




Brendan Carvalho

Professor of Anesthesiology, Perioperative and Pain Medicine (Obstetrics) and, by courtesy, of Obstetrics and Gynecology (Maternal Fetal Medicine)

 NIH Biosketch available Online

 Curriculum Vitae available Online

CLINICAL OFFICE (PRIMARY)

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Bio

BIO

Dr. Carvalho is the Chief of Obstetric Anesthesiology and Maternal Health, Vice Chair of Faculty Development, and Professor in the Department of Anesthesiology, Perioperative and Pain Medicine, Stanford University Medical Center. He is the Past President of the Society of Obstetric Anesthesia and Perinatology (SOAP), and founder the SOAP Center of Excellence for Obstetric Anesthesia Care Designation. He has published extensively in the field of Obstetric Anesthesia with over 350 peer-reviewed articles, editorials, reviews, book chapters and commentaries. He has received several NIH, pharmaceutical and institutional grants, and won numerous research awards including three Best Research Papers at SOAP scientific meetings. Dr. Carvalho has won both the early and late-career Teacher of the Year awards at SOAP, and was voted Teacher of the Year at Stanford University's Departments of Anesthesia. He has presented at over 220 regional, national and international meetings and visiting professorships. He serves/has served on numerous national medical society committees and medical journal editorial boards, and as an advisor/consultant to the World Health Organization. His clinical and translational research and scholarly activities cover cesarean and labor analgesia, perinatal pharmacology and immunology, obstetric hemorrhage, and postpartum recovery.

CLINICAL FOCUS

- Anesthesia
- Anesthesia, Obstetrical
- Anesthesia, Regional

ACADEMIC APPOINTMENTS

- Professor - University Medical Line, Anesthesiology, Perioperative and Pain Medicine
- Professor - University Medical Line (By courtesy), Obstetrics & Gynecology - Maternal Fetal Medicine
- Member, Maternal & Child Health Research Institute (MCHRI)

ADMINISTRATIVE APPOINTMENTS

- Chief, Division of Obstetric Anesthesia, (2013- present)

PROFESSIONAL EDUCATION

- Board Certification: Anesthesia, American Board of Anesthesiology (2014)
- Fellowship, Stanford University , Obstetric Anesthesia (2002)
- Residency: Southwest School of Anesthesia (2001) England
- Internship: Groote Schuur Hospital (1995) South Africa
- Medical Education: University of Witwatersrand (1994) South Africa

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

I have completed research in a number of important areas in obstetric anesthesia including: optimizing neuraxial techniques for labor and cesarean analgesia; predicting individual labor and cesarean pain and analgesic needs; evaluating pregnancy-induced and hormonal changes in pain perception; determining the role of cytokines and other biochemical mediators in incisional wounds; evaluating local anesthetic potency and anesthetic requirements during labor and cesarean delivery; determining epidural and spinal opioid applications and the role of long-acting neuraxial opioids in obstetric pain management; investigating peripartum hemostatic and coagulation changes; conducting cost-analyses of various obstetric anesthesia practices; optimizing the management of maternal cardiac arrest and other obstetrical emergencies; determining patient attitudes and ethnic preferences towards obstetric analgesia; determining the efficacy of peripheral wound drug administration; and pharmacokinetics/pharmacodynamics of drugs administered to pregnant women. My current area of research focus is in developing novel ways of improving post-cesarean and peripartum labor pain management, and developing detailed pharmacokinetics/pharmacodynamics models of key antenatal medications.

CLINICAL TRIALS

- Calcium Chloride for Prevention of Uterine Atony During Cesarean, Not Recruiting
- Oxytocin Pharmacokinetics and Pharmacodynamics, Not Recruiting
- Pharmacokinetic (PK) and Pharmacodynamic (PD) Modeling of Ampicillin and Gentamicin in Peripartum Patients, Not Recruiting
- Virtual Reality Compared to Nitrous Oxide for Labor Analgesia, Not Recruiting

