1), 1-10.

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3

1

Obstetric Management and Anesthesia Considerations in Huntington's Disease

Lucas Steele, MD; Becky Mirsky, MD; Teri Gray, MD
Department of Anesthesiology, The Ohio State University Wexner Medical Center, Columbus, Ohio

Background

- Huntington's Disease (HD), an autosomal dominant condition that leads to motor neuron degeneration in the basal ganglion, classically presents with cognitive decline, psychiatric changes, and motor disorders.
- HD is NOT a contraindication to neuraxial anesthesia, but the disease poses unique challenges that must be addressed.
- Dexmedetomidine has been shown to be an effective agent for perioperative chorea symptoms in non-pregnant patients with HD.
- Limited case reports exist on dexmedetomidine use in during pregnancy and delivery.
- Incidence of post-dural puncture headache range from less than 2% to as high as 40%, depending on a variety of factors. Additionally, up to 1/3 of post-partum patients report a headache after delivery, but less than 5% are due to PDPH.

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1. Indian Journal of Anesthesiology, May 2010.
2. Reg Anesth Pain Med 2020; 15:1-10.
3. Brown MJA Int J Obstet Anesth 2020

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1

Obstetric Management and Anesthesia Considerations in Huntington's Disease

Lucas Steele, MD; Becky Mirsky, MD; Teri Gray, MD
Department of Anesthesiology, The Ohio State University Wexner Medical Center, Columbus, Ohio

Case Presentation

- A 36-year-old G1P0 with HD and oropharyngeal dysphagia presented for IOL and tubal ligation.
- She was previously seen in OB anesthesia clinic with recommendations for early epidural and dexmedetomidine to suppress chorea movements.
- She underwent successful 1st attempt epidural and uncomplicated vaginal delivery. However, her tubal ligation was delayed until the following day, and she ultimately required a replacement epidural.
- A combined-spinal epidural was placed, but due to choreiform movements during the procedure, an unanticipated dural puncture occurred.
- She ultimately developed a post-dural puncture headache but declined an epidural blood patch given the risk of repeat dural puncture.

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2

Obstetric Management and Anesthesia Considerations in Huntington's Disease

Lucas Steele, MD; Becky Mirsky, MD; Teri Gray, MD
Department of Anesthesiology, The Ohio State University Wexner Medical Center, Columbus, Ohio

Key Learning Points

- Huntington's Diseases is NOT a contraindication to neuraxial anesthesia.
- Patients with Huntington's disease and oropharyngeal dysphagia symptoms are at an increased risk of prolonged intubation or re-intubation following general anesthesia, which should be avoided.
- Cognitive impairment, autonomic dysregulation, hemodynamic instability, and respiratory compromise are complications to watch for in patients with Huntington's disease.
- Dexmedetomidine has been shown to suppress chorea movements in multiple studies and case reports.
- No literature exists regarding repeat dural puncture incidence during epidural blood patch in patients with Huntington's disease but given the risk of further chorea movements the risk can be inferred to be higher than the general population, which is very low.

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3

BACKGROUND

Chloroprocaine Laboring Epidural for Parturient with History of Anaphylaxis to Amide Local Anesthetic

Spencer Hansen, MD and Laura Roland, MD

How Common Is True Lidocaine Allergy?

- Reported allergy to local anesthetics is frequently attributable to adverse reactions to additive epinephrine or vasovagal syncope during a procedure.
- Even when a patient describes an anaphylactic event, the culprit is often a preservative such as metabisulfite or methylparaben rather than the local anesthetic.
- True anaphylactic allergy to lidocaine is estimated to occur in fewer than 1 in 1,000,000 patients based on data from formal allergy testing.

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THE CASE

35 yo G3P1011 @ 38 weeks to undergoing IOL for history of chronic hypertension with lidocaine allergy — angioedema × 2 (occupational exposure + dental), both requiring emergency treatment

Anesthetic Management

Upon requesting laboring epidural placement, clinicians have made errors, code cart brought bedside, and standard ASA monitors applied.

Incremental test epidures up to 1 mL of 0.5% chloroprocaine given subcutaneously; patient remained hemodynamically stable with no signs of allergic reaction.

Endoepidural cannula inserted and 8 mL of 0.5% chloroprocaine administered as a loading dose with analgesia to T8 bilaterally within 10 minutes.

Epidural infusion started with scheduled intermittent boluses of 6 mL 1.5% chloroprocaine + fentanyl 2 mcg/mL q45-min; optional patient-controlled boluses 5 mL q15-min.

Labor progressed for several hours with good pain control.

Second pain following AROM despite PCA use, treated with bolus of 100 mcg opioid (fentanyl) with improvement and successfully uncomplicated vaginal delivery shortly thereafter.

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TEACHING POINTS

1. Parturients with a reported history suggestive of local anesthetic hypersensitivity should undergo early referral for formal allergy testing during pregnancy, ideally in the first trimester. Early antenatal evaluation enables anesthesiologists, allergists, and obstetricians to develop a comprehensive, individualized anesthetic plan.

2. Chloroprocaine is a safe and effective medication to provide epidural analgesia during labor in parturients with suspected or confirmed allergies to lidocaine.

3. A range of dosing strategies for epidural chloroprocaine in labor analgesia has been described in the literature. Several case reports have used regimens consisting of initial loading doses of 10–12 mL of 1.5% chloroprocaine followed by continuous infusions at 10–12 mL/hr to provide effective analgesia while minimally affecting motor function and preserving the ability to push. In contrast, other reports demonstrate successful analgesia using both loading and maintenance doses as low as 0.5%.

Sources:

1. J Allergy Clin Immunol 2014; 6:1224–1225; 2. Anesth Prog 2018; 65(2):119–128; 3. Local Reg Anesth 2021; 14:21–23; 4. ASA Practice 2018; 10(4):95; 5. ASA Practice 2017; 8(1):207–209

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1

Anesthetic Management of a Parturient with Cowden Syndrome and Lhermitte-Duclos Disease

Allison Mootz MD, WeiKe Tao MD, Alex Guinn MD

Cowden Syndrome



Rare PTEN hamartoma tumor syndrome (incidence 1:200,000)



Risk of neoplasms (breast, thyroid, endometrium)



Clinical features (macrocephaly, mucocutaneous hamartomas & polyps, AVMs)



Lhermitte-Duclos disease (dysplastic cerebellar gangliocytoma)

No current literature on obstetric anesthesia management

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Case







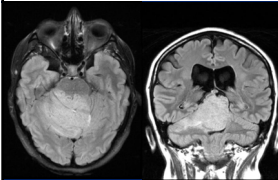

2016: Epidural for 1st pregnancy	2019: Obstructive hydrocephalus 4.6 cm cerebellar mass, tonsillar hamartomas, pharyngeal mass, ovarian teratoma, breast mass Managed with endoscopic third ventriculostomy and surveillance Followed by ENT, GYN, Onc Med, Neuro, NSGY	2025: 3rd Trimester Initial NSGY recs Cleared for VD Neuraxial contraindicated	IOL for PROM 40w2d Strong desire for neuraxial analgesia	Repeat multidisciplinary discussion Airway/GA risk vs neuraxial Proceeded with epidural placement	Uneventful vaginal delivery Uncomplicated PP course
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Genetic testing: **PTEN gene** mutation (c.829dup)

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2

Discussion



Individualized decision making based on symptoms and imaging

Risk of airway **bleeding** and airway **obstruction**

Consideration of elevated ICP, **herniation** risk, **AVM** of the spine

Figure 1. Brain MRI. Hyperintense mass with laminated appearance consistent with dysplastic cerebellar gangliocytoma, effacement of fourth ventricle and Aqueduct of Sylvius.

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 5. Harjovic, World Neurology. 2020;136:267-76.

3

High Pressures, High Stakes: Anesthetic Management of Cesarean Delivery in a Patient with Severe Pulmonary Arterial Hypertension Requiring Mechanical Circulatory Support

Daniel F. Berenson, MD, PhD; Kate J. Frost, MD; MaryJo Kramer, MD; Bushra W. Taha, MD
Department of Anesthesiology | Mass General Brigham | Harvard Medical School

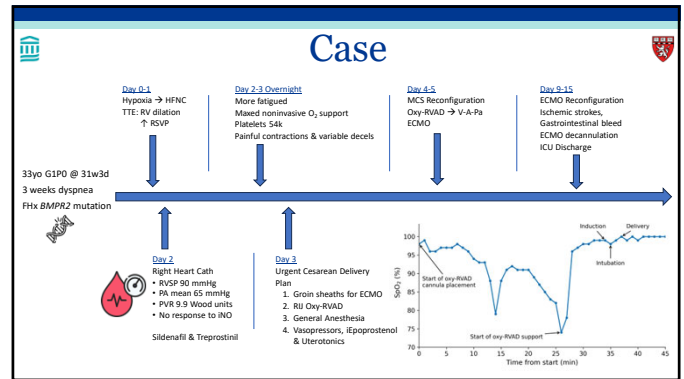
Background

- Pulmonary hypertension in pregnancy carries high morbidity and mortality
- mWHO class IV (Highest risk)
- "High mortality rate"
"Pregnancy generally discouraged"
- "Pregnancy contraindicated"
"Discuss induced abortion"

Physiology

- Increased cardiac output
- Postpartum volume load
- Hypercoagulable state
- Arrhythmia
- Decreased systemic vascular resistance
- High pulmonary vascular resistance
- Pregnancy + PAH = Perfect storm of RV failure**

1



2

Management Dilemmas

When to Deliver

- Balance of maternal-fetal wellbeing
- Highest risk is 12-24hrs postpartum

Vaginal vs Cesarean

- Considerations
- Valsalva
- Hemorrhage
- Sympathectomy
- Pain
- Logistics

General vs Neuraxial Anesthesia

- PAH physiology favors neuraxial
- Neuraxial concerns/contraindications
- Orthopnea
- MCS
- Coagulopathy

Mechanical Circulatory Support

- Anticoagulation
- Circuit configuration
- Oxy-RVAD has reduced thrombosis risk
- VA-ECMO supports full circulatory function

Expert opinion

↓

Evidence based

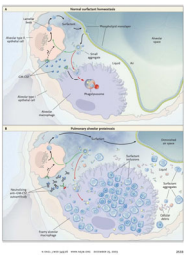
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Bridging the Knowledge Gap: The Role of Obstetric Anesthesiologists in a Case of Pulmonary Alveolar Proteinosis (PAP)

Jace R. Battrell MD MSMP, Samantha F. Lu MD
Department of Obstetric Anesthesiology
Northwestern University Feinberg School of Medicine

Background

- PAP affects ~6-7 per 1,000,000 (all age groups, male & female)
- PAP classified as primary, secondary, hereditary, or congenital
- Primary PAP accounts for ~90% of cases
- Disrupted **surfactant homeostasis** due to impaired alveolar macrophage function
- Accumulation of lipoproteinaceous material (surfactant proteins & lipids)
- Anti-granulocyte-macrophage colony stimulating factor (GM-CSF) antibodies (IgG)
- PAP **exceedingly uncommon in pregnancy**
- Paucity of published data (less than 25 entries in PubMed as of 2022) (1)
- No existing guidelines or recommendations in obstetric anesthesiology





ANNUAL MEETING

2025

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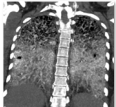
Case Discussion

The Patient

33yo G1 P0 @29w3

PMHx: None
OB Hx: None
RDS: Recent URI
SHx: Works at candy factory

PEX/VIS:
Tachypnea + tachycardia (HR 90-110)
BP WNL (No vasopressor)
SpO2 96-98% on HFNC 100% 40L/min



The Case

Care Team: MFM + Pulm/Crit + OB Anes + CT Surgery

Plan: OB Anes recommended delivery before WLL in cardiac OR with CT surgery

Procedure Workflow:

- Continue HFNC in OR
- Awake arterial line + large-bore PIV
- CSE + slow incremental dosing (2% lidocaine/HCO3/Epil)
- 0.6 mL hyperbaric bupivacaine +15 mcg fentanyl + 150 mcg morphine + 75 mcg epidural clonidine
- VA ECMO cannulation
- pLTCS under epidural anesthesia
- ECMO decannulation + Epidural removal
- Transfer to MICU/Newborn to NICU

The Outcome

POD 9: Whole-lung lavage (WLL) under GA/ETT → Cardiopulmonary collapse (refractory hypoxia + RHF) → VAE/CMO

POD 12: ECMO decannulation

POD 16: Extubation

POD 23: Discharged home (home O2)

Final Dx: Pulmonary Alveolar Proteinosis (BAL w/ (+)PAS Stains)

Newborn Dx: Extreme prematurity, RDS, PDA, VSD

2

Teaching Points



- OB anesthesiologists act as **unifying voice** amongst multidisciplinary team
- Expertise across multiple specialties** & ability to provide recommendations and guidance for non-anesthesia colleagues



- Appropriate **sequencing of interventions** (delivery versus high-risk non-obstetric procedures) is critical to successful outcomes
- Clear benefit of neuraxial anesthesia in pregnant patients



- OB anesthesiologists are well-suited to **create patient-specific care pathways** when guidelines and recommendations do not exist
- Ability to integrate expertise in maternal-fetal physiology and procedural risk

"How do you perform a whole lung lavage?"

"Do patients get hypoxic during lung lavages?"

"Can we perform the lavage and then delivery immediately afterwards?"

"Does the patient need general anesthesia for a whole lung lavage?"

"I've never seen this in a pregnant patient."

"I don't pretend to remember delivery timing for pregnant patients."

References

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- Clinics in Chest Medicine 2025; 46(2):373-382

3

1



Pituitary Hemorrhage After Uncomplicated Repeat Cesarean Delivery

Makela Stankey, MD · Phillip Callihan, MD PhD · Andrea Traynor, MD
Department of Anesthesiology, Perioperative, and Pain Medicine · Stanford Health Care

Postpartum Headache: A Critical Diagnostic Challenge

30–40% of patients experience headache in the postpartum period

Multiple etiologies range from benign to immediately life-threatening

A thorough history and physical are essential to establish etiology, acuity, and management

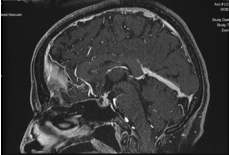
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Clinical Course

38F G2P1 w/ anemia s/f elective repeat CS at 39 weeks

- PPD 0 - Uncomplicated Cesarean Delivery**
Single-shot SAB: 12 mg hyperbaric bupivacaine, 15 mcg fentanyl, 100 mcg morphine - 25g pencil-point needle - QBL 384 mL, Hgb 9.6 → 8.5
- PPD 1-2 - Headache Onset**
Relieved with acetaminophen and oxycodone → fluctuating severity
- PPD 3 - Positional Headache → MRI**
Worse supine & eye movement, improved upright - MRI: hemorrhagic necrosis of pituitary suggestive of Sheehan syndrome - Neurology, neurosurgery, endocrinology consulted
- PPD 4 - Discharge**
Headache improved - Labs and vitals within normal limits - Discharged with multidisciplinary follow-up
- Follow-Up & Recovery**
Repeat MRI: hemorrhage resolved - Menses returned - Mild breastfeeding difficulties - No headaches, hypotension, or visual impairment



MRI Postpartum Day 3



MRI 1 Month Post-Delivery

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Discussion

Positionality Matters

This patient's headache worsened supine - opposite of classic PDPH - prompting consultation & imaging prior to considering an epidural blood patch

Sheehan's or Pituitary Apoplexy?

- No PPH and stable endocrinology labs puts Sheehan's Syndrome lower on the dxs
- Acute onset headache + pituitary hemorrhage = higher likelihood of pituitary apoplexy

Low Threshold for imaging

- CT or MRI indicated for headaches that worsen in the supine position or fail to fit a benign pattern
- Consider Neurology consultation

Differential Diagnosis of Postpartum Headache

Meningitis	Stroke / Intracranial Hemorrhage	Preeclampsia / Eclampsia
Cerebral Venous Sinus Thrombosis	Posterior Reversible Encephalopathy Syndrome	Pituitary Apoplexy
Postdural Puncture Headache	Migraine	Postpartum Lymphocytic Adenohypophysitis

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1

Tiny Spine, Tall Challenges : A Case Report of Cesarean Delivery in Spondyloepiphyseal Dysplasia

Presenting Author: Fatine Karkri, MD

Presenting Author's Institution: Stanford University School of Medicine - Palo Alto, California

Co-Authors: Gillian Abir, MBChB, FRFCA - Stanford University School of Medicine

Senior Author: Lindsey Ralls, n/a – MD, Stanford University

Introduction: Spondyloepiphyseal dysplasia congenita (SEDC) is a rare skeletal dysplasia causing extreme short stature, craniovertebral anomalies, and kyphoscoliosis. Pregnancy and delivery in patients with SEDC pose unique anesthetic challenges: unpredictable neuraxial spread, cervical instability with airway risk, and reduced pulmonary reserve. Obstetric anesthetic experience is limited: two cesarean deliveries (CD) were performed under epidural only^{1,2}, and two were performed under general anesthesia with awake fiberoptic intubation.^{3,4} We present the case of a patient with SEDC who underwent a successful CD under combined spinal-epidural (CSE) anesthesia.

Case One: A 28-year-old patient (G1P0) with genetically confirmed SEDC was referred to our high-risk obstetric anesthesia clinic at 35+3 weeks gestational age (GA). Her height and weight were 128.3 cm and 58.1 kg (BMI 35.3). Imaging showed C1-C2 instability, cerebellar tonsillar descent consistent with Chiari 1 malformation (cleared by neurosurgery for a neuraxial procedure), and marked thoracic kyphoscoliosis (Fig 1). Echocardiography was normal. Limited hip abduction after prior bilateral hip surgeries prompted a scheduled CD at 38+2 weeks GA. Because surface landmarks were unreliable, neuraxial ultrasound guided placement of a reduced-dose CSE (hyperbaric bupivacaine 0.75% 0.8 mL, fentanyl 15 mcg and morphine 100 mcg). A bilateral sensory level to T2 was achieved within seven minutes. Intraoperatively the patient reported transient dysphagia with preserved hand strength. A male neonate (3.22 kg) was delivered (Apgar scores 8 and 9) and placed skin-to-skin following neonatal assessment. Near the end of surgery, the patient developed increasing surgical discomfort; epidural and intravenous supplemental analgesia were given. Quantified blood loss was 741 mL. Postpartum the patient developed new-onset preeclampsia with severe features and she received magnesium sulfate. She was discharged on POD5 with improving liver tests and no new neurologic deficits.

Case Two:

Discussion: This case highlights that multidisciplinary planning, neuraxial ultrasound guidance, and a reduced-dose CSE after neurosurgical clearance, can be effective for CD in SEDC with Chiari 1 and cervical instability. In short-statured patients, unpredictable neuraxial spread supports decreasing intrathecal hyperbaric bupivacaine, recognizing this may shorten bloc duration and necessitate reliable epidural supplementation to achieve adequate anesthesia. The transient dysphagia likely reflected rostral opioid migration; clinicians should remain vigilant for evolving neurologic signs and airway compromise. Given limited literature, individualized risk-benefit assessment and close neurologic monitoring are recommended for optimal patient care.

References: 1. Br J Anaesth. 2001;86(1):133-4. 2. Anaesthesia. 1991;46(8):648-50.[GA1.1] 3. Indian J Anaesth. 2016;60(6):435–437. 4. Int J Obstet Anesth. 2018;33:96-97.



Figure 1: Sagittal MRI of the spine showing marked thoracic kyphoscoliosis with vertebral flattening

Extreme Sustained Hemorrhage during Cesarean-Hysterectomy for PAS: Blood Product Stewardship, Precision Coagulation Management, and Interdisciplinary Communication

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Presenting Author's Institution: UC Davis Health Anesthesiology and Pain Medicine - Rancho Cordova, California

Co-Authors: Maria C. Gutierrez, MD - UC Davis Health

Senior Author: Daniel Conti, MD – Assistant Clinical Professor, University of California, Davis

Introduction: Placenta accreta spectrum (PAS) can cause extreme obstetric hemorrhage, particularly during emergent cases.¹ Surgical blood loss as high as 47 liters have been reported.^{2,3} This magnitude of hemorrhage strains hospital blood supplies, requiring real time coordination among anesthesia, surgery, blood bank and pharmacy. Although robust clinical trials are lacking in PAS, guidelines and expert opinion generalizing from other clinical contexts supports the importance of Viscoelastic (TEG) guided resuscitation, consideration of factor concentrates and proactive blood bank mobilization.^{5,6}

Case One: A 29 year old G7P6 (3 prior C-sections) with known PAS presented at 30w3d with vaginal bleeding. Emergent cesarean hysterectomy under general anesthesia was initiated within 30 minutes. Arterial monitoring and 16g PIV x3 were established. Delivery occurred within 10 minutes. Over the next 12 hours, hysterectomy and hemostasis were complicated by bleeding from diffuse pelvic and retroperitoneal sources as well as avulsed splenic and renal veins, requiring left nephrectomy. Blood loss was estimated at 86L with an average of 6.6 L/hr. REBOA was inflated twice. Resuscitation included 162u pRBCs, 170u FFP, 51u platelets, 21u cryoprecipitate, 12u Whole Blood, 10L cell saver, and 33L crystalloid. Continuous TEG monitoring and laboratory values guided fibrinogen concentrate and PCC administration. Fibrinogen levels remained >150 mg/dL, Hgb >7.3, and TEG abnormalities were rapidly corrected. Anesthesiology-led communication with the blood bank, surgeons, pharmacy and hospital leadership prevented trauma diversion despite near-depletion of blood bank resources. She discharged home on POD 35 with her baby after numerous complications (Abdominal compartment syndrome, AKI, PE, intraabdominal abscess with MDRO), without neurological injury or need for dialysis.

Case Two:

Discussion: This case may be the largest blood loss ever reported in PAS. It escalated far beyond the level of hemorrhage ever imagined in our multidisciplinary PAS planning. Maternal survival depended on systems level processes as much as technical anesthetic skill. The foundation of our PAS team, built from the SMFM recommendations, including standing committee meetings for delivery planning and dedicated subspecialty teams with interpersonal familiarity, created an environment where, in a sustained, critical emergency, the OB anesthesiology team could act as the communication node between pharmacy, blood bank, and hospital leadership.⁴ No less importantly, this case illustrates the value of frequent TEG in sustained hemorrhage and the feasibility of maintaining adequate coagulation levels despite extreme hemorrhage.

References: 1. JAMA Netw Open. 2025;8(7):e2521909. 2. Acta Obstet Gynecol Scand. 2021 Mar;100 Suppl 1:29-40. 3. J Med Invest . 2014;61(1-2):208-12. 4. Am J Obstet Gynecol. 2024 Jan;230(1):B2-B11.

5. J Obstet Gynaecol Res. 2019 Jan;45(1):13-21. 6. J Thromb Haemost. 2020 Aug;18(8):1813-1838.

[SOAP PAS hemorrhage supplementary chart.pdf](#)

The Alarm That Never Sounded: Epidural Pump Failure Resulting in Pneumorrhachis

Presenting Author: Eliezer Mendelev, MD

Presenting Author's Institution: The Ohio State University Wexner Medical Center - Columbus, Ohio

Co-Authors: Sonia Ristev, MD - The Ohio State University Wexner Medical Center

Senior Author: Jennifer Tripi, MD – The Ohio State Wexner Medical Center

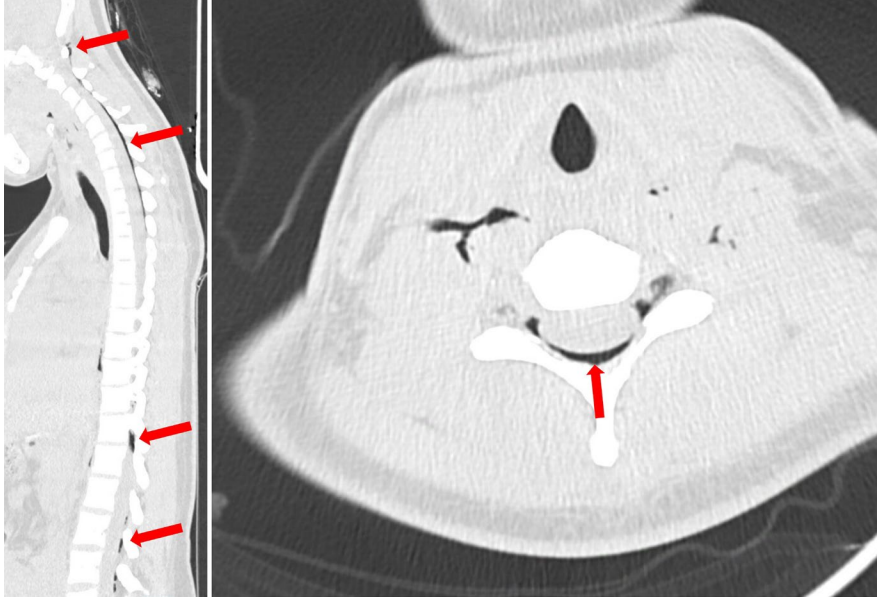
Introduction: Pneumorrhachis (PR), or the presence of air in the spinal canal, is a rare phenomenon, most often associated with trauma or iatrogenic causes. Presentation varies greatly, ranging from asymptomatic imaging findings to devastating neurological injury. Limited case reports of PR following neuraxial anesthesia have been reported and there are not any published cases associated with a disabled epidural pump air alarm. We present this case to highlight considerations for prevention, diagnosis and management of this rare condition in an obstetric context.

Case One: A 20-year-old female underwent elective labor epidural placement for analgesia. She experienced inadequate pain control intermittently with temporary relief following clinician epidural bolus doses. Subsequent replacement of epidural infusion solution with a higher concentration identified an unprimed epidural infusion solution. The epidural catheter tubing delivered air instead of local anesthetic solution via the epidural pump resulting in an estimated 50 ml of air entrained epidurally. Patient report of back and neck discomfort prompted a STAT CT head and spine, which revealed gas tracking along the entire spinal epidural space (Figure). Neurological examination was otherwise normal with no focal deficits. Her symptoms resolved within 48 hours with conservative management, which included oxygen via simple face mask to accelerate intraspinal air absorption, bed rest and acetaminophen.

Case Two:

Discussion: Symptoms of PR such as headache, neck or back pain are non-specific and can be confused for post-dural puncture headache or sequelae of labor. Diagnosis relies on imaging; CT scan is more sensitive than MRI for identification of intraspinal gas, though MRI can be valuable for evaluating spinal cord compression or identifying underlying etiologies (1). Conservative management of PR involves bed rest and administration of supplemental oxygen to hasten absorption, with regular neurological exams. If PR causes spinal cord compression or dysfunction, neurosurgery should be consulted for possible surgical decompression. Prevention of iatrogenic PR is critical and involves a combination of provider awareness and safety technology. Providers must confirm epidural infusion tubing has been appropriately primed prior to its initiation. In this instance, epidural pump air alarms were disabled without provider awareness due to alarm thresholds being overly sensitive. Ensuring that manufacturer air alarms are enabled by default, clearly indicate when they are disabled, and are appropriately sensitive is critical to preventing this complication. (2).

References: 1. Continuum 2021;27:225–263 2. Hosp Pharm 2015;50(2):113-7



Successful Avoidance of Ventricular Tachycardia Using Combined Spinal-Epidural Anesthesia for Cesarean Section in a Patient with Catecholaminergic Polymorphic Ventricular Tachycardia

Presenting Author: Momoko Kobayashi, physician

Presenting Author's Institution: Saitama Medical Center - Kawagoe, Saitama

Introduction: Catecholaminergic polymorphic ventricular tachycardia (CPVT) is a rare genetic disorder, often involving the ryanodine receptor (RyR2), characterized by ventricular tachycardia (VT) triggered by endogenous catecholamine release during physical or emotional stress. The prevalence is approximately 1 in 10,000, with onset typically around age 10. While cases of pregnancy with CPVT have been reported, no case has documented a single patient undergoing cesarean sections under both general anesthesia (GA) and neuraxial anesthesia. We report a case of a parturient with CPVT who had previously experienced VT under GA but was successfully managed without VT during a subsequent cesarean section using combined spinal-epidural anesthesia (CSEA).

Case One: A 36-year-old woman (G2P1) was diagnosed with CPVT at age 8. Her first delivery was a cesarean section for breech presentation performed under GA with endotracheal intubation. VT occurred twice specifically during tracheal intubation and extubation. These events were attributed to the catecholamine surge caused by airway stimulation. For the current pregnancy, a planned cesarean section was scheduled. To avoid airway manipulation, Sequential Combined Spinal-Epidural Anesthesia (seqCSEA) was selected. A spinal block was performed at L3/4 with 6 mg hyperbaric bupivacaine, 10 µg fentanyl, and 150 µg morphine. Invasive arterial blood pressure monitoring was used. Fifteen minutes after delivery, transient sinus tachycardia was observed and managed with landiolol (1-2 µg/kg/min) and phenylephrine. No VT was observed perioperatively. Oral carvedilol and flecainide were resumed on the day of surgery. The patient recovered without complications and was discharged on postoperative day 6.

Case Two:

Discussion: Anesthetic management of CPVT requires strict control of sympathetic tone. Previous reports indicate a high susceptibility to VT during intubation, extubation, and succinylcholine administration due to catecholamine release. In this patient's previous surgery, VT was indeed triggered by airway manipulation under GA. Therefore, CSEA was chosen for the current delivery to avoid airway reflexes. The intrathecal local anesthetic dose was reduced (sequential technique) to minimize rapid hemodynamic fluctuations. This strategy successfully prevented VT recurrence. We successfully managed a cesarean section in a parturient with CPVT using CSEA. Although the patient had a history of VT triggered by tracheal intubation and extubation under general anesthesia, the use of neuraxial anesthesia allowed for stable hemodynamics and avoidance of catecholamine-induced arrhythmias.

References: 1. J Arrhythm. 2016 Oct;32(5):344-351. 2. Clinical Laboratory 2018 62:1042-1047. 3. Pediatric Cardiology and Cardiac Surgery 34(3):155-159(2018) 4. Obstet Gynecol 2016;127:735–9) 5. Clinical Case Reports 2016; 4(4): 361–365 6. Pediatr Cardiol. 2015 Oct;36(7):1542-1547.

SAT – BCR – 05

Obstetric Management and Anesthesia Considerations in Huntington's Disease

Presenting Author: Lucas Steele, MD

Presenting Author's Institution: The Ohio State University - Columbus, Ohio

Co-Authors: Becky G. Mirsky, MD - The Ohio State University Wexner Medical Center

Senior Author: Teri Gray, MD – Assistant-Professor Clinical, The Ohio State University Wexner Medical Center

Introduction: Huntington's disease (HD) is an autosomal dominant disease that leads to progressive Huntingtin protein buildup and subsequent degeneration of neurons in the basal ganglia. The disease is characterized by cognitive decline, psychiatric changes, motor disorders – classically chorea (involuntary jerking). While neuraxial anesthesia is not strictly contraindicated for HD patients, unique challenges, such as instability with positioning, that must be considered when determining the anesthetic plan for each patient.

Case One: A 36-year-old G1P0 with known Huntington's disease complicated by oropharyngeal dysphagia presented for induction of labor and postpartum tubal ligation. Her pregnancy was otherwise complicated by pre-eclampsia and gestational diabetes. She had been evaluated in the pre-op obstetric anesthesia clinic with recommendation for early epidural placement with dexmedetomidine to suppress choreiform movement. She displayed significant truncal instability, but with heavy support and stabilization she had a successful first-attempt epidural placement followed by uncomplicated vaginal delivery. Immediate postpartum tubal ligation had been initially planned but ultimately delayed due to NPO timing and patient preference to wait until the following day. Unfortunately, her epidural had pulled out overnight, requiring replacement prior to the procedure. A combined spinal epidural was performed, but due to choreiform movements during the procedure, a dural puncture occurred. The procedure was completed as planned, and she underwent successful tubal ligation. She was given IV cosyntropin and caffeine in PACU but ultimately developed post-dural puncture headache symptoms. Given the high likelihood of repeat dural puncture, epidural blood patch was deferred and symptoms resolved with conservative management.

