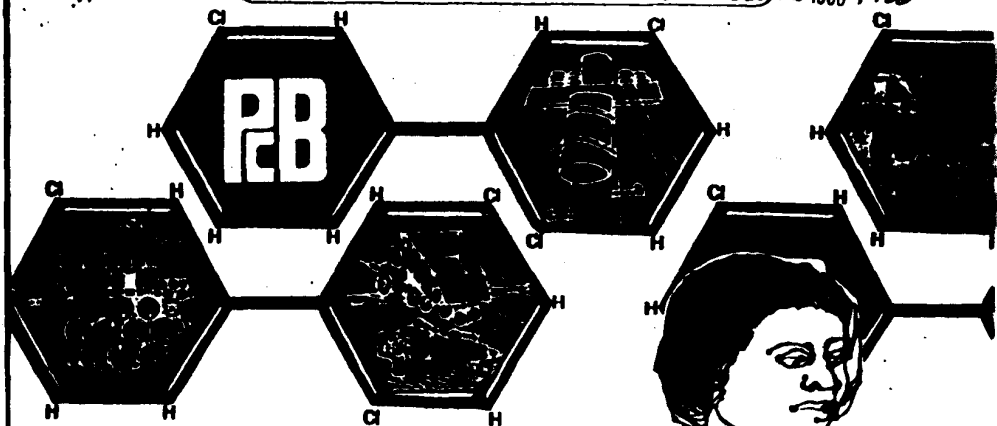




Breast milk, our species' nutritional link with the newborn, is polluted.

That news came as a shock back in 1976 when toxic industrial chemicals were found in virtually all samples of mothers' milk tested by the Environmental Protection Agency (EPA). Polychlorinated biphenyls—the notorious PCBs—had seeped into our food chain and in a scant half-century become an extraordinarily widespread chemical contaminant.

To environmentalists, nutritionists, and progressive health advocates this news was a devastating blow. Just as America was weaning itself off bottle-feeding and artificial supplements, the purity of the "ideal food" seemed seriously compromised.

The public learned that PCBs—shown to cause cancer in laboratory rats and mice—were widespread in the natural environment. Air, water, soil, plants, and animals were all touched. Coincidentally, a study from the University of Wisconsin Primate Research Center reported that offspring of monkeys nursed with PCB-laden milk exhibited skin disorders, showed signs of hyperactivity, and appeared to have learning deficiencies. Within a year, three of the six infant monkeys had died.

The public outcry then, as now, was one of anger mixed with frustration. No woman can quickly or totally cleanse her system of this toxic industrial product. Nor can she totally avoid ingesting some amount of the substance from the food she eats.

People slowly realized that future generations were destined to be chemically "branded" with one of the most toxic and persistent synthetic chemicals ever invented. The PCB tragedy became the classic example of what happens when toxic chemicals are let loose in the environment without strict governmental controls.

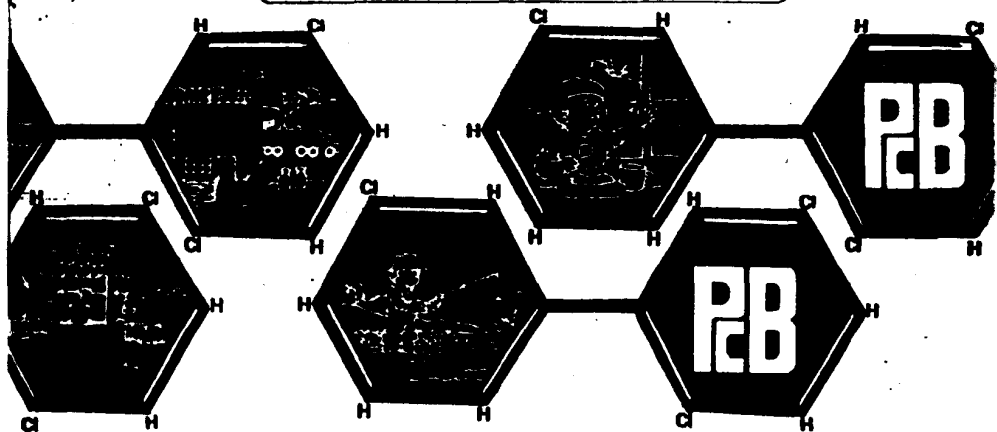
But the possible consequences of PCBs' effects are compounded for infants who breast-feed. Research has shown that breast-feeding tends to pass on higher concentrations of PCBs and other toxins than had existed in the mother. As a woman lactates, she draws on nutrients



PCBs and Breast Milk

Mothers Reconsider Choice of Nursing Over Bottled Formulas Given PCB Threat

By Marcella R. Mosher
and Greg Moyer



stored in her fatty tissue. And it is in these cells where the pollutant accumulates.

