SMFM Special Statement: Surgical Safety Checklists for Cesarean Delivery

Patient Safety and Quality Committee, Society for Maternal-Fetal Medicine, C. Andrew Combs, MD, PhD;, Brett D. Einerson, MD, MPH;, Lorraine E. Toner, MD

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Correspondence: Patient Safety and Quality Committee, Society for Maternal-Fetal Medicine; smfm@smfm.org

Condensation: The Society for Maternal-Fetal Medicine presents checklists for use with cesarean deliveries and suggests processes for implementation.

Key words: never events, perioperative complications, safe surgery, sentinel events

Abstract

The routine use of surgical safety checklists can reduce perioperative complications. Generic surgical checklists are insufficient for cesarean delivery because each cesarean delivery involves two patients (mother and fetus/newborn), each with separate care teams and health and safety considerations. To address the added complexity of care coordination and communication inherent in cesarean delivery, the Society for Maternal-Fetal Medicine presents example standard surgical safety checklists for cesarean surgery that include elements of care for both the mother and newborn. We also present an alternative checklist for time-critical emergency cesareans in which there is not time to safely perform the standard checklist and a sample preoperative checklist that can be used before moving the patient to the operating room. We recommend steps for implementation that should optimize successful introduction of the checklists at individual facilities.

Introduction

Every surgery has significant potential for serious complications. Some surgical risks are attributable to the underlying conditions for which surgery is performed; others are attributable to the complexity of the surgical process itself. Safe surgery requires meticulous performance and continuous coordination among various providers, including surgeons, anesthetists, nurses, and other hospital staff. In every surgery, there are myriad opportunities for errors of omission and failures of communication. Therefore, it is not surprising that roughly one-third of Sentinel Events reported to the Joint Commission in recent years involve surgery or anesthesia.[1]

Surgical safety checklists, such as the one developed by the World Health Organization (WHO),[2] have been shown to reduce serious perioperative complications and death by 30% to 40% when implemented across a wide range of hospital settings.[3, 4] Use of a checklist reduces the chance of neglecting routine items such as antibiotic prophylaxis and sponge, instrument, and needle counts. Pausing to identify the patient and the planned procedure reduces the chances of wrong-patient, wrong-site, or wrong-procedure surgeries and other "Never Events."[5] Performing a checklist during and after surgery enhances communication between team members and gives all participants a chance to speak up if something appears to have been overlooked.

Cesarean delivery is even more complex than other types of surgery because there are two patients (mother and fetus/newborn), each with separate care teams and health and safety considerations. Thus, additional coordination and communication are needed to ensure the safety of both patients. Although we are aware that some hospitals have developed a specific

surgical safety checklist for cesarean delivery, we have only found two published examples, neither of which includes a dedicated newborn care provider.[6, 7]

In this Special Statement, we present sample operating room surgical safety checklists appropriate for most cesarean deliveries in the United States and other high-resource countries. We also present an alternative checklist for time-critical emergency cesarean deliveries in which there is no time to safely perform the standard checklist and a sample preoperative checklist that can be used before moving the patient to the operating room. Finally, we present some suggestions for the implementation of the checklists at individual facilities.

Comments on the Checklists

Sample standard operating room checklists for cesarean delivery are shown in Box 1 and Box 2. These checklists are adapted from the WHO surgical safety checklist.[2] Both checklists are divided into three sections representing distinct time points: (1) Briefing occurs before initiation of anesthesia; (2) Time-out occurs before skin incision; and (3) Debriefing occurs after completion of the final counts.

In the larger sample checklist (Box 1), most items are written as questions for a designated team member to ask other team members. This format is intended to guide providers to double-check each other's work and to encourage dialog. It is also intended to keep all individuals engaged throughout the process. On certain items, the patient and their partner (if present) are asked to participate, thus including them in the safety process. If general anesthesia is to be used or the patient is heavily sedated, the patient will be unable to

participate, so other team members will need to check wrist bands against the paperwork and the stated planned procedure.

