

DDT exposure early in life increases breast cancer risk

For many years the debate on whether or not DDT increases the rates of breast cancer have been raging. There are probably at least one hundred studies that have been published on the topic, some of which show a positive association and some that do not. Back in the 1980s Mary Wolff published a study showing that serum levels of DDT and PCB were predictive of breast cancer development. This was very intriguing and if confirmed would have given women a wonderful means of risk detection as well as a definite course of evasive action. Unfortunately, subsequent studies failed to confirm her research. But, amidst the negative studies on the topic, positive studies (studies showing a positive association continue to crop up.

In an upcoming article in Environmental Health Perspectives a group of researchers, including Mary Wolff, have relooked at data on women exposed to DDT and whose blood was collected between 1959 and 1967. They found that women who had exposure to relatively high levels of DDT prior to mid-adolescence were 5 times more likely to develop breast cancer later in life than women with lower exposures. Interestingly, they found that exposure to DDT after adolescence did not increase risk. The median time to diagnosis of breast cancer after the sample was taken was 17 years. Fortunately, high levels of DDT exposure are much harder to come by today than they were when these women had their blood tested. But, DDT use has been increased in recent times for fighting malaria in certain African countries, where many still die from the disease. Many US women who were heavily exposed to DDT in childhood have not yet reached the age of 50, when this risk would be made manifest. According to the scientists who conducted the study, "the public health significance of DDT exposure in early life may be large.

If you are concerned about this it is possible to have your blood tested for DDT and its metabolite DDE. Accu Chem labs in Richardson, Texas have been doing this testing for years, and is the lab that I have used in my practice for the last 25 years. For the pdf of the entire article go to: <http://www.ehponline.org/members/2007/10260/10260.pdf>

Cohn et al. analyzed DDT levels in blood that had been collected between 1959 and 1967 as part of a prospective study. The samples were obtained during the period when DDT in the US was near its peak use (1959) and near the peak of DDT contamination in food (1965). The subjects all participated voluntarily. According to Cohn et al., "this is the first study to measure blood levels in young adulthood (mean age of 26 years). Prior studies collected blood when women were of middle age or much older." It is also "the first study specifically designed, a priori, to consider whether age at exposure may modify DDT effects on breast cancer." Their approach rests on the fact that because DDT was first widely introduced in the US in 1945, a woman's age in 1945 is an indicator of the youngest possible age at which a woman could have been exposed to DDT. Women who reached puberty before 1945 could not have been exposed to the pesticide during development up to puberty. Health records of the women whose blood had been stored were obtained from the California Cancer Registry and the California Vital Status Records. They assigned women to the 'case group' if they were diagnosed with breast cancer before age 50 or if they had died because of breast cancer before age 50, based on data available in early 1998. Of the women whose blood was stored, 133 met those criteria. The analysis was based on 129 cases, paired with controls matched on year of birth. The excluded cases could not be used because of insufficient serum or missing data. They measured three forms of DDT: p,p'-DDT, o,p'-DDT, and p,p'-DDE. Their main focus was on p,p'-DDT because it was the main constituent of commercial grade DDT. Prior studies have typically focused on the DDT metabolite p,p'-DDE because it is the most persistent and thus most likely to be detectable in women long after exposure.

In their first test of the association between breast cancer risk and DDT exposure, the divided the women into 3 groups based on DDT exposure level, the lowest third of exposure, the middle third and the highest third (called tertials). To test their hypothesis that age of exposure influences the effect of DDT on breast cancer risk, they tested whether age in 1945 changed the strength of associations between p,p'-DDT and breast cancer. They divided the women into 4 groups depending upon their age in 1945: younger than 4 years old, 4-7, 8-13 and >13. They then estimated odds ratios for each of these groups. What did they find? They detected p,p'-DDT and p,p'-DDE in all subjects, while 65% had measureable levels of o,p'-DDT. As could be expected, the levels of p,p'-DDT and p,p'-DDE were 'considerably higher' than in samples obtained a decade or more later. First pooling women of all ages, women in the highest exposure group for p,p'-DDT were 2.9 times more likely to have breast cancer. This increased odds ratio was statistically significant (p < 0.04). Women in the highest exposure group for o,p'-DDT had a decreased risk of breast cancer (p < 0.02). o,p'-DDT is the least persistent of the DDT compounds studied; its presence indicates recent exposure.

When they examined the influence of age of exposure on the strength of association between breast cancer risk and DDT exposure, they found that women exposed before the age of 14 with the highest levels of exposure were 5.4 times more likely to have breast cancer (p < 0.01). In contrast, in women who were at least 14 by 1945, there was no relationship between exposure level and breast cancer risk. In another analysis of the same data, looking at the odds ratios of the highest tertial of exposure as a function of which of the [four age groups](#) the women were in, they found a significant inverse relationship between age and breast cancer risk. Those exposed at the youngest age had the highest breast cancer risk (p < 0.01). What does it mean? This study provides the strongest data to date linking exposure to DDT to an increased risk of breast cancer. Women under that age of 14 when DDT came into widespread DDT use in the US have a 5-fold increase in risk of breast cancer if they are within the high exposure group. No relationship is apparent for women 14 or older. This is the first epidemiological study to test for the possible effect of age of exposure as an influence on risk, a hypothesis amply justified by experiments with animals. The conclusions are strengthened by the fact that this is a prospective study designed explicitly (a priori) to test that

hypothesis. The opposite effects of p,p'-DDT (increasing risk) and o,p'-DDT (decreasing risk) cannot be explained with current knowledge. As noted above, it is the least persistent DDT metabolite, which indicates recent, active exposure to DDT. Cohn et al. suggest that this may mean the strong, adverse effects of p,p'-DDT reflect longer, younger exposure because it is more persistent in the human body. They also note that p,p'-DDT levels were higher, on average, than o,p'-DDT. In their assessment of how DDT may be increasing risk, they note that p,p'-DDT is not known to be estrogenic nor anti-androgenic. Hence they don't believe that the association they find is due to estrogenic or androgenic activity. They also note that their sample size is small, even though the statistical analysis reports a strongly significant effects for p,p'-DDT. Their conclusion is carefully worded: "It is too soon to decide that DDT exposure has little public health exposure for breast cancer risk. We based this conclusion on 1) the long latency of possible effects on breast cancer, 2) the large numbers of women exposed worldwide, and 3) the evidence that we provide here which suggests that women exposed when young may be most strongly affected." And they note "the public health significance of DDT exposure is potentially large."

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