

## **DOHaD ANZPac Conference 2026**

Paternal occupational and household exposures during pregnancy; is there an association with offspring adult bone health and body composition?

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## **Aims**

There is growing evidence supporting paternal contributions to child health. While research into maternal exposures to substances during pregnancy, such as paint fumes, chemicals and solvents, has been associated with offspring later life bone health and body composition, few studies have assessed this association in fathers. Therefore, this study aimed to investigate associations of paternal exposures to household and occupational substances during conception and pregnancy with offspring bone health and body composition at age 20 years.

## **Methods**

Data from the Raine study, a multigenerational birth cohort, were used. Among 1183 offspring (Generation 2) with total body DXA (Norland XR-36) at the 20-year follow up, 631 had complete information on their father's household and occupational exposures, reported by the mother during pregnancy (16-20 weeks' gestation), and were included in analysis. Linear regression models were developed to examine associations of paternal substance exposure with offspring bone (total body bone mineral density, content and area) and body composition (total body fat and lean mass) measures, adjusted for the same maternal substance exposure, and offspring sex, height, weight, alcohol

consumption, smoking status, physical activity level, calcium intake and vitamin D status at 20 years of age.

## **Results**

In adjusted linear regression models, herbicide and fungicides exposure and pest spraying were associated with lower offspring total body bone mineral content and bone area ( $\beta$  -71.0g; 95%CI -140.6 to -1.3;  $p=0.046$  and  $\beta$  -36.3 cm<sup>2</sup>; 95%CI -63.5 to -9.1;  $p=0.009$ , respectively). In contrast, visual display unit (electronic screens) exposure was associated with an increase in offspring total body bone mineral density ( $\beta$  0.014 g/cm<sup>2</sup>; 95%CI 0.001-0.028;  $p=0.038$ ). All other exposures including air pollution, chemicals, dust, insulation, glues, paint and solvents were not significantly associated with bone measures, and none of the exposures studied were associated with body composition outcomes.

## **Conclusions**

Our study indicates that paternal exposure to occupational and household substances, particularly agents such as pesticides and herbicides, may adversely influence offspring bone health in adulthood. Further research is needed to confirm these associations at other clinically relevant skeletal sites, including the lumbar spine and hip.