SUPPLEMENTARY MATERIAL

Gestational Estimated Glomerular Filtration Rate and Adverse Maternofetal Outcomes

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Table S1. Pregnancy outcomes according to time-averaged eGFR, divided by subgroups with eGFR ranges of 15 mL/min/1.73 m^2.

Outcomes	60≤eGFR<75 (n = 24)	75≤eGFR<90 (n = 100)	90≤eGFR<105 (n = 310)	105≤eGFR<120 (n = 2485)	120≤eGFR<135 (n = 7107)	135≤eGFR<150 (n = 2234)	eGFR > 150 (n = 639)	P value
Composite outcome	20 (83.3)	53 (53.0)	165 (53.2)	895 (36.0)	2129 (30.0)	811 (36.3)	287 (44.9)	< 0.001
Preterm birth (<37 weeks)	16 (66.7)	43 (43.0)	132 (42.6)	636 (25.6)	1640 (23.1)	681 (30.5)	259 (40.5)	< 0.001
Low birth weight (< 2.5 kg)	18 (75.0)	32 (32.0)	95 (30.6)	512 (20.6)	1108 (15.6)	459 (20.5)	173 (27.1)	< 0.001
Small for gestational age	9(37.5)	19 (19.0)	55 (17.7)	360 (14.5)	629 (8.9)	172 (7.7)	43 (6.7)	< 0.001
Preeclampsia	11 (45.8)	31 (31.0)	76 (24.5)	262 (10.5)	298 (4.2)	55 (2.5)	16 (2.5)	< 0.001

Table S2. Risk of adverse pregnancy outcomes according to time-averaged eGFR, using eGFR interval of 15 mL/min/1.73 m^2.

Outcomes	Univariable analysis			[a]Multivariable analysis		
	OR	95% CI	P value	Adjusted OR	95% CI	P value
Composite outcome						
eGFR ≥ 150	1.32	1.20-1.45	< 0.001	1.37	1.23-1.52	< 0.001
135 ≤ eGFR < 150	1.33	1.21-1.47	< 0.001	1.21	1.08-1.35	< 0.001
120 ≤ eGFR < 135	Ref.	Ref.		Ref.	Ref.	
105 ≤ eGFR < 120	1.91	1.62-2.25	< 0.001	1.73	1.45-2.06	< 0.001
90 ≤ eGFR < 105	2.66	2.12-3.35	< 0.001	2.45	1.90-3.15	< 0.001
75 ≤ eGFR < 90	2.64	1.78-3.93	< 0.001	2.10	1.34-3.30	< 0.001
60 ≤ eGFR < 75	11.69	4.42-40.23	< 0.001	9.06	2.84-28.88	< 0.001
Preterm birth						
eGFR ≥ 150	2.27	1.92-2.68	< 0.001	2.13	1.78-2.55	< 0.001
135 ≤ eGFR < 150	1.46	1.32-1.62	< 0.001	1.36	1.22-1.53	< 0.001
120 ≤ eGFR < 135	Ref.	Ref.		Ref.	Ref.	
105 ≤ eGFR < 120	1.15	1.03-1.27	0.01	1.13	1.01-1.27	0.04
90 ≤ eGFR < 105	2.47	1.96-3.11	< 0.001	2.23	1.73-2.87	< 0.001
75 ≤ eGFR < 90	2.52	1.68-3.74	< 0.001	2.06	1.32-3.24	0.002
60 ≤ eGFR < 75	6.67	2.93-16.47	< 0.001	5.22	2.05-13.27	< 0.001
Low birth weight						
eGFR ≥ 150	2.01	1.67-2.42	< 0.001	1.76	1.44-2.15	< 0.001
135 ≤ eGFR < 150	1.40	1.24-1.58	< 0.001	1.25	1.10-1.43	< 0.001
120 ≤ eGFR < 135	Ref.	Ref.		Ref.	Ref.	
105 ≤ eGFR < 120	1.41	1.25-1.58	< 0.001	1.45	1.27-1.65	< 0.001
90 ≤ eGFR < 105	2.39	1.86-3.06	< 0.001	2.07	1.56-2.74	< 0.001
75 ≤ eGFR < 90	2.55	1.65-3.86	< 0.001	1.85	1.13-3.02	0.01
60 ≤ eGFR < 75	16.24	6.79-44.88	< 0.001	13.87	4.89-39.40	< 0.001
Small for gestational age						
eGFR ≥ 150	Ref.	Ref.		Ref.	Ref.	
135 ≤ eGFR < 150	1.16	0.83-1.65	0.41	1.19	0.83-1.69	0.34
120 ≤ eGFR < 135	1.35	0.99-1.88	0.07	1.59	1.15-2.21	0.005
105 ≤ eGFR < 120	2.35	1.71-3.31	< 0.001	2.96	2.10-4.18	< 0.001
90 ≤ eGFR < 105	2.99	1.96-4.59	< 0.001	2.84	1.81-4.45	< 0.001
75 ≤ eGFR < 90	3.25	1.77-5.78	< 0.001	2.49	1.33-4.66	0.004
60 ≤ eGFR < 75	8.32	3.32-19.83	< 0.001	6.00	2.27-15.87)	< 0.001
Preeclampsia						
eGFR ≥ 150	Ref.	Ref.		Ref.	Ref.	
135 ≤ eGFR < 150	0.98	0.57-1.78	0.95	0.90	0.50-1.63	0.74
120 ≤ eGFR < 135	1.70	1.06-2.95	0.04	1.75	1.03-2.98	0.04
105 ≤ eGFR < 120	4.59	2.84-7.98	< 0.001	5.13	2.97-8.85	< 0.001
90 ≤ eGFR < 105	12.65	7.42-22.88	< 0.001	10.33	5.66-18.85	< 0.001
75 ≤ eGFR < 90	17.49	9.24-34.34	< 0.001	9.40	4.58-19.30	< 0.001
60 ≤ eGFR < 75	32.95	12.76-85.70	0.04	25.47	8.45-76.77	< 0.001

