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## New study raises worries about chemicals in non-stick cookware

September 07, 2010 07:17 By **Dr. Marla Shapiro**

Perfluoroalkyl acids! What are they? Well, they are manmade chemicals that include PFOA and PFOS (perfluorooctanoic acid and perfluorooctane sulfonate... see why I abbreviated?) These chemicals have been found in our blood samples across a myriad age group and geographic areas. Typically, the average measurements of PFOA have ranged from 5.2 and 3.9 ng/ml.

So where does the exposure come from? Typically, these chemicals have a unique purpose. They are used to create non-stick heat resistance to cookware or they are used to create breathable but waterproof properties to fabric and upholstery.

They may also come from breakdown of another compound called fluorinated telomers, which are compounds used as coating for commercial food packaging, factory treatments for fabrics and carpets, and manufacturer pretreatment for stain-resistant clothing. We get exposed to it from drinking water, dust, food packaging, breast milk, microwave popcorn, ambient air, occupational exposure and the breakdown of these compounds used in the sources identified above. PFOA and PFOS do not break down.

So the issue is that the chemicals leave the surface to which they were applied (clothing, carpeting, food containers etc) and we incorporate them into our bodies either by inhaling them, eating them, or absorbing them through our skin. These chemicals get into our food because the food was stored in containers that were coated with these chemicals (the chemicals being used to make the containers water/grease-proof). So, for example, the inside of a microwave popcorn bag is coated, so that the flavoring and oils included as part of the popcorn don't wick out of the bag during transport or storage. The same rationale exists for pizza boxes, Chinese food containers and so on. Breast milk and cord blood contain these chemicals because they are in the mother's body and become transferred to the fetus/ infant through those routes.

Clothing, upholstery and carpeting are slightly more complicated. There is evidence that these chemicals are absorbed across our skin. But it is also reasonable to think that some of the chemicals become airborne (as part of dust particles or on their own) which we then inhale, or they get on our hands / other objects and we end up ingesting them. The latter -- hand-to-mouth transfer -- is a logical explanation for why the study reported saw a "U-shaped" curve for serum levels, with younger children having higher serum levels than older children as they are more likely to put their hands in their mouths.

Interestingly, in non-stick cookware, these chemicals are used in creating them but is not present in the final product. A science panel in 2005 from the American Council on Science and Health stated that there is no human health risk associated with the level of PFOA to which the general population is exposed. However, the ACSH webpage now also says that more research is clearly needed, and concern about these chemicals has been increasing because of a) the increasing evidence about their widespread presence in the environment (and that they don't break down), b) their rather ubiquitous presence in human sera, and c) the evidence from animal studies.

PFOA and PFOS are known to affect the liver and can cause an enlarged liver and impact on the way the liver manufactures cholesterol and triglycerides.

In 2002, a lawsuit was filed by communities that were exposed to PFOA from the Dupont Washington Works facility near Parkersburg, W Virginia. Some

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12,476 adolescents and children were included in this study looking at the exposure between PFOA and PFOS and their serum lipids. Their average concentrations were 69.2 and 22.7 ng/ml, substantially higher than what is usually found in average individuals for PFOA. However, in other surveys of the general population while PFOA was 3.9 ng/ml, PFOS levels were similar at 19.3 ng/ml.

What was found was that higher PFOA levels were associated with increased total cholesterol and increased LDL (bad) cholesterol. PFOS was associated with an increase in total cholesterol, LDL cholesterol and HDL (good) cholesterol.

The authors of this study, found in [Archives of Pediatric and Adolescent Medicine](#), write that PFOA and PFOS exposure and possibly the entire class of perfluoroalkyl acids are associated with increase in serum lipids and the range of exposure is the range characterized by nationally representative studies. Although the study cannot prove cause and effect, it documents a strong association between the chemicals and the impact on cholesterol and triglycerides. Given the early age at which these associations were seen in this study group, there is concern about the long-term impact.

I had the opportunity to review the results with one of the authors, Stephanie J. Frisbee, MSc, MA, PhD (Cand.) She said that at a minimum, the study results strongly support the need for additional research studies to determine a) if these associations are in fact causal, b) the physiologic mechanisms being affected and through which these chemicals might be acting, and c) which of the known exposure routes are contributing more or less to the accumulation of these chemicals in our bodies.

We don't yet fully understand the impact of long-term elevated cholesterol as well in this age group. We know from the NHANES study in the US that almost all of us have these chemicals in our bodies (and given the scientific evidence for their widespread global presence in the environment, including the Canadian Arctic and the Great Lakes, there is no reason not to think that a substantial proportion of Canadians also have these chemicals in their bodies). These chemicals do not break down in the environment and they persist in our bodies for multiple years.

Indeed, more research is needed for us to understand the relationship of these exposures and our health.



[WATCH: My segment on Canada AM: Non-stick chemicals](#)

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9/8/2010 12:15:36 AM #

I'm no scientist; but I am a consumer. I own a number of different types of cookware; including a few pots, pans, and bakeware; with a non-stick, Teflon-like coating. In most cases with these types of cookware, and over varying periods of time; I have noticed a considerable amount of deterioration and flaking, of the non-stick coating applied to the cooking surfaces; of these types of cookware. Over the years, I have followed the manufacturer's instructions (ie. using plastic-utensils to stir food, washing-immediately

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