Case Two:

Discussion: The anesthetic management of a pregnant patient with Huntington's disease must take into account both the significantly increased risk of aspiration during general anesthesia and difficulty of neuraxial anesthesia, given chorea and disinhibition. Dexmedetomidine has been reported to decrease chorea movements in these patients, given its sympatholytic effects. This patient initially underwent successful epidural placement, but experienced chorea and an unintended dural puncture with the second. This underscores the need to prevent delays of care in this population when possible and minimize repeat interventions. Furthermore, informed decision making is critical when choosing an anesthetic plan. The significant oropharyngeal dysphagia that these patients can experience often leads to prolonged intubation or re-intubation following general anesthesia, which should be avoided whenever possible. However, this must be weighed against the risks of neuraxial anesthesia, such as dural puncture.

References: 1. Indian Journal of Anaesthesia 54(3):263-4. May 2010. 2. Reg Anesth Pain Med. 2024 Jul 8;49(7):471-501. 3. Broom MA Int J Obstet Anesth 2023 Aug;55:103900.

SAT – BCR – 06

Chloroprocaine laboring epidural for parturient with history of anaphylaxis to amide local anesthetic

Presenting Author: Spencer Hansen, n/a

Presenting Author's Institution: George Washington University - Arlington, Virginia

Co-Author: Laura Roland, MD – The George Washington University

Introduction: Patient reported history of allergy to local anesthetics is most often due to an adverse reaction to additive epinephrine or procedure-related vasovagal syncope; and even if the patient describes the allergy as anaphylactic, the preservative component, commonly metabisulfite or methylparaben, is more likely to be the triggering agent. It is estimated that true allergy to local anesthetics occurs in less than one in a million patients, however, when a patient reports a history consistent with anaphylaxis, the anesthesiologist must take precaution.

Case One: We present a case of a 35 year old G3P1011 who presented to labor and delivery at 38 weeks to undergo induction of labor for a history of chronic hypertension. She had additional history of von Willebrand disease and Chiari I malformation and a listed allergy to lidocaine. During her initial exam, she reported two prior exposures to lidocaine—once during a dental procedure and once while preparing it as a medical assistant—both resulting in angioedema requiring emergency treatment. Following a thorough discussion of the risks and benefits, the patient consented to chloroprocaine-based patient controlled epidural analgesia. When she requested laboring epidural placement, the obstetric team was made aware should emergent delivery be necessary, and a code cart was brought to the bedside. To rule out hypersensitivity, we performed incremental subcutaneous skin testing up to 1 mL; the patient remained hemodynamically stable with no signs of an allergic reaction. We then proceeded to place an epidural catheter without incidence. An epidural loading dose of 8 mL of 1.5% chloroprocaine was administered followed by scheduled intermittent 9 mL boluses of 1.5% chloroprocaine with fentanyl 2 mcg/mL every 45 minutes with optional patient controlled boluses of 5 mL every 10 minutes. 15 minutes after administration of the loading dose, analgesia to T8 was achieved bilaterally. Labor went ahead uneventfully for several hours until our patient began complaining of sacral pain despite use of patient controlled boluses following artificial rupture of membranes. She was given an epidural bolus of 100 mcg of fentanyl with improvement and delivered vaginally shortly thereafter.

Case Two:

Discussion: Ester local anesthetics are an option to provide epidural labor analgesia in patients with a questionable anaphylactic allergy to amino local anesthetics who have never had formal allergy testing.

References: 1. The Journal of Allergy and Clinical Immunology 2014; 6:1224 – 1225 2. Anesth Prog 2018; 65(2):119-123 3. Local and Regional Anesthesia 2021; 14: 21–23

Anesthetic Management of a Parturient with Cowden Syndrome and Lhermitte-Duclos Disease

Presenting Author: Allison A. Mootz, M.D.

Presenting Author's Institution: UT Southwestern Medical Center - Dallas, Texas

Co-Authors: Weike Tao, MD - University of Texas Southwestern Medical Center

Senior Author: Alexander B. Guinn, M.D. – Assistant Instructor, University of Texas Southwestern

Introduction: Cowden syndrome (CS), is a rare genetic condition with an incidence of 1:200,000 patients that falls within the broader spectrum of phosphatase and tensin homolog (PTEN) hamartoma tumor syndromes.(1, 2) Patients have an elevated risk for neoplasms within the breast, endometrium, and thyroid gland and variably demonstrate macrocephaly, mucocutaneous hamartomas, developmental delay, and arteriovenous malformations (AVM).(1, 2) CS also predisposes to a unique brain lesion, dysplastic cerebellar gangliocytoma, eponymously known as Lhermitte-Duclos disease (LDD).(2) There exists no literature describing the obstetric anesthetic management of parturients with CS or LDD.

Case One: A 29yo G2P1 at 40w2d presented with premature rupture of membranes (PROM). She had presented 6 years earlier with symptoms of obstructive hydrocephalus secondary to a 4.6 cm cerebellar mass with imaging features characteristic of LDD. Tonsillar hamartomas, an ovarian teratoma, and a breast mass were identified as well. Genetic testing was undertaken with identification of a pathogenic mutation in the PTEN gene (c.829dup) confirming a diagnosis of CS. Her hydrocephalus was managed with an endoscopic third ventriculostomy and surveillance. A brain magnetic resonance imaging (MRI) obtained 9 months earlier was stable (figure 1). Neurosurgery had been re-consulted 1 month prior who cleared her for vaginal delivery without neuraxial analgesia given the concern for herniation with dural puncture. However, with induction of labor for PROM, the patient strongly desired neuraxial analgesia. Also of note, her airway pre-pregnancy had necessitated video laryngoscopy with bougie to navigate around her tonsils. Therefore, after a repeat multidisciplinary discussion, given stable imaging findings, lack of symptoms, and her uncertain airway, the decision was made to proceed with epidural placement. The patient subsequently had an uneventful vaginal delivery. Her postpartum course was uncomplicated.

Case Two:

Discussion: Patients with CS and LDD require unique anesthetic considerations. Firstly, while intracranial lesions have historically been a contraindication to neuraxial anesthesia, a growing body of literature supports individualized decision making based on identification of symptoms consistent with elevated ICP, evolving imaging findings, or imaging findings of mass effect, hydrocephalus, or secondary signs of elevated ICP in conjunction with cerebrospinal fluid outflow obstruction.(3) Additionally, those with CS are at risk of airway bleeding and airway obstruction from friable mucosal papillomas.(4) Thyroid neoplasms and macrocephaly may complicate airway management further. A final consideration includes the possibility of AVM of the spine; spinal imaging prior to neuraxial anesthesia is prudent.(2, 5)

References: 1. J Clin Anesth. 2017;38:173-4. 2. J Natl Cancer Inst. 2013;105(21):1607-16. 3. Anesthesiology. 2013;119(3):703-18. 4. Anesthesiology. 2010;113(1):253-5. 5. World Neurosurg. 2020;139:567-76.

High Pressures, High Stakes: Anesthetic Management of Cesarean Delivery in a Patient with Severe Pulmonary Arterial Hypertension Requiring Mechanical Circulatory Support

Presenting Author: Daniel F. Berenson, MD, PhD

Presenting Author's Institution: Brigham and Women's Hospital - Boston, Massachusetts

Co-Authors: Kate J. Frost, MD - Brigham and Women's Hospital

MaryJo Kramer, M.D. - Mass General Brigham

Senior Author: Bushra W. Taha, MD – Anesthesia Physician, Brigham and Women's Hospital

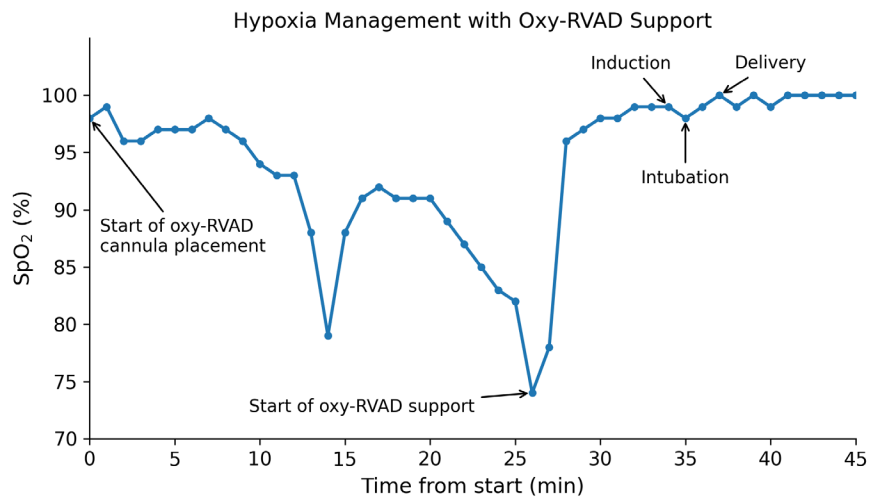
Introduction: Pulmonary arterial hypertension (PAH) in pregnancy is classified as modified World Health Organization (mWHO) risk category IV and is associated with severe maternal and fetal morbidity and mortality¹. It also poses major challenges for anesthetic care.

Case One: A 33-year-old woman at 31w3d gestation was newly diagnosed with severe PAH. Despite sildenafil, treprostinil, and high-flow oxygen, she had progressive respiratory distress. Risks of continued pregnancy were judged to outweigh those of preterm cesarean delivery (CD). Plans for neuraxial anesthesia were abandoned due to severe thrombocytopenia and concern for acute hemodynamic compromise. Instead, we planned general anesthesia (GA) after insertion of an oxygenating right ventricular assist device (oxy-RVAD) and femoral sheaths for rapid conversion to venoarterial (VA) extracorporeal membrane oxygenation (ECMO) if needed. During placement of the large-bore oxy-RVAD cannula through the right internal jugular vein into the pulmonary artery (PA), her oxygen saturation declined from 97% to 74%, attributed to supine positioning and discomfort leading to increased right ventricular preload and afterload and intrapulmonary shunting. Fetal bradycardia was detected, but we deferred GA until oxy-RVAD support was established and oxygenation improved (Figure). We then induced GA with etomidate and rocuronium, supporting hemodynamics pharmacologically and with mechanical circulatory support (MCS). Titration of medications (epinephrine, norepinephrine, vasopressin, and inhaled epoprostenol) and oxy-RVAD flows were guided by transesophageal echocardiography. We treated persistent uterine atony after delivery with oxytocin, methylergonovine, and carboprost, reasoning that with MCS, increased pulmonary afterload would be better tolerated than hemorrhagic shock or disseminated intravascular coagulation. Her postoperative course was complicated by cardiogenic shock requiring reconfiguration from oxy-RVAD to V-A-PA and ultimately VA ECMO, acute kidney injury requiring hemofiltration, gastric bleed requiring embolization, and cerebral and spinal strokes. She was decannulated from ECMO on post-operative day 12, and two months later discharged home with wheelchair support for persistent lower extremity weakness.

Case Two:

Discussion: Anesthetic management of severe PAH during CD is complex. While MCS has been used to support ongoing pregnancy², the maternal and fetal risks and benefits must be carefully weighed by a multidisciplinary team. While neuraxial anesthesia is generally preferred for CD, GA may be more compatible with MCS depending on anticoagulation and clinical status. The optimal MCS configuration for peripartum PAH has not been established, as oxy-RVAD and VA ECMO have distinct advantages. Given the potential for significant morbidity from MCS and PAH, these patients benefit from multidisciplinary management in highly resourced referral centers.

References: 1. Humbert et al., Eur Heart J 2022 2. Taha et al., Anesth Analg 2022



Bridging the Knowledge Gap: The Role of Obstetric Anesthesiologists in a Case of Pulmonary Alveolar Proteinosis

Presenting Author: Jace R. Battrell, MD, MSMP

Presenting Author's Institution: Northwestern University Feinberg School of Medicine - Chicago, Illinois

Co-Authors: Samantha F. Lu, MD - Northwestern University

Introduction: Pulmonary alveolar proteinosis (PAP) is a rare disorder (~6 cases per million) characterized by accumulation of surfactant within alveoli, often presenting with severe hypoxemic respiratory failure and “crazy paving” on CT imaging. PAP in pregnancy is exceedingly rare, with only a limited number of case reports published, resulting in minimal guidance regarding anesthetic management nor delivery timing.

Case One: A 33-year-old G1P0 at 29+3 weeks gestation was transferred for progressive dyspnea, cough, and severe hypoxemia requiring high-flow nasal cannula. CT angiography was negative for pulmonary embolism but demonstrated diffuse ground-glass opacities with interlobular septal thickening, concerning for PAP. Multidisciplinary planning among obstetric anesthesiology, maternal fetal medicine, pulmonary & critical care medicine, and cardiothoracic surgery focused on delivery timing and risks of bronchoscopy and whole lung lavage (WLL). Given concerns for maternal and fetal safety, a decision – led by obstetric anesthesiology – was made to proceed with cesarean delivery in a cardiac OR prior to non-obstetric procedures. A CSE was utilized (0.6 mL hyperbaric bupivacaine, 15 mcg fentanyl, 150 mcg morphine) with slow titration of 2% lidocaine-epinephrine-bicarbonate mixture and 75 mcg epidural clonidine until an adequate sensory level was achieved. A radial arterial line, multiple large-bore IV, and prophylactic ECMO wires were also placed prior to incision. The patient remained on high-flow nasal cannula throughout the procedure and did not require conversion to general anesthesia and endotracheal intubation. The delivery was uncomplicated and the newborn was intubated and admitted to NICU for treatment of respiratory distress syndrome and extreme prematurity. The newborn was eventually discharged home on day seventy of life. One week after delivery, the patient underwent bronchoscopy and WLL under general anesthesia, which was complicated by severe hypoxemia and hemodynamic instability with right heart failure, necessitating VA ECMO for three days. Days later, she was decannulated and extubated and eventually discharged home on supplemental oxygen. The final workup from bronchoalveolar lavage revealed PAS-positive staining, confirming diagnosis of PAP.

Case Two:

Discussion: This case underscores the obstetric anesthesiologist's critical role in multidisciplinary coordination and sequencing of delivery versus high-risk non-obstetric procedures in rare maternal conditions lacking established guidelines. Early obstetric anesthetic involvement enabled risk stratification, contingency planning for extracorporeal support, and safe delivery timing. The patient's intolerance of general anesthesia during WLL requiring ECMO highlights the value of neuraxial anesthesia for cesarean delivery. Proactive anesthetic planning was central to optimizing maternal and fetal outcomes.

References: 1. Clinics in Chest Medicine 2025. 46(2):373-382 2. Medicina 2022. 58(8):984



SAT – BCR – 10

Pituitary hemorrhage in patient after uncomplicated repeat cesarean delivery

Presenting Author: Makela Stankey, MD

Presenting Author's Institution: Stanford Health Care - Palo Alto, California

Co-Authors: Phillip Callihan, MD, PhD - Stanford Health Care

Senior Author: Andrea Traynor, MD – Clinical Professor, Stanford Health Care

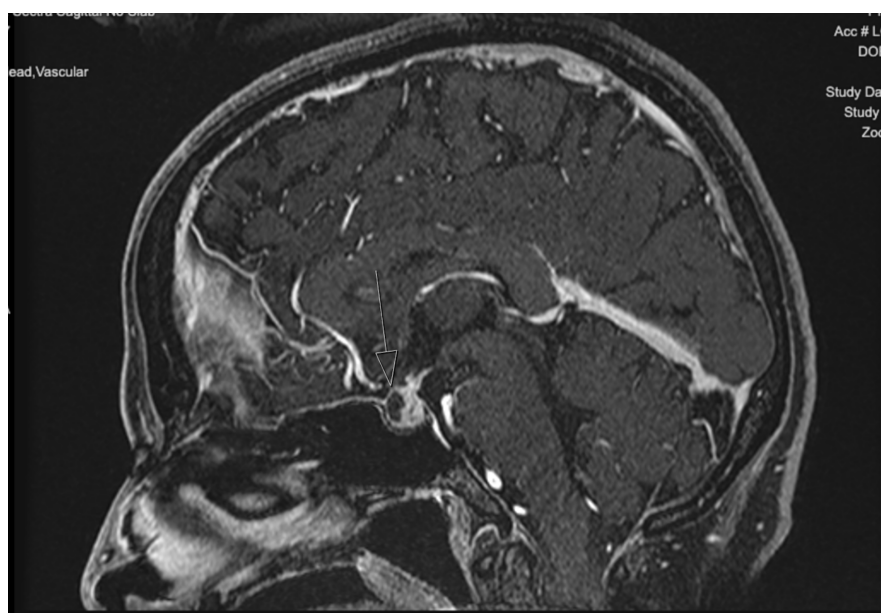
Introduction: Between 30% and 40% of patients experience headaches in the postpartum period. This case illustrates the importance of considering the full differential diagnosis for postpartum headache, including life-threatening and rare causes such as meningitis, intracranial masses, stroke, preeclampsia and eclampsia, cerebral venous sinus thrombosis, posterior reversible encephalopathy, Sheehan syndrome, and more.

Case One: A 40 year old G2P1 at 39 weeks with anemia and beta thalassemia carrier status presented for a scheduled cesarean delivery with bilateral tubal ligation. We performed a single shot subarachnoid injection of 12mg hyperbaric bupivacaine, 15mcg fentanyl, and 100mcg morphine using a 25-gauge pencil point needle for cesarean anesthesia. The surgery was uncomplicated with a quantitative blood loss of 384mL and the patient was hemodynamically stable throughout. The patient's pre- and post-cesarean hemoglobin was 9.6mg/dL and 8.3mg/dL, respectively. On postpartum day (PPD) 1, the patient reported a headache that was relieved with acetaminophen and oxycodone. On PPD 2 the headache was persistent with fluctuating severity, and on PPD 3 the headache became positional, exacerbated when lying flat and with eye movement but improved when sitting upright. An epidural blood patch was requested by the OB team due to concerns for post-dural puncture headache (PDPH). However, due to the nature of the symptoms, the obstetric anesthesiology team was concerned for mass effect and recommended imaging and neurology consultation. MRI showed a heterogeneous pituitary gland with areas of hemorrhagic necrosis suggestive of Sheehan Syndrome. On PPD 4 the patient's headache significantly improved, all blood work and hemodynamics were within normal limits. The patient was discharged home with close outpatient follow up as recommended by endocrinology and neurosurgery.

Case Two:

Discussion: While imaging suggested Sheehan syndrome, the patient's endocrine labs remained stable and there was no postpartum hemorrhage or peripartum hypotension, making Sheehan syndrome an unlikely diagnosis. In this patient, the positionality of the headache was the opposite of what is characteristic of PDPH, prompting imaging prior to considering an epidural blood patch. A thorough history and physical can help establish the etiology and acuity of the headache, as well as guide management. As many etiologies of headache can result in severe morbidity and mortality, there should be a low threshold to order advanced diagnostic testing such as CT or MRI for patients with postpartum headaches which worsen in the supine position.

References: Goldszmidt E, et al. Can J Anaesth 2005;52(9):971-7. PMID: 16251565.





Inflammation Sensitizes Term Human Myometrium To Somatostatin- Mediated Contractility Via Somatostatin Receptor Type 2 (SSTR2)

Anuradha Baishnab HBSc, MSc Candidate

Supervisors: Dr. Mrinalini Balki, Dr. Oksana Shynlova

Lunenfeld Tanenbaum Research Institute, Sinai Health

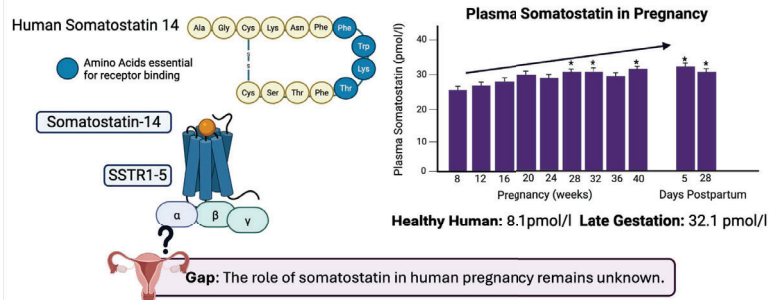
Department of Anesthesia, Obstetrics & Gynaecology and Physiology, University of Toronto



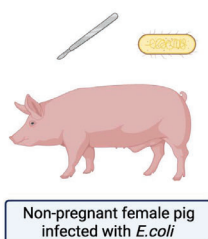
Lunenfeld-Tanenbaum Research Institute



Human plasma somatostatin levels rise during late gestation

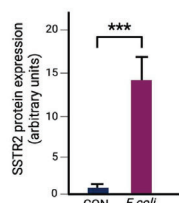


Somatostatin and its receptor SSTR2 regulate contractility in inflamed pig myometrium

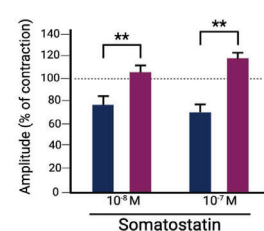


Non-pregnant female pig infected with *E.coli*

SSTR2 Protein Expression



Effect of Somatostatin on Contractility



Hypothesis

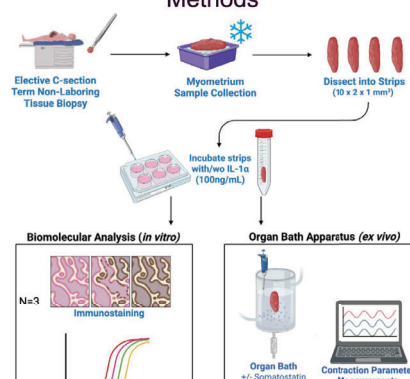
Somatostatin promotes myometrial contractility via SSTR2 in term pregnant myometrium, and inflammation enhances this response by increasing SSTR2 expression.

Objective 1: To examine the expression of *SSTR1-5* genes in pregnant human myometrium in the presence of inflammation (induced by pro-inflammatory cytokine IL-1 α).

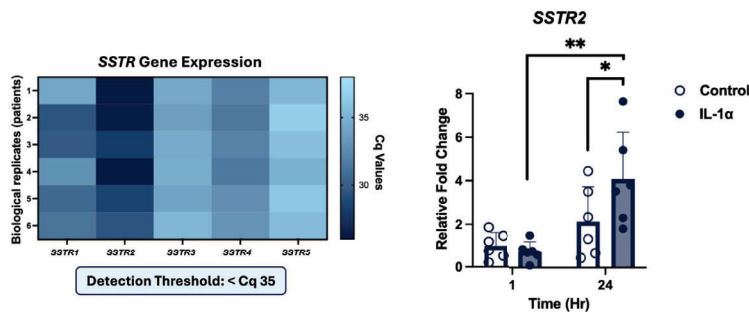
Objective 2: To study the *ex vivo* effects of somatostatin-14 on contractility of pregnant human myometrium and determine if IL-1 α enhances somatostatin-induced contractions.



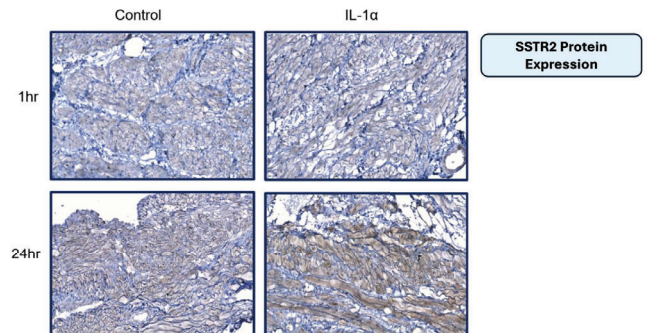
Methods



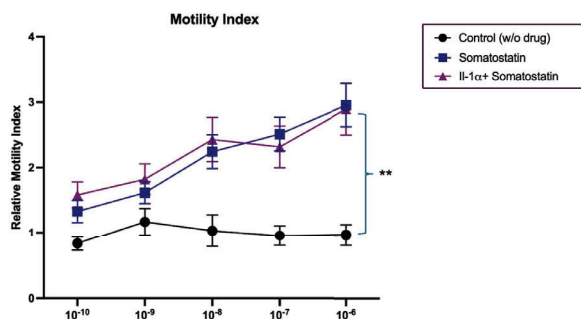
Inflammation significantly upregulates SSTR2 gene expression



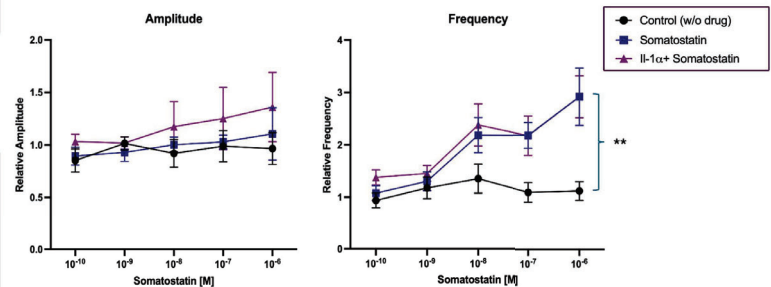
Inflammation upregulates SSTR2 protein expression



Somatostatin increases contractility in pregnant human myometrium



Somatostatin increases contractility in pregnant human myometrium



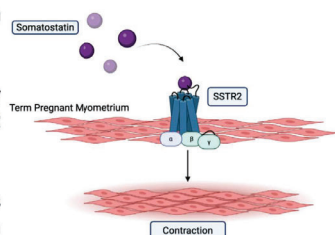
Conclusions



➤ Only SSTR2 gene was expressed in term pregnant human myometrium.

➤ Pro-inflammatory cytokine IL-1α significantly induced SSTR2 mRNA level and SSTR2 protein in term pregnant human myometrium.

➤ *Ex vivo* somatostatin treatment enhances contractile activity of term pregnant human myometrium.



Conclusions



Somatostatin-SSTR2 signalling modulates contractility of the pregnant human myometrium, supporting its potential as a therapeutic target to enhance uterine contractility in **postpartum hemorrhage (PPH)**.

Future Directions

- Interaction of somatostatin with uterotonics (i.e., oxytocin).
- **Octreotide** and **Lanreotide** are clinically available somatostatin analogs with greater stability and high affinity for SSTR2.

Proteomic Investigation of Myometrium from Patients with Class III Obesity

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Department of Obstetrics and Gynecology, University of Toronto
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Department of Physiology, University of Toronto
Lunenfeld-Tanenbaum Research Institute, Mount Sinai Hospital



Methods – Proteomic Investigation of the Obese Myometrium

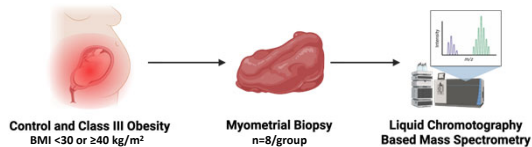
- Myometrial samples collected from full term pregnant women at elective cesarean delivery
- Class III Obesity (BMI $\geq$ 40 kg/m²) vs. Lean Control (BMI <30 kg/m²), n=16 (8/group)
- Patients with other risk factors for PPH were excluded except for GDM & macrosomia in Obesity group

Control and Class III Obesity
BMI <30 or $\geq$ 40 kg/m²

Myometrial Biopsy
n=8/group

Liquid Chromatography
Based Mass Spectrometry

- Myometrial samples collected from full term pregnant women at elective cesarean delivery
- Class III Obesity (BMI $\geq$ 40 kg/m²) vs. Lean Control (BMI <30 kg/m²), n=16 (8/group)
- Patients with other risk factors for PPH were excluded except for GDM & macrosomia in Obesity group



2

Obesity Dysregulates the Myometrial Proteome

Obesity Dysregulates the Myometrial Proteome

Proteins identified with Spectronaut using DirectDIA for peptide and protein identification against the Homo sapiens UniProt database

5,784 Proteins Quantified
778 Differentially Expressed
253 Downregulated
525 Upregulated

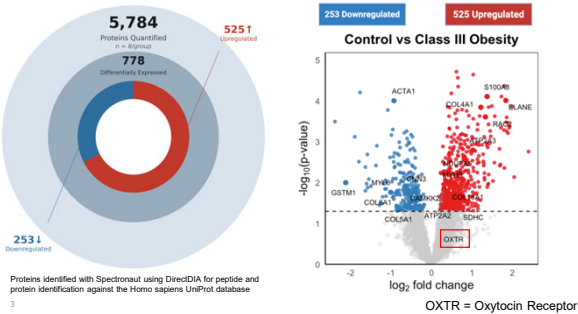
Control vs Class III Obesity

$-\log_{10}(p\text{-value})$

$\log_2$ fold change

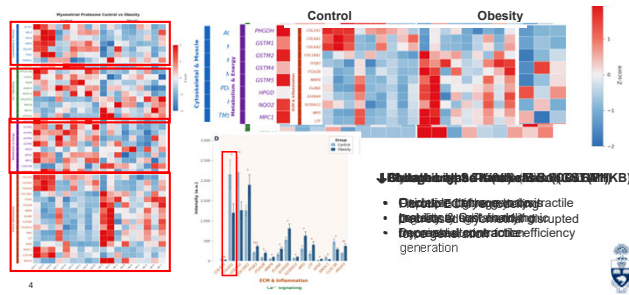
OXTR = Oxytocin Receptor

3



Proteins identified with Spectronaut using DirectDIA for peptide and protein identification against the Homo sapiens UniProt database

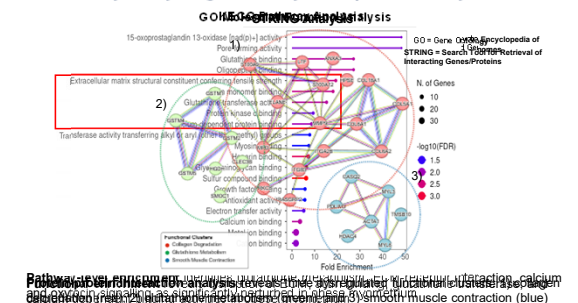
OXTR = Oxytocin Receptor

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↓ Bibliography 8.57 MB (8,570,000 Bytes) KB

- Depolarized ECG suggests high
- Depressed ST segment suggests
- Depressed T wave suggests

4

[illegible]

Pathway-level enrichment analysis reveals three dysregulated functional clusters: a signaling and oxygen sensing pathway significantly perturbed in obese hypertension (green) and skeletal muscle contraction (blue)

Conclusion & Future Directions

- Proteomics quantified 5,784 proteins, identifying **778 differentially expressed** in Class III obesity vs. lean controls

Future Directions

- Validate key protein targets through ex-vivo organ bath contractility assays
- Identify novel druggable pathways to prevent uterine atony and reduce PPH risk in women with obesity

6



- Proteomics quantified 5,784 proteins, identifying **778 differentially expressed** in Class III obesity vs. lean controls

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6

Stanford MEDICINE
School of Medicine

Systemic Immune Signatures Predict Successful Induction of Labor: A Single-Cell Mass Cytometry Prospective Cohort Study

Kazuo Ando, Maximilian Sabayev, Kotaro Miyazaki, Amy Tsai, Edward Ganio, Brendan Carvalho, Brice Gaudilliere

Department of Anesthesiology, Perioperative and Pain Medicine, Gaudilliere lab
No COI

1

Clinical Challenge & Background

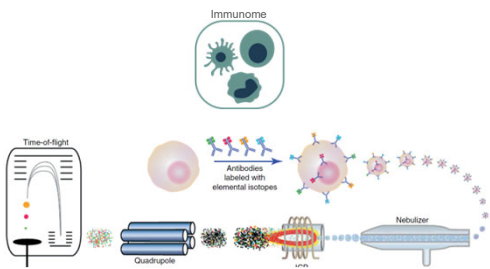
The Burden of IOL: Induction of labor (IOL) accounts for over 20% of deliveries in the United States

The Clinical Gap: Approximately 20% of these inductions fail to reach active labor, which necessitates a cesarean delivery. Predicting this failure remains a significant challenge due to a lack of current clinical and biochemical markers

Immunological Context: The maternal immune system undergoes precise, time-dependent adaptations (specifically STAT3 and STAT5 phosphorylation) that track chronological progression from induction to active labor

2

Single-cell mass cytometry (CyTOF) for the functional analysis of systemic immune responses during pregnancy



3

Method

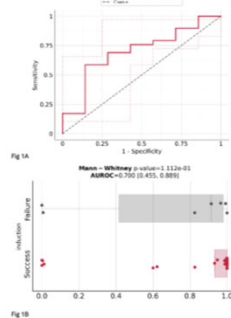
- Study Design:** A prospective cohort, IRB-approved study enrolling healthy pregnant women scheduled for IOL
- Data Collection:** One-hundred of peripheral blood samples were collected on admission, immediately prior to induction
- Cellular Analysis:** Single-cell mass cytometry (CyTOF) was used to evaluate immune activity
- Computational Pipeline:** We employed the Stabl pipeline to filter the high-dimensional datasets and identify the most robust and essential markers needed for accurate prediction

4

Result

Cohort Demographics: The analysis included 36 participants, with 29 successful inductions and 7 failed inductions.

