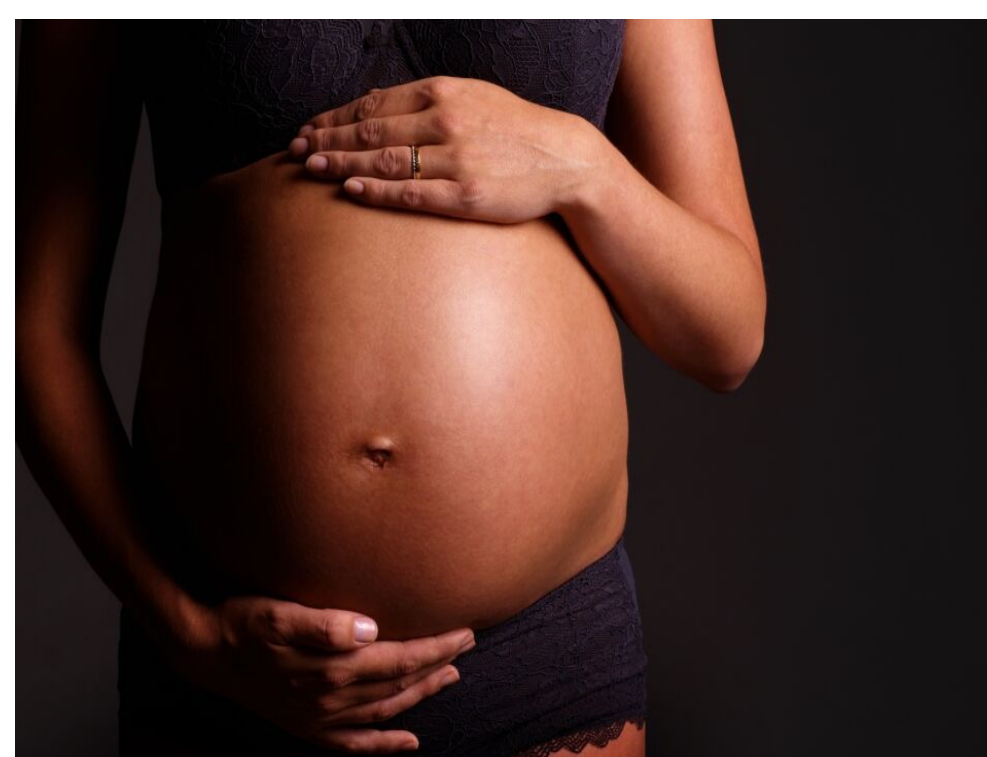


BACKGROUND

- Hairdressers are disproportionately exposed to many endocrine disrupting compounds (EDCs), like volatile organic compounds (VOCs), recognized or suspected to adversely impact reproductive health and pregnancy outcomes.
- Despite growing concerns about EDC exposures in hairdressers and CDC national biomonitoring data demonstrating that women of color experience elevated exposures to EDCs from beauty product use, studies investigating the prevalence of adverse reproductive health or pregnancy related outcomes among hairdressers of color remain sparse.



OBJECTIVE

To characterize the prevalence of pregnancy related outcomes among Black and Latina hairdressers and office workers and assess their association with exposure to VOCs.

METHODS

- Community Engagement:**
 - During the Fall 2016, we established a community partnership with Centro de Apoyo Familiar (CAF), a non-profit organization with an established community network of >400 faith-based organizations, hair salon owners, and stylists.
 - We held listening sessions/focus groups to better understand health concerns and needs among hair salon owners/stylists working in Black and Dominican salons.
 - We conducted focus groups with CAF, salon owners, and stylists to inform our study instruments and our pilot study design.
- Study Population:**
 - Between December 2018 and May 2019, we enrolled 40 female workers, ages 21-58 years: 23 Black and Latina hairdressers and 17 office workers of similar racial/ethnic distribution from Maryland/DC metro area.
- Data Collection and Exposure Assessment:**
 - We captured data on demographics, workplace behaviors, and health history, including information on low-birth weight, pregnancy-induced hypertension, preeclampsia, stillbirth, and difficulty conceiving via interviewer-administered questionnaires.
 - We collected post-shift urine samples to measure 28 VOC biomarkers for all participants.
 - Urine samples were analyzed by CDC.
- Data Analysis:**
 - We calculated summary statistics for participant demographic characteristics, target outcomes, and urinary biomarker concentrations.
 - We assessed differences in biomarker concentrations between worker groups based on self-reported pregnancy related outcomes and their association with VOC biomarker concentrations.



