BREAKING NEWS: Higher Chemical Exposure Associated With Lower Occurrence of Diabetes

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You haven't seen this actual headline published, but it would be an accurate description of the results from a new study sponsored by the U.S. National Institutes of Health. As stated in the conclusion of the study: "*Higher concentrations of triclosan, BP-3, and propyl, butyl, ethyl, and methyl parabens were associated with lower odds of diabetes*."

Almost certainly you've used consumer products containing these common chemicals. The conclusion of the study might lead you to believe that you should increase your exposure to these chemicals in order to reduce your risk of diabetes.

But before jumping to that conclusion, there are two very important words to understand. What exactly does the term "*associated with*" mean? It doesn't mean what you may think it means.

The conclusion came from what is known as a cross-sectional epidemiology study. In this new study, exposure to the chemicals was determined by measuring chemical concentration levels in urine samples provided by the study participants. The reason for urinary measurements is that the chemicals are all short-lived in the body and are quickly eliminated in urine after exposure. Recent exposure is easily measured by analysis of urine.

At the same time, health information was collected from the participants; in this case information relevant to diabetes. Studies of this type are described as cross-sectional because all of the exposure and health data is collected at a single point in time.

Cross-sectional studies are fairly common because the necessary data is often collected already for other purposes. In this case, all of the data came from the National Health and Nutrition Examination Survey (NHANES), which is an ongoing study conducted by the U.S. Centers for Disease Control and Prevention (CDC). The survey collects a wide range of data that is aimed at assessing the health and nutritional status of adults and children in the U.S.

The data were analyzed to determine if there are any statistical associations between chemical exposures and diabetes. Indeed, the analysis revealed that higher exposure levels were statistically associated with lower occurrence of diabetes. The term "*associated with*" simply refers to these statistical associations.

But as noted by the study authors, "*our study can only demonstrate [statistical] associations and not prove causality.*" This is intuitively understandable because "*diabetes develops over the course of many years.*"

In comparison, because of the short half-lives of these chemicals in the body, the measured urinary concentrations only reflect short-term exposure. As a result, the authors note that "*we therefore cannot …rule out that diabetes diagnosis occurred before the paraben/phenol exposure.*"

Numerous similar cross-sectional studies have been conducted on bisphenol A (BPA) using NHANES data or other readily available datasets. The researchers involved with this new study also examined BPA, but determined there were no statistical associations between BPA levels and higher or lower occurrence of diabetes.

Regardless of whether statistical associations were found, the authors stress that "*causal interpretation of our findings is not possible given the cross-sectional nature of NHANES.*" Additional research would be needed to determine if the statistical associations have any clinical significance.

Although this particular study has not received media attention, the results of cross-sectional studies are frequently highlighted in the news with sensational headlines such as the one noted above. The results may sound important, but the casual reader should always be aware of the limitations of cross-sectional studies. Statistical associations are just that – statistics.