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Collector: Web Link 1 (Web Link)
Started: Thursday, September 15, 2022 12:31:52 PM
Last Modified: Thursday, September 15, 2022 8:48:26 PM
Time Spent: 08:16:34
IP Address: 162.129.250.12

Page 1: Background Information

Q1

First Name

David

Q2

Last Name

Berman

Q3

Credentials

MD

Q4

Institution

Johns Hopkins Hospital

Q5

Street Address

1800 Orleans Street, Zayed 8th Floor

Q6

City

Baltimore

Q7

State

MD

Q8

Zip Code

21287

Q9

Country

USA

Q10

Email address

DaveBerman@jhmi.edu

Page 2: Institutional and Application Details

Q11

Please mark the application designation that is applicable to you.

Recertification (i.e. previously received COE certification)

Q12

Describe the institution where you provide obstetric anesthesia services

Academic/university affiliated

Q13

What is the country of the applying institution

United States of America

Q14

If USA application, what is the institution's zip code?

21287

Q15

Mark all that apply to your institution

Train/teach residents,

Train/teach obstetric anesthesia fellows,

Has an ACGME-accredited OB Anesthesia fellowship program

,

Train/teach other learners (student nurse anesthetists, anesthesiology assistants, medical students, etc.)

Q16

How many deliveries are there at your institution per year?

2470

Q17

What is the current cesarean delivery rate percentage at your institution? Do not enter percentage sign in your answer. Please answer in decimal format.

39.9

Page 3: General Anesthesia Rates

Q18

What is your institution's overall general anesthesia rate (percentage) for cesarean delivery?* Do not include percentage sign in answer. Please answer in decimal format.

3.4

Q19

What is your general anesthesia rate (percentage) for planned/scheduled/elective cesarean delivery? Do not include percentage sign in answer. Please answer in decimal format.

4.2

Q20

What is your general anesthesia rate (percentage) for unplanned/intrapartum/urgent cesarean delivery? Do not include percentage sign in answer. Please answer in decimal format.

1.8

Q21

Do you conduct a quality assurance review of all cases requiring general anesthesia (irrespective of your institution's general anesthesia rate)? Please provide (attach with application) evidence of your quality assurance review process.

Yes

Page 4: Institutional Details

Q22

What percentage of laboring patients at your institution receive neuraxial analgesia? Do not include percentage sign in answer. Please answer in decimal format.

92.4

Q23

What is your labor epidural block replacement rate (percentage)? The labor epidural replacement rate should ideally be 3-6%. Do not include the percentage sign in your answer. Please answer in decimal format.

3.4

Q24

What is your institution's "wet-tap" rate (percentage) in the obstetric setting? Do not include the percentage sign in your answer. Please answer in decimal format.

1.5

Q25

What is your institution's "epidural blood patch (EBP)" rate (percentage) in the obstetric setting? Do not include the percentage sign in your answer. Please answer in decimal format.

0.6

Q26

How many labor and delivery rooms are in your obstetric unit?

10 L&D rooms (4 ICU-capable), 6 triage rooms

Q27

How many operating rooms are in/dedicated to your obstetric unit?

3

Q28

What American College of Obstetricians and Gynecologists (ACOG) level of maternal care (Level 1, 2, 3, or 4) is your institution? (https://www.acog.org/clinical/clinical-guidance/obstetric-care-consensus/articles/2019/08/levels-of-maternal-care)

Level 4

Page 5: Personnel and Staffing:

Q29

How many faculty in total cover the obstetric anesthesia service (day, night, weekends, and holidays)?

20 faculty

Q30

How many of the total faculty that cover the obstetric anesthesia service have completed an ACGME-accredited obstetric anesthesia fellowship, and/or have equivalent expertise and experience in obstetric anesthesia (e.g. specific training in obstetric anesthesia, several years of practice with a focus on obstetric anesthesia, and/or evidence of expertise based on academic contributions)? Please enter the actual number and the percent of total faculty.

8

Q31

On a daily basis, how many staff are assigned to provide dedicated coverage for the obstetric anesthesia service during the daytime?

*Attending physician:	**1-2 (1 always, 1 additional for fetal surgeries / very high-risk sections)**
Fellow:	**1-2**
Resident:	**2-3**
Certified Registered Nurse Anesthetists (CRNA) / Certified Anesthesiologist Assistants (CAA)	**0**
Other (specify):	**1 medical student**

Q32

On a daily basis, how many staff are assigned to provide dedicated coverage for the obstetric anesthesia service during the nighttime?

*Attending physician:	**1**
Resident:	**2**

Q33

On a daily basis, how many staff are assigned to provide dedicated coverage for the obstetric anesthesia service during the weekends?

*Attending physician:	**1**
Resident:	**2 (except 1 on Sunday overnights)**

Q34

Estimate the proportion of each shift covered by attending specialists vs. generalists (percentage). Please do not include the percentage sign in your answer. Please answer in decimal format.

Daytime	**100**
Nighttime	**40**
Weekends	**40**

Q35

Are all neuraxial procedures (spinal/epidural/combined spinal epidural (CSE)/dural puncture epidural(DPE)) in labor and operating rooms performed under direct supervision of the attending physician when performed by Fellow, Resident, Student Registered Nurse Anesthetists (SRNA) and/or CRNA?

Yes

Q36

*Outline the expertise and experience of the obstetric anesthesia lead. The obstetric anesthesia lead must be a board-certified physician anesthesiologist who has completed an ACGME-accredited obstetric anesthesia fellowship, and/or has equivalent expertise in obstetric anesthesia. If equivalent expertise, the basis for this must be clearly delineated (e.g. specific training in obstetric anesthesia, several years of practice with a focus on obstetric anesthesia, and/or evidence of expertise based on academic contributions). Please provide the curriculum vitae of the lead obstetric physician anesthesiologist with your application.

Dr. Jamie Murphy serves as our Chief of Obstetric Anesthesiology. Dr. Murphy has completed Obstetric Anesthesia fellowship training and dedicate 98% of her clinical, education, and research time to the field of OB Anesthesia. She is a well-regarded leader in the field, with national recognition in high-risk obstetrics and postpartum pain.

Dr. Murphy is currently on the board of SOAP and is heavily involved in inter-society collaborative efforts. Her external efforts mirror her internal efforts at our institution, where she works closely with L&D leadership and nursing leadership to provide outstanding world-class care to our patients.

Her curriculum vitae is attached.

Q37

*Provide evidence of ongoing participation in continuing medical education and professional practice improvement. The obstetric anesthesia lead and the majority of core faculty members need to show evidence of ongoing participation in continuing medical education relevant to the practice of obstetric anesthesia (e.g. SOAP membership, attendance at a SOAP conference or equivalent obstetric anesthesia-focused meeting at least every other year, and can provide examples of professional practice improvement or evidence-based updates to clinical practice).

Our division members and fellow are active members of SOAP and attend SOAP and or ASA conferences on an annual or biannual basis. In addition to presenting on average 5-10 posters annually, our members are actively involved in the SOAP community. Drs. Murphy, Isaac, and Berman are active members of SOAP committees. Drs. Murphy and Berman gave talks at the 2022 SOAP annual meeting, and Dr. Murphy serves on the board of SOAP. Dr. Berman also won the 2022 SOAP Educator of the Year award for junior faculty.

All of our members are actively involved in either research and publication (with original publication), resident education, quality and safety and/or simulation development and training as it pertains to obstetric anesthesia.

Q38

If applicable, please also outline efforts made to ensure continuing medical education for all non-core faculty that cover the obstetric service.

Once per quarter, our grand rounds is focused on an obstetric anesthesia-related topic. This could include a guest speaker (our currently-slated Abraham lecture is scheduled to be delivered by Dr. Klaus Kjaer, and recent speakers have included Drs. Medge Owen and Alex Buttwick), a quality assurance talk, or a divisional update.

Additionally, we maintain an active chat for all of our faculty who take OB call, both members of our core division and specialists, where we routinely discuss the latest guidelines and discussions.

Q39

Outline obstetric anesthesia-related staff meetings. Regular (e.g. every 1-2 months) staff meetings for obstetric anesthesia providers to provide clinical service updates and ongoing education is recommended.

The Johns Hopkins Hospital is an institution with quality and safety at its core. As the home of the Armstrong Institute for Patient Safety, we are at the forefront of assuring safety and clinical education.

Our division meets monthly during our structured QA/QI meetings, held once per month in lieu of grand rounds. We have shifted this meeting from an in-person meeting to Zoom to accommodate clinicians working at our various clinical sites as well as offsite fellows, and routinely provide updates to clinical workflow as well as the plan for high-risk upcoming cases. We also have dedicated time during the meeting to present recent cases and discuss their management.

Q40

*Outline your coverage model. In-house (24/7) coverage of obstetric patients, by at least one board-certified (or equivalent) physician anesthesiologist who is dedicated to cover the obstetric service without additional responsibilities for non-obstetric patients is emphasized. If a low volume center (<1500 deliveries per year), non-dedicated coverage with minimal additional responsibilities may be acceptable. If a very high volume center (>5000 deliveries per year), solo dedicated coverage may not be adequate unless there is a readily available physician anesthesiologist backup with adequate numbers of trainees/CRNAs to support the clinical load. If applicable, provide the full list of out-of-unit responsibilities, and the frequency at which faculty are called to complete these duties outside the obstetric unit.

Our labor floor is staffed by a 24/7 in-house anesthesiology team consisting of one board-certified attending anesthesiologist and at least one resident (but 85% of the time, with two dedicated residents - our L&D suite has two residents all times except Sunday). The team is dedicated to labor and delivery without non-obstetric patient responsibilities. This team has call rooms on the labor floor, and has the ability to call additional personnel from elsewhere in the hospital or home when necessary.

Q41

Outline your supervision policy. In academic centers that train residents or fellows, institutional policy should dictate that the physician anesthesiologist dedicated to the obstetric floor is present (regardless of the level of experience of the trainee) for placement and induction of neuraxial labor analgesia procedures with rare exceptions (e.g. simultaneous emergency), and should be present (regardless of the level of experience of the trainee) at induction and emergence from general anesthesia. For team-based (physician plus CRNA) care models, physician leadership and active medical management involvement is necessary. Evidence of physician contribution to education and training of fellow, resident, CRNA and Student Registered Nurse Anesthetist (SRNA) should be provided.

It is the expectation of our division that our faculty are present during placement of neuraxial analgesia regardless of the experience of the trainee, except for the rare circumstances outlined above (mostly during a simultaneous emergency, while backup is being mobilized).

Our divisional policy is that an attending anesthesiologist must be present during induction/intubation and emergence/extubation of pregnant patients regardless of other circumstances. This is reiterated and communicated with the residents on a regular basis, and is also included in their orientation materials presented at the beginning of their rotation.

