



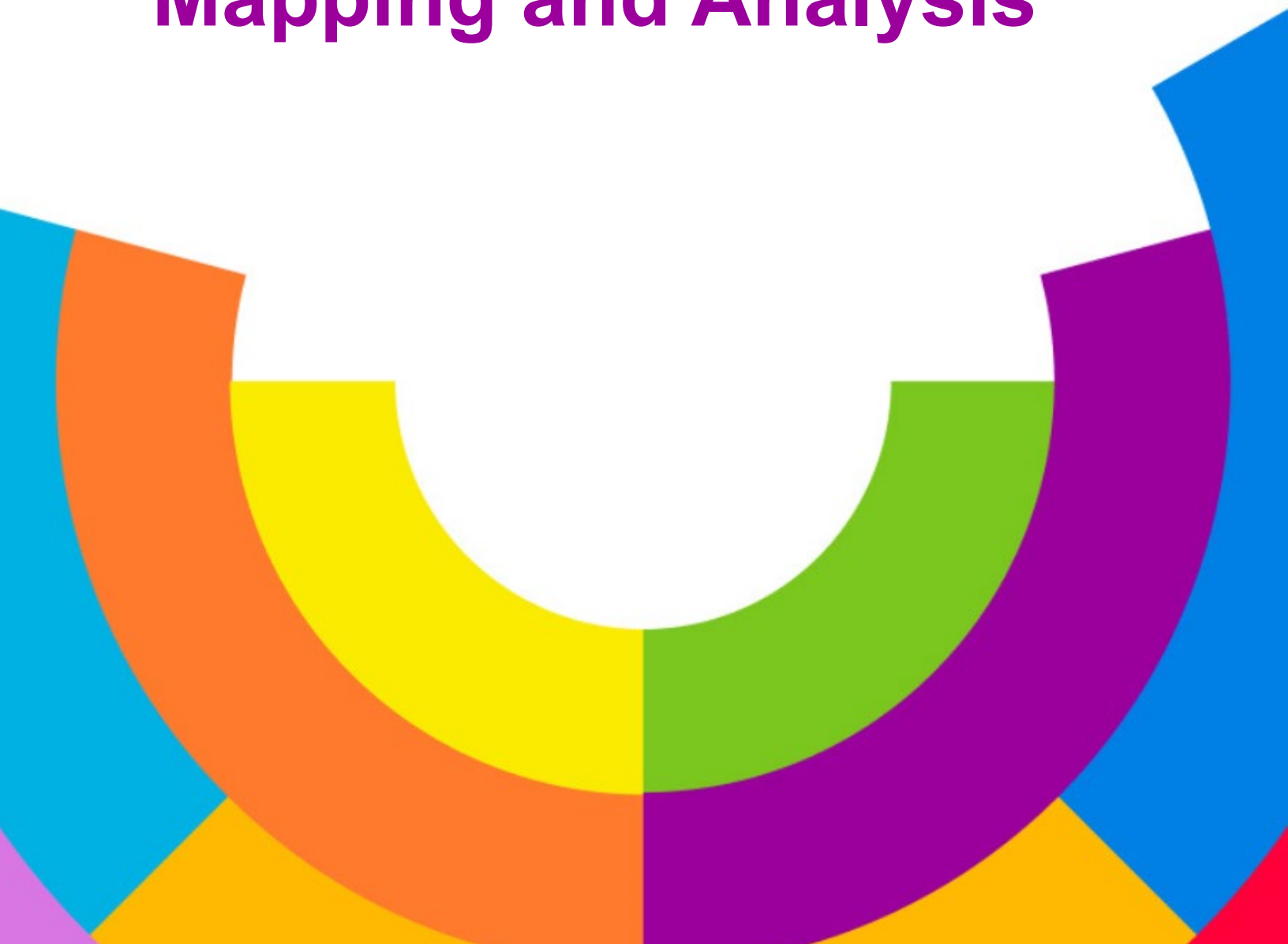
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PFAS legislative frameworks in Europe: Mapping and Analysis



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Executive Summary

This milestone provides a comprehensive analysis of the regulatory landscape concerning per- and polyfluoroalkyl substances (PFAS) across Europe.

PFAS are recognized for their environmental persistence, bioaccumulative properties, and potential health risks. These properties highlight the urgent need for effective regulations to mitigate exposure and protect human health and the environment.

The document maps out existing and previous national legislations among European countries and compares these with EU regulations, particularly focusing on restrictions on production and use, maximum levels in drinking water and food products as well environmental quality standards.

Some countries have implemented stricter national regulations than those mandated by the EU, and some countries have implemented measures prior to regulations in EU. For instance, Denmark has implemented stricter regulations in consumer products, banning PFAS in food packaging and textiles. Norway introduced a national ban on PFOA in consumer products, including textiles and paper goods, in 2014. However, most countries are only implementing EU regulations.

