The following guidelines are intended as a general educational resource for hospitals and clinicians, and are not intended to reflect or establish a standard of care or to replace individual clinician judgment and medical decision making for specific healthcare environments and patient situations.

Vaginal Birth after Cesarean (VBAC) Guidelines

Revised June 2019

Background and Rationale:

Guidelines for provision of VBAC services for NNEPQIN member hospitals were first published in 2004 in response to changes in ACOG recommendations for the "immediate availability" of personnel able to perform an emergency cesarean delivery in the event of uterine rupture. These guidelines represent the iterative collaboration of NNEPQIN member hospitals in Maine, New Hampshire and Vermont since that time based on updated evidence and recommendations.

This document incorporates guidelines from ACOG and contemporary evidence from the medical literature, and presents a regional definition of provider "immediate availability" based upon patient risk status. The goal is to maintain the availability of VBAC services throughout the region, minimizing risk and maximizing safety and good maternal and neonatal outcomes.. These recommendations apply to VBAC candidates only, and recognize the need to adapt care to the unique circumstances of each case and setting.

Patient Selection and Counseling:

The importance of thorough counseling and a rigorous shared decision-making process between a woman desiring VBAC and her obstetrical care provider cannot be overemphasized. This discussion should be consistent, evidence-based, and clearly documented in the medical record to include a signed informed consent document. All patients should receive counseling about the risks and benefits of both successful and unsuccessful trial of labor after cesarean (TOLAC) as well as repeat cesarean delivery for both mother and infant. Unit staffing models and management plans for complications should be reviewed with the patient.

ACOG states: "Consistent with the principal of respect for patient autonomy, patients should be allowed to accept increased levels of risk; however, patients should be clearly informed of the potential increase in risk and management alternatives. Evaluation of a patient's individual likelihood of VBAC and risk of uterine rupture are central to these considerations.…In settings

where the resources needed for emergency cesarean delivery are not immediately available, the process for gathering needed staff when emergencies arise should be clear, and all centers should have a plan for managing uterine rupture." (4) (Level C)

NNEPQIN has developed a patient counseling and informed consent document that mirrors these guidelines and is available for local use and/or modification.

Unit Structure and Resource Availability:

Each hospital should develop policy and procedure guidelines that reflect the resources and ability of the delivery unit to respond to emergent situations that may develop for patients attempting VBAC. These guidelines should include processes of notification and availability of key personnel, facilities, and the expectations for response times for performing an emergency cesarean section.

Consistent with ACOG Guidelines, NNEPQIN recommends that TOLAC be attempted in facilities that can provide cesarean delivery for any situation that are immediate threats to the life of the woman or fetus. Specifically, these facilities should meet the definition of at least a Level I center, which "must have the ability to begin emergency cesarean delivery within a time interval that best considers maternal and fetal risks and benefits with the provision of emergency care." (29)

Each hospital needs to have a system in place for competency review and protocol verification. This can be accomplished in several ways, including but not limited to:

- periodic emergency cesarean drills for staff
- ongoing individual review of emergency cesarean section cases
- regular staff training and ongoing competency assessment in the interpretation of intrapartum fetal heart rate monitoring

These activities will provide ongoing opportunities for quality improvement.

Definitions:

- **Labor:** Regular and painful uterine contractions that cause cervical change.
- **Active Labor**: The cervix is 4-5 cm dilated and there are regular, painful uterine contractions
- **Adequate Labor:** Contractions every 3 minutes with a 50 torr rise above baseline or contractions every 3 minutes lasting at least 45 seconds that are palpably strong.
- **Provider capable of performing a cesarean section:** An obstetrician, surgeon, or family practitioner who is credentialed to perform a cesarean delivery.
- **Admission:** Occurs when labor has been diagnosed, or when decision is made to deliver the patient. Observation to determine if the patient is in labor is not considered admission.
- **Anesthesia:** Refers to a CRNA or anesthesiologist who is privileged by the hospital.
- **OR Team:** One person competent to scrub for a cesarean section and one person competent to circulate during a cesarean section. These may be OR technicians, LNA, CNA, LPN, or RN.

Prediction of VBAC Success

The Maternal Fetal Medicine Unit Network performed a large multi-center trial evaluating VBAC and developed a nomogram to predict VBAC success. A free access web-based calculator based on this nomogram can be found at: (https://mfmunetwork.bsc.gwu.edu/PublicBSC/MFMU/VGBirthCalc/vagbirth.html.) This tool may be useful for individualizing the counseling given to patients about VBAC. In addition, a second calculator was developed to estimate an individual woman's likelihood of VBAC success based on additional factors at the time of admission for delivery: https://mfmunetwork.bsc.gwu.edu/PublicBSC/MFMU/VGBirthCalc/vagbrth2.html

Previous vaginal delivery is associated with higher rates of VBAC success and lower risk of uterine rupture.

