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COMMENT: What does exposure to environmental chemicals mean for our health?

Ivy Shiue, senior research associate at Northumbria University, Newcastle, explores the impacts of exposure to environmental chemicals on our health.

It is not possible to live in a chemical-free world on Earth. Chemicals are all around us, and some, like oxygen and hydrogen, are essential components for living creatures including us humans. However, some other chemicals may be harmful to our health.

Some environmental chemicals (which are often, but not always, human-made) have been linked to physical and cognitive health conditions and even DNA change. Many of these chemicals, such as arsenic, phthalates, polyfluoroalkyl and volatile organic compounds, to name a few, are found in a range of common household or industry products that we use or are exposed to on a regular basis, including cleaning supplies, car exhaust and certain kinds of cosmetics.

How do we study exposure to environmental chemicals and health?

One of the prime sources for data on exposure to environmental chemicals and human health comes from the National Health and Nutrition Examination Surveys (NHANES).

This is a program of epidemiological studies run by the US Centers for Disease Control and Prevention. NHANES monitors the health status of adults and children in the US with a representative sample and uses both interviews and physical examinations.

Some of the information collected includes urine and blood samples, which we can use to track exposure to environmental chemicals. This gives us a picture of the emerging risk hazards from chemicals – we can test the volume of a given chemical in urine or blood and see what the associations are with a range of health conditions. Researchers have been doing this since the 1980s, and scores of studies have been released detailing the associations between concentrations of environmental chemicals in the body and different health outcomes.

Effects on physical health

The association between exposure to these kin

ds of chemicals and human health has been well documented in research using data fr

om NHANES. While many

environment

Looking at NHANES data from 2009-2010, I found an association between high blood pressure in adults and higher concentrations of hea

vy metals, arsenic and phthalates in urine. Other research has also associated higher urinary arsenic concentrations that could be found in contaminated groundwater or in foods (eg, grains) with impaired kidney function and gout disease.al chemicals have been studied, I'll focus on a few chemicals that are fairly well-known.

Bisphenol-A and triclosan, used in consumer products including soaps, detergents, toys and surgical cleaning treatments, among other things, have been found to affect immune function and the age at which menstruation starts.

Phthalates, a chemical that makes plastic and vinyl more flexible, are found in plastic bottles and in pharmaceutical pills and cosmetics. They have been found to play a role in increased body mass index, diabetes, worse insulin resistance, higher allergy rates and decreased testosterone in both adults and children.

Environmental chemicals may be associated with oral health problems as well. In a recent study, I found that people with gum disease, bone loss around the mouth, and teeth loose not due to injury were found to have higher levels of heavy metals, phthalates, phenols, parabens and pesticides (among other chemicals) in their urine. Such harmful exposure could cause defects in the development of tooth enamel.

Environmental chemicals in the brain

Environmental chemicals could also influence brain development, particularly in children and older adults.

For example, frequent use of household products with higher levels of pyrethroid insecticides and polyfluoroalkyl chemicals are linked to learning problems and impaired attention in children.

In the elderly, vision, hearing and balance might be altered through chronic exposure to a range of chemicals including heavy metals, phthalates, arsenic, pesticides, phenols, hydrocarbons and polyfluorinated compounds. And it has been further observed that these chemicals might lead to difficulties in

thinking or remembering as well. It is thought that these chemicals may disrupt nerve regulation in the brain.

Effects on emotions

If environmental chemicals could impair our organs and change our nervous system, then they might have effects on our emotional health as well.

In recent research, I found that higher levels of parabens and polyaromatic hydrocarbons in urine might suggest that some people need more emotional support, such as talking over problems or help making difficult decisions, than others with lower concentrations do. Such relationship exists whether or not people might have other health conditions.

These chemicals are both quite common. Parabens are often used as preservatives in cosmetic and pharmaceutical products, and polyaromatic hydrocarbons are found in exhaust, asphalt, coal tar, smoke, soil and charbroiled foods.

These chemicals may trigger a physical reaction that ultimately leads to the disruption of emotions. Daily exposure to these chemicals could lead to a person developing a dependency on them. This can induce inflammation or immune function to alert cell injury or damage. And that could, in turn, chronically disturb neuron functioning, leading to the disruption of emotions, and hence a need for more emotional support.

How do we know when we are exposed to unnecessary environmental chemicals?

Once we know the relationships of harmful chemicals and health, we can start to figure out how to lessen or prevent exposure to these chemicals. This could mean reducing our use of the consumer products that contain these substances.

Buildings built more than 30 years ago could be another source of exposure and therefore need our attention to renovate. They could emit chemicals that harm our health because they have building materials that may contain these harmful chemicals or have other pollutants like mold.

A screening program is one of the ways to identify housing and chemical issues at an early stage.

Another way is through an unpleasant smell which is exactly what it sounds like. The presence of unpleasant odors might direct us to where the excess chemicals around us are. These issues could also be detected by reviewing self-rated health. This is an indicator of physical and mental health issues, created by asking people questions about their health.

And based on new research about environmental chemicals and oral health, one could also look at teeth from time to time.

These types of preventative measures could be carried out on a regular basis for individuals and each household to suggest when to examine and remove the unnecessary environmental chemicals in order to improve and sustain our health, well-being and quality of life.

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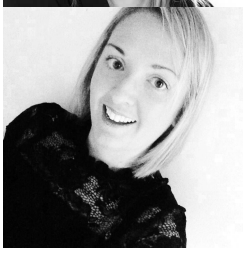

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