PBB Health Findings Summarized

Key

Evidence linked to PBB exposure
Weak evidence linked to PBB exposure
No evidence of association or link to PBB exposure
* Community Health Concern

For more details, please see our review of the scientific literature here:
https://ehp.niehs.nih.gov/doi/10.1289/EHP15012

*Community health concerns were compiled from 22 PBB community meetings held between 2011-2025 and questions asked during these meetings.

Table 1. Long-term health findings for First-Generation cohort (people with direct exposure to PBB e.g. ate contaminated food or worked on contaminated farms or Velsicol Chemical)

Health Outcome	Research Findings
Thyroid Function*	PBB was associated with increased risk of thyroid conditions, especially for those exposed before age 16 (Jacobson et al., 2017; Curtis et al., 2019b)
Breast Cancer*	People with higher PBB levels had an increased risk of breast cancer (Henderson et al., 2005; Terrell et al., 2016)
Digestive System Cancers (e.g. stomach, esophagus, liver, & pancreas)*	People with higher PBB levels had an increased risk of digestive system cancers (Hoque et al., 1998)
Lymphoma*	People with higher PBB levels had an increased risk for overall lymphoma (Hoque et al., 1998)
Rheumatoid Arthritis in Men	Men with higher levels of PBB had an increased risk of rheumatoid arthritis (Hood et al., 2023)
Menstrual Cycle	- Women with higher PBB levels and recent weight loss had shorter menstrual cycles with longer bleed length (Davis et al., 2005) - Women exposed to high levels of PBB in childhood had lower levels of estrogen and FSH during their menstrual cycle (Howards et al., 2019)
Abnormal Pap Smears	Women with higher PBB levels were more likely to report abnormal Pap smear results (Jamieson et al., 2011)
Rheumatoid Arthritis in Women	Women with higher levels of PBB had an increased risk of rheumatoid arthritis (Hood et al., 2023)

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Health Outcome	Research Findings
Neurologic Autoimmune Disorders	Women with higher levels of PBB had an increased risk of neurologic autoimmune disorders (e.g. multiple sclerosis) (Hood et al., 2023)
Thyroid Autoimmune Disorders*	Women with higher levels of PBB had an increased risk of thyroid autoimmune disorders (e.g. Grave's disease and Hashimoto's disease) (Hood et al., 2023)
Diabetes*	No association was found between PBB exposure and Type 2 Diabetes (Vasiliu et al., 2006)
Menopause	No association was found between PBB exposure and age of menopause (Blanck et al., 2004)
Endometriosis	No association was found between PBB exposure and endometriosis (Hoffman et al., 2007)
Benign Breast Disease	No association was found between PBB exposure and benign breast disease (Kaiser et al., 2003)
Miscarriage*	No association was found between PBB exposure and risk for miscarriage (Small et al., 2007)
Infertility*	No association was found between PBB exposure and infertility in women (Neblett et al., 2020)
Hypertensive Pregnancy Disorders (e.g. gestational hypertension, pre-eclampsia, eclampsia)	No association was found between maternal PBB exposure and hypertensive disorders in pregnant women (Neblett, et al., 2020)
Gestational Diabetes	No association was found between maternal PBB exposure and gestational diabetes (Neblett et al., 2020)

Table 2. Health findings for second and third generation cohort (people born to parents who were exposed to PBB)

Health Outcome	Research Findings
Birth Weight	Babies born to men or women with high PBB levels were more likely to have a lower birth weight (Givens et al., 2007; Redmond et al., 2022)
Miscarriage*	Daughters of women with high PBB levels had an increased risk of miscarriage when they became pregnant as adults (Small et al., 2011)
Bone Development	Female babies who were exposed to high PBB levels while in utero had a higher 2D:4D digit ratio (which suggests PBB might have estrogenic effects for bone development) (Wainstock et al., 2016)

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Health Outcome	Research Findings
Apgar Score	Babies born to mothers with high PBB levels had lower Apgar scores (a tool used to assess newborn health at birth) (Terrell et al., 2014)
Female Development	Daughters who were breast-fed by mothers with high PBB exposure were more likely to begin menstruating earlier (Blanck et al., 2000)
Menstrual Cycle	Women exposed to high levels of PBB while in-utero had increased progesterone levels (Barat et al., 2024)
Male Genitourinary Conditions	Sons of mothers with high PBB levels were more likely to report urinary and genital conditions such (e.g. hernia and hydrocele) (Small et al., 2009)
Male Growth & Development	Sons of mothers with high PBB levels were more likely to experience delayed puberty (Small et al., 2009)
Biomarkers of Aging	Studies examining how PBB might affect DNA function have suggested that there might be accelerated aging associated with PBB (Curtis et al., 2019a)
ADHD*	Observed a higher proportion of ADHD in females exposed but overall, no association with PBB level (Christensen et al., 2024)
Autism*	No association was found between PBB exposure and autism (Christensen et al., 2024)
Autoimmune Disorders*	No association was found between PBB exposure and self-reported autoimmune disorders (Hood et al., 2023)
Preterm birth	No association was found between maternal PBB exposure and risk of preterm birth (Neblett et al., 2020; Givens et al., 2007)
Birth Weight	No association was found between maternal PBB exposure and birth weight (Neblett et al., 2020)
Birth Defects	No association was found between maternal PBB exposure and birth defects (Neblett et al., 2020)
Female Height	No association was found between mothers' PBB levels and their daughters' height (Blanck et al., 2002)

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Additional Ongoing Analyses:

- Cancer*
- Neurodegenerative disease mortality
- Cognitive decline
- Hypertension
- Joint disease and joint replacement*
- Mental health disorders*

References

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