

ABSTRACT

A Quantitative Analysis of the Race-Correction Factor and Vaginal Birth After Cesarean

Eligibility

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In 2007, the Maternal Fetal Medicine Units Network created a calculator that provided an early estimate of the success a woman would have if she chose to attempt a vaginal birth after cesarean delivery (VBAC). Race was one of six demographic variables used in the algorithm. Women who identified as either Hispanic or African American received a score seven points lower than Caucasian women, thereby making minority women on average less likely to be recommended for a VBAC. The use of a race-correction factor is a problematic practice that has received pushback from physicians across the country due to the concern that it may propagate race-based medicine and exacerbate health disparities. The aim of this thesis was to assess how many women at a federally qualified health center were negatively affected by the race factor during a one-year period. From April 2020 to April 2021, the participating hospital had a VBAC rate of 1.90%. The authors found that without the use of race adjustment, this number could have been as high as 3.03%. To continue paving the way for an equitable healthcare system, the tools and algorithms used to treat patients must be critically analyzed and assessed.

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A QUANTATIVE ANALYSIS OF THE RACE-CORRECTION FACTOR AND
VAGINAL BIRTH AFTER CESAREAN ELIGIBILITY

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CHAPTER ONE

Introduction

The four pillars of medical ethics are beneficence, non-maleficence, justice and autonomy. Practicing medical autonomy is an intensely personal and convoluted matter. From a patient's perspective, it requires trusting your instincts and being your own advocate. From a physician's, it demands forming a relationship based on mutual respect, making the patient's wishes a priority, and fighting unconscious bias. When a woman chooses a physician to care for her throughout her pregnancy, she is no longer making an individual decision, but a decision that will impact the life of her child. With this weighing heavy on the mother's shoulders, she must be able to trust her healthcare team to assist her in making the best, most informed decisions.

A woman who has had a prior cesarean section is given two options for her next birthing experience: a repeat caesarean section or a vaginal birth after caesarean section (VBAC). The latter is an option given to women who have had a minimum of one prior non-vaginal birth and desire to deliver vaginally. A trial of labor after cesarean (TOLAC) is the planned attempt to labor despite the outcome. A TOLAC is classified as a VBAC when the fetus is delivered vaginally. It is estimated that 70% of women who attempt TOLAC are successful in their endeavor. However, 30% of TOLAC's do not go as planned and ultimately end in a repeat cesarean section (RCS). These unplanned RCS are at a greater risk for serious complications and associated with a 3% increase in maternal morbidity (Devarajan and Arulkumaran, 2018). In light of this statistic, the decision to pursue a VBAC is not a trivial matter. Although this paper will further elaborate on the

numerous benefits of having a VBAC, this decision requires careful consideration of the individual and their unique circumstances.

The Maternal Fetal Medicine Units Network published an algorithm to guide mothers and their physicians in this choice. This algorithm, created in 2007, calculates the likelihood that a woman will have a successful TOLAC based on six demographic variables. The creator's intention was to increase VBAC rates, thereby decreasing the number of cesarean sections. However, like any computer-based algorithm, it is not perfect in design and unable to predict the complexities of life.

The six demographics that were included in the VBAC calculator were maternal age, body mass index (BMI), history of a previous vaginal delivery, history of prior VBAC, recurrent primary indication, and race. A woman who identified as either African American or Hispanic was penalized seven points. A patient who identified as both African American and Hispanic was penalized fourteen points. The weight of each component of the predictive nomogram varies. See Figure 1.

The use of race in the manner depicted above is known as a “race-correction factor”. These are not unique to the VBAC calculator and exist in many clinical algorithms- including the American Heart Association's Heart Risk Failure Score, a nephrology algorithm used to estimate glomerular filtration rate and the STONE score to predict the likelihood of kidney stones (Vyas et al., 2020). Though these calculators serve vastly different purposes, their race-correction factors commonly target minority population, specifically African Americans. In the VBAC calculator, the race-correction factor makes it less likely that a Hispanic or African American woman would be recommended to attempt a trial of labor. In the Heart Risk Failure and STONE score,

three points are given to a person who identifies as “nonblack”, indicating to healthcare professionals that black patients are at a lower risk for both heart failure and kidney stones. This may lead to less extensive care given to minority populations than their White counterparts receive. Additionally, little to no justification is often given for the implementation of a race correction factor in the aforementioned tools.

