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Executive Summary

October is Children's Health Month, a time when official federal agencies call attention to important efforts and policies designed to advance childhood health and safety. In recognition, Environmental Protection Agency (EPA) Administrator Andrew Wheeler recognized the importance of the occasion in a press statement explaining: "EPA is highlighting the availability of its many programs and resources dedicated to improving air quality, reducing lead exposure, and protecting the health and well-being of children." The occasion offers the perfect opportunity to assess federal programs that fund research in this field as well as the EPA's recent move to reduce funding for a number of university-based children's environmental health centers.

The EPA and the National Institute of Environmental Health Sciences (NIEHS) have jointly funded a number of university-based children's environmental health centers for more than two decades. The EPA announced in May 2019 that it would cut its half of the funding for the centers starting in July. The announcement prompted a firestorm of criticism from environmental activists, including claims that reduced funding of these centers would undermine children's health. Lost in this melee is the fact that these centers do not have a measurable impact on children's health or add much to the body of research on the topic. In fact, many of the centers simply waste taxpayer dollars while funding junk science and environmental activism. Rather than simply cutting the EPA's half of the funding, the Trump administration should go further and eliminate all funding for these centers and investigate similar NIEHS grant programs.

In 1995, the Clinton EPA, under the leadership of Administrator Carol Browner, published a policy statement calling on EPA assistant administrators to consider unique risks to children when assessing chemical risks. President Bill Clinton followed up two years later by issuing Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks." The executive order set up an intergovernmental task force and offices at various agencies devoted to children's environmental health. In 1997, pursuant to the executive order, the EPA began a collaboration with the NIEHS, which is housed at the Department of Health and Human Services' National Institutes of Health. Since then the EPA and NIEHS have jointly funded, at a 50/50 ratio, several university-based children's environmental health centers.

The EPA and NIEHS have poured a substantial sum of federal dollars into these centers as well as into other children's environmental health research programs. NIEHS lists 13 centers on its website that are currently part of the program. However, the EPA/NIEHS "Impact Report" on the centers states that the two agencies have spent more than $300 million to fund 24 different centers since 1997. These centers' grants only represent a fraction of federal spending for children's environmental health. For example, a NIEHS newsletter reports that, over the past decade, the agency has spent more than $1 billion in children's environmental health research, including $100 million in grants during fiscal year 2018 alone. In addition, NIEHS recently announced an expansion of its efforts to include new "children's environmental health research translation centers" that will focus on outreach efforts related to children's environmental health rather than conduct research.

Even if the EPA were to permanently cut funding for the centers, a substantial portion of funding in the field will likely continue. Accordingly, it makes sense to better evaluate this funding and determine if any of it should continue. It is also worth examining whether other "children's environmental health" programs funded solely by the National Institutes of Health, the EPA, or other federal agencies should be eliminated as well.

In addition, the National Institutes of Health should halt plans for NIEHS to fund the creation of additional "translational centers," which will be specifically designed to engage in activism without even attempting to provide any scientific justification.

Taxpayers should not be forced to fund agenda-driven science. If the government spends on any funding for health-related research, it should focus on such things as finding cures and treatment for cancers, heart diseases, and other serious illnesses.

Introduction

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The EPA and the National Institute of Environmental Health Sciences (NIEHS) have jointly funded a number of university-based children's environmental health centers for more than two decades.[2] The EPA announced in May 2019 that it would cut its half of the funding for the centers starting in July.[3] The announcement prompted a firestorm of criticism from environmental activists, including claims that reduced funding of these centers would undermine children's health.[4] Lost in this melee is the fact that these centers do not have a measurable impact on children's health or add much to the body of research on the topic. In fact, many of the centers simply waste taxpayer dollars while funding junk science and environmental activism. Rather than simply cutting the EPA's half of the funding, the Trump administration should go further and eliminate all funding for these centers and investigate similar NIEHS grant programs.

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Background

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Gaming the Science

Since the centers are based at universities, often within science-related schools, one would expect these children's environmental health centers to be focused on producing independent, objective scientific research. Unfortunately, an examination of their activities reveals otherwise. They tend to focus on generating research to serve an activist-oriented, anti-chemical agenda.

As will be detailed below, many of the research studies these centers produce are essentially nothing more than statistical analyses that attempt to find an association between a chemical and a health effect. Yet, such associations alone do not prove cause-and-effect relationships and can happen by mere chance.

In fact, the chance of generating a statistically significant positive association is more common than one might think. As David Randall and Christopher Welser of the National Association of Scholars detail in their study, *The Irreproducibility Crisis of Modern Science*, it is common for positive associations to occur by mere chance. They explain that researchers apply a generally accepted standard for determining whether a finding is "statistically significant," which ensures that positive associations will occur by chance no more than 5 percent of the time. That means that there is a

one in 20 chance that a research study will generate a positive—statistically significant—association simply by accident.[11]

The fact that false positives are relatively common has fostered both unintentional bias and scientific mischief, including the propensity for researchers to manipulate the data until it generates a positive finding. As James Mills of the National Institute of Child Health and Human Development lamented back in 1993, in the *New England Journal of Medicine*: "'If you torture your data long enough, they will tell you whatever you want to hear' has become a popular observation in our office."[12] Randall and Welser highlight one outrageous case where Brian Wansink, head of Cornell University's Food and Brand Lab, literally bragged in a blog post that he had schooled one of his students on how to churn data to generate positive results and get them published.[13]

Even when researchers do not torture data, many positive associations will occur by mere chance or unintentional biases. Stanford Professor of Medicine John Ioannidis demonstrated in a 2005 research article that most published research findings are false positives. He explained:

> Simulations show that for most study designs and settings, it is more likely for a research claim to be false than true. Moreover, for many current scientific fields, claimed research findings may often be simply accurate measures of the prevailing bias.[14]

Hence, it is not all that hard to find associations, especially weak and largely inconclusive ones, and publicize those to scare the public and lobby for regulations. That is why we should pay attention to the strength of an association, which is expressed in these studies numerically as a relative risk ratio.