Publications

PUBLICATIONS

- **Comparative efficacy of intravenous treatments for perioperative shivering in patients undergoing caesarean delivery under neuraxial anaesthesia: A systematic review and Bayesian network meta-analysis of randomised-controlled trials.** *Journal of clinical anaesthesia*
Ferrea, G., Monks, D. T., Singh, P. M., Fedoruk, K., Singh, N. P., Blake, L., Carvalho, B., Sultan, P.
2024; 100: 111680
- **Consensus Statement on Pain Management for Pregnant Patients with Opioid-Use Disorder from the Society for Obstetric Anesthesia and Perinatology, Society for Maternal-Fetal Medicine, and American Society of Regional Anesthesia and Pain Medicine.** *Anesthesia and analgesia*
Lim, G., Carvalho, B., George, R. B., Bateman, B. T., Brummett, C. M., Ip, V. H., Landau, R., Osmundson, S. S., Raymond, B., Richebe, P., Soens, M., Terplan, M.
2024
- **A Survey of Obstetric Anaesthesia Services and Practices in the United Kingdom.** *Cureus*
O'Carroll, J., Zucco, L., Warwick, E., Arbane, G., Moonesinghe, R., El-Boghdadly, K., Guo, N., Carvalho, B., Sultan, P.
2024; 16 (10): e70851
- **The evaluation of the performance of ChatGPT in the management of labor analgesia.** *Journal of clinical anaesthesia*
Ismail, N., Nguyen, T. P., Guo, N., Carvalho, B., Sultan, P.
2024; 98: 111582
- **Comparison of artificial intelligence large language model chatbots in answering frequently asked questions in anaesthesia.** *BJA open*
Nguyen, T. P., Carvalho, B., Sukhdeo, H., Joudi, K., Guo, N., Chen, M., Wolpaw, J. T., Kiefer, J. J., Byrne, M., Jamroz, T., Mootz, A. A., Reale, S. C., Zou, et al

2024; 10: 100280

- **In Response. *Anesthesia and analgesia***
Mootz, A. A., Carvalho, B., Sultan, P., Nguyen, T. P., Reale, S. C.
2024; 138 (6): e37-e38
- **Associations between anxiety, sleep, and blood pressure parameters in pregnancy: a prospective pilot cohort study. *BMC pregnancy and childbirth***
Miller, H. E., Simpson, S. L., Hurtado, J., Boncompagni, A., Chueh, J., Shu, C. H., Barwick, F., Leonard, S. A., Carvalho, B., Sultan, P., Aghaeepour, N., Druzin, M., Panelli, et al
2024; 24 (1): 366
- **Strategies for optimising early detection and obstetric first response management of postpartum haemorrhage at caesarean birth: a modified Delphi-based international expert consensus. *BMJ open***
Pingray, V., Williams, C. R., Al-Beity, F. M., Abalos, E., Arulkumaran, S., Blumenfeld, A., Carvalho, B., Deneux-Tharoux, C., Downe, S., Dumont, A., Escobar, M. F., Evans, C., Fawcus, et al
2024; 14 (5): e079713
