



VBAC

Safer than you think

The pendulum continues to swing between these 2 delivery options.
Has it swung too far toward elective cesarean?

■ BY ELLEN MOZURKEWICH, MD, MS

Despite numerous studies detailing the safety and efficacy of attempted vaginal birth after cesarean (VBAC), the strategy remains controversial. Many obstetricians are retreating from the assumption that this mode of delivery is safer than elective repeat cesarean (ERC) for most women with

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1 or 2 prior cesarean sections. This shift in attitude springs in part from a decreased societal tolerance of risk and in part from a misinterpretation of current data.

Here, I review a large body of literature supporting the contention that a trial of labor (TOL) yields a more favorable maternal risk profile than ERC. Although the risk of uterine rupture and fetal complications may be slightly

increased with a TOL, the overall incidence of these complications is reassuringly low.

Absolute risks and benefits

Research into the relative safety of a TOL after cesarean was conducted throughout the 1970s and 1980s. In 1989, Meehan and Magani published data from 15 years of experience at the University College Hospital in Galway, Ireland.¹ This series included 1,350 trials of labor, with an 81.26% vaginal delivery rate. Among the women who labored, the incidence of true uterine rupture (which the authors defined as “complete uterine scar disruption, requiring repair at emergency cesarean section or laparotomy”) was 0.44%. In comparison, the incidence of true rupture among the 1,084 women who opted for ERC was 0.37%. There were 4 perinatal deaths attributable to uterine ruptures; 3 occurred in the TOL group, and 1 occurred in the ERC group.

Other evidence from large databases includes a meta-analysis by Rosen and Dickinson, which pooled data from studies carried out in the United States between 1982 and 1989.² Among the 29 studies included in the analysis, the rate of successful vaginal delivery ranged from 54% to 89%.

A later meta-analysis by Rosen et al compared morbidity and mortality for TOL and ERC.³ In 5,463 trials of labor, there were 22 true uterine ruptures (4/1,000), with 3 perinatal deaths (5/10,000) attributable to these ruptures. There was one maternal death in each group, yielding maternal mortality rates of 2.8 in 10,000 for women choosing a TOL and 2.4 in 10,000 for women undergoing ERC. Maternal febrile morbidity was greatest among women having failed a TOL, intermediate among women undergoing ERC, and lowest among women having successful TOLs. This analysis did not compare maternal morbidity according to intended mode of delivery.

Subsequently, several large series compared TOL with ERC. One from California

prospectively compared these delivery options among women receiving obstetrical care within the Kaiser Permanente managed-care organization.⁴ This cohort study included 5,022 women who attempted vaginal birth, and 2,207 women who underwent ERC. Among women attempting vaginal birth, 75% were successful, with a rate of uterine rupture of 0.8%. There were no perinatal deaths due to rupture, and women attempting vaginal

Febrile morbidity was less common among women having a TOL than an ERC.

birth required significantly fewer transfusions and had significantly less postpartum fevers than those undergoing ERC. There were fewer hysterectomies among women in the TOL group than the ERC group, though the difference was not statistically significant.

In another series, Miller et al reported a prospective evaluation of TOL and ERC among 17,322 women with at least 1 previous cesarean who delivered at the University of Southern California Women’s Hospital or at

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KEY POINTS

- Although the risk of uterine rupture and fetal complications may be slightly increased with a trial of labor (TOL), the overall incidence of these complications is low.
- In a recent meta-analysis involving 47,682 women, a TOL produced more favorable maternal outcomes than elective repeat cesarean (ERC). Women choosing TOL also were much less likely to undergo hysterectomy than those selecting ERC.
- Many investigators remain reluctant to recommend induction of labor in the setting of vaginal birth after cesarean section (VBAC), fearing an increased risk of uterine rupture when oxytocic agents are used.
- Between 374 and 809 women would need to undergo ERC to prevent 1 uterine rupture, and between 693 and 3,332 women would need to undergo ERC to prevent 1 perinatal death attributable to a TOL.

Los Angeles County Hospital.⁵ Of these women, 12,707 had trials of labor, with 82% delivering vaginally. There were 95 uterine ruptures (0.7%), but the rate of related perinatal death was only 2 in 10,000.