If the relative risk is one, the study reports no association between a chemical and any health effects. When the number is less than one, the research indicates that the chemical exposure may have positive health effects, which is what drug researchers seek when conducting drug trials. On the other hand, if the relative risk number is higher than one, the research indicates that the chemical may adversely impact health, and the higher the number, the stronger the association. Risk ratios of close to one and even two or three are generally considered weak and not particularly compelling for drawing cause-and-effect conclusions. They can easily occur by mere chance.

Mount Sinai School of Medicine epidemiologist Paolo Boffetta explains:

> Although any measure of risk would follow a continuous

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> distribution and there are no predefined values that separate "strong" from "moderate" or "weak" associations, relative risks below 3 are considered moderate or weak.[15]

Such weak associations *alone* do not offer much compelling evidence of actual health impacts. Boffetta explains further that weak associations raise the prospect that one of three serious problems with the research may be in play: "chance, bias or confounding factors."[16] He notes that some weak associations might be telling only under certain circumstances. Specifically he says:

> Identifying the causal nature of a weak association is not impossible, but requires large, well-planned, and well-conducted studies and supporting evidence from molecular and experimental studies.[17]

Yet, activist researchers are willing to draw conclusions and sound alarms even when they find weak associations without a larger, stronger body of research to support them. To cover themselves, they include qualifiers, such as the findings "suggest" or "link" a chemical with a health problem or they "may" demonstrate a connection. They will often note serious limitations with their research and rationalize why it is somehow still compelling. Once one study finds a link, it will be cited in other studies to build yet more "evidence" with weak statistical associations.[18] But just as you cannot build a sound structure in the sand, you cannot build a firm scientific body of evidence with a series of weak and largely meaningless research findings. Unfortunately, much of what the government is funding in the name of "children's environmental health" involves a seemingly endless web of weak studies cross-citing one another and then being cited as justification for government action.

The Children's Environmental Health Impact Report

The 2017 EPA/NIEHS Impact Report on the children's health centers provides a telling profile of what these entities are truly about. On the surface, it seems impressive as the report defines the "problem" with worrisome statistics related to children's environmental health. That is followed by an overview of myriad research studies and discussion of the alleged public health impacts the centers have achieved. But many of their statistics and research claims fall apart under scrutiny, and the reported impact involves mostly political activism rather than validated health benefits.

Statistical Shenanigans. The report opens with infographics that contain lots of statistics designed to impress

and worry readers, but the statistics carry little weight, and many are not particularly relevant to the research and claims included in the rest of the report.

For example, one infographic states: "Approximately 1,600 premature births per year in the U.S. are attributable to air pollution."[19] This claim is referenced with a study that lists Leonardo Trasande of New York University as the lead author,[20] a researcher who often combines his research with pro-regulation advocacy efforts.[21] This study is based on the assumption that outdoor air pollution—particularly levels of airborne particles smaller than 2.5 micrometers in diameter, known as PM2.5—increases premature birth rates. The study's stated objective is described as: "Objective: We aimed to estimate burden of PTB [premature birth] in the United States and economic costs attributable to PM2.5 exposure in 2010."[22] Hence, the goal is not to determine if PM2.5 causes premature birth rates, it is to measure the economic impact of a *presumed* cause-and-effect relationship.

To achieve this end, the authors simply pulled data from the EPA and other sources that fit their narrative. They then modified that data "to obtain an estimate that better represents the true relative risk." Apparently, they wanted to make the relative risk estimates—which were quite low and largely inconclusive at 1.04 to 1.16—stronger. Yet even with their modifications to the data, the relative risk numbers they developed are still too low to draw a meaningful conclusions. Remember, numbers below 3 are weak and not particularly compelling, and the numbers in this study ranged between 1 and 1.4.[23]

Trasande et al acknowledge other problems with their study in the section where they discuss "limitations":

> The specific components of outdoor air pollution that contribute to prematurity and other adverse birth outcomes remain elusive, as do the mechanisms by which they produce effects. Although it is true that some studies to date have failed to find significant associations with adverse outcomes, exposure imprecision may have biased those estimates (Fleiss and Shrout 1977); others may have had modest statistical power to detect significant differences in prematurity. Therefore, some may argue that the scientific evidence for air pollution has not reached the threshold for causation.[24]

In other words, the research literature does not show or even theorize how air pollution in the United States—which is relatively low and declining[25]—

could affect premature birth rates. Trasande et al also admit that the other statistical research in this field is either contradictory or equally weak.

The Impact Report includes two other alarming claims in the infographic that can be tackled together. One states: "60% of acute respiratory infections in children worldwide are related to environmental conditions." The other states: "Air pollution contributes to 600,000 deaths worldwide in children under 5 years old." Both claims may reflect some truth *but they have little, if anything, to do with the chemicals discussed in the report or children's environmental health in the United States*. The authors should have known this, but stating things this way helps sound alarms to continue the flow of federal dollars.