- **Liposomal Bupivacaine for Abdominal Fascial Plane Blocks: No Evidence or Lack of Relevant Evidence? *Anesthesiology***
Habib, A. S., Gadsden, J., Carvalho, B.
2024; 140 (5): 871-873
- **Evaluation of Sleep in Pregnant Inpatients Compared With Outpatients. *Obstetrics and gynecology***
Panelli, D. M., Miller, H. E., Simpson, S. L., Hurtado, J., Shu, C. H., Boncompagni, A. C., Chueh, J., Barwick, F., Carvalho, B., Sultan, P., Aghaeepour, N., Druzin, M. L.
2024
- **Physical activity among pregnant inpatients and outpatients and associations with anxiety. *European journal of obstetrics, gynecology, and reproductive biology***
Panelli, D. M., Miller, H. E., Simpson, S. L., Hurtado, J., Shu, C. H., Boncompagni, A. C., Chueh, J., Carvalho, B., Sultan, P., Aghaeepour, N., Druzin, M. L.
2024; 297: 8-14
- **Continuous wound infusion catheter as part of a multimodal analgesia regimen for post-Caesarean delivery pain: a quality improvement impact study. *BJA open***
Fowler, C., Stockert, E., Hoang, D., Guo, N., Riley, E., Sultan, P., Carvalho, B.
2024; 9: 100242
- **Ethnicity, socio-economic deprivation and postpartum outcomes following caesarean delivery: a multicentre cohort study. *Anaesthesia***
O'Carroll, J. E., Zucco, L., Warwick, E., Radcliffe, G., Moonesinghe, S. R., El-Boghdadly, K., Guo, N., Carvalho, B., Sultan, P.
2024
- **A Cost and Waste-Savings Comparison Between Single-Use and Reusable Pulse Oximetry Sensors Across US Operating Rooms. *Anesthesia and analgesia***
Stockert, E. W., Carvalho, B., Sun, E. C.
2024
- **The Accuracy of ChatGPT-Generated Responses in Answering Commonly Asked Patient Questions About Labor Epidurals: A Survey-Based Study. *Anesthesia and analgesia***
Mootz, A. A., Carvalho, B., Sultan, P., Nguyen, T. P., Reale, S. C.
2024
- **A retrospective cohort study of the anesthetic management of postpartum tubal ligation. *International journal of obstetric anesthesia***
Ansari, J., Sheikh, M., Riley, E., Guo, N., Traynor, A., Carvalho, B.
2024; 103974
- **Adrenaline or noradrenaline for spinal hypotension during caesarean section - beware; the cure may be worse than the disease *SOUTHERN AFRICAN JOURNAL OF ANAESTHESIA AND ANALGESIA***
Dyer, R. A., Carvalho, B., Blockman, M., Pfister, C.
2024; 30 (4): 100-102
- **Association of antenatal anxiety, short sleep duration, and blood pressure parameters: a pilot study**
Miller, H. E., Simpson, S. L., Hurtado, J., Shu, C., Chueh, J., Barwick, F., Leonard, S. A., Carvalho, B., Sultan, P., Aghaeepour, N., Druzin, M. L., Panelli, D. M.
MOSBY-ELSEVIER.2024: S287