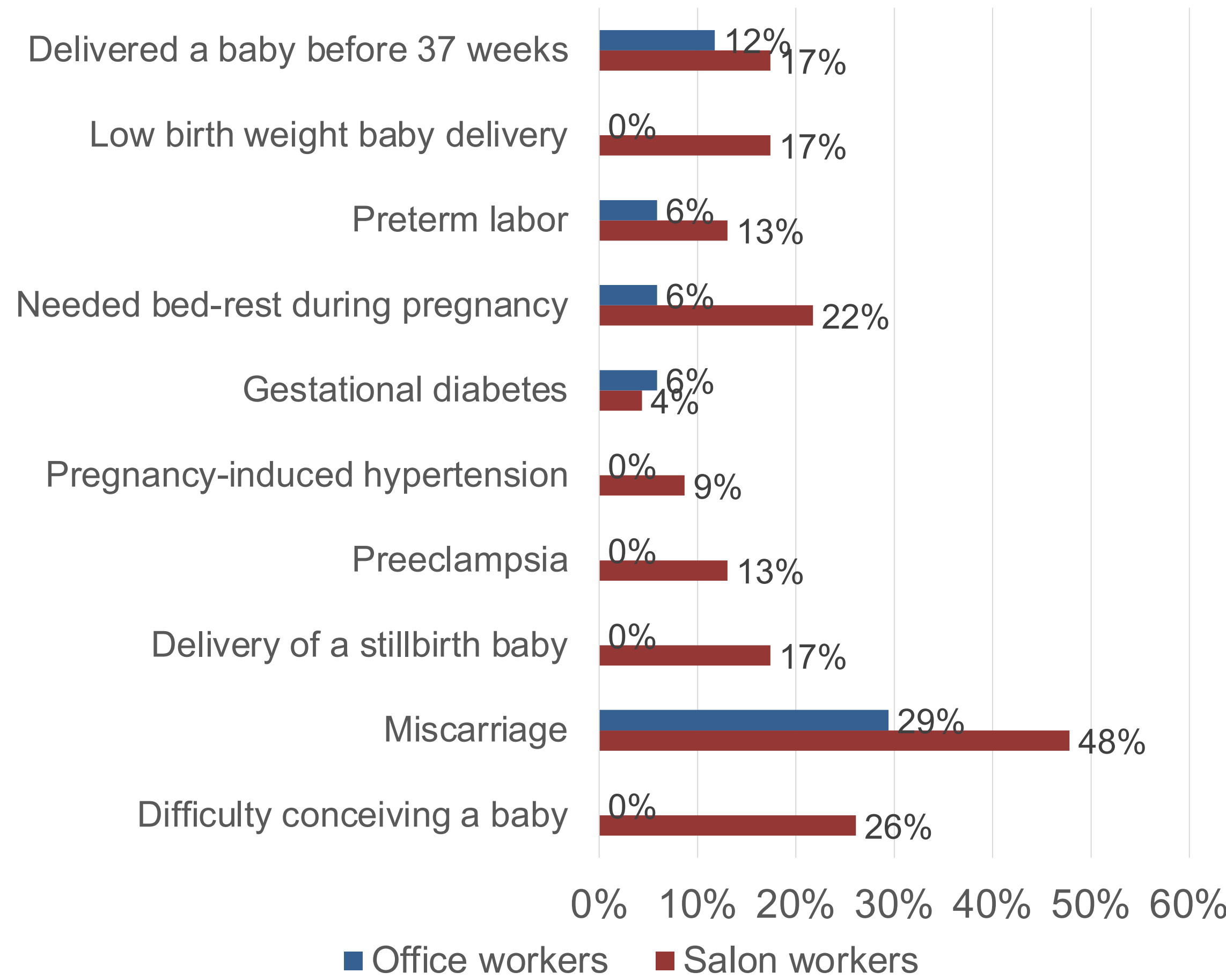
RESULTS

Table 1. Participant characteristics (n=40).

Characteristic	Hairdressers (n=23)	Office Workers (n=17)
N (%)		
Race/Ethnicity^a		
Hispanic/Latina	11 (47.8)	7 (41.2)
Non-Hispanic Black	11 (47.8)	7 (41.2)
Other	1 (4.4)	3 (17.6)
Education		
Less than High School	4 (17.4)	0 (0.0)
High School or GED	6 (26.1)	1 (5.9)
Trade School	8 (34.8)	1 (5.9)
College/Other	5 (21.7)	15 (88.3)
Income		
≤ \$30,000	10 (52.6)	3 (17.7)
\$30,001-\$50,000	4 (21.1)	3 (17.7)
\$50,001-\$75,000	2 (10.5)	4 (23.5)
> \$75,000	3 (15.8)	7 (41.2)
Current smoker		
No	19 (82.6)	16 (94.1)
Yes	4 (17.4)	1 (5.9)
Hair salon services received in past 12 months^b		
0 services	7 (30.4)	12 (70.6)
1 service	6 (26.1)	3 (17.7)
2-3 services	10 (43.5)	2 (11.8)
Mean (SD)		
Age (years)	40.2 (10.6)	33.6 (7.9)
Years working in hair salons	15.1 (9.5)	n/a
Hours worked per week	44.3 (18.7)	40.4 (10.4)
Clients per week	26.2 (12.1)	n/a
Personal use in past 24-48 hrs		
Cosmetics	3.4 (3.1)	2.5 (2.1)
Hair products	2.1 (1.5)	1.5 (1.1)
Personal care products ^c	10.5 (4.7)	10.6 (2.0)