We do not supervise CNRAs or SRNAs on L&D at JHH. Our SRNA program sends their trainees to our affiliate sites for experience in obstetric anesthesia, leaving our labor floor as an MD/DO-only environment.

Q42

*Outline your backup system. Ability to mobilize (within 30-minute timeframe) additional anesthesia personnel in case of obstetric emergencies or high clinical volume beyond the capacity of in-house staff assigned to the obstetric service is required.

Our institution is a level I adult and pediatric trauma center, a burn center, a STEMI receiving center, a comprehensive stroke center and performs cardiac and transplant surgeries. As such, we have a significant number of staff in-house and available in the event of an emergency. We have four in-house anesthesia residents in the general operating room team (CA1/CA2/CA2-3/CA3) who are available to come and assist during an emergency on labor and delivery. This is our first-line of additional help on L&D to assist when both of our dedicated residents are involved in patient care.

There are two residents on "jeopardy" home call (CA1 and CA2/3) who are expected to be within 30 minutes of the hospital. These residents are the next line of defense in the event of a critical staffing need.

Lastly, there are several home-call residents available (liver call, cardiac call, peds call) who are available to assist when the trauma operating rooms are busy and additional help is needed. There has seldom been a need for all these residents simultaneously, but our layers of backup call run quite deep.

We also have an additional anesthesiology attending in-house covering the main OR and traumas, as well as a central intensivist or airway attending in-house 24/7 and a cardiothoracic intensivist in-house 24/7. Most of our cardiothoracic intensivists are anesthesia-trained, with the exception of two cardiac surgeons with subspecialty training in critical care medicine. There is also an attending pediatric anesthesiologist in-house 24/7 one elevator away from L&D, as we are an ACS-verified Pediatric Level I trauma center. All told, on any given day, there are over 80 anesthesiology attendings in-house at Johns Hopkins Hospital - and overnight or on weekends, there are at least 4 attending anesthesiologists in-house at all times as well as two attending intensivists who are very likely anesthesia-trained.

Q43

Outline if anesthesia techs or equivalent are staffed on the obstetric unit. Describe their availability (24/7 or only daytime) and if anesthesia techs are dedicated to the obstetric service.

Our department has a plethora of anesthesia techs, as well as one of the only accredited anesthesia technologist schools in the country. This unique and innovative program is a collaboration between the Community College of Baltimore County and our department, allowing graduates to finish the program with an Associates of Applied Science degree and certification by the American Society of Anesthesia Technologists and Technicians (ASATT). Cost of the program is subsidized heavily for current Hopkins employees, allowing our patient care technicians or unit aides to attend our program and become successful anesthesia technologists. As such, our pipeline of anesthesia technicians is well-formed.

We have two in-house overnight anesthesia techs 24/7, who cover the adult operating rooms / pediatric operating rooms as well as L&D. During the day, our anesthesia technicians cover L&D as well as endoscopy.

Page 6: Equipment, Protocols and Policies

Q44

Outline your hemorrhage risk stratification algorithm and management protocol. Protocols should consider core elements of the National Partnership Obstetric Hemorrhage Bundle (1), California Maternal Quality Care Collaborative Obstetric Hemorrhage Toolkit (2), or comparable recommendations to manage obstetric hemorrhage.

We perform a hemorrhage risk assessment on every patient who enters our labor floor. In addition a CMQCC toolkit for the management of obstetric hemorrhage is available on the unit at all time.

Additionally, our obstetricians have created a hemorrhage cart which includes all of the surgical equipment necessary to reasonably handle a postpartum hemorrhage, either vaginal or cesarean. We have a backup system of gynecologic oncology surgery attending in the event of a complicated surgical patient, and have in-house trauma surgery residents and attending 24/7.

Q45

*Describe your massive transfusion protocol. Availability of a massive transfusion protocol with O-negative blood and other blood products, and an emergency release system for available blood is essential. Blood bank protocol needs to have been tested and be functional on the obstetric unit.

Our blood bank maintains an emergency release stock of 4 units of O-negative blood available in a refrigerator immediately next to our operating room suite on labor and delivery. This blood is available at all times on labor and delivery and checked daily by the blood bank service. Temperature in the refrigerator is monitored remotely by the blood bank team.

Additionally, our institution has a well-developed and tested functional massive transfusion protocol specific to obstetric patients. Given its status as a trauma, cardiac and transplant center the blood bank is fully functional 24/7 and capable of handling multiple ongoing massive transfusion protocols. We have in-house anesthesia technicians 24/7, who can courier the blood in a cooler from the blood bank (five floors down in the same building) directly to our labor suite and blood is available within minutes of notification to the blood bank for activation. Please see the attached TXA and massive transfusion protocols for more information.

The blood bank maintains a supply of 70-100 packs of platelets in stock, always maintains at least 6 units of thawed universal-recipient FFP and has approximately 1000-1200 units of PRBCs in stock at any given time. The institution also maintains banked PRBCs in deep freezer storage for our sickle-cell patients, with specific areas reserved for patients with multiple positive antibodies to store blood specific to their antibody status. This constitutes another approximately 1000 units of blood in frozen storage accessible in the event of an emergency.

All of our operating rooms also have tranexamic acid stocked in our in-OR Pyxis medication manager.

Q46

*Describe your rapid-infuser devices. Rapid-infuser device to assist with massive resuscitation (e.g. Belmont® Rapid Infuser, Level 1® Fast Flow Fluid Warmer) should be stored on the obstetric unit.

Our department shifted away from the Belmont rapid infuser device in 2018 due to the end-of-warranty period of our devices. We shifted towards a Thermacor device, a similar device with a higher maximum flow rate (1200 mL/min) and the enhanced ability to be brought on a standard OR pole. The device is also capable of battery-powered operation, in the event we are transfusing a patient and require transport to the IR suite or for further imaging.

Our Thermacor device is available immediately outside the operating room, in our anesthesia workroom. The device is checked by our anesthesia technicians daily, and the consumables are located next to the Thermacor itself. Each of our operating rooms also has at least one Ranger High-Flow fluid warmer for transfusion use as well as for use during fetal surgeries.

Alongside our Thermacor device is a pre-made pharmacy-prepared "liver tray" which includes large amounts of calcium chloride, epinephrine, sodium bicarbonate, and atropine for use during massive hemorrhage cases. These trays are restocked by pharmacy and checked daily by our anesthesia techs.

Q47

Outline how obstetric blood loss is recorded (quantitative versus estimated blood loss) and how the incidence of postpartum hemorrhage is tracked.

We utilize quantitative blood loss for all cesarean and vaginal deliveries. Our Neptune suction systems give a precise volume of suctioned blood, and this is tabulated at various points in the case (before uterine incision, post-placental delivery, at skin closure, etc) as well as weighed lap pads.

Our circulating nurses tabulate a running QBL, which is updated real-time in Epic. This running QBL is visible in the right-hand side of our Epic intraoperative screen.

Our institution utilizes a Tableau dashboard to track the number of deliveries associated with a blood loss of >500mL vaginally or >1L via cesarean section. This dashboard is available to all providers.

Q48

*Outline plans for difficult peripheral and/or central intravascular access, e.g. ultrasound and intraosseous kits available.

We have several different ultrasound devices available on L&D for difficult vascular access. We have two dedicated ultrasound towers (both Sonosite devices) and a variety of peripheral and central venous catheters available. We maintain a full set of central line supplies in our anesthesia workroom, including 9Fr 10cm introducer catheters, 16Ga 16cm single-lumen catheters, 7Fr 16cm triple-lumen catheters, and 8.5Fr RIC catheters. This is in addition to standard and elongated PIV catheters of all sizes.

All of our code carts contain an IO gun and needles of various sizes, and another IO gun is present in our workroom as well. Given the ubiquity of ultrasound for vascular access and the average skill of our residents with ultrasound-guided access, the placement of IO devices on labor and delivery is thankfully rare: despite this, all of our residents practice IO placement at least yearly during their structured didactic sessions.

Q49

Describe your point-of-care equipment to assess hematocrit and/or coagulation. Outline if thromboelastography (TEG®), thromboelastometry (ROTEM®), sonorheometry (QuantraTM) or other viscoelastic monitoring technology are available to guide management.

Our hospital maintains a critical care lab available for use 24/7. This lab runs all our specimens with minimal delay, and is able to run a blood gas with hemoglobin, lactate, and electrolyte levels within 5 minutes. The critical care lab is located three floors below the L&D suite, and specimens are either tubed or hand-carried to the lab for rapid processing. Our anesthesia techs or L&D techs will deliver labs for processing.

Additionally, this lab is able to run thromboelastography with a variety of different assays in order to assess hematologic function. We are capable of running standard Kaolin TEGs, heparinase TEGs, and rapid TEGs 24 hours a day, and can also run platelet function studies and platelet mapping when a perfusionist is in-house (24/7 while any ECMO circuit is running, which has meant 24/7 since at least 2017).

Q50

Outline availability of intraoperative cell salvage for patients who refuse banked blood, and/or during high-risk cesarean deliveries. How are patients who refuse blood transfusion identified prior to presenting for delivery, counselled regarding blood product options, and prepared or optimized for delivery?

Our center is a world leader in bloodless medicine services, as a result of the work of Dr. Steve Frank. He has published a number of blood management algorithms and programs to decrease the use of perioperative transfusion. Our bloodless medicine program is directed by Dr. Frank, a liver transplant anesthesiologist, and Dr. Linda Resar, a hematologist.

Part of this program includes antepartum bloodless medicine and obstetric anesthesiology consultation for patients who refuse blood transfusions or for whom blood products would be particularly difficult to crossmatch (such as our sickle cell population), and also includes the availability of cell salvage for patients who will accept it. In house perfusionist for cell salvage are available with less than 30 minutes' notice.

During our abnormal placentation procedures, we routinely employ the use of cell-saver technology to decrease the number of units transfused and the associated cost and complications. We employ the use of leukocyte filters to decrease the risks of cell saver during obstetric hemorrhage.

For more information about some of our institution's leadership in blood management and blood conservation strategies, see the publications below:

Sikorski RA, Rizkalla NA, Yang WW, Frank SM. Autologous blood salvage in the era of patient blood management. Vox Sang 2017;112(6):499–510.

Frank SM, Thakkar RN, Podlasek SJ, et al. Implementing a Health System-wide Patient Blood Management Program with a Clinical Community Approach. Anesthesiology 2017;127(5):754–64.

Hensley, N.B., Abeysiri, S. and Frank, S.M. (2022). Using Data to Support Patient Blood Management. In Practical Transfusion Medicine (eds M.F. Murphy, D.J. Roberts, M.H. Yazer and N.M. Dunbar).

Frank SM, Cushing MM. Bleeding, anaemia, and transfusion: an ounce of prevention is worth a pound of cure. Br J Anaesth. 2021;126: 5–9.