OR, Odds ratio, CI, Confidence interval, eGFR, estimated glomerular filtration rate

[a]Adjusted with age, both body mass indexes at baseline, weight gain during pregnancy, multiparity, previous history of preterm birth, history of hypertension, diabetes mellitus, presence of hypertension during pregnancy, gestational diabetes mellitus. Missing value imputation by classification and regression trees method was performed to impute missing data in baseline body mass index (3146 cases), weight gain during gestation (2594 cases). Hypertension during gestation was not adjusted in the multivariable model for preeclampsia risk, as preeclampsia itself was a hypertensive disorder.

Table S3. Risk of adverse pregnancy outcomes according to eGFR measured during first trimester.

Outcomes	Univariable analysis			[a]Multivariable analysis		
	OR	95% CI	P value	Adjusted OR	95% CI	P value
Composite outcome						
eGFR ≥ 150	0.60	0.29-1.12	0.13	0.82	0.34-2.00	0.66
120 ≤ eGFR < 150	Ref.	Ref.		Ref.	Ref.	
90 ≤ eGFR < 120	1.23	0.95-1.58	0.12	1.08	0.42-2.75	0.88
60 ≤ eGFR < 90	3.05	1.24-7.52	0.01	0.52	0.09-3.06	0.47
Preterm birth						
eGFR ≥ 150	0.55	0.22-1.14	0.14	0.61	0.27-1.41	0.25
120 ≤ eGFR < 150	Ref.	Ref.		Ref.	Ref.	
90 ≤ eGFR < 120	1.10	0.82-1.47	0.51	0.85	0.60-1.19	0.34
60 ≤ eGFR < 90	3.12	1.21-7.67	0.01	1.59	0.58-4.38	0.37
Low birth weight						
eGFR ≥ 150	0.82	0.31-1.80	0.65	0.97	0.40-2.35	0.94
120 ≤ eGFR < 150	Ref.	Ref.		Ref.	Ref.	
90 ≤ eGFR < 120	1.20	0.84-1.69	0.31	1.04	0.70-1.56	0.83
60 ≤ eGFR < 90	4.49	1.65-11.24	0.002	2.26	0.77-6.57	0.14
Small for gestational age						
eGFR ≥ 150	Ref.	Ref.		Ref.	Ref.	
120 ≤ eGFR < 150	1.67	0.89-3.41	0.13	0.82	0.34-2.00	0.66
90 ≤ eGFR < 120	2.05	1.08-4.24	0.04	1.08	0.42-2.75	0.88
60 ≤ eGFR < 90	5.09	1.72-15.52	0.003	0.52	0.09-3.06	0.47
Preeclampsia						
eGFR ≥ 150	Ref.	Ref.		Ref.	Ref.	
120 ≤ eGFR < 150	1.25	0.37-7.84	0.76	0.92	0.20-4.29	0.92
90 ≤ eGFR < 120	1.77	0.51-11.18	0.45	1.04	0.21-5.08	0.96
60 ≤ eGFR < 90	3.61	0.41-31.85	0.22	1.09	0.12-9.61	0.94

