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THE NEW BEDFORD PCB STUDY - PRELIMINARY FINDINGS

Last November, in cooperation with the New Bedford Health Department, the Department of Public Health enlisted volunteers for a pilot study of the health effects of exposure to polychlorinated biphenyls (PCB's).

PCB's are the chlorinated derivatives of a class of aromatic organic compounds called biphenyls. PCB's used in commercial products are colorless, odorless liquids containing mixtures of chlorobiphenyls. The chlorine content generally ranges up to 68 percent. PCB's, because of their thermal and chemical stability and low electrical conductivity found use in a number of applications as coolant insulation fluids in electrical transformers and capacitors, plasticizers in paints and plastics, and as a component of carbonless paper. Unfortunately, the same characteristics which make PCB's commercially useful are precisely those which lead to environmental accumulation in the food chain with concomitant adverse implications for public health and the environment.

The findings of this study must be interpreted cautiously for several reasons. Since the persons studied were volunteers, many of whom had known exposure to PCB's, no conclusions as to the PCB levels in the general population of New Bedford can be made. This question could be answered only by studying a

random sample of New Bedford residents. The number of subjects studied was only 51 so that it is difficult to control for confounding variables such as age or weight.

The group studied completed a health questionaire, including history of occupational exposure and of eating seafood taken from the Acushnet River. Each participant received a brief physical examination and gave blood and urine for laboratory examinations. Analyses of the blood for PCB levels were performed by the Centers for Disease Control.

The PCB serum levels are summarized in Table 1. Because there were three persons with levels greater than 100 ppb, the median is a more accurate summary statistic than the mean. PCB levels >30 ppb were found in 16 persons. The highest levels were among those with long term occupational exposure. Nine of the 16 above 30 ppb had received occupational exposure. (Table 2). The remainder had frequently eaten fish or eels caught in the Acushnet River. (Table 3). It has been reported that New Bedford sewage contains PCB's. The wastewater treatment plant workers did not have elevated PCB levels. (Table 2).

The health data are difficult to interpret because of the small number of people studied. There was a weak association between PCB levels and blood pressure in persons less than 45 years, but some or all of this may be due to age, since older persons had higher PCB levels. (Table 4).

There was no correlation between PCB level and liver size or level of serum glutamic - oxaloacetic transaminase (SGOT), a non-specific liver function test. There was a positive correlation between PCB levels and triglycerides, a finding which has been observed in other studies. Ten persons reported acne but none specified chloracne.

In summary, the highest PCB levels were found in occupationally exposed persons, there was no evidence of a relationship between PCB and liver disease,

a slight PCB level association with hypertension, and no greater than expected numbers of chronic conditions.

Since there is no therapy to reduce serum PCB levels, the Department of Public Health recommends that New Bedford residents abstain from eating seafood taken from the Acushnet River. There has been no occupational exposure to PCB's since 1977, when all use of PCB's in New Bedford ceased.

TABLE 1

SUMMARY OF PCB RESULTS

	MALES	FEMALES	ALL SUBJECTS
Number	39	12	51
Average Level (ppb)	41.7	18.5	36.2
Median Level (ppb)	17	9	15
Range (ppb)	2-343	4-64	2-343
N (%) ≥30 ppb	13 (33%)	3 (25%)	16 (31%)
N (%) ≥100 ppb	3 (8%)	0 (0%)	3 (6%)

TABLE 2

SUMMARY OF PCB LEVELS AMONG SPECIFIC OCCUPATIONAL GROUPS

	ELECTRICAL CAPACITOR MANUFACTURING	NEW BEDFORD WASTE WATER TREATMENT PLANT
Number	9	10
Average Level (ppb)	126	13
Median Level (ppb)	68	10
N (%) ≥30 ppb	9 (100%)	1* (10%)
Average Length (years) of employment (range)	22 (5-38)	5 (1-9)
Range	41-343	6-41

*Worked both capacitor manufacturing plant and waste water treatment plant.

TABLE 3

SUMMARY OF PCB LEVELS AMONG THOSE REPORTING EVER/NEVER EATING SEAFOOD FROM THE ACUSHNET RIVER (EXCLUDING THOSE WITH LONG-TERM OCCUPATIONAL EXPOSURE)

	REPORTED EATING ACUSHNET RIVER SEAFOOD	REPORTED NEVER EATING ACUSHNET RIVER SEAFOOD
Number*	26	14
Average PCB Level (ppb)	21	12
Median PCB Level (ppb)	15	10.5
Range (ppb)	6-68	2-32
N (%) ≥ 30 ppb	6 (23%)	1 (7%)
N (%) ≥ 15 ppb	14 (54%)	4 (28%)

*2 persons did not respond to the question. Both had PCB levels of 6 ppb.

TABLE 4

RELATIONSHIP BETWEEN PCB LEVELS AND HYPERTENSION

<45 Years of Age

	HYPERTENSION CATEGORIES			
	NORMAL	BORDERLINE	DEFINITE	ALL SUBJECTS
Number	17	4	5	26
Average PCB Level	11	19	30	16
Median PCB Level	9	12	18	10
N (%) ≥30 ppb	0 (0%)	1 (25%)	2 (40%)	3 (12%)

>45 Years of Age

	NORMAL	BORDERLINE	DEFINITE	ALL SUBJECTS
Number	9	10	5	24
Average PCB Level	78	52	41	60
Median PCB Level	42	16	41	32
N (%) ≥30 ppb	6 (67%)	3 (30%)	4 (80%)	13 (54%)

NORMAL - Systolic <140 mm, Diastolic <90 mm

BORDERLINE - Systolic 140-159 mm or Diastolic 90-94 mm

DEFINITE - Systolic ≥160 mm or Diastolic ≥95 mm