Key Drivers: Predictive features for success included higher baseline levels of specific memory T-cells and activated Natural Killer T-cells



5

Conclusion

- Proof of Concept:** This study demonstrates the feasibility of utilizing maternal immune signatures to predict the likelihood of IOL success
- Clinical Implications:** Biological readiness for labor can be detected in peripheral blood via a baseline immune signature
- Next Steps:** These findings warrant validation in larger cohorts to develop robust prognostic tools that can guide clinical management and inform patient-centered care

6



SOAP 2026 Best Paper Session



Incidence of general anesthesia for cesarean delivery according to urgency

Prospective multinational multicenter observational study of 31 European countries, 9,989 cases



Carolyn F Weiniger¹, Adam Lustig¹, Arash Afshari², Oscar F C van den Bosch³, Carolina Romero Soledad⁴, Asaf Berman¹, Nicolas Brogly⁵ & the ACCESS Study Group

¹Tel Aviv Sourasky Medical Center affiliated with the Gray Faculty of Medicine and Health Sciences, Tel Aviv University, Israel
²Rigshospitalet & Institute of Clinical Medicine, University Hospital of Copenhagen, Denmark
³Wilhelmina Children's Hospital, University Medical Center Utrecht, Netherlands
⁴University General Hospital of Valencia, Spain
⁵Hospital General Universitario Gregorio Marañón, Hospital Universitario Sanitas La Zarzuela, Madrid, Spain
The ACCESS Study Group

1





Disclosures

Investigator sponsored research grant, Masimo

Honorarium Elsevier

2



Slide 1/6



Background and Aims

Audit targets for cesarean delivery anesthesia

Overall Targets	Conversion Targets
RCOA: Neuraxial	RCOA: Neuraxial to GA
Category 1 > 50%	Category 1 < 15%
Category 1-3 > 85%	Category 2-3 < 5%
Category 4 > 95%	Category 4 < 1%

SOAP (all Categories)
GA ≤ 5%

Category 1 = Emergency (Stat)
Category 2 = Urgent
Category 3 = Expedited
Category 4 = Planned

GA = General Anesthesia
CD = Cesarean Delivery
Cat = Category

Guidelines based on data from 
Audit targets vary by urgency

Primary Aim: Report GA rates, according to CD urgency in European Countries

Secondary Aims: Report Neuraxial Conversion to GA; use of Supplementary Medication

Lucas DN J R Soc Med 2000; RCoA 2020; Juang J A&A 2017; Bucklin B Anesthesiology 2025; https://www.soap.org/centers-of-excellence_program

3



Slide 2/6



Study Methods

Prospective cross-sectional multinational multicenter study

2-week snapshot methodology in each participating center

➢ Expert Steering Committee - Delphi process identified 24 study variables

- All urgency categories
- No exclusion criteria

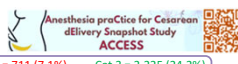
- National coordinator(s) identified per country
- Lead Investigator identified per center
- Ethical waiver/approvals all participating centers
- ACCESS study protocol published

➢ Descriptive statistics → to inform guidelines

4



Slide 3/6



Results: Characteristics

Sept 1st 2023 to April 30th 2025
→ 31 countries, 361 centers, 9,989 CD cases

Center size

Small	22.2%
Medium	44.4%
Large	33.4%

Maternal age*

15-20	2.4%
21-39	88.3%
≥40	9.2%

*Missing data not imputed

Provider

Trainee <2 yr	2.8%
Trainee 2-5 yr	11.5%
Attending	63.8%
OB Anesthesiologist	21.9%

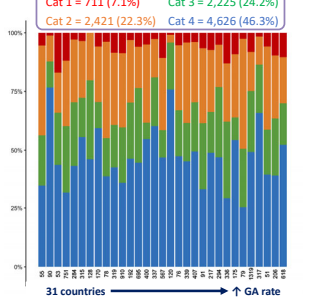
2,116 (21.2%) had labor epidural analgesia (LEA)

Leading CD indications all cohort

Prior CD	30.1% n=3,006
Fetal distress	19.2% n=1,919

Leading CD indications Cat 1

Fetal distress	68.4% n=486
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31 countries → ↑ GA rate

5



Slide 4/6



Results: General Anesthesia Rates

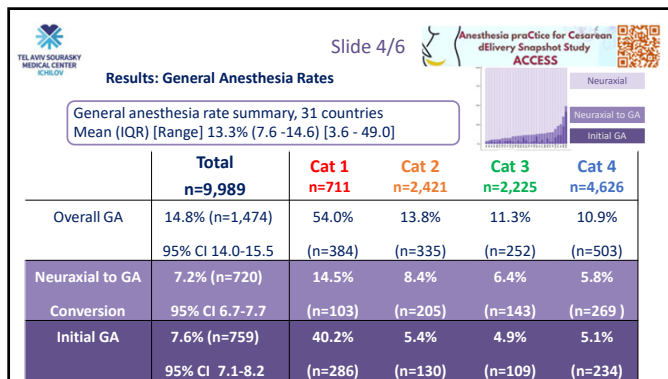
General anesthesia rate summary, 31 countries
Mean (IQR) [Range] 13.3% (7.6 -14.6) [3.6 - 49.0]



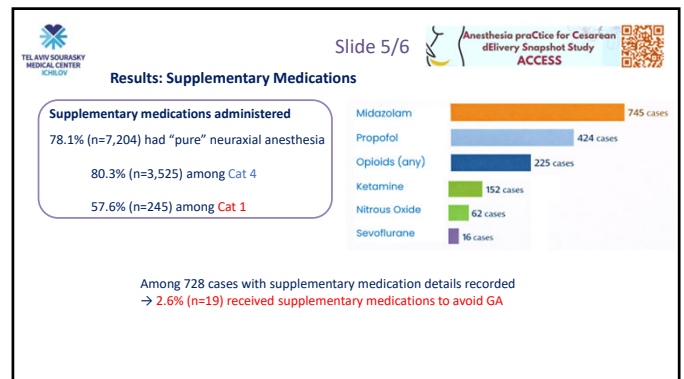
	Total n=9,989	Cat 1 n=711	Cat 2 n=2,421	Cat 3 n=2,225	Cat 4 n=4,626
Overall GA	14.8% (n=1,474) 95% CI 14.0-15.5	54.0% (n=384)	13.8% (n=335)	11.3% (n=252)	10.9% (n=503)

6

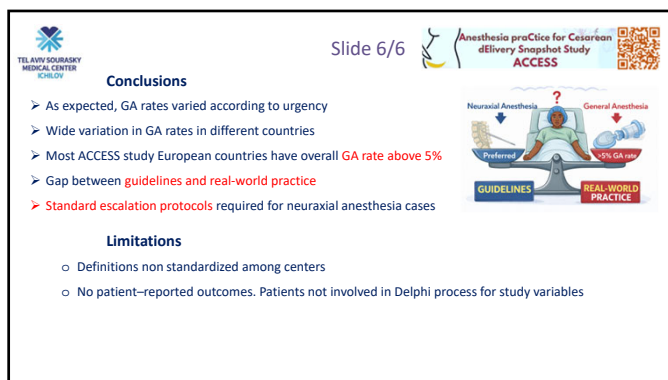
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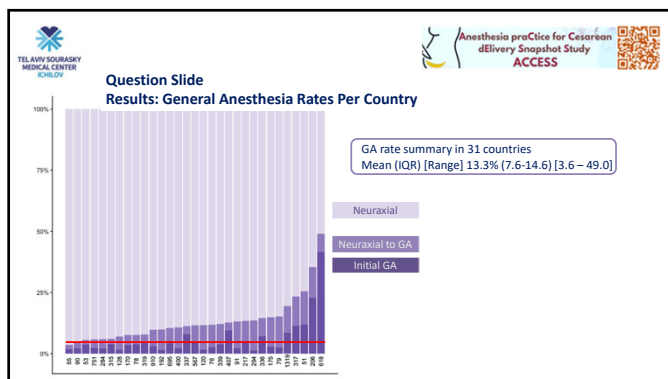
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10



11

Question Slide Anesthesia proCtice for Cesarean dElivery Snapshot Study ACCESS

Results: Indications for General Anesthesia

	Overall GA n=1,474	Cat 1 n=384	Cat 2 n=335	Cat 3 n=252	Cat 4 n=503
Among all GA cases					
Emergent reasons	171 (11.6%)	144 (37.5%)	21 (6.3%)	3 (1.2%)	3 (0.6%)
Failed neuraxial anesthesia	321 (21.8%)	47 (12.2%)	111 (33.1%)	65 (25.8%)	98 (19.5%)
Other neuraxial issue	11 (0.7%)	2 (0.5%)	3 (0.9%)	4 (1.6%)	2 (0.4%)
Maternal request	337 (22.9%)	18 (4.7%)	66 (19.7%)	83 (32.9%)	170 (33.8%)
Maternal comorbidity	252 (17.1%)	40 (10.4%)	57 (17.0%)	47 (18.7%)	108 (21.5%)
Instability/Hemorrhage	100 (6.8%)	44 (11.5%)	17 (5.1%)	13 (5.2%)	26 (5.2%)
Prolonged surgery	26 (1.8%)	2 (0.5%)	7 (2.1%)	8 (3.2%)	9 (1.8%)
Not reported	266 (18.0%)	87 (22.7%)	54 (16.1%)	36 (14.3%)	89 (17.7%)

Other neuraxial issue = Technical/Total spinal

12

2




Question Slide

Results: Failed Neuraxial Anesthesia

Failed neuraxial anesthesia mode

→ converted to secondary GA

Spinal	6.9%	(468/6,765)
CSE	4.3%	(26/606)
LEA	11.8%	(214/1,806)

Failed neuraxial anesthesia according to cesarean urgency

Total	Cat 1	Cat 2	Cat 3	Cat 4
21.8%	12.2%	33.1%	25.8%	19.5%
(n=321)	(n=47)	(n=111)	(n=65)	(n=98)

13




Question Slide

Results: Use of Labor Epidural Analgesia for Anesthesia

21.2%
(n=2,116)

85.0%
(n=1,798)

Labor epidural augmentation for anesthesia
For patients with in situ epidural catheter

15% alternative anesthesia

Spinal anesthesia was most common alternative
81.8%

Except Category 1 → GA most frequent alternative
55.6%

14

Dural Puncture Epidural Technique Reduces Labor Epidural Failure Rate: Causal Inference from Electronic Health Records

Daniel F. Berenson, MD, PhD; Ayumi Maeda, MD, PhD; Nolan Wheeler, BS; Lawrence Tsen, MD; Vesela Kovacheva, MD, PhD
Department of Anesthesiology | Mass General Brigham | Harvard Medical School

Reported Benefits of DPE

- Anatomic confirmation
- Translocation of medication
- Improved block quality

Limited Evidence

- Do DPEs fail less often?
- Failure defined as:
 - Catheter replacement
 - Spinal anesthesia
 - General anesthesia

Beger et al. *Int J Obstet Anesth* 2022;
Cao et al. *BMC Anesthesiology* 2026;
Chau and Tsen, *Curr Opin Anesth* 2023;
Smith et al. *British J Anaesthesia* 2025

1

Approach

Problem = Rare Outcome

Assume: DPE decreases failure rate by ¼ (4% to 3%)

Set: Power 80% at $\alpha = 0.05$

Calculate: **$N = 10,000$**

Solution = Retrospective data

BWH Cohort 2017-2024:
33,757 catheters

Problem = Confounding

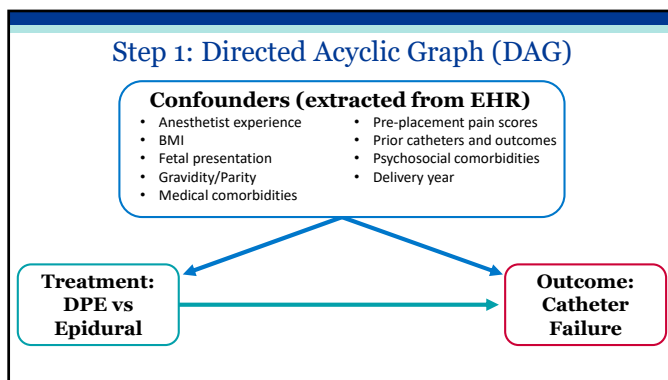
DPE chosen for higher risk patients?

Failures reflect confounders vs. DPE treatment effect?

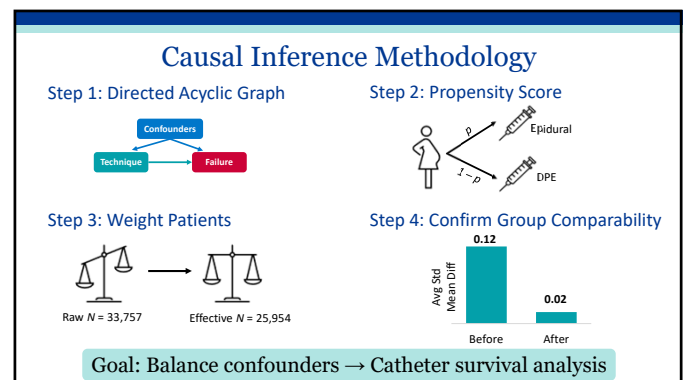
Solution = Causal inference

Treatment assignment independent of confounders

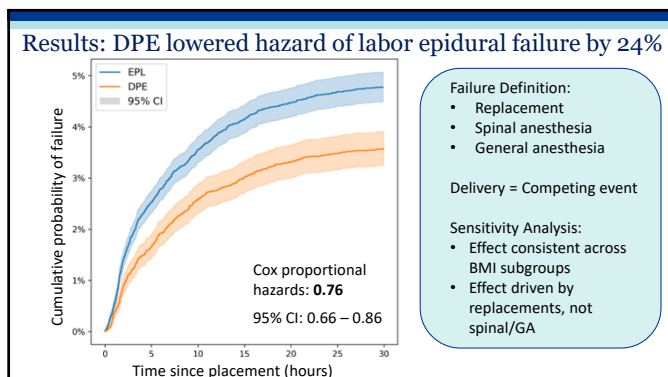
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3



4



5

Conclusions

In propensity-weighted cohort of 33,757 labor epidural catheters, **DPE technique** was associated with **lower catheter failure**

Limitations: Unmeasured confounders
Likely **underestimate effect size**
Large sample size from **single institution**

Retrospective causal inference is a valuable tool to investigate **rare outcomes** not amenable to randomized controlled trials

6

The Effect of Tranexamic Acid Rate of Administration on Maternal Blood Pressure

A Prospective, Randomized, Double-Blind, Non-Inferiority Trial

Juliana Kruthof, Simon Wydall, Aislynn Sharrock, Garvin Kruthof, Loic Sentilhes, Anton Chau






1

Background

FDA / Health Canada Drug Monograph

WHO/FIGO Guidelines

Hypothesis

Infusion of IV TXA over **1 min (FAST)** is **non-inferior** to over **10 min (SLOW)** with respect to mean % change in SBP over 15 minutes post-administration.



2

Study Flow + Outcomes

Elective Cesarean Delivery

3

Statistical Analysis

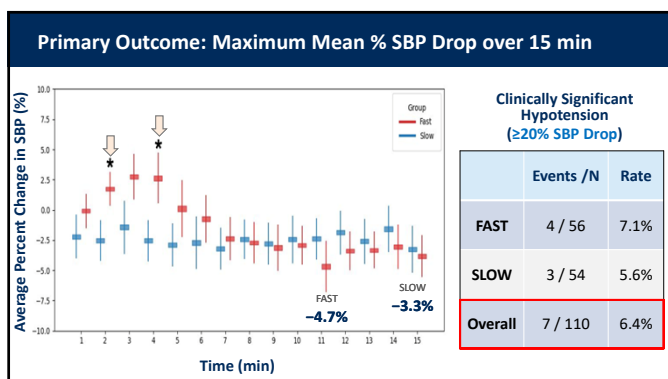
Sample Size

- TRAAP-2 (Sentilhes et al., NEJM 2021).
- Assuming SD - **18%**, between-group difference - **0%**, one-sided type I error - **2.5%**, power - **80%**, noninferiority margin - **10%**.
- N=100 patients; accounting for attrition, total 110 patients recruited.

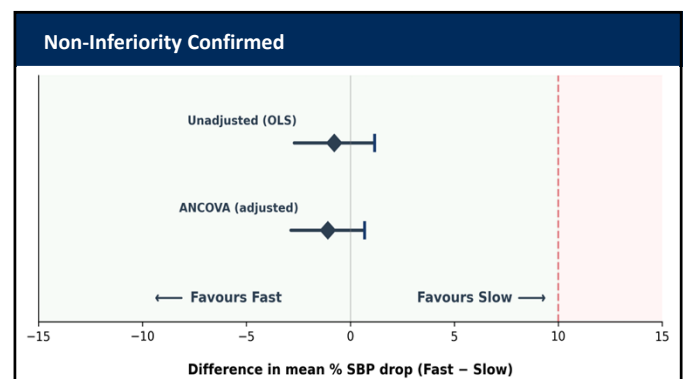
Analysis

- Welch's t-test for unadjusted analysis.
- ANCOVA adjusted analysis with baseline SBP as a covariate.
- Non-Inferiority analysis: One-sided 97.5% upper confidence limit.
- Mixed-effects linear model for repeated measurements within participants.

4



5



6

Maternal Adverse Effects & Neonatal Outcomes

- **No significant differences in maternal adverse effects:** nausea, vomiting, headache, photopsia, dizziness.

- **No significant differences in neonatal outcomes:** Apgar scores, cord blood gases, NICU admissions. No seizure in either group.

Nausea Post TXA Infusion

Time	FAST (Event/N)	SLOW (Event/N)	P-value
5 min	13/56	3/54	0.013*
10 min	6/56	8/54	0.577
15 min	4/56	10/54	0.091
Overall	15/56	15/54	1.00

7

Discussion & Clinical Implications

- **1-min (FAST) vs 10-min (SLOW) TXA:** similar early maternal SBP response.
- **Maternal adverse events:** earlier nausea in the FAST group but similar overall incidence between groups.
- **Neonatal outcomes:** when TXA given prophylactically before incision, no obvious signal of harm at delivery.
- **Findings limited to:** first 15 min, healthy obstetric patients undergoing CD.
- **Potential implications:** low-resource settings, nursing workflow.

8

Abstract #: SAT – BP - 01

Inflammation Sensitizes Term Human Myometrium to Somatostatin-Mediated Contractility via Somatostatin Receptor Type 2 (SSTR2)

Presenting Author: Anuradha Baishnob, HBSc

Presenting Author's Institution: University of Toronto - Toronto, Ontario

Co-Authors: Oksana Shynlova, PhD - Lunenfeld Tanenbaum Research Institute

Senior Author: Mrinalini Balki, MD – Professor, University of Toronto

Abstract :

Background:

Myometrial contractility is essential for postpartum hemostasis, but dysfunction contributes to postpartum hemorrhage (PPH). Despite widespread use of uterotonics, options remain limited in resistant cases of uterine atony, highlighting the need for new therapeutic strategies. Somatostatin and its receptor, somatostatin receptor subtype 2 (SSTR2), have been shown to regulate contractility in inflamed pig

myometrium, but their role in human pregnancy is unknown.¹ The objective of this study was to determine whether somatostatin regulates contractility in term pregnant human myometrium. We hypothesized that somatostatin promotes myometrial contractility via SSTR2 in term pregnant myometrium, and that inflammatory exposure enhances this response by increasing SSTR2 expression.

Methods:

After REB approval and informed patient consent, myometrial biopsies were obtained from term non-labouring women undergoing elective cesarean delivery (CD) (n=24) and dissected into multiple strips. Tissue strips (3 per patient) were then incubated for 24 hours in MOPS solution with interleukin-1 α (IL-1 α , 100 ng/mL) to model inflammation or without IL-1 α (Control). *Ex vivo* organ bath experiments assessed

dose-response effects of somatostatin-14 (10^{-10} - 10^{-6} M) in three tissue groups: (1) Control without somatostatin, (2) Control with somatostatin dose response, and (3) Inflamed with somatostatin dose response. The primary outcome of contractility was motility index (frequency $\times$ amplitude), and the area under the curve was analyzed as a secondary endpoint, both using mixed-effects models. Expression and localization of SSTR2 were assessed by RT-qPCR (n=6) and immunohistochemistry (n=4). Inflammatory markers were quantified by ELISA (n=5).

Results:

The inflamed model was established by IL-1 α treatment, which induced a robust inflammatory response compared to control, as confirmed by increased secretion of pro-inflammatory cytokines IL-6, IL-8, and CCL2, with a 2-3-fold increase ($p < 0.01$). Interestingly, somatostatin-14 significantly increased motility index in both control and IL-1 α -treated tissues compared to control tissue without somatostatin exposure,

with an approximate fold change of ~ 2.5 at doses 10^{-8} and 10^{-7} M ($p < 0.01$) (Fig 1). RT-qPCR demonstrated a significant increase in SSTR2 expression in IL-1 α -treated myometrial tissue compared with controls (~ 5 -fold, $p < 0.01$), with immunostains supporting receptor localization within the myometrium.

Conclusion:

The findings of our study identify the somatostatin–SSTR2 axis as a previously unrecognized regulator of contractility in term pregnant human myometrium. The potential implications of these findings include the use of somatostatins in inflamed states, such as labour, CD, and infection, to improve myometrial

contractility. This pathway may represent a novel therapeutic target for improving uterine tone and inform the development of adjunctive strategies for PPH.

References: 1. Vet Sci 2020;133:163

Somatostatin increases motility index in non inflamed and inflamed pregnant human myometrial model compared to control

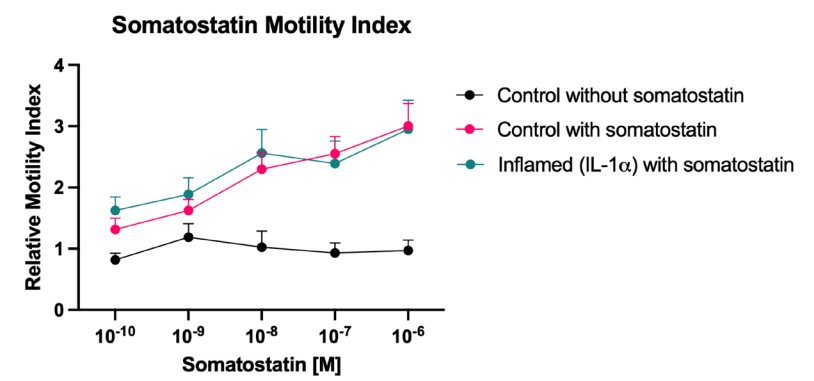


Fig.1 Somatostatin significantly increased relative motility index in both control and inflamed tissue as compared to control tissue that did not receive somatostatin (mixed-effects ANOVA, $p < 0.05$), with significant treatment x concentration interaction.

N=24

Abstract #: SAT – BP - 02

Proteomic investigation of myometrium from pregnant women with class III obesity

Presenting Author: Joseph Park

Presenting Author's Institution: University of Toronto - Toronto, Ontario

Co-Authors: Cynthia Maxwell, MD - University of Toronto

Senior Author: Mrinalini Balki, MD – Professor, University of Toronto

Abstract : Introduction: Maternal obesity is an escalating global health burden with implications for reproductive outcomes and parturition. In North America, obesity affects nearly one in five pregnancies

and is associated with higher rates of cesarean delivery (CD) and postpartum hemorrhage (PPH).¹ Up to 80% of PPH cases result from inadequate myometrial contractility, classified clinically as uterine atony.

Class III obesity (BMI 40 kg/m² or higher) confers a particularly elevated risk of PPH.² In obese patients, the molecular basis of poor myometrial contractility is not well understood, while it is clearly driven by metabolic and cell signaling abnormalities. The aim of this study was to examine the molecular origin of obesity-associated myometrial dysfunction. We hypothesized that women with class III obesity would exhibit obesity-associated proteomic remodeling of the myometrium that impairs calcium signaling and cellular energetics, resulting in reduced uterine contractile capacity.

Methods: Myometrial biopsies were obtained from term pregnant non-laboring women undergoing elective CD: 1) control: BMI < 30 kg/m² (n=8) and 2) class III obesity (n=8). Samples were snap frozen in liquid nitrogen and total protein was extracted using hydrophilic interaction liquid chromatography magnetic bead-based method, followed by data-independent acquisition mass spectrometry. Data was analyzed with Spectronaut using DirectDIA for peptide and protein identification against the Homo sapiens UniProt database. Differential expression analysis was performed using a two-sample t-test with Benjamini–Hochberg correction (adj. p < 0.05, |log₂FC| ≥ 0.58).

Results: A total of 5,795 proteins were identified, of which 780 were differentially expressed between the class III obesity and control groups (527 upregulated, 253 downregulated). Gene ontology analysis revealed significant alterations in pathways governing myometrial contractility. CaMKK2, a key regulator of calcium signaling and energy homeostasis, was downregulated in the obesity group, while SERCA2/3, crucial for calcium reuptake and relaxation, were upregulated. Class III obesity also resulted in altered expression of mitochondrial enzymes (SDHC, NDUFA5), extracellular (COL4A1), cytoskeletal protein (CNN3), and inflammatory mediators (S100A8/Calgranulin, neutrophil elastase), indicating that obesity alters multiple molecular pathways contributing to impaired myometrial contractility.

Conclusions: This study provides the first comprehensive proteomic characterization of the myometrium in women with class III obesity. Our results indicate that obesity alters multiple molecular pathways contributing to impaired myometrial contractility. These characteristics may facilitate the development of new uterotonic drugs to enhance myometrial contractility and mitigate the risk of CD and PPH in this high-risk population.

2. Butwick AJ, et al. Anesthesiology. 2018;128:774-783

I am running a few minutes late; my previous meeting is running over.

References: 1. Gerede A, et al. Med Sci (Basel). 2025;13(3):182

[Abstract Figure 1.pdf](#)

Abstract #: SAT – BP - 03

Systemic Immune Signatures Predict Successful Induction of Labor: A Single-Cell Mass Cytometry Prospective Cohort Study

Presenting Author: Kazuo Ando, MD, PhD

Presenting Author's Institution: Stanford University School of Medicine - PALO ALTO, California

Co-Authors: Brendan Carvalho, MD - Stanford Department of Anesthesiology, Perioperative and Pain Medicine (Obstetrics) and, by courtesy, OBGYN (MFM)

Edward Ganio, PhD - Stanford University School of Medicine

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Maximilian Sabayev, MS - Stanford University School of Medicine

Amy Tsai, MD - Stanford University School of Medicine

Senior Author: Brice Gaudilliere, MD, PhD – Department of Anesthesia, Perioperative, and Pain Medicine, Stanford University School of Medicine

Abstract :

Introduction

Induction of labor (IOL) is performed in over 20% of deliveries in the United States, however approximately 20% fail to reach active labor, necessitating cesarean delivery. Predicting IOL failure remains a significant clinical challenge as current clinical and biochemical markers are lacking. A previous study demonstrated that the maternal immune system undergoes precise, time-dependent adaptations during the course of induced labor¹. The study found that systemic signaling responses, specifically STAT3 and STAT5 phosphorylation across innate and adaptive immune subsets, closely track the chronological progression from induction to active labor. The aim of this study was to utilize high-dimensional mass cytometry to determine if distinct immune signatures present at baseline (prior to starting induction) can prospectively differentiate between successful and failed IOL.

Methods

In this prospective cohort IRB-approved study, we enrolled healthy pregnant women scheduled for IOL. Peripheral blood samples were collected on admission immediately prior to induction and analyzed using single-cell mass cytometry (CyTOF) to evaluate endogenous activity. We employed the Stabl pipeline², a framework that filters high-dimensional datasets to identify only the most robust and essential markers needed for accurate prediction, to identify the most informative features associated with IOL success. We defined IOL success as achieving 2nd stage of labor (complete cervical dilation).

Results

The analysis included a cohort of 36 participants, consisting of 29 successful inductions and 7 failed inductions. Leveraging STABL's stability selection, we obtained a sparse multivariate model of pre-induction immune features that reliably discriminates clinical outcomes. (AUC 0.700, p=0.11; Figure 1AB). Key predictive features included higher baseline levels of specific memory T-cells and activated Natural Killer T-cells. These findings suggest that the maternal immune system is biologically primed for labor prior to induction.

Conclusion

This study demonstrates the feasibility of using maternal immune signatures to predict the likelihood of IOL success. The identification of a baseline immune signature associated with IOL success indicates that biological readiness for labor can be detected in the peripheral blood. These novel findings warrant validation in larger cohorts to develop robust prognostic tools to guide clinical management and to inform patient-centered care.

References:

1. Ando K et al. A Peripheral Immune Signature of Labor Induction. *Front Immunol.* 2021;12:725989
2. Hédou J et al. Discovery of sparse, reliable omic biomarkers with Stabl. *Nat Biotechnol.* 2024;42(10):1581-1593.

[Fig 1AB SOAP2026.pdf](#)

Abstract #: SAT – BP - 04

Incidence of general anesthesia for cesarean delivery according to urgency: Prospective multinational multicenter observational study of 31 European countries, 9,989 cases

Presenting Author: Carolyn F. Weiniger, MB, ChB

Presenting Author's Institution: Division Critical care and Pain Tel Aviv Sourasky Medical Center - Tel Aviv, Tel Aviv

Co-Authors: Arash Afshari - Copenhagen

Asaf Berman, MD - Tel Aviv

Adam Lustig, n/a - Tel Aviv

Carolina Soledad Romero - Valencia

Oscar F. van den Bosch- Utrecht

Senior Author: Nicolas Brogly, MD – Department of Anaesthesia and Critical Care, Hospital Universitario Gregorio Marañón, Madrid, Spain

Abstract :

Background: Neuraxial anesthesia (NA) is the preferred technique for cesarean delivery (CD), but contemporary European data on general anesthesia (GA) use are limited.

Primary aim: To report GA rates by CD urgency.

Main secondary aim: To report the incidence of GA conversion.

Methods: Prospective, multinational, multicenter 2-week snapshot study of all CDs (ethics approval/waiver), with no exclusion criteria, (1 September 2023 to 30 April 2025). A Delphi process defined 24 case-report variables, including CD urgency (Lucas classification: Emergency, Urgent, Expedited, Planned)¹. The main outcome was anesthesia mode. Post-hoc calculation showed a random sample of 4,947 CDs would be sufficient to estimate a GA population proportion of ~15%, with 95% confidence and $\pm 1\%$ precision. Data are presented as (% , n).

