

COST OF INACTION FOR PFAS EXPOSURE IN CALIFORNIA

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THE COST OF INACTION

A socioeconomic analysis of
environmental and health
impacts linked to exposure
to PFAS

2019 study for the Nordic Council of Ministers:

- 1) establish a framework (methodology) for estimating costs to society due to negative impacts linked with PFAS exposure
- 2) to provide monetary values for those societal costs, as documented by case studies

Annual health-related costs: **EUR 52 to EUR 84 billion** for the 550 million people in the European Economic Area (\$59.5 – \$97 billion)

Environmental clean-up costs: **EUR 821 million to EUR 170 billion** over 20 years, including O&M (\$19 - \$195 billion)

[The cost of inaction | Nordic cooperation \(norden.org\)](https://norden.org)

THE CHALLENGE: DEVELOP COST ESTIMATES FOR THE USA

- Only two partial studies so far
- High-level working group established
- Decision to develop more detailed estimates for two states
 - California
 - New Hampshire

WHY CALIFORNIA?



- Large, diverse population & geography
- No primary production of PFAS
- PFAS serum concentrations of Californians is higher than average person in the US
- Water is extremely important
 - Prolonged drought
 - Recycled water not treated for PFAS contamination
 - CA is main produce supplier for markets throughout the US

THE PROBLEM

- PFAS contamination is pervasive throughout California and the rest of the USA
- Awareness is growing about the associated problems, but no one knows the **true cost** of producing and using PFAS

DIRECT ENVIRONMENT-RELATED COSTS

- Testing and monitoring
- Drinking water remediation
- Wastewater & sewage sludge treatment
- AFFF disposal & replacement
- Groundwater & soil remediation

DIRECT ENVIRONMENT-RELATED COSTS

- Testing and monitoring → shifted to state and local officials
- Drinking water remediation → shifted to local public utilities
- Wastewater & sewage sludge treatment → shifted to local public utilities
- AFFF disposal & replacement → Department of Defence, local airports, local fire departments
- Groundwater & soil remediation → property owners, local authorities

HOW DIRECT COSTS CALCULATED FOR CALIFORNIA

- Testing and monitoring
 - Used values from CA Water Boards and CA Biomonitoring Program
- Drinking water remediation
 - Used CA drinking water monitoring + costs of remediation from real US examples
- Wastewater & sewage sludge treatment
 - Used testing from CA Water Boards + costs of remediation similar to those of drinking water
- AFFF disposal & replacement
 - Estimated quantities of AFFF + obtained costs from San Francisco & fluorine-free AFFF manufacturers
- Groundwater & soil remediation
 - Used site testing from CA Water Boards + estimated remediation

PRELIMINARY COSTS: NON-HEALTH

CATEGORY	ASSUMPTIONS	COST
Drinking water remediation	30-year cost	\$4.1 billion
Wastewater/sludge treatment	30-year cost	\$21 billion
Soil & groundwater remediation	10-year cost, low estimate	\$2.6 billion
AFFF disposal & replacement	Includes some decontamination costs	\$207 million
PFAS testing	Potentially contaminated sites	\$1.5 billion
TOTAL:		\$29 billion

HEALTH-RELATED COSTS

HIGH EXPOSURE

- Occupational exposure
 - 2-6% of workers at certain industries
- Considered elevated risk of death due to **kidney cancer** from occupational PFOA exposure

MEDIUM EXPOSURE

- Californians drinking water above PFAS response levels: 19%
- Considered elevated risk of **all-cause mortality** and
- Increase in number of **low-birth-weight** births

LOW EXPOSURE

- Everyone else
 - Californians exposed to low, background PFAS: 81%
- Considered elevated risk of death due to **hypertension**

PRELIMINARY COSTS: HEALTH

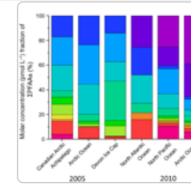
CATEGORY	ASSUMPTIONS	COST
High exposure: kidney cancer	Life value: \$11.6 million	\$15 million
Medium exposure: all-cause mortality	Life value: \$11.6 million	\$38 billion
Medium exposure: low-birth weight	Two-year cost	\$167 million
Low exposure: hypertension	Life value: \$11.6 million	\$2 billion
ANNUAL COSTS:		\$40 billion

COSTS OF PFAS: UNQUANTIFIED COSTS

- Governance & personnel
- Research & development
- PFAS air emissions
- Product replacement
- Food contamination
- Litigation
- Other health conditions
- Loss of property value, etc.

Continuous non-marine inputs of per- and polyfluoroalkyl substances to the High Arctic: a multi-decadal temporal record

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LOCAL NEWS

Fullerton Joins PFAS Lawsuit Against 3M, DuPont, Others

Potentially Hazardous Chemicals Are Found in Fast-Food Packaging, a New Report Finds

'Forever chemicals' are linked to harmful health effects

Are 'forever chemicals' in our milk?
Nobody really knows.



PRELIMINARY CONCLUSIONS FOR CALIFORNIA

- Costs to society are significant
- Public utilities particularly impacted
- Health-related costs are a major societal burden
- Investment in drinking water remediation appears highly cost-effective in comparison to rise in annual health costs if no action taken
- Prevention of further contamination is urgent

THE BIG QUESTION: WHO
SHOULD PAY?

The top half of the image features a background of industrial smokestacks and structures. A semi-transparent white rectangular box is centered over this background, containing the text "THANK YOU FOR YOUR ATTENTION!".

THANK YOU FOR YOUR ATTENTION!

