

# Evaluating the effect of digital prenatal care services on the odds of vaginal birth after cesarean

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# Presenter Disclosures

## Evaluating the effect of digital prenatal care services on the odds of vaginal birth after cesarean

This research was funded by Maven Clinic. The following personal financial relationships with commercial interests relevant to this presentation existed during the past 24 months:

- Drs. Hannah Jahnke, Natalie Henrich, and Neel Shah hold positions at Maven Clinic and have equity in Maven Clinic.
- Drs. Alex Peahl and Tomi Ojo are paid consultants for Maven Clinic.

# Background

**1 in 3**

pregnant people in the US  
have a cesarean birth

**<40%**

of appropriate candidates  
labor after cesarean birth

**13%**

of people have a successful  
Vaginal Birth After Cesarean (VBAC)

# Objective

## Aim 1

To assess how use of digital prenatal services is associated with VBAC

## Aim 2

To assess how user-report that the digital platform influenced their pregnancy experience is associated with VBAC



The image shows a digital interface for a prenatal service. At the top, a weekly calendar shows week 7, with days 8 through 11 visible. Below the calendar is a whimsical illustration of a small figure in a red Santa hat standing on top of two large blueberries. To the left of the illustration, the text 'YOUR BABY SIZE' is followed by 'Blueberry'. To the right, the text 'COUNTDOWN' is followed by '7 MONTHS 6 DAYS'. Below this, a text box contains the following message: 'This week your half inch bump is sprouting their arms and legs. The umbilical cord has grown to provide nutrition to baby throughout the rest of your pregnancy.' At the bottom of the screen, there is a 'CHECKING IN' section with a question: 'Are you taking at least 400mcg of folic acid or folate daily?'. Three buttons are provided: 'Yes', 'No', and 'No, but I did previously'. At the very bottom of the screen is a green button labeled 'Get care now'.

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# Methods

## Study Design

### Study type

Retrospective cohort study

### Population

- 271 pregnant users of an employer-sponsored digital prenatal health platform
- All users with a history of cesarean birth

## Predictors

### Use of digital prenatal services

- Articles read
- Messages to a Care Advocate
- Care Advocate appointments
- Messages to a specialist
- Specialist appointments

