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To Treat or Not to Treat

Comparing Health Impacts of PFAS Exposure to Health Impacts of PFAS Removal Technologies

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3.25.T-03 To Treat or Not to Treat: Comparing Health Impacts of PFAS Exposure to Health Impacts of PFAS Removal Technologies

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Associations between PFAS and adverse health effects have led to the global introduction of drinking water concentration limits in the low ng/L range. PFAS exposure has been shown to contribute considerably to disease burden, so interventions are clearly necessary to reduce exposure. However, to adequately quantify the health benefits of intensified drinking water treatment, the health effects of the treatment technologies should be considered as well. Therefore, the aim of this study was to estimate both types of human health impacts, i.e. the health gained by reduced PFAS exposure via drinking water and the health lost due to the drinking water treatment technologies, and quantify these in disability-adjusted life years (DALYs).

We performed a life cycle assessment to quantify the health lost (in DALYs) due to an increased regeneration frequency of granular activated carbon (GAC), which is used at a local drinking water producer to meet recent PFAS guidelines. To quantify the health gained by lower PFAS exposure, we first used the existing physiologically based pharmacokinetic model by EFSA to relate ?EFSA4 concentrations in drinking water to those in blood serum. Serum concentrations were then used in exposure response relationships from literature to relate them to an increase in disease occurrence, which was subsequently related to DALYs.

For all endpoints considered, we found that the gain in human health by removing PFAS from drinking water was in the same range as the loss of human health from the increased GAC regeneration. While the high uncertainty in PFAS health effects limits our ability to make a reliable comparison, it is likely that

other interventions that limit PFAS exposure have a higher net benefit than drinking water treatment. For example, phasing out all non-essential uses of PFAS will lead to a decreased exposure via multiple routes, including diet. Altogether, PFAS limits in drinking water may need to be determined on a case-by-case basis, that considers the current concentration levels in addition to the secondary impact of the required treatment technologies. This study mainly serves to start a dialogue about this complex issue, which is particularly important as increasingly many PFAS are added to drinking water guidelines, most of which are even more challenging to remove than those currently included.