- **Insomnia in pregnancy: are hospitalized inpatients sleeping less than outpatients?**
Panelli, D. M., Miller, H. E., Simpson, S. L., Hurtado, J., Shu, C., Boncompagni, A. C., Chueh, J., Barwick, F., Carvalho, B., Sultan, P., Aghaeepour, N., Druzin, M. L.
MOSBY-ELSEVIER.2024: S378
- **Physical activity among pregnant inpatients and outpatients and associations with anxiety**
Panelli, D. M., Miller, H. E., Simpson, S. L., Hurtado, J., Shu, C., Boncompagni, A. C., Chueh, J., Carvalho, B., Sultan, P., Aghaeepour, N., Druzin, M. L.
MOSBY-ELSEVIER.2024: S578
- **Feasibility of Focused Cardiac Ultrasound Performed by Trainees During Cesarean Delivery.** *Anesthesia and analgesia*
Ortner, C. M., Sheikh, M., Athar, M. W., Padilla, C., Guo, N., Carvalho, B.
2023
- **Prevalence and predictors for postpartum sleep disorders: a nationwide analysis.** *The journal of maternal-fetal & neonatal medicine : the official journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstetricians*
Sultan, P., Guo, N., Kawai, M., Barwick, F. H., Carvalho, B., Mackey, S., Kallen, M. A., Gould, C. E., Butwick, A. J.
2023; 36 (1): 2170749
- **Standardizing nomenclature in regional anesthesia: an ASRA-ESRA Delphi consensus study of upper and lower limb nerve blocks.** *Regional anesthesia and pain medicine*
El-Boghdadly, K., Albrecht, E., Wolmarans, M., Mariano, E. R., Kopp, S., Perlas, A., Thottungal, A., Gadsden, J., Tulgar, S., Adhikary, S., Aguirre, J., Agur, A. M., Alt#parmak, et al
2023
- **Intravenous Calcium to Decrease Blood Loss During Intrapartum Cesarean Delivery: A Randomized Controlled Trial.** *Obstetrics and gynecology*
Ansari, J. R., Yarmosh, A., Michel, G., Lyell, D., Hedlin, H., Cornfield, D. N., Carvalho, B., Bateman, B. T.
2023
- **Obstetric operating room staffing and operating efficiency using queueing theory.** *BMC health services research*
Lim, G., Lim, A. J., Quinn, B., Carvalho, B., Zakowski, M., Lynde, G. C.
2023; 23 (1): 1147
- **Effect of an electronic medical record nudge to improve quality improvement program tracking of neuraxial catheter replacements in obstetric patients.** *BMJ open quality*
Fedoruk, K., Xie, J., Wang, E., Fowler, C., Riley, E., Carvalho, B.
2023; 12 (4)
- **Association of inpatient postpartum quality of recovery with postpartum depression: A prospective observational study.** *Journal of clinical anesthesia*
Ben Hayoun, D. H., Sultan, P., Rozeznic, J., Guo, N., Carvalho, B., Orbach-Zinger, S., Weiniger, C. F.
2023; 91: 111263
- **Outcomes and outcome measures utilised in randomised controlled trials of postoperative caesarean delivery pain: a scoping review.** *International journal of obstetric anesthesia*
Ciechanowicz, S., Kim, J., Mak, K., Blake, L., Carvalho, B., Sultan, P.
2023: 103927
- **Investigation of the Optimum Baseline Blood Pressure for Spinal Anesthesia to Guide Vasopressor Management for Elective Cesarean Delivery: A Case-Control Design.** *Cureus*
Kovacheva, V. P., Armero, W., Zhou, G., Bishop, D., Dyer, R., Carvalho, B.
2023; 15 (9): e45380
- **Postpartum recovery of nulliparous women following scheduled cesarean delivery and spontaneous vaginal delivery: a prospective observational study.** *AJOG global reports*
Mazda, Y., Ando, K., Kato, A., Noguchi, S., Sugiyama, T., Hizuka, K., Nagai, A., Ikeda, Y., Sakamaki, D., Guo, N., Carvalho, B., Sultan, P.
2023; 3 (3): 100226
- **Erratum to "A randomized trial to investigate needle redirections/re-insertions using a handheld ultrasound device versus traditional palpation for spinal anesthesia in obese women undergoing cesarean delivery" [Int. J. Obstetric Anesth. 49 (2022) 103229].** *International journal of obstetric anesthesia*
Weiniger, C. F., Carvalho, B., Ronel, I., Greenberger, C., Aptekman, B., Almog, O., Kagan, G., Shalev, S.
2023: 103903

