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Epistemic Silences and Experiential Knowledge in Decisions After a First Cesarean: The case of a vaginal birth after cesarean calculator

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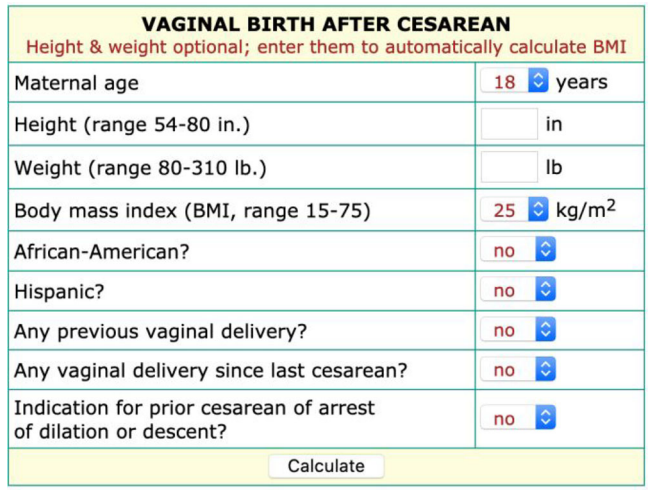
Abstract

Evidence-based obstetrics can employ statistical models to justify greater use of cesareans, sometimes excluding experiential elements from informed decision making. Over the past decade, prenatal providers adopted a vaginal birth after cesarean (VBAC) calculator designed to support patients in making informed decisions about their births by estimating their probability for a VBAC. Among other factors, the calculator used race and ethnicity to make its estimate, assigning lower probabilities for a successful VBAC to Black and Hispanic patients. I analyze how a diverse group of women and their providers engaged with the VBAC calculator. Some providers used low calculator scores to remove a shared decision-making model by prescriptively counseling Black and Hispanic women who desired a VBAC into undergoing repeat cesareans. Consequently, women racialized by the calculator as Black or Hispanic used experiential knowledge to challenge the calculator's assessment of their supposed lesser ability to give birth vaginally.

KEYWORDS
algorithms, cesarean birth, evidence-based medicine, feminist anthropology, racism

INTRODUCTION

In obstetrics, the relationship between evidence-based medicine (EBM) and patient choice is complicated. While ostensibly intended to enhance choice by arming patients with reliable data to support shared decision-making around different effective care options, in practice, EBM has in some instances



VAGINAL BIRTH AFTER CESAREAN
Height & weight optional; enter them to automatically calculate BMI

Maternal age	18 years
Height (range 54-80 in.)	in
Weight (range 80-310 lb.)	lb
Body mass index (BMI, range 15-75)	25 kg/m^2
African-American?	no
Hispanic?	no
Any previous vaginal delivery?	no
Any vaginal delivery since last cesarean?	no
Indication for prior cesarean of arrest of dilation or descent?	no

Calculate

FIGURE 1 The MFMU VBAC calculator as it used to appear on an NIH-hosted website, formerly found at https://mfmu.bsc.gwu.edu. The web-hosted calculator was based on the equation first published Grobman et al. 2007.

vitiated choice (Rogers, 2002). EBM in obstetrics has been criticized for facilitating prenatal risk assessments that deem cesarean surgery as less risky than vaginal birth, thus fueling the rise in cesareans while erasing experiential aspects of birth, such as maternal subjectivity and the interconnected mother-baby dyad (Wendland, 2007). Evidence-based prenatal risk assessments produce the bodies of racialized minorities as sites of risk and, therefore, in greater need of sometimes-unwanted obstetric and even state intervention (Bridges, 2011; Weir, 2006). Thus, EBM can be misapplied to exclude patient perspectives from the decisions that determine which populations and outcomes merit study and which treatments should be implemented.