The VBAC calculator was created using statistics from a four-year observational study. The study revealed that African American and Hispanic women reportedly had more unplanned RCS (Landon et al., 2005). African American women were shown to have an RCS rate of 28.7%. Hispanic women’s results were slightly higher at 29% and Caucasian women’s RCS rates were the lowest at 21%.

However, this correlation cannot be attributed to race alone. Race is viewed as a social category, not a biological one (Bonham, n.d.). If race does not have an impact on an individual’s physiology, then it has no place in a predictive nomogram based off of biological factors. Scholars such as Nancy Krieger believe that the attribution of racial health disparities to inherited genetic differences stems from the pre-civil war desire to prove that African Americans were innately inferior to their White counterparts (Krieger, 1987, p. 259-278). An observed racial correlation comes with an abundance of potential confounding variables such as socioeconomic class, attitude towards the healthcare system, access to prenatal care and more.

By implementing a calculator that decreases the chance of an African American or Hispanic woman from obtaining a VBAC delivery, the system is propagating race-based medicine. While the MFMU removed the race-correction factor from the algorithm in June 2021, the goal of this study was to illuminate the impact the factor had on birthing

outcomes in Waco, Texas while it was in effect (Grobman et al., 2021). The author will begin first with a review of the literature discussing the history of medical racism and VBAC rates. Then, the scope of the study will be established, and the results will be critically analyzed. Lastly, the authors will discuss the implications of the study, the importance of the patient's perspective and future research.

CHAPTER TWO

A Review of the Literature

2020 will forever be remembered for Coronavirus: the virus that shut the world down (“The Virus that Shut Down the World”, 2020). This unprecedented time occurred in a polarized environment when rapid circulation of false information, political turmoil, police brutality, and the uprising of social justice movements were the norm. The silver lining of the lockdown is that it provided an opportunity for society to put their lives on pause and reflect on the state of the world. With the topic of social justice on the rise, many Americans were faced with the stark reality that systemic racism is not a skeleton in America’s closet, but something that is alive and well today. The field of Obstetrics and Gynecology, who’s founders experimented on slaves in the name of scientific advancement, is not immune to racism (Washington, 2008).

The Father of Gynecology: James Marion Sims

James Marion Sims was born in South Carolina in 1813. In 1840, Sims and his wife moved to Alabama, where he earned his living as a physician for the local slaves. It is through his experimental procedures on the plantations that Sims came to be known as the father of modern surgical gynecology (Andrei, 2013).

In the 19th century, gynecological surgeons were few and far between, especially in the south. Often, complicated gynecological conditions went untreated as surgical repairs were unexplored and risky. Sims was the first to successfully operate on vesicovaginal fistula, a catastrophic childbirth complication in which a hole develops between a woman’s bladder and her vagina (Wall, 2006). This condition leads to

uncontrollable urinary incontinence, consistent discomfort and societal ostracization due to the pungent odor. Sims was lauded as a surgical hero and a benefactor of women; or a benefactor of white women at least.

Vesicovaginal fistulas are a risk for women of all skin colors, but during this time, enslaved women were at a much higher risk (Washington, 2008, p.111). The cure to this birthing complication did not come to Sims overnight. He acquired eleven African American women with the condition from their owners. For the next four years, Sims performed experimental studies on their ravaged bodies without the use of anesthesia, a proper diet or much regard for their wellbeing. In fact, his experiments were so cruel that his on own journals reveal his assistants could not handle it:

Several male doctors had initially assisted Sims by holding down the enslaved women as he made incisions, but within a year they could bear neither the bone-chilling shrieks of the women nor the lack of progress any longer (Washington, 2008, p. 113).

In lieu of proper medical assistants, he forced his own subjects to assist him in his surgeries. Anarcha, the first woman that he successfully performed a fistula repair on using silver sutures, suffered through thirty unsuccessful surgeries first (Washington, 2008, p.115).

