

# PFCs, chemicals in environment, linked to lowered immune response to childhood vaccinations

January 24 2012

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A new study finds that perfluorinated compounds (PFCs), widely used in manufactured products such as non-stick cookware, waterproof clothing, and fast-food packaging, were associated with lowered immune response to vaccinations in children. It is the first study to document how PFCs, which can be transferred to children prenatally (via the mother) and postnatally from exposure in the environment, can adversely affect vaccine response.

The study appears in the January 25, 2012 issue of the [Journal of the American Medical Association](#) (JAMA).

"Routine childhood immunizations are a mainstay of modern [disease prevention](#). The negative impact on childhood vaccinations from PFCs should be viewed as a potential threat to public health," said study lead author Philippe Grandjean, adjunct professor of environmental health at Harvard School of Public Health.

PFCs have thousands of industrial and manufacturing uses. Most Americans have the [chemical compounds](#) in their bodies. Prior studies have shown that PFC concentrations in mice similar to those found in people suppressed immune response, but the adverse effects on people had been poorly documented.

The researchers analyzed data on children recruited at birth at National

Hospital in Torshavn, Faroe Islands during 1999-2001. A total of 587 participated in follow-up examinations. Children were tested for immune response to tetanus and diphtheria vaccinations at ages 5 and 7 years. PFCs were measured in maternal pregnancy serum and in the serum of children at age 5 to determine prenatal and postnatal exposure.

The results showed that PFC exposure was associated with lower [antibody responses](#) to immunizations and an increased risk of [antibody levels](#) in children lower than those needed to provide long-term protection. (Antibody concentrations in serum are a good indicator of overall [immune functions](#) in children.) A two-fold greater concentration of three major PFCs was associated with a 49% lower level of serum antibodies in children at age 7 years.

"We were surprised by the steep negative associations, which suggest that PFCs may be more toxic to the immune system than current dioxin exposures," said Grandjean.

The PFC concentrations are similar to or slightly below those reported in U.S. women, and most serum PFC levels in Faroese children at age 5 were lower than those measured in U.S. children aged 3 to 5 years in 2001-2002.

**More information:** "Serum Vaccine Antibody Concentrations in Children Exposed to Perfluorinated Compounds," Philippe Grandjean, Elisabeth Wreford Andersen, Esben Budtz-Jorgensen, Flemming Nielsen, Kare Molbak, Pal Weihe, Carsten Heilmann, *JAMA*, January 25, 2012, Vol. 307, No. 4, pp. 391-397.

Provided by Harvard School of Public Health

Citation: PFCs, chemicals in environment, linked to lowered immune response to childhood vaccinations (2012, January 24) retrieved 25 April 2024 from <https://medicalxpress.com/news/2012-01-pfcs-chemicals-environment-linked-lowered.html>

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