More recently, Rageth and colleagues evaluated 29,046 deliveries after previous cesarean in a pooled Swiss database of 457,825 deliveries.⁶ Of these patients, 17,613 underwent a TOL, with a success rate of 73.7%. There were 70 uterine ruptures among the women attempting vaginal birth (0.4%) and 22 ruptures among those undergoing ERC (0.2%). Perinatal death was more common among those undergoing a TOL, but the absolute risk of perinatal death was low (2/1,000 for TOL compared with 1/1,000 for ERC when infants with congenital anomalies or extreme prematurity were excluded). Hysterectomy, febrile morbidity, and thromboembolic complications all were significantly less common among women having a TOL than those choosing elective repeat cesarean.

Similarly, Gregory et al reported on a cohort of 66,856 women with prior cesarean deliveries whose records were gathered from 1995 discharge data from the California Office of Statewide Health Planning and Development.⁷ In this cohort, 39,096 women attempted vaginal delivery, and 61.4% were successful. There were 209 uterine ruptures among women having a TOL (0.5%) and 79 ruptures among those having ERC (0.3%).

Perhaps the most influential recent investigation is a population-based longitudinal study by McMahon and colleagues suggesting that maternal morbidity might be greater with a TOL than with ERC.⁸ This

study included 6,138 women with prior cesarean deliveries. Of these, 3,249 had a TOL, and 2,889 underwent ERC. There were 10 uterine ruptures (0.3%) among those in the TOL group, and 1 uterine rupture (0.0%) among those in the ERC group. There were no significant differences in hysterectomy, puerperal fever, or the need for transfusion. However, operative injuries were significantly more common among women having a TOL, while abdominal wound infections were significantly more frequent among those undergoing elective repeat cesarean.

McMahon et al classified uterine ruptures, hysterectomies, and operative injuries as “major complications,” and puerperal fever, transfusions, and abdominal-wound infections as “minor complications.” They found that pooled major complications were significantly more frequent in the TOL group, but that there was no difference between groups in pooled minor complications. This finding contradicted much earlier research, which suggested maternal morbidity would be reduced when a TOL was undertaken.

This influential study contributed greatly to the decrease in enthusiasm for a TOL. However, a careful examination of its data reveals that though there was greater risk of uterine rupture among women experiencing labor, that number was a quite low 0.3%. And while the difference was not significant, fewer hysterectomies were performed in the TOL group than in the ERC group. Overall maternal morbidity did not differ between the groups. Further, the classification of operative injury as a major complication and the need for blood transfusion as a minor complication is, at least, debatable.

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The assumption that elective repeat cesarean will result in significantly fewer cases of long-term neurologic impairment is unproven at this time.

Cutting the legal risks of VBAC

Medical liability claims spurred by complications associated with vaginal birth after cesarean (VBAC) are a disturbing fact. Although the risks of VBAC generally are very low, foremost among them is uterine rupture, which can have dire consequences for both mother and infant.

Of course, when a trial of labor (TOL) is successful—as it usually is—maternal morbidity is lower than with elective repeat cesarean (ERC). For this reason, properly selected and counseled patients should be allowed a TOL if they desire. Other recommendations to help minimize the possibility of litigation include:

Know the risks. As mentioned above, there is a low but significant risk of uterine rupture. In addition, placenta previa and placenta accreta are more likely to occur in women with a history of primary cesarean. If the TOL is unsuccessful, the likelihood of maternal and fetal complications increases further.¹ Contraindications to a TOL include a previous uterine rupture, a prior classic or T-shaped uterine incision, a contracted pelvis, and maternal or fetal conditions that preclude vaginal delivery.¹

Select patients carefully. Candidates for a TOL include women who have undergone a previous low-transverse cesarean and have no evidence of fetopelvic disproportion.¹ Even women who have undergone up to (but not more than) 2 previous cesareans may be allowed a TOL, provided they have no other uterine incisions or contraindications to vaginal delivery. However, they should be counseled that the risk of uterine rupture is greater when there is more than 1 previous incision.

Assess the incision. If the previous incision was low transverse, and no other contraindications are present, the risk of rupture is 0.2% to 1.5%. Other incisions carry a significantly greater risk. These include low vertical (1% to 7% risk), T-shaped (4% to 9%), and classical uterine scars (4% to 9%).¹

Appeal global mandates. Some insurers require all women with a previous cesarean delivery to undergo a TOL. Unfortunately, such policies can

lead to attempted VBAC in cases where ERC is indicated.¹ If a TOL would be unwise for your patient, bring her to the insurer's attention rather than adhere to potentially harmful requirements.

