

The Science behind the PFAS Drinking Water Health Advisory and How It Affects Risk Management Decision Making

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Background/Objectives. Since the May 2016 Drinking Water Health Advisory for PFOA and PFOS was issued, the USEPA and state agencies have been working to set regulatory guidelines that will establish limits for PFASs in drinking water and other environmental media. While this process is focused on establishing limits that are protective of human health and the environment, it has highlighted challenges in quantifying the risk associated with PFASs given the limited scope and breadth of toxicological research that has been completed to date. Consequently, regulatory guidelines established to date have been generated using a conservative approach to increase the certainty that they are in fact protective. While this has provided a framework for assessing PFAS data, questions remain about the actual level of risk that is present at most PFAS sites. This level of uncertainty presents challenges for site managers and project teams who are tasked with developing an approach to reduce risks to the surrounding public and communicating site risks and project approaches to stakeholder groups where PFASs are of concern.

Approach/Activities. This study is a desktop review of the supporting documentation used in development of the existing USEPA Drinking Water Health Advisory for PFOA and PFOS. The approach consisted of evaluating the supporting documentation and researching the reference sources to provide a critical evaluation of the basis for the Drinking Water Health Advisory.

Results/Lessons Learned. This study presents a critical evaluation of the toxicological basis underpinning the USEPA Drinking Water Health Advisory – a description and explanation of the scientific studies upon which the Advisory was based. The toxicology of PFAS is complicated with complex pharmacokinetics that vary widely across species and by gender, which complicates the interpretation of toxicological research and development of toxicity values. To address these complexities, physiologically-based pharmacokinetic (PBPK) modeling was used to mathematically balance the difference in rates and mechanisms of absorption and/or excretion. While, this type of PBPK modeling is commonly used, it carries the same limitations as any model in that it is subject to the simplifications of the input parameters. This presentation discusses both the strengths and weaknesses in the foundational research dataset as well as the PBPK model assumptions. The degree to which those strengths and weaknesses impact the final derivation of the Drinking Water Health Advisory will also be presented, along with how those strengths and weakness impact risk management decisions as the Advisory is applied to sites across the country. By cataloging and summarizing existing toxicological data for PFAS we are able to better assess PFAS-related project risks and support project decisions and stakeholder communications.