Evidence suggests that women with at least a 60-70% chance of successful VBAC may experience equivalent or reduced morbidity if they attempt TOLAC compared to if they choose repeat Cesarean delivery. Conversely, women with less than a 60% calculated chance of successful VBAC are more likely to experience morbidity if they TOLAC than if they choose repeat Cesarean delivery. (26, 27).

Patient Risk Stratification:

Each patient should be evaluated for risk factors associated with decreased VBAC success and uterine rupture (See Table 1). The association of factors related to an increased risk of uterine rupture has not translated into the reliable prediction of uterine rupture (1, 2). Patients without other risk factors may still experience uterine rupture. There are limited data on outcomes for women with multiple risk factors present. Based upon careful review of the literature and regional experience over the past 15 years, NNEPQIN has devised the following risk stratification system to aid hospitals, maternity care providers, and patients in making decisions regarding the appropriate mode and place of delivery.

1. **Low Risk Patient:** Risk for uterine rupture approximately 0.3-0.7%.
   - 1 prior low transverse cesarean section
   - Singleton gestation
   - Spontaneous onset labor
   - No need for augmentation
   - No repetitive FHR abnormalities
   - Patients with a prior successful VBAC are especially low risk. However, their risk status escalates the same as other low risk patients.

2. **Medium Risk Patient:** Risk for uterine rupture is likely greater than 0.7%.
   - 2 prior cesarean sections
   - Induction of labor (mechanical and/or with oxytocin)
   - Oxytocin augmentation
   - < 18 months between prior cesarean section and current delivery
   - >1 hour duration of second stage of labor (28)
   - Twin gestation

3. **High Risk Patient:** Patients who have intra-partum signs or symptoms that may be associated with uterine rupture or failure of vaginal delivery (4).
    - Recurrent clinically significant deceleration (variable, late or prolonged fetal heart rate decelerations) not responsive to clinical intervention
    - Significant bleeding of uterine origin
    - New onset of severe abdominal pain disproportionate to labor
    - 2 hours without cervical change in the active phase despite adequate labor

Prenatal Care Recommendations:

- Review records of prior deliveries, including type of uterine incision and method of hysterotomy closure. Evaluate history of previous uterine surgery.
    - VBAC may be attempted in some cases where documentation of the previous uterine scar is not available, as long as there is not a high suspicion of a classical uterine incision. (4) (Level B)
    - Patients with a previous classical uterine incision, previous extensive transfundal surgery or prior uterine rupture are not candidates for VBAC. (4) (Level B)
- Perform second trimester fetal anatomic survey to evaluate for fetal anomalies, placental location, and evidence of placenta previa and/or placenta accreta spectrum
- Consider pelvic exam to assess adequacy of maternal pelvis for a trial of labor
- Completion and documentation of a shared decision making process between the patient and her obstetrical care provider, including a VBAC consent document that is reviewed and signed during prenatal care, to include a discussion of the following
    - Risks and benefits of both successful and unsuccessful trial of labor after cesarean (TOLAC) as well as repeat cesarean delivery for both mother and infant.
    - A description of the process of risk assessment.
    - The ability of the institution to care for the patient, based on her risk level.
    - The process of pre-labor transfer of care, should it become necessary based on changes in risk factors.
    - Institutional management plans for uterine rupture.
    - Unit staffing models and management plans for complications
    - Anesthesia consultation/evaluation per institution guidelines.
    - If the primary OB provider cannot perform a cesarean section, consultation with provider privileged to perform a cesarean section.

Intrapartum Care Recommendations for all VBAC Patients:

- Review with the patient the risks/benefits of proceeding with VBAC on admission.
- Determine if the patient's risk level has changed, or patient choice has changed. This review should be documented in the medical record. Consider updating calculation of patient's likelihood of successful VBAC using the MFMU calculator specific to presentation for delivery. https://mfmunetwork.bsc.gwu.edu/PublicBSC/MFMU/VGBirthCalc/vagbrth2.html
- Obtain peripheral IV access
- Lab/Blood Bank Preparation
    - Type and Screen, or Type and Cross depending on the institution's blood bank availability in off hours
- Notification of Anesthesia, O.R., and Pediatric personnel at time of admission.
- In Active Labor (4-5 cm dilated).
    - Continuous Electronic Fetal Monitoring.

