APPENDIX

PCBs: A STUDY OF BREAST CANCER AMONG WORKERS FROM THREE MANUFACTURING PLANTS

Overview

The National Institute for Occupational Safety and Health (NIOSH) is a government agency that strives to improve worker health and safety. At NIOSH, we studied the risk of breast cancer associated with exposure to polychlorinated biphenyls (PCBs) among female workers from three capacitor manufacturing plants. These plants were located in:

- New Bedford, Massachusetts
- Hudson Falls, New York
- Bloomington, Indiana

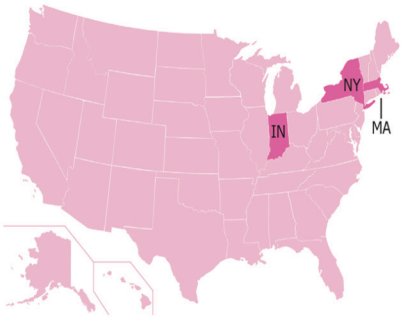

Figure 1: States where manufacturing plants were located.

Overall, we found no increased risk of breast cancer among these workers compared to women in the general population. This is consistent with what other studies have found. However, we did find that the more PCBs the nonwhite female workers were exposed to, the more their risk of breast cancer increased.

This fact sheet contains health information that may be important to you. Our records indicate you, or a relative of yours, worked at one of these manufacturing plants during the time when PCBs were used in the production process.

Background about PCBs

PCBs, also known as dielectric fluid, are oily and clear to light-yellow in color. They have no smell or taste and were used for many commercial purposes. At these manufacturing plants, PCBs were used in capacitors because they do not burn easily and hold an electrical charge well.

The main sources of PCBs were the metal capacitor boxes that were made at the plants. In a heated vacuum chamber, the capacitor boxes were filled with PCB and then welded shut. Any spilled PCB was washed off each box and the unit was sent to quality control for testing.

Workplace PCB exposure can happen if the chemicals are:

- Absorbed (absorbs quickly through skin; high level exposure can cause skin conditions, such as acne or rashes)
- Breathed in (when heated, more vaporizes into the air)
- Ingested (if hands are not washed properly before eating)

Why we did this study

In 1977, PCBs were banned in the United States because they were found to harm the environment. Many studies have found PCBs may also be bad for our health. Some laboratory tests have found PCBs may affect our hormones. Some of these hormones are related to breast cancer.

We did this study to see if working with PCBs could increase a woman's chance of getting breast cancer. We wanted to know if women who worked at these plants for at least a year had a higher risk of breast cancer than women in the general public. We also wanted to know if female workers exposed to more PCBs were more likely to have breast cancer than those exposed to less.

APPENDIX (Cont'd.)

How we did the study

Using work site records, we found 5,752 women worked at these plants for a year or more (5,390 white and 362 nonwhite).We determined the number of female workers with breast cancer by using a health survey, which we sent to female workers and family members of deceased workers. We also searched death certificates and state cancer registries (Indiana, Massachusetts, and New York, as well as California and Florida, which are common retirement destinations).

Worker PCB exposure was not measured regularly, so we don't know exactly how much PCB each person was exposed to. We estimated PCB exposure for each worker based on work history data. This included worker job titles and descriptions, length of employment, plant layouts, and general air samples that were taken in the 1970s. For each worker, we accounted for all jobs worked while at the plant. For each job, we accounted for the time period and the length of time in each job. From this, we estimated the overall PCB exposure for each worker.

What we found

We received 3,141 completed surveys (80% were from workers, 20% were from families of deceased workers). Of those who filled out the surveys, we found 145 women from these plants have or had breast cancer before 1999; 131 women were white and 14 women were nonwhite (see figure 2). "Nonwhite" included women who said their racial background was something other than white (Caucasian), such as: multi-racial, African American, Portuguese (Cape Verdean), and others.

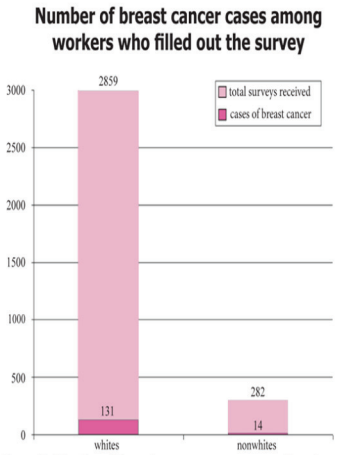

Figure 2: Number of breast cancer cases among all workers (white and nonwhite) for whom surveys were recieved

When we compared the number of breast cancer cases among workers of all races from these three plants to what would be expected in the general public, there was no increase in breast cancer risk.

When we separated the data by race, we found the more PCBs the nonwhite workers were exposed to, the more their risk of breast cancer increased. This finding is based on a small number of cases; more research is needed to confirm this. Most of the nonwhite women worked at the Massachusetts plant. The women from the Massachusetts plant had higher PCB exposure than the women who worked at the plants in New York and Indiana. The differences in exposure are likely due to differences in the work and housekeeping practices and the dielectric fluid used.

We did not see an increased risk in breast cancer with increasing PCBs exposure among the white women.

APPENDIX (Cont'd.)

What you should do

Women from these plants should follow American Cancer Society and National Cancer Institute recommendations and continue doing regular breast self-exams and getting mammograms. These are routine practices that all women should do. Breast cancer is caused by many things and is most treatable when found early.

See the enclosed step-by-step information to learn how to do a breast self-exam.

If you have questions or concerns about breast cancer, talk with your doctor. He or she can tell you about other routine tests, such as clinical breast exams.

If you have questions about this study, please call 1-800-CDC-INFO (1-800-232-4636).

What we are doing next

We are planning a study to see if workers from these same three plants have a higher risk of developing other types of cancers when compared to men and women from the general public. This will help determine if a link exists between PCB exposure and certain cancers. It will be different from other studies done over the years because it will use cancer registry data and will look at all types of cancer.

Additional information

PCB levels in the body decrease over time. If you were exposed many years ago, your current levels may not be any different from those of the general public. Most people have low levels of PCBs in their body from environmental exposures.

Many of the state health departments have done studies on PCBs in the environment and in communities. If you would like to learn more about these studies, contact your state health department:

- Indiana State Department of Health: call (317) 232-3413 or visit www.in.gov/isdh.
- Massachusetts Office of Health and Human Services: call (617) 624-5757 or visit www.mass.gov and search "Environmental Health Investigations."
- New York State Department of Health: call 1-800-458-1158 or visit www.health.state.ny.us/environmental/pcb/index.htm.

For more information about how you can prevent breast cancer, contact:

- The National Cancer Institute at 1-800-4-CANCER or visit www.cancer.gov/cancertopics/wyntk/breast/page1.
- The American Cancer Society at 1-800-ACS-2345 or visit www.cancer.org/.

Centers for Disease Control and Prevention (CDC) is the federal agency that promotes health and quality of life by preventing and controlling disease, injury, and disability. NIOSH is part of the CDC. To learn more, visit www.cdc.gov/niosh or call 1-800-CDC-INFO.