Results: 9,989 CDs from 361 centers in 31 European countries were reported; 46.3% Planned, 22.3% Urgent, 24.2% Expedited, 7.1% Emergency CDs; 21.9% (2,187) were performed by an Obstetric Anesthesiologist. Leading CD indications were prior CD (30.1%, 3,006) and fetal compromise (19.2%, 1,919). Among Emergency and Urgent CDs, fetal distress was the most frequent indication (68.4%, 486 and 44.4%, 1,075, respectively).

Overall GA rate was 14.8% (95%CI 14.0-15.5; n=1,474), Table. GA was the intended anesthesia mode in 7.6% (95%CI 7.1-8.2; n=759) and NA was the initial plan in 92.4% (95%CI 91.9-92.9; n=9,228) CDs. Among Emergency CDs, 59.8% (425) were initiated under NA, and GA was used for 54.0% (384).

Overall, GA conversion occurred in 7.2% (720) of CDs: 6.9% (468/6,765) after spinal, 4.3% (26/606) after combined spinal–epidural, and 11.8% (214/1,806) after labor epidural augmentation (LEA). The Table details indications for GA conversion according to CD urgency. Main indications were maternal request (22.9%, 337) and NA failure (21.8%, 321), however among Emergency CDs, emergent reasons (fetal compromise, prolapse, bleeding) were most frequent, 37.5% (144).

After initial NA, no escalation (supplementary medication (Supp Meds)/GA conversion) was used in 80.3% (3,525) of Planned and 57.6% (245) of Emergency CDs. Supp Meds included midazolam (745), propofol (424), opioids (225), ketamine (152) CDs. After initial NA, 2.6% (239) received Supp Meds intended to avoid GA. Timing of Supp Meds/GA conversion was recorded for n=728: before incision 43.0% (313), after incision/before delivery 30.2% (220), and after delivery 26.7% (195).

Interpretation: This study represents the largest European database to date with detailed information on anesthesia mode, GA conversion including neuraxial failure. We highlight a contemporary disconnect between recommended and real-life GA rates. Frequent use of GA for Planned cases suggests additional contributors beyond clinical acuity and NA failure. These findings support the need for optimized NA management and standardized escalation protocols.

Acknowledgments: ACCESS Study Group

References: 1. J R Soc Med 2000; 93:346

Table: Anesthesia mode performed according to cesarean delivery urgency

	Total n=9,989	Category 4 Planned n=4,626	Category 3 Expedited n=2,225	Category 2 Urgent n=2,421	Category 1 Emergency n=711
Number of cases					
Initial Anesthesia Plan					
General Anesthesia (GA)	759 (7.6%)	234 (5.1%)	109 (4.9%)	130 (5.4%)	286 (40.2%)
*all cases had urgency category assigned					
Neuraxial Anesthesia (NA)	9,228 (92.4%)	4,392 (94.9%)	2,116 (95.1%)	2,291 (94.6%)	425 (59.8%)
*4 cases had no urgency category assigned					
NA Technique Used (among all NA cases)					
Single-shot spinal anaesthesia	6,765 (73.3%)	3,887 (88.5%)	1,437 (67.9%)	1,250 (54.6%)	188 (44.2%)
Combined spinal epidural anaesthesia	606 (6.6%)	451 (10.3%)	111 (5.2%)	43 (1.9%)	1 (0.2%)
Epidural augmentation	1,806 (19.6%)	19 (0.4%)	560 (26.5%)	991 (43.3%)	235 (55.3%)
Continuous spinal anaesthesia	10 (0.1%)	5 (0.1%)	2 (0.1%)	3 (0.1%)	0 (0.0%)
Epidural anaesthesia (de novo)	41 (0.4%)	30 (0.7%)	6 (0.3%)	4 (0.2%)	1 (0.2%)
General Anesthesia					
GA performed at any time (among all cases)	1474 (14.8%)	503 (10.9%)	252 (11.3%)	335 (13.8%)	384 (54.0%)
Secondary GA (among all cases)	720 (7.2%)	269 (5.8%)	143 (6.4%)	205 (8.4%)	103 (14.5%)
Indication for GA (among all GA performed)*					
Emergent reasons	171 (11.6%)	3 (0.6%)	3 (1.2%)	21 (6.3%)	144 (37.5%)
Failure of neuraxial anaesthesia	321 (21.8%)	98 (19.5%)	65 (25.8%)	111 (33.1%)	47 (12.2%)
Other anaesthesia issue (Techn. Prob./ Total spinal)	11 (0.7%)	2(0.4%)	4 (1.6%)	3 (0.9%)	2(0.5%)
Maternal request	337 (22.9%)	170 (33.8%)	83 (32.9%)	66 (19.7%)	18 (4.7%)
Maternal condition	252 (17.1%)	108 (21.5%)	47 (18.7%)	57 (17.0%)	40 (10.4%)
Hemodynamic instability or hemorrhage	100 (6.8%)	26 (5.2%)	13 (5.2%)	17 (5.1%)	44 (11.5%)
Prolonged surgical procedure	26 (1.8%)	9 (1.8%)	8 (3.2%)	7 (2.1%)	2 (0.5%)
Not clearly reported	266 (18.0%)	89 (17.7%)	36 (14.3%)	54 (16.1%)	87 (22.7%)

Key: GA = general anaesthesia; NA = neuraxial anaesthesia. Among the 9,989 cases, 2 had no record of initial anaesthesia plan or case urgency classification. * Patients may have more than one indication for GA; Emergent reasons for GA included fetal compromise, cord prolapse, bleeding

Abstract #: SAT – BP - 05

The Dural Puncture Epidural Technique Reduces Labor Epidural Failure Rate: Causal Inference from Electronic Health Records

Presenting Author: Daniel F. Berenson, MD, PhD

Presenting Author's Institution: Brigham and Women's Hospital - Boston, Massachusetts

Co-Authors: Ayumi Maeda, MD, MD, PhD - Brigham and Women's Hospital/Harvard Medical School
Lawrence C. Tsen, MD - Harvard Medical School

Nolan K. Wheeler, BS - Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts, USA

Senior Author: Vesela P. Kovacheva, MD, PhD – Director of Translational and Clinical Research, Brigham and Women's Hospital/Harvard Medical School

Abstract :

Background:

Compared to a conventional labor epidural (EPL), the dural puncture epidural (DPE) technique has demonstrated several advantages including confirmation of anatomic location, faster onset with improved bilateral and sacral spread, lower initial dose to establish analgesia, reduced need for clinician and patient controlled epidural doses, and faster extension to cesarean anesthesia¹. Few data exist regarding differences on epidural catheter failure; previous retrospective studies are limited by confounders that restrict causal inference, while prospective studies are limited by small sample sizes, which obscure differences in rare outcomes²⁻⁴. A recent meta-analysis found a lower replacement rate with DPE, but this was not statistically significant and the certainty of evidence was very low⁵. These limitations can be mitigated using large retrospective causal inference analysis. We hypothesized that, after propensity score weighting to adjust for confounders, DPE would be associated with a lower hazard rate of failure than EPL.

Methods:

Data were extracted from the electronic health records of a single-center retrospective cohort (2017-2024). Epidural failure was defined as a replacement with another epidural or spinal technique, or provision of an airway procedure. A directed acyclic graph was constructed to clarify proposed causal pathways among patient demographics, comorbidities, and anesthesia procedural details. A propensity score was calculated for DPE versus EPL by logistic regression, then inverse probability of treatment weighting was used to isolate the treatment effect. Survival analysis was plotted with the Aalen-Johansen cumulative incidence function to account for delivery as a competing event. The hazard ratio was calculated using Cox proportional hazards.

Results:

Among 20,759 EPL and 12,728 DPE techniques, the overall failure rate was 4.2%: there were 924 failures after EPL (4.5%) and 490 failures after DPE (3.9%). After weighting by inverse probability of treatment, the groups were well matched with small standardized mean differences. The Figure shows the Aalen-Johansen cumulative incidence function. The hazard ratio from the weighted Cox proportional hazards analysis was 0.76 (95% CI 0.66 – 0.86).

Conclusion:

The DPE, compared to the EPL technique, reduced the hazard rate of epidural failure by 24% in a large propensity score weighted causal inference model. This reduction is similar in magnitude to the non-statistically-significant estimate from a recent meta-analysis ⁵, and may be an underestimate as residual unmeasured confounders could dilute the observed effect if clinicians favored DPE when especially concerned about failure in a particular patient. Increased use of the DPE technique may improve patient outcomes and satisfaction.

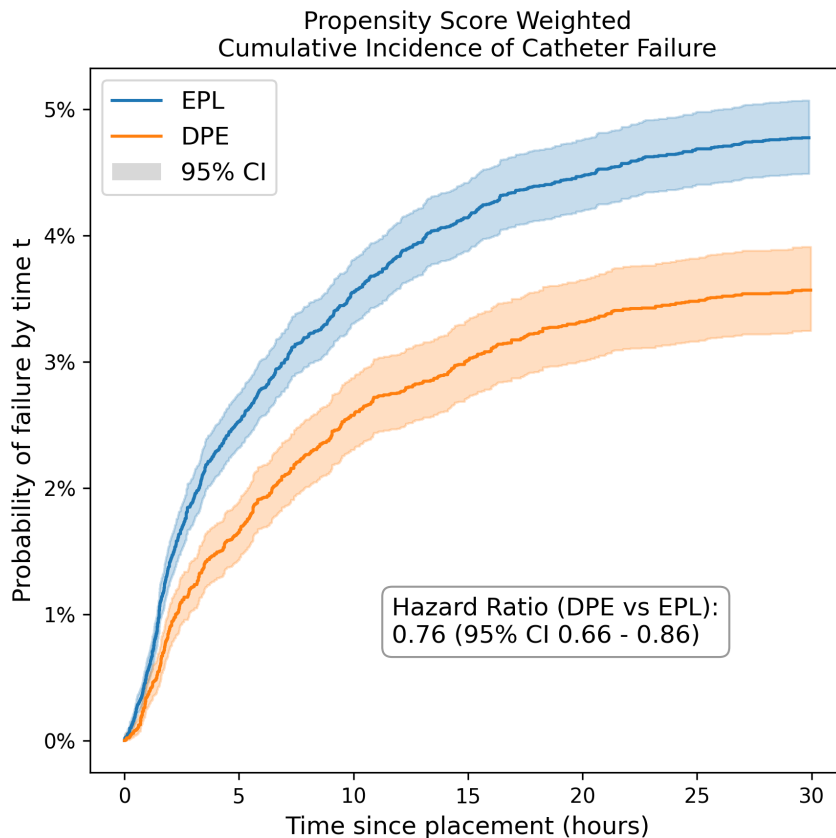
References: 1. Chau and Tsen, Curr Opin Anesth 2025

2. Arnolds and Scavone, IJOA 2021

3. Berger et al., IJOA 2022

4. Tan et al., Anesthesiology 2022

5. Singh et al., Br J Anesth 2025



Abstract #: SAT – BP - 06

Impact of Tranexamic Acid Rate of Administration on Maternal Blood Pressure: A Prospective, Randomized, Double-Blind, Non-Inferiority Trial

Presenting Author: Juliana Kruthof, MD, MSc, FRCPC

Presenting Author's Institution: BC Women's Hospital, University of British Columbia - Vancouver, British Columbia

Co-Authors: Garvin Kruthof, PhD - Department of Anesthesia, BC Women's Hospital

Loic Sentilhes, MD, PhD - Department of Obstetrics and Gynecology, Bordeaux University Hospital Aislynn L. Sharrock, BA (Hons), MScR Candidate - Department of Anesthesia, BC Women's Hospital Simon Wydall, MBBS, BSc, FRCA - Department of Anaesthesia, St. George's Hospital

Senior Author: Anthony Chau, MD, MSc, FRCPC – Clinical Associate Professor, Department of Anesthesia, BC Women's Hospital; Department of Anesthesia, St. Paul's Hospital; University of British Columbia

Abstract :

Background: Tranexamic acid (TXA) reduces obstetric blood loss, but the optimal administration rate remains unclear. Although the US FDA¹ and Canadian Product Monograph² recommend infusion of 1g over 10min to avoid hypotension, major trials and contemporary practice have used faster administration without clear evidence of harm.³ We designed a randomized, double-blind, non-inferiority trial comparing the impact of TXA administration rate on maternal blood pressure (BP) and adverse effects in women undergoing elective cesarean delivery (CD) under spinal anesthesia.

Methods: After ethics and Health Canada approval, 110 healthy women undergoing elective CD were randomized to receive TXA 1g IV over 1min (fast) or 10min (slow) preoperatively using a double-dummy design. Blood pressure was recorded at baseline and every minute until 15 min after completion of infusions. Side effects were assessed every 5 min for 15 min, then every 15 min until discharge to ward. All patients received standardized spinal anesthetic and phenylephrine infusion. The primary outcome was the mean percent change in systolic blood pressure (mean % Δ SBP) at 15 min after TXA, analyzed using mixed-effects linear regression (non-inferiority margin 10%). Secondary outcomes included incidence of maternal adverse effects (hypotension ($\geq 20\%$ decrease), nausea, vomiting, dizziness, photophobia, headache), time to first nausea, and neonatal outcomes (Apgar scores, cord gases, seizures and NICU admission).

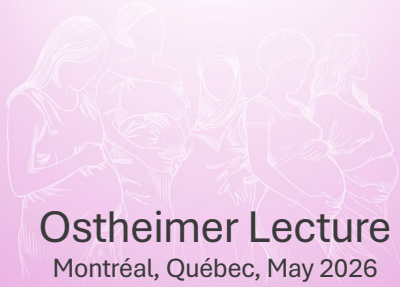
Results: A significant between-group difference in mean % Δ SBP was observed at 2 min (4.27%; $p=0.002$) and 4 min (5.18%; $p=0.003$), driven by mean SBP decrease in the slow group. Non-inferiority was met, with the upper 97.5% CI $< 10\%$ margin in both unadjusted (1.17%) and adjusted (0.70%) models. Within groups, mean SBP changed significantly over time, with maximum reductions of -4.7% (fast) and -3.3% (slow). Incidence of hypotension was similar (7.1% vs. 5.5%, $p=1.00$), as were maximum SBP reduction (-34.1% vs -33.3% ; $p=0.80$). In those with nausea, onset occurred earlier with fast administration (median 5 vs 10 min; $p=0.004$) but incidence was similar (26.8% vs. 27.8%, $p=1.00$). Other adverse effects did not differ: vomiting (1.8% vs 3.7%; $p=0.61$), dizziness (16.1% vs 11.1%; $p=0.58$), photophobia (12.5% vs 9.3%; $p=0.76$), and headache (3.6% vs 13.0%; $p=0.09$). Neonatal outcomes were comparable and no seizures occurred.

Conclusion: Administration of 1g TXA IV rapidly over 1min was non-inferior to over 10 min with respect to mean change in SBP, and was not associated with greater incidence of maternal adverse effects. Our findings suggest that TXA rate of administration primarily influences the timing of hypotension and nausea, but not the incidence, which is associated with TXA exposure. Importantly, pre-delivery administration of TXA was not associated with adverse neonatal outcomes at birth.

References:

1. Lancet.2024;404:1657
2. TXA IV. Product monograph
3. NEJM.2021;384:1623

A review of the literature published in 2025
relevant to obstetric anesthesiologists



Ostheimer Lecture

Montréal, Québec, May 2026

1

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9

Pregnancy

10

Severe maternal morbidity (SMM) and mortality across subtypes of hypertensive disorders in pregnancy (HDP)

AJOG MFM, Xu et al.

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Severe maternal morbidity (SMM) and mortality across subtypes of hypertensive disorders in pregnancy (HDP)

AJOG MFM, Xu et al.

BACKGROUND

Hypertensive disorders of pregnancy affect ~8-16% of US deliveries

Includes:

- chronic hypertension
- gestational hypertension
- preeclampsia (with and without severe features)
- superimposed preeclampsia
- HELLP syndrome
- eclampsia

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Severe maternal morbidity (SMM) and mortality across subtypes of hypertensive disorders in pregnancy (HDP)

AJOG MFM, Xu et al.

AIMS

Assess the risk of SMM among patients with HDP

DESIGN

Repeated cross-sectional study
ICD-10 definitions of HDP and adverse events

POPULATION

22,554,997 delivery hospitalizations
from the 2015–2021 US National Inpatient Sample

RESULTS

Increasing prevalence, ↑risk of SMM and Mortality
HELLP and eclampsia posing highest risk

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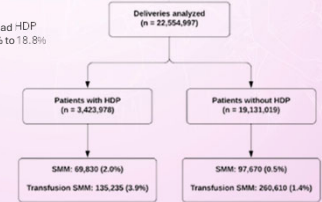
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RESULTS

Prevalence

15.2% of the 22,554,997 had HDP
HDP increased from 12.0% to 18.8%



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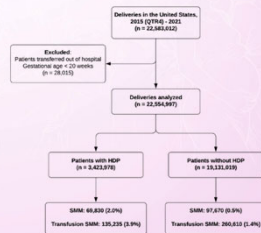
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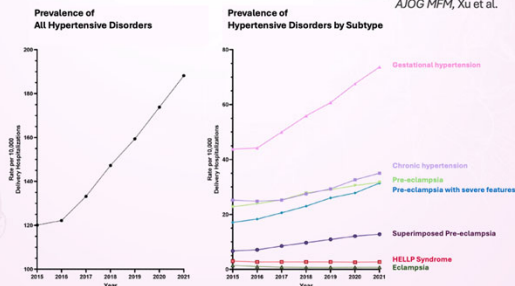
Maternal risks

- ↑risk of SMM (2.0% vs. 0.5%, aOR 3.04)
- ↑risk of maternal death (25.1 vs. 7.3 per 100,000 dets, aOR 2.41)
- Substantially ↑risk of mortality with eclampsia (30x) and HELLP syndrome (nearly 9x)
- Chronic hypertension carried a fivefold increased mortality risk

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Severe maternal morbidity (SMM) and mortality across subtypes of hypertensive disorders in pregnancy (HDP)

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RESULTS

SMM indicators

HDP significantly increased risks for cardiovascular (aOR 5.14), renal (aOR 8.30), and respiratory (aOR 3.22) complications.

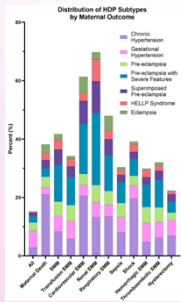
Racial Disparities

Non-Hispanic Black patients had the highest population-attributable fraction for SMM (34.8%) compared to other racial groups

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Severe maternal morbidity (SMM) and mortality across subtypes of hypertensive disorders in pregnancy (HDP)

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Global trends in opioid use

Anesthesiology, Brett et al.

BACKGROUND

- Substantial shifts in the prescribing of opioid and nonopioid analgesics globally over the past 20y
- Global data regarding the epidemiology of analgesic opioid use during pregnancy are limited

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Global trends in opioid use

Anesthesiology, Brett et al.

AIMS

Describe global prescription of analgesic opioid use during pregnancy

DESIGN

Retrospective analysis of population-based data
Dispensing or prescribing records

POPULATION

Pregnancies across Oceania, North America, Northern Europe, and East Asia between 2000 - 2020

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Retrospective analysis of population-based data
Dispensing or prescribing records

POPULATION

Pregnancies across Oceania, North America, Northern Europe, and East Asia between 2000 - 2020

Oceania	New South Wales, Australia, New Zealand
North America	Ontario, Canada, United States
Northern Europe	Denmark, Finland, Iceland, Norway, Sweden, UK
East Asia	Hong Kong, South Korea, Taiwan

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Global trends in opioid use

Anesthesiology, Brett et al.

RESULTS

- 20,306,228 pregnancies
- 55 per 1000 had at least 1 opioid prescription
- Range: 4/1000 (UK) to 191 per 1000 (US- public insurer)

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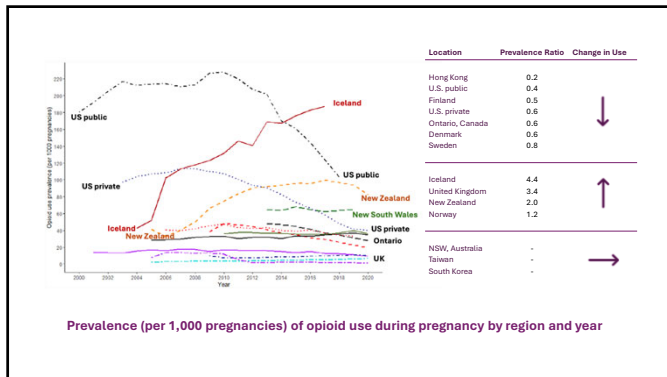
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RESULTS

- 20,306,228 pregnancies
- 55 per 1000 had at least 1 opioid prescription
- Range: 4/1000 (UK) to 191 per 1000 (US- public insurer)
- Codeine & tramadol** among the most common globally
- Hydrocodone** was most prevalent in the USA
- Psychotropic comedication was common**
 - particularly with antidepressants and sedatives
 - followed by antipsychotics, antiepileptics, and ADHD medications
- Iceland** had the highest prevalence of psychotropic comedication

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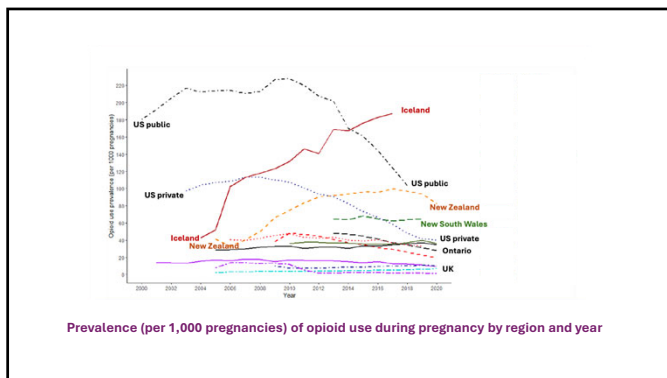
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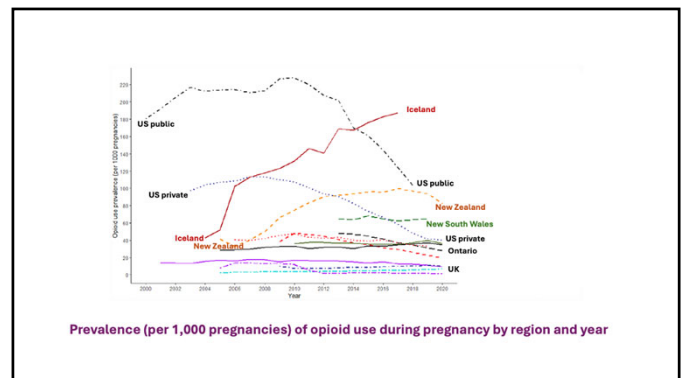
INSIGHTS

- Wide global variation in analgesic opioid use during pregnancy
- Publicly insured US population:
 - one of the largest reductions over the past 20y
 - But still one of the highest prevalences of opioid prescription
- Further research is needed:
 - on the safety and risks of individual opioids during pregnancy
 - especially for populations with higher prevalence of use and psychotropic comedication.

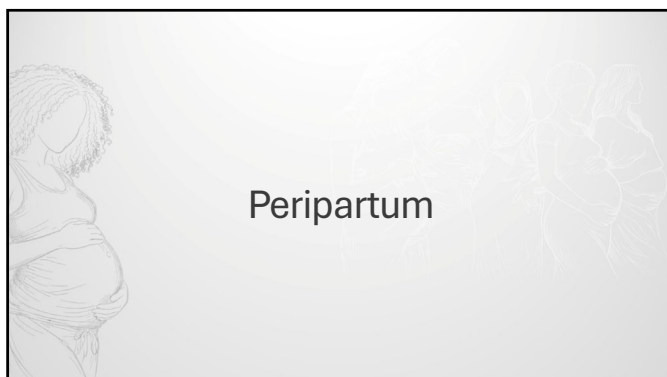
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Racial & ethnic disparity in obstetric anaesthesia: a systematic review & meta-analysis

Anaesthesia, Craig et al.

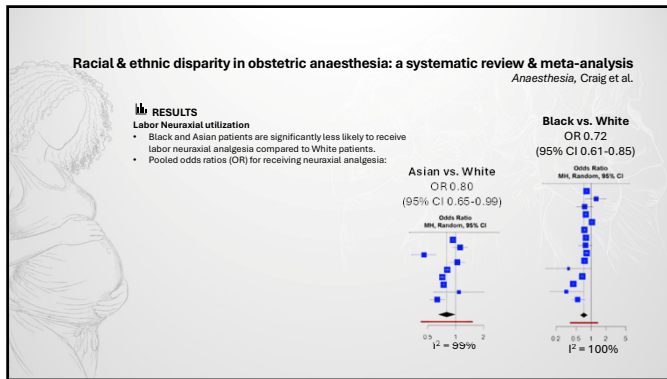
AIMS
To evaluate racial and ethnic disparities in obstetric analgesia and anaesthesia across different healthcare settings

DESIGN
Systematic review and meta-analysis

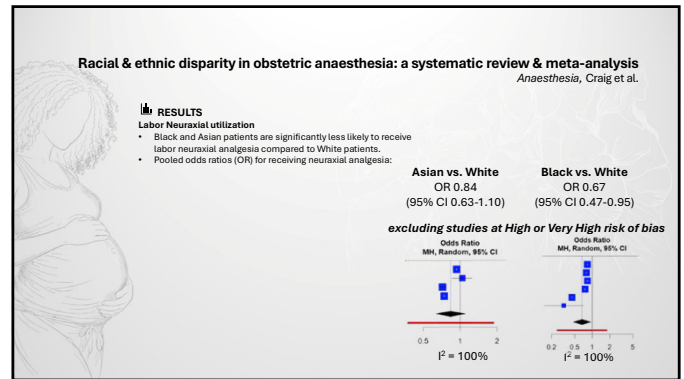
POPULATION
Studies reporting outcomes relating to peripartum analgesia/anaesthesia and comparing racial/ethnic groups

RESULTS
25 studies from UK (4) and USA (21)
Reported outcomes: Labor Neuraxial utilization; GA for CD
Substantial heterogeneity. High risk of bias
Persistent disparities in obstetric anaesthesia over past 20y

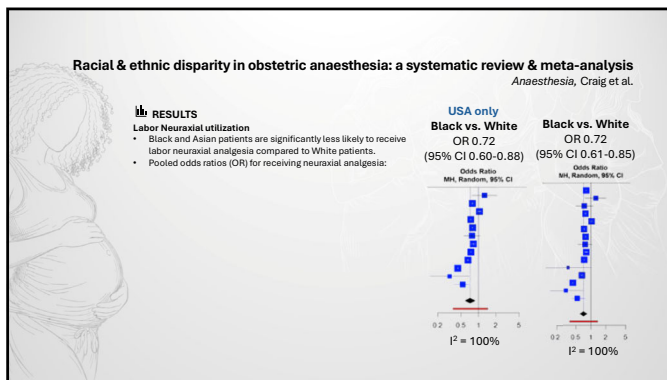
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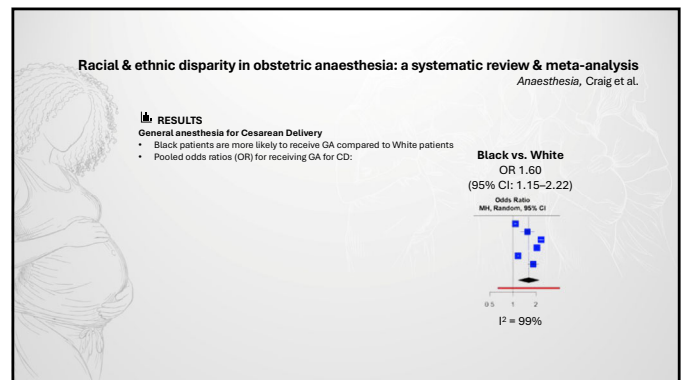
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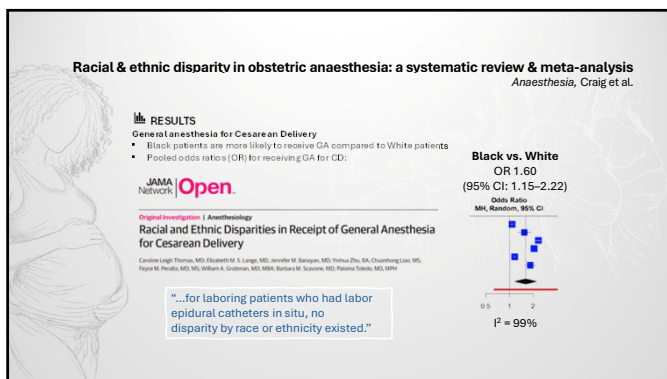
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RESULTS

- Persistent disparities in obstetric anaesthesia over past 20y
- Patients of Black and (possibly) Asian backgrounds are significantly less likely to receive labour neuraxial analgesia

"No indication of cause of disparities which likely reflect complex structural, social and economic processes"

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Possible causes:

- Provision and access
- Systemic racism
- Differences in socio-economic levels
- Education and cultural differences

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"No indication of cause of disparities which likely reflect complex structural, social and economic processes"

Urgent need for prospective investigation

Possible causes:

- Provision and access
- Systemic racism
- Differences in socio-economic levels
- Education and cultural differences

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The Incidence, Characteristics, Management and Outcomes of Peripartum Hyponatraemia in the United Kingdom
Anaesthesia, Pillai et al.

AIMS
To determine the national incidence, characteristics, management and outcomes of peripartum hyponatraemia

DESIGN
Prospective, observational study using United Kingdom (UK) Obstetric Surveillance System (UKOSS) methodology (April 2019–September 2020)

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CASE DEFINITION
Peripartum UK obstetric admissions with

- symptomatic hyponatraemia (sodium < 125 mmol/L)
- in labour or ≤ 48 h postpartum
- excluding other causes of symptoms.

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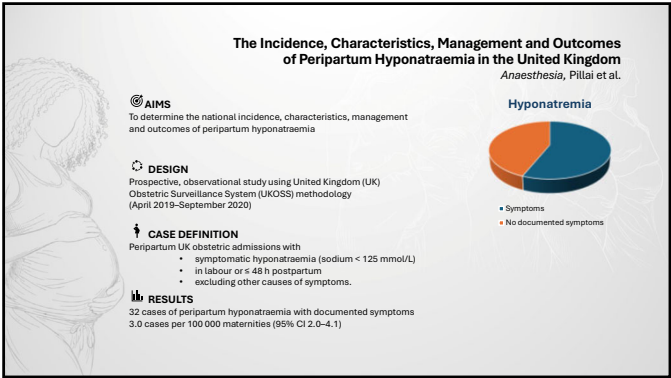
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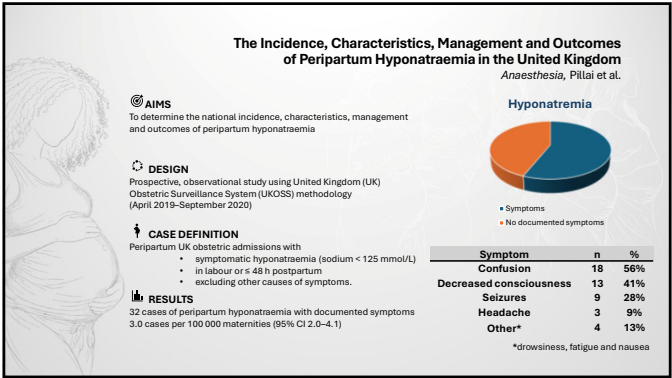
- symptomatic hyponatraemia (sodium < 125 mmol/L)
- in labour or ≤ 48 h postpartum
- excluding other causes of symptoms.