    - Provider on hospital campus who is credentialed to perform a cesarean section. (If the primary obstetric provider is not credentialed to perform a cesarean section, the cesarean delivery provider will be consulted).
- All patients attempting VBAC should have their labor progress monitored carefully to ensure adequate progress. Arrest of labor is associated with decreased VBAC success and uterine rupture. Patients with a macrosomic fetus (EFW > 4000 gm), especially those with no previous vaginal birth, are more likely to experience outcomes related to arrest of labor, and require careful monitoring.
- Cesarean section may be recommended if a woman's risk status increases and provider services cannot be increased and maintained until delivery.

Recommended Staffing and Resource Availability:

1. **Low Risk Patient:**
    - No additional interventions other than those listed above.
    - Cesarean delivery provider may have other acute patient care responsibilities during active labor, but should remain on the hospital campus.

2. **Medium Risk Patient:**
    - Cesarean delivery provider on the hospital campus during the active phase of labor. Cesarean delivery provider may have other acute patient care responsibilities.
    - An open and staffed operating room is available or there is a plan in place if immediate delivery is required. This may be a room where there is adequate lighting, instruments, and general anesthesia can be administered if needed.
    - An anesthesia provider is present on the hospital campus during the active phase of labor.
    - Anesthesia staff may have other acute patient care responsibilities.
    - There is an established back up protocol for anesthesia services during times of high clinical acuity.

3. **High Risk Patient:**
    - The cesarean delivery provider is present on the hospital campus and does not have other acute patient care responsibilities
    - Anesthesia staff is present on the hospital campus and does not have other acute patient care responsibilities.
    - An open and staffed operating room is available.

Caveats and Special Circumstances:

- Maternal obesity is associated with a decreased likelihood of successful VBAC, but not an increased risk of uterine rupture. In addition, maternal obesity is associated with increased risk of surgical complications in women undergoing elective repeat cesarean delivery. Counseling and care of these women should be individualized.
- Misoprostol is associated with a high rate of uterine rupture and should not be used when a living fetus is still in-utero (4) (Level A). It may be used after delivery for uterine atony.
- There are limited data regarding the safety of a trial of labor in women with more than 2 prior cesarean sections. The degree of increase in risk of uterine rupture is unclear.

- Single layer closure of the uterus with an interlocking chromic type suture has been reported to be associated with an increased risk of uterine rupture. Operative records should be reviewed for the method of closure.
- Transfer of care during the active phase of labor holds little benefit for the patient as access to timely delivery is not present during transport and should be avoided if at all possible
- Attempting VBAC with twin gestation carries a similar risk as for those women with singleton pregnancies. Women without other risk factors, who have twins and are candidates for vaginal delivery, may be considered candidates for attempting VBAC. (4) (Level B)
- Women may present to hospitals that have chosen not to offer VBAC services. Transfer to a hospital providing VBAC services necessitates evaluation of the patient, to determine safety, and must comply with federal and state law. Hospitals not offering VBAC services should meet the following standards:
  - Protocol in place for women with prior cesarean sections who present in labor
  - Institution complies with ACOG Guidelines for Prenatal Care and JACHO Standards for Obstetrical Care.
  - Referral and counseling practices established so that women desiring VBAC may be referred to an appropriate center based upon their risk status.
  - Meets NRP Guidelines for infant care.

Table 1: Factors Associated with VBAC Failure and/or Uterine Rupture:

Factors Associated With Decreased VBAC Success
Labor induction (3, 4)
Labor augmentation(3, 4)
Short inter-pregnancy interval (3, 4)
Birth weight >4000 gm(3, 4)
Gestational age 41 weeks or greater (3, 4)
Excess maternal weight gain, variously defined (3, 4)
Maternal obesity, variously defined (3, 4)
Recurrent indication for initial cesarean delivery (3, 4)
Unfavorable cervical status at admission (3, 4)
Non-white ethnicity (3, 4)

Factors Associated With Uterine Rupture
Labor induction (5, 6, 7)
Labor augmentation (8, 9, 10)
Short inter-pregnancy interval (17, 18, 19)

Other Factors Investigated for Association with Uterine Rupture Data insufficient to demonstrate consistent association.
Gestational age 41 weeks or greater (14, 15, 16)
Birth weight >4000 gm (11, 12, 13)
Previous single layer closure of the uterus (20, 21)
Maternal obesity, variously defined (22)
Recurrent indication for initial cesarean delivery (1)
Unfavorable cervical status at admission (1)
Non-white ethnicity (1) 3 or more prior cesarean sections (24, 25)