Once the PCBs get into the blood, they quickly find their way into the mother's milk. Ironically, one of the best methods for excreting the poisons is through breast milk.

The Wisconsin primate study showed that it took only three months for the breast-fed monkeys to reach the contamination level of their mothers. By the end of the lactation period, the levels in the babies had far exceeded the levels of the mothers.

Aware of this new scientific information, parents are put in the position of gambling with their infant's well-being. A mother can elect to breast-feed given the ample nutritional, sensory, and psychological benefits, but risk exposing her baby to higher levels of PCBs. Or she can opt for bottle-feeding and settle for the lower nutritional content of the supplements in order to guard the infant from the toxins.

How Did It Happen?

PCBs belong to a group of chemicals known as chlorinated hydrocarbons. This highly stable organic compound arrived on the scene in 1927 when Theodore Swann, of the Federal Phosphorus Company, first used biphenyl in the refining of lubricating oils. Two years later, Swann invented polychlorinated biphenyls and sold the process to the Monsanto Company.

Since 1939, 1.25 billion pounds of the stuff have been manufactured for use in this country. Over half of all PCBs ever made are still in use, though the 1976 Toxic Substances Control Act allowed EPA to order all further production halted. About 90 percent of the rest lies in dumps, landfills, soil, water, and living organisms. The EPA estimates that about 10 million pounds contaminate the biosystem each year through seepage, spills, and evaporation. For years PCBs were routinely discharged into rivers, streams, and sewers.

In its 50-year history, industry has found no shortage of uses for this versatile material. It burns only at very high

temperatures, conducts heat well, refuses to dissolve in water, and resists corrosive chemicals. Only in fats will the PCB molecule enter solution. The compound has been used in everything from transformers and power capacitors, adhesives, washable wall coverings, upholstering materials, and flameproofers to early versions of carbon-less copy paper.

PCBs are actually many times more toxic and much slower to break down into less harmful forms than the better known insecticide pollutants: DDT, chlordane, dieldrin, and mirex. The toxic effect of the biphenyls was first seen in 1943 among workers handling electrical equipment who had developed skin lesions and liver damage. In 1966, PCBs were found in birds in Sweden.

PCBs created more headlines in the early 1970s when striped bass caught in the Hudson River near New York City registered dangerously high concentrations. By 1974, the U.S. Department of Interior's Fish and Wildlife Service identified PCBs in 90.2 percent of freshwater fish sampled across the entire United States.

Each step up the food chain tends to concentrate the toxins. This process is known as "bio-accumulation." For example, fish have been discovered with PCB levels many million times that of their watery environment. Also, cow's milk contains a much higher PCB level than the corn on which the animal feeds. Breast-feeding, in effect, sends bio-accumulation into overdrive.

Who Are the Victims?

It falls to the tiniest and weakest members of the human race to withstand the greatest concentrations of PCBs. The studies of Dr. James Allen, formerly of the Wisconsin Primate Center, and new research detailing the transfer of PCBs through breast milk underscore the dangers for the newborn in a post-PCB world.

But another category of victims include those people exposed by accident or through occupation to unusually high dosages of PCBs. The real life experience of a Japa-

Regulators Mum on Risks

In its report to the nation, the Surgeon General's *Healthy People* barely acknowledges the PCB threat in mother's milk while endorsing breast-feeding. Chapters on healthy infants, pregnancy, and infant care make no mention of the trade-offs and risks of breast-feeding.

Only in a chapter on toxic substances is there a brief description of the PCB problem. It concludes: "PCBs have been found in tissues of humans and in the milk of nursing mothers. When fed experimentally to nursing monkeys, PCBs have led to serious injury of offspring." Period. No recommendations. No advisories.

