

# The Michigan PBB Research Registry

## Information for Clinicians



**60% of recently tested Michiganders still have elevated levels of PBB in their blood<sup>1</sup>**

### Michigan PBB Contamination – Quick Facts

In early 1973, the Velsicol Chemical Company accidentally shipped polybrominated biphenyls (PBB), a fire-retardant chemical, to the Farm Bureau instead of a nutritional supplement.

- The PBB was mixed into livestock feed and consumed by cattle, pigs, and chickens. Contaminated farm products were distributed throughout the state until the accident was discovered about a year later.
- The major acute health effects reported were skin rashes, hair loss, and memory problems, though these effects were mainly transient, and prevalent regardless of the level of PBB exposure.
- PBB is stored in adipose tissue, crosses the placenta and remains in the body for many years. Children of PBB-exposed women are exposed *in utero* and through breastmilk. Children of exposed men may have been exposed to PBB brought home on clothing.

### Michigan PBB Research Registry

To study the long-term health effects of the PBB exposure, the Michigan State Health Department created a Registry which now contains 7,500 people who consumed contaminated farm products or worked at the chemical plant and their descendants. Important findings include:

- PBB impacts the endocrine system and has been shown to mimic or interfere with steroid hormone function and thyroid function.
- PBB has been shown to increase the risk of breast cancer and is considered a probable human carcinogen by the WHO and the US National Toxicology Program.
- More detailed research findings and references appear on the reverse side.

### Continuing Education for Healthcare Providers

Courses focused endocrine-disrupting chemicals on that use PBB as a case study:

- Continuing Medical Education: <https://ee.ce.emorynursingexperience.com/courses/edcs-for-providers>
- Continuing Nursing Education: <https://ee.ce.emorynursingexperience.com/courses/endocrine-disrupting-chemicals>



## Clinically important health outcomes associated with PBB

- More thyroid problems were found among those exposed to higher levels of PBB and differences in thyroid hormones were associated with PBB exposure in childhood.<sup>2</sup>
- Children of women with high exposure to PBB were more than twice as likely to have lower Apgar scores at birth.<sup>3</sup>
- PBB levels were associated with differences in menstrual hormone levels among women exposed in childhood and among the daughters of exposed women.<sup>4</sup>
- Higher risks of breast cancer,<sup>5</sup> lymphoma and gastrointestinal cancers<sup>6</sup> were associated with PBB exposure. The International Agency for Research on Cancer and the US National Toxicology Program have classified PBB as a likely human carcinogen.<sup>7</sup>
- Breastfed daughters exposed to high levels of PBB *in utero* had an average age of menarche approximately one year earlier than breastfed daughters exposed to low levels of PBB *in utero* or daughters who were not breastfed.<sup>8</sup>
- Daughters exposed to higher levels of PBB *in utero*, now of reproductive age, were two to four times more likely to experience miscarriages compared to daughters with low *in utero* exposure.<sup>9</sup>
- Sons of women highly exposed to PBB were twice as likely to report a genitourinary condition (hernia, hydrocele, cryptorchidism, hypospadias, or varicocele), than sons of lower exposed women.<sup>10</sup>

## References

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3. Terrell et al, 2015. Maternal exposure to brominated flame retardants and infant Apgar Scores. *Chemosphere* 118: 178-186.
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5. Terrell et al, 2016. Breast Cancer among women in Michigan following exposure to brominated flame retardants. *Occupational and Environmental Medicine* 73:564-7
6. Hoque et al, 1998. Cancer among a Michigan cohort exposed to polybrominated biphenyls in 1973. *Epidemiology* 9:373-8.
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8. Blanck et al, 2000. Age at menarche and tanner stage in girls exposed in utero and postnatally to polybrominated biphenyl. *Epidemiology* 11, 641-647.
9. Small et al, 2011. Reproductive outcomes among women exposed to a brominated flame retardant in utero. *Archives of Environmental & Occupational Health* 66(4), 201-208.
10. Small et al, 2009. Maternal exposure to a brominated flame retardant and genitourinary conditions in male offspring. *Environmental Health Perspectives* 117(7), 1175-1179.

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**[PBBregistry.emory.edu](http://PBBregistry.emory.edu)**