### User-reported platform influence on pregnancy experience

## Primary Outcome

### Mode of delivery

## Statistical Analysis

### Adjusted logistic regression

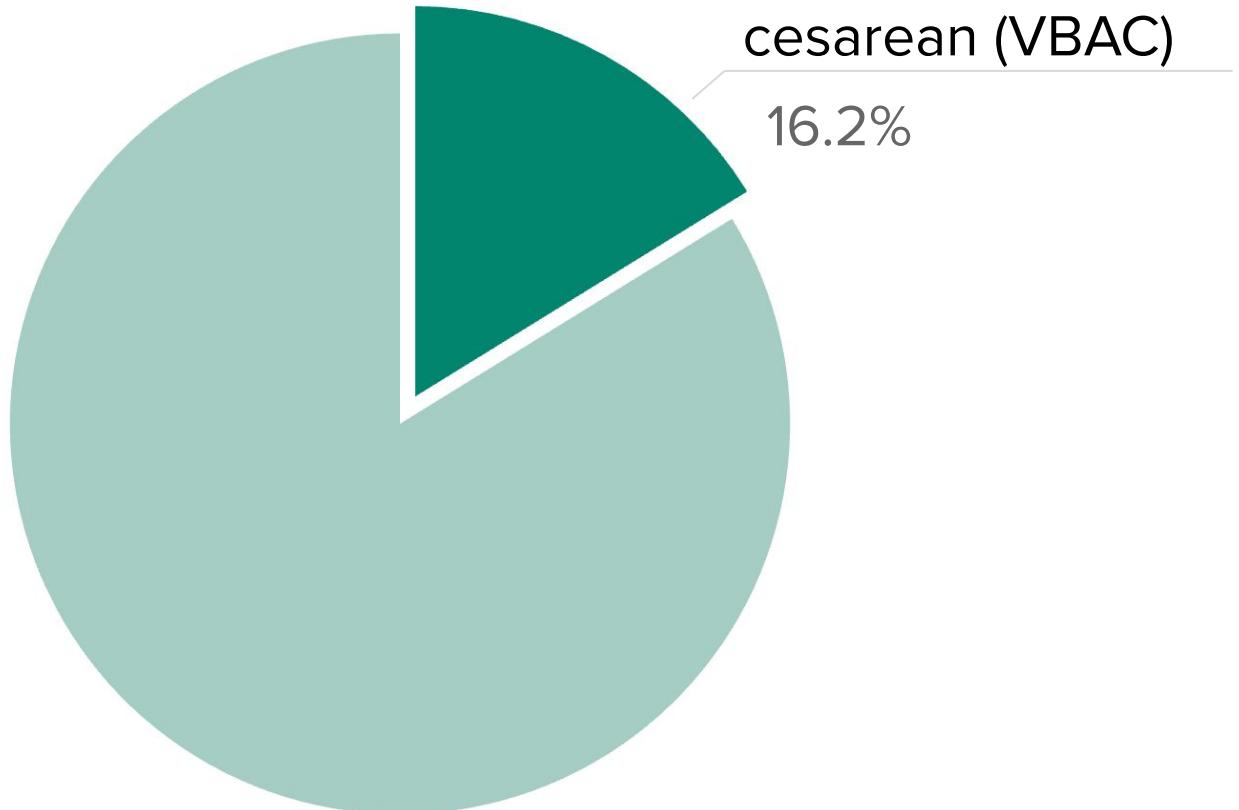
### Confounders

- Age
- Race / ethnicity
- Social Vulnerability Index (SVI)
- Obesity
- Medical conditions
- Mental health conditions
- Pregnancy-related anxiety
- Preferred mode of delivery

