

## **Thank you California, for standing up for public health**

On March 28, 2017, the California Office of Environmental Health Assessment identified the widely used herbicide, glyphosate, as a chemical known to the State to cause cancer under Proposition 65. This determination was based on the identification of glyphosate as a probable human carcinogen on March 20, 2015 by the International Agency for Research on Cancer (IARC), a part of the World Health Organization (WHO). As scientists with extensive training and experience in the areas of cancer, children's health, developmental biology, endocrine disruption, environmental biology, epidemiology, and reproductive health we agree with these assessments and commend California regulators for their foresight in acting to protect the health of future generations.

Predictably, the major manufacturer of glyphosate and genetically modified, glyphosate-resistant crops, Monsanto, has filed suit to block this action. Monsanto and its sympathizers are waging a public relations campaign that is spreading misinformation and "alternative facts" in support of glyphosate (most recently in the Op-Ed section of the Los Angeles Times on April 28, 2017). This campaign relies on tactics first perfected by the tobacco industry - to attack peer-reviewed findings by independent scientists as "pseudoscience". Such arguments ring as hollow today as in the past.

Monsanto and its sympathizers assert four major arguments in support of glyphosate. Primary among these is the contention that there is no persuasive evidence that glyphosate causes cancer, birth defects or other reproductive harm in humans. We disagree with this "straw man" argument. What evidence would they demand to establish that glyphosate is harmful to humans?

The implication is that only controlled human trials such as those the FDA requires to license drugs would provide persuasive evidence that a chemical causes harm to humans. Fortunately for the residents of California, and people everywhere, it is unethical, immoral and illegal to conduct such experiments on humans. In reality, only accidental human exposures and occupational exposures can provide anything approaching cause and effect data in humans. What are the alternatives?

Modern science has provided a battery of tools we can use to evaluate the effects of chemical exposures on health outcomes. State-of-the-art tests, often using cells and laboratory animals, provide the biochemical and molecular tools that are needed to understand how glyphosate, and other chemicals, can cause harm.

Carefully performed, peer-reviewed studies can – and do – identify clear cause-and-effect relationships between glyphosate (and other chemicals used in weed control) and adverse health consequences. Ironically, industry uses a selected sub-set of animal studies to support their claims that chemicals such as glyphosate are safe, while demanding evidence from human studies, which would be illegal to perform, to refute these claims. This is a typical, yet unsupportable double standard. The public should not be fooled.

Next, industry and its surrogates suggest that IARC is under fire for using a "flawed" approach to identify glyphosate as a carcinogen. IARC is not under fire by the scientific community which has long appreciated the rigorous and thorough approach it takes to chemical evaluation. Rather, IARC and the State of California are under fire from Monsanto and the industry trade groups to which it belongs.

A further error these industry advocates have made suggests that the IARC decision is flawed because it did not appropriately assess the probability of harm. In particular, they suggest that IARC failed to take actual levels of exposure to glyphosate into consideration. This argument is deeply flawed. Many readers may be surprised to learn that the level of glyphosate exposure in the U.S. population is unknown. Although the Centers for Disease Control and Prevention evaluates samples collected from ~5000 people a year for hundreds of pollutants, glyphosate is not among them. Moreover, no industry group has funded or conducted the testing needed to determine how much glyphosate reaches food or is in people's bodies. Initial testing by independent researchers revealed that glyphosate is widely detected in the urine of both US and German populations and in 30% of Canadian food tested.

We and our colleagues independently analyzed the scientific findings on glyphosate in two peer-reviewed articles: one published in the Journal [Environmental Health](#), and one published in [The Journal of Epidemiology and Community Health](#). (Both are available free online). We identified a dramatic increase (more than 100-fold) in the use of glyphosate-based herbicides between 1974 and 2014 and called upon manufacturers and government agencies to measure glyphosate levels in blood and urine so that actual exposures of the general public can be determined, rather than current "guesstimates".

