CARB and OEHHA Must Exercise Caution in Adopting or Adapting Health Reference Values from Other Jurisdictions

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The following table from Fiedler, Kennedy and Henry, 2020 (submitted to IEAM 6/2020) compares drinking water HBVs for five perfluoroalkyl acids (PFBA, PFHxA, PFOA PFBS PFOS) and HFPO NH_4^+ values across US state, US federal and other countries. Note the wide differences in HBVs across these jurisdictions for the same PFAA: 300x PFBA; 11x PFHxA; 17,647x PFOA; 6,670x PFBS; 1,698x PFOS; 5X HFPO NH_4^+.

Table 4: Standards and Guidance Values for PFAS in Drinking Water; PFAS Analyte Concentration (µg/L) (Modified from ITRC, Table 4-1, accessed 2020-06-24.)

Location	Agency / Dept	Standard / Guidance	Type	PFBA	PFHxA	PFOA	PFBS	PFOS	HFPO NH_4^+	Min to Max (µg/L)
CAS Number				375-22-4	307-24-4	335-67-1	375-73-5	1763-23-1	3252-13-6	PFBA 0.1 to 30
U.S. Environmental Protection Agency										PFHxA 0.09 to 1
USEPA	Office of Water	HA	DW			0.070		0.070		PFOA 0.0051 to 90
U.S. States										PFBS 0.1 to 667
Alaska (AK)	DEC	Action Level	DW/GW/SW			0.070		0.070		PFOS 0.0053 to 9
California (CA)	SWRCB	NL	DW			0.0051		0.0065		HFPO NH4 0.140 to 0.7
	SWRCB	RL (CA)	DW			0.0100		0.0400		
Connecticut (CT)	DPH	AL	DW/GW			0.070		0.070		
Massachusetts (MA)	DEP	Drinking Water Values	DW			0.020		0.020		
Michigan (MI)	DEQ	GCC	DW/GW			0.070		0.070		
	DHHS	Screening Levels	DW			0.009	1	0.008		
Minnesota (MN)	MDH	HRL- subchronic	DW/GW	7		0.035	9			
	MDH	HRL - chronic	DW/GW	7		0.035	7	0.300		
	MDH	HBV - subchronic	DW/GW				3	0.015		
	MDH	HBV - chronic	DW/GW				2	0.015		
Nevada (NV)	DEP	BCL	DW			0.667	667	0.667		
New Jersey (NJ)	DEP	MCL	DW							
	DWQI	MCL	DW			0.014				
	DWQI	MCL	DW					0.013		
North Carolina (NC)	DHHS	Health Goal	DW						0.140	
Ohio (OH)	ODH	Action Level	DW			0.070	140	0.070	0.700	
Rhode Island	DEM	GWQS	DW/GW			0.070		0.070		
Vermont (VT)	DEC/DOH	MCL	DW/GW			0.020		0.020		
	DEC/DOH	HA	DW/GW			0.020		0.020		
International										
Australia	DOH	health-based	DW			0.560		0.070		
British Columbia, Canada		water standard	DW/GW			0.200	80	0.300		
Canada	HC	DWSV	DW	30	0.200	0.200	15	0.600		
	HC	DWSV	DW							
	HC	MAC	DW			0.200		0.600		
Denmark	EPA	health-based	DW/GW	0.100	0.100	0.100	0.100	0.100		
Germany	GMH	health-based	DW			0.300		0.300		
		administrative	DW			0.100		0.100		
Italy		health-based	DW	7	1	0.500	3	0.030		
Netherlands	EPA	health-based	DW					0.530		
		administrative	DW					0.0053		
Sweden		health-based	DW					0.090		
		administrative	DW		0.090	0.090	0.090	0.090		
UK	DWI	health-based	DW			10		0.300		
		admin. Level 1	DW			0.300		0.300		
		admin. Level 2	DW			10		1		
		admin. Level 3	DW			90		9		

Regulatory Agency

DEC = Dept. of Environmental Conservation
DEM = Dept. of Environmental Management
DEP = Dept. of Environmental Protection
DEQ = Dept. of Environmental Quality
DHHS = Dept. of Health and Human Services
DOH = Dept. of Health
DPH = Division or Department of Public Health
DWI = Drinking Water Inspectorate
DWQI = NJ Drinking Water Quality Institute
EPA = Environmental Protection Agency
GMH = German Ministry of Health
HC = Health Canada
MDH = Minnesota Department of Health
ODH - Ohio Dept. of Health
SWRCB = California State Water Resources Control Board

Standard or Guidance

AL = private well action level
BCL = basic comparison level
DWSV = Drinking Water Screening Value
GCC = Generic Cleanup Criteria
GWQS = Groundwater Water Quality Standard
HA = lifetime health advisory
HBV = health-based value
HRL = health risk limit
MAC = maximum acceptable/allowable concentration
MCL = maximum contaminant level
NL = Notification Level
RL = reporting level
RL (CA) = Response Level (California only)

Per- and polyfluoroalkyl substances

PFAS = per- and polyfluoroalkyl substances
PFOA = perfluorooctanoic acid (C8)
PFOS = perfluorooctane sulfonic acid (C8)
PFBA = perfluorobutyric acid (C4)
PFBS = perfluorobutane sulfonic acid (C4)
PFHxA = perfluorohexanoic acid (C6)
HFPO NH_4^+ = hexafluoropropylene oxide dimer acid, ammonium salt

Type of Medium

DW = drinking water
GW = groundwater

The Interstate Technology and Regulatory Council (ITRC) has published information on their website (http://pfas-1.itrcweb.org) about the differences between state and federal health based values. The following excerpt (emphasis added) highlights the need for exercising caution when adopting an HRV from another jurisdiction. Although this text refers only to differences among US state and federal agencies, these same differences exist among other countries as well.

> "As of September 2019, regulatory human health–based guidance values and/or standards have been derived for 16 PFAAs, two polyfluoroalkyl precursors, and one fluorinated ether carboxylate (FECA) by state and/or federal agencies in the United States. The values for these nonpolymeric PFAS vary across programs, with *differences due to the selection and interpretation of different key toxicity studies, choice of uncertainty factors, and approaches used for animal-to-human extrapolation. The choice of exposure assumptions, including the life stage and the percentage of exposure assumed to come from non-drinking water sources, also differs…*These same key decision points also underlie the differences that exist in the other perfluoroalkyl substance regulatory values…".

Another contemporary reference expressing the same concern is Cordner et al., 2019 (pdf of the publication provided with this document). That publication compares PFOA drinking water health based values, uncertainty factors, exposure parameters etc. in different jurisdictions within the US.

Therefore, we believe it is critical that the California Air Resources Board and the Office of Environmental Health Hazard Assessment be aware of these methodological differences in adopting or adapting health reference values developed by other government agencies or authoritative bodies for California. To the extent CARB and OEHHA identify such values for potential use in the Air Toxics Hot Spots program, or for any other purpose, we ask that OEHHA adjust these values as necessary to reflect California risk assessment methodologies and policies. This approach will ensure consistency in application of uncertainty factors, route-to-route extrapolation approaches, sensitive target populations, etc, and will result in more scientifically rigorous HRVs to support future screening and regulatory decisions.