Vaginal birth after cesarean (VBAC) in the United States is exemplary of these challenges around EBM and patient choice. In the 1990s, researchers used EBM to challenge the orthodoxy of "once a cesarean, always a cesarean" by quantifying the low risks of repeat cesarean and VBAC, demonstrating both to be safe and reasonable for most patients (Flamm et al., 1990). By the late 1990s, the VBAC rate peaked at 28 percent (NIH, 2010). In the early 2000s, two influential studies provoked a shift toward repeat cesareans as a means to avoid excess risk to the fetus, causing some 50 percent of hospitals to stop offering VBAC (Barger et al., 2013; Leeman et al., 2013). Subsequently, the national VBAC rate declined to 9 percent (NIH, 2010). Currently, the VBAC rate has rebounded to 14 percent (Martin et al., 2022), but pregnant people still report needing to "fight" for a VBAC (Basile Ibrahim et al., 2021). In this period of decreased VBAC access, poor, racialized, or religious minority women have even been subjected to coerced and court-ordered repeat cesareans in the name of safety and best evidence (Diaz-Tello, 2016; Paltrow and Flavin, 2013).

This article considers these challenges through an analysis of a prenatal risk assessment technology called a "VBAC calculator," first published in 2007 by the Maternal-Fetal Medicine Units (MFMU), an obstetric research collaborative funded by the National Institutes of Health (NIH) (Grobman et al., 2007). The MFMU designed the VBAC calculator to support patients by providing an individualized estimate of their probability for a VBAC using six factors, among them age, body mass index (BMI), race, and ethnicity (see Figure 1). Because of how the VBAC calculator factored race and ethnicity, it assessed Black and Hispanic patients as having probabilities for a VBAC that were, on average, 5 to 15 percentage points lower than White patients with identical factors (Grobman et al., 2007). Although a new version of the VBAC calculator excludes race and ethnicity (Grobman et al., 2021), at the time of this study, the VBAC calculator's inclusion of race and ethnicity was purportedly viewed as beneficial to Black and Hispanic patients by helping them decide to avoid a potentially risky labor process. In

light of the aforementioned challenges between EBM and patient choice, even the new calculator raises important concerns.

However, evidence-based technologies that assess risk in pregnancy seldom fully determine how pregnant people, families, and communities adopt, alter, or challenge the production and management of reproductive risks (Fordyce and Maraesa, 2012; Gálvez, 2012; Williamson, 2021). In addition to weighing statistical risk when considering an approach to birth after cesarean, a pregnant person's prior birth experience, a desire to physically experience labor and birth, and future reproductive plans all come into play (Attanasio et al., 2019; Lyerly and Little, 2010). Thus, after a first cesarean pregnant people consider multiple sources of experiential knowledge in deciding a course of action for their subsequent births. Yet, it is unclear how pregnant people leverage experiential knowledge in the face of a seemingly objective prenatal risk assessment tool like the VBAC calculator, a biomedical instrument the design of which became infused with race (Braun 2014; Braun et al., 2021).

In this article, I analyze how a racially and ethnically diverse group of women engaged with the VBAC calculator in the context of a variety of interactions with their providers. I wanted to understand how use of a VBAC calculator could benefit or be detrimental to informed patient choice, particularly when experiential elements were not explicitly permitted into an equation that explicitly factored race and ethnicity. I found that some providers used low calculator scores to remove a shared decision-making model by counseling Black and Hispanic patients who desired a VBAC into undergoing repeat cesareans. Consequently, women racialized by the calculator as Black or Hispanic leveraged experiential knowledge against the calculator's statistical evaluation of their supposed lesser ability to give birth vaginally. Finally, beyond the calculator's use of race and ethnicity, women dismissed the calculator's result in their pursuit of both VBACs and repeat cesareans in ways that also emphasized the experiential aspects of labor and birth.

THE RISE OF THE VBAC CALCULATOR

The effort to statistically predict VBAC began in the 1990s and coincided with the rise of EBM in obstetrics (Troyer and Parisi, 1992). Prior to this, the standard approach obstetricians used to counsel patients in their consideration of a VBAC was to provide a generally accepted statistical range for VBAC success between 60 and 90 percent (Guise et al., 2004). A VBAC prediction model could offer more specificity through an individualized estimate, and research groups began to delineate the patient factors associated with VBAC (Brill and Windrim, 2003).

