

Traffic-related Air Pollution Exposure During Pregnancy and Preterm Birth

Amy Padula, PhD, MSc

Assistant Professor

Department of Obstetrics, Gynecology and Reproductive Sciences

Division of Maternal-Fetal Medicine

amy.padula@ucsf.edu



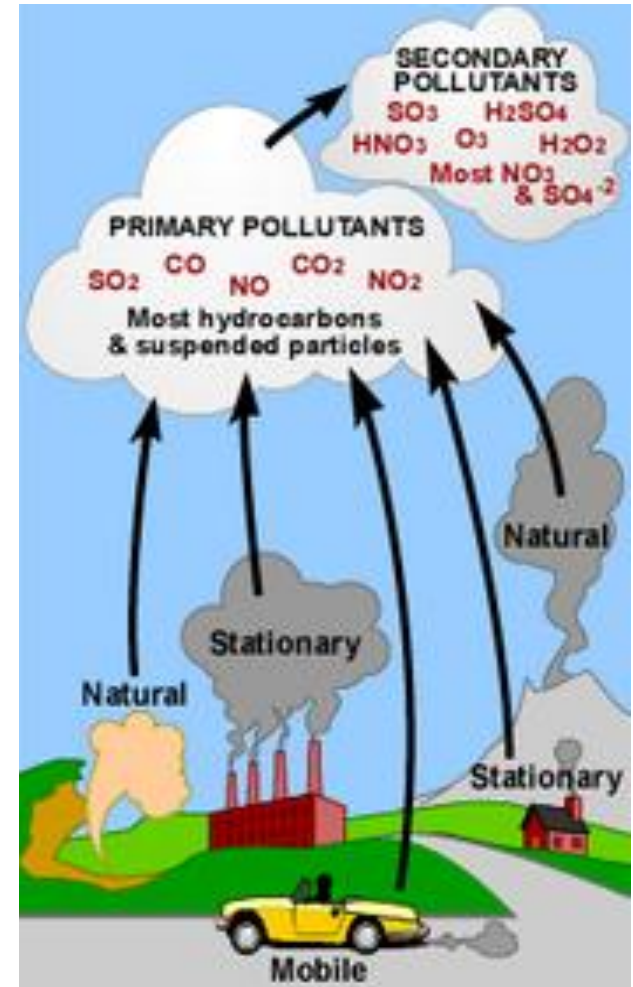
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Air Pollution

- **Regulated by U.S. EPA**
 - Carbon monoxide (CO)
 - Nitrogen dioxide (NO₂)
 - Particulate matter (PM₁₀, PM_{2.5})
- **Traffic exposure**
 - Traffic density