RESULTS
32 cases of peripartum hyponatraemia with documented symptoms
3.0 cases per 100 000 maternities (95% CI 2.0–4.1)

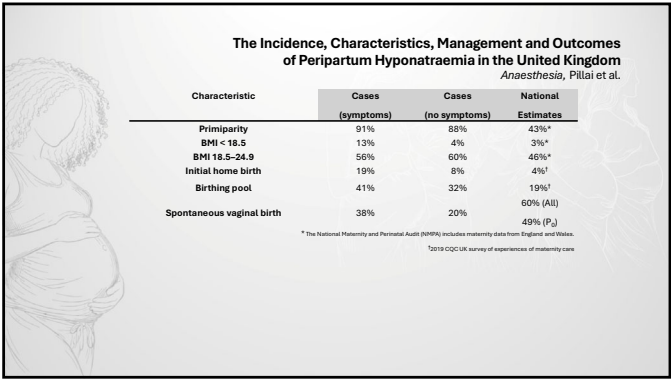
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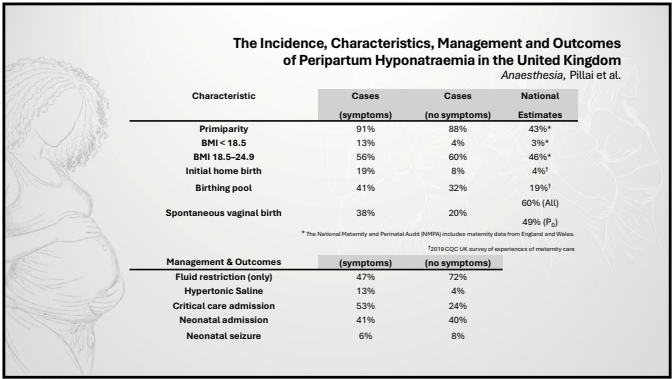
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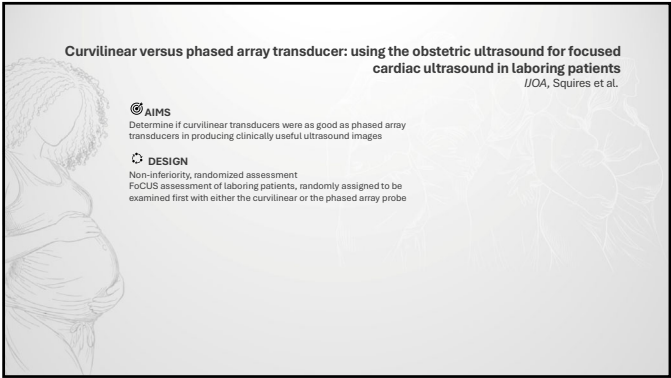
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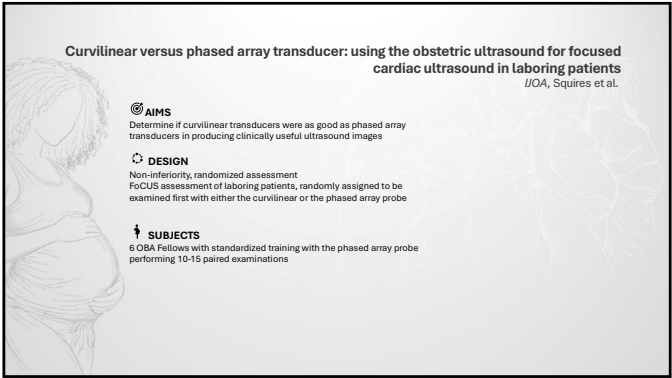
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48

Curvilinear versus phased array transducer: using the obstetric ultrasound for focused cardiac ultrasound in laboring patients
J/OA, Squires et al.

AIMS
Determine if curvilinear transducers were as good as phased array transducers in producing clinically useful ultrasound images

DESIGN
Non-inferiority, randomized assessment
FoCUS assessment of laboring patients, randomly assigned to be examined first with either the curvilinear or the phased array probe

SUBJECTS
6 OBA Fellows with standardized training with the phased array probe performing 10-15 paired examinations

RESULTS
Clinically useful examinations were achieved in

- **Curvilinear: 91.4% of scans** (95% CI 82.3%, 96.8%)
- **Phased array: 95.7% of scans** (95% CI 88.0%, 99.1%)

49

	Phased Array Transducer	Curvilinear Transducer		Phased Array Transducer	Curvilinear Transducer
Transducer			Apical Four Chamber View		
Parasternal Long Axis View			Subcostal Four Chamber View		
Parasternal Short Axis View			Inferior Vena Cava View		

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Epidural analgesia versus dural puncture epidural analgesia in labouring parturients: a meta-analysis of randomised controlled trials.
B/A, Singh et al.

AIMS
Compare clinical outcomes between parturients receiving epidural analgesia vs DPE analgesia for labour pain

DESIGN
Systematic review and pairwise meta-analysis

STUDIES
RCTs comparing epidural analgesia with DPE analgesia in labouring parturients published up to October 2024

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graph TD
    A[18 RCTs] --> B[2,144 patients]
    B --> C[DPE 1,075]
    B --> D[Epidural 1,069]
  
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Outcome	Epidural vs DPE	Anticipated absolute effect	NNT
Onset of analgesia	Slower	14 vs 11 mins	-

54

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Sacral sparing	More likely	35% vs 16%	6	OR 2.79 (1.43-5.55)	0.31-24.91

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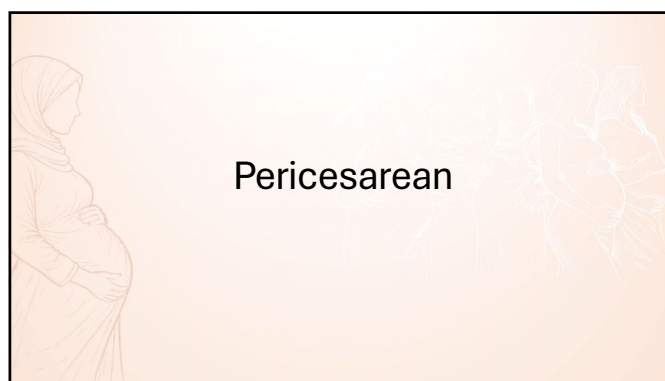
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BJA, Singh et al.

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Severe Perioperative Surgical Morbidity (SPSM) With Cesarean Delivery
Obstet Gynecol, Butwick et al.

AIMS
To evaluate the prevalence and risk factors for severe perioperative surgical morbidity among patients undergoing cesarean delivery

DESIGN
Retrospective cross-sectional study
Linked birth certificate and maternal discharge data identified cesarean delivery hospitalizations

POPULATION
Patients who underwent cesarean delivery in any California hospital between 2016 and 2021

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POPULATION
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Singleton live births California, 2016-2021
n=2,622,231

With birth certificates linked to maternal and neonatal discharge records
n=2,244,210

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Severe Perioperative Surgical Morbidity (SPSM) With Cesarean Delivery
Obstet Gynecol, Butwick et al.

AIMS
To evaluate the prevalence and risk factors for severe perioperative surgical morbidity among patients undergoing cesarean delivery

DESIGN
Retrospective cross-sectional study
Linked birth certificate and maternal discharge data identified cesarean delivery hospitalizations

POPULATION
Patients who underwent cesarean delivery in any California hospital between 2016 and 2021

RESULTS

Singleton live births California, 2016-2021
n=2,622,231

With birth certificates linked to maternal and neonatal discharge records
n=2,244,210

Unknown mode
n=107,874

Cesarean deliveries
n=94,655

Prepartum CD
n=331,227

Intapartum CD
n=363,428

65

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DESIGN
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POPULATION
Patients who underwent cesarean delivery in any California hospital between 2016 and 2021

RESULTS

- 94,655 cesarean deliveries
- 10,182 (171/10,000, 95% CI, 168-175) had SPSM
- Patients with PAS had the highest risk of SPSM (adjusted risk ratio 15.3, 95% CI, 14.9-16.7)

Singleton live births California, 2016-2021
n=2,622,231

With birth certificates linked to maternal and neonatal discharge records
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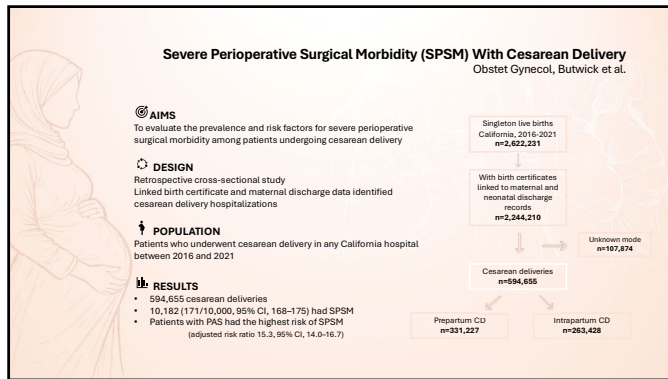
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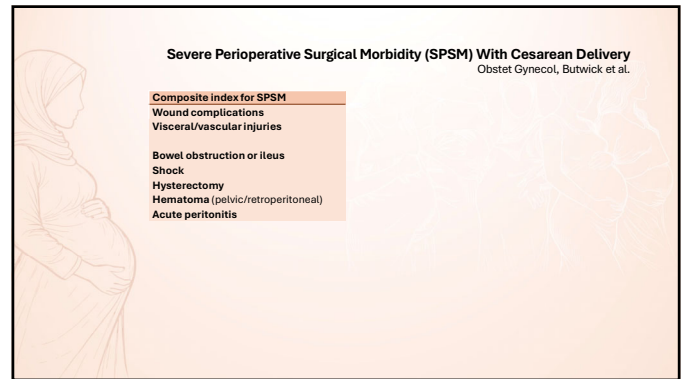
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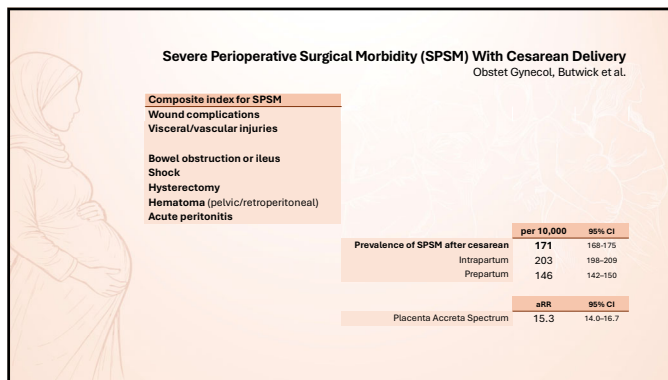
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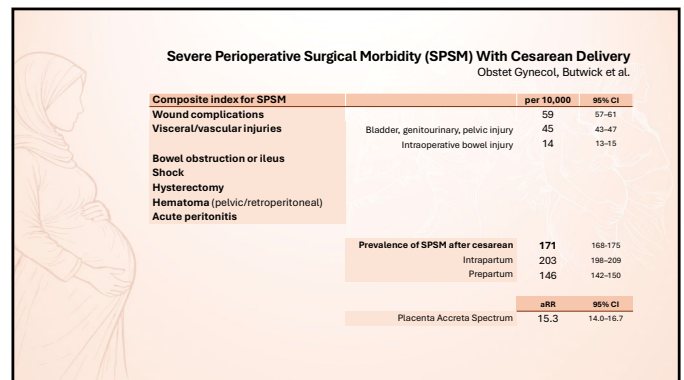
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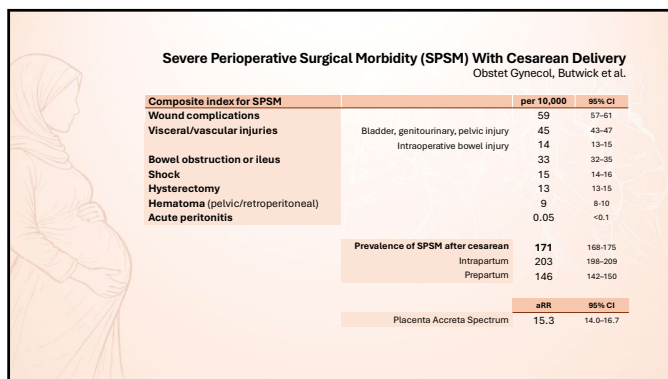
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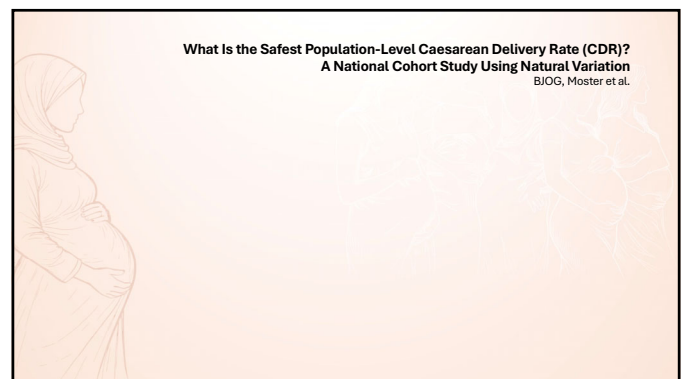
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What Is the Safest Population-Level Caesarean Delivery Rate (CDR)? A National Cohort Study Using Natural Variation

BJOG, Møster et al.

BACKGROUND

- The indications for cesarean vary from obstetric emergencies to patient preference
- Cesarean rates are increasing and vary considerably within and across countries



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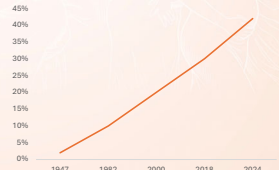
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CD Rate in the UK (%)



CDR >30%

- China
- Brazil
- USA

74

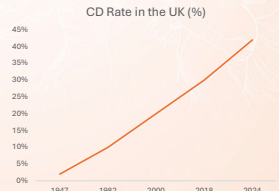
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CD Rate in the UK (%)



CDR <10%

- sub-Saharan Africa

CDR >30%

- China
- Brazil
- USA

75

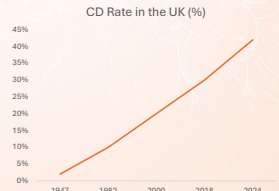
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CDR <20%

- Norway
- Finland
- Netherlands

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What Is the Safest Population-Level Caesarean Delivery Rate (CDR)? A National Cohort Study Using Natural Variation

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AIMS

To evaluate the effect on health outcomes of local variation in rates of cesarean delivery in a well-resourced healthcare system

DESIGN

Prospective national cohort to calculate annual CD rates and health outcomes for 435 municipalities

Maternal: mortality, severe hemorrhage and perineal tears

Neonatal: stillbirth, death, encephalopathy and cerebral palsy

POPULATION

Norwegian deliveries 1995–2014



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Unit of analysis

Mothers' municipalities of residence instead of hospitals or delivery locations



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Exposure
ASSIGNING A COMMUNITY LEVEL OF CAESAREAN DELIVERY

Municipalities are assigned a rate of caesarean delivery in each year, based on that municipality's mean rate in the 2 years before and after

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BJOG, Møster et al.

RESULTS
CD rates ranged from ~10% - 20% across municipalities
Most adverse outcomes less frequent when CD rates >15%

TABLE 1 | Total number of births, numbers with actual outcomes, prevalence rates and linear trends for outcomes related to community-level caesarean delivery rate. Odds ratio (95% confidence interval) for a decrease of a 10% step in the municipality caesarean rate, for example from a 20% to a 10% rate of caesarean delivery

	Births	N	Prevalence, %	OR (95% CI)*	OR (95% CI)*
Maternal outcomes					
Severe maternal haemorrhage ^a	936 794	17 422	1.86	0.83 (0.77–0.85)	0.83 (0.79–0.87)
Perineal tear grade 3–4	1 172 546	30 424	2.59	1.41 (1.36–1.46)	1.54 (1.48–1.61)
Maternal death ^b	936 794	25	0.003	2.26 (0.69–7.36)	2.43 (0.75–7.89)
Perinatal outcomes					
Stillbirths	1 103 229	3707	0.48	1.07 (0.99–1.17)	1.12 (1.02–1.23)
Neonatal deaths	1 107 522	2578	0.22	0.95 (0.84–1.08)	0.95 (0.83–1.09)
Neonatal encephalopathy (NE) ^c	949 281	3190	0.34	1.91 (1.71–2.13)	1.74 (1.54–1.96)
Cerebral palsy ^d	1 068 020	1399	0.13	1.48 (1.24–1.77)	1.33 (1.13–1.61)
Neonatal seizures without NE ^e	949 281	1741	0.18	1.07 (0.92–1.24)	1.06 (0.90–1.24)

^aAdjusted for year of birth.
^bAdjusted for year of birth, immigrant parents, single mothers, mother's and father's education independently, mother's age, placental previa and parity.
^cBirths years 1999–2014.
^dBirths years 1999–2012.

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OR for decrease of a 10% step in municipality CDR

Condition	OR	95% CI
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Pre-cesarean

Gastric US

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Gastric emptying in pregnancy and its clinical implications: a narrative review

BJA, 134 (1): 124-167 (2025)
Lawson et al.

AIMS

Evaluate the effect of pregnancy on gastric emptying

DESIGN

Narrative review

POPULATION

Women during the various phases of pregnancy, including the trimesters, Caesarean delivery, labour, and the postpartum period

RESULTS

- Gastric emptying is decreased in 1st but not 2nd & 3rd trimesters.
- Before elective CD carbohydrate drink or tea with milk results in no difference in gastric cross-sectional area compared with fasting or water.
- Gastric emptying is delayed in labour and with systemic opioids; it is increased by epidural analgesia, but not back to baseline.
- Inconsistencies in the literature reflect the unpredictability of gastric emptying in pregnancy.

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Anemia

Impact of hemoglobin increases on allowable blood loss (ABL) and transfusion needs during cesarean delivery

Transfusion. 2025; 65: 2259-2262
Russo et al.

AIMS

To test the hypothesis that a theoretical 1 g/dL increase in preoperative Hb could increase ABL and potentially avoid transfusion

DESIGN

Single-center retrospective EMR analysis
ABL and ABV were calculated for two theoretical scenarios

- 1-point increase in Hb
- Hb of 10 g/dL

Avoidable transfusion definition: ABL > EBL

POPULATION

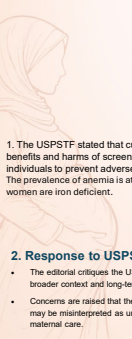
25 women with pre-delivery anemia
Received blood transfusion for PPH during CD

RESULTS

Hb increase	Transfusions Prevented (%)
1 point increase	92
Hb of 10 g/dL	96

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Iron deficiency and anemia in pregnancy: a call to action!

"If you don't take a temperature, you can't find a fever"
IJOA Editorial

1. The USPSTF stated that current evidence is insufficient to assess the benefits and harms of screening for iron deficiency and anemia in pregnant individuals to prevent adverse maternal and infant health outcomes. The prevalence of anemia is at least 5%, and approximately 20% of pregnant women are iron deficient.

2. Response to USPSTF Recommendations

- The editorial critiques the USPSTF's conclusion, arguing that it overlooks the broader context and long-term benefits of early iron deficiency management.
- Concerns are raised that the recommendations, although intended for the U.S., may be misinterpreted as universal guidelines, potentially impacting global maternal care.

3. Global Perspective on Iron Deficiency in Pregnancy

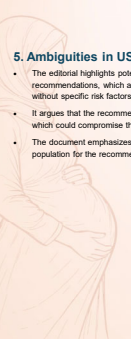
Anemia and iron deficiency affect over one-third of pregnant women globally, with a 38% prevalence of anemia among pregnant women worldwide and 22% in high-income countries.

Iron deficiency is the most common cause of anemia during pregnancy, and untreated iron deficiency can lead to serious maternal and fetal health consequences.

4. Consequences of Untreated Iron Deficiency

- Untreated iron deficiency progresses to anemia, which is associated with risks such as maternal infection, preterm birth, maternal death, and neurodevelopmental disorders in offspring.
- Iron deficiency during pregnancy can impair cognitive development in children, particularly during the third trimester.
- Modern intravenous iron preparations can effectively treat anemia even in the third trimester, reducing adverse outcomes.

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IJOA Editorial

5. Ambiguities in USPSTF Recommendations

- The editorial highlights potential misinterpretations of the USPSTF recommendations, which apply only to asymptomatic pregnant women without specific risk factors.
- It argues that the recommendations may discourage routine screening, which could compromise the health of many pregnant women.
- The document emphasizes the need for clarity regarding the target population for the recommendations.

6. Practical Recommendations for Clinicians

- Early Testing:** Screen for iron deficiency and anemia using valid indicators (e.g., ferritin/transferrin saturation) early in pregnancy.
- Oral Supplements:** Treat diagnosed iron deficiency with oral supplements from the beginning of pregnancy.
- Repeat Testing:** Conduct follow-up testing in the second and third trimesters.
- Intravenous Iron:** Administer modern intravenous iron preparations in the third trimester if oral supplements are ineffective or delivery is imminent.

7. Call for Policy and Research Alignment

- The editorial calls for amendments to peripartum anemia management to prioritize early diagnosis and treatment of iron deficiency.
- It emphasizes the need for further research and cost-effectiveness studies to support routine screening and treatment.
- The authors advocate for global alignment of policies to improve maternal and fetal health outcomes.

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Pericesarean Intra-operative

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Incidence, risk factors, management and outcomes of high neuraxial block in obstetric anaesthetic practice: a prospective national observational study using the UK OSS

Anaesthesia. Lucas et al.

AIMS
To investigate the potential risk factors and causes of high neuraxial block (HNB) in UK obstetric practice

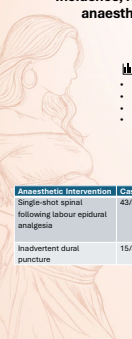
DESIGN
Prospective descriptive study using the UK Obstetric Surveillance System (UKOSS) methodology

CASE DEFINITION
HNB in association with neuraxial anaesthesia/analgesia that required ventilatory/airway support and/or cardiac compressions

RESULTS

- 89 reports of HNB
- 14.7 per 100,000 (95%CI 11.8–18.0)
- 6 cases of cardiac arrest
- No maternal or neonatal deaths
- 7 patients with psychological distress

94



Incidence, risk factors, management and outcomes of high neuraxial block in obstetric anaesthetic practice: a prospective national observational study using the UK OSS

Anaesthesia 2026, 81, 24–30
Lucas et al.

RESULTS

- 89 reports of HNB
- 14.7 per 100,000 (95%CI 11.8–18.0)
- ~1 in 5,000 spinal anaesthetics
- ~1 in 14,000 epidural boluses

Anaesthetic Intervention	Cases	Details
Single-shot spinal following labour epidural analgesia	43/89	37% (16/43) after unsuccessful epidural top-up to convert epidural analgesia to anaesthesia
Inadvertent dural puncture	15/89	

Strategies to reduce risk include:

- Minimizing supine hypotension during spinal anaesthesia.
- Adjusting intrathecal local anesthetic dosing.
- Avoiding epidural-to-spinal conversion if epidural effectiveness is uncertain.
- Providing follow-up care to address psychological distress in affected patients.

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Closed-loop vasopressor systems for hemodynamic stability during cesarean delivery and maternal and neonatal outcomes: a systematic review and meta-analysis

IJOA Khan et al.

AIMS
To evaluate the performance and hemodynamic outcomes of closed-loop vasopressor systems vs. manual titration in cesarean delivery under spinal anaesthesia.

DESIGN
Systematic review and meta-analysis

POPULATION
Studies comparing closed-loop vasopressor systems with manual vasopressor administration for spinal hypotension in CD

RESULTS

- Seven studies
- Three RCTs (n = 654)
- Four observational studies (n = 210).

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UOA Khan et al.

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Study ID	Type of Study	Type of CLVS	Setting	System	Measured variable	Vasopressor	Trigger	Intervention
Nagan Kato (2017)	Single arm interventional	On-Off	Single vasopressor	Single variable	MAP every 1 min	Phenylephrine	SBP > calculated baseline	Phenylephrine 100µg/min
Sia (2012)	Single arm interventional	On-Off	Double vasopressor	Double variable	CNAP (integrated every 15 sec)	Phenylephrine	SBP > 90 % of Baseline	Phenylephrine 50µg bolus
Sing (2016)	Single arm interventional	On-Off	Double vasopressor	Double variable	Heart rate	Ephedrine	HR < 60 bpm	Ephedrine 4 mg bolus
					Heart rate	Naufin	SBP 90-100 % of Baseline	Phenylephrine 2.4 mg
					Heart rate	Ephedrine	SBP 90-100 % of Baseline	50µg bolus
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Mengemont (2012)	Single arm interventional	On-Off	Double vasopressor	Double variable	Naufin (integrated every 10 sec)	Phenylephrine	HR < 60 bpm or < 90 %	bolus
					Triple variable	Ephedrine	100%, 80 to 90 % or < 80 %	Phenylephrine 25, 50 or 75µg bolus
					Triple step decision	SBP gradient	80 %	Ephedrine 2.4 or 6 mg bolus
Nagan Kato (2013)	RCT	Proportional	Single vasopressor	Single variable	MAP every 1 min	Phenylephrine	SBP > calculated baseline	Phenylephrine 0-100µg/min
			Unknown number of step decisions	Double vasopressor	CNAP (integrated every 10 sec)	Phenylephrine	SBP > 90 % Baseline	Phenylephrine
					Double variable	Ephedrine	HR < 60 bpm	50µg bolus
					Heart rate	Naufin	SBP 90-100 % of Baseline	Ephedrine 4 mg bolus
					Heart rate	Ephedrine	SBP > 90 % of Baseline	Phenylephrine 2.4, 50µg bolus
					Double step decision	Naufin	HR < 60 bpm	Ephedrine 2.4 mg

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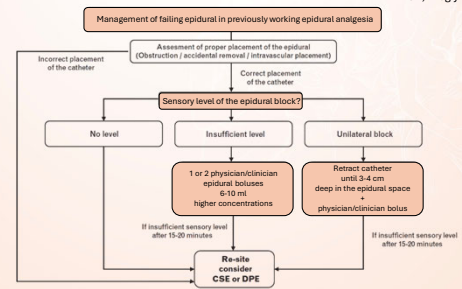
CLVS may reduce SBP variability and the incidence of spinal anesthesia-induced hypotension during cesarean delivery compared to manual vasopressor administration. However, the clinical significance of these findings is modest, and further large-scale, multicenter studies are needed to validate the results and explore the potential of CLVS in diverse clinical settings.

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ESAIC focused guidelines for the management of the failing epidural during labour epidural analgesia

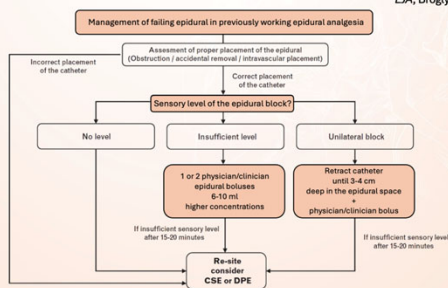
EJA, Brogly et al.



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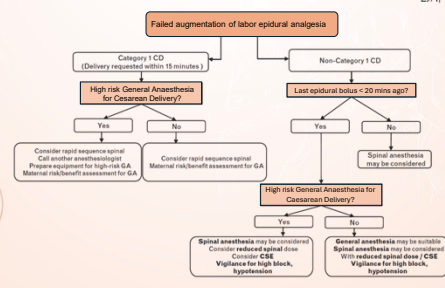
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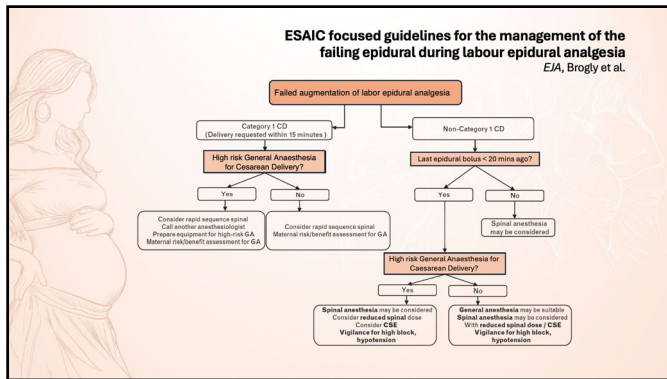
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ESAIC focused guidelines for the management of the failing epidural during labour epidural analgesia

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PDCD

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**Intraoperative Pain during Cesarean Delivery (PDCD) under Neuraxial Anesthesia:
A Systematic Review and Meta-analysis**
Anesthesiology, Charles et al.

AIMS
Determine the incidence of patient-reported intraoperative pain during cesarean delivery under neuraxial anesthesia

DESIGN
Systematic review and meta-analysis

SEARCH
Terminology concerning cesarean delivery, neuraxial anesthesia, pain, and incidence

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**Intraoperative Pain during Cesarean Delivery (PDCD) under Neuraxial Anesthesia:
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Anesthesiology, Charles et al.