Table 2: Composite Maternal Risks and Neonatal Morbidity from Repeat Elective Cesarean Delivery and Trial of Labor After Previous Cesarean Delivery in Term Patients

Risk/Complication	ERCD (%)	TOLAC (%)
Maternal		
• Infectious morbidity	3.2	4.6
• Surgical injury	0.30-0.60	0.37-1.3
• Blood transfusion	0.46	0.66
• Hysterectomy	0.16	0.14
• Uterine rupture	0.02	0.71
• Death	0.0096	0.0019
Neonatal (fetus/baby)		
• Antepartum stillbirth	0.21	0.10
• Intrapartum stillbirth	0-0.004	0.01-0.04
• HIE	0-0.32	0-0.89
• Perinatal mortality	0.05	0.13
• Neonatal mortality	0.06	0.11
• NICU admission	1.5-17.6	0.8-26.2
• Respiratory morbidity	2.5	5.4
• Transient tachypnea	4.2	3.6

Data from Guise JM, Eden K, Emeis C, Denman MA, Marshall N, Fu R, et al. Vaginal birth after cesarean: new insights. [Archived] Evidence Report/Technology Assessment no. 191. AHRQ Publication No. 10-E003. Rockville (MD: Agency for Healthcare Research and Quality; 2010.

Proposed Performance Measure:
The percentage of patients for whom there is documented risk status at the time of admission, and documented change in risk status during labor, should that occur.

References:

1. Grobman WB, Lie, Y, Landon MB, et al: Prediction of uterine rupture associated with attempted vaginal birth after cesarean delivery. Am J Obstet Gynecol July 2008;199:30. (Level II-3)

2. Macones GA, Chahill AD, Stamilo DM, et al: Can uterine rupture in patients attempting vaginal birth after cesarean delivery be predicted? Am J Obstet Gynecol Oct 2006;195:1148. (Level II-3)

3. Landon, MB, Leindecker, S, Spong, CY, et al: The MFMU Cesarean Registry: Factors affecting the success of trial of labor after previous cesarean delivery. Am J Obstet Gynecol Sep 2005;193:1016 (Level II-2)

4. ACOG Practice Bulletin #184, Vaginal Birth After Previous Cesarean Delivery, Obstet Gynecol Nov 2017; 130:5;116:450

5. Landon MB, Hauth JC, Leveno KJ, et al: For the National Institutes of Child Health and Human Development Maternal-Fetal Medicine Units Network. Maternal and perinatal outcomes associated with a trial of labor after prior Cesarean delivery. N Engl J Med 351:2581-2589, 2004 (Level II-2)

6. Grobman WA, Gilbert S, Landon MB, et al: Outcomes of induction of labor after one prior Cesarean. Obstet Gynecol 109:262-269, 2007 (Level II-2)

7. Cahill AG, Waterman BM, Stamilio DM, et al: Higher maximum doses of oxytocin are associated with an unacceptably high risk for uterine rupture in patients attempting vaginal birth after Cesarean delivery. Am J Obstet Gynecol 199:32.e1-32.e5, 2008 (Level II-2)

8. Health and Human Development Maternal-Fetal Medicine Units Network. The MFMU Cesarean registry: Risk of uterine rupture with a trial of labor in women with multiple and single prior Cesarean delivery. Obstet Gynecol 108:12-20, 2006 (Level II-2)

9. Leung AS, Farmer RM, Leung EK, et al: Risk factors associated with uterine rupture during trial of labor after Cesarean delivery: A case controlled study. Am J Obstet Gynecol 168:1358, 1993 (Level II-2)

10. Mark B. Landon, MD: Predicting Uterine Rupture in Women Undergoing Trial of Labor After Prior Cesarean Delivery. Semin Perinatol 34:267, 2010 (Level III)

11. Elkousy, MA, Mary Sammel, ScD, Erika Stevens, MA, et al: The effect of birth weight on vaginal birth after cesarean delivery success rates. Am J Obstet Gynecol 2003;188:824 (Level II-2)

12. Nicole Jastrow, MD, Stephanie Roberge, Robert J. Gauthier, MD, et al: Effect of Birth Weight on Adverse Obstetric Outcomes in Vaginal Birth After Cesarean Delivery. Obstet Gynecol 2010;115:338 (Level II-2)