In 2007 the MFMU published a VBAC prediction model that, by fulfilling several features of EBM, emerged from a crowded field and became known as *the* VBAC calculator (Grobman et al., 2007). Compared to other retrospectively designed models, the MFMU developed their model from one of the largest, prospective cohort studies to examine VBAC prediction, earning an evidence level II. Another prospectively designed model required factors known upon admission in labor (Flamm and Geiger, 1997); the MFMU model relied entirely on prenatal factors. If the purpose of counseling was to facilitate a decision for a repeat cesarean before labor started, only the MFMU model delivered a probability for a VBAC that could be calculated as early as the first prenatal visit.

The MFMU applied the model to discover that patients who attempted a VBAC with scores below 60 percent experienced twice the morbidity compared with those with similarly low scores but who scheduled a repeat cesarean (Grobman et al., 2009). Presumably, if patients with scores below 60 percent scheduled a repeat cesarean instead of attempting a VBAC, they might avoid additional morbidity. Thus, not only did the VBAC calculator appear to function well statistically, it was posited that the calculator might make birth after cesarean safer.

Although the MFMU was not the only scientific group to find an association between race, ethnicity, and VBAC (Hollard et al., 2006), their model contributed most significantly to an evidence base that influenced obstetric care in the United States. The MFMU found that race and ethnicity decreased the odds of a successful VBAC by 50 percent (Grobman et al., 2007). The association between race

or ethnicity and VBAC initially went unchallenged likely due to prior epidemiologic work that had normalized race and ethnicity as demographic factors (Shim, 2002), as compared to exploring whether their influences on outcomes stemmed from health inequities like racist clinical practices (Scott et al., 2019).

In the early 2010s, an NIH-funded website began to host the calculator. Due in part to its accessibility on the Internet, the calculator entered widespread use and was discussed in the 2010 VBAC guidelines (ACOG, 2010). Historically, the ACOG VBAC guidelines have led to rapid dissemination of new standards of care, as those standards become norms against which to judge medical negligence (Kukura, 2010). While representative data on the scope of VBAC calculator use is scarce, 40 percent of certified nurse-midwives (CNMs) reported they were required to use the calculator in counseling. Sixty percent of CNMs said the calculator was not used to influence patient decisions, but 20 percent reported the calculator was used to discourage or prohibit pregnant people with scores below 50–60 percent from attempting a VBAC (Thornton et al., 2020).

More than a decade after its adoption, concern surfaced around the VBAC calculator's use of race and ethnicity (Thornton, 2018; Vyas et al., 2019). Scholars critiqued the use of race in clinical predictive models for perpetuating a biological construct of race (Chadha et al., 2020) and for obscuring the structural root causes of health disparities, such as racism (Crear-Perry et al., 2021). In response to these concerns, the MFMU released a new VBAC calculator that excludes race and ethnicity (Grobman et al., 2021).

Evidence is accumulating as to the harms of racialized assessments of risk in the context of perinatal care. Such assessments can lead to discrimination, stressful interactions with care providers, unmet information needs, and greater involvement of child protective services (McLemore et al., 2018). Racialized risk assessments can lead to diagnostic lapses when a provider fails to identify a disease presentation in a patient that doesn't fit into an "at risk" racial, gender, or class category (Davis, 2018). Thus, racialized risk assessments in perinatal care need not be confined to a single equation. Such assessments can result in both systematic neglect and exclusion from the benefits of needed care as well as systematic surveillance and excess biomedical or state intervention (Bridges, 2011). The concern about the VBAC calculator has been whether certain uses could lead to Black and Hispanic women undergoing more repeat cesareans that may be undesired or clinically unnecessary (Vyas et al., 2019).