Be conservative. Adopt a cautious approach in obstetric situations in which TOL is controversial, such as gestational diabetes, multiple gestation, postdate pregnancy, and suspected macrosomia.^{1,2}

Ensure back-up. The obstetrician should offer a TOL only when he or she can ensure immediate access to surgical facilities for emergent cesarean, including skilled health-care personnel, anesthesia, pediatric specialists, and the proper instrumentation. When these are not available, the patient should undergo ERC or be transferred to a hospital that can provide them.^{1,3}

Be vigilant. Continuous fetal monitoring is recommended. Support staff should be well educated about the signs of uterine rupture (nonreassuring fetal heart rate [FHR], abdominal pain, vaginal bleeding, hypovolemia, or a loss of station of the presenting part), and the obstetrician should remain nearby until the infant is delivered. If FHR tracings indicate a long deceleration to 60 to 70 bpm or severe and unresponsive variable decelerations, the obstetrician should intervene immediately. Note that epidural analgesia rarely obscures the signs of rupture.^{1,3}

Write it down. In a number of cases, physicians have had to defend their actions in court based on their memory of how the delivery proceeded, since documentation in the patient's chart was sparse. The solution? Write everything down. It's better to have a thorough record and not need it than to need documentation that doesn't exist.

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REFERENCES

1. American College of Obstetricians and Gynecologists. *Vaginal birth after previous cesarean delivery*. Practice Bulletin #5. Washington, DC: ACOG; 1999.
2. Coleman TL, Randall H, Graves W, et al. VBAC among women with gestational diabetes. *Am J Obstet Gynecol*. 2001; 184(6):1104-1107.
3. Flamm BL. Vaginal birth after cesarean: reducing medical and legal risks. *Clin Obstet Gynecol*. 2001;44(3):622-629.

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Sorting recent data

To obtain more precise estimates of morbidity and mortality risks, Eileen Hutton and I performed a meta-analysis of the literature published between 1989 and 1999.⁹ We included studies in which women undergoing a TOL and those choosing ERC had both been candidates for vaginal birth. That is, we

Overall, a TOL results in a more favorable maternal risk profile than ERC.

tried to evaluate studies in which those choosing either of the 2 treatments were as comparable as possible at the outset. Unfortunately, in the absence of randomized treatment assignments, it is impossible to exclude all intrinsic differences.

Fifteen studies involving a total of 47,682 women met our inclusion criteria. We evaluated 8 outcomes of interest: the rates of vaginal birth, uterine rupture, perinatal death, maternal death, maternal febrile morbidity, maternal blood transfusion, hysterectomy, and 5-minute Apgar scores less than 7.

Of the 28,813 women undergoing a TOL, 72.3% achieved vaginal birth. Although the risk of uterine rupture among those choosing TOL was about twice that of those choosing ERC, the absolute risk of this complication was quite small for both groups (0.4% and 0.2%, respectively). The risk of perinatal death was significantly increased in the TOL group, compared with the ERC group; however, the unadjusted risk of death was quite low (0.6% for TOL compared with 0.3% for ERC). When deaths attributable to extreme prematurity or lethal anomalies and intrauterine deaths before labor were excluded, the risk of death decreased to 0.2% in the TOL group and 0.1% in the ERC group. Thus, we calculated the risk of perinatal death attributable to trial of labor to be about 1 in 1,000.

There were about twice as many babies

with 5-minute Apgar scores below 7 in the TOL group as in the ERC group. However, we were unable to identify studies comparing long-term infant or childhood morbidity by intended delivery method. The assumption that ERC will result in significantly fewer cases of long-term neurologic impairment is unproven at this time.

For all measures of maternal morbidity, a TOL produced more favorable outcomes than ERC. We found that women electing TOL were about half as likely to require a blood transfusion as those choosing ERC. Women choosing TOL also were much less likely to undergo hysterectomy than those selecting ERC (odds ratio [OR] 0.39; 95% confidence interval [CI], 0.27 to 0.57). Maternal mortality did not differ between the groups.