13. Carolyn M. Zelop, MD, Thomas D. Shipp, MD, John T. Repke, MD, et al: Outcomes of trial of labor following previous cesarean delivery among women with fetuses weighing >4000 g. Am J Obstet Gynecol 2001;185: 903 (Level II-2)

14. Usha Kiran TS, et al: Is gestational age an independent variable affecting uterine scar rupture rates? Eur J Obstet Gynec Reprod Biol 2006;126:68 (Level II-2)

15. Hammoud A, Hendler I, Gauthier RJ, et al: The effect of gestational age on trial of labor after cesarean section. J Mat Fet Neo Med 2004;15:202 (Level II-2)

16. Ram M, Hiersch L, Ashwal E, Nassie D, Lavie A, Yogev Y, et al. Trial of labor following one previous cesarean delivery: the effect of gestational age. Arch Gynecol Obstet 2018. 297(4):907–13. (Level II-2)

17. Shipp TD, Zelop CM, Repke JT, et al: Interdelivery interval and risk of symptomatic uterine rupture. Obstet Gynecol 97:175-177, 2001 (Level II-2)

18. Stamilio D, DeFranco E, Para E, et al: Short interpregnancy interval: Risk of uterine rupture and complications of vaginal birth after Cesarean delivery. Obstet Gynecol 110:1075-1082, 2007 (Level II-2)

19. Bujold E and Gauthier R: Risk of uterine rupture associated with an interdelivery interval between 18 and 24 months. Am J Obstet Gynecol 115:1003-1006, 2010 (Level II-2)

20. Bujold, E, Goyet, M, Marcoux, S, et al: The Role of Uterine Closure in the Risk of Uterine Rupture. Obstet. Gynecol. 2010;116:43 (Level II-2)

21. Bujold E, Bujold C, Hamilton, EF, et al: The impact of a single-layer or double-layer closure on uterine rupture. Am J Obstet Gynecol 2002;186:1326 (Level II-2)

22. Hibbard, JU, Gilbert, S, Landon, MB, et al: Trial of Labor or Repeat Cesarean Delivery in Women With Morbid Obesity and Previous Cesarean Delivery. Obstet Gynecol 2006;108:125. (Level II-2)

23. Guise JM, Denman MA, Emis C, Marshall N, Walker M, Fu R, Janik R, et al. Vaginal birth after cesarean. New insights on maternal and neonatal outcomes. Obstet Gynecol 2010; 115:1267

24. Macones, GA, Cahill A, et al: Obstetric outcomes in women with two prior cesarean deliveries: Is vaginal birth after cesarean delivery a viable option? Am J Obstet Gynecol 2005; 192: 1223 (Level II-2)

25. Tasheen F, Griffiths M: Vaginal birth after two caesarean sections (VBAC-2)—a systematic review with meta-analysis of success rate and adverse outcomes of VBAC-2 versus VBAC-1 and repeat (third) caesarean sections. BJOG 2010;117:5–19 (Level II-2)

26. Cahill A, Stamilio D, Odibo A, Peipert J, Ratcliffe S, Stevens E, et al. Is vaginal birth after cesarean (VBAC) or elective repeat cesarean safer in women with a prior vaginal delivery? Am J Obstet Gynecol 2006;195:1143-7 (Level II-2)

27. Grobman W, Lai Y, Landon M, Spong C, Leveno K, Rouse D, et al. Can a prediction model for vaginal birth after cesarean also predict the probability of morbidity related to trial of labor? Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Am J Obstet Gynecol 2009;200:56.e1-6 (Level II-2)

28. Hehir M, Rouse D, Miller R, Ananth C, Wright J, Siddiq Z, et al. Second Stage Duration and Outcomes Among Women Who Labored After a Prior Cesarean Delivery. Am J Obstet Gynecol 2018;131:514-522 (Level II-2)

29. Levels of maternal care. Obstetric Care Consensus No. 2. American College of Obstetricians and Gynecologists. Obstet Gynecol 2015;125:502–15.

Studies were reviewed and evaluated for quality according to the method outlined by the U.S. Preventative Services Task Force

I Evidence obtained from at least one properly designed randomized controlled trial.

II–1 Evidence obtained from well–designed controlled trials without randomization.

II–2 Evidence obtained from well–designed cohort or case–control analytic studies, preferably from more than one center or research group.

II–3 Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments also could be regarded as this type of evidence.

III Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

Based on the highest level of evidence found in the data, recommendations are provided and graded according to the following categories:

Level A—Recommendations are based on good and consistent scientific evidence.

Level B—Recommendations are based on limited or inconsistent scientific evidence.

Level C—Recommendations are based primarily on consensus and expert opinion.