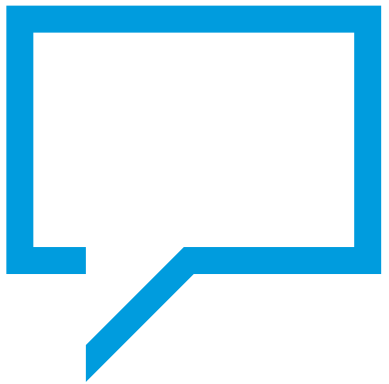
MAYO CLINIC

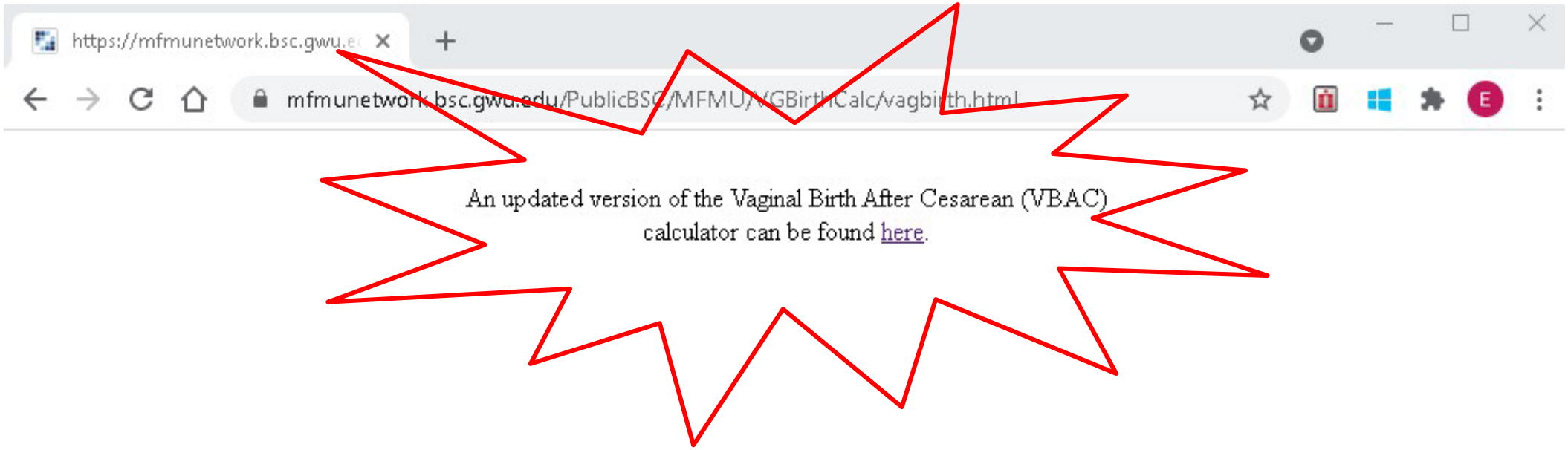
CALCULATED RISK: THE UPDATED VBAC CALCULATOR



Enid Rivera-Chiauzzi

OB/GYN Clinical and Surgical Updates: Staying Current and Ahead of the Curve 2022
February 10, 2022

WHAT HAPPENED TO THE ORIGINAL CALCULATOR?



LEARNING OBJECTIVE

- Definition of TOLAC and VBAC
- Background of TOLAC
- Risk and Benefits of TOLAC vs Repeat Cesarean
- Development of Calculator
- Concern around Race and Ethicity
- Historical Racisim in OB
- Chance to VBAC Calculator

DEFINITIONS

- **Trial of labor after cesarean (TOLAC):** A planned attempt to deliver vaginally by a woman who has had a previous cesarean delivery

- **Vaginal birth after cesarean delivery:** An outcome of achieving vaginal delivery

BACKGROUND

- Cesarean Delivery (1970 to 2016): Increased 5% to 31.9%
- VBAC (1985-1996): Increased 5% to 28.3
- Cesarean Delivery (1985-1996): Decreased 22.8% to 20%
  - Increased uterine rupture and complications
- VABC (2006): Decreased 8.5%
- Cesarean Delivery (2006): Increased 31.1%

TOLAC: RISK AND BENEFITS

RISKS

- Maternal morbidity related to TOLAC occurs when repeat cesarean delivery becomes necessary
- Uterine rupture or dehiscence
  - location of the prior incision on the uterus