Historians maintain that in judging historical figures actions you must keep their narrative in the proper context of their times. James Marion Sims neglected to anesthetize his patients though it was common practice by the 1840's, failed to acknowledge their pain, did not obtain patient consent and performed brutal operations even his hired assistants could not handle to witness. In recognizing medical advancements, it is imperative to understand and pay severance to the price of this knowledge. For the field of Obstetrics and Gynecology, there was a large price to pay.

Maternal Mortality Rates in Waco and Beyond

While internationally maternal mortality rates have declined, rates in the United States have steadily increased since 2000. In 2018 there were 17.4 maternal deaths for every 100,000 live births in the United States, which is the highest rate amongst developed nations. In comparison, New Zealand has a maternal mortality ratio of 1.7 per 100,000 births and the United Kingdom has a ratio of 6.5 per 100,000 (Tikkanen et al., 2020).

In Texas, maternal mortality rates vary by region. A 2018 regional analysis report split Texas into eleven public health regions. The median maternal mortality rate amongst these regions is 25.05 deaths per 100,00 live births. The study reported that public health region 7, which includes Waco, has a maternal mortality rate of 25.3 per 100,000 live births (Texas Department of State Health Services, 2018, p. 33). This puts Waco and the surrounding area's slightly above the Texas median in maternal mortality rate.

Labor is an even more dangerous endeavor for black women in America. Besides the potential negative impact of race-correction factors, studies have revealed that African American women are more than twice as likely to die in childbirth (Burris et al., 2021). Is this a result of their genetics? Or a reflection of implicit bias and social disparities in the healthcare system? The literature points to the latter (Parsons, 2020). As a society, it is imperative to make reparations for past injustices and take steps to create an equitable healthcare system. This involves critically evaluating the tools used to treat patients.

History of Vaginal Birth After Cesarean Delivery

Edwin Cragin, an early 20th century physician, coined the phrase “once a cesarean, always a cesarean” when he observed a small sample of women fail to deliver vaginally after having a prior c-section (Ugwumadu, 2005). This idea long persisted in America until the 1970s when physicians reopened the conversation and successful VBACs occurred. They have been a common procedure since the 1980s, with rates peaking in 1990 (Trifiro, 2019).

Shortly after this peak, however, VBAC rates faced a stark decline in 1998 (Landon et al., 2005, para. 1). Today VBAC’s are back on the rise in America, increasing 7% from 2016 to 2018 (Osterman, 2020). The United States current VBAC rate of 13.3% still lags behind other industrialized nations with rates in Europe ranging from 20 to 55% (Carauleanu et al., 2021).

Because there is a chance that a TOLAC could result in serious complications, hospitals and insurance companies have expressed hesitation. Regulation has been put in place to ensure the safest experience possible including good monitoring and properly equipped surgical facilities (Gupta et al., 2019). This method of delivery requires a dedicated medical team as they must be patient while a woman naturally labors. Repeat cesarean sections in contrast are quicker and routine. The World Health Organization stresses that cesarean sections should only be performed in cases of absolute necessity. Unfortunately, this recommendation has done little to decrease the rising cesarean section rates (Tsai and Wu, 2017).

What makes a woman VBAC eligible?

Women would not be a candidate for VBAC if they have had a high vertical uterine incision, a prior uterine rupture, undergone fibroid removal, or have had more

than two cesarean sections (Mayo Clinic Staff, 2020). Women who do not have any of the listed comorbidities and express interest in a VBAC are counseled by their physician on the potential benefits, risks, and provided with an estimate for the likelihood of their success.

What makes a VBAC desirable?

The benefits of a VBAC include avoiding future pregnancy complications due to buildup of cesarean section scar tissue, a lower risk of surgical complications such as excessive bleeding, clotting and deep vein thrombosis. A VBAC also leads to a shorter hospital stay and a shorter recovery time (Mayo Clinic Staff, 2020). Some women simply desire to experience a vaginal birth. Amy Paturel writes in her VBAC testimony on parents.com:

I thought a VBAC (vaginal birth after cesarean) would heal the emotional wounds from my previous labor and delivery, and that I felt it was best for both my health and my baby's health. (para. 4)

The benefits are high, but so are the risks if a woman is not properly counseled in her decision. It is estimated that 30% of women who attempt a trial of labor end in a repeat cesarean. These women are at increased risk for uterine rupture and even death (Mayo Clinic Staff, 2020).

