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# Patient-Led Approaches to a Vaginal Birth After Cesarean Delivery Calculator

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**OBJECTIVE:** To describe patient approaches to navigating their probability of a vaginal birth after cesarean (VBAC) within the context of prediction scores generated from the original Maternal-Fetal Medicine Units' VBAC calculator, which incorporated race and ethnicity as one of six risk factors.

**METHODS:** We invited a diverse group of participants with a history of prior cesarean delivery to participate in interviews and have their prenatal visits recorded. Using an open-ended iterative interview guide, we queried and observed these individuals' mode-of-birth decisions in the context of their VBAC calculator scores. We used a critical and feminist approach to

analyze thematic data gleaned from interview and visit transcripts.

**RESULTS:** Among the 31 participants who enrolled, their self-identified racial and ethnic categories included: Asian or South Asian (2); Black (4); Hispanic (12); Indigenous (1); White (8); and mixed-Black, -Hispanic, or -Asian background (4). Predicted VBAC success probabilities ranged from 12% to 95%. Participants completed 64 interviews, and 14 prenatal visits were recorded. We identified four themes that demonstrated a range of patient-led approaches to interpreting the probability generated by the VBAC calculator: 1) rejecting the role of race and ethnicity; 2) reframing failure, finding success; 3)

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factoring the physical experience of labor; and 4) modifying the probability for VBAC.

**CONCLUSION:** Our findings demonstrate that a numeric probability for VBAC may not be highly valued or important to all patients, especially those who have strong intentions for VBAC. Black and Hispanic participants challenged the VBAC calculator's incorporation of race and ethnicity as a risk factor and resisted the implication it produced, especially that their bodies were less capable of achieving a vaginal birth. Our findings suggest that patient-led approaches to assessing and interpreting VBAC probability may be an untapped resource for achieving a more person-centered, equitable approach to counseling.

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In the United States, one vaginal birth after cesarean (VBAC) prediction model surpassed all others in gaining prominence: the Maternal-Fetal Medicine Units' (MFMU) VBAC Success Calculator.<sup>1,2</sup> When first introduced, the MFMU calculator estimated VBAC probability by assessing patient age, body mass index (BMI, calculated as weight in kilograms divided by height in meters squared), race and ethnicity, in combination with clinical history (eg, prior cesarean delivery for labor arrest). The inclusion of race and ethnicity provided Black and Hispanic pregnant people with scores that were 5–15 percentage points lower than White individuals.<sup>1</sup> Initially, the VBAC calculator's use of race and ethnicity went unchallenged, likely due to prior work in epidemiology that reconstructed race and ethnicity from an anatomic difference to a quantifiable and, in theory, less racist risk factor.<sup>3,4</sup> In contrast, critical-race epidemiologists examine how multilevel racism explains the influence of race and ethnicity in prediction models.<sup>5,6</sup>

Ample qualitative literature addresses the experience of attempting VBAC<sup>7,8</sup> and the barriers to finding VBAC services.<sup>9</sup> Little is known regarding how pregnant people use numeric estimates of VBAC probability.<sup>10</sup> Finally, to our knowledge, no qualitative study has examined patient responses to the MFMU VBAC calculator's incorporation of race and ethnicity, which may contribute to a construction of race as an essential difference, be that cultural or biological.<sup>11</sup> Given these knowledge gaps, we designed an exploratory, open-ended study aimed at describing how patients approached probabilities generated by the MFMU VBAC calculator. We were interested specifically in patient responses to the calculator's use of race and ethnicity, and, more generally, in how they approached VBAC prediction.

After more than 10 years of use and amid concerns that its inclusion of race and ethnicity obscured structural inequities and perpetuated obstetric racism,<sup>12,13</sup> the MFMU revised the calculator to exclude race and ethnicity.<sup>14</sup> Unless otherwise specified, all subsequent mentions are to the original version. Still, the effects of the original tool have not been well-described. Racialized pregnant people, especially Black women, have higher rates of cesarean birth, due in part to structural and systemic factors.<sup>15</sup> Understanding Black pregnant people's lived experiences with the VBAC calculator, a tool that potentially put them at risk for additional cesarean deliveries, is important for ensuring health equity.