Specifically, both of these claims cite a United Nations report that quantifies deaths and health effects related to "environmental threats" primarily in poor nations, including inadequate disinfection of water supplies, insect-borne diseases like malaria, poor air quality related to burning wood and other biofuels in homes without proper ventilation, food borne illnesses related to poor sanitation, and chemicals. Basically, these numbers largely reflect problems in poor nations directly related to poverty and the lack of modern sanitation. They have little relationship to exposure to trace chemicals from consumer products in the United States, which is the focus of the children's environmental health centers. It is highly misleading to use these figures to demonstrate the need to spend money to research U.S. risks, which are completely different.[26]

Questionable Research. The report then follows with sections on "health outcomes" addressing how chemicals might adversely affect or cause asthma, birth defects, cancer, immunity, neurodevelopment, obesity, and reproduction. A subsequent section addresses "environmental exposures," including things like arsenic, plastics, lead, pesticides, and secondhand tobacco smoke. Much of what is included in each section simply ignores the larger body of evidence to focus on the myriad statistical studies that "suggest" certain chemicals cause adverse health effects. These sections do not address the public health benefits that many of the products they demonize provide to public health.

The section on the chemical Bisphenol A (BPA) is illustrative. Without any regard to its many valuable uses, BPA has been under attack for decades by environmental activists who work in tandem with these federally funded researchers to continue to produce and publicize numerous studies of questionable value. While many studies involve weak and largely meaningless statistical associations, they are useful

to activists who sound false alarms and keep the issue in the news.

BPA is used to make hard, clear plastics and resins that line food packaging to prevent rust and the development of pathogens in food. BPA has enormous value in securing a safe food supply[27] and improving public health and safety thanks to its use in medical devices, among other uses.[28] Humans can consume small traces of BPA from packaging, but the body quickly passes it out via urination.

The Impact Report lists a handful of BPA-related studies conducted by the children's environmental health centers, noting that, "BPA may contribute to childhood obesity."[29] Yet these studies simply generated inconsistent findings and statistical associations that do not demonstrate cause-and-effect relationships. In addition, they all relied on relatively small samples and highly questionable exposure estimates. In particular, these studies use a handful of one-time measurements, or "spot" measurements, of BPA levels found in the study participants' urine samples. For example, a study might develop a BPA exposure estimate for a child using a couple of measurements of BPA in the mother's urine when pregnant and a couple of measurements of BPA levels in the child's urine years later. But such "spot" measurements cannot accurately measure the long-term BPA exposures of *any* of the subjects. BPA levels can vary substantially over time—even over just a few hours—because the body metabolizes it relatively quickly.[30] Accordingly, a few spot measurements are poor proxies for actual exposures over several years.

Using these questionable methods, the studies highlighted in the Impact Report managed to tease out associations between allegedly high BPA exposures and obesity among children, but those studies are highly inconsistent. They are all over the map, more akin to a fishing expedition than an objective scientific discovery process. For example:

- One study found associations between prenatal exposures to BPA and obesity later in life,[31] while another found the opposite—prenatal exposure was associated with lower body fat among children later in life.[32]
- One study found no association between BPA and obesity in boys.[33] Another alleged BPA impacted metabolic hormones that could impact boys' weight.[34]
- One study found that exposures of BPA measured in a child's urine correlated with obesity,[35] while another reported no such association."[36]

Numerous governmental and other research bodies around the world have dismissed such small studies with

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disparate findings as not useful when conducting a review of the literature. After a thorough review of the full body of research, they all have concluded that BPA presents no significant health risks at current human exposure levels and that its benefits exceed any risks. These include the U.S. Food and Drug Administration (FDA),[37] the European Food Safety Authority,[38] Health Canada,[39] the Japanese National Institute of Advanced Industrial Science and Technology,[40] and the U.S. National Toxicology Program (NTP).[41]

Yet, NIEHS and the EPA have continued to fund small studies of questionable value. In addition to having small sample sizes and producing weak statistical associations, most of these studies do not follow good laboratory practice (GLP) standards. GLP involves applying internationally recognized methods of ensuring data quality control when conducting scientific research, which reduces risks associated with contaminated samples, researcher bias, and data churning, among other problems.[42] As a result, activist researchers have been able to generate scary headlines and push the EPA and NIEHS to fund yet more dubious studies.

In 2012, in an attempt to resolve disagreements and controversies, the NIEHS, NTP, and the FDA formed the Consortium Linking Academic and Regulatory Insights on BPA Toxicity (CLARITY-BPA), a joint effort between regulatory agencies and academics to "address research gaps."[43] It included a core study conducted by FDA researchers and 13 grantee university-based studies, all of which would be GLP compliant. The grantees were to use the same samples and data developed in the core study to promote consistency.

The core study, which involved rodent testing, was the largest of its kind. It found that at current human exposure levels, BPA is unlikely to cause adverse health effects. The FDA statement on the research concluded:

> Although a comprehensive review of this report, along with future data from other CLARITY-BPA research, will be conducted as part of our continued assessment of BPA safety, our initial review supports our determination that currently authorized uses of BPA continue to be safe for consumers. The report also builds upon the already extensive data collected in the FDA's 2014 assessment of the safety of BPA.[44]

The grantee studies are not all yet released, but the core study underscored reasons to doubt much of the university research conducted in the past.

