

PBB News Update

Fall, 2003

Since our last newsletter in the Fall of 2000, a number of scientific articles have been published based on research from the Long-Term PBB Study. Many of you participated in those research projects. This newsletter includes summaries of some of the findings from those studies.

While you read the newsletter you may notice that some of the medical language is footnoted. These numbers correspond to helpful definitions listed at the end of the newsletter. If you have difficulty understanding how these research findings apply to you or your family's health, please discuss these findings with your physician or contact the project staff using the contact information at the end of this newsletter.

Recent studies, including those involving the Michigan Long-Term Study participants, have shown that PBB and other related chemicals, such as PCBs¹, may interact with the endocrine system² and disrupt its natural balance. Similar chemicals are found in our environment today. The endocrine system plays an important role in growth and development, fertility, and reproduction. You will see this is the main focus of most of the studies presented below.

Growth in Girls Exposed to PBBs & PCBs

Our previous newsletter described the results of a study by Dr. Heidi Michels Blanck. It concluded that breastfed girls born to mothers who ranked in the top 10% for PBB exposure during pregnancy had an earlier age at first menstrual period or menarche (average age 11.6 years) compared to breastfed girls born to mothers with lower PBB levels (average age 12.4 years) or girls who were not breastfed (average age 12.7 years). Other researchers have suggested that for every year earlier a woman has her first menstrual period, her risk of breast cancer goes up by 5%. Therefore, earlier menarche appears to be a minor factor in a woman's overall chance of developing this disease. Our finding suggests that daughters born to highly exposed moms (a relatively small number of women), who were also breastfed, have some PBB in their bodies and this exposure may alter hormone levels leading to a small change in the start of puberty. This study was published in the November, 2000 issue of the journal *Epidemiology*.

Dr. Michels Blanck and her colleagues at Emory University's School of Public Health and the Centers for Disease Control and Prevention (CDC) also published a paper in the March 2002 issue of the journal *Epidemiology* describing growth of girls who were exposed to PBBs and PCBs *in utero*³ and through diet in early infancy. The researchers examined the relationship between PBB and

PCB exposure during pregnancy with the height and weight of daughters, 5-24 years of age, born to women enrolled in the Long-Term PBB Study. The researchers were also interested in PCB exposure since the enrolled women had also been exposed to general U.S. background⁴ levels.

The results of this study indicated that *in utero* PBB exposure was not related to a daughter's height or weight. However, exposure to detectable amounts of PCBs *in utero* was associated with reduced weight. Mothers with detectable PCB levels had daughters whose current weights were 11 pounds lower than that of daughters whose mothers had undetectable levels. These results were the same for both women who had breast-fed and those who did not breastfeed.

Breastfeeding Among Exposed Women

A study of breastfeeding by Dr. Ann Thomas and her colleagues at the CDC and Emory University's School of Public Health was published in the November 2001 issue of the journal *Environmental Health Perspectives*. These researchers were interested in understanding how PBB exposure might alter the frequency and duration of breastfeeding among women in the Michigan Long-Term PBB Study. They found that a mother's decision to breastfeed, the duration of her breastfeeding as the main source of nutrition for the child, and total breastfeeding duration was not related to her PBB exposure overall. However, in the five years immediately following the PBB exposure incident, women with high levels of PBB in their blood were less likely to breastfeed than women with lower levels.

Benign Breast Disease and PBB Exposure

The lead investigator, Dr. Reinhard Kaiser and colleagues at the CDC and Emory University, published their findings in the January 2003 issue of the journal *Annals of Epidemiology*. This study examined PBB and the risk of benign breast disease, breast conditions that are not cancerous but might put a woman at a higher risk for developing breast cancer at a later time in her life.