Uterine rupture is a catastrophic birthing outcome in which the uterus tears open into the abdominal cavity. This poses a serious risk to both the mother and the infant and requires immediate action. A study of 130,000 women reported an incidence rate of uterine rupture to be 0.6 percent for women undergoing a trial of labor (Toppenberg and Block, 2002). These statistics frightened the public and physicians alike, and likely

contributed to the decline of VBAC rates seen in 1998. For this reason, it is imperative that a patient's eligibility is carefully considered, and that informed consent is obtained.

The intended purpose of the VBAC calculator

In 2007, the Maternal Fetal Medicine Units Network proposed an algorithm that was meant to guide both the physician and patient in their decision, eliminate the element of the unknown, and help to decrease the national cesarean section rate.

Other algorithms to predict TOLAC success existed before, but what is unique about MFMU's 2007 model was that it used demographic information available at the first prenatal appointment (Landon et al., 2005, para. 1). This made the nomogram easy to implement and gave patients time to make their decision based on what they viewed as statistical evidence.

Creating the algorithm

To determine the variables that would be put into the final model of the calculator, researchers analyzed over 14,000 charts of women from nineteen academic hospitals who previously had a low-transverse cesarean delivery and underwent trial of labor from 1999 to 2002. Using multivariate logistic regression analysis, Landon and his team determined the factors that were statistically indicative of VBAC success. Factors that were considered include maternal age, marital status, insurance status, race, history of smoking, height, weight, past obstetric and medical history, history of a VBAC or vaginal delivery and presence of maternal diseases. They found that:

Women who achieved successful VBAC were more likely to be Caucasian, married, privately insured, tobacco users, and to have BMI less than 30 when compared with those failing a trial of labor. The successful group was also more likely to have spontaneous labor, greater cervical dilation at admission, epidural use, lower mean birth weight and gestational age (all $P < 0.001$) (p.195).

When deciding which final factors to use in the calculator, researchers chose maternal age, body mass index (BMI), history of a vaginal delivery, history of a VBAC, if there was a recurrent primary indication for a cesarean section and race. (Grobman et al., 2007, p. 806).

The Race-Correction Factor

Race-correction factors, however, are controversial in practice. While some argue that racial categories may help reflect useful population genetics, others counter this by saying that we do not have enough knowledge of the connection between race and genetics for the pros to outweigh the cons (Vyas et al., 2020, p. 874). Instead, these types of algorithms may be propagating race-based medicine. Because of this, the 2007 VBAC calculator created by the MFMU Network is one of many like it that has received physician pushback. Vyas scrutinizes the algorithm saying:

The study used to produce the algorithm found that other variables, such as marital status and insurance type, also correlated with VBAC success. Those variables, however, were not incorporated into the algorithm. The health benefits of successful vaginal deliveries are well known...Use of a calculator that lowers the estimate of VBAC success for people of color could exacerbate these disparities (p. 875).

In addition, observational data is often confounded by existing disparities and not reflective of biological phenomena. There are various elements that could contribute to African American and Hispanic women having more cesarean sections such as decreased access to prenatal care or adverse relationships with the healthcare system.

Race as a social category

The National Human Genome Research Institute (n.d.) defines race as fluid, stating that many scientists view it as a social construct. Most genetic variation has been found to

exist within racial groups and not between them. Therefore, using a calculator that treats race as a scientific category is problematic and perpetuates systemic racism in medicine.

Human biology is continuous because allele frequencies vary gradually and the environment epigenetically interacts with each individual. Race, in contrast, is a fixed and typological concept. Something that does not have the capacity to change cannot predict the complex nature that is a person's biology (LaVeist and Isaac, 2013, p. 49). It is incompatible with the theory of evolution. In fact, the idea of categorizing race is left over from the polygenetic position of early scientists who theorized that races were separately created species (LaVeist and Isaac, 2013, p. 50). Now that the research world has reached a general consensus that this belief is false and different races are not subspecies of each other, why do we continue to place people into racial categories? Racism, not race, may be the largest risk factor.