However, some grantees disagree and continue to make claims about BPA risks that belie the larger body of science.[45]

In any case, the CLARITY study was never really necessary because it was already well known that human exposures to BPA via consumer products are simply too low to have any health effects, particularly because humans metabolize BPA quickly and pass it out of the body before it can have any impact. The EPA has estimated that a safe human dose is 0.05 milligrams per kilogram of body weight per day, which agency researchers derived based on levels found safe for rodents and then extrapolated that to a safe level for humans.[46] As Michael A. Kamrin, professor emeritus of toxicology at Michigan State University, pointed out in 2004, consumers are most likely exposed to BPA at levels that are 100 to 1,000 times lower than the EPA's excessively cautious estimated safe exposure levels. He further noted that the research on BPA also shows that exposure levels per body weight are similar for adults and children, which indicates that infant exposure is not significantly higher.[47] The European Food Safety Authority has made similar observations, noting that current BPA exposure levels pose little risk to children and even infants.[48]

Nonetheless, BPA is one of several chemicals in the Impact Report deemed to be dangerous, because the researchers maintain it is one of many synthetic chemicals that are so-called "endocrine disrupters." The Impact Report explains that such chemicals "disrupt" human endocrine systems in a way that causes illnesses ranging from cancer to obesity to developmental issues. Yet synthetic chemicals like BPA are "weakly estrogenic," which means that simply they are not potent enough—and human exposure is not significant enough—to produce health effects.[49] Humans are regularly exposed to naturally forming estrogen-mimicking compounds produced by plants—so-called phytoestrogens—in our everyday diet, and these are much more potent and exposure is much higher. Yet we suffer no ill effects because none of those chemicals, like BPA, are as potent as human hormones.

Phytoestrogens, for example, are found in legumes, with a particularly high level found in soy. Exposure to natural phytoestrogens from food is 100,000 to 1 million times higher than exposure to estrogen-mimicking substances found in BPA, according to data from a 1999 National Academy of Sciences study.[50] Researcher Jonathan Tolman noted: "Given the huge relative disparity between the exposure to phytoestrogens as compared to BPA concentrations, the risk of BPA in consumer products appears to be about the same as a tablespoon of soy milk."[51] We have

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little to fear from soy milk, so we have even less to fear from BPA and similar synthetic compounds.

Yet BPA and other chemicals deemed "endocrine disrupters," are a central focus of many children's environmental health centers, expending millions of taxpayer dollars to study the issue *ad nauseum*, despite the fact that it's highly unlikely to add any value to the already extensive body of research on this topic. By demonizing these products, such efforts can eventually lead to bans and regulations that undermine many of the important benefits those products provide to society. And BPA is just one of many chemicals covered by these groups according to the Impact Report.

Community Outreach/Activism. In addition to questionable statistics and research, the Impact Report also details children's environmental health center outreach programs. According to NIEHS, each center sets a Community Outreach Translation Core (COTC) to translate "basic research findings into intervention and prevention methods to enhance awareness among communities, health care professionals, and policymakers of environmentally related diseases and health conditions."[52] Each COTC "develops, implements, and evaluates strategies to translate and apply the Center's scientific findings into information that can be used to protect the health of children." While this might sound scientific, it is a facade for engaging in environmental activism rather than advancing science or its application.

Use of the term "translate" appears to be designed to build credibility for COTCs by attempting to link them to an area of study within the biomedical field known as "translational science." Yet COTCs do not conform to the definitions of translational science. According to Christopher P. Austin, director of the National Center for Advancing Translational Sciences at the National Institutes of Health, translational science is "the field of investigation which seeks to understand the scientific and operational principles underlying each step of the translational process."[53] He explains:

> [T]ranslation is the process of turning observations in the laboratory, clinic, and community into interventions that improve the health of individuals and the public—from diagnostics and therapeutics to medical procedures and behavioural changes.[54]

However, the children's environmental health centers' Community Outreach Translation Cores do not translate scientific findings because they rarely bother to produce science first, so *there is no science to translate*. Often,

they assert highly questionable risks and fail to mention new risks their advice might create. Most important, they cannot be sure to promote public health—which is the goal—because they lack a firm scientific basis. Rather, as examples in the case studies will show, COTCs often start with ideologically derived, predetermined conclusions—sometimes related to the area of study and sometimes not—and then design outreach programs around those conclusions. The research component is secondary and tainted with bias; it has become little more than a smokescreen to legitimize activism.

The Impact Report, for example, details many supposed efforts to translate science in ways that educate the public in order to improve public health. But the programs involved do more to mislead and alarm than to inform, and they follow up with calls for government regulation. For example, the report highlights the creation of "culturally appropriate" brochures that "inform" people about the dangers of toxic chemicals to their health and then urges them to take political action. After a few sentences alleging that "toxic chemicals" are causing health problems, one brochure reads: "Support policies that prevent pollution: We need policies that identify existing toxic substances, phase out their use, and replace them with alternatives that are safer for human health and the environment."[55] It then offers advice for healthy living that includes such things as: "drive less," "don't spray pesticides," "don't use chemical tick-and-flea collars, flea baths, or flea dips," "take off your shoes," (so you do not track chemicals around the house), "don't dry-clean your clothes," "choose glass, stainless steel or ceramic" (to avoid plastics), "select flame retardant-free foam products," eat organic food, and so on.[56]

There is no science presented and no discussion of the benefits we trade off to avoid such "toxic" products and activities. In fact, such advice may increase public health risks, which is the opposite of the objective of translation of science. For example, telling people not to use flea and tick control for animals may mean more risk to both pets and humans.[57] Fleas carry serious diseases, including typhus and the bubonic plague, while ticks can transmit Lyme disease, Babesiosis (similar to malaria), Rocky Mountain spotted fever, and many other diseases that affect pets and humans. Urging people to eat organic food—which is not any healthier or less risky than conventional produce—may discourage people from eating enough healthy fruits and vegetables in their diets because organic food tends to be more expensive. And switching from unbreakable plastic

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containers to glass introduces risks associated with glass breakage, and flame-retardant free furniture could increase fire related risks.

