

## **PRESS RELEASE**

**EMBARGOED UNTIL 11 MAY 2026 AT 15:30 CET**

### **Environmental chemicals may interfere in infants' bone development**

Infants exposed to certain environmental chemicals, including breast milk and everyday products such as personal care items, are more likely to have lower bone density in the first year of their lives, according to research presented at the 28th European Congress of Endocrinology in Prague. The findings highlight how exposure to environmental pollutants early in life may negatively affect bone development, and the use of which urgently needs to be better regulated on a national and international level.

Endocrine-disrupting chemicals (EDCs) used in the manufacture of plastics, cosmetics, pesticides and medicines can interfere with the normal function of our hormones, as we are constantly exposed to these in our daily lives. EDCs have previously been associated with puberty and child development, including skeletal development. However, except for perfluoroalkyl and polyfluoroalkyl substances (PFAS) which are well-known to have a negative effect on bone health, there is little research on bisphenols and phthalates.

In this study, researchers from the University of Parma, University Hospital of Parma, University of Florence, University of Messina and G. Martino University Hospital of Messina in Italy analysed 52 different chemicals in urine of 88 healthy one-month-old infants. By using Radiofrequency Echographic Multi Spectrometry (REMS) technology, they also measured the infants' bone mineral density (BMD) — at 48 hours after birth, one month, three months, six months and one year.

The researchers found that at least 21 of the environmental chemicals analysed were detectable in one-month-old infants and only boys had a lower bone mineral density only at birth. Higher levels of Bisphenol A (BPA) were associated with lower bone density at birth, while higher levels of phthalates were linked to lower bone density at both six and 12 months of age. This association was stronger at 12 months when BPA and several phthalates were combined. In addition, several PFAS, including PFHxS, and parabens were also implicated in lower bone density at different months.

“Evidence has suggested that EDCs may adversely affect skeletal development that begins in fetal life and continues through infancy, but hardly any studies have measured bone mineral density during the first 12 months and assessed these chemicals at such a young age as we did in ours,” said lead investigator, Professor Maria Elisabeth Street from the University of Parma.

She added: “Measuring the bone mineral density in infants is very difficult due to technical, biological and practical barriers.”

“Our study shows that early exposure to some EDCs — such as PFAS and a combination of Bisphenol A, phthalates and parabens — is associated with a lower bone mineral density at 12 months after birth, suggesting that infancy is a vulnerable window for environmental exposure and skeletal development,” said Professor Street. “This calls for protection and action to reduce exposure during pregnancy and after delivery for better bone health in future generations.”

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## Abstract

### OC8.5

#### **Bone mineral density (BMD) evaluated using REMS is associated during the first year of life with early life exposure to endocrine-disrupting chemicals (EDCs)**

**Background:** Human data on early exposure to EDCs and bone outcomes remain limited. This study-clinical trial (NCT06750523) evaluated bone status from intrauterine life and investigated factors affecting BMD in infants. We present data on early-life exposure to EDCs and BMD from birth to 12 months of age.

**Materials and methods:** This prospective, longitudinal cohort study analyzed urinary concentrations of EDCs in 88 full-term, healthy AGA infants at 1 month of age. 52 compounds were analyzed, including bisphenols (BPA, BPS, BPF, BPFEDGE), phthalates (DBP, BBP, DEHP, DEP, DMP, DnOP, MBP, MBzP, MEHP, MEHHP, MEOHP, MEP, MMP, MnOP), parabens (EtPB, MePB, PrPB, iBuPB, iPrPB) and per- and polyfluoroalkyl substances (PFAS: 11Cl- PF3OUdS, 4-2\_FTS,8-2\_FTS,6-2\_FTS,9Cl-PF3ONS, ADONA, FBSA, FOSA, GenX\_HFPO-DA, PFBA, PFBS, PFDA, PFDS, PFDoDA, PFHpS, PFHxS, PFNA, PFNS, PFOA, PFOS, PFPHpA, PFPHxA, PFPeA, PFPeS, PFTrDA, PFTreDA, PFUnDA) by UPLC-MS/MS. BMD was assessed using Radiofrequency Echographic Multi Spectrometry (REMS), and BMD z-scores were defined at 48hours after birth(V0), at 1 (V1), 3 (V3), 6 (V6) and 12 months of life (V12). Associations between urinary EDC concentrations and BMD z-scores across time points were evaluated by correlation and principal component (PCA) analyses.

