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Controversy over a new evaluation of glyphosate, the world's most widely used herbicide, lifts the lid on aspects of chemical safety regulation that often remain hidden from public view.

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Glyphosate, the world's most widely used herbicide, hit the headlines in March after the International Agency for Research on Cancer (IARC) announced that it is a "probable human carcinogen".

The IARC, which is responsible for providing an evidence base for the cancer control policies of the World Health Organisation and its members, had completed a year long review of the scientific literature on the herbicide. It found "convincing evidence" that glyphosate causes cancer in laboratory animals, "limited evidence" that it does so in agricultural workers, and evidence that it causes DNA and chromosomal damage in human cells.

The IARC's evaluation is hugely important because it is sharply at odds with the views of the world's major regulatory agencies. Last year, an evaluation by German government regulators, on behalf of the European Commission, concluded that there was no evidence that glyphosate is carcinogenic or mutagenic, or that the herbicide posed any other serious hazard to health. All other regulatory agencies have reached similar conclusions.

The IARC did not have access to new evidence. So why has it reached totally different conclusions about the hazards posed by glyphosate?

First, this kind of disagreement is not unprecedented, or entirely surprising. Evidence about chemical safety is often incomplete, uncertain and ambiguous, such that assessments of safety cannot always be resolved on the basis of evidence alone. What, for example, constitutes a reliable and relevant study? How should conflicting evidence be weighed? How much of what kinds of evidence are necessary to support a judgement about hazard, or its absence? Subjective judgements and assumptions, as well as evidence, are typically required to settle such questions, so it is no wonder that institutions sometimes disagree.

We do not know exactly why institutional evaluations of glyphosate differed so markedly in this case because the IARC has yet to publish its full evaluation (that is promised for later in the year). But, from the IARC's summary, it appears likely that it used different criteria for choosing which evidence to evaluate; made different judgements about the reliability of some of the evidence; and interpreted the results of some of the experimental studies in different ways.

Most regulatory agencies are reluctant to acknowledge that there are choice-laden aspects to chemical safety assessment. This is partly because science is a powerful source of legitimacy, and regulators often want to portray their assessments as far more objective, reliable and consensual than is actually the case. But it is also because to do so would be an open invitation to scrutinise regulators' technical assessments. We might reasonably want to ask how have the choice-laden aspects of those assessments been exercised: in ways that resolve ambiguities and uncertainties in favour of public health, or in favour of agribusiness?

The IARC's evaluation presents a dilemma for regulatory institutions. If they explicitly accept the validity of the IARC's findings (and therefore acknowledge the choice-laden nature of safety evaluation) this might invite scrutiny and criticism of their own assessments, and regulatory decisions. The only alternative is to insist that the IARC's review is scientifically flawed or politically biased.

This latter tactic has often been adopted when individual scientists criticize a sensitive regulatory consensus, but the IARC is a rather formidable dissenter. It is about as scientifically rigorous and independent an institution as they come. Its evaluations are conducted by senior academic and regulatory scientists, drawn from around the world, and subject to a strict conflict of interest policy. IARC insists that its evaluations are transparent and so all evidence used to support its evaluations must be publicly available. The evaluation process is guided by published scientific principles and assessment criteria, and is explained in considerable detail in IARC's monographs.

We don't yet know how regulators will handle this dilemma, but the agrochemical industry's strategy is already clear: "[IARCs] result was reached by selective 'cherry picking' of data and is a clear example of agenda-driven bias" was Monsanto's reported response. The American Council on Science and Health, an industry-funded "consumer" organization, opined in similar style: "… [IARC] started out with the conclusion they aimed at reaching, and then they evaluated the data they wanted to utilize to get to that conclusion and ignored or manipulated the rest."

This strategy is curious because it is bound to invite comparison between the IARC and those regulatory institutions that have supposedly produced a more impartial evaluation of glyphosate. And such comparisons are unlikely to be favourable.

Readers might be astonished, for example, to learn that much of the German government's recent evaluation of glyphosate - favourably compared to the IARC's evaluation by the agrochemical industry - was not actually written by scientists working for the German Federal Institute for Risk Assessment (BfR), but rather by the European Glyphosate Task Force, a consortium of agrochemical firms.

BfR officials explained that due to the quantity of evidence they did not have the time to report the original studies in detail, but instead based their evaluation on descriptions provided by the agrochemical industry. But those descriptions also contained the industry's assessment of the reliability and interpretation of each study, which involves exactly the kinds of choice-laden decisions described earlier. BfR regulators commented, in italics, on the industry text, but this falls well short of what most people would understand as an independent review.

We do not know if the BfR evaluation is unusual in having been drafted by the firms whose products were being evaluated, or unusual because German regulators were honest enough to make that practice explicit. But if one of the world's wealthiest nations does not have sufficient resources to conduct its own independent evaluations of toxicological evidence we might well ask what are the practices in regulatory institutions elsewhere?

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