This brochure does not constitute translation of science; it is political advocacy for a certain way of life grounded in ideology. Not surprisingly, among the partner organizations listed on the back of this brochure is the Natural Resources Defense Council (NRDC), which consistently lobbies for stricter government regulations of chemicals.

The Impact Report also boasts of having generated "1,400 news media stories," "2,300 Facebook posts," and "8,000 Tweets."[59] That is the real goal—outreach to influence the public and regulators. The following case studies provide more examples of how these centers conduct their research and outreach efforts in order to advance their agenda.

Unfortunately, we can expect even more phony "translation" efforts emerging from NIEHS grants in the coming years, squandering yet more taxpayer dollars. NIEHS announced in July 2019 that it will be placing "new emphasis" on translation of children's environmental health research by establishing "a network of CEH Research Translation Centers." NIEHS officials say they plan to devote $5 million for "new centers [that] will develop and test strategies for communicating CEH information through regional support for individual scientists, health care professionals, and local communities."[60] NIEHS officials say they will set up five centers by the end of 2019 that will use social media and other methods for community outreach activities. If these new centers turn out to be anything like the COTCs in the following case studies, which NIEHS already funds, we can expect them to simply spread scientific misinformation while engaging in political advocacy.

CASE STUDIES

Columbia University. Columbia Center for Children's Environmental Health (CCCEH).

This case study shows how much impact a single children's environmental health center can have on the policy process even when its research is sorely lacking. Located at Columbia University in New York City, CCCEH produced a single study that nearly led to a federal ban of the pesticide chlorpyrifos. Chlorpyrifos is critically important in the protection of many crops, and banning it could significantly increase crop damage and food prices.[61]

Shortly after the EPA reregistered chlorpyrifos in 2006 (the agency reviews all pesticides every 15 years and reregisters those it deems safe),

environmental activists used a provision in the federal pesticide law that allows citizens to petition the EPA to change pesticide registration decisions. The Natural Resources Defense Council and the Pesticide Action Network of North America (PANNA) petitioned the EPA in 2007 to revoke the "tolerance" for chlorpyrifos, which would amount to instituting a ban. The law requires the agency to decide on such requests "after giving due consideration."[62]

For nearly a decade, the EPA deliberated and environmental activists initiated numerous lawsuits trying to force the agency to act. The EPA appeared to be moving toward denying the ban, but it reversed course in March 2016, when the agency called for a meeting of its Science Advisory Panel (SAP). It asked the panel to consider whether it made sense for the agency to use a single study as a basis for accepting the activists call to ban this pesticide. That study, conducted by CCCEH, measured traces of chlorpyrifos in umbilical cords shortly after women gave birth and then conducted cognitive tests of the children several years later. CCCEH researchers reported that the children whose mothers' umbilical cords had the highest levels of chlorpyrifos experienced greater developmental delays.

As noted, such statistical associations on their own do not prove cause-and-effect relationships. They might help build a case for effects in the presence of other supporting evidence, such as a significant number of other studies coming to the same conclusions, a biologically plausible explanation for such effects, findings reproduced by other researchers, or a combination of these. Yet none of these factors applied in this case, and similar studies reported no such effects.[63]

The SAP review revealed many serious flaws with this study that may explain why it was out of line with the prevailing research on chlorpyrifos.[64] Most importantly, using cord blood data as a measurement for exposure to infants was not appropriate. The panel noted:

> Because many uncertainties cannot be clarified, the majority of the Panel does not have confidence that the CCCEH cord blood data on chlorpyrifos levels can accurately be used in quantitative risk assessment to determine a Point of Departure (PoD).[65]

In addition:

> Given the ~5 day terminal half-life of chlorpyrifos, it would seem unreasonable to think that the chlorpyrifos concentration in blood at birth would directly influence the chlorpyrifos blood concentration between 1 and 2 years of age.[66]

SAP reviewers also noted that the data was particularly weak because it involved only one-time measurements, which may not represent actual exposure during pregnancy. A "large fraction" of samples were unreliable because researchers used default numbers—estimates where the chemical exposure was too low to even detect. In addition, biological plausibility that the chemical could affect neurological development was questionable because all the levels measured were at very low concentrations—in the "low parts per trillion." To make matters worse, the CCCEH researchers failed to make key portions of their data available, which means the study lacked transparency; hence it could not be reproduced and validated.[67]

Nonetheless, shortly before President Trump took office, the Obama EPA released a revised risk assessment in November 2016 that used the CCCEH study to support a proposed ban.[68] The poorly designed study had considerable weight in the policy world because CCCEH appeared to be an objective scientific body.[69] The Trump administration reversed course, announcing in March 2017 that it would reject the activist petition and not proceed with the ban, as it was not supported by science. Yet again, activists sued the EPA to push for a ban, and in August 2018, a three-judge panel actually ordered the agency to ban the chemical within 60 days.[70] The Trump administration appealed that decision and has prevailed to date.[71]

However, the issue is not over because all the hype caused by the CCCEH study led California to pursue a state-level ban despite the fact that it may devastate its orange industry, which is battling a serious pest-related disease.[72] In addition, several state attorneys general are suing the Trump administration in an attempt to force a federal ban.[73]

Activists have succeeded in moving this issue this far because CCCEH appears to be an unbiased university based research center, when in reality it is part of the activist network working to push bans and regulations. On its website, CCCEH claims to be "ambassadors of preventive measures to protect children from environmental threats," and lists among its activities community outreach "efforts to remove unsafe chemicals and toxicants in our communities."[74] The group also states that it focuses on "generating new findings" that link chemicals to developmental problems, which it can then use in various community "campaigns" to eliminate these chemicals in commerce.[75] In other words, CCCEH does not appear to be looking to produce unbiased results.