**Results:** At V0, BMD z-score was  $1.31 \pm 0.87$ ;  $-0.09 \pm 0.61$  at V1;  $-0.06 \pm 0.99$  at V3;  $-0.03 \pm 0.97$  at V6, and  $-0.04 \pm 1.01$  at V12. At birth, BMD z-scores were different in males and females ( $p:0.028$ ), but this disappeared thereafter. In the infant's urine, BPA was detected in 62.5% of samples, BPS in 19.3%; EtPB in 1.1%, MePB in 21.6%, PrPB in 9.1%. Among PFAS, 6-2\_FTS was detected in 73.9% of samples, PFBA in 70.5%, PFDA in 3.4%, PFHxS in 29.5%, PFNA in 15.9%, PFOA in 69.3%, PFOS in 76.1%, PFPHpA in 78.4%, PFPHxA in 63.6%. DBP was detected in 2.3%, MBP in 100%, MBzP in 22.7%, MEHHP in 62.5%, MEHP in 1.1%, MEOHP in 42.0% and MEP in 98.9%. BPA and PFDA were associated with BMD z-score at V0 ( $r: -0.31, p:0.025$  and  $r:0.99, p:0.038$ , respectively). MePB was associated with BMD z-scores at V6 and V12 ( $r:-0.52, p:0.044$  and  $r:-0.738, p:0.009$ ). PFHxS, PFNA and PFOS presented associations with BMD z-scores at V6 ( $r:-0.49, p:0.015$ ;  $r:-0.615, p:0.037$ ;  $r:-0.287, p:0.030$ ). Phthalates showed the most consistent associations with BMD at both V6 and V12. DEP showed a linear association with BMD z-scores at 6 ( $r:-0.557, p:0.039$ ) and 12 ( $r:-0.703, p:0.035$ ) months. MBP, MBzP and MEOHP were associated with BMD z-scores at V12 ( $r:-0.346, p:0.015$ ;  $r:-0.654, p:0.040$ ;  $r:-0.501, p:0.021$ ). Notably, PCA found a cluster (19%) of BPA and phthalates (MBzP, MBP, MEOHP) with BMD z-score at V12, suggesting that higher exposure is associated with lower BMD at 1 year of age. Additionally, PFHxS contributed to BMD z-scores at V1, V3 and V6 (13.4%).

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## Notes for Editors:

1. For press enquiries, or to arrange an interview with the study authors, please contact the ECE 2026 Press Office:

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2. The study '**Bone mineral density (BMD) evaluated using REMS is associated during the first year of life with early life exposure to endocrine-disrupting chemicals (EDCs)**' will be presented on **Monday 11 May 2026, 15:30 - 15:40 CEST**, at the European Congress of Endocrinology at the Prague Congress Centre (PCC) in the Czech Republic.
3. The 28th European Congress of Endocrinology (ECE) is held at the Prague Congress Centre (PCC) in the Czech Republic, on 9-12 May 2026. See the full scientific programme [here](#).
4. The [European Society of Endocrinology](#) (ESE) provides a platform to develop and share leading research and best knowledge in endocrine science and medicine. By uniting and representing every part of the endocrine community, we are best placed to improve the lives of patients. With over 5,400 individual members and through the 50 National Societies involved with the ESE Council of Affiliated Societies (ECAS) ESE represents a community of over 20,000 European endocrinologists. We inform policy makers on health decisions at the highest level through advocacy efforts across Europe.