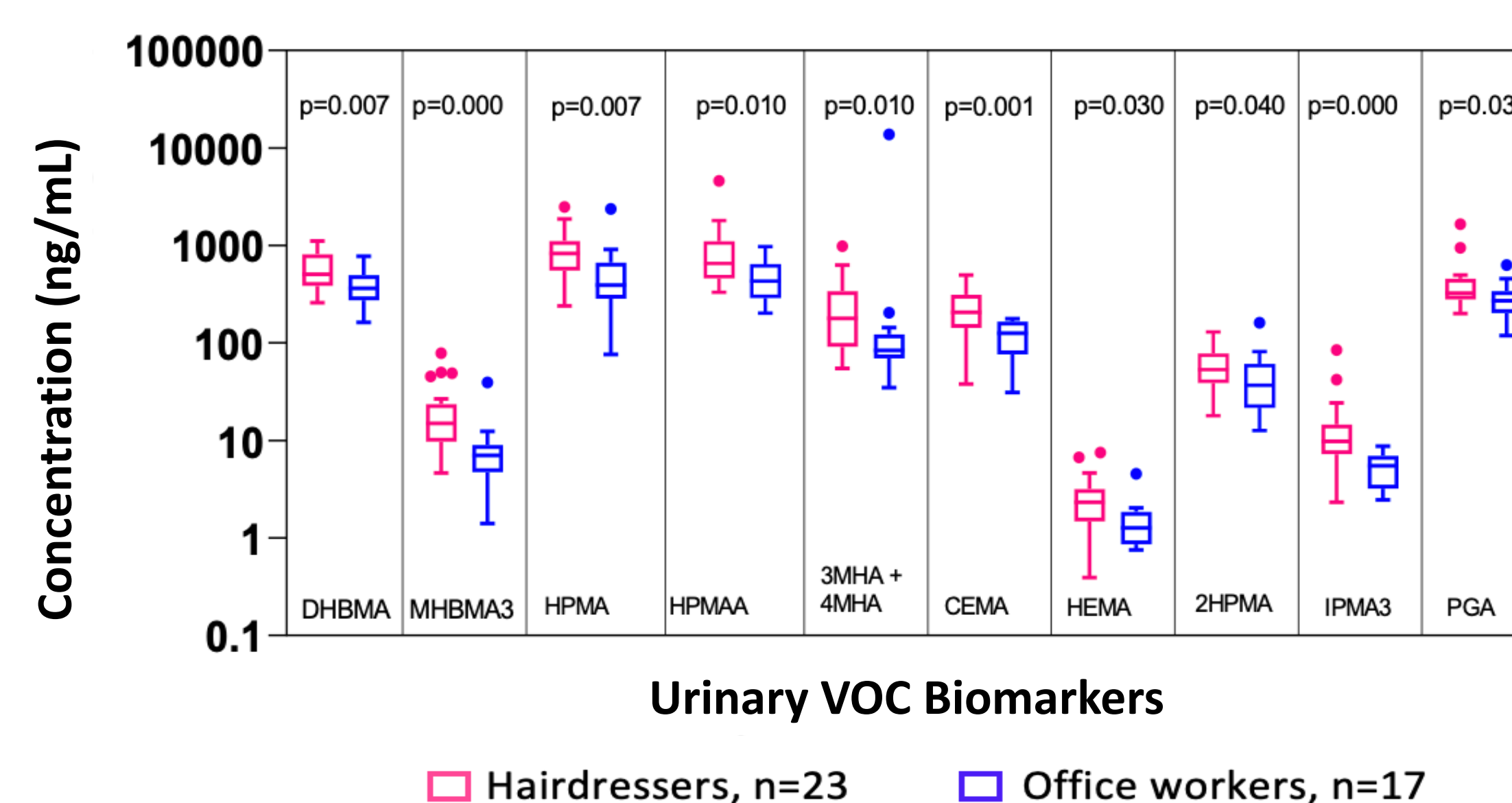
a Other race category includes White, American Indian or Alaska Native, Asian, and Other.
b Hair salon services included bleach or highlights, hair straightening/relaxing, permanent waves/texturizing, Brazilian blowout/keratin treatments, and hair color.
c Personal care products included a total of 31 non-cosmetic and non-hair products.

Fig 1. Prevalence (%) of adverse pregnancy related outcomes in hairdressers (n=23) vs. office workers (n=17).



Higher prevalence of adverse pregnancy related outcomes observed in hairdressers compared to office workers.

