

First evaluation of maternal and neonatal outcomes associated with PFAS contamination

Paola Facchin*, Laura Salmaso**, Laura Visonà Dalla Pozza**, Giulia Crema Falceri***, Giulia Lorenzoni****, Silvia Manea**

* University of Padua, Veneto Region Birth Registry

** Rare Diseases Registry and Birth Registry of the Veneto Region

*** University of Padua, Medical Specialization in Community Medicine and Primary Care

*** University of Padua, PhD in Health Planning Science and Developmental Medicine

Objective: to evaluate the effect of PFAS contamination and maternal and neonatal outcomes.

Materials and methods: Levels of PFAS contamination in drinking water have been assumed as proxy of individual exposure. Comparison among 4 areas: 3 (red, orange, yellow) with decreasing contamination, 1 (green) not contaminated. Red area: women giving birth are younger and foreigner. Sources: Birth Registry, HDR and Rare Diseases Registry. Starting from delivery retrospective cohorts for pregnancy outcomes and prospective cohorts for newborn's health until 12 months have been built. From 2003 to 2015 for the different areas 15.365 deliveries and 15.582 newborns; 30.803 deliveries and 31.241 newborns; 45.851 deliveries and 46.562 newborns; 74.387 deliveries and 75.608 newborns on a regional amount of 560.314 deliveries and 564.955 newborns have been studied. Outcomes: fertility, maternal health, neonatal health. Covariates: maternal age and nationality, parity, multiple births, gestational age. Frequencies, crude rates and time trends; crude RR, adjusted ODDS ratio and IC through stepwise logistic analysis have been calculated.

Results: By descriptive analysis the following outcomes have been selected: for mother, gestational diabetes, preeclampsia, for newborn, SGA and cerebral malformations. Gestational diabetes: prevalence red area 5.5% vs 3.13% green, RR 1.76 (1.58-1.96), $p < 0.0001$ and adjusted ODDS 1.69 (1.51-1.90); orange 1.38 (1.25-1.52); yellow 1.31 (1.20-1.43). Preeclampsia: red area 4.58%; green 3.25%; RR 1.41 (1.25-1.58), $p < 0.0001$, adjusted ODDS 1.49 (1.32-1.69); orange 1.28 (1.16-1.41); yellow 1.33 (1.22-1.45). SGA: red area 3.7%, green 2.9%; RR (until 2013) 1.3 (1.15-1.54), $p < 0.001$; since 2014 1 (0.8-1.32); adjusted ODDS (2003-2013) 1.36 (1.22-1.50), (2014-2015) 1.04 (0.80-1.34). Cerebral malformations: 0.51% red, 0.11% green; RR 4.49 (2.92-6.90) $p < 0.001$; adjusted ODDS 3.23 (1.77-5.89).

Conclusions: The results suggest an effect of PFAs contamination and adverse maternal and neonatal outcomes. New studies on individual exposure are recommended.