Particulate Matter

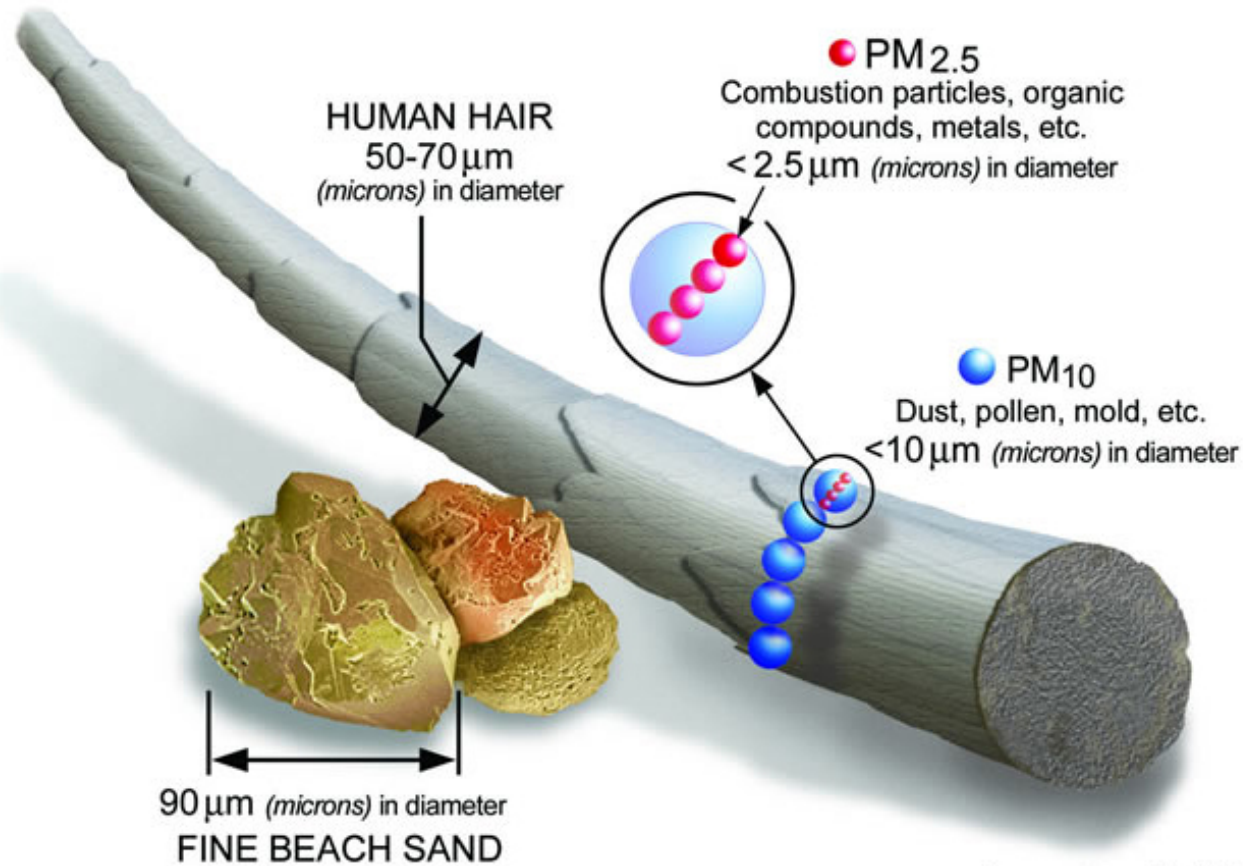
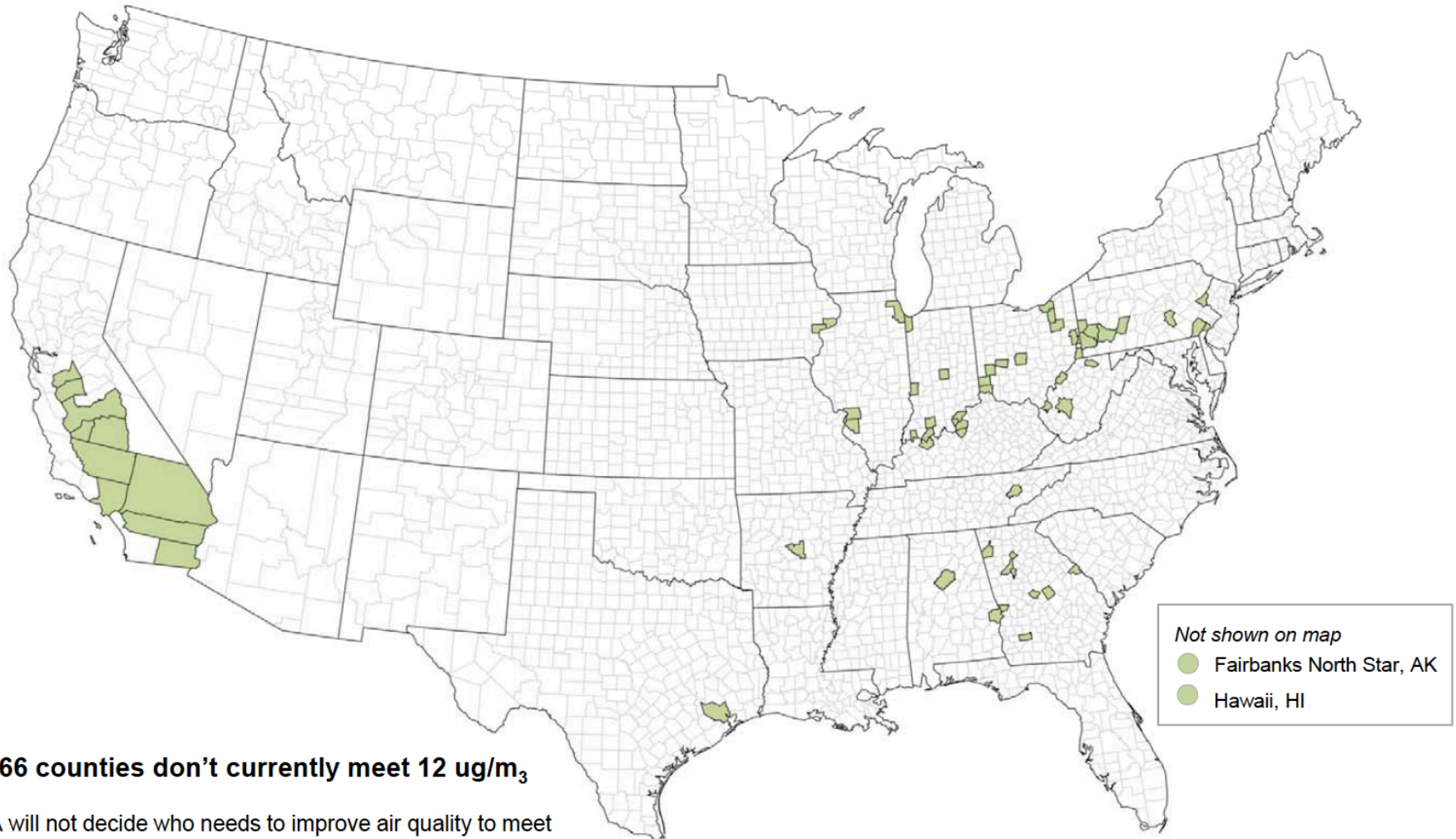