The application of a race-adjusted predictive model in the context of birth after cesarean evinces its own complexity. The intensity of an initial cesarean can strongly influence future inclinations to repeat or avoid a cesarean in subsequent births (Keedle et al., 2018). As mentioned earlier, after a first cesarean pregnant people enroll multiple sources of experiential knowledge that are not explicitly factored into estimates of statistical risk (Wendland, 2007). Accordingly, any VBAC decision tools must be deeply grounded in the contextual aspects of post-cesarean experiences, as otherwise they may frustrate or cement preexisting desires. Furthermore, due in part to structural and systemic factors that include racism, Black and sometimes Hispanic pregnant people have higher rates of primary cesareans (Okwandu et al., 2022), thus increasing the frequency with which these patients will need to decide how to approach birth after cesarean. The VBAC calculator was published with no instructions regarding its use or how to contextualize the score in patient-led approaches to VBAC decision-making. Clinicians and patients were left to independently determine, and often struggle, with how to use, apply, and interpret the tool.

CONTEXT AND APPROACH

As an obstetrician, I had never used the VBAC calculator, as its rise to prominence occurred while I worked at a hospital that did not offer VBAC.[1] My interest to examine this technology was sparked through research and advocacy efforts around informed choice in perinatal care, cesarean overuse, and obstetric violence. These efforts led me to deeper study into feminist and critical race perspectives on

obstetrics in my dissertation, which broadly examined themes related to the medicalization of birth and processes of racialization effected by the VBAC calculator.

Setting and sample

I recruited clinician and patient participants at four sites: an academic hospital in the Northeast, a community practice in the Southwest, and two academic hospitals in Northern California. I reached clinicians in the Northeast and Southwest through professional networks. At the two Northern California sites where I work, I identified clinician users of the calculator through a short email survey. Providers gave verbal consent to participate.

I recruited patients who were pregnant or postpartum at the same four sites. Inclusion criteria were: having a prior cesarean, the ability to speak English or Spanish, and being over the age of 18 years. In the Northeast and Southwest, I reached participants through snowball sampling. At the California sites, research staff identified eligible participants using the Electronic Health Record. Then, I 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. I purposively sampled pregnant or postpartum patients to obtain a range of racial and ethnic identifications, birth histories, and calculator scores. If the participant added to the sample and remained interested to participate, I then obtained written consent.

I interviewed 17 providers (12 obstetricians and 5 midwives). Thirty-one patients enrolled; 28 were pregnant and 3 postpartum. All identified as women. Participants' racial or ethnic identifications were: 2 Asian/South Asian; 4 Black; 12 Hispanic; 1 Native American; 8 White; 4 who identified as mixed-African, Asian, or Hispanic descent. Calculator scores ranged from 12 percent to 95 percent with an average score of 57.5 percent. The cohort had a range of birth outcomes with 13 VBACs, 10 unplanned cesareans, and 8 repeat cesareans.

DATA COLLECTION

In a single interview with providers, I inquired how they used the calculator and what they regarded as the technology's main benefits and challenges. Pregnant participants could opt into a series of interviews and recordings of prenatal visits. The first interview focused on understanding the context of a participant's approach to birth after cesarean, probing their experiences with the first cesarean and initial discussions with providers. In follow-up interviews, I focused on how decisions evolved over time as participants encountered new information, including the VBAC calculator's prediction score. As the study progressed, I altered interview guides to hone in on emergent findings. Postpartum participants underwent a single compressed interview addressing the above topics. In total, the 31 women participated in 64 interviews and 14 prenatal visit recordings.

Participants' introductions to the calculator were variable. No matter how and when they encountered the calculator, I emphasized my interest was in their reactions to the scores. If questions regarding clinical management arose, I encouraged participants to direct those questions to providers. I reviewed prenatal visit recordings to see if the calculator had been discussed, and then later reviewed those conversations with participants. If the calculator had not been discussed during a visit, I calculated the participant's score in a follow-up interview. In my follow-ups, I demonstrated how calculator scores adjusted by changing the race or ethnicity variable from Black or Hispanic to White or vice versa. This often prompted participants to reflect on the relevance of race and ethnicity to their scores.

My positionality as a White, male physician affected data collection in key ways. Black women participants were cautious to discuss experiences of racism with me, and some participants may have withheld aspects of their encounters with the calculator that intersected with experiences of racism. Some par-

ticipants' comfort with me increased over time. In a subsequent interaction, a Hispanic participant volunteered that she had initially withheld her more critical thoughts about the calculator because she assumed that as an obstetrician I was advocating for the calculator's adoption.