PDCD is reported by:

- 1 in 6 patients under neuraxial anesthesia
- 1 in 3 patients under epidural
- 1 in 7 patients under spinal anesthesia

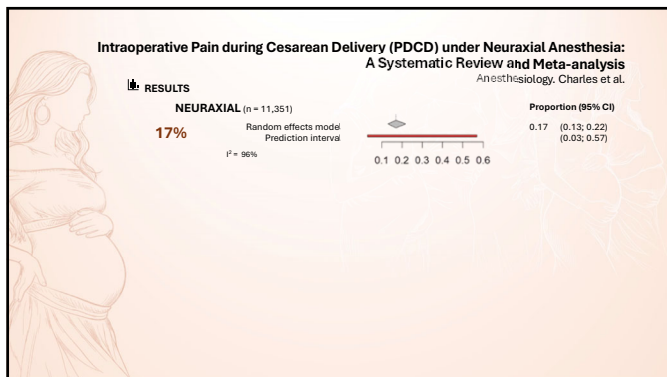
This has implications for:

- preoperative consent process
- choice of neuraxial anesthesia

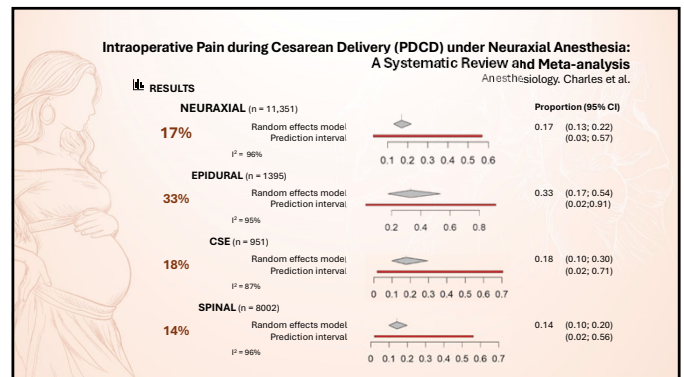
Future research:

- prospective quantification of intraoperative pain experience
- short- and medium-term consequences of PDCD

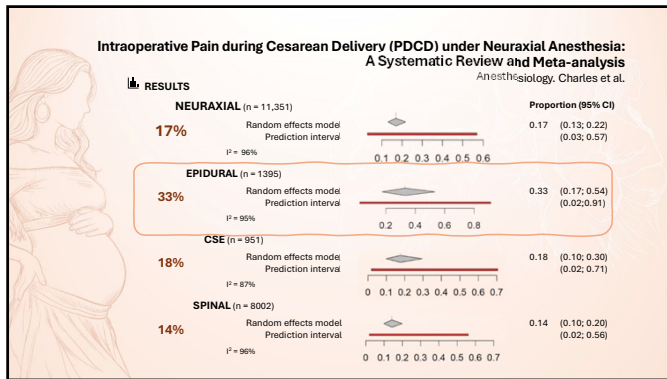
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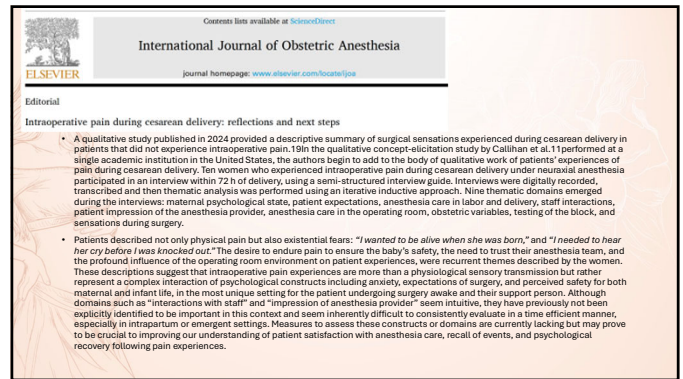
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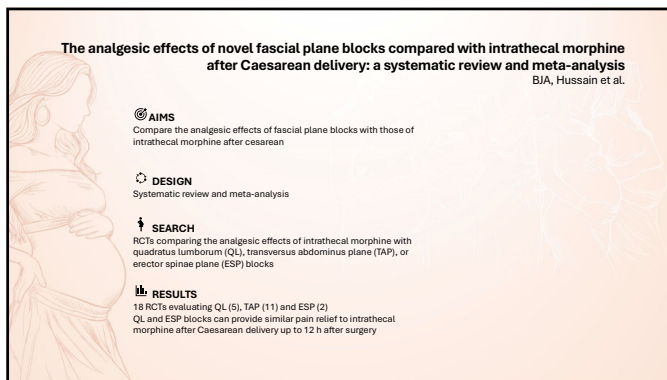
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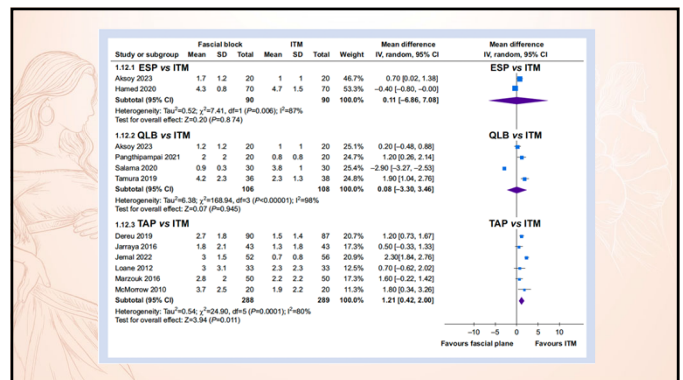
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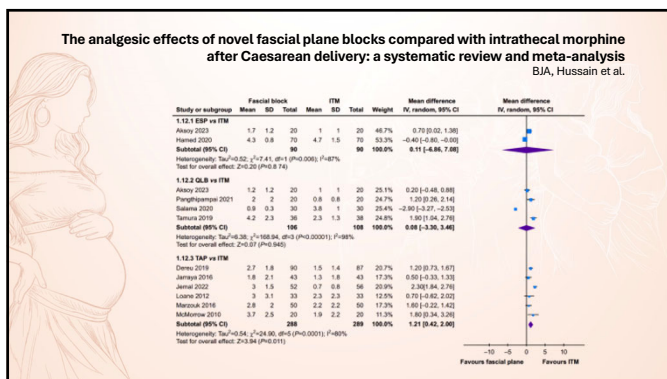
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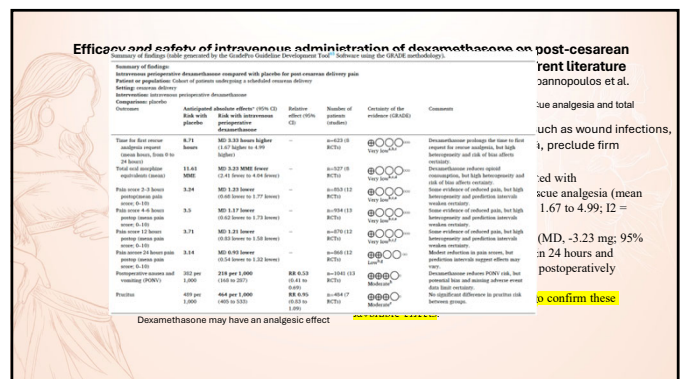
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113



114

Efficacy and safety of intravenous administration of dexamethasone on post-caesarean delivery pain: a systematic review and meta-analysis of current literature

IJOA. Ioannopoulos et al.

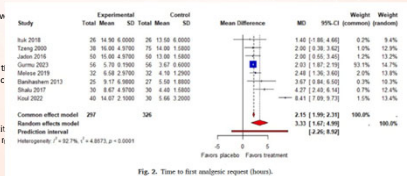
AIMS

Assess IV dexamethasone for post-caesarean pain management. Limited data on adverse effects, such as wound infections, healing issues, and hyperglycemia, preclude firm conclusions about safety.

DESIGN
Systematic review

SEARCH
RCTs comparing dexamethasone c

RESULTS
15 RCTs in quanti
Dexamethasone t



115

Efficacy and safety of intrathecal adjuvants for perioperative management of cesarean delivery: a systematic review and network meta-analysis of RCTs

RAPM. Ollosu et al.

AIMS

Evaluate the analgesic efficacy of intrathecal adjuvants for CD

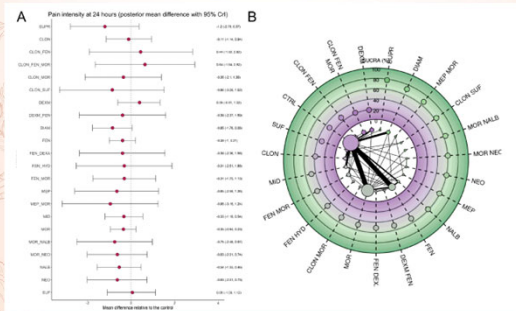
DESIGN
Systematic review and network meta-analysis

SEARCH
RCTs including women undergoing CS under single-shot spinal anesthesia with any intrathecal drug or placebo added to LA

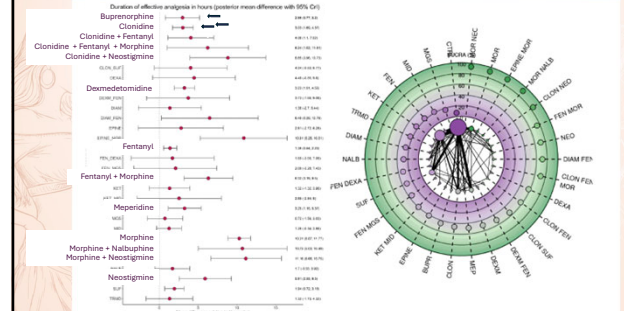
RESULTS
166 RCTs evaluating 32 interventions

Morphine alone or in combination with meperidine, neostigmine, epinephrine, or nalbuphine significantly increased the duration of effective analgesia and reduced opioid consumption.

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Pericerebral Recovery: CPCD

Incidence of chronic postsurgical pain (CPSP) after caesarean delivery: a systematic review and meta-analysis

Anaesthesia. Wang et al.

AIMS

Evaluate the incidence of CPSP after caesarean delivery

DESIGN
Systematic review and meta-analysis

SEARCH
RCTs evaluating the incidence of CPSP after caesarean delivery

RESULTS
15 RCTs in quanti

CPSP after caesarean delivery

CPSP after caesarean delivery

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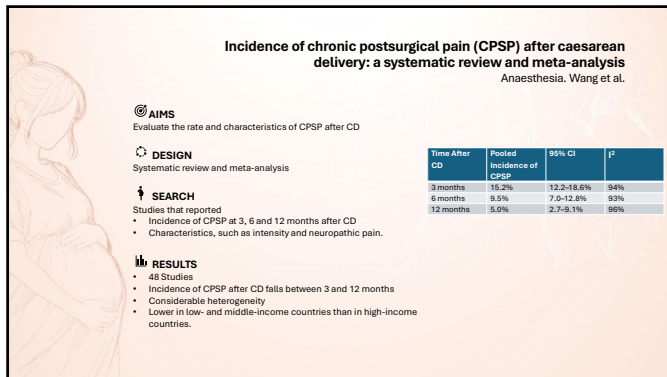
CPSP after caesarean delivery

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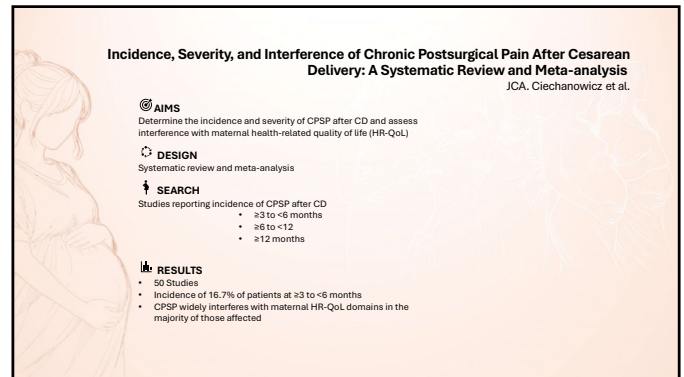
CPSP after caesarean delivery

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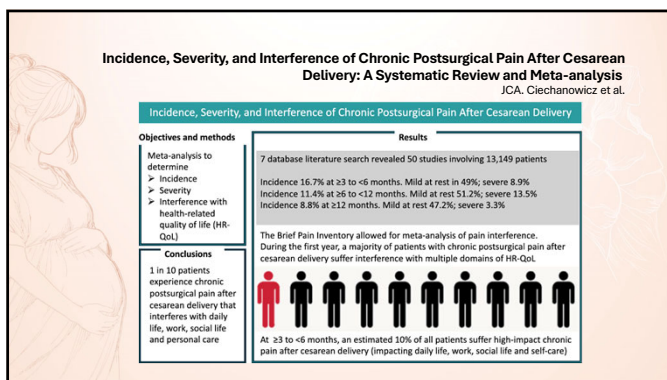
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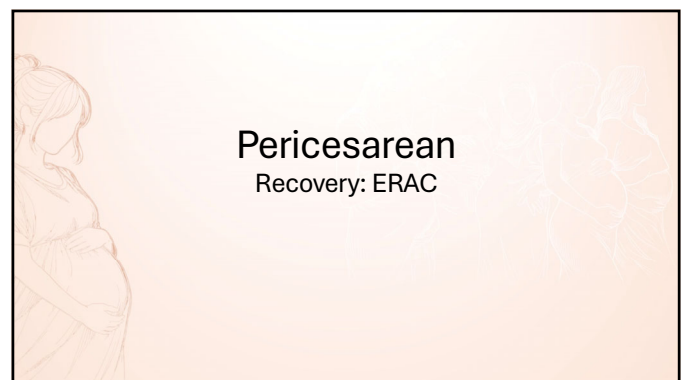
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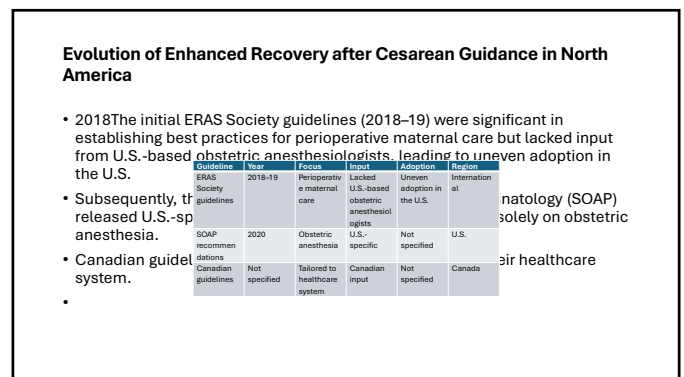
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126

Comparison of SOAP and updated ERAS society guidelines for ERAC					
Domain	Guideline scope	Patient inclusion in development	Intended audience	Evidence review	Implementation guidance
SOAP guidelines (2020)	Perioperative focus, anaesthesia-led	None	Anesthesiologists	Based on literature and clinical expertise	Minimal; focus on checklist
ERAS Society guidelines (2025)	Broad, multidisciplinary scope from antenatal to postpartum care	Formal inclusion of patient representatives in the consensus process	Obstetricians, anesthesiologists, nurses, physiotherapists, lactation consultants	Updated systematic search performed by a medical librarian	Includes detailed guidance on implementation, audit, and feedback loops

127

Comparison of SOAP and updated ERAS society guidelines for ERAC						
Domain	Maternal education	Anemia remediation	Analgesia	PONV	Nutrition and fluids	Thromboprophylaxis
SOAP guidelines (2020)	Preoperative education encouraged but not detailed	Screen and treat anemia	Emphasis on neuraxial morphine and multimodal strategies and lactation friendly regimens	2 anti-emetics (ondansetron and dexamethasone or metoclopramide)	Early oral intake encouraged; limited specific detail	Risk-based approach
ERAS Society guidelines (2025)	Emphasizes structured preoperative counseling as essential to recovery	More specific recommendations to consider transfusion if Hb <7 g/dL or if symptomatic. Treat iron deficiency anemia with iron therapy	Reinforces opioid-sparing multimodal approach (including neuraxial morphine); incorporates lactation-friendly regimens	Strong recommendation for dual anti-emetic therapy	Strong recommendation for early feeding and reduced IV fluid duration	Similar recommendations with added clarity on risk stratification

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Chronic pain and long-term disability following postdural puncture headache in obstetric patients: a five-year prospective follow-up of a case-control cohort
IJOA, Weiss et al.

AIMS
Evaluate the analgesic efficacy of intrathecal adjuvants for CD

DESIGN
Prospective case-control study

POPULATION
336 women followed up to five years after delivery

130

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DESIGN
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POPULATION
336 women followed up to five years after delivery

RESULTS

n	Cohort Group	Chronic Headache (%) at 5y	Chronic backache (%) at 5y
113	No epidural	0.9	1.8
113	Uncomplicated epidural	5.3	7.0
54	PDPH no EBP	21.4	22.2
56	PDPH with EBP	20.4	23.2

131

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RESULTS

Reporting headache	High disability	High disability
21.2	11.2	
PDPH-no EBP 8.9%	7 of 16 (43.8%)	
PDPH-EBP 8%	4 of 14 (28.6%)	

132

Chronic pain and long-term disability following postdural puncture headache in obstetric patients: a five-year prospective follow-up of a case-control cohort

UJOA Weiss et al.

AIMS

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DESIGN

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RESULTS

Reporting headache/backache	High disability	High disability
PDPH-no EBP	8.9%	7 of 16 (43.8%)
PDPH-EBP	8%	4 of 14 (28.6%)

Chronic headache and backache following UDP and PDPH are persistent conditions with significant long-term functional consequences

133

Uterine Tone Numeric Rating Score (NRS) as an Early Indicator of Major Postpartum Hemorrhage during Cesarean Delivery: A Prospective Observational Study

Anesthesiology, Koons et al.

AIMS

Assess if lower uterine tone NRS would be strongly associated with progression to major PPH

DESIGN

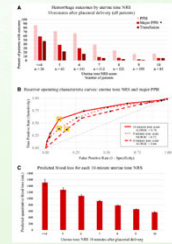
Prospective observational study (1y period)
Uterine tone NRS at 0, 5, & 10 min after placental delivery.
Definition Major PPH: QBL > 1500 mL

POPULATION

1,599 consecutive cesarean deliveries

RESULTS

Major PPH in 9.9% and transfusion 6.7% of CD
10-min NRS strong predictor of Major PPH
AUROC 0.78 (95% CI, 0.73 to 0.82)
Each 1-point decrease in NRS increased the risk of major PPH by 71% (95% CI, 0.58 to 0.86)



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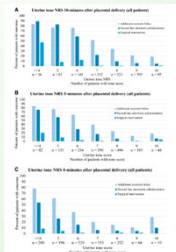
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Timing of Uterine Tone NRS	AUC	PPV	NPV	Major PPH	Transfusion
0-5 min after placental delivery	0.78	0.82	0.73	10.1%	6.7%
5-10 min after placental delivery	0.78	0.82	0.73	10.1%	6.7%
0-10 min after placental delivery	0.78	0.82	0.73	10.1%	6.7%

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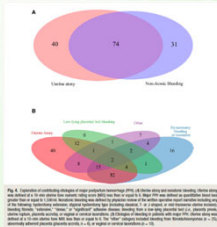
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137

Artificial intelligence in prediction of postpartum hemorrhage: a primer and review

UJOA Wakefield et al.

138

Morbidity & Mortality

Maternal care deserts and risks of maternal morbidity AJOG MFM. Ramos et al.

🎯 **AIMS**
Assess Maternal morbidity between US counties

🔍 **DESIGN**
Cross-sectional study of CDC birth certificate data

👤 **POPULATION**
9,226,640 singleton, term live births from 2019–2021

Maternal care deserts and risks of maternal morbidity AJOG MFM. Ramos et al.

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Box 1 The 2020 March of Dimes Definition of Maternity Care Deserts and Access to Maternity Care

Definition	Maternity Care Desert	Low Access to Maternity Care	Moderate Access to Maternity Care	Full Access to Maternity Care
Hospital and birth centers offering obstetric care	Zero	< 2	< 2	> 2
Obstetric providers (obstetricians, CNM/CM) per 10,000 births	Zero	< 60	< 60	≥ 60
Proportion of women 18–64 without health insurance	Any	≥ 10%	< 10%	Any

Ramos et al. Maternal care deserts and risk of maternal morbidity in term pregnancies. Am J Obstet Gynecol 2025.
CNM, certified nurse-midwife; CM, certified nurse-midwife.

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📊 **RESULTS**
Women in counties without maternity services had higher odds (95%CI) of:

- Adverse outcomes

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📊 **RESULTS**
Women in counties without maternity services had higher odds (95%CI) of:

- Adverse outcomes
- Transfusion
- Hysterectomy

Adverse maternal outcomes	aOR 1.59 (1.23–2.06)
Transfusion	aOR 2.04 (1.45–2.86)
Unplanned hysterectomy	aOR 1.24 (1.03–1.50)

Maternal care deserts and risks of maternal morbidity

AJOG MFM. Ramos et al.

Geographic access to maternity services independently affects maternal health outcomes in the USA

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Counties without maternity services and risks of maternal morbidity

AJOG MFM. Ramos et al.

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AJOG MFM. Ramos et al.

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RESULTS
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- Adverse outcomes
- Transfusion
- Hysterectomy

Recommendations:
Urgent policy interventions needed to address gaps in maternal care access

- expanding Medicaid
- ↑ obstetric workforce
- telemedicine

Adverse maternal outcomes	aOR 1.59 (1.23-2.06)
Transfusion	aOR 2.04 (1.45-2.86)
Unplanned hysterectomy	aOR 1.24 (1.03-1.50)

147

Obstetric Anesthesia Workforce Survey: Forty-year Update

Anesthesiology. Bucklin et al.

AIMS
Assess trends in obstetric anesthesia practices and identify areas for improvement

DESIGN
Web-push survey methodology

POPULATION
Contacted 1,180 hospitals
Response rate of 24% (284 responses)

RESULTS

- Response rate of 24% (284 responses)
- Hospitals providing obstetric care has decreased by 50% over the last 40 yr
- Access to neuraxial labor analgesia has dramatically increased
- Lower rates of general anesthesia for cesarean deliveries

Fig. 1. Rates of labor epidural utilization and decreased use of general anesthesia for cesarean delivery over time in all states, US, general population.

148

Maternal mortality associated with anaesthetic interventions: nationwide analysis of maternal mortality in Japan from 2010 to 2022

BJA. Hasegawa et al.

AIMS
Examine maternal deaths in Japan that were directly attributable to anesthesia-related complications

DESIGN
Retrospective descriptive analysis

REGISTRY
Japan Association of Obstetricians and Gynaecologists maternal death registry

RESULTS
MMR ~4 in 100,000 deliveries
PPH (18%), ICH (13%), AFE (11%), and suicide (10%)

1.3% of deaths (vs. <0.1% in the UK) attributed to complications of anesthesia

- 3 Can't Intubate, Can't Ventilate
- 3 High Spinal
- 1 LA Systemic Toxicity

Key Issues:

- Anesthesia-related deaths in small obstetric facilities where obstetricians administered anesthesia
- Airway management, spinal/epidural anesthesia techniques, and emergency protocols contributed
- Inappropriate use of GA and LA, a recurring problem.

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Trends in maternal mortality estimates 2000 to 2023

Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA / Population Division

AIMS
Accurately estimate the MMR for 2000-2023 to

- Identify trends and areas of stagnation or improvement
- monitor progress towards the Sustainable Development Goal (SDG)

DESIGN
Civil Registration and Vital Statistics (CRVS) systems, specialized studies and national level surveillance data

SUBJECTS
Maternal deaths (15-49y) between 1985 - 2023

150



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SDG 3: Ensure healthy lives and promote well-being for all at all ages

SDG target 3.1: Ending preventable maternal mortality

“By 2030, reduce the global maternal mortality ratio [MMR] to less than 70 per 100 000 live births”

152

Trends in maternal mortality estimates 2000 to 2023
Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA / Population Division

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RESULTS

- In 2000, global MMR: 328 per 100,000 live births

154

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SUBJECTS
Maternal deaths (15-49y) between 1985 - 2023

RESULTS

- In 2000, global MMR: 328 per 100,000 live births
- In 2023, global MMR: 197 per 100,000 live births (down by ~40%)

155

Trends in maternal mortality estimates 2000 to 2023
Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA / Population Division

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Accurately estimate the MMR for 2000-2023 to

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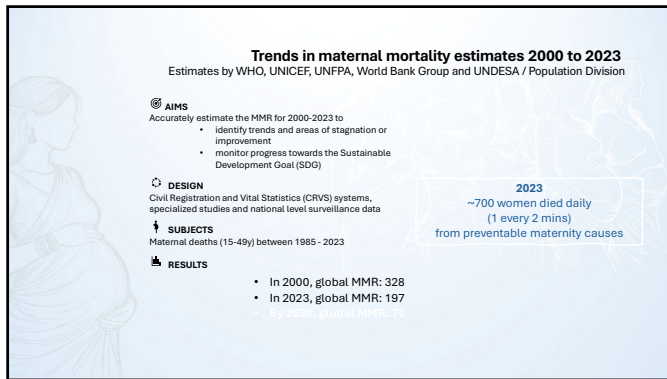
SUBJECTS
Maternal deaths (15-49y) between 1985 - 2023

RESULTS

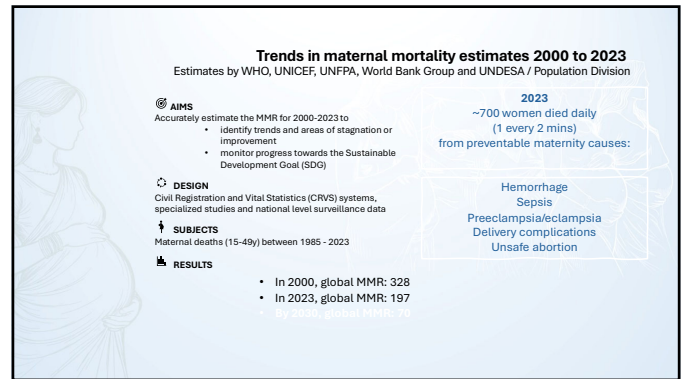
- In 2000, global MMR: 328 per 100,000 live births
- In 2023, global MMR: 197 per 100,000 live births (down by ~40%)

2023
~700 women died daily (1 every 2 mins) from preventable maternity causes

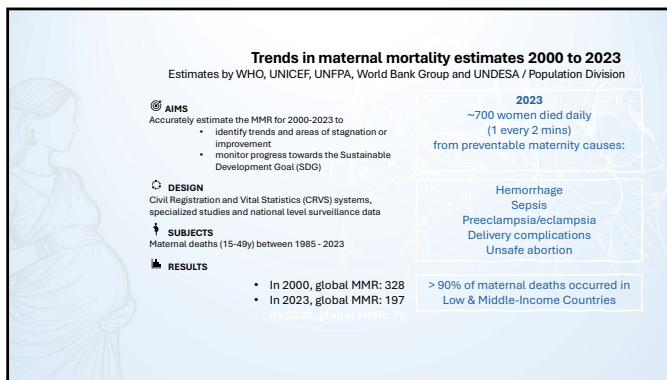
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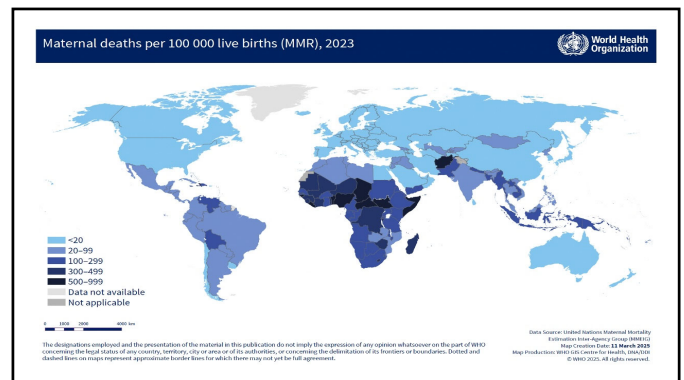
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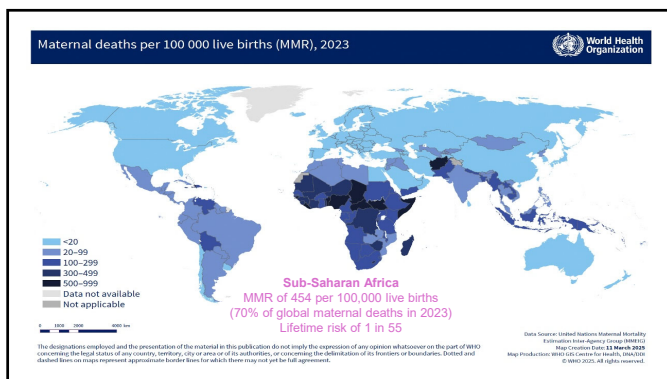
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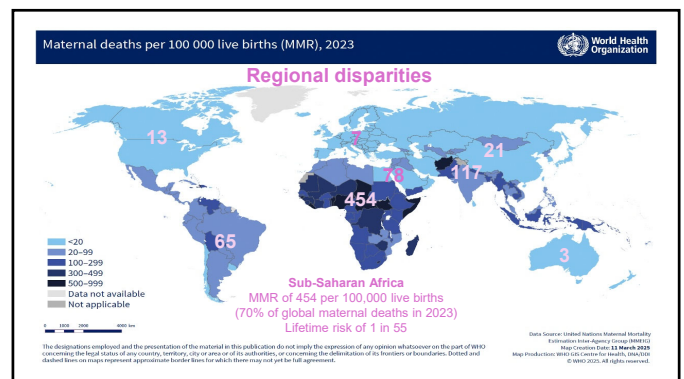
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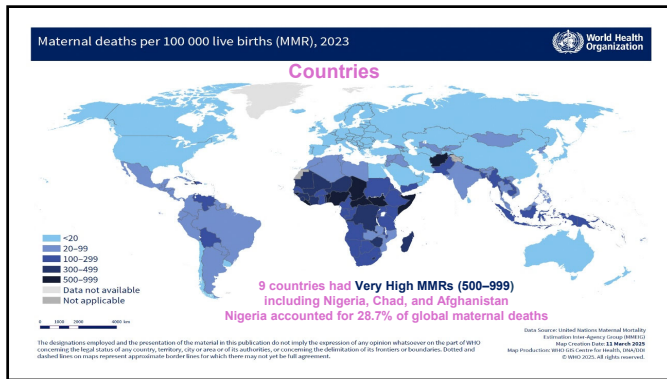
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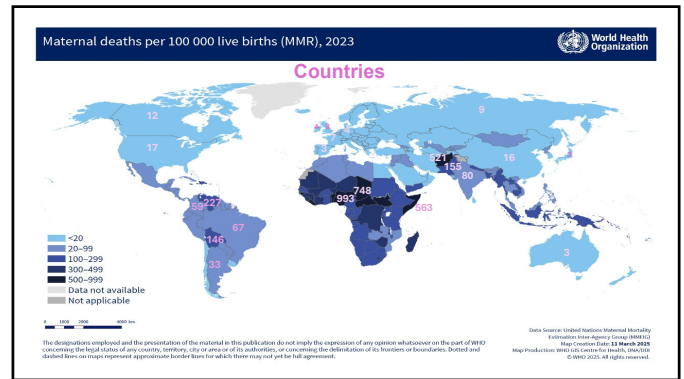
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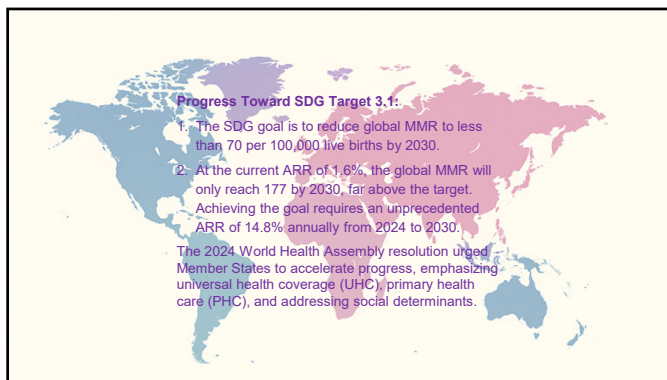
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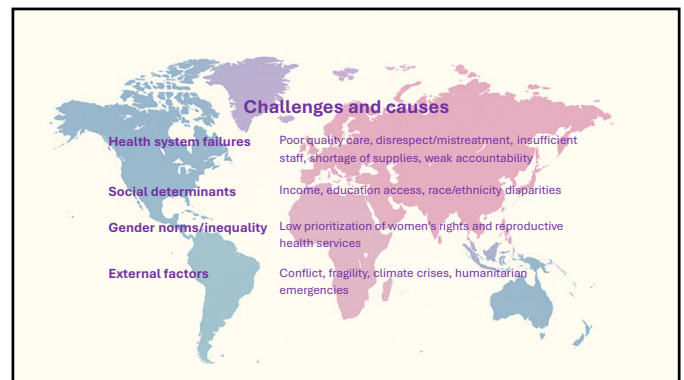
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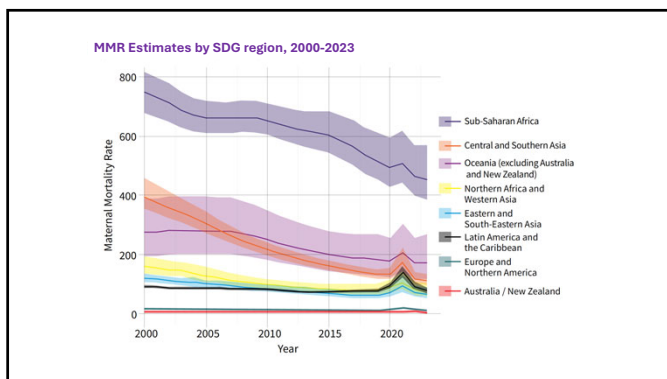
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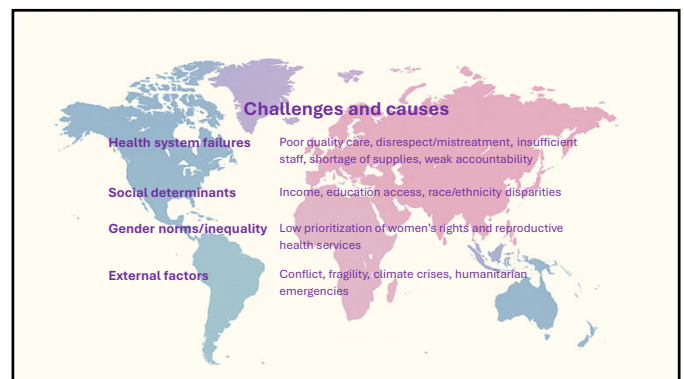
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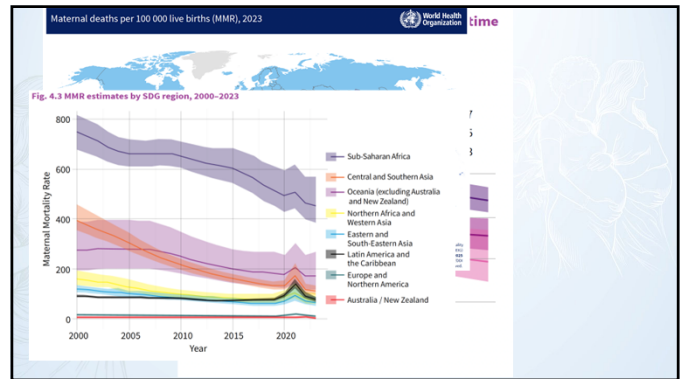
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MBRRACE-UK Saving Lives, Improving Mothers' Care
Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2021-23



AIMS
Review maternal deaths and morbidity in the UK and Ireland to identify lessons learned and inform improvements in maternity care

171



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Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2021-23



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DESIGN
A comprehensive multidisciplinary expert review of cases of M&M identified through multiple sources including local reporting, national records and coroner's reports

172



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Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2021-23



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Review maternal deaths and morbidity in the UK and Ireland to identify lessons learned and inform improvements in maternity care

DESIGN
A comprehensive multidisciplinary expert review of cases of M&M identified through multiple sources including local reporting, national records and coroner's reports

SUBJECTS
During pregnancy and up to one year postpartum

RESULTS

- A Data Brief
- A State of the Nation report
- A compiled report

www.npeu.ox.ac.uk/mbrrace-uk/reports

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MBRRACE-UK Saving Lives, Improving Mothers' Care
Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2021-23



Key messages from the surveillance report 2025

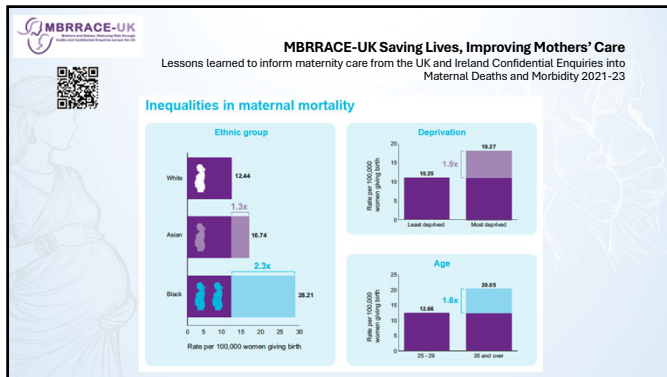
In 2021-23, 257 women died during or up to six weeks after pregnancy among 2,004,184 women giving birth in the UK. This represents a maternal death rate of 12.82 women per 100,000 women giving birth.