BENEFITS Successful VBAC

- Experience a vaginal birth
- Avoid major abdominal surgery
- Lower rates of hemorrhage, thromboembolism, and infection
- Shorter recovery period
- Decrease the risk of maternal consequences related to multiple cesarean deliveries

NATIONAL INSTITUTES OF HEALTH

2010 SAFETY AND OUTCOME

- TOLAC was a reasonable option for many women
- Called on organizations to facilitate access to TOLAC
- Addresses concerns over liability

LIKELIHOOD OF SUCCESS

- Based on demographic and obstetric characteristics
- Undergo labor induction or augmentation: less likely to achieve
- Spontaneous labor without augmentation: more likely to achieve
- Negatively influence the likelihood of VBAC
  - BMI, high birth weight, and gestation > 40 weeks
  - Shorter interdelivery interval (less than 19 months) and preeclampsia
- Positively influence the likelihood of VBAC
  - Prior vaginal delivery

FINE PRINT

- Although such a calculator may provide more specific information about the chance of VBAC, which can be used by health care providers and their patients to further the process of shared decision making, **no prediction model for VBAC has been shown to result in improved patient outcomes.**

WHO ARE CANDIDATES?

- Yes: One previous cesarean delivery with a low-transverse
- No: Previous classical or T-incision, prior uterine rupture, or extensive transfundal uterine surgery
- No: Vaginal delivery is otherwise contraindicated
- Everyone else?

PREDICTION MODELS: VBAC CALCULATOR

MFMU 2007

- Patient: Term with one prior low-transverse cesarean delivery incision, singleton pregnancy, and cephalic fetal presentation
- Based on a multivariable logistic regression model:
  - maternal age, BMI, race, prior vaginal delivery, history of a VBAC, and indication for prior cesarean delivery
- Predicted probability of VBAC: reflect the actual probability in the original study population
- Help providers create individualize risk assessment

HOW DO WE CHOOSE?

- **60–70% likelihood of achieving** a VBAC who attempt TOLAC experience the same or less maternal morbidity than women who have an elective repeat cesarean delivery

- A predicted success rate of less than 70% is **not a contraindication** to TOLAC.

- We need the VBAC Calculator to figure out predicted success rate.

- Is there a problem?

MATERNAL MORTALITY AND MORBIDITY

- Black woman are 3-4 times likely to die from pregnancy related causes than white women
- Black woman are twice as likely to experience severe maternal morbidity
- Black and Hispanic women have higher cesarean delivery rates than white woman.

QUESTIONS?

African American
Hispanic
Subtract from success

Women's Health Issues 29-3 (2019) 201–204

ELSEVIER

WOMEN'S HEALTH ISSUES

www.whijournal.com

Commentary

Challenging the Use of Race in the Vaginal Birth after Cesarean Section Calculator

Darshali A. Vyas, BA [a,*], David S. Jones, MD, PhD [a], Audra R. Meadows, MD, MPH [a,b], Khady Diouf, MD [a,b], Nawal M. Nour, MD, MPH [a,b], Julianna Schantz-Dunn, MD, MPH [a,b]

[a] Harvard Medical School, Boston, Massachusetts
[b] Department of Obstetrics and Gynecology, Brigham and Women's Hospital, Boston, Massachusetts

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These examples suggest the VBAC model can be used effectively without race-based correction. While it is critical to acknowledge racial inequities in maternal outcomes, the lack of biological plausibility for race-based correction factors and their potential to worsen existing disparities creates a setting of reasonable doubt surrounding their inclusion in the VBAC calculator. Now, more than a decade after the model was initially developed, the potential unintended consequences of the algorithm merit close consideration. In doing so, we can ensure that our clinical standards are elevated to the aspirational goal of remedying unjust disparities rather than tacitly perpetuating them. As a step toward this goal, we strongly urge obstetrics practices to no longer include race-based correction in VBAC risk-stratification.