Dr. Kaiser and colleagues found that there is no relationship between PBB level and benign breast disease occurrence. However, the study did observe an increased risk of benign breast disease for women who smoked. The risk of benign breast disease increased with the number of cigarettes smoked daily. A woman's age and the yearly number of visits to a healthcare provider also were associated with breast disease. It is well known that

getting older increases a woman's risk for having benign breast disease. A possible explanation of why the number of medical provider visits is associated with increased breast disease is that the disease is more likely to be detected in women who have better access to or more frequent medical care.

Is the Elimination of PBBs & PCBs in the Body Affected by Age at Exposure?

Our previous newsletter mentioned two studies describing the changes in the amount of PBB and PCB in blood over time. The previously published study by Dr. Heidi Blanck and colleagues at Emory University and the CDC found that it takes approximately 13 years for a woman with low to moderate PBB levels to get rid of half of the PBB in her blood. For women with higher PBB levels this number was about 29 years. The study also determined that the elimination rate of PBB from the body was not affected by breastfeeding.

An additional study has been published in the June 2001 issue of the journal *Environmental Research* by Dr. Anne Sweeney. This study, conducted at the University of Texas School of Public Health along with colleagues at the Michigan State University Institute for Environmental Toxicology, examined the relationship between changes in PBB and PCB levels and the age at study enrollment in females. Dr. Sweeney's analysis also indicated that young children (less than 11 years old) at the time of enrollment were about 70% more likely to show a decrease in blood PBBs compared to women 17-45 years of age at enrollment. Compared to women in this older age group, PBB levels for those near or at puberty (11-16 years of age) at the time of enrollment were about 40% more likely to decline. The reasons for these differences are not known, although these differences might be associated with increases in body mass with growth and hormonal fluctuations during sexual maturation. Age at enrollment was not significantly related to the change in PCB levels over time.

What Are We Doing Now?

The studies presented here and others in the past have shown that PBB and similar chemicals may interact with the endocrine system² in humans and in animals. The National Institutes of Health (NIH) has funded further study by scientists at MDCH and Emory University's Rollins School of Public Health. These scientists will study whether PBB exposure is related to the following health conditions or life events:

- 1) Onset of puberty and reproductive health/fertility in the sons of women in the Long-Term PBB Study,
- 2) Reproductive health/fertility of daughters of these women and
- 3) Menstrual cycle characteristics of women exposed by diet and *in utero*.³

Thank You

As you can see from the findings above, the Long-Term PBB Study has yielded truly valuable information. The value of this study is evident by the fact that we have been granted funding for further research, indicating that the scientific community is aware of how important you are to our understanding of how environmental exposures affect us. Many chemicals similar to PBBs and PCBs can be found today throughout the world. The PBB Study can help us learn how these chemicals might influence human health, growth and development. *We sincerely appreciate and thank you for your time and cooperation, which have made this study possible.*

How to Reach the Project Staff:

To speak with project staff, call the toll-free Toxic and Health Hotline at 1-800-648-6942 or write to Michigan Dept. of Community Health, Division of Environmental & Occupational Epidemiology, P.O. Box 30195, Lansing, MI 48909. Questions or comments can also be e-mailed to cameronl@michigan.gov.

Definitions:

¹ **PCBs** Polychlorinated biphenyls are a mixture of compounds very similar to PBBs. The difference between the two is the substitution of chlorine for bromine in PBBs. PCBs are man-made chemicals. They have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was banned in the U.S. in 1977 because of evidence that they build up in the environment and can cause harmful health effects. Elevated levels of PCBs have been found in Great Lakes fish. Products made before 1977 that may contain PCBs include microscope and hydraulic oils, fluorescent lighting fixtures and electrical devices containing PCB capacitors.

² **Endocrine system** The group of organs and glands which work together to secrete hormones into circulation. Hormones are chemical substances that are formed in one organ or part of the body and carried to another organ or part of the body where they alter the activity of that organ or system. The endocrine system plays an important role in growth and development of infants and children as well as the reproductive capacity of adults.

³ **In utero** While in the uterus or mother's womb.

⁴ **Background levels** An average or expected amount of a substance in the general population.