# Birth type among users with a previous cesarean birth

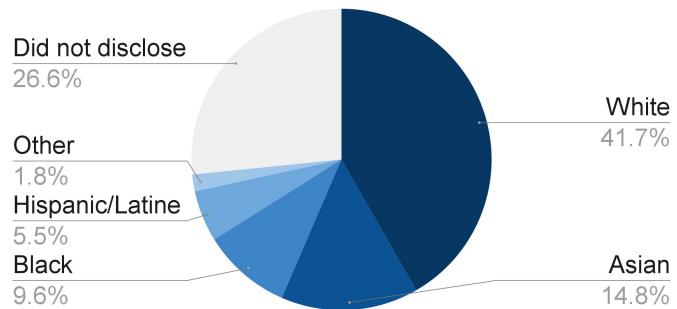
Repeat  
cesarean birth

83.8%

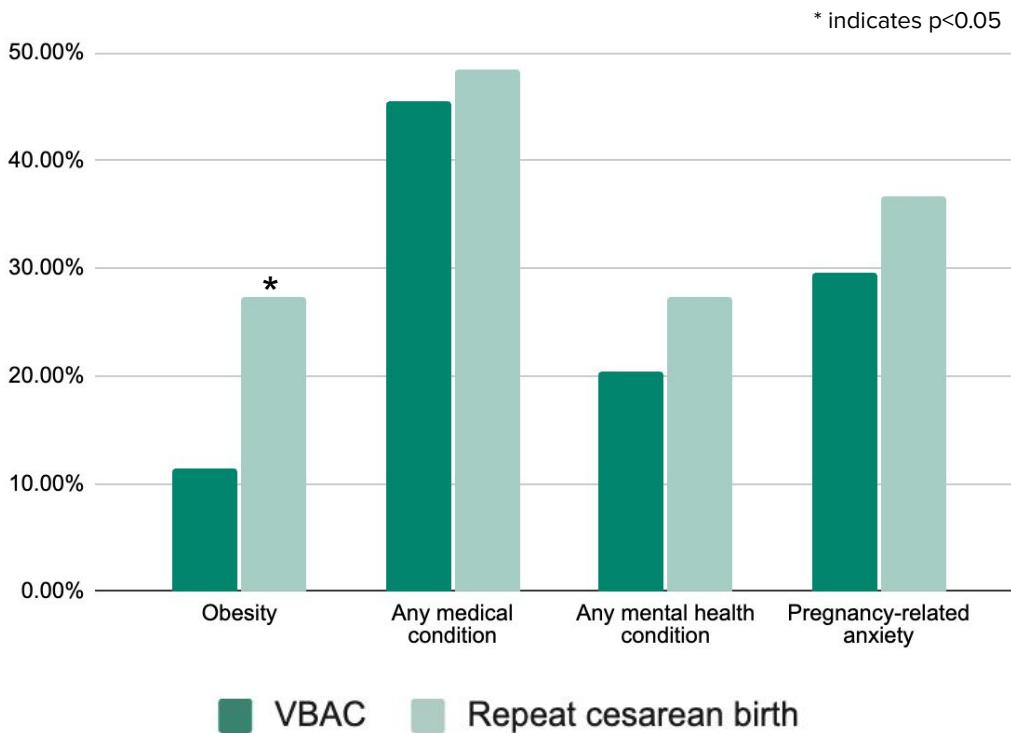


# User characteristics

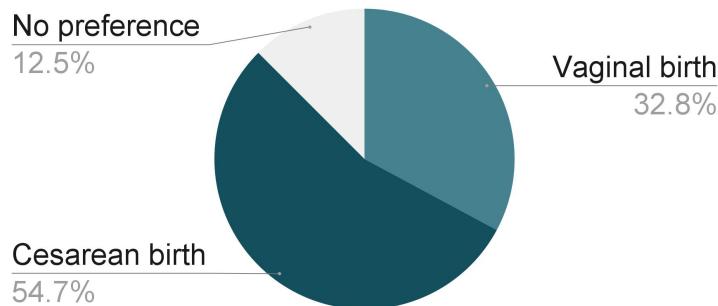
## Race / Ethnicity



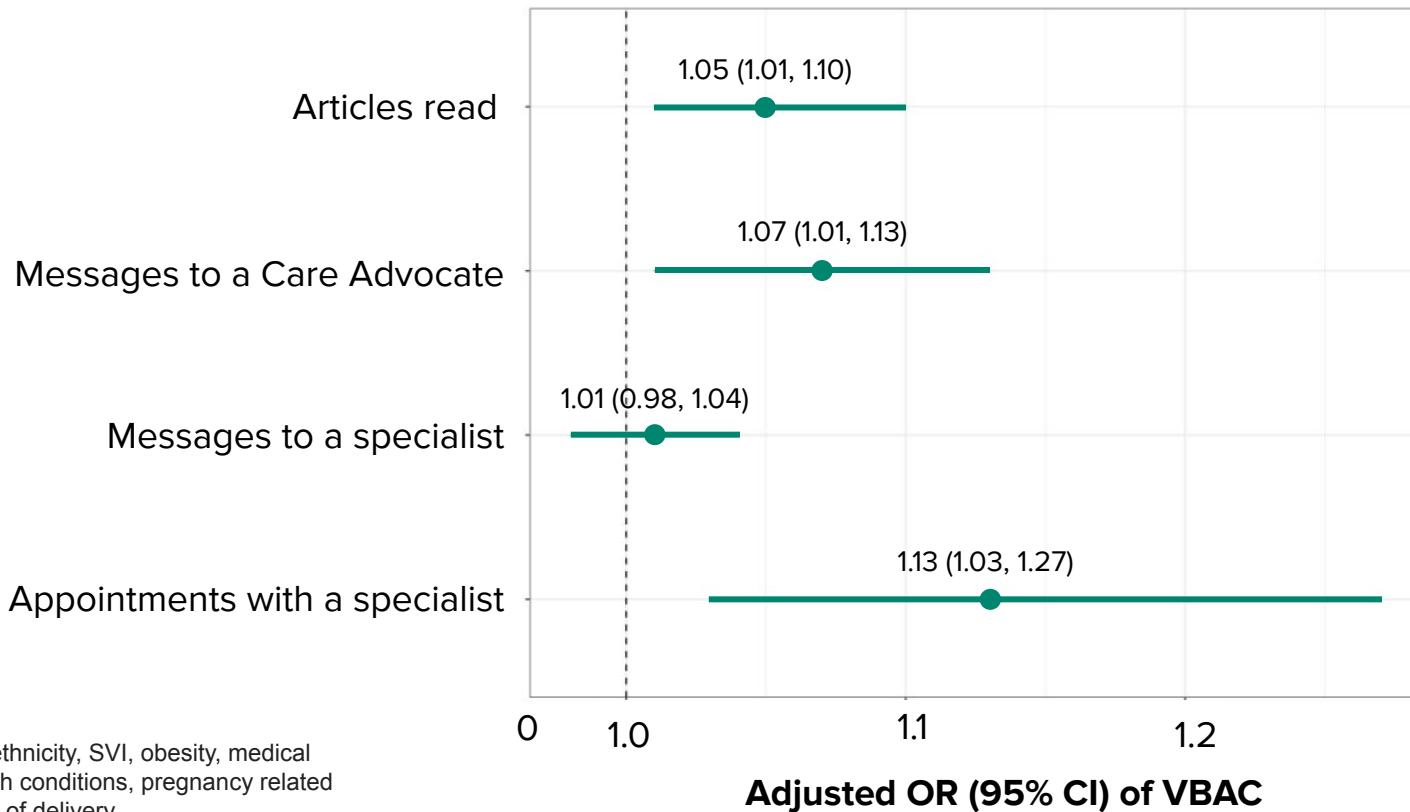
## Medical conditions



## Birth preference



# Digital service use is associated with VBAC



Having an appointment with a Care Advocate is associated with a 7.6 times greater odds of VBAC



**aOR: 7.60 (95% CI: 2.0 - 54.4)**

Adjusted for age, race/ethnicity, SVI, obesity, medical conditions, mental health conditions, pregnancy related anxiety, preferred mode of delivery

