

Long-lasting effects of the Seveso disaster on thyroid function in babies

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Three decades after an accident at a chemical factory in Seveso, Italy in 1976, which resulted in exposure of a residential population to the most dangerous type of dioxin, newborn babies born to mothers living in the contaminated area at the time of the accident are over six times more likely to have altered thyroid function than those born to mothers in a non-contaminated area. The study finding these results is published in the open access journal *PLoS Medicine* this week by Andrea Baccarelli (of the University of Milan) and colleagues from the United States and Italy.

Dioxins are toxic chemicals that are a byproduct of waste incineration and which persist in the environment and accumulate in people. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) – the dioxin released by the Seveso disaster – is the most toxic type of dioxin and in 1997 was declared a class-1 carcinogen by the World Health Organization.

Animal studies and some studies in people have shown that maternal exposure to dioxins can damage the function of their babies' thyroid gland. To investigate the continuing effect of TCDD on children born in the Seveso area, Andrea Baccarelli and colleagues investigated three groups of child-bearing women. These included 1,772 women who were living very near the factory in Seveso at the time of the accident (the most contaminated area, Zone A) or the nearby area where contamination was less but still high (Zone B), and the same number of women from the surrounding non-contaminated area (Zone Reference).

Altogether these women had 1,014 babies between 1994 and 2005. The researchers measured the amount of thyroid secreting hormone (TSH) in the blood of these children – a common practice at birth in many countries, because high blood TSH levels are associated with a failing thyroid, which can lead to permanent damage to

the baby's developing body and brain.

The results show that one long-lasting effect of the Seveso disaster (and potentially of other areas where there have been high environment levels of dioxins) is a deleterious effect on the health of children in the area born decades after the accident. The babies from Zone A - the area most highly contaminated with TCDD after the accident in 1976 - were 6.6 times more likely to have a high blood TSH level than those from the surrounding area that was not contaminated. Those babies born in Zone B had intermediate TSH blood levels. The researchers also studied 51 pairs of mothers and children for whom dioxin measurements were available at the time of delivery, and found that the blood TSH levels were highest in the babies whose mothers had the highest levels of dioxin in their blood.

As the authors conclude, these findings suggest that maternal exposure to dioxins such as TCDD in the environment produces damaging effects on the thyroid function of their babies "far apart in time from the initial exposure." Further studies on the long-term progress of the children is needed in order to establish whether this results in longer term development problems, such as reduced growth and intellectual development.

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