The smaller sample checklist (Box 2) eliminates the question-answer format and removes some items. This briefer format may be preferred by some facilities.

A sample ancillary checklist (Box 3) is intended to be completed in the preoperative area before moving the patient to the operating room. These steps are often completed by a single nurse rather than an entire team, so the items are not phrased as questions but rather presented as a simple task list. In many hospitals, the items on this checklist are scattered across various formats, including paper forms, electronic health records, tablet computer applications, and fetal heart monitoring systems. For simplicity, we have gathered all of these items into a single one-page form.

In a small percentage of cases, a time-critical emergency necessitates that surgery must start without delay. In such cases, there is no time to complete the preoperative checklist (Box 3) or the standard cesarean surgical safety checklist (Box 1 or Box 2). To minimize the chances of omitting key items, we present a sample checklist for emergency cesarean deliveries in Box 4. This checklist assigns tasks to the labor and delivery (L&D) or circulating nurse to complete as time permits, minimizing the burden on the surgeon and anesthesiologist. The checklist is intended to "catch up" on items that may have been overlooked because the Briefing and Time-out sections of the standard cesarean checklist were not performed. In most cases, the emergency will have been resolved by the time of closing; therefore, we recommend performing the full Debriefing section of the standard cesarean checklist in addition to a few

items unique to emergency cases (eg, x-ray to rule out retained materials and a reminder to place sequential compression devices postoperatively to prevent venous thromboembolism).

Each checklist is designed using common checklist design principles, such as non-serif typeface with upper case and lower case letters, black text on a white background, avoidance of color, and inclusion of a version date.[8] A key principle is including only those items that are likely to be overlooked. Thus, we have not included such items as gowning and gloving of the operating personnel, placement of bladder catheter, antiseptic skin preparation, and patient draping.

Suggestions for Implementation

How a facility implements a surgical safety checklist is critical to its success. Studies demonstrating reduced morbidity and mortality with the use of a surgical safety checklist included detailed implementation programs involving extensive staff engagement and education.[3, 4, 9] In contrast, a province-wide government mandate to document the use of surgical safety checklists in Ontario, Canada failed to produce any benefit.[10] Commenting on that failure, Leape[11] wrote, "it is important to state the obvious: it is not the act of ticking off a checklist that reduces complications, but performance of the actions it calls for." It is not sufficient to simply post a checklist and tell providers to use it.

It has been known for a decade that the effectiveness of checklists "hinges on the ability of implementation leaders to persuasively explain why and adaptively show how to use checklists."[12] A recent review concluded that the implementation of a surgical safety checklist is "a complex and challenging process that requires effective leadership, clear delegation of responsibilities from each professional, collaboration between team members, and institutional

support".[13] Another concluded that "the sustained use of surgical checklists is discipline-specific and is more successful when physicians are actively engaged and leading implementation. Involving clinicians in tailoring the checklist to their context and encouraging them to reflect on and evaluate the implementation process enables greater participation and ownership."[14]

Helpful general guidance on the implementation of checklists and other quality and safety projects is given in documents by the American College of Obstetricians and Gynecologists, the Society for Maternal-Fetal Medicine,[15] and the Council for Patient Safety in Women's Healthcare.[16]

The first step in the implementation of a surgical checklist is to assemble a team of relevant stakeholders. The team should be led by clinical "champions" who have a passion for the project and can communicate the rationale for the checklists and roll-out process. We recommend that both a nurse and a physician champion be engaged in the cesarean delivery checklists because nurses and physicians will perform the checklist together. Additional members of the team should include obstetricians (surgeons), L&D nurses, anesthesiologists, other operating room personnel, a neonatologist, a neonatal nurse, and a representative from the hospital's administration. An expert in the hospital information system should be included if the team wishes to incorporate one or more of the checklists into the electronic health record (EHR). In teaching hospitals, residents and fellows should be included. Including a patient advocate may help the team better understand the patient perspective.