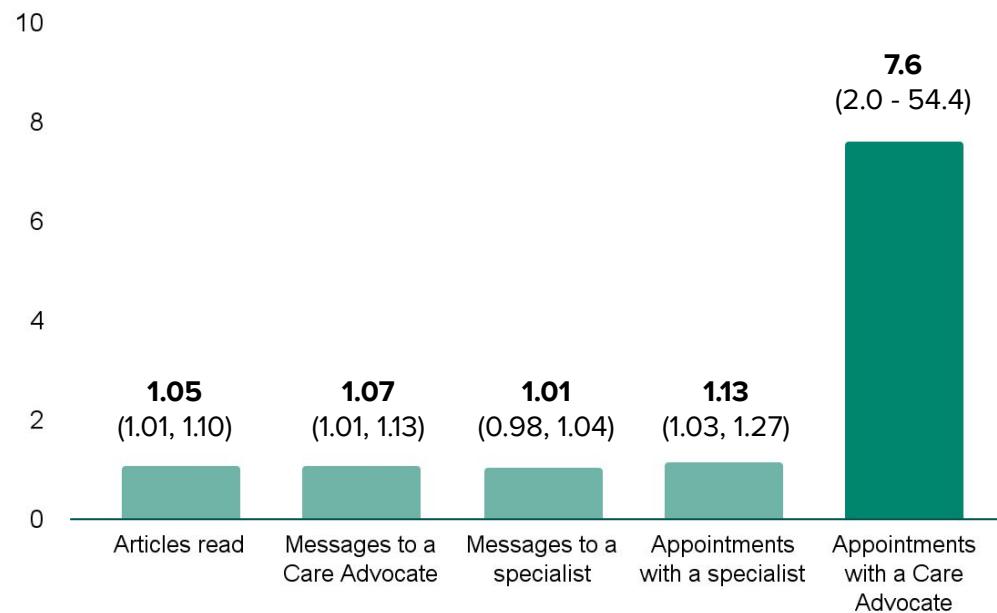
# Having an appointment with a Care Advocate is associated with VBAC

Digital service use	Adjusted OR (95% CI) of VBAC
Articles read	<b>1.05</b> (1.01, 1.10)
Messages to a Care Advocate	<b>1.07</b> (1.01, 1.13)
Messages to a specialist	<b>1.01</b> (0.98, 1.04)
Appointments with a specialist	<b>1.13</b> (1.03, 1.27)
Appointments with a Care Advocate	<b>7.6</b> (2.0 - 54.4)

Adjusted for age, race/ethnicity, SVI, obesity, medical conditions, mental health conditions, pregnancy related anxiety, preferred mode of delivery

