Figure 1: Potential effects of exposure to environmental factors on female health. EDCs, Endocrine Disrupting Chemicals (Created with BioRender.com).

→ **Environmental exposures in adulthood can affect reproductive health.**

- Air quality has been shown to have a correlation with female fertility. Poor air quality is linked to reduced levels of anti-Müllerian hormone in females of reproductive age, indicating an accelerated depletion of ovarian reserve. Cohort studies further demonstrate significant associations between air pollution levels and decreased rates of both spontaneous and medically assisted conception, along with an increased incidence of miscarriages [8].
- Additionally, levels of human-made chemicals have been associated with diminished fertility markers in females. Exposure to environmental chemicals has been linked to a decrease in ovarian reserve and earlier onset of menopause. Furthermore, chemical exposures have been implicated in an elevated risk of developing conditions such as polycystic ovary syndrome and endometriosis.
- Most females of reproductive age are active in the workforce, potentially facing heightened exposure to harmful substances before and during pregnancy. Concerningly, there is a lack of understanding regarding whether current occupational safety standards adequately safeguard fertility and the developing foetus.
- All individuals are subject to complex mixtures of chemicals and air pollution, but the extent of exposure to these environmental factors varies depending on lifestyle, socio-economic status, geographic location, and occupation. This variability poses challenges in comprehensively evaluating environmental influences in cohort studies. Female fertility remains an area with limited number of studies, hampering efficient risk assessment.

Time for action: policies to mitigate environmental impact on female fertility.

Facilitate Research

- ✓ **Promote and finance research aimed at identifying environmental factors, including occupational exposures, contributing to reproductive diseases and infertility.**
- ✓ **Establish and maintain a Europe-wide digital healthcare data collection system for long-term monitoring of reproductive health trends.**

Promote Awareness

- ✓ **Educate the public about the potential risks posed by environmental contaminants.**
- ✓ **Provide training for healthcare professions to enhance their understanding and ability to communicate about the impact of environmental factors to patients.**
- ✓ **Support policymakers in recognising and acting on the urgency and importance of addressing reproductive health concerns linked to environmental factors.**

Support Prevention

- ✓ **Develop and enforce prevention strategies at both institutional and individual levels to effectively mitigate environmental and health risks.**
- ✓ **Fulfil the commitment to implement the European Chemicals Strategy for Sustainability.**

References[1]

1. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS, *Chemicals Strategy for Sustainability Towards a Toxic-Free Environment* 2020.
2. European Environment Agency (EEA) *Europe's air quality status 2023 - Briefing no. 05/2023*. 2023
3. Björvang RD and Damdimopoulou P, *Persistent environmental endocrine-disrupting chemicals in ovarian follicular fluid and in vitro fertilization treatment outcome in women.* Ups J Med Sci, 2020. **125**(2): p. 85-94.
4. Hallberg I, et al., *Suspect and non-target screening of ovarian follicular fluid and serum - identification of anthropogenic chemicals and investigation of their association to fertility.* Environ Sci Process Impacts, 2021. **23**(10): p. 1578-1588.
5. Bellavia A, et al., *Association between chemical mixtures and female fertility in women undergoing assisted reproduction in Sweden and Estonia.* Environ Res, 2023. **216**(Pt 1): p. 114447.
6. Uhl M, et al., *Chemical Exposure: European Citizens' Perspectives, Trust, and Concerns on Human Biomonitoring Initiatives, Information Needs, and Scientific Results.* Int J Environ Res Public Health, 2021. **18**(4).
7. Ho SM, et al., *Environmental factors, epigenetics, and developmental origin of reproductive disorders.* Reprod Toxicol, 2017. **68**: p. 85-104.
8. Checa Vizcaino MA, et al., *Outdoor air pollution and human infertility: a systematic review.* Fertil Steril, 2016. **106**(4): p. 897-904 e1.

[1]Only key papers were included, but further detailed references on individual studies can be requested from ESHRE by contacting guidelines@eshre.eu

Developed by the ESHRE expert panel for environmental factors and fertility, consisting of Willem Ombelet, Maribel Acién, Pauliina Damdimopoulou, Linda Giudice, Niels E. Skakkebæk, Miguel Angel Checa, Rémi Béranger, Nicolas Garrido, Karin Sørig Hougaard, Rune Lindahl-Jacobsen, Olwenn Martin, Jeanne Perrin, Cristina Richie, and Nathalie Vermeulen.