Advocating for change

Obstetricians and Gynecologists across America recognized this as a problem and successfully advocated for change. In June 2021, MFMU developed a new tool to predict VBAC success without the use of race and ethnicity. See Table 1. Grobman, an original creator of the algorithm, found that when removing the race correction factor:

The model had excellent calibration between predicted and empirical probabilities and when applied to the overall analytical population, an area under the receiver operating characteristic curve of 0.75 (95% confidence interval, 0.74-0.77), which is similar to the area under the receiver operating characteristic curve of the previous model (0.75) that included race and ethnicity) (p 1.e3).

Scientific advancement in medicine is widely accepted and considered imperative in making the system safer. Social advancement is just as important, however, and must be made a priority as society grows and diversifies. As the times change, healthcare providers and researchers must change with it. A computer-based algorithm cannot possibly interpret

all of the complexities of an individual's past, present or future. Our understanding of population genetics is not advanced or justified enough to explain the implementation race-correction factors like the one placed in the VBAC calculator. Instead, it may be harming those that it was created to help.

CHAPTER THREE

Methods

The study was conducted at a federally qualified health center that treats 60,000 patients per year. 84% of their patient population is below the federal poverty level and 37% are uninsured. By race, 48% of the hospital's patients identify as Hispanic, 27% Caucasian, 23% African American and 2% other. The data was anonymized to protect the confidentiality of the patients. It was then stored on a computer that remained at the participating hospital that did not have internet access. The lack of internet access prevented the transport of confidential patient records from off the hospital site. The student author was supervised and trained in HIPPA compliance. All research was completed according to hospital's privacy guidelines onsite.

The author of this study performed a retrospective chart review. A year of medical files were analyzed of individuals who had given birth at the participating health center from April 2020 to April 2021. The sample was separated first into having a scarred or unscarred uterus. A scarred uterus means that the woman had a history of at least one cesarean section and there was existent scar tissue. An unscarred uterus means that the woman has had no history of cesarean sections.

Of the 1,055 patients, 882 were designated as having an unscarred uterus. They either delivered vaginally (n=733) or that they had a primary cesarean section (n=149). Having an unscarred uterus eliminated them from the authors' sample. 173 women were then deemed having a scarred uterus. For this group of women, the author recorded their VBAC scores from the MFMU 2007 algorithm, age, BMI, race, ethnicity, reason for

prior cesarean section, their birthing outcome and any documents found that communicated their birthing preference.

The selected sample was further separated into women who were scheduled for a repeat cesarean section (n=115) and those who underwent VBAC counseling (n=58). Reasons a woman may be ineligible for a VBAC, and thus scheduled for a repeat cesarean section include a lack of planning, a multiple pregnancy, prior myomectomy, history of chronic illness, or more than two prior cesarean sections. If a woman indicates her interest in a trial of labor, and is not medically excluded for reasons listed above, she may undergo VBAC counseling. A healthcare provider will review the potential risks, benefits and calculate the patients VBAC calculator score. See Figure 2.

Data Analysis

A score of 60% or higher on the MFMU algorithm is adequate for a healthcare provider to recommend a vaginal birth after cesarean section. Correcting for race subtracted seven to ten points if the patient identified as either Hispanic or African American. The calculator subtracted a maximum of fourteen points if a woman identified as both. The number of Hispanic or African American women who met or exceed 60% after removing the race correction factor were counted. Caucasian, Native American or Asian women's scores did not reflect a change between the 2021 and 2007 calculator.

The VBAC scores of the sample who desired to attempt trial of labor, but instead had a repeat Cesarean-section, were quantitatively analyzed by placing their demographics into the 2021 MFMU algorithm (Version 2.0). The 2021 algorithm, in comparison to the 2007 algorithm used previously, removes the race correction factor. Inputting the sample of women who were rejected from a VBAC, despite being eligible for TOLAC, allows

the author to quantify how many women were barred from their desired birthing outcome based on their race or ethnicity.

CHAPTER FOUR

Results

Thirty-eight women from the author's source population were eligible to attempt trial of labor but had too low of a calculated VBAC success score to be recommended. Of these thirty-eight women, thirty-five had a VBAC score on file. Thirty-two met the study's further qualifications of identifying as African American or Hispanic. See Table 2.