OR, Odds ratio, CI, Confidence interval, eGFR, estimated glomerular filtration rate

[a]Adjusted with age, both body mass indexes at baseline, weight gain during pregnancy, multiparity, previous history of preterm birth, history of hypertension, diabetes mellitus, presence of hypertension during pregnancy, gestational diabetes mellitus. Missing value imputation by classification and regression trees method was performed to impute missing data in baseline body mass index and weight gain during gestation. Hypertension during gestation was not adjusted in the multivariable model for preeclampsia risk, as preeclampsia itself was a hypertensive disorder.

Table S4. Risk of adverse pregnancy outcomes according to eGFR measured during second trimester.

Outcomes	Univariable analysis			[a]Multivariable analysis		
	OR	95% CI	P value	Adjusted OR	95% CI	P value
Composite outcome						
eGFR ≥ 150	1.67	1.28-2.18	< 0.001	1.59	1.18-2.15	0.003
120 ≤ eGFR < 150	Ref.	Ref.		Ref.	Ref.	
90 ≤ eGFR < 120	1.50	1.20-1.87	< 0.001	1.53	1.18-1.98	0.001
60 ≤ eGFR < 90	11.04	2.07-203.76	0.02	8.37	0.92-76.34	0.06
Preterm birth						
eGFR ≥ 150	1.97	1.51-2.56	< 0.001	1.95	1.43-2.65	< 0.001
120 ≤ eGFR < 150	Ref.	Ref.		Ref.	Ref.	
90 ≤ eGFR < 120	1.52	1.22-1.89	< 0.001	1.52	1.16-1.98	0.002
60 ≤ eGFR < 90	14.54	2.72-268.33	0.01	13.92	1.52-127.99	0.02
Low birth weight						
eGFR ≥ 150	1.50	1.14-1.97	0.004	1.36	1.00-1.84	0.05
120 ≤ eGFR < 150	Ref.	Ref.		Ref.	Ref.	
90 ≤ eGFR < 120	1.52	1.20-1.91	< 0.001	1.52	1.16-1.99	0.003
60 ≤ eGFR < 90	23.55	1.41-434.87	0.003	21.08	2.32-191.51	0.007
Small for gestational age						
eGFR ≥ 150	Ref.	Ref.		Ref.	Ref.	
120 ≤ eGFR < 150	1.41	0.87-2.45	0.19	1.49	0.88-2.53	0.14
90 ≤ eGFR < 120	2.64	1.54-4.78	< 0.001	2.80	1.54-5.10	< 0.001
60 ≤ eGFR < 90	6.00	1.21-23.81	0.01	2.58	0.57-11.69	0.22
Preeclampsia						
eGFR ≥ 150	Ref.	Ref.		Ref.	Ref.	
120 ≤ eGFR < 150	1.07	0.57-2.23	0.84	0.99	0.48-2.06	0.98
90 ≤ eGFR < 120	2.61	1.32-5.64	0.009	1.94	0.86-4.38	0.11
60 ≤ eGFR < 90	36.75	9.15-165.16	< 0.001	7.79	1.43-42.32	0.02

OR, Odds ratio, CI, Confidence interval, eGFR, estimated glomerular filtration rate

[a]Adjusted with age, both body mass indexes at baseline, weight gain during pregnancy, multiparity, previous history of preterm birth, history of hypertension, diabetes mellitus, presence of hypertension during pregnancy, gestational diabetes mellitus. Missing value imputation by classification and regression trees method was performed to impute missing data in baseline body mass index and weight gain during gestation. Hypertension during gestation was not adjusted in the multivariable model for preeclampsia risk, as preeclampsia itself was a hypertensive disorder.