## METHODS

To understand patient-led approaches to VBAC prediction, we analyzed data obtained from patient interviews and recordings of prenatal visits collected between April 2019 and October 2020, a period when the original VBAC calculator was still in use. This study was approved by the Human Research Protection Program at the University of California at San Francisco.

We recruited participants at four sites in the United States: an academic hospital in the Northeast, a community practice in the Southwest, and two academic hospitals in Northern California. Participants were pregnant or postpartum, had undergone prior cesarean delivery, spoke English or Spanish, and were older than age 18 years. Sites in the Northeast and Southwest were identified as locations where health care professionals used the calculator, and postpartum participants exposed to the calculator were recruited through snowball sampling. Postpartum participants were also recruited through social media. The two Northern California sites were chosen based on the geographic location of the research team. At these locations, to mitigate coercion to enroll, research staff not involved in data collection identified and approached eligible pregnant participants using the electronic health record. The research team contacted potential participants and gathered basic demographic and clinical information. Participants self-identified their race and ethnicity according to standard census categories and could identify as multiracial or multiethnic. To obtain a wide range of experiences and calculator scores, we then sampled participants to maximize diversity of race, ethnicity, and prior birth history.<sup>16</sup>

After obtaining written informed consent, participants could opt into a series of interviews and prenatal visit recordings (Fig. 1). Interviews were

conducted by the first author and occurred via telephone, internet video, or in person. For pregnant participants, in the initial semi-structured interview, we used a set of open-ended questions to inquire about the context of mode-of-birth decisions. In follow-up interviews, we focused on how decisions evolved as participants encountered new information, including the VBAC calculator score.

Prenatal visits were recorded via digital audio recorder in the exam room. Visit transcripts were reviewed to determine whether a health care professional introduced the calculator. If participants did not encounter the calculator, we introduced their score in a follow-up interview. During interviews, the first author demonstrated to participants how calculator scores increased or decreased by changing the race or ethnicity variable from Black or Hispanic to White or vice versa. Irrespective of how or when participants encountered the calculator, we emphasized that our interest was in gauging reactions to scores. If questions regarding clinical management arose, we encouraged participants to discuss those with their health care professional. In postpartum interviews, we asked participants to reflect on their recent birth experiences. If the participant was already postpartum at the time of enrollment, they underwent a single, compressed interview. As the study pro-

gressed, following the method of theoretical sampling, interview guides were honed to focus on emergent findings.<sup>17</sup> Participants were reimbursed \$25–50, depending on interview length, plus \$50 for visit recordings. Sample interview questions are listed in Table 1.

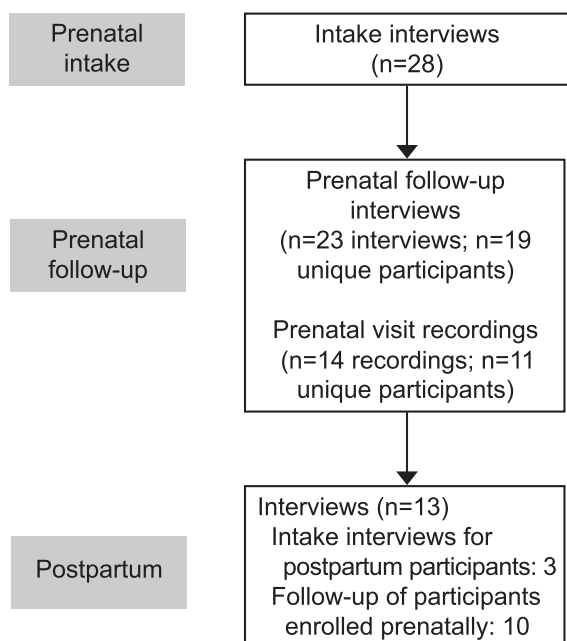
All interviews and visits were transcribed verbatim and entered into Atlas.ti. Data were analyzed thematically using a critical, feminist approach,<sup>18</sup> wherein we sought to leverage participants' diverse experiences to gain insights into how statistical models in obstetrics operate through hidden assumptions about gender, race, risk, and cesarean deliveries, with the potential for these assumptions to erase experiential aspects of birth that matter to pregnant people.<sup>19–22</sup> Following the method of grounded theory,<sup>23</sup> we examined patterns in how participants assigned meaning to and used the numeric probability for VBAC.<sup>24</sup> We selected themes that contrasted with the VBAC calculator's approach. Data saturation was reached when no new information emerged during subsequent interviews. See Appendix 1, available online at <http://links.lww.com/AOG/D361>, for additional detail on our methods.