- **Pharmacological agents for prevention of pruritus in women undergoing Caesarean delivery with neuraxial morphine: a systematic review and Bayesian network meta-analysis.** *British journal of anaesthesia*
Singh, P. M., Sultan, P., O'Carroll, J., Blake, L., Carvalho, B., Singh, N. P., Monks, D. T.
2023
- **A systematic review of patient-reported outcome measures used in maternal postpartum anxiety.** *American journal of obstetrics & gynecology MFM*
O'Carroll, J., Ando, K., Yun, R., Panelli, D., Nicklin, A., Kennedy, N., Carvalho, B., Blake, L., Coker, J., Kaysen, D., Sultan, P.
2023: 101076
- **Quality of recovery following childbirth: a prospective, multicentre cohort study.** *Anaesthesia*
O'Carroll, J. E., Zucco, L., Warwick, E., Arbane, G., Moonesinghe, S. R., El-Boghdadly, K., Guo, N., Carvalho, B., Sultan, P.
2023
- **Automated Alert System of Second-Line Uterotonic Drug Administration.** *A&A practice*
Abir, G., Riley, E. T., Oakeson, A. M., Judy, A., Wang, E., Carvalho, B.
2023; 17 (5): e01687
- **Comparison of different nonsteroidal anti-inflammatory drugs for cesarean section: a systematic review and network meta-analysis.** *Korean journal of anesthesiology*
Murdoch, I., Carver, A., Sultan, P., O'Carroll, J., Blake, L., Carvalho, B., Onwochei, D. N., Desai, N.
2023
- **Data-driven longitudinal characterization of neonatal health and morbidity.** *Science translational medicine*
De Francesco, D., Reiss, J. D., Roger, J., Tang, A. S., Chang, A. L., Becker, M., Phongpreecha, T., Espinosa, C., Morin, S., Berson, E., Thuraiappah, M., Le, B. L., Ravindra, et al
2023; 15 (683): eadc9854
- **Assessment of fatigue in postpartum women using patient-reported outcome measures: a systematic review utilising Consensus Based Standards for the Selection of Health Measurement Instruments (COSMIN) guidelines** *FATIGUE-BIOMEDICINE HEALTH AND BEHAVIOR*
Ciechanowicz, S., Pandal, P., Carvalho, B., Blake, L., Van Damme, S., Taylor, J., Sultan, P.
2022
- **A Systematic Scoping Review of Peridelivery Pain Management for Pregnant People With Opioid Use Disorder: From the Society for Obstetric Anesthesia and Perinatology and Society for Maternal Fetal Medicine.** *Anesthesia and analgesia*
Lim, G., Soens, M., Wanasejja, A., Chyan, A., Carvalho, B., Landau, R., George, R. B., Klem, M. L., Osmundson, S. S., Krans, E. E., Terplan, M., Bateman, B. T.
2022
- **Obstetric services in the UK during the COVID-19 pandemic: A national survey.** *Anaesthesia, critical care & pain medicine*
O'Carroll, J. E., Zucco, L., Warwick, E., Arbane, G., Moonesinghe, R., El-Boghdadly, K., Guo, N., Carvalho, B., Sultan, P.
2022: 101137
- **Incidence, prevalence, and timing of postpartum complications and mortality in Canada and the United States: a systematic review and meta-analysis protocol.** *JBI evidence synthesis*
Ke, J. X., Vidler, M., Dol, J., Carvalho, B., Blake, L. E., George, R. B., Bone, J., Seligman, K., Coombs, M., Chau, A. A., Saville, L., Gibbs, R. S., Sultan, et al
2022
- **Obstetric Anesthesia Procedure-Based Workload and Facility Utilization of Society of Obstetric Anesthesia and Perinatology Centers of Excellence Designated Institutions.** *Anesthesia and analgesia*
Im, M., Riley, E. T., Hoang, D., Lim, G., Zakowski, M., Carvalho, B.
2022
- **Assessment of Patient-Reported Outcome Measures for Maternal Postpartum Depression Using the Consensus-Based Standards for the Selection of Health Measurement Instruments Guideline: A Systematic Review.** *JAMA network open*
Sultan, P., Ando, K., Elkhateb, R., George, R. B., Lim, G., Carvalho, B., Chitneni, A., Kawai, R., Tulipan, T., Blake, L., Coker, J., O'Carroll, J.
2022; 5 (6): e2214885
- **Virtual Compared to In-Person Obstetric Anesthesiology Trainee Education During the COVID-19 Pandemic: A Short Report.** *Cureus*
Fedoruk, K., Abir, G., Carvalho, B.
2022; 14 (6): e26423
- **Storage of emergency airway equipment on labor and delivery units.** *Journal of clinical anesthesia*

