ATSDR
Agency for Toxic Substances and Disease Registry

Community Questions and Answers on PCB Contamination and Health

Orote Landfill Site, Guam

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1. How do PCBs enter and leave the body?

For most people who do not work with polychlorinated biphenyls (PCBs), consumption of PCB-contaminated fish, meats, eggs, and dairy products is the most common and significant sources of human exposure to PCBs (ATSDR 2000).

PCB Exposure

- For most people, PCBs enter their bodies primarily through the fish, meats, and milk they eat. Blood sampling is a simple and effective way to measure exposure.
- PCB soil levels are poor indicators of levels possibly present in the body.

PCBs that are swallowed are passed from the gastrointestinal tract into the bloodstream. Once PCBs are in the body, some change into other related chemicals called metabolites and some leave the body in feces in a few days. The remaining PCBs and metabolites stay in the body and can be stored for years mainly in the body fatty tissue. PCBs also accumulate in human milk fat (ATSDR 2000).

Everyone has some amount of PCBs in their body through environmental exposures worldwide. Since PCBs are so widespread, don't break down easily in the environment, and can accumulate in people, they have been heavily studied.

2. What are the health effects from PCB exposure?

From the thousands of PCB studies conducted since the 1960s, the effect of low-level exposures to PCBs on human health remain inconclusive. Most of the human studies have many limitations that make it difficult to establish a clear association between PCB exposure and health effects.

PCB Exposure & Human Health Effects

- **Skin Effects**: Effects seen from over-exposure in occupational settings include chloracne, hyperpigmentation of the nails & skin, and skin irritation. These symptoms generally disappear when PCB exposure stops (ATSDR 2000).
- **Developmental Effects:** There are no reports of structural birth defects in humans caused by PCB exposure. Several recent studies suggested that children born to mothers who ate PCB-contaminated fish during their pregnancies may have had an increased risk of developing subtle (i.e., not easily observable) nervous system delays (e.g., abnormal reflexes, motor immaturity, deficits in memory, learning, and IQ), which in some cases persisted into adolescence, but returned to normal in most cases within the first 2-4 years. These effects were only seen when large populations were studied and tended to be within the normal range of variation. The clinical relevance of these effects, particularly for individual children, is unknown. Other studies, however, did not find these associations and any changes that were observed disappeared upon later study (ATSDR 2000).
- **Cancers:** *Some human studies provide suggestive evidence that PCBs are carcinogenic based on indications of PCB-related cancer in areas such as the liver, biliary tract, intestines, and skin (ATSDR 2000).* Studies have shown that animals exposed to high levels of PCBs over their lifetimes developed liver and kidney tumors (ATSDR 2000). On the basis of the observed cancer in animals, the Department of Health and Human Services concluded that PCBs might reasonably be anticipated to be carcinogens (ATSDR 2000). Both the U.S. Environmental Protection Agency and the International Agency for Research on Cancer have determined that PCBs are probably carcinogenic to humans (ATSDR 2000). *This designation means that a clear cause-and-effect relationship has not been established in humans but there is sufficient evidence to take precautions about exposure to this chemical. ATSDR continues to support recommendations by health and regulatory agencies to reduce exposure to PCBs.*

3. *Is there a medical test to determine if a person has been exposed to PCBs?*

Yes, there are tests that measure PCB levels in the blood, fat tissue, and breast milk. Blood tests are the safest and easiest method for detecting PCB exposure. These tests only indicate whether someone was exposed to a greater extent than the general population. They cannot determine the type and amount of PCB, how long someone was exposed, or whether they will become ill. Therefore, they do not assist physicians in providing better treatment. Measuring the level of a chemical is different from establishing its effects. Everybody will have some detectable amount of PCBs in their blood, fat, and breast milk. The medical significance of detectable blood PCB levels is unclear.

Who Should Be Tested?