The implementation team must first consider whether to introduce dedicated cesarean delivery checklists or use a nonspecific surgical safety checklist such as the WHO checklist. If

dedicated checklists are chosen, the team must decide whether to use a question-answer format as in Box 1, a brief format as in Box 2, or a hybrid format incorporating elements from both. The choice of format should seek to achieve a balance between completeness and usability. Whatever format is chosen, we encourage each facility to adopt a single cesarean delivery operating room checklist to ensure uniformity among providers, not two different checklists.

The team should next consider where the checklists will be physically located. We envision the standard cesarean delivery checklist (Box 1 or Box 2) as a wall chart posted in the operating rooms on the L&D unit, the preoperative checklist (Box 3) as a paper form in the patient chart, and the emergency checklist (Box 4) as a laminated sheet to be kept in a convenient location in the operating room where it can be retrieved as needed. A checklist for venous thromboembolism prophylaxis is mentioned in the Debriefing section of Box 1; a laminated copy of SMFM's checklist on this topic[17] can also be kept in the operating room. Individual hospitals may customize how these materials are used and where they are kept. Hospitals may also choose whether to store the checklists as part of a patient's medical record or use them only as cognitive aids to ensure that all the tasks are done.

Extensive customization of checklist items is encouraged. *SMFM does not consider that the mere inclusion of an item on our sample checklists makes that item mandatory.* Teams should feel free to add, delete, or substitute items as needed to be consistent with their local practice. One example is the use of a chlorhexidine shower and chlorhexidine wipes in the preoperative checklist (Box 3); some hospitals include these procedures as part of enhanced recovery after surgery (ERAS) bundles.[18] Another example is the use of patient warming devices or

procedures in the Time-Out sections in Boxes 1 and 2. Active steps to maintain normothermia are supported by high-quality evidence.[19] However, hospitals may use different means to accomplish this, including forced-air warming devices, under-patient warming devices, warming of intravenous fluids, or increasing ambient temperature of the operating room.[19-21]

Several items that should already be completed during the Briefing are repeated in the Time-out section on both checklists. These include identification of the patient and planned procedures, hemorrhage risk assessment, and blood product availability. We assume that only the anesthesiologist and L&D nurse will perform the Briefing, whereas the Time-out requires the presence of the entire operating team. Some hospitals may require the presence of the surgeon during the Briefing portion, in which case they can remove the redundant items from the Time-out portion.

Once the team has decided on the items to include on their checklists, they should test the usability and feasibility by conducting "table read" dry runs with roles acted out by appropriate personnel on the team. Once the team is satisfied, a few more dry runs should be done involving personnel not on the team. These rehearsals will teach the team how easy or difficult it is for people with minimal training to use the materials. If there are "sticking points" where users are not clear about the intent of an item or the action required, the wording of the checklist item should be modified to clarify the issue. After these preliminary tests, the revised materials can be put into production.

In preparation for a "go-live" start, educational notices and announcements should be made to all personnel who will use the checklists, including obstetricians, nurses, anesthesiologists, other operating room personnel, neonatologists, and nursery staff.

Appropriate venues for such notices can include department meetings, staff meetings, grand rounds, in-service training sessions, and e-mail "blasts." We recommend at least one announcement a few weeks in advance with a clearly stated start date and a follow-up announcement on the day before the "go-live" date.

After the "go-live" date, the team should listen carefully to all feedback received and must be open to making changes as needed. Any barriers to usage need to be identified and promptly addressed. The team should reconvene soon after the implementation and consider whether any modifications are needed immediately. Thereafter, the champions should remain engaged and encourage feedback from all users. The team may need to meet periodically to evaluate whether there have been any changes to the standard of care that would require updating the checklists. When a checklist is revised, the version date should be revised, and all older versions should be discarded.