Image courtesy of the U.S. EPA

Counties that do not meet the annual $PM_{2.5}$ Standard





Air Pollution & Preterm Birth

Traffic-related air pollution



Preterm birth



Carbon Monoxide (CO)
 Nitrogen Dioxide (NO₂)
 Particulate Matter < 10 and 2.5 μm (PM₁₀, PM_{2.5})
Traffic Density (within 300m)

Birth at... **34-36** weeks gestation (8%)
32-33 weeks gestation (2%)
28-31 weeks gestation (1%)
20-27 weeks gestation (1%)

N=250,000 2000-2006

Original article

Traffic-related air pollution and risk of preterm birth in the San Joaquin Valley of California

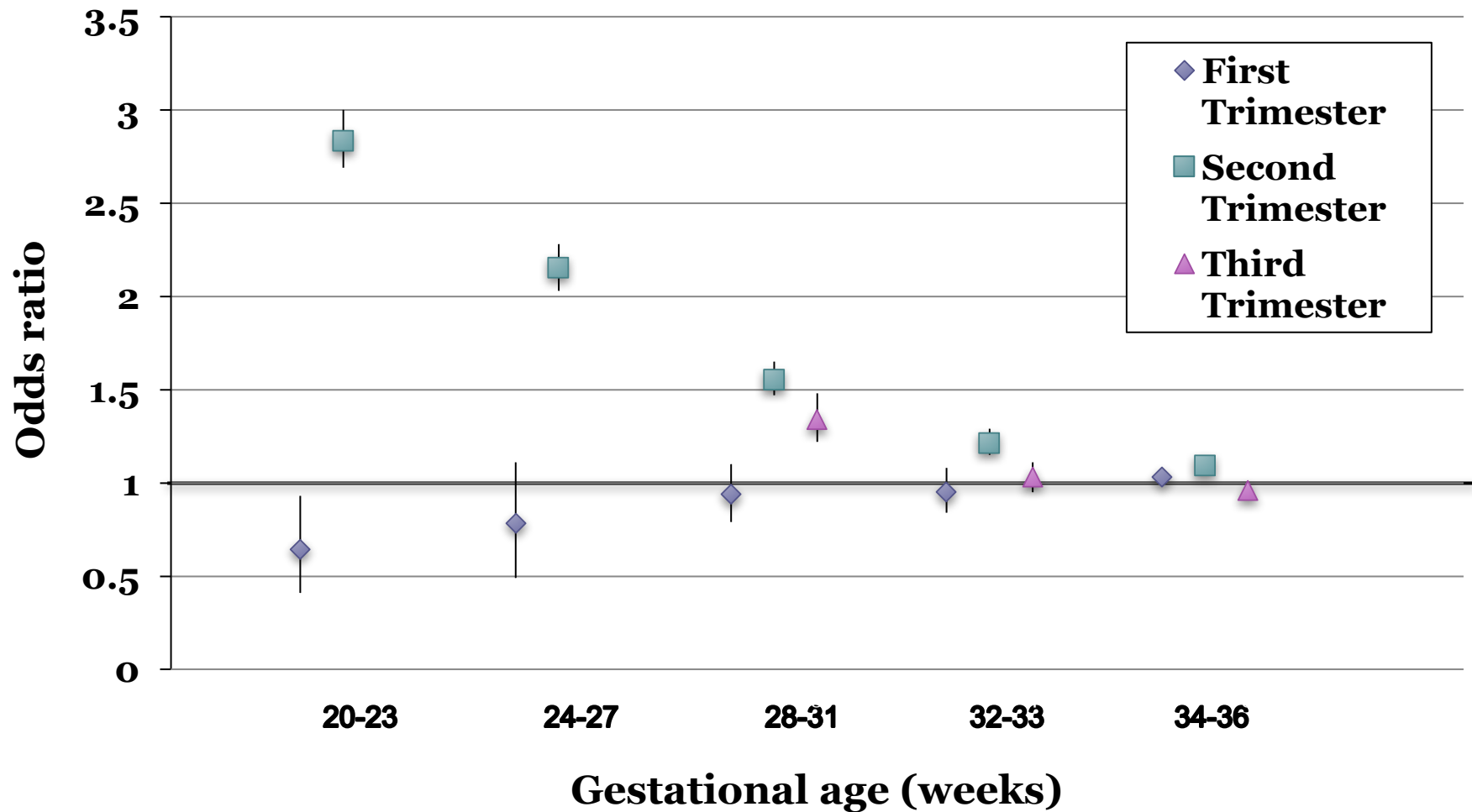


Amy M. Padula PhD, MSc^{a,*}, Kathleen M. Mortimer ScD, MPH^b, Ira B. Tager MD, MPH^c, S. Katharine Hammond PhD, MS^c, Frederick W. Lurmann MS^d, Wei Yang MD, MS, MA^a, David K. Stevenson MD^a, Gary M. Shaw DrPH^a