Guinn NR, Resar LMS, Frank SM. Perioperative Management of Patients for Whom Transfusion Is Not an Option. Anesthesiology. 2021;134: 939–948.

Frank SM, Pippa A, Sherd I ’shah, Scott AV, Lo BD, Cruz NC, et al. Methods of Bloodless Care, Clinical Outcomes, and Costs for Adult Patients Who Decline Allogeneic Transfusions. Anesthesia & Analgesia. 2022;135: 576.

Q51

Describe your hemorrhage quality assurance review process. Quality assurance review of all “severe” hemorrhage cases (defined at an institutional level, e.g. >4 unit blood transfusion) and all unplanned intrapartum hysterectomies should be in place so that opportunities for improvement can be identified and initiated.

Any "severe" PPH case triggers an automatic debrief from all of the involved parties, ideally within minutes of the patient reaching a stable and safe level of care. This debrief involves our nurses/techs, anesthesiologists, obstetricians, and any other physicians involved in caring for the patient. These debriefs are done in a constructive, non-threatening manner, and are meant to find areas for potential improvement and infrastructure changes to augment our already-excellent care. Notes from the debrief are then kept by nursing leadership and forwarded to our OB anesthesiology and L&D physician leadership for further review.

Severe PPH cases with areas for improvement are discussed at our monthly QUAC conference.

Q52

*Briefly describe and provide your institution’s obstetric hemorrhage toolkit (including protocols, checklists and/or algorithms).

Included in this application will be our institution's hemorrhage toolkit, protocols, checklists, and algorithms. Note that these protocols are concordant with CMQCC guidelines and the Joint Commission guidelines: all who work on the labor floor (from our surgical techs to our nurses and physicians) are required to undergo 2-hour mandatory training about hemorrhage algorithms and basic management steps.

These algorithms are also included on our postpartum hemorrhage cart. There are carts on labor and delivery, postpartum, and a "travel" cart used for deliveries in the ICU, main operating room, or emergency department.

Q53

*Outline your policies/procedures for suspected abnormal placentation (e.g. placenta accreta/percreta) cases. Describe the location (obstetric or main operating suite), staffing (e.g. obstetric anesthesia specialists), planning process (e.g. multidisciplinary meeting) and other considerations (e.g. blood management) for these cases.

Our institution is currently on track to perform approximately 40 accreta cases this year, and has historically done 20-50 of these cases per year. Over 90% of our cases are MFM-led, specifically by a small team of MFMs with significant surgical experience in peripartum hysterectomy. Our gyn/onc team is also on call 24/7 to assist our obstetricians.

For scheduled abnormal placentation cases, these patients are evaluated by the MFMs as well as by our team in clinic during our antepartum consultation clinic. We evaluate the patents and have a plan of care for their delivery, and will often establish multidisciplinary meetings if we are concerned about specific aspects of the case (bladder invasion, concern for bowel adherence, major vascular involvement with iliac vessels, etc). Our accreta volume is significant enough that we do not routinely perform multidisciplinary meetings for our standard accreta spectrum cases, as these are done with frequency.

For accreta/increta cases, >80% of scheduled cases are done on labor and delivery. This allows for proximity to NICU and the familiarity of our environment. For suspected percreta cases, we perform these in the main operating rooms so that interventional radiology can embolize in our hybrid OR: we also perform these cases in the main operating room for proximity to other surgical services, most commonly gyn/onc, urology, and general/trauma surgery.

From a blood management perspective, we will often utilize intraoperative cell salvage for these cases with a leukocyte reduction filter in place. When this is done, care is taken to transfuse in an appropriate ratio - maintaining as close to whole blood ratios as possible. Our accreta cases are done either fully awake, planned GA, or planned conversion after delivery once the diagnosis is confirmed: several factors determining which approach is utilized. These include patient factors (airway exam, concern for cooperation / ability to tolerate procedure, vascular access) as well as case factors and the setting.

Q54

Outline your difficult airway cart and supplies (laryngoscopes, endotracheal tubes, rescue airway devices (e.g. supraglottic airway device such as a laryngeal mask airway), video-laryngoscope and surgical airway equipment) that are stored on the obstetric unit.

Johns Hopkins Hospital developed the first-of-its-kind Difficult Airway Response Team in 2013, whose protocol is attached to this application as a PDF. In addition to a dedicated video laryngoscope and a wide variety of standard endotracheal tubes, LMAs and rescue devices, we also have a DART cart which includes a fiberoptic bronchoscope, a tracheostomy tray and equipment for jet ventilation in our operating room cluster on labor and delivery. This equipment is checked by our critical care technicians daily, and is dedicated for use on L&D.

Our pediatric anesthesiology colleagues established a pediatric DART program in 2018, who are pediatric-specific physicians (pediatric trauma surgery, pediatric anesthesiology, pediatric ENT) dedicated to the management of children with difficult airways. This team is occasionally activated as a part of the NICU response during difficult neonatal airways, either in advance (for EXIT procedures) or ad hoc.

For more information about our DART program, see here: Mark LJ, Herzer KR, Cover R, et al. Difficult airway response team: a novel quality improvement program for managing hospital-wide airway emergencies. Anesth Analg 2015;121(1):127–39.

Dalesio NM, Diaz-Rodriguez N, Koka R, Kudchadkar S, Mark LJ, Cover R, Pandian V, Tunkel D, Brown R. Development of a Multidisciplinary Pediatric Airway Program: An Institutional Experience. Hosp Pediatr. 2019 Jun;9(6):468-475. doi: 10.1542/hpeds.2018-0226. Epub 2019 May 14. Erratum in: Hosp Pediatr. 2019 Sep;9(9):741. PMID: 31088891.

Q55

*Describe if you have an obstetric-specific difficult airway protocol on the difficult airway cart and in obstetric operating rooms.

Our DART cart includes a variety of specific modifications for labor and delivery. This includes the presence of smaller endotracheal tubes and fiberoptic scopes, the presence of various intubating LMAs, and the ubiquity of video laryngoscopy available.

Unlike the main operating rooms where direct laryngoscopy is still the standard, our culture on L&D is to use video laryngoscopy as a first attempt. For patients with significant airway concerns we will perform awake fiberoptic intubations on L&D, but will avoid nasal intubation due to concerns for significant epistaxis associated with the mucosal changes of pregnancy.

Q56

Describe the availability of suction devices. Suction and a means to deliver positive pressure ventilation (e.g. bag-valve mask device) is required to be immediately available in readily accessible locations where neuraxial analgesia/anesthesia and/or general anesthesia are administered.

All of our operating rooms are supplied with suction and anesthesia machines as well as bag valve mask devices to support positive pressure ventilation. In addition our labor suites and triage rooms have a dedicated anesthesia suction setup, as well oxygen supply line with bag valve mask device to support positive pressure ventilation and suction.

Additionally, our code carts are equipped with portable suction machines. We have a code cart in our PACU, our OR cluster (next to our DART cart), and in a central location on our labor floor.

Q57

Describe your in-house backup plan to provide personnel with surgical airway access skills if needed 24/7.

Our DART team is easily activated with a call to the operator, and immediately broadcasts a page to the rest of the anesthesiology team in-house, the trauma surgery attending and senior resident, the in-house ENT resident, and the in-house central intensivist. These physicians all respond to the call for a difficult airway, and ENT or trauma surgery are both capable of providing a surgical airway if that is necessary.

We also have a pDART (Pediatric DART) team who respond to difficult intubations for neonates. See the description of the team in a prior question above.

Additionally, all of our anesthesia residents undergo yearly training in percutaneous surgical airway approaches and we maintain this kit in every operating room at Hopkins.

Q58

*Outline your lipid emulsion availability, appropriate supplies, and protocols that allow a timely response to local anesthetic systemic toxicity.

Lipid emulsion is stocked in our workroom for immediate use. We maintain two 500mL bags for use as a bolus and infusion.

Protocols for management of LAST are attached to our carts which contain our neuraxial kits. These protocols include the standard LipidRescue protocol published by ASRA.

Q59

Outline your malignant hyperthermia protocol. Dantrolene formulations and sterile water vials, along with other supplies must be available to allow a timely response to malignant hyperthermia.

Our anesthesia workroom on labor and delivery is stocked with an MH response kit. This includes cooled saline, dantrolene vials (ryanodex), and carbon filters for immediate application.

Our OR pxyis contains all of the medications required to maintain total intravenous anesthesia during an MH emergency, and our workroom is also stocked with two arterial line setups (checked daily and replaced every 3 days by our anesthesia technicians).

Dr. Berman (one of our core OB anesthesia faculty) is also a consultant for the MH Hotline (MHAUS), and takes 4 weeks of MH hotline call per year. He routinely performs anesthetics for our MH-susceptible cases presenting to Johns Hopkins, including several recent notable pregnant patients.

Q60

Outline cognitive aids and training resources. Provide evidence for cognitive aids and clinician awareness of resources to manage emergencies, and training to facilitate team member awareness of the location and means to retrieve resources to better manage emergencies.

We have a number of cognitive aids attached to our anesthesia machines and epidural carts. These include standard management of local anesthetic toxicity, malignant hyperthermia and cardiac arrest in pregnancy. We routinely review these protocols with our residents when they rotate with us.

Additionally, there are cognitive aids for these and other emergencies present on all our code carts throughout the labor suite. Our electronic medical record also includes decision support algorithms accessible in one click from the intraoperative anesthetic record, with drug dosages calculated from the patient's dosing weight.

Lastly, we perform in-situ simulation with regularity, in order to simulate an interdisciplinary response to a rare but critical scenario. Recent drills have included amniotic fluid embolism, uterine inversion, and cardiac arrest in pregnancy.

Q61

*Outline availability and usage by obstetric anesthesia providers of ultrasound devices for peripheral and central intravenous access, neuraxial blocks, regional blocks (e.g. transversus abdominis/quadratus lumborum/erector spinae), and point-of-care evaluations (gastric, airway, lung, and cardiac).

Our department's requirement is that ultrasound be utilized for the performance of central venous access. This is universally followed and routinely tracked as a compliance metric. Our faculty and residents are facile with ultrasound-guided peripheral venous access.

Our residents and faculty get significant experience in truncal blocks, and the majority of our core faculty and call-taking generalists are comfortable with regional anesthetic interventions for post-C/S pain. If difficult to perform or the physician is not comfortable doing so, a regional anesthesiologist is available during the day and from home call on nights/weekends for assistance.

Our residents receive twice-monthly structured POCUS didactics, and several of our faculty have received advanced trained in ultrasound as well. Dr. Berman is certified by the National Board of Echocardiography, and many of our intensivists are as well.

Q62

*Describe systems in place to ensure inter-professional communication and situational awareness on your obstetric unit such as: board sign-out at each shift change of anesthesiology staff; pre-procedural timeouts; post-procedural briefings, as indicated; daily multidisciplinary rounds or huddles to discuss management plans for patients on labor and delivery, antepartum and postpartum.