## RESULTS

We enrolled 31 participants, all of whom self-identified as women. The women participated in 78 data-collection events, with an average of 2.5 per participant (range 1–6). See Table 2 for demographic and clinical characteristics and Figure 1 for additional details about data collection.

We identified four themes that described well patient-led approaches to interpreting probability scores generated by the MFMU VBAC calculator: 1) rejecting the role of race and ethnicity; 2) reframing failure, finding success; 3) factoring the physical experience of labor; and 4) modifying the probability for VBAC. We report the results as representative cases, introducing each participant with a pseudonym and providing their racial and ethnic self-identification and their calculator score. See Table 3 for a summary of how these patient-led approaches were identified.

In finding 1—rejecting the role of race and ethnicity—Black and Hispanic women often had to neutralize the assigned effect of race and ethnicity on their probabilities to proceed with plans for VBAC. Because the calculator required that women self-identify into mutually exclusive racial and ethnic categories, it failed to capture the complexity of their self-identifications, which could lessen the calculator's effect. During a prenatal visit, a health care professional asked Valentina (Hispanic, score 54%) about her ethnicity and gave her a calculator score she found



**Fig. 1.** Scope of data collection (n=64 interviews, n=14 prenatal visit recordings).

Rubashkin. *Patient-Led Approaches to a VBAC Calculator*. *Obstet Gynecol* 2023.

**Table 1. Sample Interview Guide Questions for Pregnant and Postpartum Participants**

Domain	Questions
Understanding the context and factors influencing birth after cesarean delivery	Tell me more about what happened leading up to and during your cesarean? How did this first cesarean affect you? How did you learn about VBAC or repeat cesarean as an option for your next pregnancy? What or who have been helpful sources of information about these options?
Current pregnancy	How are your visits going so far? How has the topic of attempting a VBAC or scheduling a repeat cesarean come up? How did that conversation go? Based on your prior birth experience, what is important to you in this pregnancy?
Calculator utilization	How would you react if the birth doesn't go as planned? How did the VBAC calculator come up during your visit? What was your reaction to the score? How do you imagine using or not using the score? Why or why not? What did you find helpful or unhelpful about the score you were given? What are your thoughts on why race and ethnicity are included in the calculation?
Postpartum	What was your VBAC or repeat cesarean like for you? How is your recovery going? How do you feel about your decision for [repeat cesarean or attempted VBAC]?

VBAC, vaginal birth after cesarean.

discouraging. “Yeah, it was just kind of deflating. Like, oh really, that’s it? Essentially a 50-50 chance?” Subsequently, Valentina began to question the relevance of ethnicity, because her ethnic identity had recently been a topic of contemplation. A genetic ancestry test revealed Valentina was, “25% Hispanic, but I’m also French and German and Italian and British. So, I’m more Caucasian than I am Hispanic.” Beyond genetics, Valentina shared how being married to another Mexican-American and honoring her grandparent’s Mexican nationality also caused her to identify as Hispanic.