When contacted, a spokesperson in the Surgeon General's Office said that stronger warnings were not appropriate until other agencies in the government take a firm position on the matter.

We suggest, instead, that the risks be aired and serious studies begin immediately.

nese community serves as a frightening example of the awesome power packed in this toxin.

In 1968, residents on the Japanese island of Kyushu unwittingly ate large amounts of PCBs when a cooling pipe leaked into a vat of rice oil at a food processing plant. The level of contamination (2000 to 3000 parts per million) reached 200 times what is considered safe by the U.S. Food and Drug Administration. Officially, 1,291 people contracted the "rice oil disease" characterized by acne-like rashes, headaches, nausea, diarrhea, loss of hair, loss of libido, fatigue, numbness, and menstrual disturbances.

Thirteen children were born to PCB-exposed women. One fetus was stillborn, four were small for gestational age, ten had dark skin pigmentation, four had pigmented gums, nine had conjunctivitis (inflammation of the membrane around the eye), and eight had neonatal jaundice. Nine years after the accident, a follow-up study of some of the children breast-fed by exposed mothers showed "slight but clinically important neurological and developmental impairment," according to a report of the research prepared by Dr. Walter J. Rogan of the National Institute of Environmental Health Sciences, and others.

Allen's rhesus monkeys fared little better. His research involved feeding controlled amounts of PCBs to female monkeys. Their offspring exhibited the same skin disorders as the victims of the "rice oil disease." The baby monkeys failed to make the developmental progress shown by the control group and several died at an early age.

A study led by Dr. Hirokazu Kodama of Nagoya, Japan, finds comparable effects in humans. He discovered that mothers with average exposure to PCBs are still likely to pass on levels higher than their own to nursing offspring thanks to bio-accumulation.

Still, some researchers caution against making direct comparisons between monkeys and humans, because the monkeys have less subcutaneous fat in which to store the PCBs. In the animals, the toxins assault the vital organs

more quickly. But with this caveat in mind, one can compare the levels of PCBs ingested by a nursing infant and those which were shown to affect the health of the monkeys.

PCB Contamination in Breast Milk

Subject	Toxins in milk	Contamination by weight*
Monkey	16 ppm PCBs on a fat basis. (Toxicological effect observed at Wisconsin Primate Center)	64 micrograms of PCB per kilogram of body weight.
Infant (human)	1.8 ppm PCBs on a fat basis. (EPA national average)	10 micrograms of PCB per kilogram of body weight.
Infant (human)	10.6 ppm PCBs on a fat basis. (Worst case uncovered by EPA study)	60 micrograms of PCBs per kilogram of body weight.

*These figures are based on the assumption that baby monkeys weighed 200 grams and drank 100 cubic centimeters (cc) milk per day, while human babies weighed six kilograms and drank 1,000 cc milk per day.

Data drawn from Harris, "Health Risks and Benefits of Nursing or Bottle-feeding: The Limits of Choice," a chapter in the forthcoming book, *Strategies for Public Health*.

The average exposure infants receive when adjusted for body weight is one-sixth that shown to adversely affect the baby monkey's health. In the worst case found by EPA's nationwide sampling, a human infant was receiving virtually the same dose as the monkey. Normally, regulatory agencies use a safety factor of 100 to set a "safe" standard for humans based on the results of the animal studies. Here, the concentrations are on the same order of magnitude, if not actually equivalent when translated to the common denominator of micrograms per kilogram of body weight.

The EPA figures are shocking in another sense: the average levels of PCBs in human breast milk is seven times higher than the amount permitted in cow's milk by the Food and Drug Administration. And it is about ten times what the FDA recommends as an acceptable daily allowance for infants.

In a telephone interview, Allen underscored the need for parents and the pediatrician to know about the physiological changes that may be occurring in infants exposed to high levels of PCBs. He said autopsies of the monkeys indicated abnormalities of the lymph system, bone marrow, thymus, and cortex. In short, he saw irregularities in some of the organs most important to normal growth and development.

Despite these ominous signs, Allen does not suggest women return to bottle-feeding their babies: "The values of breast-feeding outweigh the deleterious effects," he said. "I would advise my wife to breast-feed unless we lived in an area of high exposure to PCBs."