The center also works closely with other environmental activist and lobbying organizations that share its

anti-chemical ideology, including the Environmental Working Group (EWG) and the two activist groups behind the petition to ban chlorpyrifos, PANNA and NRDC.[76]

CCCEH also promotes questionable research produced by other activist organizations. Its website highlights recent publications produced by the Children's Health Center, housed within the World Health Organization (WHO). These WHO publications, which were cited in the 2017 Impact Report, make many unsupportable claims about pollution and children's health.[77] For example, the WHO issued a press release claiming that 1.7 million children die every year from "pollution," and the implication is that "industrial pollution" and free enterprise are to blame.[78] Based on this view, the "answer" lies in "sustainable development"—government management of the economy. However, the "pollution" to which the WHO refers is largely due to problems arising from low levels of economic development, such as untreated drinking water and heavy smoke related to rudimentary energy sources. Hence, the problem is not industrial activity, but the lack thereof.

Finally, CCCEH only discusses negative impacts from pesticides.[79] Specifically, it fails to acknowledge the critical role that these products play in helping farmers provide a safe and affordable food supply or how they help fight disease-carrying vectors, from mosquitoes to ticks to rats.[80]

Modern, high-yield farming methods are crucial to fighting hunger, starvation, and malnutrition. These practices, which include pesticide use, have made it possible for food production to outpace population growth. As a result, people in both developed and developing countries have gained access to more food on a per capita basis over the past century. Per capita grain supplies have grown by 27 percent since 1950 and food prices have declined in real terms by 57 percent since 1980.[81] In 1929, before the use of many modern agricultural practices, Americans spent more than 23 percent of their income on food;[82] today, the average American family spends less than 10 percent of its income on food. That is quite an accomplishment, yet CCCEH ignores these realities as it pushes out junk science and misinformation about chemical risks.

The problem is not industrial activity, but the lack thereof.

University of California, Berkeley. Center for Integrative Research on Childhood Leukemia and the Environment (CIRCLE).

Linked from the NIH website are some "educational" materials published by the University of California's Center for Integrative Research on Childhood Leukemia and the Environment.[83] A review of its activities reveals a less than objective approach to these issues.

The center's researchers lack good data, but that has not stopped them from drawing conclusions and engaging in advocacy.

For starters, the center's website includes the image of a house with links to different rooms where people can learn about "leukemia risk factors."[84] Yet the center fails to present a solid body of research to show that the risk factors highlighted in the image, which include various chemicals, actually pose any significant risk. Perhaps that is because they cannot find any. The center does admit:

> In fact, because childhood leukemia is rare, it's very unlikely that any single child exposed to these risk factors would develop leukemia. Moreover, because there are many risk factors for childhood leukemia, it is not usually possible to identify the specific cause of an individual child's disease.[85]

In other words, the center's researchers lack good data, but that has not stopped them from drawing conclusions and engaging in advocacy, some related to leukemia risks and some that fall within a wide net of other risks.

Another example of CIRCLE's unscientific and alarmist activism is found in an online presentation titled "Dirty Little Secrets about Household Dust." It warns that homes across America contain seemingly dangerous levels of "toxic dust," composed of trace chemicals that include everything from flame retardants to phthalates (chemicals used to make soft and pliable plastics) to Bisphenol A to lead and asbestos. The nation's kids, the presentation suggests, face worrisome health threats from this "toxic dust" that include "asthma, eczema, cancers, as well as endocrine and neurodevelopment disorders."[86] What this has to do with the center's mission to research leukemia is not clear, and neither are the actual risks alleged.[87]

The presentation includes several slides and embedded videos, which involves narration by a cute five-year old girl named Eleanor, who highlights the problems associated with "toxic dust." In the first video, Eleanor warns that "15 pounds of dust settles in our house each year," and that these particles "attract lots of toxins. It's a magnet!"[88] In the second video, she explains, "Toxic dust spreads chemicals everywhere around the house."[89] The video then shows a dusty mist move around rooms as Eleanor lists where one might find chemicals, such as in the kitchen from cooking food or from toys containing phthalates or asbestos from ceilings.

The third video offers recommendations such as "don't bite your nails" and "wash your hands after using a computer."[90] There are plenty of good reasons to not bite your nails and wash your hands, but exposure to trace chemicals in dust at home is not one

of them. These recommendations wrongly imply that computers transmit dangerous levels of trace chemicals from keyboards, a claim that is not backed up with any data.

It would be helpful if the video focused on circumstances under which certain chemicals could pose problems and what problems they might actually pose. There is no good body of evidence that traces of flame retardants in furniture or chemicals used to make plastics such as phthalates or Bisphenol A pose any risks via household dust. Lead and asbestos may pose risks *in some limited circumstances*, although those risks have nothing to do with leukemia.

Nowhere does the presentation explain those risks and in what limited contexts they occur, nor do they provide useful information on what parents could do to address them. For example, for homes built after lead paint was banned in 1978, lead is not something to worry about, but the CIRCLE videos do not mention that, as it undermines the "toxic dust" narrative. Nor does it discuss how to address lead paint in homes built before lead paint was banned. Lead paint risks—from lead poisoning to potential impacts on learning ability—can be serious in homes that have peeling lead paint, which can be addressed in a variety of ways, from complete removal to covering it via scraping and repainting. Rather than provide useful details on that, the presentation simply suggests that *all families* have "toxic dust" in their homes that they can address by avoiding dry sweeping and instead using a wet mop when cleaning. That is not a real solution for the limited cases where peeling lead paint can pose a risk.