Attention to these implementation steps should increase engagement of all users and increase the rate of utilization, thereby improving the rate of completion of the many critical steps that contribute to safe cesarean surgery.

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This document has undergone an internal peer review through a multilevel committee process within SMFM. This review involves critique and feedback from the SMFM Patient Safety and Quality and Document Review Committees and final approval by the SMFM Executive Committee. SMFM accepts sole responsibility for document content. SMFM publications do not undergo editorial and peer review by the American Journal of Obstetrics & Gynecology. The SMFM Patient Safety and Quality Committee reviews publications every 36-48 months and issues updates as needed. Further details regarding SMFM Publications can be found at www.smfm.org/publications.

The Society for Maternal-Fetal Medicine (SMFM) recognizes that obstetric patients have diverse gender identities and is striving to use gender-inclusive language in all of its publications. SMFM will be using terms such as “pregnant person/persons” or “pregnant individual/individuals” instead of “pregnant woman/women” and will use the singular pronoun “they.” When describing study populations used in research, SMFM will use the gender terminology reported by the study investigators.

All questions or comments regarding the document should be referred to the SMFM Patient Safety and Quality Committee at smfm@smfm.org.

Reprints will not be available.

Box 1. Sample Operating Room Checklist for Cesarean Delivery: Question-Answer Format

This checklist is a sample only and should be modified to fit facility-specific needs.

Team members must stop activity and respond to each question of the Briefing, Time-out, and Debriefing

Briefing	Time-Out	Debriefing
Before initiation of anesthesia	Before skin incision (eg, while skin prep is drying 3 minutes)	After the last count, before surgeon leaves
Nurse ask the patient: ☐ Please tell us your name, date of birth, and planned procedure. (Nurse: Confirm that wrist band and consent form match.) ☐ Do you have any allergies to medications? Latex? Other? **Nurse ask the anesthesiologist:** ☐ Is Anesthesia Safety Check complete (machine and med checks)? ☐ Are there any unusual concerns (BMI, difficult airway, etc)? ☐ Are any special procedures needed (central line, art line, etc)? **Nurse and anesthesiologist discuss:** ☐ Who are the primary and assistant surgeons? ☐ Who will attend to newborn (neonatologist, NNP, NICU nurse)? ☐ Any pertinent medical or obstetrical problems. ☐ Review most recent lab results: ☐ Hemoglobin ☐ Platelet count ☐ Glucose (if diabetes) ☐ Magnesium level ☐ Type & Screen (if available) ☐ Updated PPH Risk Score (done within previous 30 minutes) ☐ What blood products are on hold and where are they? ☐ Any other concerns? **Anesthesiologist and surgeon discuss:** ☐ Antibiotic prophylaxis: ☐ Cefazolin 2 gm (or other)? ☐ Azithromycin 1 gm over 1 hour if labor or ROM ☐ Other antibiotics?	**Primary surgeon to initiate time-out and ask/confirm:** ☐ Call for NICU to send provider for fetal/neonatal briefing (neonatology, NNP, or NICU nurse as appropriate). *Proceed with time-out even if they have not yet arrived.* ☐ Ask all team members to introduce themselves. ☐ Ask patient to state her name, date of birth, and planned procedure. Confirm that wrist band and consent form match. ☐ State all planned procedures (including tubal ligation, cord blood collection, cerclage removal, etc.), confirm with consent form. **Ask the anesthesiologist:** ☐ What antibiotic(s) was given and when? ☐ What post-op analgesia is planned (Duramorph, TAP block, other)? ☐ Are patient warming procedures/devices activated? **Ask the primary nurse:** ☐ Are sequential compression devices are on and working? ☐ What is the **updated** PPH Risk Assessment (low, medium, high)? (To be done within previous 45 minutes) ☐ What blood products are on hold and where are they? If no blood products, was antibody screen negative? ☐ Is equipment set up and ready (cautery, suction, etc.)? **Brief the newborn provider(s) (must be present at this point):** ☐ Gestational age, EFW ☐ Reason(s) for cesarean ☐ Pertinent pregnancy issues ☐ Pertinent medications (anesthetics, opioids, magnesium, betamethasone, other) ☐ Discuss whether early or delayed cord clamping is planned **Ask everyone:** ☐ Have 3 minutes of drying time elapsed to reduce fire risk? ☐ Any other concerns? Does everyone agree?	**Nurse to ask/confirm the following:** ☐ Announce results of counts (sponges, sharps, instruments). **Ask the primary surgeon:** ☐ What procedure(s) was performed? What indication(s)? ☐ Should cord gases be sent? ☐ With surgeon, complete the VTE Prophylaxis checklist. Discuss any need for anticoagulation and timing if needed. ☐ Will any special orders will be needed for recovery or postpartum (magnesium, HTN, PPH, diabetes, antibiotics, foley)? ☐ Should placenta to be sent to pathology? Other specimens (tubes, etc)? **Ask surgeon and assistant:** ☐ Are any changes needed to preference cards? Confirm with scrub tech that changes will be made. **Ask surgeons, anesthesiologist, and scrub tech:** ☐ Are there any special pain management considerations? ☐ What are agreed values of blood loss, fluid intake, urine output? ☐ Were there any equipment or instrument issues? Who will follow-up to resolve these issues? ☐ Were there any delays? Who will report this and how? ☐ Is a formal debrief required for: ☐ Stage 2 or 3 PPH? ☐ Severe HTN episode? ☐ NTSV huddle form? ☐ System or process issues? ☐ Any other concerns? **Ask patient (if awake) and her partner (if present):** ☐ Do you have any questions or concerns? **Ask anesthesiologist:** ☐ Are medications secured and wasted meds properly disposed of?