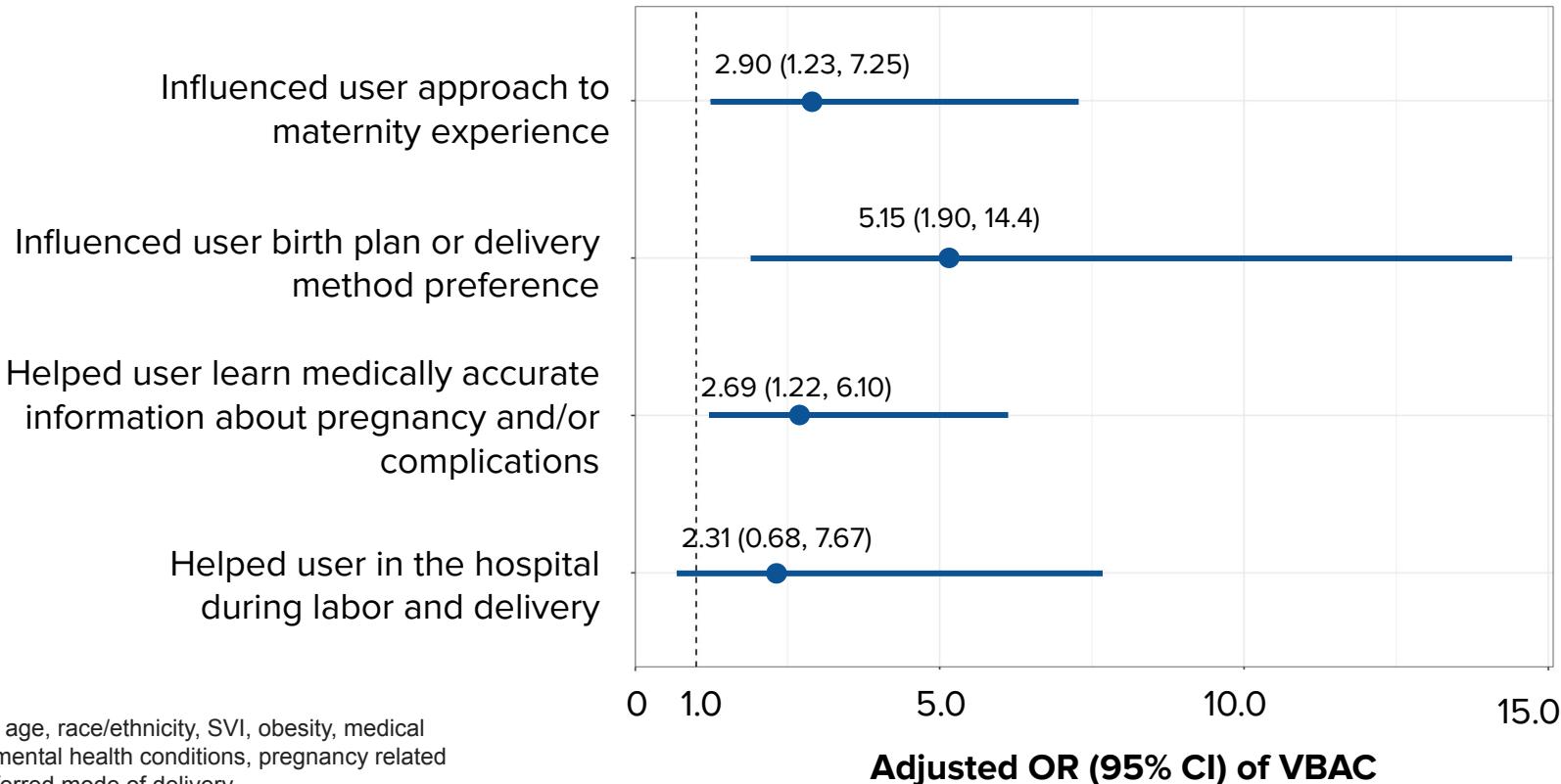
# Having an appointment with a Care Advocate is associated with VBAC

Adjusted OR (95% CI) of VBAC



Adjusted for age, race/ethnicity, SVI, obesity, medical conditions, mental health conditions, pregnancy related anxiety, preferred mode of delivery

# Platform influence is associated with VBAC



# Key points

**16%** Overall VBAC rate in this sample

Utilization of digital health services, and particularly having an appointment with a care advocate, was associated with higher likelihood of VBAC

User-report that the digital platform influenced aspects of pregnancy was associated with higher likelihood of VBAC