Every change of shift, our anesthesiology staff signs out every patient. After this occurs, we attend a multidisciplinary signout with the outgoing and incoming teams from OB anesthesiology, L&D, and nursing teams. We discuss all patients on the labor floor, all "coming ins", any antepartum or postpartum complicated patients, and all patients who are admitted to other services who are pregnant or recently delivered.

Additionally, we employ routine huddles during times of clinical overflow or high-risk patients: these "MedTeams" are announced via our phone/Epic messaging system, and consists of the nursing, OB, and anesthesia teams joining together to prioritize and practice a shared mental model.

Before every procedure (with the exception of "level red" or stat procedures), we have a multi-disciplinary huddle with the involved physician and nursing teams caring for the patient.

Q63

Outline how timeouts are performed prior to all anesthetic interventions.

Prior to entering the OR with non-emergent procedures, we perform an interdisciplinary huddle with the nursing and surgical teams as well as our team. The expectation is that the huddle includes all who will participate in the procedure - attendings, residents, and nurses/techs. These huddles are led in a structured manner by the primary nurse taking care of the patient, and include a cognitive aid so that common safety areas can be covered (uterotonic contraindications, plans for magnesium/insulin post-delivery, key hemorrhage management specific to the case/patient, etc) as well as the patient's history, the anesthetic/surgical plan, and the plan for post-procedural analgesia.

Upon entering the OR with the patient or prior to performing a neuraxial labor analgesic procedure, we perform a time out (with computer verification using a barcode scanner) before every procedure, and verify patient identification, allergies, relevant medical conditions and labs, as well as the intended procedure prior to proceeding. Additionally, we review anticoagulation plans with the patient and bedside nurse as well as recent thromboprophylaxis medications prior to proceeding with neuraxial anesthesia.

Q64

Outline evaluations by the anesthesiology service of: 1) all patients undergoing scheduled cesarean delivery and other obstetric-related surgeries, and 2) the vast majority of patients presenting to labor and delivery. Patients presenting to labor and delivery should be triaged, and/or evaluated by the anesthesiology service soon after admission.

All pregnant women undergoing cesarean or other obstetric surgeries are evaluated by our team on arrival to the labor floor, and a pre-procedure evaluation is placed into our EMR in real time during the patient interview.

If women present to L&D in labor or for admission, our team sees them within 30 minutes of presentation to L&D in order to perform an evaluation and write a pre-procedure evaluation. We believe strongly that evaluating all patients prior to presentation is an important safety step to identify patients at risk for decompensation, those with challenging airways, and those for whom anticoagulation plans need to be coordinated with our OB colleagues.

Q65

Outline the system in place to screen and identify all high-risk patients. Discuss early anesthesia evaluation of high-risk antenatal patients prior to admission for scheduled surgery or labor and delivery (e.g. high-risk anesthesia clinic).

Our division runs a high-risk antepartum clinic service known as the Center for Peripartum Optimization. This center addresses all patients with high risk maternal diagnosis or concerns for previous or anticipated anesthesia complications. We maintain a list of high-risk conditions that serves as a referral guide for providers to direct referral of patients into the clinic in a timely manner. This center is staffed by an OB Anesthesiologist as well as an OB Anesthesia fellow 3 times a month, and averages up to 12 new patient consultations per day.

Our obstetrics colleagues also meet twice-monthly to discuss upcoming high-risk cases on Wednesday afternoons, and include representatives from our team in these discussions. This allows us to have an impromptu multidisciplinary meeting on a multitude of our patients and discuss their status as their pregnancy progresses.

Q66

*Describe the availability of surgical backup. Surgical backup (e.g. trauma and/or gyn-onc surgeons) must be available, ideally 24/7 and in-house.

We have 24/7 in-house trauma surgery staffed by a fellowship-trained trauma surgery attending. There is a second trauma surgeon on home call who is available within 30 minutes of alert.

Additionally, gyn-onc is available in-house during the day and on call from home at night.

Q67

Outline your protocol or pathway to activate interventional radiology.

Our interventional radiology residents are on in-house call 24/7 and are frequently used due to our standing as a level I trauma center. They are available by page, and perform in-person consutations within minutes of notification.

Our IR suites are located next to our trauma ORs, and are available with 24/7 IR and Anesthesiology staffing for any obstetric emergency.

Q68

Describe the intensive care units available to receive obstetric patients (e.g. expertise, proximity to the obstetric unit and capacity).

Johns Hopkins hospital has 2 surgical ICU's,1 medical ICU, 1 CCU (Coronary Care Unit), 1 Progressive Cardiac Care Unit (PCCU), 1 Cardiac Surgical Intensive Care Unit (CSICU), 1 Neuro Critical Care Unit with step down (NCCU) all available and capable of caring for obstetric patients. These units are closed units with specialized providers and nursing staff capable of caring for OB patients. In addition, the labor and delivery staff (OB, anesthesia and nursing) closely coordinate with those providers to provide comprehensive care for mother and baby in those units.

We have operating rooms directly communicating with all of the above ICU's and private ICU rooms. For instance, our cardiac operating rooms are located on the same floor as our cardiothoracic ICU and our neurological operating rooms are on the same floor as the NCCU. We are capable of performing emergency C-sections within minutes of all ICU locations and all rooms are equipped to allow for vaginal deliveries if necessary.

Our ICUs are centered in the same building as our labor and delivery suite, with the exception of our of our surgical ICUs which is one building away.

Q69

Outline the qualifications of nursing staff who provide post-anesthesia care in the obstetric unit and describe their competencies to recover surgical patients from both neuraxial and general anesthesia.

Our PACU is on the labor and delivery suite within immediate approximation to our labor and delivery OR's. All labor and delivery nursing staff are PACU and ACLS certified and qualified to recover surgical patients. All PACU's and nursing staff meet AWOHN standards of care.

Q70

*Describe your obstetric emergency response team and policy. Outline obstetric conditions and/or vital sign parameters that warrant activation, the means of notifying all members of the response team, and the approach for including anesthesiologists in the response to obstetrical emergencies such as hemorrhage, severe hypertension and non-reassuring fetal heart rate.

Labor and delivery is staffed 24/7 with an OB rapid response/STAT team. We have the ability to activate an "OB STAT TEAM" page which reaches the phones of all the medical staff on L&D. There is a list of cases necessitating this activation available at our nursing station.

Our OB Stat team policy and a list of personnel and their responsibilities is attached.

Q71

*Outline your simulation drills and training.

Our labor and delivery team runs yearly multidisciplinary simulation drills for maternal arrest, hemorrhage, stat cesarean delivery, shoulder dystocia, difficult intubation and neonatal arrest. These simulations are run as live unscheduled drills on the unit as well as planned events in the simulations center. These simulations take place several times a year to ensure that rotating staff are all experienced in the above scenarios.

Additionally, our anesthesiology trainees undergo a rigorous simulation curriculum throughout their residency as a part of our "college day" program. Every other Thursday throughout their residency, our residents are excused from clinical duties and participate in simulation, hands-on demonstrations, cadaver labs and case discussions. Our obstetric anesthesia faculty are among the educators for our college day curriculum and specific obstetric emergency scenarios including failure to intubate, hemorrhage, and seizure are included in the curriculum.

Q72

Outline the percentage of anesthesiology faculty (who cover obstetric anesthesia call), obstetricians, nurses, and other personnel who have participated in obstetric simulation (or inter-professional team training) in the last five years. _____%

All of our nurses have undergone simulation center within the last year, as a requirement for credentialing.

The vast majority of our obstetric anesthesiology faculty participate in some sort of simulation experience or inter-professional team training at least yearly, but it is difficult to coordinate a time for all of us to be available given the difficulty in staffing requirements for our various campuses and clinical duties. COVID has made this especially difficult, with a significant number of our faculty participating in the institutional effort by working as intensivists or on various mobile procedure teams during COVID surges.

Q73

Describe simulation training scenarios practices and compliance with The Joint Commission (JACHO) requirements for obstetric hemorrhage and preeclampsia simulations. (https://www.jointcommission.org/standards/r3-report/r3-report-issue-24-pc-standards-for-maternal-safety/#.YofbDHbML-g)Physicians providing obstetric anesthesia should participate in at least one simulation drill every five years. An active multidisciplinary program with obstetric and anesthetic emergency simulation drills (e.g. emergent cesarean delivery, maternal cardiac arrest, difficult/failed intubation, obstetric hemorrhage, and eclampsia) is preferable. Simulation drills for anesthesiology providers only may be acceptable, if no formal multidisciplinary program exists, or to supplement pre-existing drills.

Our obstetricians and core OB anesthesia faculty participate in these simulation drills. It is our goal to include all call-takers in these simulations as well, and we are nearing 100% compliance.

Our anesthesiology residents all participate in these simulations twice per year as part of their College Day protected educational time, which happens every other Thursday.

Q74

Describe your ability to provide anesthesia care for postpartum tubal ligation procedures within 24 hours of delivery, and urgent cerclage placement within 12 hours of surgical request. Outline policies/procedures to ensure postpartum tubal ligation are prioritized and performed in a timely manner as per ACOG recommendations. https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2021/06/access-to-postpartum-sterilization

Our labor floor maintains a case "leveling" system - whereby cases are color-coded based on urgency. Elective procedures are "green", procedures which should be performed within eight hours are "yellow", procedures performed within 30 minutes are "orange", and STAT procedures are "red".

Tubal ligation procedures are considered orange procedures. This means that they take priority over elective sections or non-elective, level-yellow procedures. Cerclage procedures are generally level yellow procedures, and are therefore performed as soon as an OR is available and the patient is appropriately NPO.

Q75

*Outline options for an additional operating room (with nursing/tech/obstetric and anesthesiology personnel) that is available at all times for emergency obstetric procedures (if all obstetric unit operating rooms are occupied).

We have three operating rooms on the labor floor, and do not run more than two elective procedures simultaneously. In the rare event that this does occur and the third room is occupied, we will call the trauma operating rooms and place a hold on one of our trauma OR suites with a full anesthesia/nursing/OR tech team until an L&D OR is available.

Additionally, when all three ORs are in use, it is standard procedure to pause all oxytocin infusions on all laboring patients and delay artificial rupture of membranes in any laboring women until an operating room in our suite is cleaned and ready for use.

Q76

Describe your ability to provide invasive monitoring and other advanced management techniques for high-risk patients on the obstetric unit, including arterial lines, central lines, cardiac output monitoring, and transthoracic/transesophageal echocardiography.

Four of our labor and delivery suites are equipped with ICU-level monitors capable of monitoring invasive pressures and measuring cardiac output. These rooms also have remote monitoring via telemetry capability.