Overall, our systematic review of a large body of literature supported the contention that a TOL results in a more favorable maternal risk profile than ERC. Although we found that uterine ruptures and fetal risks may be slightly increased with a TOL, our estimates of these complications were reassuringly small. In addition, it should be noted that rates of placenta previa and placenta accreta—potentially life-threatening complications—tend to increase with the number of sections, further supporting a TOL.

Additional research is needed to investigate any possible pelvic-floor trauma associated with VBAC, as well as potential long-term morbidities—such as bowel obstructions, chronic pelvic pain, and dyspareunia—from cesarean section.

Induction of labor

Although TOL became increasingly popular in the 1980s and '90s, many investigators have been reluctant to recommend induction of labor in the VBAC setting, fearing an increased risk of uterine rupture when oxytocic agents are used. There is less evidence of the safety and efficacy of induction of labor than of spontaneous labor in VBAC attempts. Most

CONTINUED

▪ VBAC: Safer than you think

reports of induction of labor in this setting come from small series, which may lack the statistical power to identify differences in relatively rare outcomes such as uterine rupture.

A number of authors have published series of labor inductions involving oxytocin. In 1987, Molloy et al reported on 418 women with prior cesarean section whose labors were induced with oxytocin.¹⁰ Of these women, 374 (89.5%) delivered vaginally, and 3 (0.7%) experienced uterine ruptures. In contrast, Zelop and colleagues reported a relatively high risk of uterine rupture in a similar population.¹¹ In their series of 458 women attempting VBAC who had labor induced with oxytocin, 9 (2%) experienced uterine rupture. In 2 Canadian series, the risks reported for induction of labor with oxytocin were lower. Ravasia et al¹² reported a uterine rupture rate of 2 in 248 (0.8%), and Bebbington and Waterman¹³ reported a rate of 2 in 460 (0.4%).

There also have been several large series reporting on the use of prostaglandin E₂ (PGE₂) for induction of labor in VBAC attempts. In 1991, MacKenzie published a

series describing 482 women attempting VBAC who had labor induced with PGE₂.¹⁴ Seventy-five percent delivered vaginally, and 1 (0.2%) experienced uterine rupture. In a 1994 German series, 161 women received PGE₂ for induction of labor.¹⁵ No uterine ruptures occurred in this cohort.

In 1997, Flamm et al published a series involving 453 women attempting VBAC who had unfavorable cervixes and received PGE₂ for cervical ripening.¹⁶ Fifty-one percent delivered vaginally, and 6 (1.3%) experienced uterine rupture. Flamm and colleagues found no differences in perinatal or maternal morbidity between women receiving PGE₂ and those who managed without it.

Several small series have described labor induction with misoprostol in the VBAC population.¹⁷⁻¹⁹ These studies reported uterine-rupture rates ranging from 0 to 6%. A randomized trial comparing misoprostol with oxytocin among VBAC patients was terminated prematurely because of 2 uterine ruptures among 17 women who received misoprostol.²⁰ Consequently, misoprostol cannot be recommended for use among

VBAC: a timeline

• **1916** Origination of the aphorism: "Once a cesarean, always a cesarean." According to Enkin et al, the phrase was a warning to avoid primary cesarean whenever possible because it always entailed a classic or T-shaped incision.¹

• **1970s** Research begins into the safety of vaginal birth after cesarean (VBAC). The national cesarean rate remains below 5%, while the number of VBACs starts to rise.²

• **1981** The National Institutes of Health (NIH) recommend a trial of labor for women with a previous cesarean. The rate of successful VBAC is 3%, and the overall cesarean rate is 17.9%.³

• **1984** ACOG recommends that VBAC be offered to women who have 1 or more low transverse uterine scars, provided the fetus is in a vertex presentation and there are no contraindications to vaginal delivery.³

REFERENCES

1. Enkin M, Keirse MJNC, Neilson J, et al, eds. *A Guide to Effective Care in Pregnancy and Childbirth*. Oxford, UK: Oxford University Press; 2000.
2. Caughey AB, Mann S. Vaginal birth after cesarean. *eMed J*. 2001;2(9). Available at <http://emedicine.com/med/topic3434.htm>. Accessed June 20, 2002.
3. Harer WB Jr. Vaginal birth after cesarean delivery: current status. *JAMA*. 2002;287:2627.
4. McMahon MJ, Luther ER, Bowes WA Jr, Olshan AF. Comparison of a trial of labor with an elective second cesarean section. *N Engl J Med*. 1996;335: 689-695.

women with prior cesarean deliveries.