Following an ethnographic approach to grounded theory (Clarke, 2005), I identified key themes by using an intersectional approach to gendered racialization in childbirth (Crenshaw, 2014; Vega, 2017). I paid attention to how participants mobilized experiential aspects of birth in ways that challenged or aligned with the calculator's statistical assessment (Wendland, 2007). I report my findings using representative ethnographic cases to illuminate key processes. Where helpful, I triangulate the cases with data from provider interviews or recorded visits. I gave all women participants pseudonyms to protect their identities; I identify providers only by their profession.

The experiential aspects of recurrence

In the context of birth after cesarean, assessing the likelihood of a repeat cesarean was paramount for many women. However, women framed the issue of recurrence in experiential ways that often departed from the calculator's quantitative approach. Many experienced the prior cesarean in such a way that *any* circumstance that contributed to the cesarean could recur. Participants worried that they would consistently produce breech babies or babies with large heads that would impede labor, or that their pelvis was too narrow.

Participants' concerns over what might recur sometimes ran counter to the calculator's logic. Becca (White, 70 percent) personalized her cesarean in such a way that made it a desirable experience to repeat: "Cesarean, for me, is just—because that's what I had. That is my normal." Becca's prenatal provider shared a probability for a successful VBAC that, in her recollection, was "pretty high." Nonetheless, "It [the score] obviously doesn't make a big difference to me. I still feel like the experience I had last time is impacting me more." Becca's familiarity with cesarean led her to resist the calculator, and in a recorded visit, her provider validated that comfort with cesarean was a fine reason to undergo another one.

Yael (White, 95 percent) had already had a VBAC when she entered the study. Her first cesarean was done for a fetal heart-tracing issue, and her VBAC resulting in a vacuum birth also was performed for fetal heart-tracing issues. In a recorded prenatal visit, Yael's provider shared her high probability for a VBAC, but Yael had other concerns. "Like I told you [addressing her provider], I'm interested in knowing what caused the vacuum and trying to see if we can avoid that." Because of the vacuum, Yael described her VBAC as not "fully natural." In this, her third and final birth, Yael wanted to accomplish the birth without assistance, and a high probability for a VBAC did not alleviate her concerns about certain undesirable elements happening again.

In interviews, providers discussed using the calculator to open a broader conversation about the patient's approach to birth after cesarean. In recorded visits, when providers introduced the calculator, the conversation could turn toward a patient's experiential concerns as they related to recurrence. Sometimes, providers recognized this as an opportunity to validate a patient's experiential reasoning. In this way, the calculator could facilitate sharing statistical and experiential expertise between patient and provider.

Challenging the stigma of low scores

At two sites, providers reported that policies dictated they discourage, and sometimes prohibit, patients with scores below 60 percent from attempting VBACs. Providers reported using cutoff scores to avoid the likelihood of greater morbidity resulting from a "failed" VBAC attempt, which can result in a more complicated cesarean. When providers used the calculator prescriptively, they removed a shared decision-making model and discounted the experiences that caused some women to plan a VBAC.

Propelled forward by their desire to avoid negative prior birth experiences, some Black and Hispanic women leveraged their experiences to challenge the implication that the calculator produced, namely that they were supposedly less able to achieve a vaginal birth.

Beatriz wanted a VBAC after having a "traumatic" experience with her first cesarean after which she had been immediately separated from her newborn. Therefore, the possibility for immediate skin-to-skin contact in a VBAC was very appealing. In her second pregnancy, Beatriz discovered that her hospital had a policy of not allowing VBAC below a calculator score of 63 percent.[2] With a Hispanic mother and White father, Beatriz faced a quandary about how she should identify, as the calculator required one to identify as either White or Hispanic. Beatriz recalled her Ob/Gyn encouraging her to identify as White, to receive a higher score and meet the practice cutoff. The calculator's reductive and arbitrary treatment of race and ethnicity frustrated Beatriz. "You know, this is systemic racism. If minorities and people of color are not able to have as high [a] rate of successful VBAC as white people, like there's more things at play than just biology." Beatriz reveals how the VBAC calculator's use of race and ethnicity produced an implication that Black and Hispanic women were biologically less able to achieve a VBAC. However, Beatriz proposed an alternative that racism could instead explain the association between VBAC and race and ethnicity.