Twelve women met or exceeded a score of 60% when the race correction factor was removed from the algorithm. By race, eight of these patients identified as Hispanic or Latino, three as African American and one as both Hispanic and African American. Therefore, the author found that 37.5% of women who gave birth during April 2020-April 2021 and underwent VBAC counseling were negatively impacted by the use of the race-correction factor and potentially discouraged to attempt a VBAC because of it.

From April 2020 to April 2021, twenty trials of labor were successful. In other words, the participating hospital had a VBAC rate of 1.90%. Under the new guidelines without the use of the correcting factor, this number could have been as high as 3.03%.

CHAPTER FIVE

Discussion and Conclusions

When the algorithm was first published and cesarean rates in America were at an all-time high, the VBAC rate was 8.3% (MacDorman et al., 2011). In 2018, the CDC reported a national VBAC rate of 13.3% (Osterman, 2020). While this is undoubtedly an improvement, a larger increase may have been observed had the VBAC calculator not considered race to begin with.

The MFMU nomogram for prediction of vaginal birth after cesarean delivery that corrected for race and ethnicity was used in hospitals across the United States for fifteen years. For these fifteen years, minority women's calculated VBAC success was misleadingly low. For fifteen years, women across the states were undergoing invasive abdominal surgery based on racial bias embedded into the American healthcare system. For fifteen years, there was yet another barrier for women of color to climb over in order to practice their right of medical autonomy.

Concurring Studies on VBAC Calculator Efficacy

This study detailed how many women at a single center during a one-year period were affected by the race correction factor. A 2018 retrospective study compared MFMU VBAC scores with observed outcomes. Researchers found that actual VBAC success was higher than their scores anticipated, especially for women within the score range of 40-80% (Wyckoff et al., 2018).

Similarly, a larger 2019 retrospective cohort study that compared observed VBAC's and VBAC calculator scores reported that the success rate for women with a

scores ranging from 31-60% was significantly higher than expected (Perez et al., 2019). Researchers concluded that the model may underestimate the rate of success, specifically for women with moderate to low predicted success rates. Based on the model used in both studies, African American and Hispanic women were more likely to fall into moderate to low predicted success rates.

The Patient's Perspective

Patients are the heart of medicine. Without them, the medical system would cease to exist, rendered a relic of the past. It is them who are directly affected by the decisions and conversations held in the medical community. Therefore, to offer a most deserved seat at the table in this conversation, the author will next highlight the concept of VBAC calculators from a mother's perspective.

Reproducing Racism

The women in Christine Smith's family had historically delivered naturally. So, for her first birth she desired to do the same (Letson, 2020, 18:57). Unfortunately, Smith's birthing experience ended in a cesarean section, something that her and her husband later felt was unnecessary and a result of her healthcare team's impatience. Smith was set on attempting a VBAC for her next pregnancy. At an early consultation with her new physician, he calculated her VBAC score and determined that he would not be able to offer her a trial of labor after asking *how* Hispanic she was. Smith says:

I paused, and thought for a second, "Should I just lie about it?" Then I'm like, "Why? Why even bother lying? It's not even worth it, to lie about my race" (21:05).

Janae Somervil had a similar experience at the end of her second trimester. Her doctor said that attempting a VBAC score would be dangerous because of her race. She

then went onto explain that African American females do not have the pelvic structure to support delivering vaginally. When the podcast host asked Somervil how that made her feel, she said:

I was... I felt abandoned, to be honest with you. She told me to find another doctor and she said she was needed elsewhere, walked out of the room and left me in there, alone(30:29).

According to David Jones, a historian of medicine at Harvard medical school, the anthropometric data Somervil's doctor referenced has been debunked numerous times and is based on antiquated ideals of race being a biological concept (Leston, 2020, 26:49). The race correction factor was founded on a predictive algorithm that used birthing outcomes as a measure of success. A computer, however, is not able to account for medical racism as a risk factor.

Changing the verbiage

In a poster presentation at the Society for Maternal-Fetal Medicine's 42nd annual meeting, Rubashkin shared his results on patients' perspective of VBAC prediction tools (2022). This ethnographic study enrolled 31 patients of diverse ethnicities and VBAC scores. While the VBAC calculator's purpose was to avoid a "failed" TOLAC, Rubashkin reported that many women believed just attempting was a success. Furthermore, other women said that they believe the actual labor, and not the calculator, is the supreme diagnostic tool because "you don't really know until you try" (Rubashkin, 2022). Women who both had successful trials of labor and ended in repeat cesarean sections vocalized their hesitation on its accuracy and implementation. These results imply that the predictive tool may not be as beneficial as its creators hoped.