SUCCESSFUL VBAC PATIENT

- Caucasian
- Married
- Privately Insured
- Tobacco Users
- BMI less than 30

- Social advantage or disadvantage: non-biological connection
- Only race included in final predictive model, without biological support

RACISM IN PELVIC ANATOMY

- Pelvic Anatomic Differences
- Anthropoid pelvis: Degraded or animalized arrangement seen in the lower races
- Parallel between "anthropoid" and "animal"
- Reflected intentions to debase black women as anatomically deficient for giving birth
- Indigenous Mexican: pelvis describe as "backward" and "downward" considered primitive in comparison to European
  - More intervention and cesarean deliveries
  - Forced sterilization

MAYO CLINIC

ASSUMPTION OF PELVIC DIFFERENCE IN BLACK AND HISPANIC WOMEN HAVE BEEN HISTORICALLY ROOTED IN DEEPLY RACIST ENTERPRISES

DESPITE AN EMPIRICAL ASSOCIATION BETWEEN RACE/ETHNICITY AND VBAC, THE ASSOCIATION IS NOT SUPPORTED BY BIOLOGICAL PLAUSIBILITY

RACE AS PROXY FOR VARIABLES THAT REFLECT RACISM

- Income
- Educational level
- Access to care
- Social Circumstances:
  - Transportation
  - Support systems
  - Distances from hospital
  - Time off work
  - Childcare

RACIAL CATEGORIES

- African American and Hispanic reflect society's construction of race/ethnicity rather than a biological truth
- Hispanic is itself contested since it is unclear which ancestries or ethnicities the term encompasses and excludes.

- The original study use Latina rather Hispanic
- Patients and clinicians are forced to constrict their conceptions of race/ethnicity into binary categories.
- Example Black Dominican: can't select both

REMOVE RACE AND ETHNICITY

- Dr. Grobman' s group validated without race-base in Canada:
  - "We did not include women's ethnicity (being or not being of Hispanic or African AMerican origin) in the model because of potential difference in ethnic and socioeconomic background between populations in the United States and Canada."

- Dr. Fagerberg's group in Sweden validated the Grobman model:
  - Included women from sub-Saharan Africa, Spain, South American and Portugal along with Swedish natives and found ethnicity unrelated to successful VBAC

MAYO CLINIC

THE LACK OF BIOLOGICAL PLAUSIBILITY FOR RACE-BASED CORRECTION FACTORS AND THEIR POTENTIAL TO WORSEN EXISTING DISPARITIES CREATES A SETTING OF REASONABLE DOUBT SURROUNDING THEIR INCLUSION IN THE VBAC CALCULATOR.

QUESTIONS?

Limitations of Vaginal Birth After Cesarean Success Prediction

Patrick Thornton, CNM, PhD

The Society for Maternal-Fetal Medicine endorses an algorithm for estimating the probability of successful vaginal birth for women undergoing trial of labor after cesarean (TOLAC). The algorithm is available online in the form of an easy-to-use calculator. This calculator has significant limitations that are easily overlooked by women and providers alike. The calculator has much greater positive than negative predictive power, and it cannot predict unsuccessful TOLAC or uterine rupture. Furthermore, the calculator cannot predict rare catastrophes, such as unplanned hysterectomy, permanent injury, or death. Predictions are heavily influenced by race and ethnicity, which are social and not biological constructs. Relevant variables, such as provider attitudes and institutional differences, are not accounted for. Providers should be mindful and transparent about calculator limitations when counseling women, particularly Latina and African American women. It may be appropriate to use the calculator to inform but not restrict women's options.

J Midwifery Womens Health 2018;63:115–120

Keywords: vaginal birth after cesarean (VBAC), trial of labor after cesarean (TOLAC), sensitivity, specificity, uterine rupture, maternal morbidity, perinatal morbidity

QUESTIONS?

The NEW ENGLAND JOURNAL of MEDICINE

MEDICINE AND SOCIETY

Debra Malina, Ph.D., *Editor*

Hidden in Plain Sight — Reconsidering the Use of Race Correction in Clinical Algorithms

Darshali A. Vyas, M.D., Leo G. Eisenstein, M.D., and David S. Jones, M.D., Ph.D.

Obstetrics

Vaginal Birth after Cesarean (VBAC) Risk Calculator[13,14] (https://mfmunetwork.bsc.gwu.edu/PublicBSC/MFMU/VGBirthCalc/vagbirth.html) *Estimates the probability of successful vaginal birth after prior cesarean section. Clinicians can use this estimate to counsel people who have to decide whether to attempt a trial of labor rather than undergo a repeat cesarean section.*	Age BMI Prior vaginal delivery Prior VBAC Recurring indication for cesarean section African-American race Hispanic ethnicity	The African-American and Hispanic correction factors subtract from the estimated success rate for any person identified as black or Hispanic. The decrement for black (0.671) or Hispanic (0.680) is almost as large as the benefit from prior vaginal delivery (0.888) or prior VBAC (1.003).	The VBAC score predicts a lower chance of success if the person is identified as black or Hispanic. These lower estimates may dissuade clinicians from offering trials of labor to people of color.

