

## Blood Lead (Pb) Levels as a Possible Marker of Cancer Risk in a Prospective Cohort of Women with Non-Occupational Exposure

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**Background/Objectives:** To correlate blood lead (Pb) levels with cancer risk in a prospective cohort of healthy women with non-occupational exposure to lead. We hypothesize that blood Pb levels can predict the risk of cancer in healthy women. **Methods:** The study was performed with women registered at the Hereditary Cancer Centre, Szczecin, aged 40 years and above between September 2010 and March 2024. A total of 2927 unaffected women were included in the study. Exclusion criteria were BRCA1 gene mutation, women with diagnosed cancer, and women with occupational exposures to Pb. All patients were asked about their occupational exposure and tested for the three Polish BRCA1 founder mutations (c.5266dupC/5382insC; c.181T > G/300T > G; c.4035delA/4153delA). Inductively coupled plasma mass spectrometry was used to measure blood Pb levels. The study was blinded to all scientists involved, and all samples were assayed in the absence of any knowledge about the clinical status of each participant. **Results:** There were 239 incident cancers diagnosed in the cohort after an average follow-up of 6 years. Compared to women with the lowest blood Pb concentration, women with higher blood Pb levels had a significantly increased risk of developing any cancer (HR = 1.46; (95% CI: 1.006–2.13;  $p = 0.046$ )). The association was stronger for women below the age of 50 years at study entry (HR = 2.59; (95% CI: 1.37–4.89;  $p = 0.003$ )). For women over 50 years of age, the results were statistically insignificant. **Conclusions:** This study suggests that blood Pb levels have the potential to be used as a marker of cancer risk in women under 50 years of age who have no known occupational exposure to this heavy metal. Further investigations using additional groups of women from Poland and other countries are needed for validate these findings.

**Keywords:** Pb, cancer risk, prospective study, non-occupational exposure, carcinogen