flavanol (HFC) or low-flavanol chocolate (LFC). A total of 30 g of chocolate was consumed daily for 12 weeks and women were followed until delivery. Uterine artery Doppler pulsatility index (UtA PI), reported as multiple of medians (MoM) adjusted for gestational age, was assessed at baseline and 12 weeks after randomization. Preeclampsia, gestational hypertension, placenta weight, and birthweight were also evaluated.

RESULTS: One hundred twenty nine women were randomized at a mean gestational age of 12.4 ± 0.6 weeks with a mean UtA PI of 1.4 ± 0.4 MoM. Although adjusted UtA PI significantly decreased from baseline to 12 weeks in the 2 groups (<0.0001), the difference between the 2 groups was not significant (p=0.16). At 12 weeks, we observed no significant difference between HFC and LFC groups in the rate of preeclampsia (4.7% vs 3.1%, p=0.49) and gestational hypertension (6.2% vs 12.5%, p=0.56). Placental weight (466 vs 464 grams, p=0.93) and birthweight (3348 vs 3215 grams, p=0.07) were comparable between the two groups.

CONCLUSION: Compared with low-flavanol chocolate, daily intake of 30g of high-flavanol chocolate did not improve placental function, placental weight and the risk of preeclampsia. Nevertheless, the marked improvement of the pulsatility index observed in the 2 chocolate groups might suggest that chocolate effects are not solely and directly due to flavanol content.

33 Short and long sleep durations in pregnancy are associated with extremes of gestational weight gain

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OBJECTIVE: Epidemiologic data from non-pregnant cohorts have linked poor sleep with obesity and weight gain. Our objective was to determine the relationship between objectively measured sleep duration and weight gain in pregnancy.

STUDY DESIGN: Women enrolled in the nuMoM2b study, a multicenter prospective cohort study of nulliparous women with a singleton gestation, were recruited at the 2nd study visit (16-21 weeks') to wear an actigraph to record objective sleep activity for 7 consecutive days. Women with pregestational diabetes and chronic hypertension were excluded. Sleep duration (SD) was calculated as an average across study nights and categorized as follows: <6, 6 to <7, 7 to <8, 8 to <9, and >9 hours/night. Gestational weight gain (GWG) was calculated relative to self-reported prepregnancy weight using measured weights at visit 2 and visit 3 (22-29 weeks'), and chart abstracted last weight prior to delivery. We examined GWG using gestational age-standardized z-scores, a measure of GWG that by design is uncorrelated with gestational age at measurement and BMI. Z scores of <-1 and >+1 were used to define groups with the smallest and largest normalized weight gains, respectively.

RESULTS: Actigraphy and weight data were available for 751 women. The majority of women (74.8%) had a SD between 7 to <9 hours; 2.1% and 5.2% had a SD of <6 and >9 hours/night, respectively. Non-linear relationships were observed between SD and GWG (see Table). For all GWG assessments, large GWG (Z>+1) became less frequent as SD increased. Women with the shortest (<6) and the longest (> 9) SD had the highest rates of small GWG (Z<-1). Differences were statistically significant for GWG at Visit 2 and Visit 3 (p<.0001, p=.04) and were similar in magnitude for the last weight prior to delivery (p=0.0504).

CONCLUSION: Our data suggests that both short and long SD in pregnancy are associated with GWG. Poor sleep in pregnancy has been linked to adverse pregnancy outcomes, and our findings provide one potential mechanism for this association.

Table: Gestational Weight Gain Z Scores in Relation to Mean Sleep Duration

Gestational Weight Gain (GWG)[1/]	Mean Sleep Duration Over 7 Days (hours)					
	<6	6-<7	7-<8	8-<9	9+	p-value
Visit 2 - N	**16**	**134**	**366**	**196**	**39**	
z-score[2/] - mean (SD)	-0.18 (1.01)	0.17 (1.05)	0.01 (0.95)	-0.24 (1.16)	-0.74 (1.38)	<.0001
< -1 (smallest weight gain) - n (%)	3 (18.8)	11 (8.2)	44 (12.0)	43 (21.9)	15 (38.5)	<.0001
-1 to 1- n (%)	10 (62.5)	101 (75.4)	274 (74.9)	132 (67.3)	22 (56.4)	
> 1 (largest weight gain) - n (%)	3 (18.8)	22 (16.4)	48 (13.1)	21 (10.7)	2 (5.1)	
Visit 3 - N	**17**	**131**	**360**	**189**	**37**	
z-score[2/] - mean (SD)	-0.05 (1.38)	0.17 (1.05)	0.08 (0.99)	-0.09 (1.04)	-0.40 (1.10)	0.0143
< -1 (smallest weight gain) - n (%)	4 (23.5)	14 (10.7)	36 (10.0)	32 (16.9)	9 (24.3)	0.0372
-1 to 1- n (%)	9 (52.9)	95 (72.5)	270 (75.0)	135 (71.4)	26 (70.3)	
> 1 (largest weight gain) - n (%)	4 (23.5)	22 (16.8)	54 (15.0)	22 (11.6)	2 (5.4)	
Last Recorded Prior to Delivery[3/] - N	**16**	**131**	**357**	**191**	**37**	
z-score[3/] - mean (SD)	-0.20 (1.19)	0.08 (0.97)	0.10 (0.90)	-0.09 (1.02)	-0.28 (1.32)	0.0504
< -1 (smallest weight gain) - n (%)	5 (31.3)	16 (12.2)	39 (10.9)	26 (13.6)	9 (24.3)	0.0543
-1 to 1- n (%)	7 (43.8)	95 (72.5)	266 (74.5)	142 (74.3)	26 (70.3)	
> 1 (largest weight gain) - n (%)	4 (25.0)	20 (15.3)	52 (14.6)	23 (12.0)	2 (5.4)	

