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January 17, 2019

Comments submitted by the Environmental Working Group to the Department of Health and Human Services, Office of Disease Prevention and Health Promotion proposing six new objectives in the topic areas of environmental health and cancer for the Healthy People 2030 initiative.

Topic Area: Environmental health

New Objective: Reduce exposure to chemical flame retardants in the population, as measured by blood or urine concentrations of its metabolites.

Objective Rationale: Flame retardants have been added to furniture and consumer products for more than 40 years. However, as the state of California concluded, in 2013, they do not lead to increased safety. Further, scientific studies show that chemical flame retardants migrate out of furniture and other products, leading to exposure and accumulation in people's bodies. Flame retardants have been linked to cancer, endocrine disruption and developmental problems in children.

Biomonitoring studies show flame retardants in Americans nationwide, and children often have higher levels than adults. Children are more susceptible to exposure from playing near the floor, where dust settles, and from putting their hands in their mouth. During critical stages of development, they are especially vulnerable to the health hazards of flame retardants. A 2017 study from the University of California, San Francisco found that exposure to PBDEs was associated with lowered IQ in children.

Many states, including Maine, Rhode Island and California, have recently responded to these findings by banning flame retardants or specific chemicals used in flame retardants. At the federal level, in 2017 the Consumer Product Safety Commission granted a petition to remove the entire class of halogenated chemical flame retardants from upholstered furniture, mattresses, electronics casings and children's products.

Studies have shown that removing furniture containing flame retardants from living spaces reduces the level of flame retardants in dust and therefore reduces exposure. Levels of flame retardants in women's bodies have also dropped following state-wide bans of PBDEs in California, as shown in additional studies from University of California, San Francisco.

Proposed Baseline and Unit of Measure:

Blood and urine concentrations of flame retardants and/or their metabolites.

Proposed Data Source:

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Ongoing academic and state agency research and biomonitoring is needed to track exposure to flame retardants and their replacements as they evolve.
Ongoing biomonitoring and intervention research studies; NHANES

Anticipated number of data points throughout the decade

5

Topic Area: Environmental Health

New Developmental Objective:

Reduce exposure to organophosphate and pyrethroid pesticides in the population, especially vulnerable subpopulations (children and pregnant women).

Objective Rationale: Organophosphates and pyrethroids are two classes of insecticides commonly used for agriculture, home and garden, and commercial or governmental applications. In 2012 approximately 20 million pounds of organophosphate insecticides were used in the U.S.

Recent epidemiological studies demonstrated that exposure to organophosphate pesticides during pregnancy is associated with adverse neurological outcomes in the children of exposed mothers, including reduced IQ and delays in motor function. Similarly, exposure to pyrethroid insecticides at ambient levels has been linked to cognitive and behavioral changes in children.

Current biomonitoring data for the pyrethroid metabolite 3-phenoxybenzoic acid, or 3-PBA, from the Centers for Disease Control and Prevention's National Health and Nutrition Examination Survey, or NHANES, indicate that children ages six to 11 are the most-exposed age group and that median exposure levels increased 50 percent from 2000 to 2010.

In 2016 the Environmental Protection Agency reviewed the available data for chlorpyrifos, a widely used organophosphate pesticide, and proposed to prohibit its use, because of the risk of adverse neurological impacts on children. In 2018 a study published by the field's leading scientists recommended a ban on the entire organophosphate class.

Given the potential harm to children's health, reducing exposure to these pesticides in the general population, but especially among children and pregnant women, is of national importance. In addition, evidence-based interventions exist to reduce



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exposure to these and other harmful pesticides. The academic literature has shown that behavioral changes, such as consumption of an organic or low-pesticide-residue diet, are effective in lowering the concentration of these pesticides in the urine of children and adults.

Proposed Baseline and Unit of Measure

Urinary concentration of organophosphate and pyrethroid metabolites.

Proposed Data Source

Centers for Disease Control and Prevention's National Health and Nutrition Examination Survey (NHANES)

Anticipated number of data points throughout the decade

5 based on timing of NHANES data release

Topic Area: Cancer

New Core Objective: Reduce melanoma incidence rates.

Melanoma is an issue of national importance. There were an estimated 91,270 new cases of melanoma and 9,320 deaths in 2018, according to the National Cancer Institute. Melanoma rates have been increasing steadily, at a few percent per year, for more than 30 years. New cases of melanoma have nearly tripled, from 7.9 per 100,000, in 1975, to 23 per 100,000, in 2015.