Table S5. Risk of adverse pregnancy outcomes according to eGFR measured during third trimester.

	Univariable analysis			[a]Multivariable analysis		
	OR	95% CI	P value	Adjusted OR	95% CI	P value
Composite outcome						
eGFR ≥ 150	1.87	1.57-2.21	< 0.001	1.42	1.02-1.97	0.04
120 ≤ eGFR < 150	Ref.	Ref.		Ref.	Ref.	
90 ≤ eGFR < 120	1.20	1.09-1.33	< 0.001	2.73	1.93-3.86	< 0.001
60 ≤ eGFR < 90	2.71	1.81-4.06	< 0.001	3.26	1.80-5.90	< 0.001
Preterm birth						
eGFR ≥ 150	2.15	1.81-2.56	< 0.001	2.07	1.72-2.48	< 0.001
120 ≤ eGFR < 150	Ref.	Ref.		Ref.	Ref.	
90 ≤ eGFR < 120	0.98	0.88-1.10	0.77	0.98	0.86-1.11	0.71
60 ≤ eGFR < 90	2.35	1.56-3.53	< 0.001	1.72	1.10-2.71	0.02
Low birth weight						
eGFR ≥ 150	1.80	1.47-2.18	< 0.001	1.63	1.31-2.03	< 0.001
120 ≤ eGFR < 150	Ref.	Ref.		Ref.	Ref.	
90 ≤ eGFR < 120	1.31	1.16-1.48	< 0.001	1.39	1.21-1.59	< 0.001
60 ≤ eGFR < 90	3.12	2.03-4.72	< 0.001	2.17	1.33-3.53	0.002
Small for gestational age						
eGFR ≥ 150	Ref.	Ref.		Ref.	Ref.	
120 ≤ eGFR < 150	1.22	0.90-1.70	0.21	1.42	1.02-1.97	0.04
90 ≤ eGFR < 120	2.15	1.56-3.02	< 0.001	2.73	1.93-3.86	< 0.001
60 ≤ eGFR < 90	4.09	2.32-7.07	< 0.001	3.26	1.80-5.90	< 0.001
Preeclampsia						
eGFR ≥ 150	Ref.	Ref.		Ref.	Ref.	
120 ≤ eGFR < 150	1.18	0.79-1.85	0.44	1.35	0.86-2.13	0.19
90 ≤ eGFR < 120	3.12	2.07-4.09	< 0.001	3.79	2.37-6.07	< 0.001
60 ≤ eGFR < 90	10.08	5.56-18.44	< 0.001	9.15	3.63-14.10	< 0.001