Although many have critiqued the notion that genetic ancestry represents an unproblematic proxy for race and ethnicity,<sup>25,26</sup> the complex layers of genetics, nationality, and family bonds led Valentina to an understanding of the multiplicity of racial and ethnic identities. “We’re so many different nationalities and hereditary species...it’s just so uncertain what people are these days. [The calculator] could be misleading depending on what somebody identifies with.” Valentina wondered whether she could have identified as White for the purposes of the calculator. Understanding the arbitrary basis for the point difference between White and Hispanic women helped Valentina to reject the role of race and ethnicity in determining her VBAC probability.

Rejecting the role of race and ethnicity could involve challenging as unfair or racist the calculator’s

implication, from the perspective of participants, that Black and Hispanic pregnant people were more prone to cesarean deliveries. After prenatal calculation of her score, Destiny (Black, score 12%) thought the inclusion of race was not “fair because I don’t think race has anything to do with it...[Because] a lot of Black women have babies vaginally.” For Destiny, the fact that many Black women give birth vaginally served as proof enough that she, too, could have a VBAC. The ability to lessen the effect of race and ethnicity depended on health care professionals inquiring about racial and ethnic self-identification and on how persistent a participant was in their desire to attempt VBAC.

Marta (Hispanic, score 25%) was considering VBAC and never encountered the calculator during prenatal visits. On learning about how the calculator worked in an interview, she expressed anger that race and ethnicity should factor into scoring. “That [the inclusion of race] makes me angry. Like why would my race change what my body does, what it’s supposed to do?” Marta’s family networks in the United States and in El Salvador included extensive experience with cesarean deliveries, leading her to consider systemic racism. “I know what happened in LA county to all these Mexican or Latino mothers who were sterilized.” Connecting this history to how the VBAC calculator classified her, Marta concluded, “Women of color are subjected to more invasive treatment.” Importantly, the exact numeric contribution of

**Table 2. Demographic and Clinical Characteristics of the Study Participants (N=31)**

Characteristic	Value
Age (y)	34.2 (25–41)
Enrolled while pregnant	28
Enrolled postpartum	3
Prior VBACs or vaginal births	6
Birth geographic location	
Northern California (purposive)*	28
Southwest (snowball and social media) <sup>†</sup>	2
Northeast (snowball) <sup>†</sup>	1
Calculator score (%)	57.5 (12–95)
Race and ethnicity	
Asian or South Asian	2
Black	4
Hispanic	12 (3 Spanish speakers)
Indigenous	1
White	8
Mixed-Black, -Hispanic, or -Asian	4
Reported indication for 1st cesarean	
Fetal indication	17 (5 breech)
Labor arrest	14
Birth outcome for pregnancy after 1st cesarean	
VBAC	13
Unsuccessful TOLAC	10
Elective repeat cesarean delivery	8

TOLAC, trial of labor after cesarean.

Data are average (range) or n.

\* We sampled in a purposive manner to maximize range of variation in terms of prior birth histories, racial and ethnic identities, and calculator scores.

<sup>†</sup> Through snowball sampling and social media recruitment, postpartum participants were either referred by other study participants or self-referred. Both recruitment methods meant that postpartum participants had already been exposed to the calculator. Exposure to the calculator was confirmed in the eligibility discussion.

race and ethnicity to scores did not become clear for many until the research interview. Nonetheless, some did not need to know exactly how the calculator worked to reject its use of race and ethnicity.

In finding 2—reframing failure, finding success—although several participants chose a repeat cesarean delivery out of a concern for “failure” after a long labor, many VBAC-interested women reframed the probability of failure and found success in other ways. In an initial prenatal visit, an obstetrician recommended that Chloe (Black, score 25%) schedule a repeat cesarean delivery given her low score. This interaction imparted a feeling of failure that Chloe reframed temporally: “If I try, I’m successful with that. And I successfully tried...I don’t want the pressure or feeling like I failed from the beginning.” Although Chloe later decided on a repeat cesarean delivery, she highlighted how a low score given in the first trimester could make one feel like a failure before the pregnancy had barely begun. Many women, regardless of their race and ethnicity, discussed the importance of building their confidence to attempt VBAC.

