

# ASSOCIATION BETWEEN CONGENITAL HEART DEFECTS AND MATERNAL EXPOSURE TO AMBIENT AIR POLLUTION AND TEMPERATURE IN AN ISRAELI BIRTH COHORT, 2000-2006

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**Background and Aims:** There are new concerns that air pollution may play a role in the causation of congenital anomalies, and such an effect is of public health importance. A recent meta-analysis reported evidence for an effect of ambient air pollutants (AP) on Congenital Heart Defect (CHD) risk. The potential influence of direct temperature effects on pregnancy outcomes is an area of emerging research. Therefore we examined associations between CHD and maternal exposure to ambient AP and temperature in an Israeli birth cohort.

**Methods:** We conducted a population-based cohort study on 138,675 newborns in Tel-Aviv region during 2000-2006. For each pregnant woman we used GIS to assess personal exposure to carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulate matter (PM10 and PM2.5) during weeks 3-8 of pregnancy; using inverse distance weighting method. In addition ambient temperature was considered. Logistic models were conducted to compare exposure levels between the 2087 CHD cases and the non-cases, adjusted for socio-demographic covariates and season.

**Results:** We did not find positive dose-response associations in both single and multi-pollutant models between exposure to air pollutants and CHD - for total CHD and for the major subgroups (Atrial Septal Defect (ASD), Ventricular Septal Defect (VSD) and Patent Ductus Arteriosus (PDA)). However, we found a positive association between ambient temperature quartiles (<16°C, 16.1-20.4°C, 20.5-25.2°C, 25.3°C<) and CHD risk, adjusted for multi-pollutant exposure. For total CHD, OR= 1.13 (95%CI: 1.05, 1.21), for ASD OR= 1.14 (95%CI: 1.04, 1.26), for VSD OR = 1.08 (95%CI: 0.98, 1.2), for PDA OR=1.13 (95%CI: 0.95, 1.34).

**Conclusions:** The positive relationship between ambient temperature exposure during weeks 3-8 of pregnancy and CHD risk found in this study should be further explored since there is biological plausibility for these results, and temperatures are expected to increase due to climate change.