

**Note to readers with disabilities:** *EHP* strives to ensure that all journal content is accessible to all readers. However, some figures and Supplemental Material published in *EHP* articles may not conform to [508 standards](#) due to the complexity of the information being presented. If you need assistance accessing journal content, please contact [ehp508@niehs.nih.gov](mailto:ehp508@niehs.nih.gov). Our staff will work with you to assess and meet your accessibility needs within 3 working days.

### **Supplemental Material**

#### **Time-Varying Exposure to Air Pollution and Outcomes of *in Vitro* Fertilization among Couples from a Fertility Clinic**

Audrey J. Gaskins, Kelvin C. Fong, Yara Abu Awad, Qian Di, Lidia Mínguez-Alarcón, Jorge E. Chavarro, Jennifer B. Ford, Brent A. Coull, Joel Schwartz, Itai Kloog, Irene Souter, Russ Hauser, and Francine Laden

#### **Table of Contents**

**Figure S1.** Overview of the directed acyclic graph used to identify confounding based on a priori knowledge (Panel A) and descriptive statistics from our cohort (Panel B).

**Figure S2.** Overview of the outcomes of the 522 fresh *in vitro* fertilization cycles in the Environmental and Reproductive Health (EARTH) Study.

**Figure S3.** Sensitivity analyses assessing whether the effects of nitrogen dioxide (NO<sub>2</sub>) (Panel A), ozone (O<sub>3</sub>) (Panel B), particulate matter <2.5 μm (PM<sub>2.5</sub>) (Panel C), and black carbon (Panel D) on the odds of failing at IVF are specific to the IVF time windows (as opposed to characteristic of baseline exposure 3 months prior to IVF) and if short-term variations in air pollutants (above a woman's average exposure concentrations) are more important than absolute exposure levels.

**Table S1.** Average nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter <2.5 μm (PM<sub>2.5</sub>) and black carbon (BC) concentrations for each of the IVF windows of exposure among the 345 women in Environment and Reproductive Health (EARTH) Study (2004-2015).

**Table S2.** Spearman correlation between the average nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter <2.5 μm (PM<sub>2.5</sub>), and black carbon (BC) levels in the 3 months prior to IVF among 345 women in Environment and Reproductive Health (EARTH) Study (2004-2015).

**Table S3.** Spearman correlation of air pollutants over time during different time windows of IVF within the 345 women in Environment and Reproductive Health (EARTH) Study (2004-2015).

**Table S4.** Baseline characteristics of 345 women in Environment and Reproductive Health (EARTH) Study (2004-2015) according to quartiles of air pollution exposure in the 3 months prior to their first IVF cycle.

**Table S5.** Effects of nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter <2.5 μm (PM<sub>2.5</sub>), and black carbon concentrations on the odds of failing at IVF with further adjustment for other pollutants.

**Table S6.** Effects of nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter <2.5 μm (PM<sub>2.5</sub>), and black carbon concentrations on the odds of failing at IVF after accounting for spatial autocorrelation of model residuals.

**Table S7.** Sensitivity analysis for the association between black carbon concentrations 3 months prior to IVF and during ovarian stimulation on controlled ovarian stimulation outcomes of IVF.

**Table S8.** Association between nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter <2.5 μm (PM<sub>2.5</sub>) and black carbon (BC) concentrations during controlled ovarian stimulation on day 3 embryo quality outcomes of IVF (n=312 women, 436 IVF cycles with an embryo transfer on day 3 or 5).