Some of the participants who underwent cesarean delivery after labor started reported valuing the experience of labor while attempting VBAC as a way of helping them to reframe success. For many, just trying to have a VBAC counted as success, despite experiencing complications during labor resulting in a cesarean delivery. Mitzi (mixed Black-Filipino, score 40–57%) had a cesarean delivery complicated by hemorrhage and transfusions after labor started. Given these complications, in a postpartum interview, Mitzi reflected that a scheduled repeat cesarean delivery might have been more optimal. Conversely, Mitzi decided to attempt VBAC after a journey of rebuilding her confidence to go through labor, and she was grateful for this process of introspection. “I’m proud of myself for really attempting to go through with the VBAC.”

Reframing failure involved focusing on other successes, which could include building confidence to attempt labor, thoroughly reviewing different birth options and making an informed decision, or

**Table 3. Identification of Patient-Led Approaches to Vaginal Birth After Cesarean Probability**

Traditional VBAC Calculator Framing	Patient-Led Approaches to VBAC Probability
Race and ethnicity are risk factors for unsuccessful VBAC.	Rejected the role of race and ethnicity and the implication it produced that patients were less capable of having a VBAC.
Success or failure is a binary variable.	Reframed failure and found success in multiple meaningful ways that could not be reduced to a success–failure binary.
Prenatal factors help make an early decision.	Reported that the physical experience of labor at full term was an important factor to some in making a decision to attempt VBAC or not.
The VBAC probability is not modifiable.	Worked to modify the probability for VBAC over the course of pregnancy, labor, and birth.

VBAC, vaginal birth after cesarean.

obtaining a new understanding of the body's capabilities and one's fortitude to navigate a second unplanned cesarean delivery.

In finding 3—factoring in the physical experience of labor—because the calculator's inputs were limited to population risk factors, its use could deemphasize how the physical experience of labor factored into mode-of-birth decisions. Paula (Hispanic, score 95%) previously had a VBAC before enrolling into the study. Before her VBAC, even into the final weeks of her second pregnancy, she was still unsure about mode of birth. Noting Paula's indecision, her perinatologist raised the possibility of waiting to see if labor started on its own. "That's what I did. So, the baby was born at 40 weeks and 5 days...Labor was started spontaneously. The baby was head down. Everything looked good. And so I decided, 'Okay. Let's try the VBAC.'" Experiencing the normal onset of labor reassured Paula about trying a VBAC.

Justine (White, score 70%), who did not experience labor before her cesarean delivery for a breech-presenting fetus, showed how the physical experience of labor mattered more than a high calculator score. Despite her perinatologist encouraging Justine to attempt a VBAC, the high probability did not factor into her decision, because the thought of experiencing labor was foreign to her. However, Justine wondered whether physically experiencing labor would have changed her decision. "I think that if I were to go into labor, I probably would just continue that route." Labor did not start on its own, and Justine underwent a repeat cesarean delivery.

In finding 4—modifying the probability for VBAC—some participants, many of whom did not question the calculator's seemingly objective result, still sought ways to modify their VBAC probability. For example, some attempted to increase their chances through evidence-informed strategies, which included: seeking out "VBAC-friendly" health care professionals, switching to a community birth setting, enrolling with a doula, or changing their diet and exercise routines.<sup>27</sup> Many saw building a supportive care team as essential to modifying their probability. Rebecca (White, score 60%) travelled 200 miles for a VBAC-supportive health care professional in the Southwest. "I know the VBAC calculator was only in this 60, maybe 65%, but like I said, I had a supportive doctor and my doula and my husband was on board with it...I feel like my chance of success was higher than what the calculator said." For Rebecca, using the calculator required modifying the probability to reflect her perception of mitigating factors.