Our dedicated anesthesia ultrasound has a TTE probe and is located in our anesthesia workroom. Cardiology is in house 24/7 for emergency TTE as well as consultation. Our cardiac anesthesia team is in-house during the day and on home call at night, and are TEE certified. Our TEE machines are housed in the same building as our labor floor, several floors below our suite.

Dr. Berman is certified by the National Board of Echocardiography TEE certification as well.

Q77

Outline your management of patients who need vasoactive drug infusions, intensive care or cardiac care, and/or additional monitoring requirements (e.g. monitored bed, telemetry).

Our labor and delivery unit has four telemetry monitored beds. Per nursing protocol basic vasoactive drug infusions (including nicardipine) are managed on labor and delivery. Advanced resuscitations, ICU level care, cardiac care and additional vasoactive infusion and monitoring requirements are managed in one of our 7 ICU's. We have attached our vasoactive drug policy for reference.

The hospital is staffed 24/7 with a rapid response team that is responsible for aiding in the escalation of care of all patients (including obstetric patients) to ICU's or step down units. In addition, we have a "central intensivist" who is a board-certified anesthesiologist or surgeon with critical care training in-house 24/7 for immediate consultation if needed.

Q78

Outline your approach to educating expectant people, patients and families.

We routinely perform consultations by request of our obstetricians. Our website is available, and we have a multitude of patient education materials produced by SOAP available for our patients to read.

Additionally, our labor floor runs tours multiple times per month for expectant patients and their partners. If questions related to anesthesiology services arise, they are answered by our anesthesia clinicians on L&D.

Q79

Outline your approach to educating nurses, obstetricians and other healthcare providers.

We have semiannual L&D town halls, where interdisciplinary discussions between all of our providers are held. These include protocol changes, changes to equipment, or new initiatives.

Q80

Outline your approach, if applicable, to educating obstetric anesthesia training for residents, fellows, CAAs, and/or SRNAs.

Our residents undergo two months of OB rotation in addition to their experience on "night float" and taking weekend OB call. We have a standardized curriculum for our residents, and are one of the founding centers of the WikiAnesthesia project. Our residents are given a thorough series of educational handouts and have several textbooks and guides immediately available to them. In addition, we have recently rolled out a pocket OB anesthesia card modeled after the UCSF guide.

Our OB anesthesia fellowship is a competitive, sought-after experience training two ACGME-approved fellows annually. These fellows get training in comprehensive management of high-risk parturients, anesthetics for fetal interventions, and in the "softer skills" of being an attending anesthesiologist such as supervising trainees and performing QA/QI work. They also undertake a scholarly project as part of their fellowship. As a testament to our fellowship's success, our division (or our affiliate hospitals) currently employ the vast majority of our fellowship graduates from the last decade.

Q81

*Outline the initiatives that you have done at your institution to better meet the needs of patients from the most prevalent racial and ethnic minority group(s) that your facility serves (e.g. implicit bias training of healthcare providers; provision of health educational resources for non-English speakers). Describe efforts to promote diversity, equity and inclusion of your workforce (e.g. support pipeline programs for groups underrepresented in medicine; diversity, equity and inclusion hiring/promotion practices; microaggression and bystander response training; mentorship/sponsorship of individuals from groups underrepresented in medicine and female trainees and faculty).

Our institution has a mandatory training on language interpretation availability, and has video remote interpreters available in every patient care area. We take care of patients with a variety of language or verbal communication-related difficulties, and strive to do so with sensitivity and dignity. We also undergo implicit bias training yearly, and are starting an initiative to undergo a three-part implicit bias training specifically for labor and delivery. This training includes a self-paced March of Dimes-produced course as well as two courses specifically addressing disparities in maternal care.

Our department is a leader in the promotion of Diversity, Equity, and Inclusion. Dr. Michael Banks serves as our Vice Chair for DEI, and Dr. Katie O'Conor serves as our Chief Diversity Officer. Dr. Banks routinely attends SNMA career fairs, and attends recruitment events for historically Black colleges and universities with medical schools. We strive to have a workforce that mirrors the patients we see, and are proud to be a female-run, female-heavy division with URM faculty as well. Our institution (at all levels) is strongly motivated to hire the best and most diverse candidates, and has several initiatives specifically geared towards the promotion of women in medicine. Additionally, our department recently underwent a salary assessment to uncover disparities in physician salaries across gender, and the gender wage gap was under 2% adjusted for years of service. This is a remarkable accomplishment in academic medicine.

Page 7: Cesarean Delivery Management

Q82

*Outline, describe, and provide your enhanced recovery protocol as defined by the SOAP Enhanced Recovery After Cesarean (ERAC) Consensus Statement (3). A standardized enhanced recovery protocol or clinical care pathway that is utilized by the institution and all obstetric anesthesia providers is an essential element.

Our ERAS after C/S protocol is concordant with what is described by SOAP's 2021 statement, and our ERAS protocol has been rolled out for approximately 1.5 years after buy-in from the obstetricians, nurses, and our anesthesia group.

Antepartum, we begin by providing patients with skin-cleansing wipes for their abdomen, encouraging carbohydrate-rich clear liquids until 2 hours prior to procedure (or low-carb Gatorade G2 if diabetic). We are aggressive about iron supplementation for patients with documented iron-deficiency anemia on 28-week labs, with either PO or IV iron. We assure bloodless medicine consultation for patients who decline blood product administration.

Intraoperatively, we administer multiple antiemetics of different classes in addition to performing spinal or CSE with low-dose IT/epidural morphine. We administer multimodal analgesic therapy in the OR, with IV acetaminophen and ketorolac prior to skin closure. Prophylactic phenylephrine infusions are utilized in all cases, except for patients with severe cardiac disease where our pressor of choice depends on their cardiac condition but often is norepinephrine for maintenance of cardiac output. We also maintain normothermia with warmed blankets and by increasing the OR temperature, and routinely place EKG leads in a position to be able to facilitate skin-to-skin and breastfeeding in the OR.

Our other perioperative management strategies include limiting exogenous IV fluid administration outside of cases of obstetric hemorrhage, and encouraging early PO hydration both preop and postop. We encourage early ambulation for both fluid mobilization and DVT prophylaxis. We maintain patients on scheduled acetaminophen and ibuprofen around the clock as well as PRN oral opiates, and our OB anesthesia team is responsible for all pain control needs during the patient's first 24 hours after surgery.

We do not routinely perform truncal nerve blocks for patients who are not on chronic opiate therapy or receiving other therapies for chronic pain unless they did not receive neuraxial morphine.

Q83

*Outline your routine utilization of a pencil-point needle, 25-gauge (or smaller) for the provision of spinal and CSE anesthesia for cesarean delivery.

We routinely utilize either 26-gauge Gertie Marx needles or 25-gauge Whitacre needles for spinal anesthesia. We stock larger needles (25ga cutting, 22ga pencil-point, 22ga pencil-point, 20ga pencil-point) but they are seldom used.

For our higher-order repeat cesarean sections, those who are morbidly obese and those with multiple prior abdominal surgeries, we perform a combined spinal-epidural technique using a 26-gauge Gertie Marx needle. Given our patient population (higher-order cesarean sections, morbidly obese, and patients with multiple prior abdominal surgeries make up the majority of our cesarean deliveries), a significant percentage of our cesarean deliveries are performed using the CSE technique.

Q84

*Describe your approach and outline policies and/or protocols to prevent and/or treat insufficient anesthesia or intraoperative pain during cesarean delivery. Outline how neuraxial block are tested prior to incision and strategies/protocols used to ensure blocks are adequate for surgery. Outline strategies/protocols to treat intraoperative pain, and describe the follow-up for patients that experience intraoperative pain.

Recent literature has shown that there is likely a subset of patients in cesarean deliveries who have undertreated pain in the operating room, likely a combination of avoidance of GA (for fetal and neonatal reasons) and cultural reasons (pressure vs. pain sensations, racial and ethnic biases in care). We are committed to making that happen as infrequently as possible.

For scheduled cases, our anesthesia team checks the block level before final abdominal prep using either a toothpick or a blunt needle. After skin prep, our OB team performs a further skin check with an Alais clamp at the level of the incision and subsequently supraumbilically before proceeding. For cases with an existing epidural in place, the same routine is followed after sequentially bolusing the epidural catheter.

For emergent (stat) cesarean sections, we will often prep and drape prior to a level being established. The OB team will perform an Alais test when prepped and draped, and we will often perform a simultaneous pinprick check prior to incision. If the level is clearly inadequate, we proceed with induction and intubation.

As part of our preoperative consent process, we attempt to set the expectations with patients before entering the operating room. We reassure patients that while they will not feel sharp pain, there are aspects of the procedure which will result in significant but short-lived pressure.

In the case of breakthrough pain, our anesthesiologists will routinely administer IV opiates, small doses of IV ketamine or midazolam, and nitrous oxide by face mask in addition to epidural local anesthetics and opiates. For cesarean sections which have lasted approximately 1 hour of operative time, we routinely test dose our epidural catheters and begin dosing them (usually with a 2% lidocaine with epinephrine infusion at 5-8mL/hr) prior to the recession of our spinal anesthetic and the onset of pain.

Q85

*Outline your post-cesarean delivery analgesic protocol. Analgesic protocols should include low dose long-acting neuraxial opioid (such as 100-150 mcg intrathecal morphine or equivalent long-acting opioid, or 2-3 mg epidural morphine or equivalent long-acting opioid), and supplemental multimodal analgesics (ideally scheduled non-steroidal anti-inflammatory drugs and acetaminophen).

As described in the ERAS section, we routinely administer low-dose IT/epidural morphine in the doses suggested above, usually 100-150mcg spinal and 2-3mg epidural. We begin IV acetaminophen and ketorolac in the operating room, and patients are scheduled to receive around-the-clock ketorolac/ibuprofen and acetaminophen postpartum in addition to PRN opiates.

Our affiliate hospital, Johns Hopkins Bayview, has one of the leading centers for women who have substance use disorders coincident with their pregnancy. This center, the Center for Chemical Addiction in Pregnancy, is world-renowned for providing these patients with housing, social support, counseling, and close MFM follow-up as well as addiction psychiatry services. These patients are often transferred to JHH for delivery, necessitating a comprehensive pain management plan. These plans often include the medications described above, non-neuraxial rescue medications (gabapentin, ketamine), truncal blocks or thoracic epidural / ESP catheters, lidocaine patches, and supplemental IV opiates if necessary. This plan is discussed with the NICU team as well, given the potential for significant impacts on lactation.

Q86

Describe your ability to provide local anesthetic wound infusions or regional nerve/fascial plane blocks when appropriate. Are regional blocks performed by obstetric anesthesia providers or the acute pain/regional anesthesia service?

Most of our core OB anesthesiologists feel comfortable performing single-shot truncal blocks. For patients with complex anatomy or the handful who do not, our regional anesthesia service is readily available to perform single-shot blocks. We rarely use wound catheters given infection concerns, though we understand these have been well-utilized in other centers without a high incidence of this potentially devastating complication.