Looking forward

Bill Grobman, one of the main physicians behind the VBAC calculator, explained in an interview that while he does not view race as a biological factor, he and his team thought long and hard before putting race into the calculator. Ultimately, they came to the conclusion that it was the most patient-centered and equitable decision. (Letson, 33:21) He discusses that the calculator was never intended to be used as the primary deciding factor (Letson, 34:31). Just under a year after Grobman made these statements, the calculator was rereleased without the race-correction factor along with a statement that it is important to continually rethink past approaches in medicine and to strive to achieve equity (Grobman et al., 2021).

While the creator's intentions were noble, the calculator was used in an unintended way across America for over a decade. Countless women like Christine and Janae were victims of unfounded doubt in their ability to choose their preferred birthing method. While it is accepted that a computer-based algorithm should not be the deciding factor in any major decision, it still establishes another barrier for women. Furthermore, many women do not feel comfortable choosing their own birthing method and so rely on both their healthcare provider and tools such as the VBAC calculator.

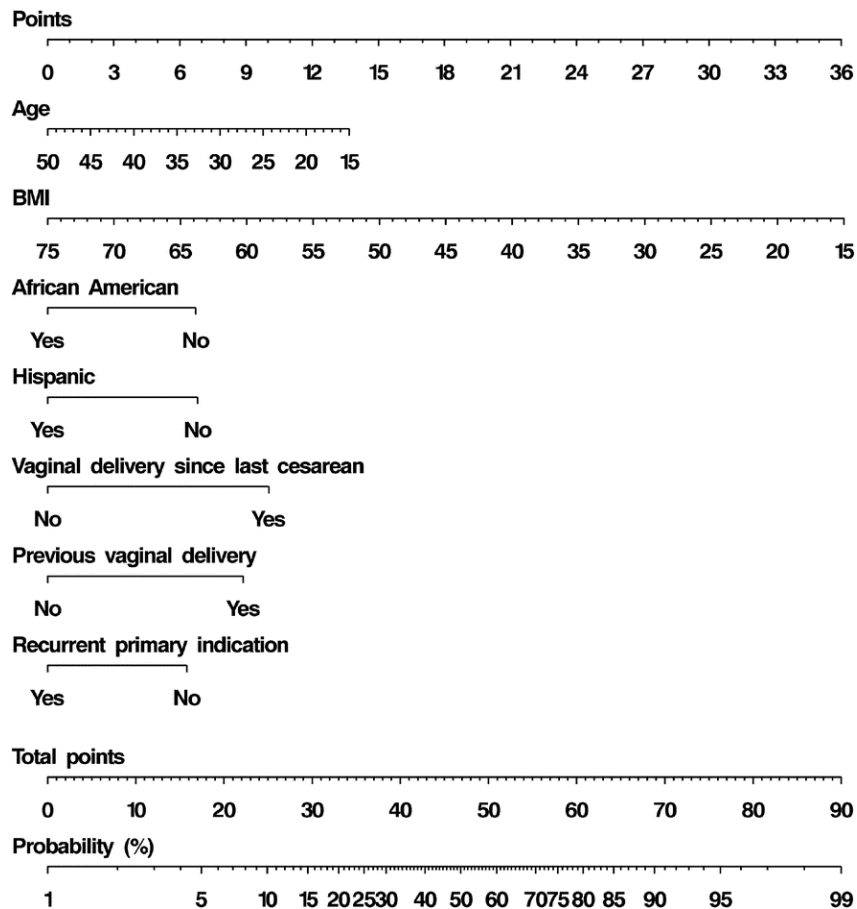
The sample size (n=35) of this study was small and may have decreased the statistical significance of the results. However, at least twelve women in Waco, Texas were casualties of racially motivated calculator. The number of women effected nationally is likely much greater. Moving forward, more research should be done on factors, both societal and physiological, that are leading to greater cesarean rates in minority populations. The threat of racism, though not a quantifiable factor, must be

assessed at every level of healthcare. Uncomfortable conversations need to continue to happen across the medical community. Safe spaces should be created for people to ask questions and converse with diverse perspectives. Through doing so, the healthcare system will better care for all members of our society.

