

prolonged 2nd stage, cesarean section, operative vaginal deliveries and perineal lacerations were similar between groups.

CONCLUSION: Patients that are physically active in pregnancy may have a shorter duration of active labor. Further research should investigate the impact of initiatives to increase physical activity in pregnancy on labor.

Table 1: Labor Outcomes

	KPAS <75 th percentile (N=608)	KPAS ≥75 th percentile (N=203)	P value	RR (95% CI)	aRR 95% CI*
Duration of active labor (hour)	7.43 (6.29)	5.77 (4.97)	0.01		
Duration of 2nd stage (hour)	0.97 (2.08)	1.29 (2.94)	0.15		
Prolonged first stage	19.4	9.8	<0.01	0.51 (0.32, 0.79)	0.51 (0.32, 0.78)
Prolonged second stage	5.8	6.4	0.73	1.11 (0.60, 2.06)	1.09 (0.56, 1.98)
Second stage cesarean section (%)	12.3	15.3	0.28	1.24 (0.84, 1.82)	1.37 (0.91, 2.00)
Operative vaginal delivery (%)	4.4	4.4	1	1.00 (0.48, 2.09)	0.98 (0.44, 1.99)
Severe perineal lacerations (3 rd or 4 th degree lacerations) (%)	3.3	2.5	0.65	0.75 (0.28, 1.97)	0.68 (0.23, 1.68)
Postpartum hemorrhage (%)	3.9	3.4	0.84	0.87 (0.38, 2.0)	0.87 (0.35, 1.90)

KPAS Kaiser physical activity survey score

*Adjusted for obesity

46 Length of labor and severe maternal morbidity in the NTSV population

Benjamin J. Lengerich¹, Rich Caruana², William B. Weeks³, Ian Painter⁴, Sydney Spencer³, Kristin Sitcov⁴, Colleen Daly⁵, Vivienne Souter⁴

¹Carnegie Mellon University, Pittsburgh, PA, ²Microsoft Research, Redmond, WA, ³Microsoft Corporation, Redmond, WA, ⁴Foundation for Health Care Quality, Seattle, WA, ⁵Microsoft HR, Redmond, WA

OBJECTIVE: To study the relationship between length of labor and the risk of severe maternal morbidity (SMM) using generalized additive models (GAMs).

STUDY DESIGN: This retrospective cohort study included nulliparous term singleton vertex (NTSV) births in 17 US hospitals (2016-2019). Clinical data were abstracted from medical records. SMM included blood transfusion, DIC, hysterectomy, eclampsia, venous thromboembolism, and amniotic fluid embolism. Cesareans performed without labor were excluded. A multivariable GAM was trained to predict SMM from 40 demographic, pregnancy and labor characteristics. GAMs are an extension of logistic regression that allow non-linear effects of continuous variables and aid interpretability by plotting risk for each variable independently while correcting for other variables in the model.

RESULTS: The cohort included 32,203 births. The rate of SMM was 1.2% (N=392). Characteristics of the study population are in Table 1. The strongest predictors of SMM were birthweight, time from admission to complete dilation, maternal height, pre-eclampsia/gestational hypertension, and 2nd stage duration. Induction was not a strong predictor of SMM when other variables (including cervical dilation on admission) were accounted for. SMM risk started to increase when admission to complete dilation duration was 12 hours and continued to increase smoothly up to 30 hours (Figure 1a). In contrast, SMM risk increased abruptly when 2nd stage duration reached 4 hours, a clinically relevant cut-off for prolonged 2nd stage in nulliparas (Figure 1b). Unlike the smooth increase in SMM during the first stage of labor, this abrupt increase likely reflects the impact of medical intervention.

CONCLUSION: The relationship between length of labor and SMM in the NTSV population is non-linear. After accounting for other variables in the model, SMM starts to increase when the time from admission to complete dilation reaches 12 hours. In the 2nd stage, SMM increases abruptly at 4 hours, a clinically actionable cut-off for prolonged 2nd stage, and likely reflects the impact of operative delivery.

Table 1 Characteristics of the study population

	SMM n = 392 No. (%)	No SMM n = 31811 No. (%)	P-value
Maternal age (years)			0.08
<20	34 (1.5)	2244 (98.5)	
20-34	303 (1.2)	25762 (98.8)	
35-39	44 (1.3)	3264 (98.7)	
≥40	10 (1.9)	527 (98.1)	
Mean BMI (kg/m²)			0.235
<25	45 (13)	3504 (98.7)	
25-29	123 (1.0)	11633 (90.0)	
30-34	125 (1.4)	8951 (98.6)	
35-39	51 (1.2)	4228 (98.8)	
≥40	42 (1.5)	2842 (98.5)	
Missing or implausible value	6 (0.9)	653 (99.1)	
Mean maternal height in cm^a	161.9	163.2	<0.001
Mean baby weight (g)^b	3450	3361	<0.001
Preeclampsia / Gestational hypertension			<0.001
Yes	100 (2.6)	3725 (97.4)	
No	292 (1.0)	28086 (99.0)	
Median length of time admission to complete dilation (hours)^c	15.8	11.3	<0.001
Median length of 2nd stage of Labor (hours)^d	2.4	1.6	<0.001

Missing data for ^a maternal height (n=454), ^b baby weight (n=22), ^c length of time admission to delivery (n=5744), ^d length of second stage (n=5743). Continuous variables were compared with a Student's t-test or Kruskal-Wallis test. Categorical variables were compared using a Chi-squared test or Fisher exact test.

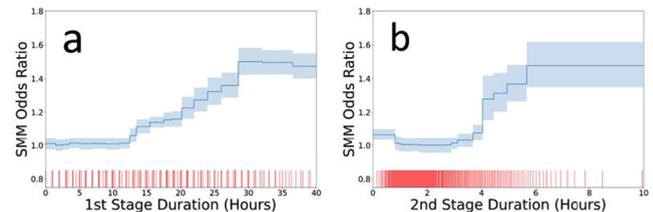


Figure 1 Generalized additive model (GAM) plots showing odds of SMM for (a) time from admission to full dilation and (b) duration of 2nd stage of labor.

47 A Double-Blinded Randomized Controlled Trial on Increased Intravenous Hydration in Nulliparous Women Undergoing Labor Induction

Jennifer Duffy¹, Erica Wu², Alex Fong³, Thomas J. Garite⁴, Vineet Shrivastava⁵

¹University of California, Irvine, Orange, CA, ²Stanford University Medical Center, Stanford, CA, ³Kaiser Permanente Woman's Health Services, Orange County, Irvine, CA, ⁴University of California Irvine Department of Obstetrics and Gynecology, Grand Junction, CO, ⁵Long Beach Memorial Medical Center Women's Hospital, Long Beach, CA

OBJECTIVE: High-dose intravenous fluid (250cc/hr) has been previously demonstrated to shorten the time to delivery in nulliparous women in spontaneous labor. Whether or not this relationship ship exists in women undergoing induction of labor is unknown. Our study aimed to evaluate the effect of high-dose intravenous hydration (compared to standard dose) on time to delivery among nulliparous women undergoing induction of labor.

STUDY DESIGN: Nulliparous women presenting for induction of labor with a Bishop score of less than or equal to 6 (with and without rupture of membranes) were randomized to receive either 125cc/hr or 250cc/hr of normal saline. The primary outcome was length of