



# Association of Exposure to Ambient Air Pollution with Thyroid Function in Early Pregnancy in a Low-Income Hispanic Cohort

Xiaoran Yang,<sup>1</sup> Trevor E. Angell,<sup>1</sup> Fred Lurmann,<sup>2</sup> Rima Habre,<sup>1</sup> Shohreh F. Farzan,<sup>1</sup> Theresa M. Bastain,<sup>1</sup> Carrie Breton<sup>1</sup>

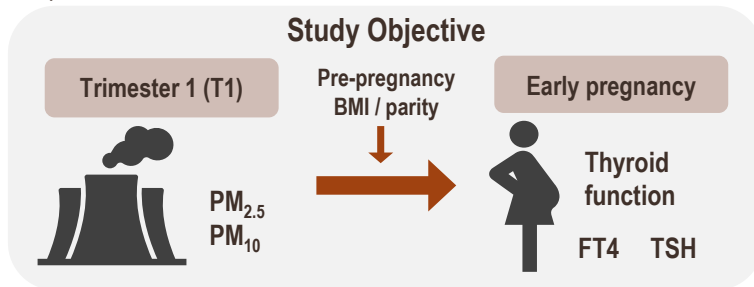
<sup>1</sup>Department of Population and Public Health Sciences, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA; <sup>2</sup>Sonoma Technology Inc.



Contact Information  
xyang336@usc.edu

## BACKGROUND AND AIM

- Maternal thyroxine in the first half of pregnancy is crucial for a fetus' neurological development<sup>1</sup> and subclinical hypothyroidism and thyroperoxidase antibodies-positive (TPO-Ab) euthyroidism have been associated with increased risk of maternal complications.<sup>2</sup>
- In pregnancy, particulate matters (PM<sub>2.5</sub> and PM<sub>10</sub>) have been associated lower levels of free thyroxine (FT4) in circulation,<sup>3,4</sup> suggesting early prenatal exposure to air pollutants is associated with mild thyroid dysfunction.
- Limited epidemiologic research has shown the association between ambient air pollution and thyroid function (FT4 and thyroid stimulating hormone [TSH]) among Hispanic mothers in US.



## METHODS

- Population:** a subset of 213 participants in MADRES -- an ongoing pregnancy cohort study in predominantly low-income Hispanic/Latino communities in Los Angeles, CA.
- Population demographics:** all information was collected via interviewer administered questionnaires at study entry. (Figure 1)
- Air pollution exposure**
  - Daily particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) exposures were estimated using inverse-distance squared spatial interpolation from ambient monitoring data and were assigned to the residential locations.
  - Average daily exposure was used from the start of pregnancy through the date of thyroid function measurement, or until gestational week 13, whichever occurs first for each participant.
- Maternal thyroid function:** measured by serum TSH (mIU/L) and FT4 (ng/dL) and collected at clinical visit (average gestational age at collection: 11.6 ± 1.9 wks).

## METHODS (CONTINUED)

- Pre-pregnancy body mass index (BMI):** calculated using first trimester self-reported weight and stadiometer measured height.
- Statistical analysis**
  - Linear regression was used to assess the individual effects of PM<sub>2.5</sub> and PM<sub>10</sub> on TSH and FT4, while effect modification of parity and pre-pregnancy BMI was assessed by interaction terms.
  - Models adjusted for Ethnicity (Hispanic or not), pre-pregnancy BMI, education, maternal age, parity, recruitment site, maternal smoking.

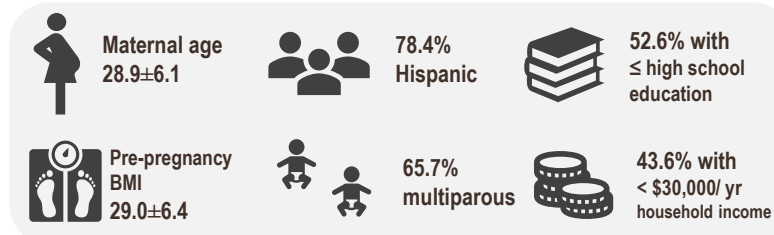


Figure 1 Population characteristics (n=213)

## RESULTS

Table 1 T1 air pollution exposure level and thyroid function at early pregnancy (n=213)

T1	Mean (SD)	Early pregnancy	Mean (SD)
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	12.0 (2.4)	TSH (mIU/L)	0.9 (1.1)
PM <sub>10</sub> (µg/m <sup>3</sup> )	29.8 (5.8)	FT4 (ng/dL)	1.1 (1.2)

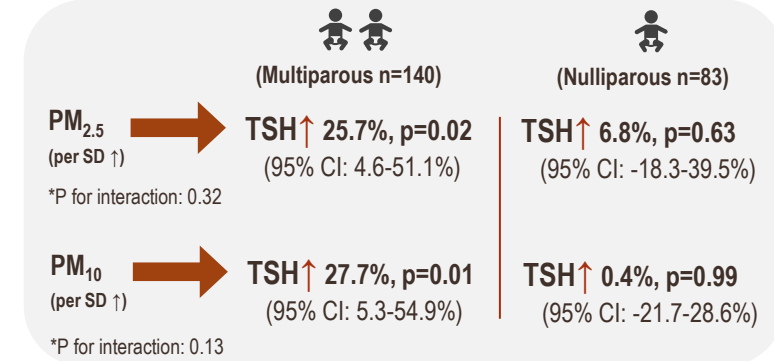
Abbreviation: standard deviation: SD

## Association between T1 air pollution exposure and thyroid function at early pregnancy (n=213)



## RESULTS (CONTINUED)

### Association between T1 air pollution exposure and thyroid function at early pregnancy by parity (n=213)



## CONCLUSION

- Our findings indicate that PM<sub>10</sub> and PM<sub>2.5</sub> exposures at early pregnancy are associated with increased TSH levels during early pregnancy, particularly among multiparous pregnant persons.
- The associations between air pollution and TSH did not differ by pre-pregnancy BMI. No associations between ambient air pollution exposures at early pregnancy and FT4 were observed.

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