[1/] GWG was taken relative to prepregnancy weight reported by the participant on V1A, D1.
[2/] Z-scores were computed using methodology described in Hutcheon, et al, 2013, Am J Clin Nutr and Hutcheon, et al, 2015, Obesity. For the purpose of this analysis, z-score values outside the range of -5 to +5 were flagged and excluded from the rate of change and z-score analysis as they likely reflect a recording error.
[3/] Weight and date weight obtained reported by chart abstraction

34 Point-of-care congo red dot (CRD) test for antenatal triage and rapid identification of preeclampsia (PE)

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OBJECTIVE: Reduction of maternal and fetal morbidity related to PE has long been a global health priority. Though powerful, the diagnostic clinical algorithms could be biased because PE cannot always be diagnosed on clinical criteria alone. Proteins in the urine are of serum, placental and kidney origin, and in PE have a propensity to aggregate and bind to Congo Red (CR). Therefore, detection of misfolded urine proteins by CR indicates PE. Our aim was to determine if a CR urine paper-based point-of-care test can be of value for rapid antenatal triage and diagnosis of PE, independent of clinical criteria.

STUDY DESIGN: 346 consecutive women were enrolled prospectively. Each was evaluated in L&D triage for PE. For clinical purposes, routine medically indicated parameters and laboratory tests were used. For research, fresh crude urine (0.5 cc) was applied to a rapid paper-based CRD test. Results were scored by trained clinical nurses at the bedside before a final diagnosis and management plan was established. The clinical team was unaware of the CRD test result. In addition to clinical symptoms, and to strengthen the final diagnosis, stored urine samples were analyzed for: CRD nitrocellulose testing (laboratory "gold standard"), Protein/Creatinine (P/C) ratio, urine and serum placental growth factor (PlGF), sFlt-1 and urine sFlt-1/PlGF (uFP) ratio.

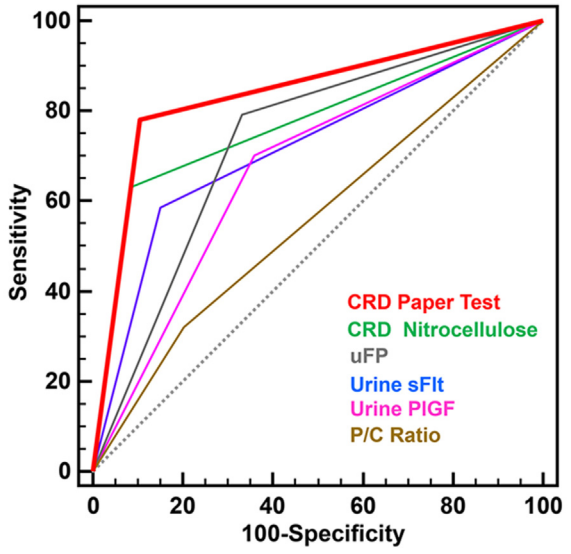
RESULTS: 89 women had a clinical diagnosis of PE and 79% (70/89) of these were delivered preterm (median [range] GA: 33 [21-36] wks). The CRD test was superior in establishing or ruling out a diagnosis of PE (Table and Figure). Out of 18 women who were followed longitudinally and initially tested negative, 14 developed a positive CRD and clinical PE. The latency period between a positive paper-based CRD test and delivery was 14 [4-35] days.

CONCLUSION: The paper-based CRD test is a simple, non-invasive, "sample-in/answer-out" point-of-care clinical tool which allows for rapid screening and identification of PE.

