Michigan Department of Community Health
Division of Environmental Epidemiology

PBB News Update

Fall, 2000

The purpose of this news update is to provide you with some information about the results of recently completed research involving persons enrolled in the Long-Term PBB Study. We apologize for the fact that you have not heard from us for some time. However, the past few years have been an active period in which researchers from the Michigan Department of Community Health (MDCH) and other organizations have been carefully reviewing and analyzing the wealth of information that has been collected from you over the years.

Some of this research has already been published in scientific journals. Research that has been accepted for publication has been carefully reviewed by knowledgeable members of the scientific community. We believe that this review certifies and improves the quality of the research. That is why we primarily include in this update the results of research that has been accepted for publication. We will make the results of currently unpublished research available to you as soon as possible after publication.

Cognitive Development Study

Many of you have made inquiries about a study that was done by Dr. Joseph Jacobson and Dr. Sandra Jacobson at Wayne State University that looked at the cognitive development (that is, the development of perception, thinking and learning abilities) of 10 and 11 year-old children of Long-Term PBB Study participants. The results of this study were never submitted for publication in a scientific journal, so we have been unable to provide you with any detailed results. However, through communication with the researchers, we have been informed that essentially no adverse cognitive effects of PBB exposure were found and that they had no plans to proceed further with this study. However, if we receive any additional information, we will pass this on to you.

Breast Cancer Studies

Dr. Alden Henderson and his colleagues at the U.S. Centers for Disease Control (CDC) and Prevention and MDCH published a paper in the September 1995 issue of the journal *Epidemiology* that described their study of breast cancer risk among women in the Long-Term PBB Study. These researchers found some evidence that women with higher levels of PBB at enrollment had a moderately higher risk of breast cancer. However, these researchers cautioned that the small number of women with breast cancer in the study added some uncertainty to the study results. Also, this study did not look at several other risk factors for breast cancer, such as use of oral contraceptives and exposure to other chemicals besides PBB, that might be contributing to this increased breast cancer risk.

In summary, this study suggests a possible connection between PBB exposure and higher breast cancer risk, but for the reasons given above it does not definitely establish that higher PBB exposure leads to breast cancer. It would nevertheless be prudent for women in the Long-Term Study over 40 years of age, like all women in this age group, to make every effort to get a breast examination from their physician and a mammogram every year.

A second study of women in the Long-Term Study was undertaken to address some of the concerns of the earlier breast cancer study. For example, this second study looked at some of the additional factors besides PBB that might raise a woman's risk for breast cancer, like oral contraceptive use and estrogen replacement therapy. This study examined PBB and the risk of breast cancer but also considered the risk of benign breast disease, that is breast conditions that are non-cancerous but may put some women at a higher risk of developing breast cancer at a later time. This study was jointly conducted by the National Cancer Institute, CDC and MDCH. It is currently being submitted for publication. Results will be shared with you once it has been accepted for publication.

Cancer – All Types Combined and Selected Types

A study by Dr. Ashraful Hoque and his colleagues at the University of Texas at Houston and the Michigan

Department of Community Health of the risk of cancer among people in the Long-Term PBB Study was published in the July 1998 issue of the journal *Epidemiology*. These researchers looked at whether cancer risks increased as the amount of PBB in the blood of study participants at enrollment increased. They found that increased exposure to PBB did not result in a higher risk for cancer in general, that is, for all types of cancer combined. Also risks did not increase for most of the specific types of cancer that were studied, including cancers of the lung, female reproductive system (cervix, uterus and vulva), urinary system (kidney and bladder), ovaries, leukemia and melanoma (a serious form of skin cancer). However, risks for lymphomas (cancers of the lymphatic system) and cancer of some but not all of the organs of the digestive system (liver, stomach, esophagus, and pancreas combined) were elevated for people who were more highly exposed, while risks for prostate and colon cancer were reduced. As with the breast cancer study by Dr. Henderson and colleagues, the risk for breast cancer was moderately increased for persons with higher PBB levels, but normal fluctuations in breast cancer occurrence could not be ruled out as an explanation for this apparent increased risk.

