MINIMISING THE IMPACT OF ENDOCRINE DISRUPTING CHEMICALS ON HEALTH AND ENVIRONMENT

A scientific update following the Joint Congress of ESPE and ESE 2025

Legacy Event: 14 May 2025
Press briefing note: FERTILITY

Relevant presentations at event:

- "Impact of lifestyle and environmental exposure on female and male fertility" (tandem talk) – Prof Pauliina Damdimopoulou, Karolinska Institutet (female fertility) and Prof Niels Jørgensen, Rigshospitalet (male fertility)

- "The potential and current limitations of new approach methodologies (NAMs) in identifying endocrine disruptors with a focus on reproductive toxicity" – Prof Terje Svingen, National Food Institute, Technical University of Denmark

Issue:

- **Reproductive health is in decline globally.** In 2023, the number of live births in the EU reached its lowest level since records began, with almost half as many children born than six decades ago. The fertility rate, defined as the number of live births per woman, also declined, with the European Union having one of the lowest fertility rates in the world. The European Society of Human Reproduction and Embryology (ESHRE) reports more than one million assisted reproductive technology treatments carried out per year.

- **Fertility can be affected by a range of biological, genetic, lifestyle and environmental factors.** These include congenital conditions, hormone imbalances and age-related decline, but also modifiable influences such as smoking, excessive alcohol intake and obesity. In children and young adults, conditions such as cancer, haematological malignancies and rare genetic conditions (such as Turner syndrome and Klinefelter syndrome) can affect the ability to conceive later in life.

- **There is growing concern that the rising burden of infertility and reproductive disease may be linked to increasing exposure to endocrine disrupting chemicals (EDCs).** These substances are found in everyday products such as plastics, cosmetics, pesticides and food packaging. EDCs can interfere with the body's hormone systems and affect fertility in both men and women. In men, EDCs are linked to reduced sperm quality and fertility. In women, exposure during key life stages, such as foetal development, puberty and adulthood, has been associated with disrupted

reproductive development and impaired fertility. For example, over 60 EDCs[1] have been detected in ovarian follicles, which can lead to an increased risk of infertility. Ovarian samples from women with high EDC exposure show disruptions in energy and hormone production, along with increased inflammation, compared to women with low EDC exposure.

- **The links between fertility and per- and polyfluoroalkyl substances (PFAS) are particularly concerning due to their persistent nature.** Research suggests that PFAS exposure may reduce fertility in women by as much as 40%, as well as increase the risk of polycystic ovarian syndrome two-fold. A Swedish cohort study found that exposure to high levels of PFAS in drinking water was linked to reproductive diseases in women. The European Commission is currently assessing a proposal to restrict PFAS, initiated by the national authorities of Germany, Denmark, the Netherlands, Norway and Sweden. More information on the proposal may be found here.

What needs to happen?

- **Tackling the challenge of increased fertility due to EDC exposure requires a multidisciplinary approach**, involving endocrinologists, gynaecologists, paediatricians and andrologists, as well as researchers, demographers and policymakers. Tailored policies need to be developed, for example, to reduce EDC exposure of citizens of reproductive age and expecting mothers. These should be complemented by general awareness-raising activities about the links between EDC exposure and reduced fertility.

- **While there is already substantial evidence of the links between EDC exposure and fertility, further research is needed to secure broad support for regulatory decisions.** The EndoCompass Research Roadmap, a major new initiative to articulate future research priorities in endocrine science, will support this. This landmark initiative, led by ESE and ESPE together with partner societies and over 228 experts from across Europe, is due for publication as a supplement to the *European Journal of Endocrinology* and *Hormone Research in Paediatrics*. Although it won't be published until June, attendees at the Joint Congress will see a preview of findings in two special sessions. The publication will include a chapter dedicated to reproductive and developmental endocrinology and one on environmental endocrinology, which will both be relevant for those interested in fertility and EDCs.

- **A better understanding of the economic and societal consequences of declining fertility rates** is needed among EU and national policy makers as well as the public. Addressing the challenges requires a comprehensive and multifaceted approach that considers economic, social and health-related factors.

[1] Bellavia et al. (2023) measured 59 chemicals in 333 women in Sweden and Estonia; Björvang et al. (2022) measured 22 chemicals studies in same cohort.

- **ESPE, ESE and the Danish Endocrine community are dedicated to advancing understanding, improving diagnosis and treatment and addressing unmet needs** in reproductive health and developmental endocrinology through both basic and clinical research.

Key studies

Björvang. R. et al. (2022) 'Follicular fluid and blood levels of persistent organic pollutants and reproductive outcomes among women undergoing assisted reproductive technologies'

Cohen, N. et al. (2023) 'Exposure to perfluoroalkyl substances and women's fertility outcomes in a Singaporean population-based preconception cohort'

European IVF Monitoring Consortium (EIM) for the European Society of Human Reproduction and Embryology (ESHRE) et al. (2023) 'ART in Europe, 2019: results generated from European registries by ESHRE'

Li, J. et al. (2024) 'The effect of endocrine-disrupting chemicals in follicular fluid: The insights from oocyte to fertilization'

Mostafalou, S. and Abdollahi, M. (2017) 'Pesticides: an update of human exposure and toxicity'

Rehman, S. et al. (2018) 'Endocrine disrupting chemicals and impact on male reproductive health'

Skakkebaek, N. et al. (2021) 'Environmental factors in declining human fertility'

Vander Borght M. and Wyns, C. (2018) 'Fertility and infertility: Definition and epidemiology'

Varik, I. et al. (2024) 'Reduced ovarian cholesterol and steroid biosynthesis along with increased inflammation are associated with high DEHP metabolite levels in human ovarian follicular fluids'

Useful links

- FREIA Project factsheet on 'Endocrine disrupting chemicals and women's reproductive health'
- FREIA Project Health Promotion Strategy
- Eurostat Fertility Statistics
- European Society of Human Reproduction and Embryology (ESHRE) factsheet on infertility
- ESE Focus Area on Reproductive and Developmental Endocrinology
- Information about ESPE Working Group on Turner Syndrome