The largest single report on induction of labor comes from a Swiss database.⁶ In this series, there were 2,459 labor inductions, with 1,612 (65.6%) women delivering vaginally. There were 17 uterine ruptures (0.7%). Unfortunately, the authors of this series do not provide information on the means used to induce labor.

Most recently, Lydon-Rochelle and colleagues compared the uterine rupture rates among women experiencing spontaneous labors with those having their labors induced.²¹ The labor-induction group included women who were given prostaglandins. In the study, the risk of uterine rupture among women experiencing spontaneous labor was 0.5%, compared with 0.8% among those induced without prostaglandins, and 2.5% among those induced with prostaglandins.

Risk scoring and decision models

Based on these estimates of maternal and fetal risks, a number of authors have attempted to optimize outcomes using deci-

sion analysis. They have constructed models estimating the probability of a successful TOL, as well as maternal and fetal morbidity, among women with differing clinical characteristics. The authors of 2 early models theorized that perinatal morbidity and mortality associated with uterine rupture would be offset by neonatal morbidity and mortality due to respiratory distress syndrome

A TOL may be the more cost-effective option when the probability of vaginal delivery exceeds 0.74%.

(RDS) after ERC.²²⁻²³ They also assumed that maternal morbidity and mortality after a TOL would be less than that after ERC. Given these assumptions, TOL was the preferred choice in both models.

The authors of a more recent decision analysis approached the controversy differently. They calculated cost-effectiveness ratios for ERC, defining “effectiveness” as the procedure’s ability to prevent some uter-

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● **1993** The Los Angeles County–University of Southern California Medical Center requires all women meeting ACOG criteria to attempt VBAC but abandons the policy in 1995 because of legal claims associated with adverse outcomes.³

● **1996** McMahon et al publish an influential study suggesting that maternal morbidity is greater with a trial of labor than with elective repeat cesarean.⁴ The cesarean rate peaks at 26%, then declines slightly. The VBAC rate is 28%.²

● **1999** The cesarean rate continues to rise, while the VBAC rate declines to 23%.² ACOG modifies the criteria for VBAC to include only women with no more than 2 prior cesarean deliveries.³

ine ruptures, some perinatal deaths, and some cases of long-term childhood morbidity.²⁴ Maternal morbidity was stratified according to whether the mother experienced vaginal birth, ERC, or emergency intrapartum cesarean. In the analysis, the preferred intended mode of delivery varied, depending on the probability of successful vaginal birth based on clinical characteristics. This model suggested that a TOL may be the more cost-effective option when the probability of vaginal delivery exceeds 0.74%. Below this threshold, ERC may be more cost-effective.

Recommendations

Despite the recent trend away from a TOL after cesarean delivery, this option remains relatively safe, and uterine rupture is fairly rare. Although maternal morbidity may be increased after a failed TOL, women who choose TOL have a more favorable outcome profile on average than those choosing ERC.

Even though ERC offers more positive fetal and infant safety profiles, the magnitude of this benefit is quite small. In our review and meta-analysis, we calculated that between 374 and 809 women would need to undergo ERC to prevent 1 uterine rupture, and between 693 and 3,332 women would need to undergo ERC to prevent 1 perinatal death attributable to a TOL.⁹

Overall, the literature suggests that a risk-benefit analysis is likely to favor TOL when the probability of success is high—as it usually is—and likely to favor ERC when that probability declines, as with induction of labor in the setting of an unfavorable cervix. Each woman's appraisal of the risks and benefits will depend on how she values each possible outcome of these delivery methods. All told, however, a TOL remains a valid option for most women with a prior cesarean delivery. ■

REFERENCES

1. Meehan FP, Magani IM. True rupture of the caesarean section scar (a 15 year review, 1972-1987). *Eur J Obstet Gynecol Reprod Biol.* 1989;30:129-135.