- Riley, E. T., Carvalho, B., Abir, G.
2022; 80: 110886
- **Expert Consensus Regarding Core Outcomes for Enhanced Recovery after Cesarean Delivery Studies: A Delphi study.** *Anesthesiology*
Sultan, P., George, R., Weiniger, C. F., El-Boghdady, K., Pandal, P., Carvalho, B., CRADLE Study Investigators, Ansari, J. R., Benhamou, D., Baluku, M., Bernstein, P. S., Bollag, L. A., Bowden, S. J., et al
2022
 - **Enhancing recovery after cesarean delivery - A narrative review.** *Best practice & research. Clinical anaesthesiology*
O'Carroll, J., Carvalho, B., Sultan, P.
2022; 36 (1): 89-105
 - **Comparing Postpartum Estimated and Quantified Blood Loss Among Racial Groups: An Observational Study.** *Cureus*
Katz, D., Khadge, S., Carvalho, B.
2022; 14 (5): e25299
 - **Development and validation of a Portuguese version of Obstetric Quality of Recovery-10 (ObsQoR-10-Portuguese).** *Anaesthesia, critical care & pain medicine*
Mathias, L., Carlos, R. V., Siaulyis, M., Gabriades, P., Guo, N., Domingue, B., O'Carroll, J., Carvalho, B., Sultan, P.
2022: 101085
 - **Calcium chloride for the prevention of uterine atony during cesarean delivery: A pilot randomized controlled trial and pharmacokinetic study.** *Journal of clinical anesthesia*
Ansari, J. R., Kalariya, N., Carvalho, B., Flood, P., Guo, N., Riley, E.
2022; 80: 110796
 - **Cardiac ultrasonography in obstetrics - a necessary skill for the present and future anesthesiologist.** *International journal of obstetric anesthesia*
Ortner, C. M., Padilla, C., Carvalho, B.
2022; 50: 103545
 - **Accuracy of visual estimation of blood loss in obstetrics using clinical reconstructions: an observational simulation cohort study.** *International journal of obstetric anesthesia*
Athar, M. W., Abir, G., Seay, R. C., Guo, N., Butwick, A., Carvalho, B.
2022; 50: 103539
 - **In-Hospital Opioid Consumption After the Previous Cesarean Delivery Weakly Predicts Opioid Consumption After Index Delivery: A Retrospective Cohort Study.** *Anesthesia and analgesia*
Komatsu, R., Nash, M., Mandalia, S., Dinges, E., Kamal, U., Singh, D., El-Omrani, H., Anwar, A., Delgado, C., Ziga, T. M., Carvalho, B.
2022
 - **World Health Organization Recommendation for Using Uterine Balloon Tamponade to Treat Postpartum Hemorrhage.** *Obstetrics and gynecology*
Weeks, A. D., Akinola, O. I., Amorim, M., Carvalho, B., Deneux-Tharoux, C., Liabsuetrakul, T., Meremikwu, M., Miller, S., Nabhan, A., Nagai, M., Wahabi, H., Walker, D.
1800
 - **Patient Preferences for Outcomes Associated With Labor Epidural Analgesia.** *Cureus*
Harding, A., George, R. B., Munro, A., Coolen, J., Snelgrove-Clarke, E., Carvalho, B.
2022; 14 (2): e22599
 - **Un sondage sur les pratiques de peridurales pour le travail dans les programmes de fellowship en anesthésie obstétricale aux États-Unis.** *Canadian journal of anaesthesia = Journal canadien d'anesthésie*
Callahan, E., Yeh, P., Carvalho, B., George, R. B.
1800
 - **Quantitative blood loss after vaginal delivery: a retrospective analysis of 104#079 measurements at 41 institutions.** *International journal of obstetric anesthesia*
Ansari, J., Farber, M. K., Thurer, R. L., Guo, N., Rubenstein, A., Carvalho, B.
2022; 51: 103256
 - **Limitations of Gravimetric Quantitative Blood Loss during Cesarean Delivery** *AJP REPORTS*
Thurer, R. L., Doctorvaladan, S., Carvalho, B., Jelks, A. T.