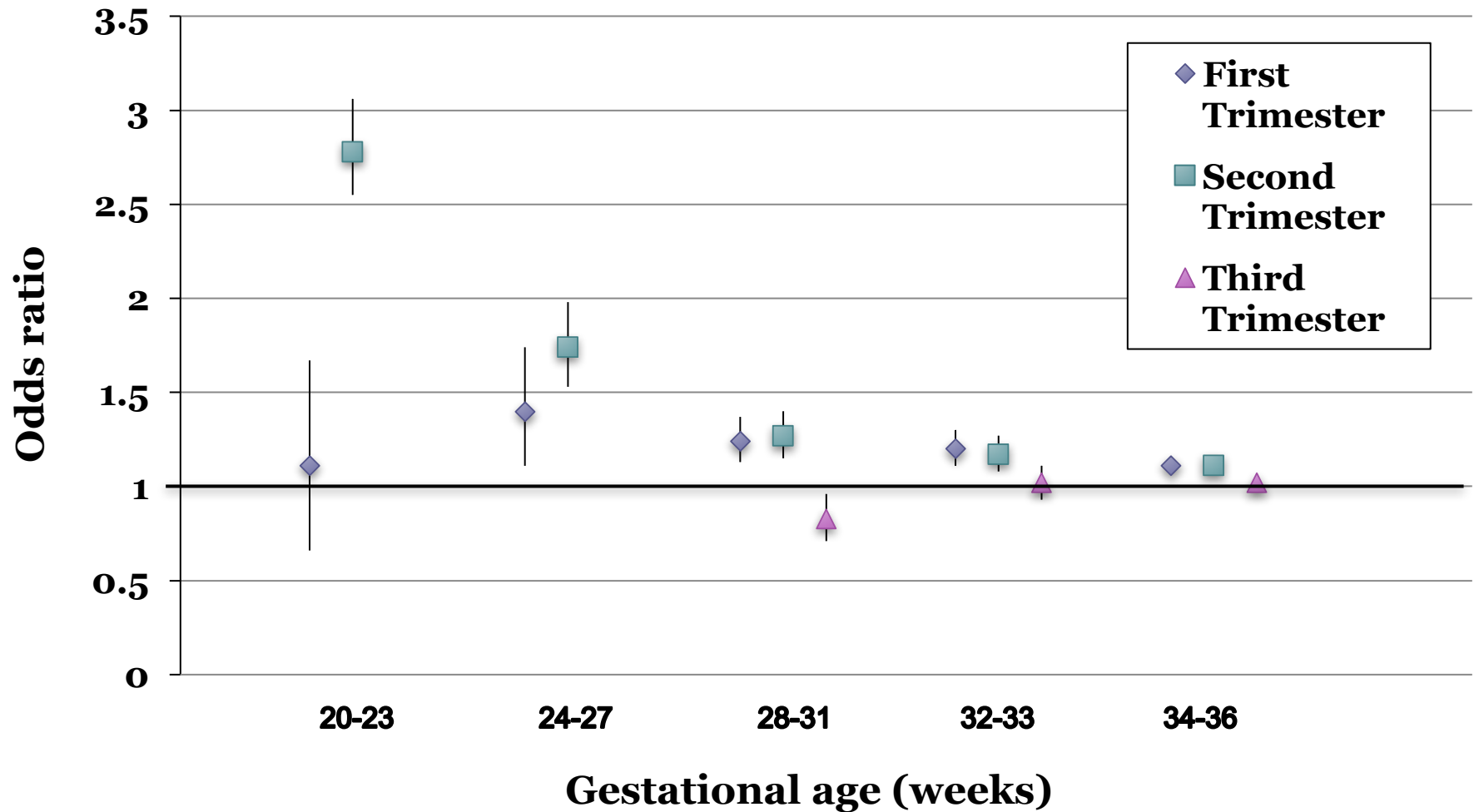
Exposure to the highest quartile in the **2nd trimester** (weeks 14-26)

Gestational age (weeks)	N	Odds Ratio			
		CO	NO ₂	PM ₁₀	PM _{2.5}
37-42 (term)	232,241	1.0	1.0	1.0	1.0
34-36	22,321	1.1	1.1	1.1	1.1
32-33	4,011	1.0	1.1	1.2	1.2
28-31	2,938	1.2	1.1	1.3	1.5
24-27	1233	1.8	1.4	1.7	2.2
20-23	460	1.6	1.9	2.8	2.8