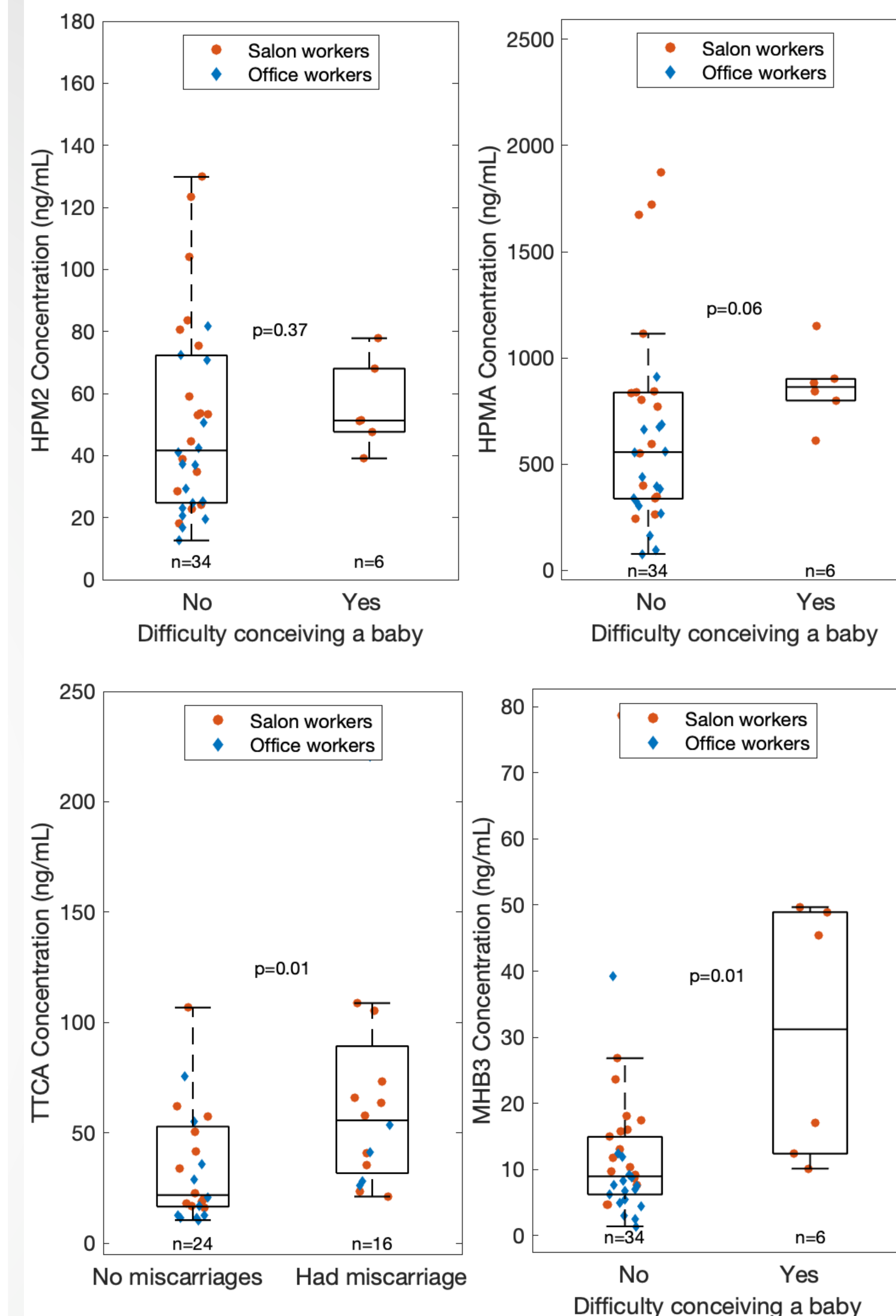
Fig 2. Select VOC biomarker concentrations in hairdressers vs. office workers.



Higher VOC biomarker concentrations observed in hairdressers compared to office workers.

RESULTS

Fig 3. Participants with select adverse pregnancy related outcomes had higher concentrations of select VOC biomarkers.



CONCLUSIONS

- Prevalence of adverse pregnancy related outcomes and VOC levels were higher in hairdressers vs. office workers.
- Trend of higher VOC levels for select pregnancy related outcomes.
- Larger studies are needed to fully characterize the association of EDC such as VOC exposures among hairdressers and their relationship with birth outcomes, develop exposure mitigation efforts, and improve worker health and safety in salons.



ACKNOWLEDGEMENTS

- We gratefully acknowledge our study participants (salon owners/stylists), study interns, and community partners.
- Funding for this work was made possible by the Johns Hopkins Education and Research Center Pilot Project Research Training Grant Program, the Sloan Foundation, and the Wait Family Scholarship.
- For more on this pilot study and an interview with one of our community partners and salon owner/stylist, scan the barcode.