Dust can also carry risks for children who are allergic to dust mites and cockroach feces that can get into the dust. In those cases, cleaning the dust, going to the doctor for allergy treatments, and eliminating cockroaches is a good idea. But again, this presentation completely ignores the real risks. Instead, it focuses on alleged health risks from pesticides. It offers no evidence that traces of pesticides pose any significant risk to children. Rather than provide helpful advice, it makes dangerous suggestions, such as calling on consumers to avoid flame-resistant furniture and pesticides, which can reduce actual risks from cockroaches and other pests.

Consider the suggestion that parents seek flame retardant-free furniture. First, allegations that these products, particularly ones that contain Polybrominated Diphenyl Ethers (PBDEs), are dangerous are not supported by the facts. The Agency for Toxic Substances Disease Registry's public health statement on PBDEs notes:

> Nothing definite is known about the health effects of PBDEs in people. The majority of information regarding toxicity of PBDEs and their breakdown products (metabolites) is from animal studies.[91]

That means rodent tests are the primary "evidence" that these chemicals might pose cancer risks to humans. But rodent tests, which administer very high levels of chemicals to the animals, are not particularly relevant to humans exposed to trace levels. After all, it is the dose that makes the poison. In fact, rodents also get tumors from very high doses of chemicals found naturally in healthy foods, like broccoli, carrots, and plums.[92]

Meanwhile, there are documented cases of people dying in fires every year. According to the U.S. Fire Administration, 3,645 people died in fires in 2017.[93] Flame retardants can play a role in reducing the very real risks associated with fires.[94]

Still, CIRCLE researchers allege there is an alarming increase in neurodevelopmental conditions, particularly autism, and chemicals, including flame retardants, may be a contributing factor.[95] They are correct that reported autism rates have risen dramatically in recent decades, but there are better explanations for that than exposure to tiny traces of chemicals in consumer products. Stephen Camarata of the Vanderbilt University School of Medicine says that although the cause is unknown and many alleged causes, such as vaccinations, have been disproven, the increase is at least due in part to more accurate diagnosis. Other causes, he notes, include reduced rates of infant fatalities (enabling more autistic babies to reach childhood) and pushing early identification to earlier and earlier ages. He argues that early identification may lead medical professionals to incorrectly categorize many children as autistic when they are actually just delayed in development. He warns we can expect even bigger increases because of new screening guidelines that will include more data, covering children aged two for the first time.[96] In a review of the research on this topic, Eric Fombonne, M.D., of McGill University's Department of Psychiatry finds:

> Although it is clear that prevalence estimates have gone up over time, this increase most likely represents changes in the concepts, definitions, service availability, and awareness of autistic-spectrum disorders in both the lay and professional public.[97]

This center does not appear to be focused on reducing risks or providing objective science, but on spreading misleading information that can help

generate support for a political agenda. After developing a scary narrative about toxic dust, it calls on parents to give money to environmental activist organizations that lobby for ever more stringent environmental regulations, and more funding for the research centers. So, taxpayers fund the researchers who work in tandem with environmental activists to support their agenda, and activists continue to sound alarms to help generate more funding for the researchers.

Emory University. Center for Children's Health, the Environment, the Microbiome and Metabolomics (CCHEM²). According to the EPA website, the research for this program was slated to run from September 1, 2015, through August 31, 2019.[98] The original project cost listed on the EPA's website was about $1.8 million, but apparently much more money has flowed to the program. An EPA press release notes that $5 million in grants were awarded in 2017 to this one center.[99]

This center focuses on an important question: Why do African-American women deliver their babies prematurely more often than other women? According to the grant abstract, the center specifically focuses on microbiomes—colonies of microbes that live inside the human body—to determine if such microbes have something to do with higher rates of premature births.[100] It is a scientifically plausible field of research. For example, a University of Pennsylvania study provides some evidence that such organisms in the microbiomes found in the cervix and vagina *may* have an impact on premature birth rates.[101] However, this study does not discuss "environmental factors" as a cause, but rather focuses on genetic differences between African-American women and other women and how that influences the presence or absence of certain bacteria.

In contrast, C-CHEM², as detailed in its original project abstract, focuses on the health impacts related to "environmental exposures"—particularly "endocrine-disrupting chemicals in the home environment"—and how these might impact microbiomes.[102] The center identifies such substances on its website as various chemicals found in consumer products, from plastics to cleaning products to pesticides.

The project proposal explains that it would set up a Community Outreach Translation Core to develop "sustainable strategies to reduce environmental exposures that negatively impact" fetal and infant microbiomes and neurodevelopment. While developing research protocols and collecting data for the research part of the program, C-CHEM² researchers launched efforts to educate

Taxpayers fund the researchers who work in tandem with environmental activists to support their agenda, and activists continue to sound alarms to help generate more funding for the researchers.

Eating organic food is touted as a way to reduce health risks, despite the fact that there is no evidence that organic food is healthier than other produce.

people on the presumed results. Instead of translating scientific findings, they are involved in pushing predetermined conclusions while doing research designed to validate those assumptions after the fact.

Despite the paucity of definitive data, the center appears to be using at least some of its tax dollars to "educate" people—primarily African American women—about the alleged risks associated with some consumer products. Linda McCauley, who heads the center, maintained in an article for *E&E News*: "We have researchers doing very sophisticated and analytical research looking at what is happening with the health of women and children when they are pregnant, but we need to communicate that with the Atlanta community."[103]

So what kind of information has the center been providing to the Atlanta community? C-CHEM^2 attempts to explain in a video featuring community "stakeholders" involved in the program.[104] The video includes interviews with university staff as well as African-American women and their families who live in Atlanta. But rather than enlighten, the video provides a confusing and vague picture of what the project actually entails.