In summary, this study did not provide evidence that PBB increases the risk of developing most types of cancer. The association between increasing PBB levels and higher risk of lymphoma and some digestive system cancers does not mean that all those with higher exposures will develop these cancers. It means that people with higher exposures may be more likely to develop these cancers than those who were less exposed. However, because the numbers of cancers in this study were small, these findings should be considered tentative. Also, while family history, smoking, alcohol consumption, and levels of some other chemicals known as PCBs were considered in this analysis, there may be some factor other than PBB that was not studied that could be influencing these differences in risk. Additional investigations will be undertaken in the future to try to clarify the relationships, if any, between PBB and different types of cancer.

PBB Elimination Studies

A study looking at the elimination of PBBs in women by Dr. Heidi Blanck and colleagues at Emory University and the CDC was published in the February 2000 issue of the journal *Environmental Health Perspectives*. The aim of this study was to determine the elimination rate of PBB in women with a broad range of PBB levels and to determine whether age, weight, smoking history, pregnancy and breastfeeding affected PBB elimination from the body. Information on pregnancies and breastfeeding was obtained primarily from a 1997 telephone interview that was part of the Michigan Female Health Study (MFHS). Participants previously provided information on age, weight and smoking to the MDCH.

This study found that it takes approximately 13 years for a woman with low or moderate PBB levels and approximately 29 years for a woman with high PBB levels to get rid of half of the PBB in her blood. It also appears to take longer in women who were heavier than average at the time their first PBB measurement was taken. Since it has been almost 27 years since the exposure, many women should have half or less the amount of PBB in their blood as was initially measured.

In a 1996 letter to you, Dr. Harold Humphrey from MDCH wrote that "We recently verified that the half-life of PBB is about eleven years, which means that it is leaving the blood stream slowly, as predicted." He was referring to a study which was published in the March 1995 issue of Environmental Health Perspectives. His statement about PBB "leaving the blood stream slowly" agrees with what the Emory researchers found. However, his statement that the half-life of PBB (that is, the amount of time for half of the PBB to be eliminated from the blood) is about 11 years refers to the 1995 study results, which were based on a smaller number of subjects -- including males in addition to females -- who were studied over a shorter period of time than those in the Emory study.

Age at Menarche in Daughters

Puberty is an event that is dependent on levels of hormones in the blood and research in animals has suggested that PBBs may alter estrogen and thyroid hormone levels. Dr. Blanck and other researchers with the MFHS wanted to find out whether the age of a daughter's first menstrual period (menarche), a sign of puberty, differed based on two possible PBB exposure sources: 1) her PBB exposure in the womb, and 2) her exposure to PBB through breastmilk. They examined the age at first menstrual period in 327 girls aged 5 to 24 years born to mothers in the PBB cohort. Using the method from their elimination study, they estimated the amount of PBB in a woman's blood at various times, for example, while she was pregnant.

They found that breastfed girls born to mothers who ranked in the top 10 percent for level of PBB in the blood during pregnancy had an earlier age at first menstrual period (average age 11.6 years) compared with breastfed girls born to mothers with lower levels of PBB (average age 12.4) 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 percent. 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 mothers (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. The finding of an earlier menarche in breastfed daughters does not suggest that women should not breastfeed, as there are numerous benefits of breastfeeding, for example, decreased ear infections and a decreased risk of sudden infant death syndrome. A paper on this analysis will be published in the journal *Epidemiology* in November 2000.

University of Texas Studies

Dr. Anne Sweeney at the University of Texas at Houston is in the final stages of publishing the results of two studies. The first study looks at changes in serum PBB levels over time. The second study examines birth weights and the length of gestation of children born to Long-Term PBB Study participants. Both of these studies are currently being reviewed for publication by scientific journals and we hope to be able to make these results available to you soon.

A Word of Thanks

The Michigan Department of Community Health and all of us working on the Long-Term PBB Study would like to extend a sincere and heartfelt thank you to all of you who have committed your time and energy to this process. Your cooperation has yielded truly unique and valuable information. You should take pride in being a part of something important – something that has benefited and will continue to benefit the public and scientific community now and for many years to come.

How you can reach us

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 Epidemiology, PO Box 30195, Lansing, MI 48909. Questions or comments can also be e-mailed to: Deguirep@state.mi.us.