Nonetheless, even by identifying as White, Beatriz's BMI kept her below the practice cutoff for attempting a VBAC. After repeated counseling sessions during which her providers contrasted her birth options as between the security of a scheduled cesarean or an untimely death should she attempt a VBAC, Beatriz declared her desire to experience labor: "I just want a chance to labor, this isn't like vaginal birth or death." Given this extreme comparison, Beatriz clearly saw the hospital's use of cutoff scores as dogmatic and effacing her agency in decision-making around vaginal birth and risk. With persistent effort, Beatriz found an Ob/Gyn in the practice who supported her plans, and she went on to have a VBAC.

After a painful recovery from her first cesarean, Destiny (Black, 12 percent) also wanted a VBAC and planned to give birth at an institution that discouraged VBACs below a score of 60 percent. After Destiny's Ob/Gyn gave her a score of 12% during a prenatal visit, in an interview Destiny later shared how she initially "felt like [having my baby vaginally] was impossible." During the calculation of her score, Destiny was made aware that her race had factored into the probability, but she rejected the calculator's use of race as unfair. Connecting the calculator to the history of Black women being excluded from the category of "woman" (hooks, 2015), Destiny asserted,

> I am female. I have a uterus and the goal is to have children, so I didn't think that me being a different color or a different race played a part in it … [because] a lot of Black women have babies vaginally.

Given her prior painful experience with cesarean birth, women like Destiny had to wrestle with the calculator's stigmatization of their bodies in order to pursue their plans for a VBAC.

Destiny's Ob/Gyn supported her goals for a VBAC, but with a score of 12 percent, Destiny's plan was controversial. When Destiny was admitted in labor, her primary Ob/Gyn shared in an interview how they persuaded the on-call team, who were unsure if they could support the VBAC, to proceed with the plan. With her primary Ob/Gyn's support, Destiny, who was unaware of the behind-the-scene discussion, had a VBAC.

Even in hospitals that had instituted cutoff scores, providers like Destiny's, to some extent, could exercise judgment to support low-scoring patients. Providers who challenged strict policies around cutoff scores thought that it was possible for a patient to make an informed decision to attempt a VBAC despite a low score. At sites where no requirement to use the calculator existed, over time some providers observed that the numeric probability did not influence those patients for whom prior experiences already informed a preference for VBAC or repeat cesarean. Over time, some providers reported selectively offering the probability only to those who were undecided about their mode of birth or who requested a specific numeric estimate of their chances for a VBAC.

Whiteness, elective cesareans, and high scores

Because the MFMU found that pregnant people with high calculator scores had equivalent outcomes should they attempt a VBAC or schedule a repeat cesarean, and because those with high scores were more likely to be racialized as White, the calculator produced Whiteness as a less risky space in which participants could interpret their prior birth experience and decide a course of action for the next birth as they saw fit. One of those benefited spaces surfaced when women with high scores opted for repeat cesareans.

Justine (White, 77 percent) described her cesarean experience as "fantastic." Because her cesarean for breech had been scheduled before labor started, the thought of experiencing uterine contractions in a VBAC scared Justine. "I just feel like there's so much that's unknown to me when I already know how terrifying it is to have another child, that for me a C-section feels safe." The anticipation of the pain of labor, combined with an easy recovery from the cesarean, made repeat cesarean the more favorable option. During a recorded prenatal visit, Justine's obstetrician encouraged her that with a score of 77 percent her "risk factors were in her favor" if she were to attempt a VBAC. Despite this messaging, the numeric probability did not factor into Justine's decision.

Justine's experience contrasted with the ways the VBAC calculator complicated decisions for Black and Hispanic patients assessed to have low scores. Black and Hispanic participants could also have high scores, but usually this meant that they had a vaginal birth that preceded their cesarean. In other words, the bar for high scores was higher for Black and Hispanic patients.