Preterm Birth & $PM_{2.5}$



Preterm Birth & PM_{10}



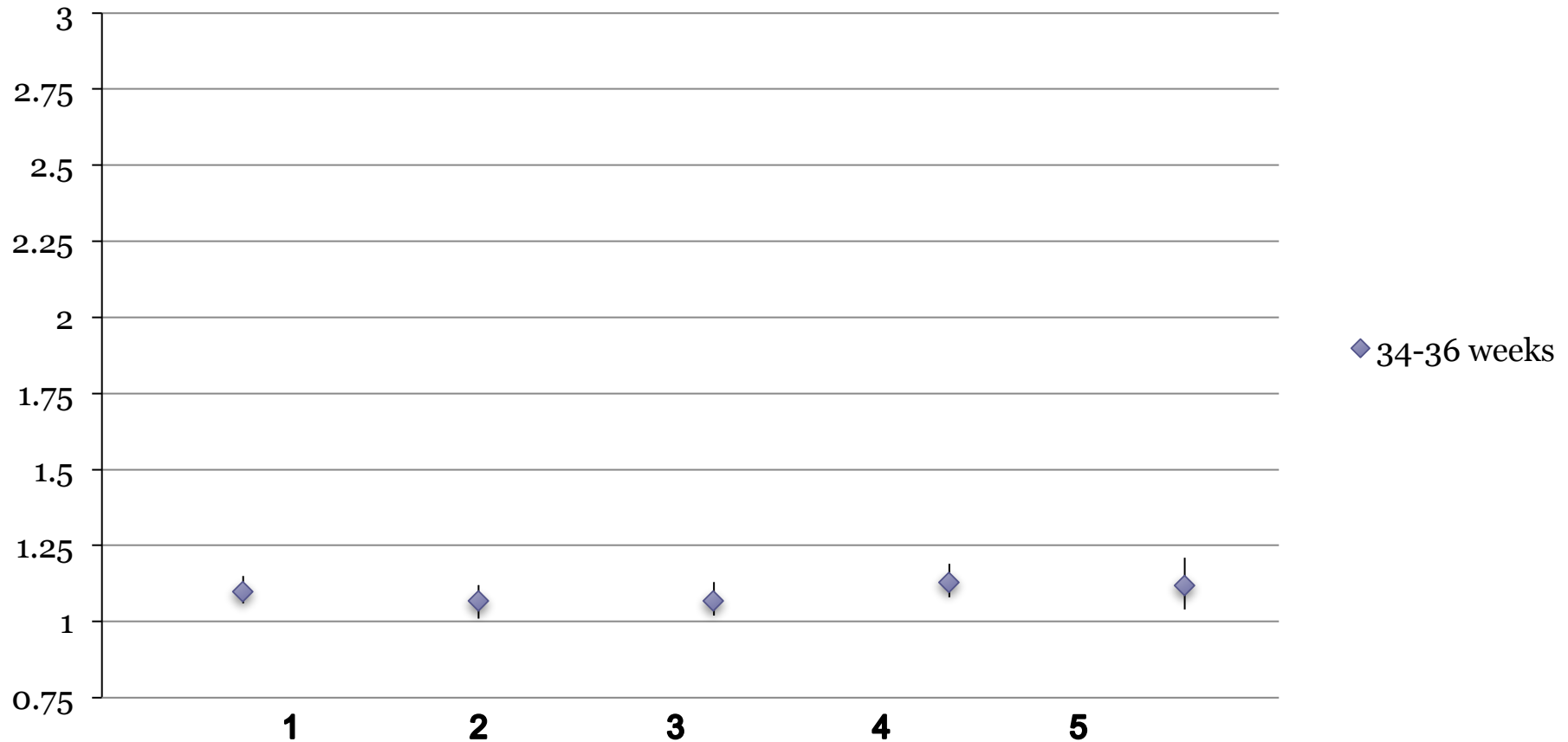
Multi-pollutant Score

- Number of exposures in the highest quartile of...
 - CO
 - NO₂
 - PM₁₀
 - PM_{2.5}
 - traffic density