RESPONSE FROM MFMU

- This study aimed to develop an accurate tool to predict vaginal birth after cesarean delivery, using data easily obtainable early in pregnancy, **without the inclusion of race and ethnicity.**

OBSTETRICS

Prediction of vaginal birth after cesarean delivery in term gestations: a calculator without race and ethnicity

William A. Grobman, MD, MBA; Grecio Sandoval, MA; Madeline Murguia Rice, PhD; Jennifer L. Bailit, MD, MPH; Suneet P. Chauhan, MD; Maged M. Costantine, MD; Cynthia Gyamfi-Bannerman, MD, MSc; Torri D. Metz, MD, MS; Samuel Parry, MD; Dwight J. Rouse, MD; George R. Saade, MD; Hyagriv N. Simhan, MD; John M. Thorp Jr, MD; Alan T. N. Tita, MD, PhD; Monica Longo, MD; Mark B. Landon, MD; On behalf of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network

BACKGROUND: Investigators have attempted to derive tools that could provide clinicians with an easily obtainable estimate of the chance of vaginal birth after cesarean delivery for those who undertake trial of labor after cesarean delivery. One tool that has been validated externally was derived from data from the Maternal-Fetal Medicine Units Cesarean Registry. However, concern has been raised that this tool includes the socially constructed variables of race and ethnicity.

OBJECTIVE: This study aimed to develop an accurate tool to predict vaginal birth after cesarean delivery, using data easily obtainable early in pregnancy, without the inclusion of race and ethnicity.