We also note that much has been learned in recent years about the adverse health effects of glyphosate-based herbicides since the initial glyphosate safety assessments were completed over 30 years ago. Those old (1980s) risk assessments were based primarily on unpublished documents (not available to the scientific community or public) produced by Monsanto, and did not benefit from any of the modern methods now available. It is particularly troublesome that Monsanto refuses to release the results of their own toxicology studies or to identify other potentially toxic chemicals in glyphosate-based herbicides, claiming both as "trade secrets".

The third prong of the industry argument holds that IARC "cherry picked" data to reach politically motivated findings. These are "alternative facts" entirely. Rather than cherry picking the data, IARC considered **all available** data to reach its findings. And let this be clear: IARC evaluated dozens of studies involving human occupational exposures and laboratory animals, and concluded that glyphosate is a probable human carcinogen. As experts in these areas, we agree. In contrast, the studies used by the EPA and European regulators to declare that glyphosate was not carcinogenic excluded virtually all studies performed by independent scientists without a financial interest in the outcome. It is clear who has been "cherry picking" data, and it is not IARC. The public should not be fooled.

The fourth prong of the industry argument is that the US EPA and European regulators have determined that glyphosate is not a carcinogen so the public should not be concerned. There are multiple problems with relying on such [findings](#) determinations. As current events clearly demonstrate, recent actions by the US EPA have been driven by politics rather than scientific information. For example, EPA overruled its own scientists in allowing the pesticide chlorpyrifos to remain on the market and is attempting to erase any evidence supporting the existence of climate changes from EPA websites. Monsanto continues to resist the release of documents describing interactions between company employees and EPA regulators involved in assessing the safety of glyphosate, claiming that such records are also confidential business information. Ongoing litigation over possible linkages between exposures to glyphosate-based herbicides and certain types of cancer has exposed some of these "trade secrets". Documents unsealed by the court show that Monsanto scientists have "ghost written" some of the "studies" used by regulators to support their conclusion that glyphosate is safe and non-carcinogenic. This is

deeply disturbing and casts a dark shadow on safety assessments of glyphosate-based herbicides.

Considering all this, should the public be assured of the safety of glyphosate? We think not and note that the amount of money expended by the agrochemical industry attempting to counter efforts to restrict the use of glyphosate is a chilling, but all-too-familiar tactic. We urge the scientific and public health communities to speak up on behalf of future generations and support stricter regulation of pesticides that pose possibly serious health risks. We challenge agribusiness to support farmers in their annual search for safer and more sustainable ways to minimize crop damage through management and prevention, rather than reliance on chemicals that threaten the health of people who eat pesticide-contaminated food, the workers who apply these chemicals, and the environment.

We appreciate the efforts of organizations and individuals whose grassroots efforts have led local school districts and cities to ban or forego the use of toxic, or potentially toxic, chemicals. We are unaware of any instances where weeds pose a significant risk to public health. In light of findings by IARC, and by independent scientists around the world, the same cannot be said about glyphosate and other chemicals used to control weeds around our homes, schools and parks, in addition to their use on crops such as corn, wheat and soy. We urge the public not to be duped by chemical company apologists who attempt to obscure independent scientific findings that threaten a highly profitable product.

In our published articles, we called on governments and government regulators to revisit the safety assessment of glyphosate and, like IARC, use **all available data** to draw conclusions about product safety. When taking any decision, it is always possible to make the wrong one. Considering this possibility, in which direction would one wish to have made such a mistake? To protect public health (even in the unlikely event that this might later turn out to be overzealous)? Or rather to protect the profits of a few corporations who have gone to great lengths to protect these profits irrespective of the potential consequences to human, animal and environmental health that cannot be undone once they occur ?

We commend California for its forward-looking decision to list glyphosate under Proposition 65 as a chemical the State has determined can cause cancer. We are proud of the many cities that have banned or eliminated the use of glyphosate and hazardous chemicals that threaten the health of our children and future generations.

Signed by,

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