As described above, we routinely do not perform truncal blocks in all-comers unless the patient did not receive neuraxial morphine. For patients who had planned GA sections, we will often do truncal blocks pre-emergence.

If neither of these options is available (no comfortable provider and the patient cannot get neuraxial anesthesia), the obstetrics team will infiltrate bupivacaine above the fascia and subcutaneously. The literature seems to show this approach is non-inferior to TAP blocks with equal volumes of local anesthetic in non-chronic-pain patients, and therefore while not ideal, it is certainly an improvement over no local anesthetic given in the abdomen.

Q87

*Outline institutional efforts to minimize opioid usage, such as limiting rescue opioid doses (e.g. <30 mg oxycodone/24 hours), non-opioid rescue analgesic options (e.g. transversus abdominis plane blocks, gabapentin), and efforts to limit the number of opioid tablets (e.g. 10-20 tablets) prescribed on discharge.

Our ERAS protocol includes 5-10mg oxycodone every 4 hours PRN, and the NICU is notified of total maternal oxycodone dose per day as part of their signout. Our OB anesthesia team sees all patients postpartum and therefore can adjust pain regimens as necessary.

Given the ongoing opiate crisis and data for substance use contributing to late maternal mortality, our obstetricians and our team are motivated to decrease opiate prescribing postpartum. Our OB team routinely administers a 5 days' supply of opiate tablets postpartum, with the expectation that a patient will follow up for care within that time if still in severe pain. Patients are routinely discharged with single-digit numbers of opiate tablets, and this metric is closely tracked. For patients on chronic opiate therapy, they are encouraged to follow up with our pain clinic: Johns Hopkins has established a well-supported clinic for post-surgical discharge pain management in patients on chronic pain medications, and will see these patients for up to 3 months after discharge. This clinic is managed by one of our regional anesthesiology colleagues, Dr. Marie Hanna.

Q88

Describe your standardized protocol or plan of action to manage patients with opioid use disorders, and/or chronic pain.

As described above, we see a significant number of these patients. They pose a challenge to our traditional pain management paradigm, as their opiate responsiveness is often vastly different from the expected opiate-naive patient. Alongside these patients' medical conditions is often the social complexity of opiate use disorder as well as the stigma these patients often face when presenting to care. We strive to treat these patients with the respect they deserve.

Patients with chronic pain or substance use disorders are often followed in our CAP (chemical addiction in pregnancy) program headquartered at our affiliate site Johns Hopkins Bayview. They deliver either at Bayview or JHH, but regardless of the site of delivery, we attempt to treat their pain to the best of our ability. We administer all of the medications for our standard ERAS protocol, but also offer truncal nerve blocks, thoracic epidural catheters / ESP catheters, ketamine infusions, IV opiate PCA, lidocaine patches, supplemental non-opiate therapy (gabapentinoids), and wound infiltration. We will often co-manage particularly complex patients with the acute pain service as well.

Above all else, the literature is clear that these patients develop a distrust of the healthcare system as a result of the sense of judgment and prejudice they receive when presenting for care. We try our hardest to make their labor and delivery experience a positive one with nonjudgmental regard, and treat opiate or other substance use as any other chronic medical condition.

Q89

*Outline strategies to prevent maternal and fetal intraoperative hypothermia, e.g. active warming, warm intravenous fluids, appropriate ambient delivery/operating room temperature. Active warming and a standardized minimum operating room temperature of at least ≥73oF (22.8oC), and/or operating room temperature based on gestational age for cesarean delivery is recommended.

Birthing persons are provided with warm blankets after neuraxial anesthesia is performed. Our operating room temperature is adjusted based on gestational age - 73º for term parturients and 78º for preterm.

Due to Joint Commission concerns about fluid storage in our warming cabinets (they require dating and timing and should only stay in a warmed environment for 72 hours according to our simulated audit), we routinely store our IV fluids at room temperature. However, in a hemorrhage scenario, we routinely warm our fluids and blood products using the fluid warmers described above.

For GA sections, a forced air warmer is applied on the upper body. For cases where maintenance of temperature is key (fetal surgeries, accreta spectrum), we will also use a lithotomy underbody warmer. We have tried using a forced air warmer during neuraxial sections, but it interferes significantly with maternal ability to breastfeed in the OR or perform early skin-to-skin.

Q90

Describe your approach to the measurement of maternal temperature during general and neuraxial anesthesia.

During neuraxial anesthesia, we rely mostly on warming blankets and increasing the ambient temperature of the room: patients' temperatures are measured preoperatively as well as in the PACU. While some providers utilize an axillary temperature probe, it underestimates body temperature when the arms are extended: temperature-sensing foley catheters are similarly no reliable when the bladder is exposed to air during a cesarean delivery.

For general anesthesia cesarean sections, we routinely place an esophageal temperature probe after intubation: while we try to avoid airway trauma, we also strongly discourage the use of nasal temperature probes to avoid epistaxis. For these cases, we use an upper body forced air warmer.

Q91

*Describe your antibiotic prophylaxis protocols, specifically how the following are ensured: timely administration (prior to skin incision) of appropriate antibiotic(s); implementation of a weight-based dosing approach; implementation of an appropriate re-dosing strategy; identification of alternatives if allergies known/detected; and consideration of additional antibiotics for high-risk patients.

We administer cefazolin (2g or 3g for >100kg) prior to incision, and azithromycin 500mg if the patient is determined to be laboring regardless of membrane rupture. For patients who are penicillin-allergic (with hives or anaphylaxis), we administer clindamycin 900mg and gentamicin. Our gentamicin doses vary by renal function and indication for antibiotic prophylaxis (chorioamnionitis vs. surgical infection prophylaxis), but we routinely administer 5mg/kg daily dosing.

Cefazolin is reduced either every 4 hours or every 1500mL blood loss. The other antibiotics are generally not redosed more than every 6 hours for clindamycin (adjusted for renal function) and 12-24 hours for gentamicin (for 2mg/kg and 5mg/kg respectively, similarly adjusted for renal function).

Q92

Outline which antibiotics are stored in the operating room for emergency cesarean deliveries, and describe how additional antibiotics are acquired urgently from pharmacy.

Cefazolin vials, gentamicin vials, clindamycin bags, and azithromycin vials are all stored in our OR Pyxis. For emergencies, we make up our own antibiotics and administer them as appropriate (slow IV push for cefazolin, IV infusion over 30-60 minutes for clindamycin/gentamicin/azithromycin).

For non-emergent cases, we prefer to have pre-mixed pharmacy-prepared medication bags to decrease the risk of drug swaps or dilution errors. Specifically for high-risk drugs such as gentamicin, the ototoxicity associated with rapid administration is a well-known phenomenon: we therefore encourage the use of premade bags and running the infusion on a pump.

Q93

*Outline your standardized approach to prevent and treat hypotension after spinal anesthesia. Ideally, prophylactic infusion of phenylephrine to maintain blood pressure within 10% of baseline, with boluses of phenylephrine and ephedrine as appropriate to treat hypotension, as well as intravenous fluid pre-load or co-load during spinal or CSE anesthesia should be utilized.

As part of our ERAS pathway, phenylephrine is utilized as our vasopressor of choice in spinal / CSE-mediated hypotension. We start our infusion at 50mcg/min and cycle our cuff Q1 minute immediately upon spinal injection, and titrate to maintain a blood pressure within 10% of the patient's baseline BP. We encourage vigorous PO hydration prior to the procedure, but will often co-load patients with a small volume of crystalloid after spinal injection to assure adequate blood pressure alongside our phenylephrine infusion.

For patients with severe cardiac disease, we will often change our vasopressor strategy to account for their cardiac lesions. For patients where negative inotropy may be harmful, or patients for whom beta-agonism might be of benefit, norepinephrine is our vasopressor of choice. For patients with severe decompensated heart failure, milrinone / vasopressin is an excellent combination, as is low-dose epinephrine in combination with a slowly-dosed epidural: these decisions are made on a case-by-case basis in discussion with our cardiac anesthesia and cardiology colleagues.

Q94

Describe your approach to risk stratify patients at risk for perioperative nausea and vomiting.

Based on modified Apfel score, the majority of our patients are young, female, non-smokers who will be getting opiates in the PACU. This makes our patients largely all at risk for PONV, so we assume that all of our patients will be high-risk for PONV. However, in patients with a history of motionsickness or a PONV history, we are especially cautious.

Q95

*Outline your perioperative antiemetic prophylaxis and treatment protocol. A standardized approach ideally involving at least one prophylactic antiemetic agent routinely administered, with an alternative class of antiemetic agent available for additional prophylaxis (in patients at higher risk for PONV) and for treatment of nausea and vomiting.

All of our patients are administered at least one antiemetic - most frequently ondansetron - due to its safety profile and efficacy. In our chronic pain patients on methadone, we administer this cautiously as the cumulative effects of QT prolongation can precipitate arrhythmias.

Most patients receive additional antiemetics - H2 blockers, non-particulate antacid, or dexamethasone - depending on attending preference.

For breakthrough intraoperative or postoperative nausea and vomiting, we will occasionally utilize subhypnotic propofol doses (10mg IV or an infusion of 5-10 mcg/kg/min) for antiemetic effect.

Q96

Outline which medications are immediately available for treatment of intraoperative shivering and pruritus in the operating room and recovery unit.

Our OR and PACU pyxis has naloxone available for pruritus, which we occasionally administer in small doses (20mcg at a time). We also have both butorphanol and nalbuphine available in our PACU Pyxis. For post-anesthetic shivering, meperidine is avoided due to concerns with lactation: we will perform active warming with a forced air warmer or warmed blankets.

Dexmedetomidine is available in our workroom Pyxis, which is occasionally used for post-delivery shivering.

Q97

Describe your approach to risk stratification to identify patients at increased risk for respiratory depression, and screening for obstructive sleep apnea.

We follow the SOAP guidelines for risk stratification of patients at risk for respiratory depression. Specifically, we screen for severe obesity (BMI >40), suspected or confirmed OSA, or a diagnosis of central sleep apnea. We also monitor patients on postpartum magnesium therapy with continuous pulse oximetry on labor and delivery for 24h postpartum with a 1:1 nursing ratio, and consider GA sections and patients receiving supplemental IV opiates to be higher-risk for delayed respiratory depression.

As part of our admitting workflow, all patients get screened with STOP-BANG criteria for OSA assessment.

Q98

*Describe your monitoring and treatment for respiratory depression after cesarean delivery. Your protocol should be consistent with the SOAP Consensus Recommendations for the Prevention and Detection of Respiratory Depression Associated with Neuraxial Morphine Administration for Cesarean Delivery Analgesia for the Prevention, Detection and Management of Respiratory Depression Associated with Neuraxial Opioids (4, 5).

