

Heat- and smoke-related pregnancy risks

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Participating Organizations

- *MOMS Orange County*
- *California Office of Environmental Health Hazard Assessment (OEHHA), CalHeatScore Program*

Extreme heat and wildfire smoke are intensifying across California, and pregnancy is one of the most climate-sensitive periods of human life. Exposure to heat and fine-particle air pollution (PM2.5) during pregnancy raises the risk of preterm birth and serious maternal complications. In Orange County, these exposures fall hardest on communities such as Santa Ana, where many families live in hotter neighborhoods with less tree cover, older housing, limited air conditioning, and busier roadways, and where few climate-health tools have been developed or tested. Protecting mothers and babies in these settings is one of the most direct ways climate research can benefit society.

This project, EQUIT (Exposure Quantification, Intervention, and Translation), unites four UCI schools, combining expertise in exposure science and epidemiology, maternal and child health, climate science, and digital health technology. The team partners with MOMS Orange County, a nonprofit whose Community Health Workers reach more than 3,800 pregnant women each year through home visitation, and with OEHHA, developer of the state's CalHeatScore heat-ranking system. The combination of a trusted community partner and a state-agency partner connects the research directly to families and to policy.

The project moves from place to person. The team will first build an open-source Orange County climate-and-health atlas mapping heat at 100-meter resolution and PM2.5, including wildfire smoke, at 1-kilometer resolution, together with neighborhood features that intensify or buffer exposure. Next, 50 pregnant women recruited through MOMS Orange County home visits will carry small wearable sensors for two weeks, producing the county's first personal heat and air-quality exposure data for pregnancy and revealing which everyday practices, such as cooling strategies and indoor air management, most effectively reduce exposure. Finally, the team will prototype a bilingual (English/Spanish) mobile app that delivers climate-health education and real-time exposure alerts, while training Community Health Workers to bring these tools into routine prenatal home visits.

End-users are engaged throughout. The atlas is designed to support the Orange County Health Care Agency, the City of Santa Ana, and community organizations in siting cooling centers and targeting heat and smoke outreach. OEHHA will gain community-validated personal exposure evidence for pregnant women, a group its CalHeatScore system identifies as heat-sensitive, to help inform statewide heat warnings consistent with California's neighborhood-scale urban heat requirements. MOMS Orange County gains climate-health training for its Community Health Worker team and practical tools embedded in services families already trust.

Our vision of climate solutions includes new knowledge (personal exposure evidence for pregnancy), new tools (an open-source atlas, a bilingual app, and a Community Health Worker training package), and new policy connections, creating a model that could be tested and adapted in other communities and positioning the team to pursue large-scale external funding to evaluate the integrated approach.

The project also advances UCI's educational mission. Climate-health content will be integrated into public health and nursing courses, and a project-based teaching case on Orange County heat-pollution mapping will be developed and made available across schools. Undergraduate and graduate students will gain hands-on experience spanning exposure science, community-engaged research, and digital health, including direct engagement with state and local agencies and community partners. These experiences will help strengthen UCI's reputation as a destination for students passionate about addressing climate change through careers in health, resilience, and sustainability.