APPENDICES

APPENDIX A

Figure 1: MFMU 2007 Weight of Predictive VBAC Nomogram



This figure lists the six factors put into the 2007 MFMU VBAC calculator, as well as the point system. Each category was assigned a different weight. Four of the factors were discrete variables while two were continuous. The total points were converted into a probability of success.

Note: Predictive Nomogram. Reprinted from “Development of a nomogram for prediction of vaginal birth after cesarean delivery” by W.A Grobman et al., 2007, *Obstetrics and Gynecology*, 109(4), 806–812. Copyright 2007 by the American College of Obstetrics and Gynecologists. Reprinted with permission.

APPENDIX B

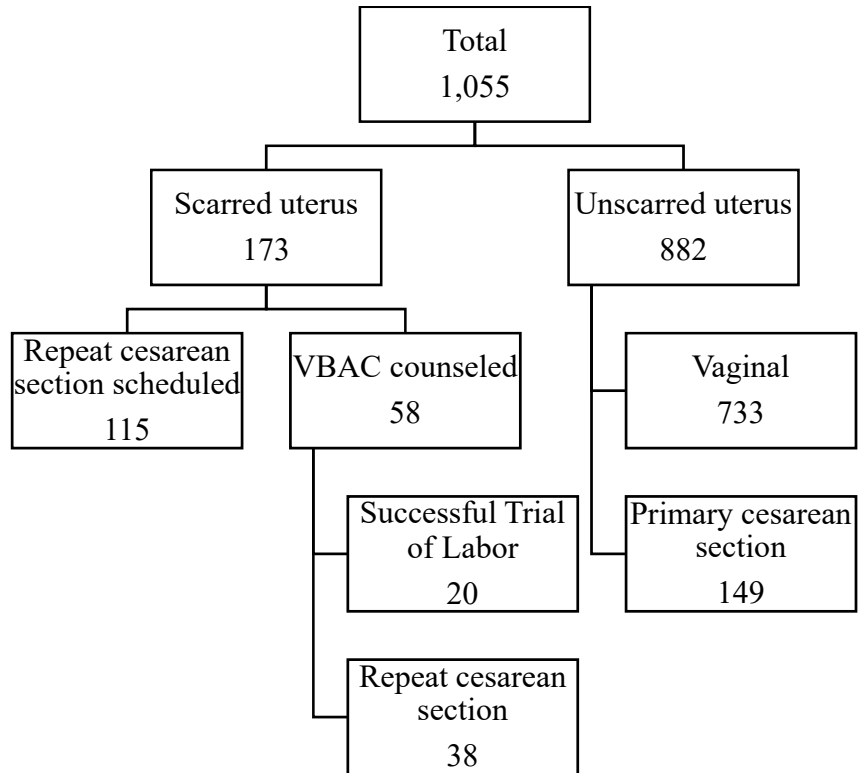
Table 1: 2007 VBAC Calculator vs 2021 VBAC Calculator

2007 MFMU VBAC Calculator	2021 MFMU VBAC Calculator
Maternal Age (years)	Maternal Age (years)
Body Mass Index (kg/m ²)	Body Mass Index (kg/m ²)
African American (yes/no)	Any previous vaginal delivery? (Yes/no)
Hispanic (yes/no)	History of VBAC? (yes/no)
Any previous vaginal delivery? (Yes/no)	Indication for prior cesarean of arrest of dilation or descent? (yes/no)
History of VBAC? (yes/no)	Treated Chronic Hypertension? (yes/no)
Indication for prior cesarean of arrest of dilation or descent? (yes/no)	

The 2021 calculator (right) was republished and replaced the use of the race factor in the 2007 model (left) with hypertension.

APPENDIX C

Figure 2: Delivery Outcomes



APPENDIX D

Table 2: Sample Demographics

VBAC Eligible, RCS	n=38
VBAC Score on file	n=35
Hispanic	n=20
African American	n=11
Hispanic/Latin and African American	n=1
<u>Other</u> race or ethnicity (Caucasian, Asian, etc.)	n=3

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