Providers indicated that a key utility of the calculator was in swaying patients with high probabilities toward a VBAC, but few providers, if any, recognized the role of Whiteness in producing higher scores as a less risky space. Among the women interviewed, high scores were more influential if the woman had prior experience with labor or a strong preexisting belief in the body's ability to give birth. However, without such a belief or laboring experience, a high score alone was far less compelling.

Intersectional experiences with independent variables

While the calculator modeled race and ethnicity as an independent variable, experiences relevant to birth after cesarean revealed how race and ethnicity intersected with the calculator's other variables, especially the BMI. The BMI was first described in the early 1800s as a means of statistically defining "the average man," a process that came to inform the project of eugenics (Eknoyan 2007). In this study, some women questioned whether the BMI represented a Eurocentric norm, while others critiqued the BMI for glossing over differences in fat distribution, muscle density, and overall fitness. Yelena (White, 48 percent) encountered the calculator during a prenatal visit, but it was not until an interview that she mused about the relationship between BMI and her score:

> I don't want to sound like I'm in denial. I know I'm a bit overweight … [but] I feel like there's quite a range of fitness you can be at a higher weight. I feel like I'm probably fitter than this calculator would assume, which is why I wasn't fully trusting the number.

Yelena, who decided for a repeat cesarean, still considered the calculator untrustworthy because it painted people with larger bodies in broad strokes.

Others proposed the BMI was a Eurocentric standard that pathologized Black and Hispanic people as well as Pacific Islanders. Rosa (Hispanic, 43 percent) identified as Costa Rican and Cuban. When discussing the calculator during an interview, Rosa rejected the BMI's assessment of her physique:

> If you kind of go by those standards, which to me, the BMI chart, I don't know if that's kind of like based on a very Eurocentric model … I've always had a curvy figure and never have I considered myself overweight.

Because Rosa did not invest much credibility in the BMI, she was cautious to use the calculator. "As a woman of color, no calculator was going to tell me what my body was capable of, and I am so glad I didn't let that deter me from trying [a VBAC]." For those interested in a VBAC, Rosa again demonstrates how her experiences mattered more than any VBAC calculator score. Furthermore, Rosa highlights how notions of race intersect with constructing the BMI, another factor that caused her to deny the relevance of the VBAC calculator to her plans for a vaginal birth.

DISCUSSION

The VBAC calculator, an obstetric technology widely adopted in the United States, further medicalized birth by presenting vaginal birth as excessively risky and appropriate only for select candidates (Wendland, 2007; Cheyney and Davis-Floyd, 2019). By not including a critical exploration of how race itself is a flawed predictor of health outcomes (Montoya, 2011; Roberts, 2011) nor how other calculator variables, like the BMI, are also intertwined with intersectional processes of inequity (Hargrove, 2018), the calculator packaged race into an estimation of risk. When providers defaulted to repeat cesareans as the best treatment for this risk, they participated in a history of obstetric racism (Davis, 2018). That is a history in which Black, Hispanic, and other women of color having been subjected to forced and coerced obstetric interventions (Gutiérrez, 2008; Irwin and Jordan, 1987; Paltrow and Flavin, 2013). On the other hand, the calculator helped to preserve the option for a repeat cesarean in the setting of a high probability for a VBAC by presenting Whiteness as less risky, a finding consistent with other work on the racialization of perinatal risk (Bridges, 2011; Weir, 2006).

Due to varied and potentially inequitable reproductive experiences, after a first cesarean Black and Hispanic pregnant people may on average be more interested in VBAC than White pregnant people (Attanasio et al., 2019). Even though the calculator discounted the experiences that led them to consider a VBAC, some Black and Hispanic women in this study marshalled experiential knowledge to reject the calculator's assessment of their supposed lesser ability to have a vaginal birth. With the support of providers, who themselves were working against new hospital policies informed by the calculator, some women were able to achieve desired VBACs. Compared to the insidious way that race has been integrated into the seamless function of lung spirometry and the estimation of kidney function (Braun, 2014; Braun et al., 2021), largely humming in the background hidden from patients, some women in this study had the opportunity to evaluate, and often, reject the role of race and ethnicity in their scores, though that opportunity depended on providers explaining how the calculator worked.