(<https://seer.cancer.gov/statfacts/html/melan.html>)

This proposed objective would replace the proposed Core Objective C-2030-10, which aims to reduce sunburns in adolescents, and includes that goal within a more comprehensive objective of reducing or halting the increase in melanoma rates. To achieve this, numerous evidence-based interventions should occur, starting with a reduction in indoor tanning, for which we have the most conclusive evidence of harm and which was classified as a known human carcinogen by the World Health Organization because of a rise in melanoma among women users. Additionally, a reduction in severe sunburns, particularly early in life, is a known risk factor in melanoma development. Finally, an intervention program should emphasize sun safety, which includes wearing clothes, finding shade, planning around the sun and, when appropriate, using sunscreen that provides strong UVA protection. The emphasis on strong UVA protection is critical, because research indicates that UVA rays play an important role in melanoma development, and sunscreens have traditionally offered minimal UVA protection relative to UVB protection.



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Baseline and Unit of Measure:

National melanoma Incidence.

Proposed Data Source:

National Cancer Institute Surveillance, Epidemiology, and End Results Program (SEER)

Anticipated number of data points through the decade

10 rounds of data collection with annual publication throughout the decade

Topic Area: Cancer

New Research Objective:

Reduce cancer incidence due to cumulative exposure to chemical mixtures in the environment.

Objective Rationale:

Cancer is one of the leading causes of mortality in the U.S., with 609,640 deaths and 1,735,350 number of cases estimated for 2018. Although we know that genetics and lifestyle contribute to cancer development, our current understanding of cancer etiology suggests that exposure to a mix of environmental contaminants, especially during fetal development and childhood, may also play a role in cancer development.

Human biomonitoring data indicate widespread human exposure to potentially toxic chemicals and environmental contaminants, including pesticides, industrial chemicals and substances used in personal care products and other consumer goods. Not surprisingly, biomonitoring studies have also revealed that adults and children are exposed to a “chemical cocktail” or a mixture of several chemicals, often at low doses. Yet conventional risk assessment frameworks have focused on one chemical at a time, an approach that does not reflect real world exposure scenarios and therefore is not sufficient for protecting public health.

In 2000 a landmark publication identifying the “hallmarks” of cancer, which has recently been expanded and revised, highlighted six major physiological characteristics of cancer cells and tumors. Such tightly regulated cell processes toward cancer progression include proliferative signaling, evasion of growth suppressors, resistance to cell death, replicative immortality, induction of angiogenesis, activation of invasion and metastasis, genomic instability,



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inflammation, dysregulated metabolism and the ability to avoid immune destruction.

Although traditional toxicological studies may identify chemicals that can influence one of these cellular processes, single chemical exposure may not lead to cancer development. However, chemicals capable of activating or disrupting different carcinogenic signaling pathways may work together in synergy so that exposure to the chemical mixtures may ultimately be carcinogenic.

In 2012 a scientific collaborative known as the Halifax Project identified chemicals that may be carcinogenic because of their ability to affect the hallmarks of cancer. The results of the working group, published in the peer-reviewed literature, showed that 85 chemicals were reviewed and determined to influence pathways and mechanisms involved in carcinogenesis, 50 of which exert their effects even at low doses.

Recently, the National Toxicology Program, a Health and Human Services interagency program dedicated to testing and evaluating environmental substances, has begun to develop a method for the assessment health risks due to cumulative exposure to multiple chemicals that may act together to promote the development of cancer. Together with the biomonitoring studies carried out by the Centers for Disease Control and Prevention, this program would form the basis for developing intervention strategies for reducing cancer incidence due to exposure to chemical pollutant mixtures in the environment and in consumer products.

Proposed Baseline and Unit of Measure

Total cancer incidence and urinary and serum concentrations of chemicals identified as influencing the hallmarks of cancer.

Proposed Data Source

National Cancer Institute Surveillance, Epidemiology, and End Results Program (SEER); Centers for Disease Control and Prevention's National Health and Nutrition Examination Survey (NHANES); Research by the National Toxicology Program

Anticipated number of data points throughout the decade

10

Topic Area: Environmental Health

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New Research Objective: Increase the number of states, territories and tribes with programs to actively monitor and report on private well drinking-water contaminants.

Objective rationale:

Private drinking-water wells largely go unmonitored, unregulated and untreated in spite of widespread environmental contamination risks. An estimated 44 million people rely on these drinking-water sources, but they lack the drinking-water quality protections offered by municipal water treatment plants. Because testing of private wells falls on the homeowner alone, and no testing is required by law, the scope of private well contamination and its impacts in the U.S. is uncertain.