Leading causes of maternal deaths

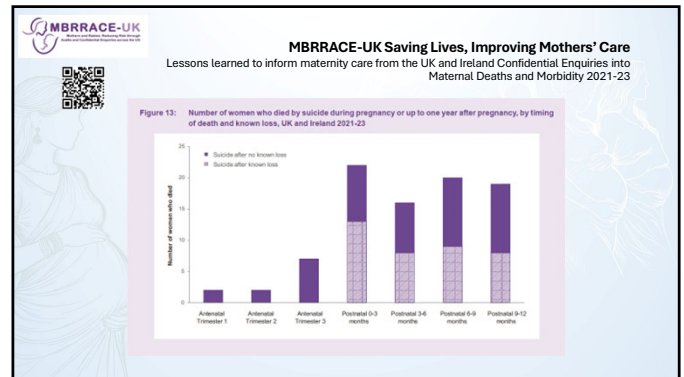
- 1 Blood clots
- 2 Heart disease*
- 3 COVID-19*
- 4 Mental health conditions
- 5 Epilepsy and stroke

*Responsible for the same number of maternal deaths in 2021-23

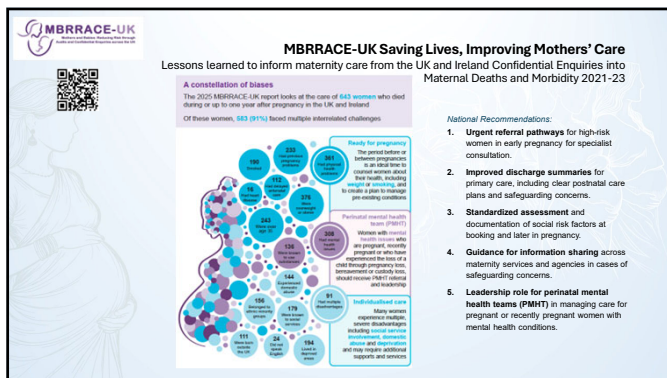
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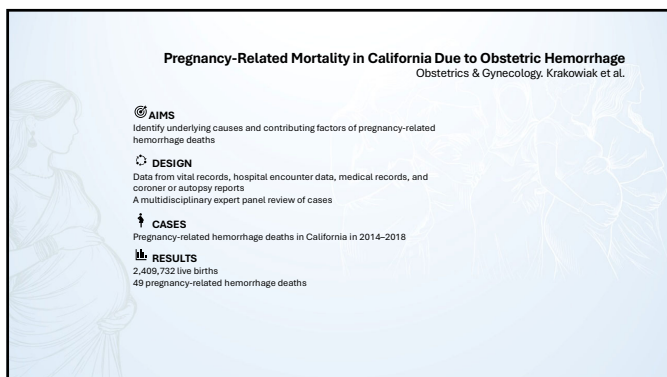
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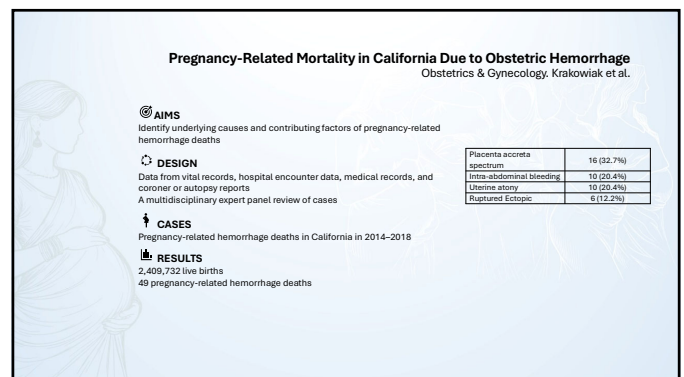
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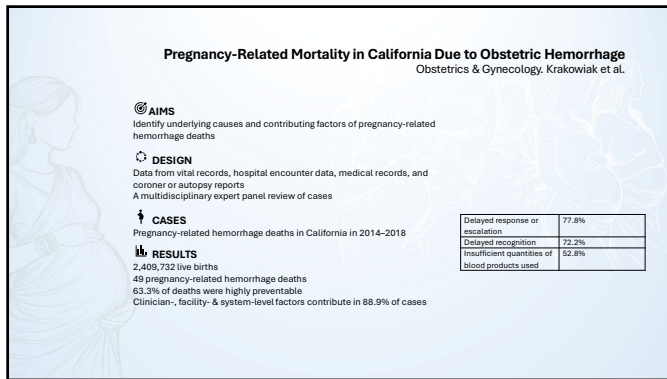
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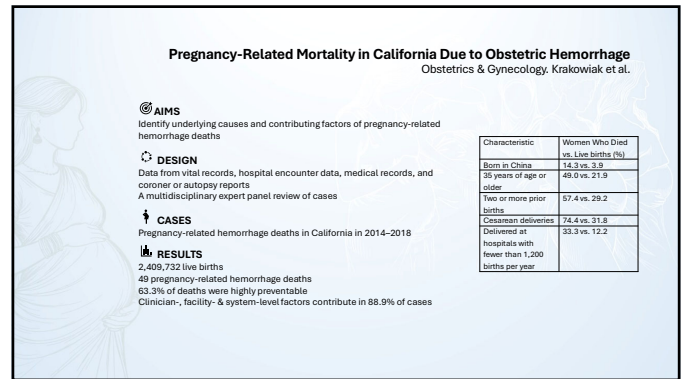
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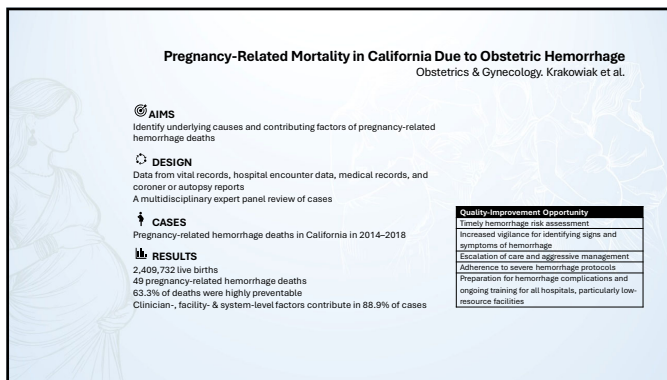
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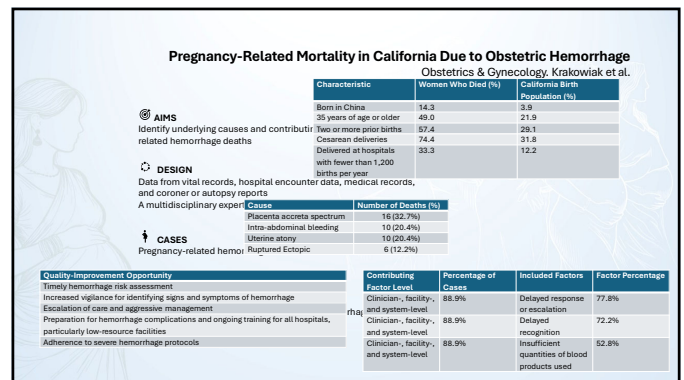
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Program Material

Sunday, May 3, 2026

Concurrent Sessions

[IARS/IJOA Peer Review Workshop](#)

Moderator: Jill Mhyre, MD

Faculty: Ashraf Habib, MD; Ruth Landau, MD; Caroline Weiniger, MB, ChB

Concurrent Sessions

[OAA: An Outsiders View on the Abstracts at SOAP](#)

Speaker: Nuala Luca, MD

Workshop (fee & pre-registration required)

[Block Workshop! Difficult Neuraxial, Fascial Plane, Occipital, and Pterygopalatine Ganglion](#)

Moderator: Adam Wendling, MD

Faculty: Soleil Schutte, MD; Julie-Ann Thompson, MD; Svetlana Chembrovich, MD; Linda Le-Wendling, MD

[Translating Research into Practical Applications: Retrofitting Evidence for your Practice](#)

Moderator: Feyce Peralta, MD

Panelists: Jeanette Bauchat, MD; Laurie Chalifoux, MD; Megan Rosenstein, MD

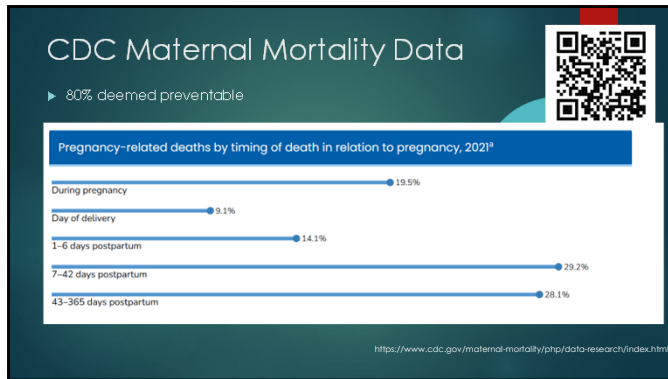
[Update on Reproductive Health Access](#)

Speaker: John Markley, MD

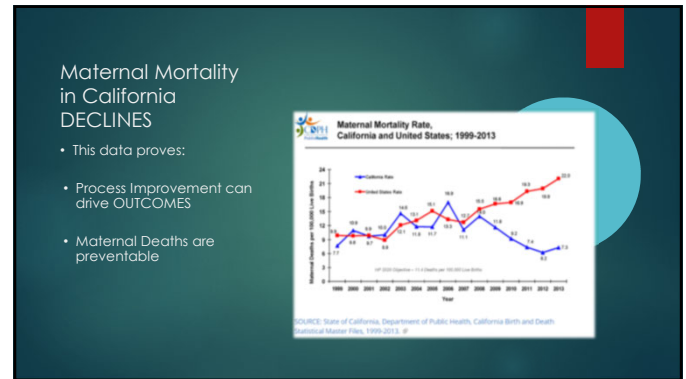
[No U-turn on Equity: Navigating Resistance and Retaining Progress](#)

Moderator: Allison Lee, MD

Panelists: Kokila Thenuwara, MD; James Damron, MD



7



8

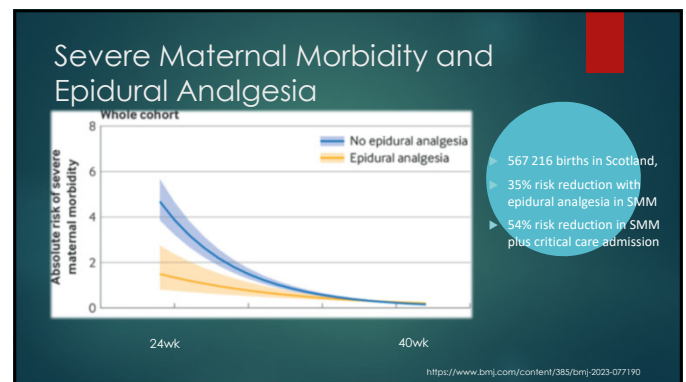
Severe Maternal Morbidity Indicators

► CDC list of 21 CPT codes

► Identify delivery hospitalizations with SMM using administrative data

► Examples: ARDS, renal failure, AFE, cardiac arrest, DIC, transfusion, eclampsia, hysterectomy, etc.

9



10

Severe Maternal Morbidity and Epidural Analgesia

February 22, 2022

Use of Labor Neuraxial Analgesia for Vaginal Delivery and Severe Maternal Morbidity

Jean Guiguet-Morin, MD, PhD¹, Ruth Landau, MD², Jamie Daw, PhD³, et al.
 ► Author Affiliations | Article Information
 JAMA Netw Open. 2022;5(2):e220102. doi:10.1001/jamanetworkopen.2022.0102

Variable	No neuraxial analgesia			Neuraxial analgesia			Risk difference, % (95% CI) ^a	Adjusted OR (95% CI) ^b	
	Women, No.	Events, No.	Incidence, % (95% CI)	Women, No.	Events, No.	Incidence, % (95% CI)		Without further adjustment ^c	With further adjustment ^d
All women	304 734	4427	1.45 (1.38 to 1.53)	219 308	2727	1.24 (1.17 to 1.32)	-0.21 (-0.30 to -0.12)	0.85 (0.81 to 0.90)	0.86 (0.82 to 0.90)
SMM	304 734	4427	1.45 (1.38 to 1.53)	219 308	2727	1.24 (1.17 to 1.32)	-0.21 (-0.30 to -0.12)	0.85 (0.81 to 0.90)	0.86 (0.82 to 0.90)
PPH	304 734	10796	3.54 (3.42 to 3.66)	219 308	7277	3.32 (3.21 to 3.43)	-0.22 (-0.36 to -0.09)	0.93 (0.91 to 0.96)	0.91 (0.88 to 0.94)

<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2789267>

11

Opportunities to Engage

- Multidisciplinary Huddles
- MEOWS response
- Emergency response

12

Multidisciplinary Huddles

-158 studies on multidisciplinary huddles

-67.7% of studies positive impact on team process outcomes

Category	Impact
EFFICIENCY	64.4% IMPROVED
SITUATIONAL AWARENESS	44.6% IMPROVED
STAFF SATISFACTION	29.5% IMPROVED
CLINICAL CARE OUTCOMES	44.3% IMPROVED
MEDICAL ERRORS	24.3% DECREASED

COMMUNICATION

Pimentel, CB et al. Huddles and their effectiveness at the frontlines of clinical care: a scoping review. J Gen Intern Med 34(9):272-83 DOI: 10.1007/s11606-021-06432-9

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Rapid Response for Obstetrics- MEOWS

Trust Guideline for the use of the Modified Early Obstetric Warning Score (MEOWS) in detecting the seriously ill and deteriorating woman.

Score	3	2	1	0	1	2	3
Temperature	<35 °C	35-35.9 °C	36-37.4 °C	37.5-37.9 °C	38.0-38.9 °C	>39 °C	
Systolic BP	≥70	71-79	80-89	90-139	140-149	150-159	≥160
Diastolic BP		<49	50-89	90-99	100-109	110-119	≥120
Pulse	<40	40-49	50-99	100-109	110-129	≥130	
Respiratory Rate	≤10		11-20	21-24	25-29	≥30	
Oxygen Saturations	≤94%		≥95%				
AVPU			Alert	Responds to Voice	Responds to Pain	Unconscious	
Urine output ml/s/hr	<10	<30	Not Measured				

High sensitivity—89% (72% to 97%) – those with high score will be sick

High specificity—85% (67% to 98%) – those with low scores will not be sick

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0217864>

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Rapid Response for Obstetrics-MEOWS

Deteriorating Obstetric Patient Escalation Algorithm

Green Pathway
Total MEOWS = 0

Continue routine clinical observation

Repeat observation if patient condition change

Total MEOWS = 1 – 6

Inform midwife/physician in charge who must monitor the patient continuously

Midwife/physician to decide if increased frequency of monitoring and/or escalation of obstetric care is required

If a response of one obstetric professional to verbal observation, the escalation goes forward. If not, the escalation goes forward if the escalation is not resolved by the escalation team.

CONSIDER DEPENDENCY – (SEE PAGE 16)

Document all actions

Amber Pathway
Total MEOWS = 5 – 6
Or
If Any individual parameter = 3

Inform midwife/physician in charge (must monitor vital signs continuously)

Midwife/physician to immediately review the patient

Contact middle grade doctor (obstetrician or midwife) and consider early escalation

Consider obstetric professional assessment

Consider escalation to consultant

Increase the frequency of observation to 1 hourly

If a response of one obstetric professional to verbal observation, the escalation goes forward. If not, the escalation goes forward if the escalation is not resolved by the escalation team.

CONSIDER DEPENDENCY – (SEE PAGE 16)

Document all actions

Red Pathway
MEOWS ≥ 7
Or
Acutely concerned regarding sudden deterioration

Contact middle grade doctor (obstetrician or midwife) and consider early escalation

Consider escalation to consultant

Consider escalation to consultant

Consider escalation to consultant

Consider escalation to consultant

CONSIDER DEPENDENCY – (SEE PAGE 16)

Document all actions

MEOWS

MEOWS score dictates ACTION:

- Evaluated by physicians, including anesthesiologists
- Increased monitoring (RN, equipment)

15

Emergency Response for Obstetrics

STORY CODE

EMERGENCY RAPID RESPONSE

Automated system calls TEAM including the anesthesiologist

16

ALLIANCE FOR INNOVATION ON MATERNAL HEALTH

A quality improvement initiative to support best practices that make births safer, improve maternal health outcomes and save lives.

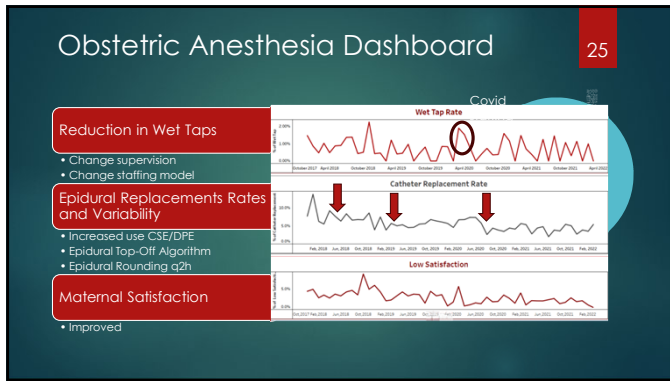
Learn More About AIMH

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Key Takeaway

- ▶ Sentinel events and maternal mortality happen primarily because of poor teamwork: delays in response, poor communication, poor handoffs
- ▶ Improving processes and systems on labor and delivery prevents maternal deaths
- ▶ YOU/YOUR TEAM's involvement reduces severe maternal morbidity

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Anesthesia for abortion care: The role of the OB anesthesia team

May 3, 2026
SOAP Annual Meeting

John C. Markley, MD, PhD
Associate Clinical Professor
Department of Anesthesia and Perioperative Care
University of California San Francisco
Zuckerberg San Francisco General Hospital and Trauma Center
National Abortion Federation Board of Directors



1

No Financial Disclosures

2

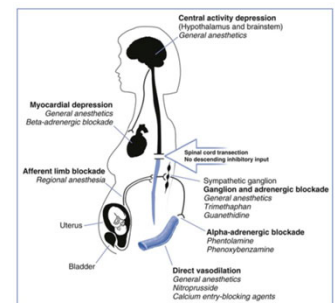
Outline

- Examples of successful OB/GYN-anesthesia partnership in abortion care
- Influence of the anesthesia team on abortion access
- Recent barriers to accessing abortion care affect anesthesiologists
- Anesthesia-associated abortion mortality
- Anesthesia modalities for 2nd trimester dilation & evacuation
- Role of the anesthesia team in post-abortion hemorrhage management

3

Case 1: Autonomic hyperreflexia

- 33F G3P0 at 15w1d presenting with undesired pregnancy scheduled for dilation and evacuation
- T3 spinal cord injury from a fall at age 20
- Autonomic hyperreflexia with flushing, hypertension/bradycardia episodes throughout pregnancy
- Patient from NV; unable to find a facility with anesthesia provider willing to take her case

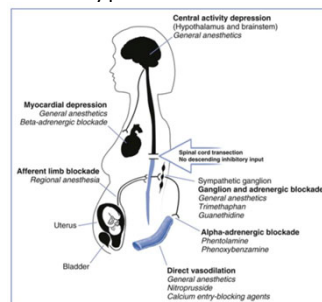


<https://obgynkey.com/neurologic-and-neuromuscular-disease/>

4

Case 1, continued: Autonomic hyperreflexia

- One-day procedure planned; cervical dilators/preparation without anesthesia contraindicated due to likelihood of precipitating AH symptoms from uterine contractions
- Intraop anesthetic: Invasive BP monitoring, lumbar epidural anesthesia, IV midazolam, vasopressors and anti-hypertensives as needed
- Postop: Dense, postoperative epidural infusion for 24h; managed in MICU for invasive BP monitoring



<https://obgynkey.com/neurologic-and-neuromuscular-disease/>

5

Case 2: Developmental delay

- 14F G1P0 at 22w5d
- Severe developmental delay/agitation, 133kg, trypanophobia, tolerant to benzodiazepines
- Patient from TX; initially tried care in NM, however procedure canceled by anesthesia provider after unable to establish preoperative IV access
- After extensive consultation with patient and patient's family, care teams, and ZSFG ethics committee, it was concluded that proceeding with abortion and placement of long-acting reversible contraception was in the patient's best interests
- Surgical plan: Cervical dilators placed on Day 1, D&E on Day 2

6

Case 2, continued: Developmental delay

- Anesthetic plan: Inhalational induction of anesthesia
- Two anesthesiologists staffed
- Premedication: 40 mg liquid midazolam
- Preoxygenation
- Nitrous oxide/sevoflurane via scented mask
- IV placement, monitors applied
- Propofol infusion initiated
- Day 2 anesthetic: Same as above



UVMHealth.org/childrens

7

Anesthesiologists can influence access to, and safety of, abortion

- Anesthesiologists are uniquely positioned to influence the conversation about abortion access
- Directly affect access to safe abortion care
 - Patient advocacy
 - Anesthetic clinical care
 - Organizational influence
 - Teaching
 - Research

Landau et al. *Anesth Crit Care Pain Med*. 2022;41:101125
Markley et al. *SCAP Newsletter*. Spring 2023

8

Rethinking the role of the anesthesiologist in abortion access: Example 1

- BMI cutoffs at outpatient surgery centers
 - Many outpatient surgery settings limit anesthesia access based solely on BMI, referring patients to hospitals instead.
 - Anesthesiologists often play a role in the formulation of these policies.
 - White, *Contraception*, 2018;98:95
 - A BMI cutoff for outpatient abortion procedures presents a barrier to access due to increased cost and delay, resulting in increased surgical risk from advancing gestational age.
 - Most studies evaluating surgical- and anesthesia-related outcomes have concluded that there are no increased risks to the higher BMI population undergoing procedural abortion.
 - Gokhale, et al. *Anesth Analg*. 2016;122(6):1957 | Benson, et al. *Obstet Gynecol*. 2016;128(5):1065 | Horwitz, et al. *Contraception*, 2018;97:48 | Lederle, et al. *Obstet Gynecol*, 2015;126(3):585 | Mark, *Am J Obstet Gynecol*, 2018;218:238e1 | Murphy, *Contraception*, 2012;86:402
 - Assisting an outpatient surgery center transition from an arbitrary BMI limit to a policy of individual patient triage based on co-morbidities is one way anesthesiologists may help influence abortion access.

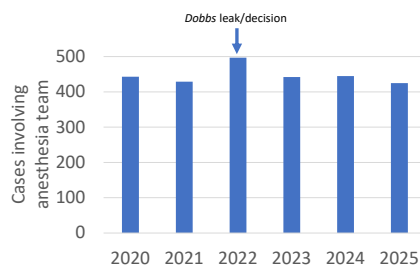
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Rethinking the role of the anesthesiologist in abortion access: Example 2

- Research: Reassessing post-anesthesia escort requirements
 - The ASA's requirement of an adult escort after receiving more than local anesthesia poses a significant barrier to patients seeking abortion care.
 - Dobson et al. *Can J Anaesth*. 2021;68:92 | Mark et al. *Contraception*. 2022;108:4
 - Larger travel distances and greater travel expenses likely make ride-home policies even more impactful on both the patient and their escort.
 - Some data show that lack of an escort in the abortion population is safe.
 - Chung et al. *Can J Anaesth*. 2005;52(10):1022 | Martin, et al. *Mayo Clin Proc Innov Qual Outcomes*. 2018;2(3):234
 - However, larger prospective studies are needed to demonstrate the safety of modifying the ride-home requirement to include ride-share, taxi, or public transportation options in the abortion population.
 - Possible role for ultra short-acting anesthetics (remimazolam)

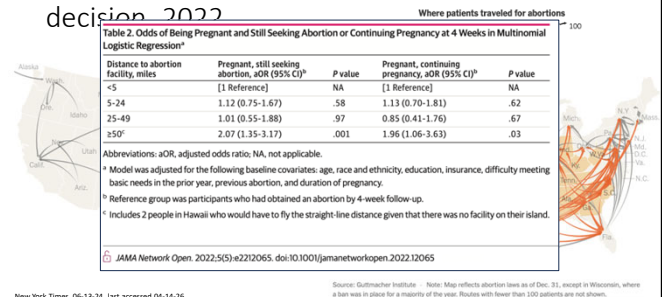
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Volume of abortion cases with anesthesia at ZSFG has not appreciably changed since *Dobbs* decision



11

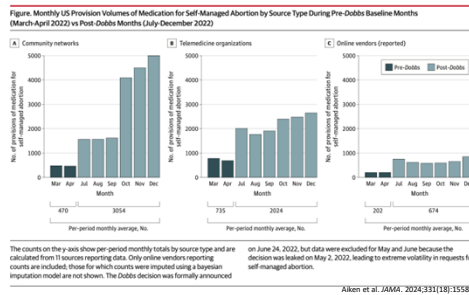
Increased travel distance since *Dobbs* decision, 2022



12

Medication for self-managed abortion has expanded

- Patients are less likely to get to the gestational age where the anesthesia team is needed.



13

Abortion access barriers affect anesthesia care



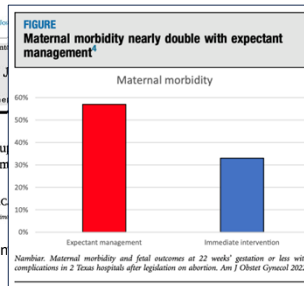
Patient was unable to obtain care in her home state →

uterine rupture, QBL 8.2 L, hysterectomy.

14

Abortion access barriers affect anesthesia care

- Parkland/UT Southwestern (Sept '21-May '22)
- 28 pregnant patients presenting at <22 weeks with PPRM
- Fetus with cardiac motion
- Expectant management required by state law
- Primary outcome: Composite of maternal morbidity (chorio, need for D&C, transfusion, etc.)



15



Care Post-Roe: Documenting cases of poor-quality care since the Dobbs decision

September 2024

Report authors:

Daniel Grossman, MD¹ Carole Joffe, PhD² Shelly Kaller, MPH¹ Katrina Kimport, PhD² Elizabeth T. Kinsey, MD¹ Natalie Morris, MPH¹ Karl White, PhD, MPH²

Author affiliations:

1. Advancing New Standards in Reproductive Health (ANSIRH), Department of Obstetrics, Gynecology and Reproductive Sciences, University of California, San Francisco (UCSF)
2. Resound Research for Reproductive Health

Grossman D, Joffe C, Kaller S, Kimport K, Kinsey ET, Morris N, White K. Care Post-Roe: documenting cases of poor-quality care since the Dobbs decision. Advancing New Standards in Reproductive Health (ANSIRH), University of California, San Francisco, 2024.

16

"Anesthesiology colleagues refused to provide an epidural for pain. They believed that providing an epidural could be considered [a crime] under the new law. The patient received some IV morphine instead and delivered a few hours later but was very uncomfortable through the remainder of her labor. I will never forget this case because I overheard the primary provider say to a nurse that so much as offering a helping hand to a patient getting onto the gurney while in the throes of a miscarriage could be construed as 'aiding and abetting an abortion.' Best not to so much as touch the patient who is miscarrying... A gross violation of common sense and the oath I took when I got into this profession to soothe my patients' suffering."

17

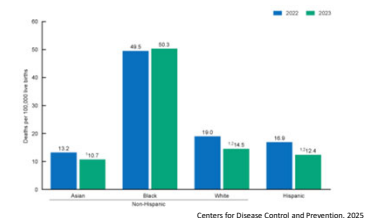
Abortion mortality

Overall US abortion mortality (1998-2010) = 0.7/100,000

Black 1.1/100,000
Hispanic 0.5/100,000
Non-Hispanic White 0.4/100,000

Maternal mortality

Maternal mortality rate, by race and Hispanic origin: US, 2022 and 2023



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Trend in US legal induced abortion-related mortality

Time Period	Abortions, n	Deaths from all causes, n	Case fatality rate from all causes, per 100K	Deaths attributed to anesthesia complications, n	Proportion of deaths attributed to anesthesia complications, %	Case fatality rate attributed to anesthesia, per 100k
1972-1976	3,809,187	115	3.0	18	16	0.47
1977-1982	7,391,473	76	1.0	18	24	0.25
1983-1987	6,612,861	52	0.8	15	29	0.23
1988-1997	13,161,608	94	0.7	15	16	0.11
1998-2010	16,103,600	108	0.7	22	20	0.14
2008-2012	5,536,110	36	0.65			
2013-2021	8,260,870	38	0.46			

Lawson et al. Am J Obstet Gynecol, 1994;171:1365
 Bartlett et al. Obstet Gynecol, 2004;103:179
 Zane et al. Obstet Gynecol, 2015;126:258
 American College of Obstetrics and Gynecology (ACOG)

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Abortion-related mortality 1998-2010: 16.1 million procedures

Table 4. Distribution of Causes of Death by Gestational Age and Type of Abortion Procedure: Pregnancy Mortality Surveillance System, United States, 1998-2010

Gestational Age and Procedure	N	Hemorrhage	Infection	Embolism	Anesthesia Complications	CV Diseases	Medical, non CV	Unknown
<13 weeks	48	5	19	5	14	1	3	1
No procedure*	1	0	0	0	1	0	0	0
Medical procedure†	12	2	9	0	0	1	0	0
Suction curettage	28	2	6	3	13	0	3	1
Unknown procedure	7	1	4	2	0	0	0	0
>13 weeks	54	17	17	5	7	3	4	1
No procedure*	4	0	3	0	1	0	0	0
Medical procedure†	8	1	1	2	0	2	2	0
D&E	39	16	12	2	6	1	1	1
Other procedure‡	2	0	0	1	0	0	1	0
Unknown procedure	1	0	1	0	0	0	0	0
Unknown gestational age	6	0	1	2	1	1	1	0
Total, all gestational ages and procedures	108	22	37	12	22	5	8	2

*No procedure: unknown procedure or procedure attributed to planned abortion procedure never occurred
 †Medical procedure: administration of medication, typically misoprostol followed by aspiration at 9 weeks of gestation or less and
 ‡Other procedure: hysterectomy and hysterectomy-related

Zane et al. Obstet Gynecol, 2015;126:258

20

Abortion-related mortality 1998-2010: 16.1 million procedures

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<13 weeks								1
No procedure*								0
Medical procedure†								0
Suction curettage								1
Unknown procedure								0
>13 weeks								1
No procedure*								0
Medical procedure†								0
D&E								1
Other procedure‡								0
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Unknown gestational age	6	0	1	2	1	1	1	0
Total, all gestational ages and procedures	108	22	37	12	22	5	8	2

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Zane et al. Obstet Gynecol, 2015;126:258

Unfortunately, "Anesthesia Complications" is not defined.