For example, eating organic food is touted as a way to reduce health risks, despite the fact that there is no evidence that organic food is healthier than other produce.[105] The video even features a stakeholder who trains people on how to farm organically in urban settings. Such farming was presented as a way to "control" how your food is produced and to address limited access to grocery stores in some communities. This is very peculiar. Is the center actually suggesting that it is more convenient and healthful for pregnant women to set up their own urban farms rather than take a bus to a grocery store? Not only is the idea as absurd as it is impractical, simply providing education on how to maintain a healthy diet would be much more useful.

Other "educational" materials on the website are equally defective. For example, the center includes links on a webpage titled "C-CHEM^2 Presents: Know Better Live Better."[106] Among the "Everyday Tips" were hyperlinks to materials that demonize the use of flame retardants,[107] plastics,[108] pesticides,[109] and household cleaners,[110] suggesting that these products pose serious health risks despite the absence of solid scientific evidence to support those claims. Nor is there any discussion of the benefits these products provide in fighting fires, storing food, killing potentially disease-carrying pests, and ensuring sanitation.

To top it off, the advice provided under each of these links is akin to—

if not directly linked to—the junk science peddled by environmental activist groups whose missions involve lobbying for government regulations. In fact, C-CHEM[2] includes a link to an Environmental Working Group flier that highlights a "dirty dozen" list of conventionally grown fruits and vegetables—strawberries, spinach, nectarines, apples, grapes, peaches, cherries, pears, tomatoes, celery, potatoes, and bell and hot peppers. The EWG flier suggests these foods are dangerous because they might have tiny traces of pesticides on them and that people should select organic versions of these foods. [111]

This "dirty dozen" list of healthy fruits and vegetables is part of EWG's annual campaign to demonize pesticide use and lobby for bans and regulations.[112] Unfortunately, such advice could easily discourage pregnant women from eating these healthy food items, since the organic versions are generally more expensive. Yet there is no compelling evidence that the conventional versions pose any more health risks than the more expensive organic versions. EWG, along with several other environmental activist groups, is also linked on the C-CHEM[2] site under a tab for "educational resources and videos."[113]

Another of the "Everyday Tips" links to a C-CHEM[2] infographic titled "Toxins and Your Child's Health: Cleaning Products." At the top, it asserts: "Cleaning products may contain strong chemicals that harm our children. Follow these tips to reduce your exposures while maintaining a clean and healthy home." It uses the word "may" because there is no evidence for the claims made in it.[114]

The infographic also states: "Brooms, dusters, and furniture sprays spread chemicals around the home," and another section says, "Wet mopping, microfiber cloths, and HEPA air filers remove dust and chemicals." At the bottom of the infographic, the center identifies "Potential Health Effects" that include: "asthma," "fertility," and "hormones." The implication is that "brooms, dusters, and furniture sprays" can lead to asthma, fertility problems, and hormonal imbalances, although the graphic never directly makes that claim—perhaps because there is no evidence.

That is your tax dollars at work. Millions of dollars spent, and we now "know" that dry sweeping is "bad" and wet mopping is "good." Also, furniture polish must also be "bad" because it is made with chemicals. But time for a reality check: Everything in the physical world is composed of chemicals—even the water in your wet mop. Ironically, surely more people get hurt from slipping on wet floors than from trace chemicals found in furniture polish.

Everything in the physical world is composed of chemicals—even the water in your wet mop.

Many of these programs sound science-based, but a close look at what they actually fund indicates otherwise.

The center also funds similarly questionable activism in the form of "community grants," offering $2,500 to groups working to demonstrate a link between chemicals and health effects. The application states: "The Community Grant Program provides funding to organizations that aim to conduct outreach, promote community awareness of local environmental health concerns, or collect information needed to address health concerns related to the environment and maternal and child health."[115] In other words, environmental activists can apply to use these funds to misinform people even more.

A flier detailing the application process suggests that applicants should focus on projects that link certain environmental exposures to the following health effects: "asthma, obesity, and birth defects." It explicitly notes examples of environmental exposures that include "chemical exposures in baby toys; air or water pollution; food access; household hazards; waste disposal/illegal dumping; contaminated soils and foods; abandoned building/site; environmental justice."[116]

In the final analysis, one must ask: What do any of these outreach and "education" programs have to do with premature births among African-American women and the human microbiome? The answer is: Not much. C-CHEM^2 simply uses that very real and important concern to advance largely unrelated activist agendas—all at taxpayer expense.

Conclusion

For more than a decade, the federal government has doled out millions of dollars to fund junk science and political activism under the guise of "children's environmental health." Based at universities around the nation, many of these programs sound science-based, but a close look at what they actually fund indicates otherwise. They are not focused on performing unbiased science, but in generating junk science to promote environmental activism.

Not only should the Trump administration cut EPA funding for these centers, it also should cut the other half of the funding coming from the National Institute of Environmental Health Sciences. In addition, the National Institutes of Health should halt plans for NIEHS to fund the creation of additional "translational centers," which will be specifically designed to engage in activism without even attempting to provide any scientific justification.

Taxpayers should not be forced to fund agenda-driven science. If the government spends on any funding for health-related research, it should focus on such things as finding cures and treatment for cancers, heart diseases, and other serious illnesses.

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