Table: Test performance parameters

Test	Sensitivity [95% CI]	Specificity [95% CI]	PPV [95% CI]	NPV [95% CI]	Accuracy [95% CI]
CRD Paper Test Point of care	79 [70-87]	89 [85-93]	74 [66-83]	91 [88-95]	86 [83-90]
CRD Test Nitrocellulose	63 [53-73]	91 [88-95]	74 [64-84]	86 [82-91]	83 [79-87]
Urine sFlt	59 [48-69]	70 [64-75]	38 [30-46]	84 [79-89]	67 [62-72]
Urine PlGF	70 [60-80]	64 [58-70]	43 [35-51]	85 [79-90]	66 [61-71]
uFP	79 [71-88]	67 [61-73]	48 [40-56]	89 [85-94]	70 [65-75]
P/C Ratio	44 [34-53]	87 [82-91]	62 [51-73]	75 [70-81]	72 [67-77]
Serum sFlt	76 [65-87]	64 [57-71]	43 [34-53]	88 [82-94]	67 [61-73]
Serum PlGF	79 [69-90]	53 [45-61]	38 [29-46]	88 [81-94]	60 [53-66]

Figure: Graphic display comparing test performances



35 A history of preeclampsia predicts coronary artery calcification three decades later

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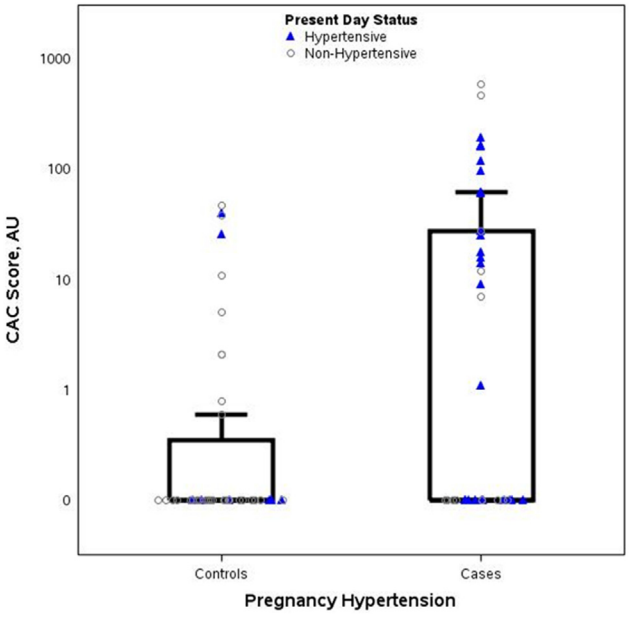
OBJECTIVE: Cardiovascular disease (CVD) is the leading cause of death in women, and a history of preeclampsia (PE) is now recognized as an independent risk factor for cardiac events and stroke. We sought to characterize a quantifiable preclinical marker of CVD disease, coronary artery calcification (CAC), in a nested cohort of women with and without a history of PE.

STUDY DESIGN: A nested sample of 80 women without prior CVD events (40 with and 40 without a history of PE matched for parity and age at index birth) were recruited from a large population based cohort of > 7500 women living in Olmsted County, MN and delivering between 1976 and 1982. From 2014-2015, computed tomography was performed to measure CAC in Agatston Units (AU). All pregnancy history and current covariates were confirmed by chart review. Additional clinical variables were assessed at the time of imaging. Groups were compared with chi-square tests, t-tests, Wilcoxon 2-sample tests and ordinal logistic regression, as appropriate.

RESULTS: Mean age at imaging was 59.5 (± 4.6) years. There were no statistically significant differences between groups in current body mass index, systolic and diastolic blood pressure, and diabetes status. However, the frequency of a current clinical diagnosis of hypertension (HTN) (60% v. 20%, p = 0.001) and hyperlipidemia (43% v. 18%, p = 0.015) was greater in the PE group. The frequency of AU > 50 (23% v. 0%, p=0.001) was greater in the PE group. Compared to those without PE, the odds of a higher CAC score was 3.54 (1.39 - 9.02) times greater in women with a prior PE without adjustment for present day HTN, and 2.61 (0.95 - 7.14) times greater after adjustment.

CONCLUSION: This is the first prospective cohort study with confirmation of PE by chart review and measurement of concurrent clinical covariates that confirms a history of PE is associated with an increased risk of present day CAC > 30 years later. This is strong evidence that a history of PE should be considered in risk assessment to initiate primary prevention strategies to reduce CVD in women. Among women with PE, the presence of CAC may be able to identify those at highest risk.



36 Placenta Growth Factor (PLGF) predicts time to delivery in women with signs or symptoms of early preterm preeclampsia

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OBJECTIVE: To examine the relationship between PLGF and time-to-delivery (TTD) among women presenting with signs or symptoms of PE <35+0 weeks, and to determine if PLGF independently predicts preterm delivery (PTD) better than gestational age (GA) at presentation or a clinical diagnosis of preeclampsia (PE).

STUDY DESIGN: Women with signs or symptoms of PE between 20 and 41 weeks were enrolled in a prospective, observational study at 26 North American centers. Blood was collected at presentation for