# Implications:

Digital health can help overcome barriers to trial of labor after cesarean



## System navigation

Help patients navigate complex health systems



## Knowledge

Connect patients to education and autonomy-supportive care coordination



## Support

Connect patients with convenient, patient-centered care

# Strengths & Limitations

## Strengths

- Data from a national cohort
- Includes nuanced measures including preferred mode of delivery and pregnancy-related anxiety
- Includes patient-perceptions of influence of digital services on key outcomes

## Limitations

- Did not have routine in-person prenatal care utilization data
- Self-reported data for medical conditions
- Challenges to generalizability

# Future work

- Assess how online services can improve cesarean birth rates in broader populations
- Examine the mechanisms through which digital services improve access, decision-making, and birth outcomes
- Evaluate the highest value ways to drive health outcomes through digital technology

# Thank you

## Key Points

Utilization of digital health services was associated with higher likelihood of VBAC

User-report that the digital platform influenced aspects of pregnancy was associated with higher likelihood of VBAC

## Contact us

Email: [research@mavenclinic.com](mailto:research@mavenclinic.com)

# Appendix

# User characteristics

	<b>Vaginal Birth N = 44 (16.2%)</b>	<b>Cesarean birth N = 227 (83.8%)</b>	<b>Full sample N = 271</b>
Age, <i>Mean (SD)</i>	35.5 (3.87)	35.1 (4.10)	35.2 (4.06)
Race/ethnicity			
White	21 (41.7%)	92 (40.5%)	113 (41.7%)
Asian	6 (13.6%)	34 (15.0%)	40 (14.8%)
Black	4 (9.1%)	22 (9.7%)	26 (9.6%)
Hispanic/Latine	2 (4.5%)	13 (5.7%)	15 (5.5%)
Other	1 (2.3%)	4 (1.8%)	5 (1.8%)
Did not disclose	10 (22.7%)	62 (27.3%)	72 (26.6%)
Social Vulnerability Index (SVI), <i>Median (Q1, Q3)</i>	0.31 (0.21, 0.50)	0.32 (0.19, 0.48)	0.32 (0.19, 0.48)
Obesity, <i>N (%)</i>	5 (11.4%)	62 (27.3%)	67 (24.7%)
Any medical condition, <i>N (%)</i>	20 (45.5%)	110 (48.5%)	130 (48.0%)
Any mental health condition, <i>N (%)</i>	9 (20.5%)	62 (27.3%)	71 (26.2%)
Pregnancy-related anxiety, <i>N (%)</i>	13 (29.5%)	83 (36.6%)	96 (35.4%)
Prefers vaginal delivery, <i>N (%)</i>	34 (77.3%)	55 (24.2%)	89 (32.8%)

Green fill represents p < 0.05

# Abstract for reference

**Background:** Digital health services are a promising but understudied method for reducing barriers to vaginal birth after cesarean (VBAC). This study aims to assess the relationship between use of digital prenatal services and VBAC.

**Methods:** In this retrospective cohort study, we analyzed the use of digital prenatal services and mode of delivery among members of a digital maternal health program. All members had a prior cesarean delivery. Members' self-reported data included demographics, medical history, and birth preferences. We used descriptive statistics and logistic regression to assess the association between digital services utilization and VBAC, adjusting for key patient characteristics.

**Results:** Of 271 included members, 44 (16.2%) had a VBAC and 227 (83.8%) had a cesarean delivery. Members of both groups were similar in age, race, and ethnicity. Fewer members in the VBAC group were obese (5/44, 11.4%; 62/227, 27.3%;  $p=0.02$ ) and more preferred vaginal birth (34/44, 77.3%; 55/227, 24.2%;  $p<0.01$ ). In adjusted models, the digital services associated with VBAC were care advocate appointments ( $aOR\ 7.67$ ; 95% CI 1.99-54.4), provider appointments ( $aOR\ 1.12$ ; 95% CI 1.02-1.25), and resource reads ( $aOR=1.05$ , 95% CI 1.00-1.09). VBAC rates were higher for members who reported the digital clinic influenced aspects of their pregnancy and delivery.

**Conclusions:** Reducing cesarean birth rates is a national priority. Digital health services are promising for accomplishing this goal through increasing VBAC rates.