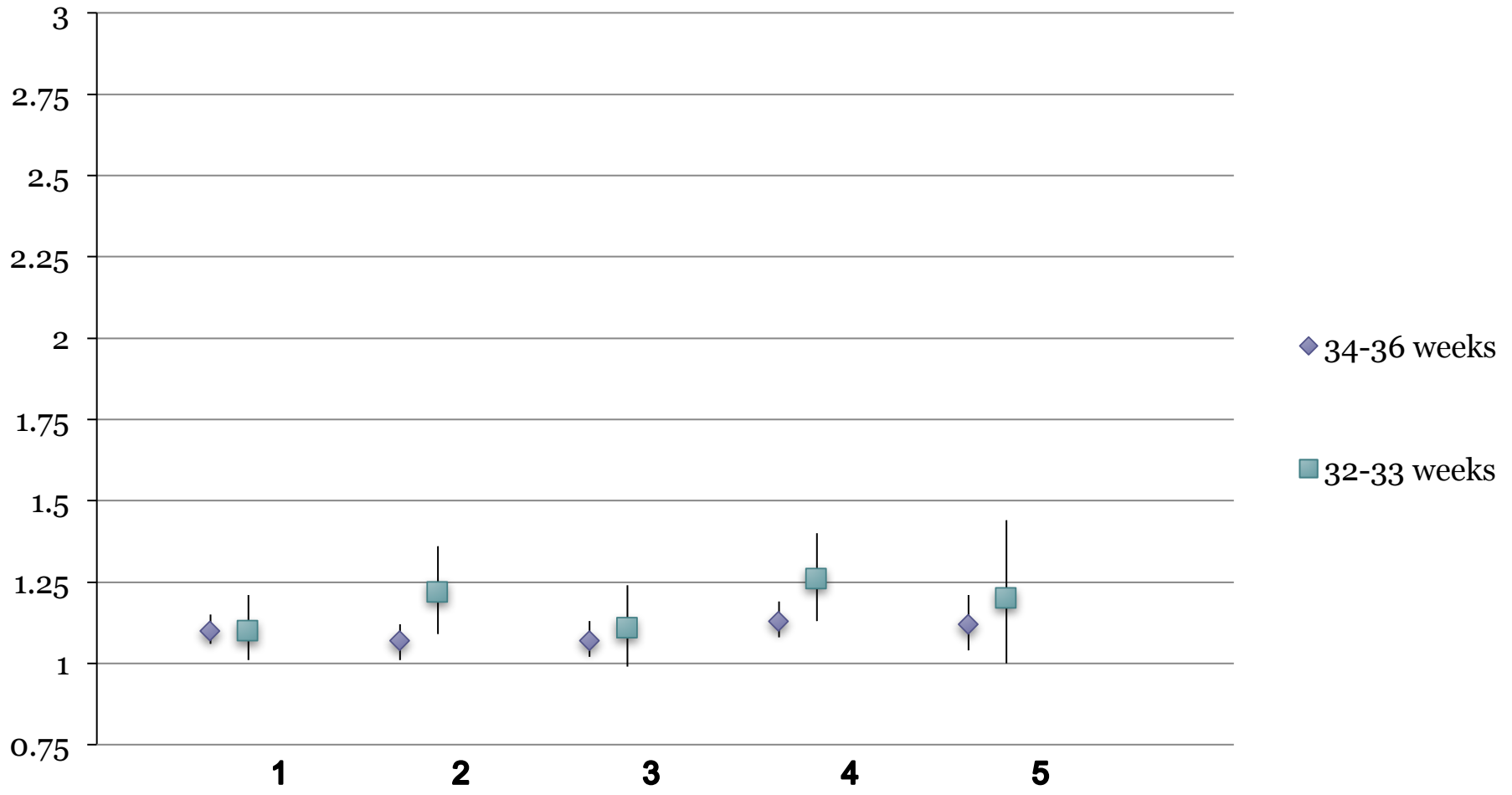


Multi-pollutant score for 2nd trimester

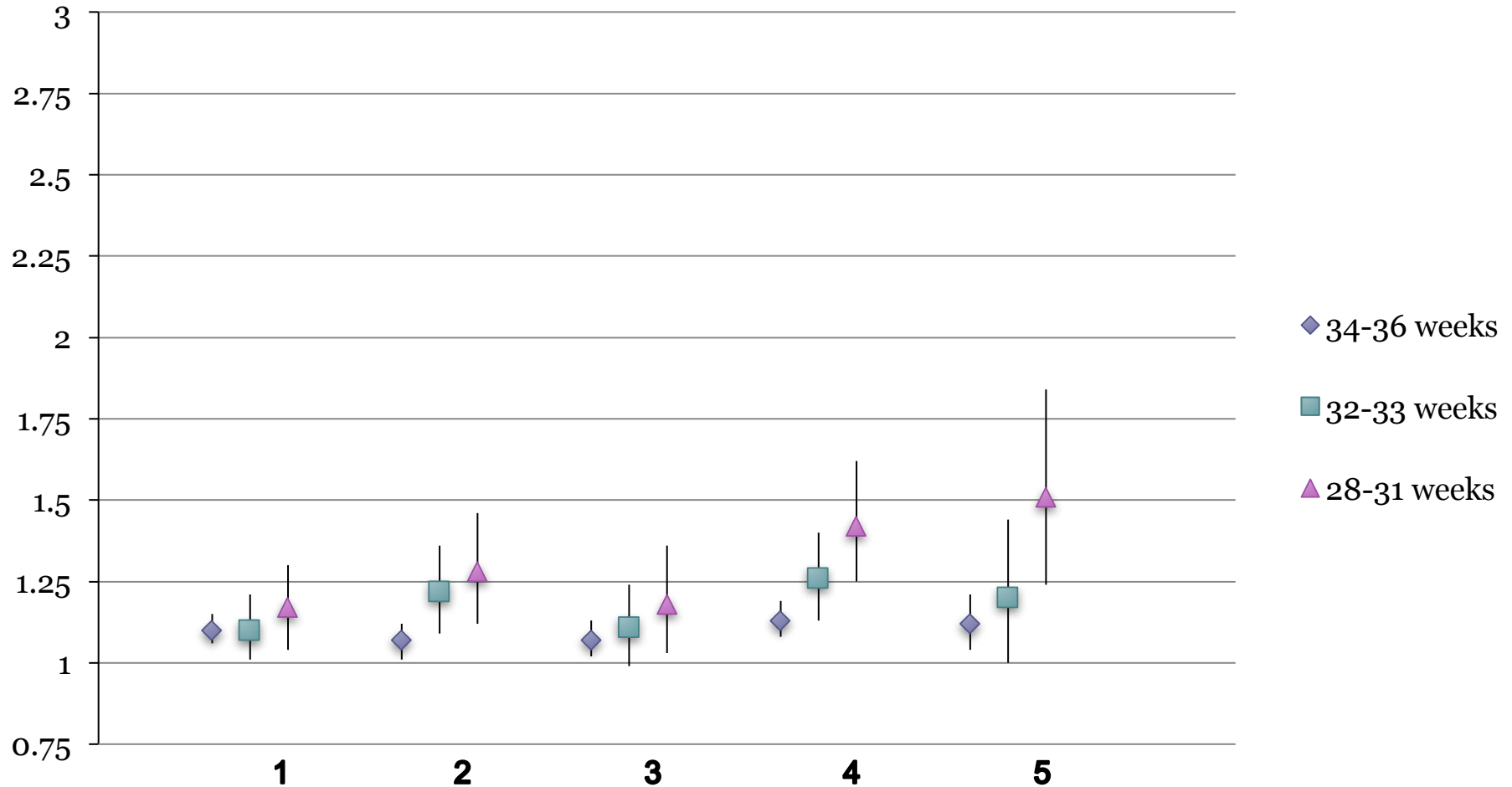
34-36 weeks



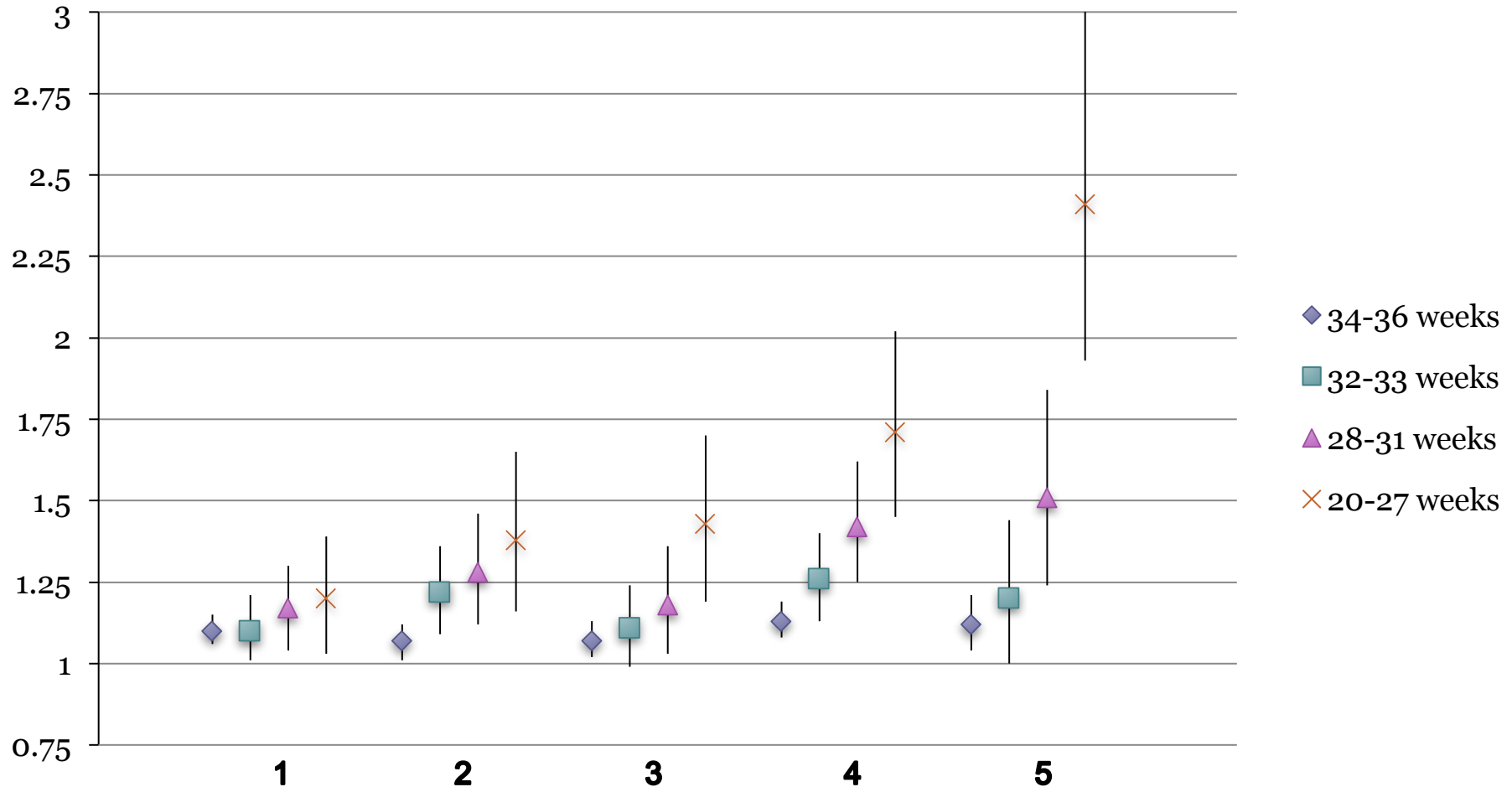
Multi-pollutant score for 2nd trimester



Multi-pollutant score for 2nd trimester

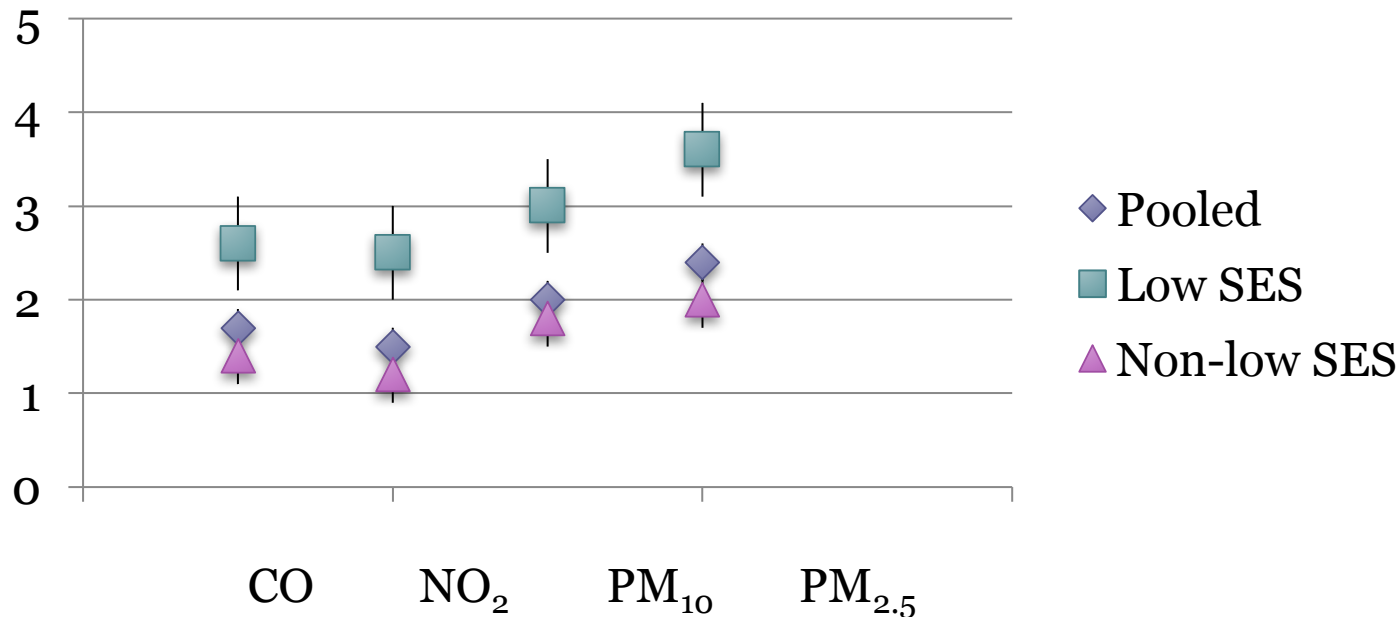


Multi-pollutant score for 2nd trimester



Role of Neighborhood SES

- Odds ratio of birth at 20-27 weeks for each exposure during the 2nd trimester of pregnancy