Beyond the calculator's use of race and ethnicity, participants resisted the calculator's statistical evaluations because they viewed its other variables as reductive, not applicable, or even racially discriminatory, as in the case of the BMI (Strings, 2019). Participants were concerned about the recurrence of another cesarean, suggesting the utility of a VBAC calculator, but the experiential aspects of recurrence could lead to an intensified desire for or against obstetric interventions in ways that ran counter to the calculator (Keedle et al., 2015).

The ways in which experiential knowledge informed decisions both for VBACs and repeat cesareans is a testament to the extensive literature on the "parallel reproductive knowledge systems" that come into play when pregnant people encounter biomedical assessments of risk (Fordyce and Maraesa, 2012, p. 8), for instance, when considering epidural anesthesia (Gálvez, 2012) or amniocentesis (Rapp, 2000), to name only two examples. When considering risk in relation to birth, pregnant people move through diverse registers of biomedical, experiential, community, and cultural knowledge systems resulting in a variety of outcomes. For instance, some Taiwanese women's embrace of cesarean represents a pragmatic response to their limited control over the highly medicalized process of hospital-based vaginal birth (Kuan, 2014). Somali refugee women view their refusal of cesarean as important to preserving their future status as mothers and the survival of their families. Somali refugee women's refusal of cesarean is consistent with the practice of female circumcision, as both are required to fulfill gendered expectations (Lowe, 2019). The embrace or refusal of cesarean birth in the U.S., Taiwan, and Somalia demonstrate

how women and pregnant people pragmatically engage with estimations of intrapartum risk and work to achieve personal goals while also at times conforming to socio-culturally inscribed roles (Fordyce and Aminata, 2012).

An extensive literature now describes and measures pregnant people's experiences with mistreatment in birth facilities, including coerced obstetric procedures (Bohren et al., 2015; Vedam et al., 2019). Recently, many have called for a shift in focus toward the drivers of mistreatment (Sadler et al., 2016; Sen et al., 2018). In probing these drivers, Rachelle Chadwick (2019) encourages an analysis of obstetric violence as a process that works through acts of "epistemic silencing," which occurs when the dominant group "fails to identify a speaker as a knower" due to the speaker's social location (Dotson, 2011). Chadwick concludes that epistemic silencing underlies the overt violence that arises when birthing people transgress often unspoken norms of conduct, similar to the pressure that some women in this study experienced when they continued to pursue VBAC in the face of low calculator scores. So, too, obstetrician Karen Scott argues that an epistemic injustice undergirds obstetric racism in that epistemic practices undermine "Black women's capacity as knowledge generators … [rendering] Black women as incapable of making sense of their own experiences, and of having them understood by others" (Scott, 2021, 156). To address overt forms of obstetric violence and obstetric racism, we must also account for these epistemic silences and injustices (Davis, 2018).

If a more epistemically inclusive and equitable approach to predicting VBAC exists, it would confer credibility to the full range of experiences that pregnant people bring to bear on deciding an approach to birth after cesarean (Charles and Wolf, 2018). It may statistically model the role of patient subjectivity and hospital culture in predicting successful VBAC (Fagerberg et al., 2015; Kaimal et al., 2019). Drawing on the insights of providers and participants in this study, a VBAC prediction model at its best could facilitate a conversation around the subject of recurring experiences in birth during which statistical and experiential data are given equal weight.

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ENDNOTES

[1] To obtain the full range of engagements with the calculator, my ethnographic approach included an 18-month immersion from April 2019 to October 2020 in scientific papers, blog posts, podcasts, visual artefacts, interviews, and prenatal visit recordings. The data analyzed in this article represents a subset of the entire data set. The study was approved by the University of California, San Francisco Committee on Human Research.

[2] In our interview, Beatriz recalled that the cutoff was 63 percent. This may have been a misrecollection, as 63 percent was not the cutoff that providers reported using. The 60 percent threshold was supported by the MFMU's own analysis (see Grobman et al., 2009).

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