ATSDR

Agency for Toxic Substances and Disease Registry

Community Questions and Answers on PCB Contamination and Health

Agana Power Plant, 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 source of human exposure to PCBs (ATSDR 2000).

PCB Exposure

- People can be exposed to PCBs from swallowing contaminated food or soil, breathing dust or air containing PCBs, drinking contaminated water, or absorbing PCBs through the skin.
- For most people, PCBs enter their bodies primarily through the fish, meats, and milk they eat.
- PCB soil levels are a poor indicator of levels possibly present in the body. Blood sampling is a simple and effective way to measure the level of exposure.

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 effects 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 overexposure 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 might 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 out from what source and reduce exposure to that source(s). 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?*

PCBs and other chemicals have been found in the fish and snails in the Agana Swamp. ATSDR evaluated the amount of people's exposure to PCBs from eating fish and shellfish over many years. Based on a review of health-related information on PCBs, ATSDR concludes that the PCB exposure from eating those foods is too low to result in harmful health effects, even to the most sensitive groups such as children.

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.

However, bacterial contamination has been detected in Agana Swamp and reported in the Agana Springs since the 1960s, therefore, bacterial contamination of fish is possible. If people choose to eat the fish and other foods, thoroughly cooking it might help to reduce the hazards. People should not eat aquatic snails unless they are thoroughly cooked to kill the parasites in them. However, handling raw, infected fish with open wounds and cuts might increase infection risk.

6. *Will people get sick from PCB exposure by playing in the dirt from runoff ditches and from gardening?*

No. For most people, PCBs enter their bodies primarily through the foods they eat. Contact with contaminated soils is unlikely to be an important contributory source to an individual's total body burden. In fact, studies of people living in the areas of PCB-contaminated soil have not demonstra adverse health effects that could be attributed to PCBs (ATSDR 2000).

Reducing the Possibility of Exposure

It is a good idea to wash hands before eating or touching one's face. It is also good to clean one's feet or leave one's shoes outside before coming into the house. To reduce the possibility of exposure to soil contamination, children should avoid areas marked as hazardous and avoid touching stained, oily soils.

Relatively low levels of PCBs and other contaminants were found in the soil samples that were tested both on the Agana Power Plant property and in run-off areas. From the data and information reviewed, it does not appear that large, highly concentrated PCB or other chemical spills occurred. Therefore, in the past, PCBs and other chemicals in soil were also expected to be low. Because of these low levels, adverse health effects from human exposure to chemical contamination are not expected.

7. If I swim or wade in the Agana Swamp and River, will I get sick from PCB exposure?

Since PCBs don't easily dissolve in water and would have been diluted by the large volume of water in the swamp, touching the water likely would not have posed a chemical health hazard. However, biological contamination in the swamp has been documented by the U.S. Geological Service (USGS) since the 1960s. Therefore, swimming or wading with open cuts or wounds might increase the likelihood of an infection.

8. 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 affect 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:

Agency for Toxic Substances and Disease Registry. Toxicological profile for polychlorinated biphenyls (PCBs) (update). Atlanta: US Department of Health and Human Services; 2000 Apr.

Agency for Toxic Substances and Disease Registry. Polychlorinated biphenyls (PCBs) toxicity, case studies in environmental medicine. Atlanta: US Department of Health and Human Services; 1990.

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 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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