2022; 12 (01): E36-E40

- **Magnesium sulfate pharmacokinetics after intramuscular dosing in women with preeclampsia.** *AJOG global reports*
Brookfield, K., Galadanci, H., Du, L., Wenning, L., Mohammed, I., Suleiman, M., Oladapo, O. T., Witjes, H., Carvalho, B.
2021; 1 (4): 100018
- **A randomized trial to investigate needle redirections/re-insertions using a handheld ultrasound device versus traditional palpation for spinal anesthesia in obese women undergoing cesarean delivery.** *International journal of obstetric anesthesia*
Weiniger, C. F., Carvalho, B., Ronel, I., Greenberger, C., Aptekman, B., Almog, O., Kagan, G., Shalev, S.
2021: 103229
- **Impact of enhanced recovery after caesarean delivery on maternal outcomes: A systematic review and meta-analysis.** *Anaesthesia, critical care & pain medicine*
Pervez, S., Sharawi, N., Blake, L., Habib, A. S., Brookfield, K. F., Carvalho, B.
2021: 100935
- **Evidence-based guidance for use of intrathecal morphine as an alternative to diamorphine for Caesarean delivery analgesia.** *British journal of anaesthesia*
Sultan, P., Carvalho, B.
2021
- **Estimating Obstetric Anaesthesia Workload: Number of Deliveries Compared to Time-Based Workload.** *Turkish journal of anaesthesiology and reanimation*
Kowalczyk, J. J., Lipman, S. S., Carvalho, B.
2021; 49 (4): 292-297
- **Estimating Obstetric Anaesthesia Workload: Number of Deliveries Compared to Time-Based Workload** *TURKISH JOURNAL OF ANAESTHESIOLOGY AND REANIMATION*
Kowalczyk, J. J., Lipman, S. S., Carvalho, B.
2021; 49 (4): 292-297
- **Standardizing nomenclature in regional anesthesia: an ASRA-ESRA Delphi consensus study of abdominal wall, paraspinal, and chest wall blocks.** *Regional anesthesia and pain medicine*
El-Boghdadly, K., Wolmarans, M., Stengel, A. D., Albrecht, E., Chin, K. J., Elsharkawy, H., Kopp, S., Mariano, E. R., Xu, J. L., Adhikary, S., Altiparmak, B., Barrington, M. J., Bloc, et al
2021; 46 (7): 571-580
- **Integrated trajectories of the maternal metabolome, proteome, and immunome predict labor onset.** *Science translational medicine*
Stelzer, I. A., Ghaemi, M. S., Han, X., Ando, K., Hedou, J. J., Feyaerts, D., Peterson, L. S., Rumer, K. K., Tsai, E. S., Ganio, E. A., Gaudilliere, D. K., Tsai, A. S., Choisy, et al
2021; 13 (592)
- **Intravenous oxytocin dosing regimens for postpartum hemorrhage prevention at cesarean section: a systematic review and meta-analysis.** *American journal of obstetrics and gynecology*
Phung, L. C., Farrington, E. K., Connolly, M., Wilson, A. N., Carvalho, B., Homer, C. S., Vogel, J. P.
2021
- **An observational pilot study of a novel loss of resistance syringe for locating the epidural space.** *International journal of obstetric anesthesia*
Athar, M. W., Guo, N., Ortner, C., Carvalho, B., Abir, G., Riley, E. T.
2021: 102984
- **Superficial Cervical Plexus Block for Awake Large-Bore Central Line Placement in Parturients: A Case Series.** *A&A practice*
Sheikh, M., Carvalho, B., Boublik, J., Ansari, J.
2021; 15 (3): e01429
- **Point-of-Care Lung Ultrasound Pattern in Healthy Parturients: Prevalence of Pulmonary Interstitial Syndrome Following Vaginal Delivery, Elective and Unplanned Intrapartum Cesarean Delivery.** *Anesthesia and analgesia*
Macias, P. n., Wilson, J. G., Austin, N. S., Guo, N. n., Carvalho, B. n., Ortner, C. M.
2021
- **A systematic review of patient-reported outcome measures used to assess sleep in postpartum women using Consensus Based Standards for the Selection of Health Measurement Instruments (COSMIN) guidelines.** *Sleep*
Sultan, P. n., Ando, K. n., Sultan, E. n., Hawkins, J. n., Blake, L. n., Barwick, F. n., Kawai, M. n., Carvalho, B. n.

2021

- **Use of Patient-Reported Outcome Measures to Assess Outpatient Postpartum Recovery: A Systematic Review.** *JAMA network open*
Sultan, P., Sharawi, N., Blake, L., Ando, K., Sultan, E., Aghaeepour, N., Carvalho, B., Sadana, N.
2021; 4 (5): e2111600
- **A systematic review of patient-reported outcome measures used to assess postpartum pain using Consensus Based Standards for the Selection of Health Measurement Instruments (COSMIN) guidelines.** *British journal of anaesthesia*
Sultan, P. n., Ando, K. n., Sultan, E. n., Hawkins, J. E., Chitneni, A. n., Sharawi, N. n., Sadana, N. n., Blake, L. E., Singh, P. M., Flood, P. n., Carvalho, B. n.
2021
- **Acute Pain Burden and Opioid Dose Requirements after Cesarean Delivery in Parturients with Preexisting Chronic Back Pain and Migraine.** *Anesthesiology research and practice*
Komatsu, R., Nash, M. G., Ruth, K. C., Harbour, W., Ziga, T. M., Mandalia, S., Dinges, E. M., Singh, D., El-Omrani, H., Reno, J., Carvalho, B., Bollag, L. A.
2021; 2021: 3305579
- **A Peripheral Immune Signature of Labor Induction.** *Frontiers in immunology*
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