2. Rosen MG, Dickinson JC. Vaginal birth after cesarean: a meta-analysis of indicators for success. *Obstet Gynecol.* 1990;76:865-869.
3. Rosen MG, Dickinson JC, Westhoff CL. Vaginal birth after cesarean: a meta-analysis of morbidity and mortality. *Obstet Gynecol.* 1991;77:465-470.
4. Flamm BL, Goings JR, Liu Y, Wolde-Tsadik G. Elective repeat cesarean delivery versus trial of labor: a prospective multicenter trial. *Obstet Gynecol.* 1994; 83:927-932.
5. Miller DA, Diaz FG, Paul RH. Vaginal birth after cesarean: a 10-year experience. *Obstet Gynecol.* 1994;84:255-258.
6. Rageth JC, Juzi C, Grossenbacher H. Delivery after previous cesarean: a risk evaluation. *Obstet Gynecol.* 1999;93:332-337.
7. Gregory KD, et al. Vaginal birth after cesarean and uterine rupture rates in California. *Obstet Gynecol.* 1999;94:985-989.
8. McMahon MJ, Luther ER, Bowes WA Jr, Olshan AF. Comparison of a trial of labor with an elective second cesarean section. *N Engl J Med.* 1996;335:689-695.
9. Mozurkewich EL, Hutton EK. Elective repeat cesarean delivery versus trial of labor: a meta-analysis of the literature from 1989 to 1999. *Am J Obstet Gynecol.* 2000;183:1187-1197.
10. Molloy BG, Sheil O, Duignan NM. Delivery after caesarean section: review of 2,176 consecutive cases. *BMJ.* 1987;294:1645-1647.
11. Zelop CM, Shipp TD, Repke JT, Cohen A, Caughey AB, Lieberman E. Uterine rupture during induced or augmented labor in gravid women with one prior cesarean delivery. *Am J Obstet Gynecol.* 1999;181:882-886.
12. Ravasia DJ, Wood SL, Pollard JK. Uterine rupture during induced trial of labor among women with previous cesarean delivery. *Am J Obstet Gynecol.* 2000;183:1176-1179.
13. Bebbington M, Waterman D. Uterine rupture following induction of labor with a previous cesarean section. *Am J Obstet Gynecol.* 2000;182:S137.
14. MacKenzie IZ. Prostaglandin induction and the scarred uterus. In: Keirse MJNC, Elder MB, eds. *Induction of Labor: Special Issues.* Amsterdam: Excerpta Medica; 1991:29-33.
15. Behrens O, Goeschen K, Jakob H, Kauffels W. Induced labor with prostaglandin E₂ gel after previous cesarean section [in German]. *Geburtshilfe Frauenheilkd.* 1994;54:144-150.
16. Flamm BL, Anton D, Goings JR, Newman J. Prostaglandin E₂ for cervical ripening: a multicenter study of patients with prior cesarean delivery. *Am J Perinatol.* 1997;14:157-160.
17. Carlan SJ, Bouldin S, O'Brien WF. Extemporaneous preparation of misoprostol gel for cervical ripening: a randomized trial. *Obstet Gynecol.* 1997;90:911-915.
18. Cunha M, Bugalho A, Bique C, Bergstrom S. Induction of labor by vaginal misoprostol in patients with previous cesarean delivery. *Acta Obstet Gynecol Scand.* 1999;78:653-654.
19. Plaut MM, Schwartz ML, Lubarsky SL. Uterine rupture associated with the use of misoprostol in the gravid patient with a previous cesarean section. *Am J Obstet Gynecol.* 1999;180:1535-1542.
20. Wing DA, Lovett K, Paul RH. Disruption of prior uterine incision following misoprostol for labor induction in women with prior cesarean delivery. *Obstet Gynecol.* 1998;91:828-830.
21. Lydon-Rochelle M, Holt VL, Easterling TR, Martin DP. Risk of uterine rupture during labor among women with a prior cesarean delivery. *N Engl J Med.* 2001;345:3-8.
22. Shy KK, LoGerfo JP, Karp LE. Evaluation of elective repeat cesarean section as a standard of care: an application of decision analysis. *Am J Obstet Gynecol.* 1981;139:123-129.
23. Silver RK, Minogue J. When does a statistical fact become an ethical imperative? *Am J Obstet Gynecol.* 1987;157:229-233.
24. Chung A, et al. Cost-effectiveness of a trial of labor after previous cesarean section. *Obstet Gynecol.* 2001;97:932-941.

The author reports no financial relationship with any companies whose products are mentioned in this article.