Destiny (Black, score 12%) also worked to modify the VBAC probability. When given her score by a health care professional, she felt discouraged. "I felt like [having my baby vaginally] was impossible." After having a prior cesarean delivery for a failed induction of labor, Destiny sought ways to increase her chances for a VBAC. "I did more prenatal exercises, I actually worked out on the prenatal ball every single day...I ate more healthy...Basically, got my body ready to open up to have the baby." When Destiny's labor was induced a second time, it progressed quickly. She gave birth to a smaller baby and cited her diet and exercise regimen as having made VBAC possible. Although women understood that they could not completely control the birth's outcome, many applied lessons from a prior cesarean delivery to increase their chances for a VBAC.

## DISCUSSION

In this study, we analyzed ethnographic data using a critical and feminist approach to understand how patients navigated the probability of VBAC within the context of prediction scores generated by the MFMU VBAC calculator. Some of the Black and Hispanic patients in this study resisted obstetric racism by rejecting the calculator's inclusion of race and ethnicity,<sup>13</sup> identifying racism, not race, as a factor in disparate VBAC rates.<sup>28</sup> However, whether participants were able to challenge the calculator's use of race depended on health care professionals disclosing race as a factor in the probability.

Although several participants attempted VBACs despite their lower scores, there is evidence that some health care professionals used low scores to counsel Black and Hispanic pregnant people into repeat cesarean deliveries. In a national survey of certified nurse midwives, 1 in 5 reported that the calculator was used to discourage or prohibit pregnant people with low scores from attempting VBAC.<sup>29</sup> Default to repeat cesarean delivery as the best treatment for those with low scores generated by the now discontinued MFMU VBAC calculator must be seen within the history of obstetric racism in the United States. That is, a history in which Black, Hispanic, and other minoritized populations were subjected to invasive treatments, including: the development of fistula surgery techniques,<sup>30</sup> forced sterilization campaigns,<sup>31</sup> court-ordered cesarean deliveries,<sup>32</sup> and coerced intrapartum labor management procedures.<sup>33</sup>

Default to repeat cesarean delivery as the appropriate choice for patients assessed to have low calculator scores contrasted with the patient-led approaches we identified. Participants reframed

failure in ways to bolster confidence, a key finding given that commitment to vaginal birth was shown to predict whether an individual will follow through with a VBAC attempt.<sup>34</sup> Participants found success in ways that challenged this binary approach, demonstrating the multiplicity of meanings that individuals assign to their birth experiences,<sup>35</sup> including valuing the physical experience of labor.<sup>36</sup> Other participants attempted to modify their chances for VBAC through evidence-based strategies.<sup>37</sup> Even when faced with low scores, VBAC-interested participants demonstrated a greater tolerance for the uncertainty of attempting VBAC, consistent with data suggesting that VBAC-interested pregnant people would choose repeat cesarean delivery only when their probability dropped below 28%.<sup>34</sup>

A strength of our study is its longitudinal design that enabled in-depth explorations of patient approaches to VBAC probability. However, our findings may not reflect the experiences of those who valued the calculator's approach. Due to a limited number of Black participants, our findings may not represent the full range of Black pregnant people's encounters with the VBAC calculator. Finally, as a qualitative study that used nonprobabilistic sampling methods, our findings cannot demonstrate any causal relationship between patient-led approaches to VBAC probability and birth outcomes.

Although removal of race and ethnicity has mitigated the calculator's most concerning effects, the original calculator may have lingering effects by continuing to inform health care professionals' habits and beliefs, and understanding how racialized patients experienced the VBAC calculator is still relevant. Furthermore, some of the patient-led approaches detailed here still hold for the new VBAC calculator. Our findings demonstrate that a numeric probability for VBAC may not be highly valued or important to all patients, especially those who have strong intentions for VBAC. This may be especially true for Black and Hispanic pregnant people, who in some studies, may be more interested in VBAC than White pregnant people.<sup>38</sup> Our findings suggest that patient-led approaches to assessing and interpreting VBAC probability may be an untapped resource for achieving a more person-centered, equitable approach to mode-of-birth counseling.

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