No details regarding:

- Anesthetic modality (paracervical block vs. sedation vs. general)
- Medications, doses, routes
- Who provided the anesthesia (OB/GYN, RN, CRNA, MD anesthesia)

21

1.14 million annual legal abortions in the US in 2024

- 63% medication abortion, 37% procedural abortion
- Anesthesia professionals are likely involved in only a small percentage of procedural abortions
- Most procedural abortion anesthesia/analgesia is likely administered by RN under license of abortion provider

Jones et al. guttmacher.org, 2024
 Madhoo-Zimet et al. guttmacher.org, 2024
 O'Connell et al. Contraception 2008;78:492
 White et al. Contraception 2018;98:95

Society of Family Planning. #WeCount Report April 2022 through June 2025. 9 Dec. 2025

22

Anesthesia modalities for 2nd tri D&E

- Sedation
 - Minimal, moderate, or deep
 - PO, IM, IV, SL, intranasal, etc. routes
- General Anesthesia
 - General endotracheal anesthesia
 - General anesthesia with supraglottic airway
 - General anesthesia without airway (GAWA)
- Regional Anesthesia
 - Para/intracervical block (local)
 - Neuraxial anesthesia

23

Variability in anesthesia practice for 2nd tri D&E

- Survey of anesthesia practices
 - 289/364 (79%) response rate
- Clinics were asked to estimate what proportion of patients underwent different anesthesia regimens
- Wide variety in anesthesia practice
 - For clinics that offered local+IV or GA, most patients received that method
- For moderate sedation procedures, the sedation was administered by:
 - Gynecologist (31%)
 - Nurse (39%)
 - CRNA (12%)
 - Anesthesiologist (11%)

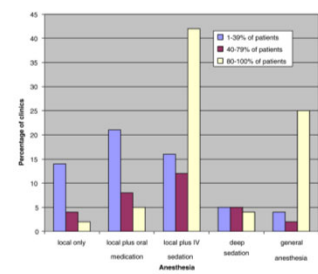


Fig. 4. Percentage of responding NFP clinics that use various methods of anesthesia during D&E (n=186).

O'Connell et al. Contraception, 2008;78:492

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Aspiration rate "deep sedation" for 2nd trimester D&E

Study*	2nd trimester abortions, n	Medications administered	Aspiration events, n	Rate of aspiration events, %
Dean et al. <i>J Clin Anesth</i> , 2011	11,039 (27% > 17 wks, 3% > 22 wks)	Propofol +/- fentanyl	0	0
Gokhale et al. <i>Anes Analg</i> , 2016	1707 (50% > 17 wks)	Fentanyl, midazolam, +/- propofol	0	0
Mancuso et al. <i>Contraception</i> , 2017	Aspiration rate is smaller than the published aspiration rate of ASA I/II patients undergoing elective surgery in Warner et al. <i>Anesthesiology</i> 78(1)56-62, 1993: 15 aspiration events in 119,351 patients = 1 in 7957			0
Aksel et al. <i>Obstet Gynecol</i> , 2018				0.08
Kim et al. <i>Contraception</i> , 2020				0
Nguyen et al. <i>JOA</i> , 2025	1165 (32% > 20 wks)	Propofol, lidocaine, +/- fentanyl, midazolam, ketamine	0	0
Total	17767		2	0.01

*All retrospective studies

**Pulmonary aspiration of gastric contents (1), and pulmonary aspiration of non-gastric contents (1).

Gambiling et al. *Anesthesiology*, 2025;143:261

25

Safety of supraglottic airway for cesarean --> Safety of deep sedation for D&E?

- LMA supreme for cesarean
 - 700 full term patients
 - 576 elective, 124 urgent
 - Mean BMI 26
 - Fasted for at least 4 h
 - 0 cases of pulmonary aspiration
- Scoping literature review:
 - 13 studies
 - 7722 patients
 - 0 cases of pulmonary aspiration

Yao et al. *Can J Anaesth*. 2012;59(7):648.

Sanganee et al. *Eur J Anaesthesiol*. 2024;41(9):668.

If LMA for full-term, properly fasted cesarean patients is not associated with aspiration, can this be extrapolated to deep sedation +/- oral airway for 2nd tri procedural abortion?

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The role of the anesthesia team in post-abortion hemorrhage prevention

- Blood loss is not insignificant
- Blood loss increases with gestational age
- EBL underestimates blood loss

Table 2
Median EBL and MBL of included D&E procedures by weeks gestation.

Weeks gestation	n (%)	Median EBL in mL (IQR)	Median MBL in mL (IQR)	p Value
Total	371 (100%)	150 (100-200)	271 (171-426)	<.00001
16	32 (8.6%)	75 (75-100)	175 (107-247)	.0001
17	29 (7.8%)	100 (75-150)	199 (138-265)	.0001
18	40 (10.8%)	100 (100-150)	200 (141-365)	<.00001
19	61 (16.4%)	100 (75-150)	265 (185-380)	<.00001
20	61 (16.4%)	150 (100-200)	326 (236-433)	<.00001
21	49 (13.2%)	150 (125-225)	356 (260-466)	<.00001
22	50 (13.5%)	175 (150-200)	370 (302-475)	<.00001
23	35 (9.4%)	200 (125-300)	500 (336-864)	<.00001
24	14 (3.8%)	200 (150-275)	638 (517-862)	.001

EBL, estimated blood loss; MBL, measured blood loss; D&E, dilation and evacuation; IQR, interquartile range.

Serapio et al. *Contraception*, 2018;97:451

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The role of oxytocin in post-abortion hemorrhage prevention

- In vitro and ex vivo experiments demonstrate low oxytocin receptor expression in the human myometrial cells until late second trimester.
- Oxytocin was thought to NOT have a role in hemorrhage management until 3rd trimester



Fuchs et al. *Am J Obstet Gynecol*. 1984;150(6):734
Elzaffar et al. *J Matern Fetal Neonatal Med*. 2016;29(5):850
Chen et al. *Anesth Analg*. 2023;137(2):345
McKenzie et al. *JOA*. 2025;63:104364

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Oxytocin indicated for D&E 18-24 weeks

- 18-24 week D&E → Randomized, double-blind, placebo-controlled trial
- Oxytocin 30 U IV or placebo over 15 min started at speculum insertion
- Primary outcome: Frequency of interventions to control excess bleeding
- **Conclusion: Significantly lower blood loss in oxytocin group (secondary outcome)**

Table 2. Blood Loss, Interventions, Complications, and Procedure Duration in Women Undergoing Dilation and Evacuation, Comparing Those Who Received Oxytocin With Those Who Received Placebo

	Oxytocin (n=82)	Placebo (n=78)	95% CI
Any intervention for bleeding	6 (7.3)	13 (16.7)	-21 to 1.9
Uterine massage	6 (7.3)	12 (15.4)	-19 to 3
Uterotonic medication	0	4 (5.1)	-11.3 to 1.0
Intrauterine tamponade	0	1 (1.3)	-5.0 to 2.5
Measured blood loss (mL)			
Intraoperative	127 (84-187)	246 (146-440)	69.1 to 169.1
Postoperative	15 (3-31)	17 (4-36)	-3.1 to 6.1
Total	152 (98-235)	317 (168-464)	71.6 to 181.5
Complications	5 (6.1)	20 (25.6)	-31.8 to -7.3
Hemorrhage (500 mL or more)*	3 (3.7)	17 (21.8)	-29.4 to -6.9
Major hemorrhage (1,000 mL or more)*	1 (1.2)	8 (10.3)	-17.4 to -0.7
Cervical laceration	2 (2.4)	4 (5.1)	-9.9 to 4.5
Procedure duration (min)	11.0 (8.0-14.0)	13.5 (10.0-19.0)	1.0-4.0

Data are n (%) or median (interquartile range) unless otherwise specified.
*Includes measured blood loss both intraoperatively and immediately postoperatively.

Whitehouse et al. *Obstet Gynecol*. 2019;133(3):484.



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Oxytocin prophylaxis in hemorrhage guidelines

- Society for Family Planning Clinical Recommendation
 - "We recommend the use of prophylactic oxytocin in settings where increased bleeding is of concern (GRADE 1A)"
- National Abortion Federation Clinical Practice Guidelines
 - "Recommendation 11.7.2: Prophylactic oxytocin can be used for procedures over 18 weeks."

Kerns et al. *Contraception*. 2024;139:110292
National Abortion Federation Clinical Practice Guidelines, 2026

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Avoid methylergonovine for hemorrhage prophylaxis

- 20-24 week D&E → Randomized, double-blind, placebo-controlled trial
- Methylergonovine 200 mcg IM or placebo within 1 min after procedure
- Primary outcome: Composite of indicators of post-procedure blood loss
- **Conclusion: No evidence for prophylactic methylergonovine (makes bleeding worse?)**



Table 2
Effect of post-operative prophylactic intramuscular methylergonovine versus placebo on excessive bleeding after dilation and evacuation abortion.

	Methylergonovine n = 140	Placebo n = 144	RR (95%CI)	p-value
Composite outcome*	78 (56)	75 (52)	1.1 (0.9-1.3)	0.5
Balloon tamponade	20 (14)	10 (7)	2.1 (1.0-4.2)	0.04
Post-procedure blood loss > 125 cc	32 (23)	23 (16)	1.4 (0.9-2.3)	0.1
Post-procedure blood loss	126 ± 241	76 ± 69	-	0.02
Massage/compression	51 (36)	46 (32)	1.1 (0.8-1.6)	0.4
Uterotonic given	56 (40)	43 (30)	1.3 (0.97-1.8)	0.07
Reoperation	4 (3)	0	-	0.06
Admission for bleeding	4 (3)	0	-	0.1
Transfusion	3 (2)	0	-	0.2
Uterine artery embolization	2 (1)	0	-	-
Major surgery	0	0	-	-

All data presented as n (%) or mean ± standard deviation.

* Composite outcome includes post-procedure measured blood loss greater than 125 mL, uterine massage or compression for at least two minutes, administration of additional uterotonic medication, intrauterine balloon tamponade, uterine re-aspiration, blood transfusion, uterine artery embolization, hospital admission for bleeding, or major surgery.

Kerns et al. *Contraception*. 2021;103:116.

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Role for carboprost for post-abortion hemorrhage?

- Relatively data-free zone
- Society for Family Planning Clinical Recommendation
 - No recommendation
- National Abortion Federation Clinical Practice Guidelines
 - "The following measures may be used for treatment of post-abortion hemorrhage... Carboprost tromethamine (Hemabate)..."



Hunkler et al. *Am J Obstet Gynecol*. 2025;232(1):72
Kerns et al. *Contraception*. 2024;129:110292
National Abortion Federation Clinical Practice Guidelines, 2026

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Role for misoprostol for post-abortion hemorrhage?

- Prophylaxis
 - Ample data that cervical preparation reduces hemorrhage
 - Misoprostol +/- mifepristone are common agents administered prior to D&E
- Treatment
 - Misoprostol is an effective uterotonic in cases of post-abortion hemorrhage
 - Society for Family Planning Clinical Recommendation
 - "We recommend immediate administration of uterotonics if massage alone fails (GRADE 1B), with methylergonovine maleate and misoprostol appropriate first-line treatments."
 - National Abortion Federation Clinical Practice Guidelines
 - "The following measures may be used for treatment of post-abortion hemorrhage... Misoprostol (Cytotec)..."



Hunkler et al. *Am J Obstet Gynecol*. 2025;232(1):72
Kerns et al. *Contraception*. 2024;129:110292
National Abortion Federation Clinical Practice Guidelines, 2026

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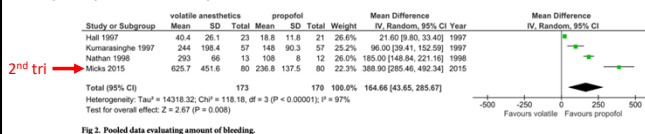
Role for TXA for post-abortion hemorrhage?

- No high-quality studies exist, however...
- Society for Family Planning Clinical Recommendation
 - "Given data supporting its use in postpartum hemorrhage, we suggest it as a safe and effective agent for prophylaxis and treatment for hemorrhage at the time of abortion (GRADE 2C)"
- National Abortion Federation Clinical Practice Guidelines
 - "The following measures may be used for treatment of post-abortion hemorrhage... Tranexamic acid..."
- Pending study: Tranexamic acid, prophylaxis
 - clinicaltrials.gov: **Tranexamic Acid for Second Trimester Dilation and Evacuation and Bleeding Outcomes**
 - Prospective, randomized, placebo-controlled
 - D&E 18-24 wks for abortion or IUFD
 - 1 g IV at start of D&E procedure
 - Primary outcome: Need for additional interventions to control bleeding
 - Secondary outcome: mean quantitative blood loss

Hunkler et al. *Am J Obstet Gynecol*. 2025;232(1):72
Kerns et al. *Contraception*. 2024;129:110292
National Abortion Federation Clinical Practice Guidelines, 2026

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Meta-analysis of RCTs evaluating volatile vs. propofol for procedural abortion



Other 1st tri studies concluding that volatile anesthesia is associated with higher blood loss

- Hackett et al. *Br J Anaesth*. 1982;54:865 (prospective, randomized, single-blinded)
 - methohexitone-N2O-enflurane vs. methohexitone-N2O-fentanyl
- Nelskyla et al. *Br J Anaesth*. 1999;83(4):576 (prospective, randomized)
 - N2O-sevoflurane vs. N2O-propofol-alfentanil
- Clare et al. *Anesthesiol Res Pract*. 2018;4051896 (retrospective)
 - midazolam-fentanyl-sevo/desflurane vs. midazolam-fentanyl-propofol

Hall et al. *Br J Anaesth*. 1997;78(2):172
Kumarasinghe et al. *Anesth Intensive Care*. 1997;25:48
Nathan et al. *Can J Anaesth*. 1998;45(12):1148
Micks et al. *Contraception*. 2015;91:488
Lee et al. *PLoS ONE*. 38(12):e0281494

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Guideline recommendations RE: volatile anesthetics



- Society for Family Planning Clinical Recommendation
 - "The use of halogenated anesthetic gases also increases the risk of hemorrhage due to atony, and the use of such agents is discouraged."
- National Abortion Federation Clinical Practice Guidelines
 - "Recommendation 11.6.2 - Inhaled anesthesia should be avoided if possible due to the increased risk of hemorrhage."

Kerns et al. *Contraception*. 2024;129:110292
National Abortion Federation Clinical Practice Guidelines, 2026

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Conclusions

- The anesthesia team plays an important role in abortion access
- Anesthesia-associated abortion mortality events are rare
- Prospective studies are needed to identify a superior anesthetic for routine procedural abortion
- Post-abortion hemorrhage management favors:
 - Oxytocin >18 weeks
 - Avoidance of volatile anesthetics, prophylactic methylergonovine

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Acknowledgments

- Anesthesia team
 - Philip Kurien, Pamela Huang, Jensen Wong, Bebhinn Akcay, Danni Chen
- OB/GYN team
 - Eleanor Drey, Allison Merz-Herrala, Emma Chew Murphy, Tina Tsang
- National Abortion Federation

Questions?



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No U-Turn on Equity: Navigating Resistance and Retaining Progress

Panel Presentation
Sunday May 3, 2026



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Session Outline

Allison Lee, MD, MS (University of Pennsylvania) – Moderator, Speaker #1

- *The Case for Equity* – “The Evidence Is In: How DEI Drives Better Health Outcomes”

Kokila Thenuwara, MD (University of Iowa) – Speaker #2

- *Navigating Restrictions Adaptive Strategies* – “Reframing the Mission: Advancing Inclusion Under DEI Bans”

James Damron, MD (University of Kentucky) – Speaker #3

- *Sustaining Equity in Marginalized Communities* – “Health Equity for Rural, Immigrant, and Racially Minoritized Populations”

Q&A

2

Why this matters now

- U.S. maternal mortality and morbidity remain unacceptably high
- Persistent racial and ethnic disparities across nearly all health outcomes
- Workforce diversity does not reflect patient populations
- Increasing scrutiny on outcomes, value, and accountability

Takeaway:

- DEI is not aspirational—it is foundational to high-quality care.

3

Defining DEI in Healthcare

- **Diversity:** Representation across race, ethnicity, gender, background
- **Equity:** Fair access to care, resources, and outcomes
- **Inclusion:** Systems that ensure all voices inform care delivery

Reframe:

- DEI = Clinical excellence + Patient safety + System performance

4

The Evidence: Obstetric Anesthesia Disparities in Care and Outcomes

- Black and Hispanic, Indigenous, Rural patients experience higher rates of morbidity and mortality
- Maternal mortality: ~2–3x higher among Black women
- Pain undertreatment persists across minoritized racial/ethnic groups
- Structural and interpersonal factors both contribute

Key Point:

- Variation in care—not biology—drives many disparities.

5

Patient-Clinician Concordance Improves Outcomes

- Racial concordance associated with
 - ↑ patient trust and communication
 - ↑ adherence to treatment
 - ↑ preventive care uptake
 - Example: Increased utilization of preventive services in concordant visits
- Language concordance reduces errors and improves satisfaction

Clinical Translation:

- Better communication → better decisions → better outcomes

6

Diverse Teams Make Better Decisions

- Diverse teams demonstrate:
 - ↑ diagnostic accuracy
 - ↑ innovation and problem-solving
 - ↓ groupthink and cognitive bias
- Studies show heterogeneous teams outperform homogeneous groups in complex tasks

Healthcare Impact:

- Improved clinical reasoning in high-stakes environments

7

Reduced Bias in Healthcare Delivery

- Implicit bias affects:
 - Pain management
 - Treatment recommendations
 - Escalation of care
- Structured DEI-informed interventions:
 - Standardized protocols (e.g., safety bundles)
 - Bias-aware training
 - Checklists and decision aids

Result:

More consistent, evidence-based care

8

Trust as a Clinical Outcome

- Trust influences:
 - Care-seeking behavior
 - Disclosure of symptoms
 - Acceptance of interventions
- Historical and lived experiences shape trust in healthcare systems

DEI Role:

Representation + culturally responsive care → ↑ trust → ↑ engagement

9

Drivers of Disparities

- Disparities persist even after controlling for income/education
- Key drivers:
 - Delayed recognition of complications
 - Communication breakdowns
 - Underestimation of symptoms
- DEI-informed strategies:
 - Team-based care models
 - Standardized escalation pathways
 - Community-informed program design

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The Business Case

- Improved outcomes → ↓ complications, ↓ LOS, ↓ readmissions
- Better patient experience → ↑ satisfaction scores, reimbursement impact
- Workforce benefits:
 - ↑ recruitment and retention
 - ↓ burnout in inclusive environments
- Risk mitigation:
 - ↓ malpractice risk
 - ↑ regulatory alignment

Bottom Line:

DEI drives **value-based care performance**

11

Quality and Safety

- Aligns with:
 - Patient safety frameworks
 - Quality improvement initiatives
 - Health system accountability metrics
- Examples:
 - Disparities dashboards
 - Equity-focused QI projects
 - Standardized care pathways

Reframe:

Health equity = **quality care delivered consistently**

12

Leadership Imperative

- Progress requires:
 - Visible leadership commitment
 - Resource allocation
 - Accountability structures
- Move from:
 - Statements → Systems
 - Intent → Measurable outcomes

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14

Sustaining Equity in Marginalized Communities

Topic: Health Equity for Rural, Immigrant, and Racially Minoritized Populations

James Damron, MD
Assistant Professor
University of Kentucky
Division Director of Obstetric Anesthesia

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1

Disclosures and US Executive Orders

The opinions expressed in this presentation are my own and do not represent the views of the University of Kentucky

- Multiple US Executive Orders Signed
- Eliminate DEI programs federally
- Restrict DEI-related funding and contracting
- Discourage or Challenge DEI practices in Private Sector



CHAPTER 128
(HB 4)

AN ACT relating to initiatives regarding diversity, equity, and inclusion.
Be it enacted by the General Assembly of the Commonwealth of Kentucky:

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2

Outline

Language
Access
Programs

Maternal
Quality Care
Collaboratives

Community
Outreach

QI Initiatives
and Strategic
Planning

Immigration
Raids

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3

Understanding Limited English Proficiency (LEP)

Definition

- U.S. Department of Health and Human Services defines LEP as individuals whose primary language is not English and who have limited ability to read, write, speak, or understand English
- Language proficiency may vary across skills (e.g., speaking vs. reading)

Why It Matters

- Communication barriers are common in clinical care
- Interpreter services are not always immediately available

Key Issue

- Language discordance between patients and providers can impact care quality

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4

Clinical Risks and Patient Safety

Risks Associated with LEP

- Misdiagnosis and medication errors
- Poor informed consent
- Communication-related safety events

Evidence from Studies

- Poorer postoperative pain control
- Reduced understanding of discharge instructions
- Possible increased:
 - Length of stay
 - Complications
 - Worse clinical outcomes



Interpreter Challenges

- Use of family/untrained staff + decreased accuracy & confidentiality

-Luan-Erle, Betty M et al. 2023

-Schulson, Lucy B et al. 2025

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5

Clinical Risks and Patient Safety

Interpreter Services & Policy

- Required under Title VI of the Civil Rights Act
- Delivered via in-person, phone, and video interpretation

DEI & Funding Concerns

- Access often supported through DEI-related programs
- Budget restrictions may lead to:
 - Reduced services or accessibility
 - Variable quality despite legal compliance

Real-World Concerns

- Reports of service reductions and funding cuts

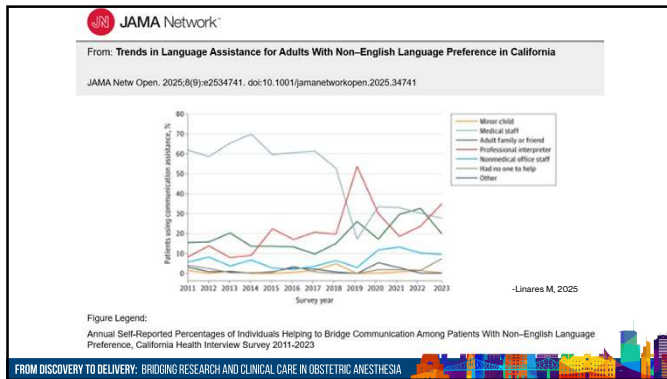
Key Takeaway

- Language barriers drive healthcare disparities
- Reliable interpreter services are essential for equitable, safe care



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6



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Language Access Programs

Interventions

- Standard Workflows (not optional use)
- Tele-interpretation Services
- Invest, in-person translators. Incentivize bi-lingual staff
- SOAP Resources (next slide)

Reframing: Not DEI, but risk management, harm reduction, compliance with title VI, and improving value-based care goals such as patient satisfaction and equity metrics.

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8

Hello World – Available on the SOAP Website

Hello World: Multilingual Greetings for those providing Obstetric Anesthesia Care

In an increasingly multicultural world, obstetric anesthesiologists frequently encounter patients who speak languages other than English. Communication is critical to ensuring safe and effective care, and ensuring patients feel comfortable, respected, and understood. The Hello World program is a free, online resource that provides multilingual greetings and phrases in 12 languages, helping to bridge communication gaps and improve patient care. The program is available on the SOAP website and can be used by any healthcare provider.

The goal of this program is to help anesthesiologists with basic tools to help patients who do not speak English to communicate with the patient's care team. We expect that using the program will improve patient care, reduce the risk of miscommunication, and improve patient satisfaction. We also expect that using the program will improve communication and help reduce the risk of miscommunication, leading to better patient care and satisfaction. The program is available on the SOAP website and can be used by any healthcare provider.

Featured Languages

SPANISH	FRENCH	GERMAN	RUSSIAN
CHINESE	KOREAN	MANDARIN	VIETNAMESE
THAI	WOLOF		

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9

Variation in Care and the Impact on Equity

- Significant variation exists across hospitals in adopting evidence-based practices
- Key drivers of variation:
 - Lack of standardized protocols
 - Fragmented systems and unaligned care pathways
 - Limited infrastructure and leadership for rapid implementation
- Resource-related disparities:
 - Under-resourced and rural hospitals face greater challenges
 - Financial barriers limit staffing and technology support
 - Workforce Factors

Mujahid, Mahasin S et al. 2021
Glance, Laurent G et al. 2019
Hovell, Elizabeth A et al. 2022

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10



11

Cardiac Conditions in Obstetrical Care Committee

Heart issues during pregnancy are often overlooked. We're changing that—because every mother's heart deserves to be heard, protected, and healed.

State leaders to add departments - title

4/21/2026 11

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12

Kentucky Pregnancy Heart Team – Guiding Principles

- Regionalization of specialist availability is key! Start with cardiologists.
- Placing a referral should be easy, reliable, and efficient.

4/9/2026 | 41 University of Kentucky

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Kentucky Pregnancy Heart Team



14

Maintaining Community Outreach

- Common Issues:
 - Historical Harms and Loss of Trust in Healthcare Systems
 - Structural Barriers
 - Rural Health Care Desserts
- Mechanisms: How Did we Get Here?
 - Clinic Closures in Rural Areas
 - Shifts Toward Hospital-Centered Care
- Interventions:
 - Community Health Care Workers
 - Telehealth Services
 - Faith-Based Partnerships

Alsan, Marcelle et al. 2020
Bailey, Zini et al. 2017
Planey, Arianna Marie et al. 2025
Knowles, Molly et al. 2023
Haggerty, Treah et al. 2022

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Doula Programs

Improved Maternal Satisfaction

Decreased Cesarean Rate

Shorter Labor

Equity Gap in Access & Insurance Coverage



Bohren, Meghan A et al. 2017
Giles, Tammie et al. 2025
Waymouth PH, et al. 2023
ACOG 2019
Bohren, M. A., et al. 2019

DONA
Doula Organization of North America

ACOG COMMITTEE OPINION
Committee on Obstetric Practice
Appropriate to Limit Interventions During Labor and Birth

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16

Embedding Equity into QI and Strategic Planning

What gets measured gets improved!

- Equity is often treated as an *add-on* metric rather than a core priority
- Many Quality Improvement (QI) efforts improve overall outcomes but fail to reduce disparities
 - **Unintentional Widening of Health Disparities can occur**
- Strategic plans may include equity language without measurable goals or accountability

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Embedding Equity into QI and Strategic Planning

Existing Challenges

- Lack of standardized metrics to define and track equity
- Inconsistent methods across organizations
- Data gaps limit accurate assessment of disparities
- Institutional culture may not prioritize equity as central work
- Siloed initiatives
 - Equity initiatives often function separately from core operational workflows

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Embedding Equity into QI and Strategic Planning

Bridging the Gap

Use **data** and **outcome measurement** to highlight disparities
→ **Drives research** and improves **patient outcomes**

Integrate **equity** into **QI dashboards**
→ **Track disparities** as standard metrics

Embed **equity** into **strategic planning**
→ **Aligns institutional priorities** with **equity goals**

Design **studies** with **equity-focused baseline characteristics**
→ **Ensures disparities** are recognized from the start

Take **initiative** as **leaders**
→ **Helps shift culture** and elevate **equity** as a consistent **priority**



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Immigration Raids

-Disclaimer: I am not a lawyer

-This section is meant to provide education and suggestions for guidance.

-My goal is to provide impartial evidence, data, and recommendations.

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20

Immigration Raids: Key Points for Labor and Delivery

Fear of immigration enforcement reduces healthcare utilization, especially prenatal care

Uninsured immigrants significantly delay initiation of prenatal care

The impact of immigration enforcement extends to measurable outcomes

ACOG Committee Statement No. 25, 2026
-Saadi, A et al 2020
-Chen, S et al 2023
-Nasaly, Nicolas et al 2017
-Borne, Romain et al 2021

21

Immigration Raids

-Immigration Law exists to protect Dreamers and Birthright citizens.

- DACA (Deferred Action for Childhood Arrivals)
- Other Limited Protections (Asylum, Special Visas, Family-based)
- 14th Amendment

-Immigration and Naturalization Statutes

- Broader powers for ICE officers, with constitutional limits
- Rights have been limited for Dreamers, and current political discussions regarding birthright citizenship are happening; US Supreme Court Decision Pending



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22

HIPAA & Law Enforcement Requests (ICE)

- **Consult legal counsel early** when law enforcement requests information
- ICE may request patient information
→ HIPAA allows limited disclosures in specific cases
- **Know the warrant type:**
 - Administrative • Judicial warrant
- Noncompliance risks:
 - Obstruction charges
 - False information → potential criminal penalties
- Denying **invalid requests is NOT obstruction**
- HIPAA protects all patients
→ Regardless of immigration status
- Do not **disclose PHI without proper legal authorization**
- Follow the **Minimum Necessary Rule**

HealthCare

MIN: _____
Patient Name: _____
Provider: _____
DOB: _____
DOB: _____

LAW ENFORCEMENT REQUEST FOR PROTECTED HEALTH INFORMATION TO BE RELEASED VERBALLY

To: _____
Name: _____
Treatment Provider: _____
Healthcare Number: _____
Law Enforcement Agency: _____

I am a law enforcement official as defined in the Health Insurance Portability and Accountability Act and the regulations promulgated thereunder ("HIPAA"). I am requesting Protected Health Information ("PHI") related to the patient named above. This patient may not be able to agree to disclosure of their protected health information and/or the need for information in such that the patient's authorization cannot be obtained.

I request verbal PHI from UK HealthCare physicians, nurses and other health care providers who treated the patient for one or more of the following reasons authorized by HIPAA:

☐ To identify or locate a suspect, fugitive, material witness, or missing person.

☐ For information about a victim or suspected victim of a crime.

☐ For information about a person's death, if hospital staff or providers suspect that criminal activity caused the death.

☐ For information in connection with a crime that may have occurred on the University of Kentucky premises or any UK property.

☐ For a medical emergency not occurring on the University of Kentucky premises or UK property, when necessary to inform law enforcement about the commission and nature of a crime, the location of the crime, or crime victims, and the perpetrator of the crime.

By: _____
Date: _____ Time: _____

* This request for information is not a substitute for a written authorization for release of records by patient or the patient's legal representative, except in the cases of a medical emergency, emergency, or administrative requests. A written authorization is required for copies of records.

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Immigration Raids

Key recommendations

- Call Attorney
- Cooperate to a reasonable extent
- Do no harm, explaining the need for continued health care where applicable
- Documentation
- Protect patient information
- Develop comprehensive institutional protocols to guide clinicians and staff

ACOG Committee Statement No. 25, 2026

-Saadi, A et al 2020

-Haber LA, et al 2025

24

Don't Let Location Deter You!

Sometimes, places with the strictest regulations can be places where your efforts can have the most profound impact.

We need advocates for all birthing people, everywhere!

Focusing on Population Health supported by Data and Outcomes will help us to retain progress and continue to improve care for all.

FROM DISCOVERY TO DELIVERY: BRIDGING RESEARCH AND CLINICAL CARE IN OBSTETRIC ANESTHESIA



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Resources and References



Thank you!

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