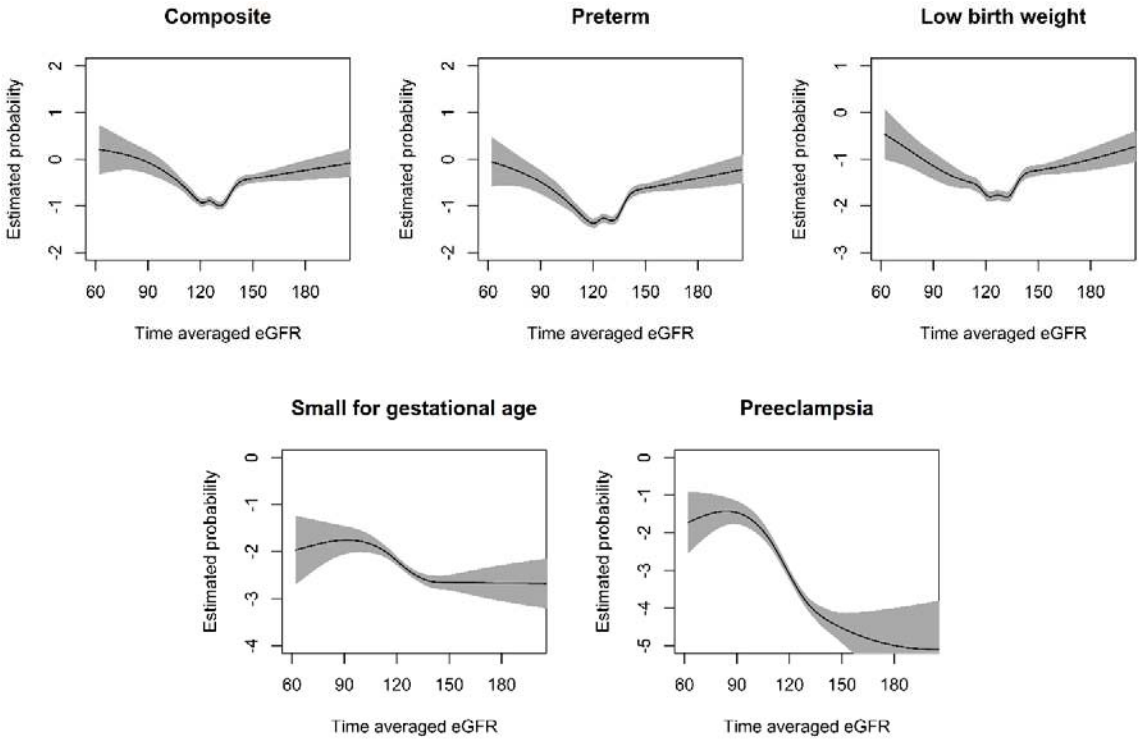
OR, Odds ratio, CI, Confidence interval, eGFR, estimated glomerular filtration rate

[a]Adjusted with age, both body mass indexes at baseline, weight gain during pregnancy, multiparity, previous history of preterm birth, history of hypertension, diabetes mellitus, presence of hypertension during pregnancy, gestational diabetes mellitus. Missing value imputation by classification and regression trees method was performed to impute missing data in baseline body mass index and weight gain during gestation. Hypertension during gestation was not adjusted in the multivariable model for preeclampsia risk, as preeclampsia itself was a hypertensive disorder.

Table S6. Pregnancy outcomes according to baseline eGFR.

Outcomes	60≤eGFR<90 (n = 76)	90≤eGFR<120 (n = 1354)	120≤eGFR<150 (n = 1371)	eGFR > 150 (n = 74)	P value
Composite outcome	26 (34.2)	353 (26.1)	293 (21.4)	16 (21.6)	0.005
Preterm birth (<37 weeks)	16 (21.1)	238 (17.6)	195 (14.2)	12 (16.2)	0.07
Moderate to late preterm (32 to <37 weeks)	11 (14.5)	181 (13.4)	146 (10.6)	7 (9.5)	0.13
Very preterm (28 to <32 weeks)	2 (2.6)	27 (2.0)	24 (1.8)	3 (4.1)	0.53
Extremely preterm (<28 weeks)	3 (3.9)	30 (2.2)	25 (1.8)	2 (2.7)	0.57
Gestational age (weeks)	38 (37-39)	38 (37-39)	38 (37-39)	38 (37-39)	0.24
Low birth weight (< 2.5 kg)	13 (17.1)	172 (12.7)	140 (10.2)	6 (8.1)	0.06
Very low birth weight (< 1.5 kg)	3 (3.9)	46 (3.4)	48 (3.5)	1 (1.4)	0.79
Birth weight (kg)	3.0 (2.7-3.2)	3.1 (2.8-3.4)	3.1 (2.8-3.4)	3.1 (2.9-3.4)	0.10
Small for gestational age	9 (11.8)	134 (9.9)	108 (7.9)	5 (6.8)	0.20
Preeclampsia	1 (1.3)	62 (4.6)	49 (3.6)	3 (4.1)	0.35

Figure S1. Association between time-averaged gestational eGFR and gestational complications in mothers without underlying hypertension or diabetes mellitus history.



Generalized additive models demonstrating the association between the time-averaged gestational eGFR and the risk of adverse pregnancy outcomes, in mothers without history of underlying hypertension or diabetes mellitus. The dotted lines indicate the 95% confidence intervals of the estimated probability for each adverse pregnancy outcome. eGFR: estimated glomerular filtration rate