ATSDR generally recommends testing people who likely have had the greatest exposures or contact (highest concentrations, most frequency, longest time). Those people would likely have significantly out-of-normal range blood PCB levels and could use blood tests to determine if changing their habits could reduce their levels. However, it is important to remember that *the information from blood testing does not provide information about health effects.*

For between $300 to $1,000, individuals can pay to have their blood drawn and sent off island for analysis. Test results can take anywhere from 1 to 3 months and should be reviewed and interpreted by physicians with experience in occupational and environmental medicine. Interested individuals can contact Guam Public Health for more information.

4. *What will happen to people who don't get a medical test and is there treatment available for PCB exposure?*

Regardless of whether or not a person has a medical test, the recommendations are the same. Determine if hazardous environmental exposures are likely; if so, find outfrom what source and reduce exposure to that source(s). For example, it can help to determine whether or not fish advisories should be in place and what types of education or risk management decisions are needed to communicate information on: fish species that can safely be consumed, changing diets, and the preparation of foods (e.g, not eating the entire fish, trimming fat).

At this time there is no treatment for PCB exposure. People with high levels should have a careful exposure history taken and increase efforts to identify and eliminate any current sources of PCB exposure.

5. *Is it safe to eat fish?*

The Navy, Guam EPA, and Guam Public Health have recommended a temporary seafood consumption advisory on seafood caught near Orote Point until more testing is done. Preliminary fish sampling results showed elevated levels of PCBs, pesticides, and some metals, thus prompting the advisory. The Navy is performing more species-specific sampling and will ask community members questions on the types and amount of fish eaten. Since fish is a healthy, nutritious food and is an important part of the diet of the people of Guam, ATSDR is working with Guam EPA, Guam Public Health, and the Navy to determine where fish can be harvested and which fish (or portions of fish)

Reducing Exposure from Fish

Families can do many things to reduce the possibility of exposure to PCBs from fish and shellfish:

- Select younger, smaller fish.
- Remove the skin and fatty tissue in the belly and along the sides.
- Bake or broil the fish, and throw away the fatty juices and drippings (PCBs are in the fat).
- Avoid eating the liver and other internal organs of the fish.

can be consumed.

6. If I have been exposed to PCBs:

- **Can I have children?**

Regardless of PCB exposure, a health care provider should be consulted before making this decision.

There have been no studies that report structural birth defects as a result of PCB exposure (ATSDR 2000). Studies of highly exposed workers suggest a slight effect on birth weight and gestational age (Kimbrough 1995). PCBs are believed to play a role in neurological development, but the changes are subtle (ATSDR 2000). Human studies provide some evidence of effects on the immune system in infants exposed to PCBs *in utero* and/or via breast milk that might make them more susceptible to infections. *However, this evidence is limited because of mixed chemical exposures and insufficient information on exposure-response relationships (ATSDR 2000).*

- ***Can I breast-feed?***

PCBs detected in breast milk (or blood) are not necessarily an indication that breast-feeding should be stopped (ATSDR 1990). Benefits of breast-feeding can include fewer ear infections, higher immunity from diseases, and improved nutrition. In most cases, the benefits of breast-feeding probably outweigh any potential risks (ATSDR 2000).

- ***Should my physician monitor my children for neurodevelopmental delays?***

Physicians should monitor children for the usual developmental parameters and do not need to change their practices.

- ***Should my physician monitor me for cancer?***

Physicians should monitor people as usual and don't need to change their practices.

References:

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Kimbrough, RD. Polychlorinated biphenyls (PCBs) and human health: an update, critical reviews in toxicology. 25(2):133-163, 1995.

About ATSDR and How To Contact Us

The Agency for Toxic Substances and Disease Registry is a non-regulatory federal public health service agency. ATSDR is part of the Public Health Service in the U.S. Department of Health and Human Services. Created by 1980 Superfund Legislation, ATSDR evaluates human exposure to hazardous substances released into the environment and makes recommendations to stop or prevent such exposure to protect the public's health.

You can call ATSDR's toll-free number at 888-42ATSDR or 888-422-8737. Visit ATSDR on the web at http://www.atsdr.cdc.gov

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