Our institutional guidelines meet or exceed the guidelines set forth by the SOAP 2019 consensus statement. For low-risk patients who receive our typical doses of neuraxial morphine, we monitor q2h for the first 12 hours. For higher-risk patients, we monitor hourly for the first 12 hours and then every 2 hours for the subsequent 12 hours. For some higher-risk patients (those on postpartum magnesium or with significant cardiopulmonary disease), we will often maintain these patients on continuous pulse oximetry with an audible alarm outside the room.

Q99

Outline your nursing care and monitoring. Your nursing care should be consistent with the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) and ASA recommendations.

Our intrapartum and postpartum nursing standards meet or exceed those set forth by the AWHONN and ASA recommendations for labor / postpartum care.

Q100

Describe how your anesthesiology service is supportive of baby-friendly breastfeeding practices (e.g. ability to safely facilitate skin-to-skin in the operating room or recovery unit, when possible).

We place our EKG leads on the back, untie the patient's gown, and avoid strapping the patient's arms to armbands. We also routinely facilitate in-OR breastfeeding if the patient and neonate are both stable during closure.

We have two nurses in our operating rooms for cesarean deliveries - one who acts as a circulating nurse (and is the patient's nurse in the PACU) and one who serves as the "baby nurse". This nurse gives report to the NICU team before delivery, accepts care of the neonate from the NICU team if deemed safe, and facilitates early skin-to-skin in the OR. During the delivery while the NICU team is assessing the neonate, the baby nurse assists with QBL tabulation.

Q101

Outline how an in-house (24/7) clinician (separate from the anesthesiology service) with appropriate training to provide neonatal resuscitation is available.

As a Level IV NICU with >50 beds and ECMO capability, we have a NICU fellow in-house 24/7 as well as a NICU attending on home call. In the event of a neonatal resuscitation, the NICU team responds to codes. In addition to these in-house resources, we always have an in-house PICU attending as well as pediatric anesthesiologist: these highly-trained clinicians will respond in the event of a pediatric difficult airway response team notification (pDART) as well as at the request of the NICU team.

All of our obstetric anesthesia core group is NRP-trained and certified, as are all of our L&D nurses and obstetrics physicians.

Page 8: Labor Analgesia

Q102

*Outline your routine utilization of a pencil-point needle, 25-gauge (or smaller) for the provision of CSE or DPE labor analgesia.

Our routine kits include a 17-gauge Tuohy and 26-gauge Gertie Marx needle. We do not stock different spinal needles for our CSEs/DPEs, so only a 26-gauge needle is utilized.

Q103

Describe your use of low concentration local anesthetic solutions (ideally ≤0.1% bupivacaine or ≤0.15% ropivacaine).

Our standard labor analgesia concentration is bupivacaine 0.125% with 2mcg/mL fentanyl. We had entered discussions with our team and the pharmacy to potentially change our concentration of our bags to 0.1% bupivacaine in late February 2020, but unfortunately the world had other ideas.

For postpartum epidurals (left in for patients with chronic pain conditions and super morbidly obese patients with known OSA or witnessed apnea events intraoperatively), our postpartum epidural concentration is 0.0625% bupivacaine with 5mcg/mL fentanyl. This solution is run at a higher volume as compared with our labor analgesic solution.

The challenge with us changing our epidural solutions is that our epidural bags are used by our team as well as the acute pain service for most epidurals throughout the Johns Hopkins Health System, a system that encompasses 15,000 deliveries per year and a large number of epidurals for other procedures.

Q104

Outline your use of neuraxial opioids (e.g. fentanyl or sufentanil) and/or other adjuvants (e.g. clonidine) added to epidural local anesthetic solutions.

Our intrapartum labor analgesia epidural solution also includes fentanyl at 2 mcg/mL concentration. We use a PCEA system with an 8mL basal rate per hour, and a 5mL PCEA bolus every 20 minutes.

Our post-cesarean 0.0625% bupivacaine solution includes fentanyl at 5 mcg/mL, and is administered via PCEA with a 6mL per hour basal rate and a 4mL PCEA bolus every 10 minutes.

We will occasionally add dilute clonidine to epidurals for patients with chronic pain, but do so with a rarity that we do not yet have it included in our order set: we will custom-order a bag in discussion with our pharmacy colleagues.

Q105

Describe how standardized epidural solutions are provided and used by all providers. Ideally, pharmacy-provided pre-mixed epidural solutions.

Our epidural solution bags are pre-mixed by either our pharmacy or Pharmedium, and we use standardized order sets to decrease provider error and variability.

This applies for both our labor epidurals as well as our postpartum epidural solutions.

Q106

Outline if and which alternative neuraxial techniques are offered in addition to standard labor epidural analgesia (e.g., CSE, DPE, single-shot spinal).

CSE techniques are offered as part of our standard neuraxial options for both labor and cesarean delivery and are employed by all faculty members.

Many of our anesthesiologists have changed to performing a DPE-by-default approach. This approach has resulted in a lowering of our replacement rate and an increase in labor analgesic efficacy.

We will occasionally perform lateral single-shot spinals in patients who are imminently delivering and cannot sit still for epidural placement.

In 2021 (the last full calendar year's worth of data), for vaginal deliveries, we performed 1048 DPE/Epidural, 165 CSE, and 10 spinal anesthetics according to our Tableau dashboard.

Q107

Please provide an estimated percentage breakdown of the utilization of these techniques, with the total equaling 100%. Do not include the percentage sign in your answers. Please answer in decimal format.

Standard epidural	**40.0**
CSE	**17.0**
DPE	**42.0**
Other (describe)	**1.0**

Q108

Outline your labor epidural maintenance techniques. Patient-controlled epidural analgesia (PCEA) and ideally background programmed intermittent epidural boluses (PIEB) should be utilized for provision of neuraxial labor analgesia.

Our labor analgesic epidural solutions are administered in a PCEA format. We use an 8mL basal rate per hour, and a 5mL PCEA bolus every 20 minutes.

In 2021, we purchased new CADD-Solis pumps capable of performing PIEB. This coincided with our Delta wave, a high turnover of nurses on our unit, and significant staffing challenges. Due to these challenges, we have decided to postpone the implementation of PIEB on our unit. At the recent SOAP meeting it was disclosed that half of centers with ACGME-approved fellowships were still not using PIEB as their standard, and therefore we are not in the minority. However, we are committed to rolling out PIEB at some point in the future.

Q109

*Describe your routine utilization of flexible (flex-tipped/wire-reinforced) epidural catheters for labor epidural analgesia.

Our catheters are multi-orifice catheters that are flex-tipped and wire-reinforced. We currently utilize Arrow MRI-conditional multi-orifice catheters at Johns Hopkins and all of our affiliate sites.

The last several months have seen challenges with availability of epidural kits in our system many other centers have similarly reported, and therefore we've been using whatever kits we can get. These kits have included Braun epidural kits, Arrow single-orifice catheters, and others. However, the crisis seems to be resolving somewhat and in the last several weeks we have returned to our regular kits (albeit without lido/epi test dose solutions).

Q110

*Outline how you provide regular assessment of neuraxial labor analgesia effectiveness. Ideally, pain scores documented by nursing staff (e.g. every 1-2 hours) supplemented with regular anesthesia provider rounds or evaluations (e.g. every 2-4 hours).

Pain scores are documented by the nurses every 1-2 hours, and our residents and fellows round on epidurals at every change of shift as well as routinely throughout the day. Residents who place the epidurals are encouraged to round on their own patients, to encourage a sense of ownership and to encourage their learning: watching their epidural catheters work is often a rewarding and enriching experience, and troubleshooting their catheters is the same.

Q111

Describe your protocol for managing epidural breakthrough pain. Describe your system used to track labor epidural replacement rates.

For breakthrough pain, we are aggressive about early catheter replacement if there is concern for catheter malposition (for instance, primary catheter failure).

After this, we initially begin with a clinical bolus of 5-10mL off our epidural pump (0.125% bupivacaine with 2mcg/mL fentanyl). If ineffective, we typically administer a higher-concentration local anesthetic by hand bolus (5mL of 0.25% bupivacaine) and assess for efficacy. If still not effective, we discuss replacement with patients. If they are hesitant or the exam is equivocal, we will test with 1% lidocaine: if unable to achieve a satisfactory block with 1% lidocaine, we cannot trust the catheter for a stat cesarean section and the catheter is therefore removed and replaced.

Our Tableau dashboard includes two methods for catheter replacement. Our epidural procedure note includes a checkbox for complications (inadvertent dural puncture, catheter replacement, intravascular catheter placement, etc) - these are tabulated in Tableau. Additionally, the system will look for records with more than one epidural placement note in a labor analgesia record and count that as a replaced catheter. This relies on accurate documentation, but is likely more accurate than asking individual residents to submit their replacements to a database.

Q112

Describe your ongoing monitoring (e.g. blood pressure, assessment of motor/sensory levels) and protocols to manage potential side effects or complications associated with neuraxial analgesia.

We have attached our protocol for labor analgesia that is currently in use at our institution.

Patients undergo blood pressure monitoring every 5 minutes for the first 30 minutes after neuraxial anesthesia administration, and every 30-60 minutes thereafter unless otherwise medically indicated. Additionally, most of our patients have continuous fetal monitoring to evaluate for adequacy of fetal/placental perfusion. Oxygen saturation is continuously monitored for 30 minutes after epidural initiation and every 30-60 minutes thereafter unless medically indicated. Maternal sedation, motor and sensory exams are performed by nursing every 4 hours while in labor.

Our epidural order set also includes the use of diphenhydramine, nalbuphine, and naloxone for pruritus.

Q113

Outline your nursing postpartum monitoring protocol that is consistent with AWHONN recommendations.

All post partum monitoring strictly adheres to the AWHONN standard. Our postpartum monitoring policy is attached.

Q114

Describe intravenous patient-controlled opioid analgesia options offered, and outline protocol specifics including opioids available, administration settings and monitoring requirements. Outline the availability of nitrous oxide for labor analgesia, and if available provide protocol specifics.

We have a remifentanil PCA protocol which is attached. This is typically reserved for patients who cannot receive neuraxial anesthesia for contraindications related to placement (infection over site, coagulopathy / use of anticoagulation, patient refusal, prior spinal surgery, prior epidural failure). Patients receiving remifentanil PCA have two PIVs, a nasal cannula ETCO2 monitor, and continuous pulse oximetry. These patients are also not candidates for intermittent fetal monitoring.

We typically start remifentanil with no basal rate, 20-30mcg PCA dose, a 2-minute lockout, and 30 maximum doses per hour.

For patients who are not candidates for remifentanil, we will offer other IV opiate PCA options. This scenario is typically offered to terminations or FDIU patients, where neonatal depression is not of concern.

We do not have the ability to use nitrous oxide in labor rooms, but occasionally use nitrous oxide for breakthrough pain during cesarean deliveries and vaginal deliveries in the OR (multiples).