Attempts have been made to quantify contaminant exposures from drinking private well water, and these attempts suggest the issue is widespread and concerning. The U.S. Geological Survey has estimated that 2.1 million well-water drinkers may be exposed to high levels of arsenic. Models produced from the Environmental Working Group's Tap Water Database predict that 2 million people relying on private wells may be exposed to nitrate levels greater than 5.0 mg/L. However, these numbers remain simple estimates with varying degrees of uncertainty.

Yet consistent, nationwide data on private well contaminants is lacking. Many repositories of test data, such as the National Environmental Public Health Tracking Network (NEPHTN), collect and report contaminant levels for community water systems only. Initiatives relating to the collection of information on private well contaminants are fragmented, and databases are incomplete. Only five of the 25 NEPHTN state grantees collect any well water data, and the data is typically recorded for a small proportion of wells only, on a limited number of contaminants. For example, in Maine, where half of the population relies on private wells, test data is collected and recorded for the Maine Tracking Network only for tests submitted directly to the Main State Health and Environmental Testing Laboratory by homeowners at their own expense.

Many states collect no private well data at all. Some local governments, typically partnering with institutions such as universities, are attempting to bridge the gap by offering free community well testing, but these efforts may be crippled by lack of staff, resources and funding, and do not necessarily result in a cohesive database of test results that can be used for public health analysis.

Addressing the health consequences of such contamination remains a challenge due to the uncertainties and deficiencies of present attempts at exposure assessment.



This presents a compelling argument for the inclusion of an environmental health research goal to increase the number of states, territories and tribes with programs for monitoring and reporting on private well drinking-water contaminants.

Topic Area: Environmental Health

New Research objective: Reduce exposure in the general population to biologically active forms of non-ionizing electromagnetic radiation from consumer-use wireless devices and the wireless transmitter networks that support them.

Objective rationale:

The explosion of human exposure to radiofrequency radiation from wireless devices has arrived well ahead of a thorough understanding of the long-term biological impacts that could be caused by exposure to the various frequencies of non-ionizing electromagnetic radiation.

It is well established that ionizing radiation, with its higher frequency and shorter wavelength, poses a health hazard for humans. Less is known about non-ionizing electromagnetic radiation, yet what is known has raised public health concerns. Research shows that, depending on its frequency and form, non-ionizing electromagnetic radiation can have either a medically beneficial or a toxicologically harmful effect on living organisms.

Potential medical uses of non-ionizing radiation include improving bone-injury healing and regeneration, as well the exploratory use of electromagnetic fields for oncological treatment, currently an FDA-approved treatment for adults with certain advanced forms of glioblastoma. These effects are being investigated by medical device manufacturers looking for ways to harness the electromagnetic fields to treat specific diseases.

At the same time, exposure to non-ionizing electromagnetic fields in the general population can cause a toxicological impact, including outcomes such as DNA damage, risk of cancer and miscarriage, and impacts on brain activity in children and adults. These effects have been associated with the ordinary daily use of wireless devices and also with exposure to electromagnetic fields from wireless transmitter networks. Yet there has been little research investigating specifically which frequencies within the non-ionizing spectrum and which forms of wireless transmission may cause these effects.



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With the latest research from the National Toxicology Program, a Health and Human Services interagency program dedicated to testing and evaluating substances in our environment, new data are becoming available for the evaluation of the biological impacts of non-ionizing electromagnetic radiation on the biological organisms.

This program should be extended to include all frequencies within the non-ionizing electromagnetic spectrum to which people are exposed. It should be also expanded to include medically appropriate monitoring of and research on the effects of electromagnetic radiation exposure in people, through competitive research grants.

Given the potential for uncontrolled adverse effects in the general population, this Environmental Health Research Objective calls for additional research that would support the reduction of exposure to both current and anticipated frequencies and forms of non-ionizing electromagnetic radiation.

Proposed baseline and unit of measure

An assessment of exposure to all forms of electromagnetic fields from personal wireless devices and the networks that support them. These studies should include current and anticipated frequencies and parts of the electromagnetic spectrum used in wireless communications, such the 5G technology.

Proposed data source

Data from research studies on laboratory animals conducted by the National Toxicology Program, and an expanded program of peer-reviewed research on the effects of electromagnetic radiation in people.

Anticipated number of data points throughout the decade

The number of data points we hope to collect would depend on future research.