- *defined as those living in a block group with >10% unemployment, >15% with income from public assistance and >20% families below poverty level

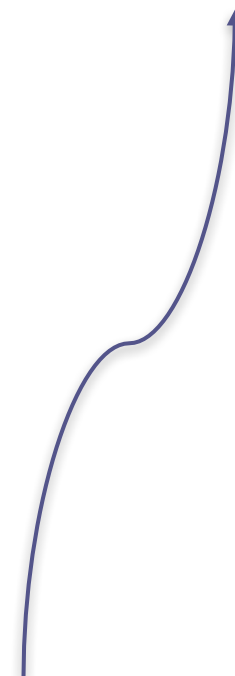


Exposure to airborne polycyclic aromatic hydrocarbons during pregnancy and risk of preterm birth

Amy M. Padula ^{a,*}, Elizabeth M. Noth ^b, S. Katharine Hammond ^b, Fred W. Lurmann ^c, Wei Yang ^a, Ira B. Tager ^b, Gary M. Shaw ^a

PAH Level	OR	95% CI	
2 nd quartile	1.49	1.08	2.06
3 rd quartile	2.63	1.93	3.59
4 th quartile	3.94	3.03	5.12

PAH exposure period	Gestational age			
	34-36 weeks	32-33 weeks	28-31 weeks	20-27 weeks
	OR	OR	OR	OR
Entire Preg	0.99	0.93	0.76	0.51
1 st trimester	0.92	0.87	0.56	0.42
2 nd trimester	0.98	1.03	1.02	1.10
3 rd trimester	1.00	0.99	1.00	NC
Last 6 wks	0.96	0.97	0.86	2.74



Next Steps

- Diabetes/Hypertension

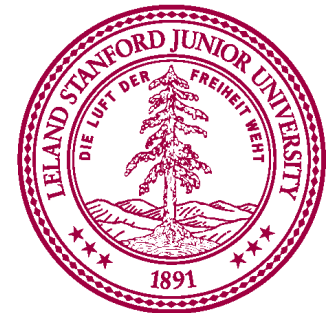


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Questions???