Version date: 27 June 2021

Abbreviations: BMI, body mass index; EFW, estimated fetal weight; HTN, hypertension;NICU, neonatal intensive care unit; NNP, neonatal nurse practitioner; NTSV, nulliparous, term, singleton, vertex; PPH, postpartum hemorrhage; TAP, transversus abdominus plane; VTE, venous thromboembolism

Box 2. Sample Operating Room Checklist for Cesarean Delivery: Brief Format

This checklist is a sample only and should be modified to fit facility-specific needs.

Briefing	Time-out	Debriefing
☐ Confirm patient name and date of birth. ☐ Confirm planned procedure. ☐ Review allergies. ☐ Perform Anesthesia Safety Check (machine and meds). ☐ Unusual concerns (BMI, difficult airway)? ☐ Special procedures (central line, art line, etc)? ☐ Review pertinent medical problems. ☐ Review most recent lab results: ☐ Hemoglobin ☐ Platelet count ☐ Glucose (if diabetes) ☐ Magnesium level ☐ Type & Screen ☐ Calculate Hemorrhage Risk Score. ☐ Blood products on hold?	☐ Call for newborn provider to come. ☐ Team members introduce themselves. ☐ Confirm patient name and date of birth. ☐ Confirm all planned procedures. ☐ Confirm antibiotic(s) given. ☐ Confirm patient warming procedures. ☐ Confirm sequential compression devices on. ☐ Confirm suction and cautery are set up and ready. ☐ Calculate Hemorrhage Risk Score. ☐ Blood products on hold? ☐ Prep drying time at least 3 minutes? Newborn provider briefing: ☐ Gestational age, EFW ☐ Reason(s) for cesarean ☐ Pertinent pregnancy issues ☐ Pertinent medications ☐ Plan for early or delayed cord clamping?	☐ Announce results of counts. ☐ Confirm procedure(s) and indication(s)? ☐ Discuss agreed values of blood loss, fluid intake, urine output . ☐ Is VTE prophylaxis indicated?. ☐ Special recovery or postpartum orders needed? ☐ Special pain management considerations? ☐ Should cord gases be sent? ☐ Any changes needed to preference cards? ☐ Any equipment or instrument issues? ☐ Medications secured or properly disposed? ☐ Any other concerns?