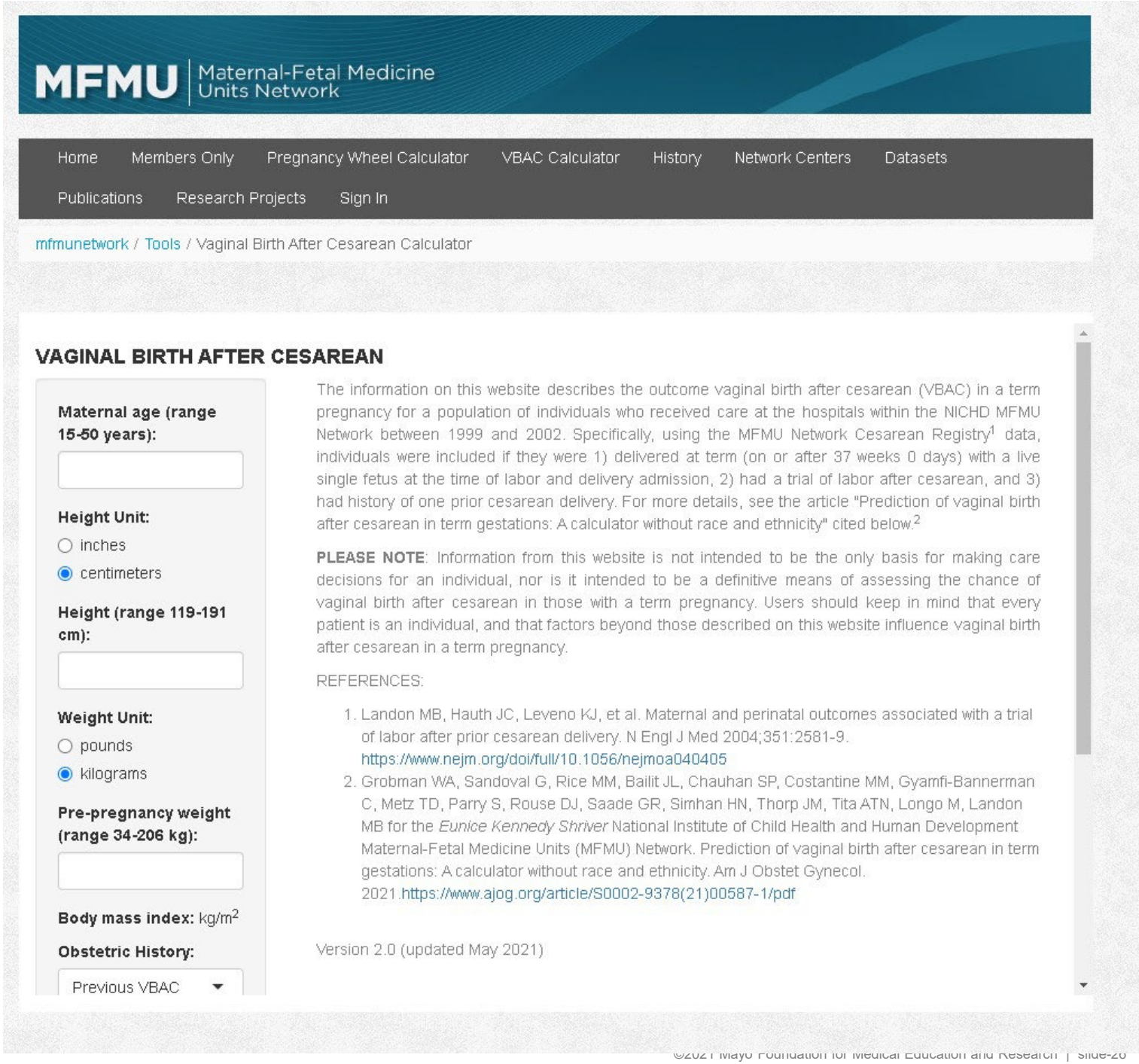
STUDY DESIGN: This was a secondary analysis of the Cesarean Registry of the Maternal-Fetal Medicine Units Network. The approach to the current analysis is similar to that of the analysis in which the previous vaginal birth after cesarean delivery prediction tool was derived. Specifically, individuals were included in this analysis if they were delivered on or after 37 0/7 weeks' gestation with a live singleton cephalic fetus at the time of labor and delivery admission, had a trial of labor after cesarean delivery, and had a history of 1 previous low-transverse cesarean delivery. Information was only considered for inclusion in the model if it was ascertainable at an initial prenatal visit. Model selection and internal validation were performed using a cross-validation procedure, with the dataset randomly and equally divided into a training set and a test set. The training set was used to identify factors associated with vaginal birth after cesarean delivery and build the logistic regression predictive model using stepwise backward elimination. A final model was generated that included all variables found to be significant ($P<.05$). The accuracy of the model to predict vaginal birth after cesarean delivery was assessed using the concordance index. The independent test set was used to estimate classification errors and validate the model that had been developed from the training set, and calibration was assessed. The final model was then applied to the overall analytical population.

RESULTS: Of the 11,687 individuals who met the inclusion criteria for this secondary analysis, 8636 (74%) experienced vaginal birth after cesarean delivery. The backward elimination variable selection yielded a model from the training set that included maternal age, prepregnancy weight, height, indication for previous cesarean delivery, obstetrical history, and chronic hypertension. Vaginal birth after cesarean delivery was significantly more likely for women who were taller and had a previous vaginal birth, particularly if that vaginal birth had occurred after a previous cesarean delivery. Conversely, vaginal birth after cesarean delivery was significantly less likely for women whose age was older, whose weight was heavier, whose indication for previous cesarean delivery was arrest of dilation or descent, and who had a history of medication-treated chronic hypertension. 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.

CONCLUSION: We successfully derived an accurate model (available at https://mfmunetwork.bsc.gwu.edu/web/mfmunetwork/vaginal-birth-after-cesarean-calculator), which did not include race or ethnicity, for the estimation of the probability of vaginal birth after cesarean delivery.

Key words: calculator, calibration, personalized, prediction, trial of labor after cesarean delivery, vaginal birth after cesarean delivery, validation

MFMU UPDATED VBAC CALCULATOR



MFMU UPDATED VBAC CALCULATOR

- **Maternal age** (range 15-50 years)
- Height (range 119-191 cm) & Pre-pregnancy weight (range 34-206 kg)
- **Calculates BMI**
- **Obstetric History**: Previous VBAC, Previous Vaginal Delivery only before prior cesarean, No previous vaginal delivery
- **Arrest disorder** indication for prior cesarean: Yes/No
- **Treated chronic hypertension:** Yes/No

QUESTIONS & ANSWERS