Page 9: Recommendations and Guidelines Implementation

Q115

*At a minimum, provide evidence of implementation of the Practice Guidelines for Obstetric Anesthesia by the ASA Task Force on Obstetric Anesthesia and SOAP (6). Select key recommendations not otherwise addressed in other areas of this application: o Platelet count prior to neuraxial block placement: No requirement for routine testing in healthy patientso Appropriate liquid and diet restrictions: Intrapartum (allow clear liquids in uncomplicated patients); cesarean delivery (clear liquids up to 2 hours prior)o Timing of neuraxial analgesia: Allow neuraxial analgesia in early labor (no specific cervical dilation required)

In healthy women, our group does not routinely wait for platelet counts prior to proceeding with block placement.

Our low risk uncomplicated patients are allowed to consume clear liquids in labor, and are encouraged to adequately self-hydrate to avoid exogenous fluid boluses. For c-sections we permit clear liquids up to 2 hours prior to the case. High risk patients or those at high risk for urgent/emergent c-section are maintained NPO.

Additionally, for our patients undergoing fetal surgery, we employ an ERAS protocol including multimodal analgesia, encouraging the use of carbohydrate-rich energy drinks until 2 hours prior to OR entry.

There is no arbitrary cervical dilation cutoff for labor analgesia. Patients who are determined to be laboring by our obstetricians are offered neuraxial anesthesia at maternal request: we consider this a sufficient indication for placement regardless of labor progress.

Q116

Outline evidence of implementation of the SOAP Consensus Statement on the Management of Cardiac Arrest in Pregnancy (7).

We have employed these recommendations, and drill regularly for these rare events. Additionally, we have a peri-morten cesarean section tray on our code cart in L&D.

Attached to this application is our policies and procedures document regarding maternal cardiac arrest.

Q117

National Partnership Maternal Safety Bundles (8): Confirm that aspects of the following Maternal Safety Bundles have been implemented. For each enter a Yes or a No.

Obstetric Hemorrhage	**Yes**
Severe Hypertension in Pregnancy	**Yes**
Maternal Venous Thromboembolism	**Yes**
Cardiac Conditions in Obstetrical Care	**Yes**
Care for Pregnant and Postpartum People with Substance Use Disorder	**Yes**

Q118

Provide examples of implementation of key aspects of National Partnership Maternal Safety Bundles; outline at least one example of an item that has been implemented to address each domain (Readiness, Recognition and Prevention, Response, and Reporting and System Learning) for the following:

Obstetric Hemorrhage	**We have universal training, as well as routine drills. See attached protocols documentation.**
Severe Hypertension in Pregnancy	**We have universal training, as well as routine drills. Our nurses have standing orders for antihypertensive medications included in every admission order set for laboring patients, and therefore do not require physician order to administer a rapidly-acting antihypertensive. See attached protocols documentation.**

Q119

Outline your approach to coordinate care for patients receiving ante- and postpartum thromboprophylaxis as outlined by the SOAP Consensus Statement on Neuraxial Anesthesia in Obstetric Patients Receiving Thromboprophylaxis (9). Describe a process by which obstetric anesthesia providers are informed about patients receiving thromboprophylaxis.

Our EMR notifies us of thromboprophylaxis medication administrations via an alert when we begin charting our labor analgesic. In addition, anticoagulation administration is included in our pre-procedure timeout with the patient and her labor and delivery nurse.

We follow the SOAP guidelines for thromboprophylaxis, being mindful that there are certain scenarios where clinical judgment comes into play. If a patient is a known difficult airway but has received low-dose heparin 3.5 hours prior to a spinal for an emergent cesarean delivery, most of our clinicians would have no hesitation offering a spinal (without waiting for coagulation studies) after an abbreviated shared decision-making model with our patient.

Q120

Outline your implementation of recommendations from SOAP Interdisciplinary Consensus Statement on Neuraxial Procedures in Obstetric Patients with Thrombocytopenia.

We have adopted the statement on thrombocytopenia in pregnancy, similarly acknowledging that there are situations in which competing aims may necessitate exercising clinical judgment beyond the published recommendations. As a group, we are generally comfortable down to a platelet count of 70,000 in all-comers with no clinically significant coagulopathy and a stable trend - however, many of our anesthesiologists will request to see other surrogate markers (liver function tests, thromboelastography) to better assess and risk-stratify. In general, our culture is to encourage early epidurals for patients admitted with HELLP syndrome. This is done to avoid the downstream consequences of a lack of epidural and a plummeting platelet count.

While knowing that there is no TEG parameter which is predictive of neuraxial hematoma formation, a normal TEG is a reassuring sign and aids in an informed shared decision-making discussion with our patients.

Page 10: Quality Assurance and Patient Follow-up

Q121

*Describe how an anesthesiologist serves as a member of the team that develops and implements multidisciplinary clinical policies, e.g. quality improvement committee, patient safety committee. Outline current quality assurance and other patient care initiatives that the obstetric anesthesia division is leading, and/or involved in.

One of our core faculty members serves as head of our division's QI team and reviews all reports submitted to our medical error reporting system. This faculty member works closely with our obstetrics and nursing quality teams to provide the best care for patients.

We have monthly QI conferences as a division, where we discuss complicated procedures as well as any equipment or systematic issues which could impact patient safety.

One of our faculty members served as the lead on the ERAS protocol implementation for our labor floor, and he continues to serve as a resource for our obstetricians and nursing colleagues. Another one of our faculty frequently lectures our obstetrics residents on anesthesia-related topics during their structured didactics sessions.

Q122

Outline involvement of obstetric anesthesia staff in hospital committees. Describe committees (e.g. peer review, blood management) that the obstetric anesthesia staff are involved in, and their role in these committees.

Dr. Murphy serves as a key member of our peer review team, as well as the anesthesiologist on our Maryland Maternal Mortality Review Committee.

Several of our faculty serve on the blood management committee, including two anesthesiologist who are part of our call pool and routinely cover L&D. Our blood management program is run by an anesthesiologist, and we are centrally involved in the blood management program at the institution.

Another one of our faculty is the faculty senator for the Department of Anesthesiology and Critical Care Medicine for Faculty Senate for the School of Medicine, responsible for serving as a voice for the faculty as a whole.

Several members of our group are part of other departmental, hospital-wide, or ad-hoc committees dedicated to providing outstanding patient care (promotions committee, root cause analysis team, clinical staffing committee, call and supplemental compensation committee, etc).

Q123

*Describe how patients receive follow-up with structured interview/consultation who received either labor neuraxial analgesia, cesarean anesthesia, or anesthesia for other procedures (e.g. postpartum tubal ligation, cerclage). Patients should be reviewed, or protocol criteria fulfilled prior to discharge or transfer from labor and delivery. All patients who received an anesthetic procedure should be reviewed by the anesthesia service on the postpartum floor prior to hospital discharge.

We evaluate all patients after delivery (either vaginal or cesarean) prior to their transfer to our postpartum floor. This constitutes our level 1 signout process, and a note is documented in the chart with any relevant findings.

On postpartum day 1, we evaluate all patients to assess for their comfort and satisfaction as well as handing off control of their pain management to the obstetrics team. In addition to an in-person evaluation, we encourage our patients to share any feedback with us about how to better perform our jobs: patients are provided with a feedback form to hand their nurse if interested. This feedback has been instrumental in changing our workflows to better care for patients.

Q124

Outline your system to follow-up on all patients with anesthesia-related complications.

We maintain a log of any patients with anesthesia-related complications, and follow up with the patient and all necessary services. We routinely contact patients at home after discharge if their peripartum course was complicated or as a result of their survey responses.

Our EMR allows us to flag a patient's chart for anesthetic follow-up, which serves as another centralized list of patients requiring further care.

For our highest-risk patients, we continue to follow up with them throughout their ICU or hospital stay and offer to help the primary team with any management assistance.

Q125

*Describe your system to evaluate and treat (with an EBP, if necessary) a PDPH in a timely fashion. Are EBPs generally performed early (within 12-48 hours) or delayed? Who performs the EBP and which location(s) are EBPs performed in prior to and after discharge? Optimally, outpatient PDPH should be evaluated and treated on the obstetric unit and not in the emergency department.

Any patient with a PDPH after discharge is referred back to labor and delivery for evaluation and possible treatment. All our providers are comfortable with performing epidural blood patches, and do so with regularity if the clinical situation is appropriate and the patient is properly consented.

PDPH is never treated in the ED: in fact, all postpartum patients who delivered within 6 weeks who present to the ED are sent to labor and delivery for evaluation and workup of their chief complaint.

Q126

Outline if the anesthesiologist is an active participant in multidisciplinary root cause analysis, maternal case conferences, or equivalent program to evaluate maternal and/or fetal adverse events. Provide examples of effective implementation of identified system solutions.

Dr. Murphy is directly involved in all root cause analysis events evaluating maternal and/or fetal adverse events. She also serves on the state's maternal mortality review committee.

Examples of identified system solutions include:
1. Delayed operative case due to poor communication
Actions: 1. Implementation of an Epic phone alert for all urgent/emergent cases
2. development of a operative leveling system that eradicates the need to use ambiguous language to define urgency of a case (e.g. level 1, 2, 3 instead of STAT, emergent, urgent)

2. Underestimation of blood loss in post vaginal delivery hemorrhage
Actions: mandatory QBL calculation for all deliveries.

3. Concern for effect of bias on a patient's outcome (patient labeled as non-compliant, difficult-to-handle) resulting in morbidity
Actions: mandatory implicit bias training for anyone who sets foot on labor and delivery - from the cleaning staff to the director of the unit. This includes both an in-person course and self-paced online modules.

Q127

Describe your approach to routinely collecting patient feedback on maternal experience of care, with a specific focus on anesthetic and analgesic care.

As described above, all patients are given a feedback survey to fill out on postpartum day 1 while still inpatients. This survey is given to the patients the morning after delivery, and is returned to their bedside nurse and collected by our division director for analysis. This evaluation is available in English and Spanish.

Additionally, patients are given contact information for our division should they have any questions post-discharge.

Page 11: Supplemental Documentation

Q128

Please upload supplemental documentation #1.

Jamie Murphy 2019 CV.pdf (147.5KB)

Q129

Please upload supplemental documentation #2.

Patient Survey.pdf (67.7KB)

Q130

Please upload supplemental documentation #3.

Tableau Dashboards Through September 2022.pdf (843.7KB)

Q131 **Respondent skipped this question**

Please upload supplemental documentation #4.

Q132 **Respondent skipped this question**

Please upload supplemental documentation #5.

Q133 **Respondent skipped this question**

Please upload supplemental documentation #6.

Q134 **Respondent skipped this question**

Please upload supplemental documentation #7.

Q135 **Respondent skipped this question**

Please upload supplemental documentation #8.