Abbreviations: BMI, body mass index; EFW, estimaged fetal weight; VTE, venous thromboembolism

Version date: 27 June 2021

Box 3. Cesarean Delivery Checklist to be Completed Before Moving Patient to Operating Room

This checklist is a sample only and should be modified to fit facility-specific needs.

General preparation

☐ Lab tests ordered. Time_____.
☐ Record time of last food _____, last clear liquids_____.
☐ Record height_____ and weight_____. Calculate BMI_____.
☐ Circle allergies: None Latex Medication_____ Other_____
☐ Current risk assessment for postpartum hemorrhage: ☐Low ☐Medium ☐High
☐ Hospital wrist band in place, patient confirms name and date of birth
☐ Blood bank wrist band in place, patient confirms name and date of birth
☐ Chlorhexidine shower
☐ Fetal heart monitor and uterine contraction monitor placed
☐ IV started, fluid bolus given
☐ Preop meds given
☐ Chlorhexidine abdominal wipe
☐ Clipper prep pubic hair

Documentation

☐ Prenatal records on chart
☐ History and physical (H&P) completed within 30 days, on chart
☐ Consent forms signed and witnessed for all planned procedures
☐ Conditions of admission form signed
☐ Patient belongings worksheet completed
☐ Nursing admission note completed

Confirmation with surgeon

☐ Lab test results. HGB____ PLT____ Ab Screen ☐Neg ☐Pos Other_____
☐ Blood products on hold (type and crossmatch?) ☐Yes ☐No
☐ If cesarean is for non-cephalic presentation, ultrasound today to confirm
☐ Placenta location (☐anterior? ☐previa? ☐suspected accreta?)
☐ Who will be assistant surgeon? _____
What antibiotic prophylaxis is requested?
- ☐ Cefazolin 2 gm (or other)?
- ☐ Azithromycin 1 gm over 1 hour if labor or ROM
- ☐ Other antibiotics?

☐ Intended incision type or special considerations based on prior operative report?
☐ Any special concerns?
☐ Physician update to H&P and attestation completed with 24 hours

Signed_____

Printed Name _____ *[Patient Label Here]*

Date_____ Time_____

Version 27 June 2021

Box 4 - Checklist for Time-critical Emergency Cesarean Delivery

This checklist is a sample only and should be modified to fit facility-specific needs.

Before delivery of newborn

L&D Nurse:

- ☐ Call for NICU staff to come STAT
- ☐ Notify anesthesiologist of any allergies (latex, medications, other)
- ☐ Brief NICU staff on gestational age, fetal condition

As soon as practical during surgery

Circulating nurse:

- ☐ Confirm standard antibiotic has been given (e.g. cefazolin)n
- ☐ Confirm whether azithromycin should be added (if labor or ROM).
- ☐ Confirm patient warming procedures/devices are activated.
- ☐ Confirm whether any additional procedures were planned and consents signed (tubal ligation, cord blood collection, cerclage removal, etc.).
- ☐ Update risk assessment for PPH, announce result (low, medium, or high).
- ☐ Confirm active Type & Screen or crossmatched blood, if appropriate.
- ☐ Record names of all personnel in room.

During Closing

Circulating nurse:

- ☐ Order STAT x-ray to rule-out retained material (if counts were not complete prior to skin incision).
- ☐ Complete the Debriefing section of the standard cesarean checklist.

After Closing

Circulating nurse:

- ☐ Place sequential compression devices on legs as soon as possible.
- ☐ Debrief the entire team about the emergency event.
  - What processes went well?
  - What processes could be improved?

Version 27 June 2021

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