The report also identifies gaps in current EU-level regulations, notably in food, and also for environmental protection, suggesting further harmonization and stricter controls are necessary. Key future developments include the anticipated [REACH](#) proposal updates and other legislative measures aimed at comprehensive PFAS regulation across all relevant sectors.

In conclusion, the report underscores the necessity for continued policy development and implementation, advocating for more uniform regulations to mitigate the risks posed by PFAS. Collaborative European and international efforts are critical in ensuring effective regulation and management of PFAS, thereby protecting both health and the environment.

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List of acronyms/abbreviations

Abbreviation	Explanation
ADI	Acceptable Daily Intake
ADONA	Ammonium 4,8-dioxa-3H-perfluorononanoate
ECHA	European Chemicals Agency
EFSA	European Food Safety Authority
EQS	Environmental Quality Standard
EURL	European Union Reference Laboratory
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid
HEAL	Health and Environment Alliance
HFPO-DA (GenX)	2,3,3,3-Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
IARC	International Agency for Research on Cancer
JRC	European Commission's Joint Research Centre
OECD	Organization for Economic Cooperation and Development
PFBA	Perfluorobutanoic acid
PFBS	Perfluorobutanesulfonic acid
PFCA	Perfluorocarboxylic acids (group)
PFDA	Perfluorodecanoic acid
PFDoDA	Perfluorododecanoic acid
PFDoDS	Perfluorododecanesulfonic acid
PFDS	Perfluorodecanesulfonic acid
PFHpA	Perfluoroheptanoic acid
PFHpS	Perfluoroheptanesulfonic acid
PFHxA	Perfluorohexanoic acid
PFHxS	Perfluorohexanesulfonic acid
PFNA	Perfluorononanoic acid
PFNS	Perfluorononanesulfonic acid

PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PFOSA	Perfluorooctanesulfonamide
PFPeA	Perfluoropentanoic acid
PFPeS	Perfluoropentanesulfonic acid
PFTeDA	Perfluorotetradecanoic acid
PFTrDA	Perfluorotridecanoic acid
PFTrDS	Perfluorotridecanesulfonic acid
PFUnDA	Perfluoroundecanoic acid
PFUnDS	Perfluoroundecanesulfonic acid
POP	Persistent Organic Pollutant
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RIVM	Rijksinstituut voor Volksgezondheid en Milieu (National Institute for Public Health and the Environment, Netherlands)
RPF	Relative Potency Factor
SVHC	Substances of Very High Concern
TFA	Trifluoroacetic acid
TWI	Tolerable Weekly Intake
WFD	Water Framework Directive

1. Introduction

Project Summary

Cancer and other non-communicable diseases (Cancer & NCDs) make up more than 2/3 of the burden of disease in Europe. At the population level, substantial variations exist according to socio-economic status, geographical area, age, disability, gender, and ethnic groups. A large part of this disease burden is preventable. The aim of the JA on Cancer and other NCDs prevention – Action on Health Determinants is to support strategies and policies designed to reduce the burden of Cancer & NCDs, their common risk factors both at a personal and societal level, and to define methods to assess their effectiveness across Europe. Specific objectives are:

- improve joint capacities of member states to plan and implement Cancer & NCDs prevention policies and activities at national, regional, and local levels.
- improve the monitoring system for Cancer & NCDs and their common risk factors.
- contribute to reduce inequalities in Cancer & NCDs.
- engage with key actors in the field of Cancer & NCD prevention, including decision makers, civil society organizations, professionals, the general population, and patients' groups to facilitate cooperation and joint efforts.

This JA represents an ambitious effort to provide strategic guidance and consolidated efforts in the field of Cancer & NCD prevention. Key outputs include an EU Consortium on Cancer Prevention, high-level annual events, and intervention tools and policy recommendations that will contribute to reduced Cancer & NCD burden and inequality across Europe.

Introduction to per- and polyfluoroalkyl substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are a large group of human-made chemicals that have been used in various industries and applications worldwide since the 1940s. They are commonly found in non-stick coatings in pots and frying pans, in food packaging (e.g. grease-resistant wrappers, pizza boxes, microwave popcorn bags), in firefighting foams and stain repellents. They are characterized by their strong carbon-fluorine bonds, which together with their other key properties make them resistant to water, oil, and heat. Initially, the term PFAS primarily referred to a limited number of compounds including perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). Today, the expanded definition of PFAS encompasses millions of chemicals that contain at least one fluorinated methyl (-CF₃) or methylene (-CF₂-) group reflecting the increasing awareness of the environmental and health impacts associated with PFAS (OECD, 2023).

PFAS pose a significant environmental and health problem due to their unique properties and widespread presence. Due to their strong carbon-fluorine bonds, PFAS are highly resistant to degradation (persistence). This resistance leads to their accumulation in the environment, as they do not break down naturally. Furthermore, some PFAS have the ability to bioaccumulate, meaning they can build up in living organisms over time, potentially reaching harmful concentrations. This bioaccumulation is concerning, as it results in long-term exposure for both humans and wildlife. Some PFAS are also capable of long-range transport, traveling far from

their initial source and contaminating regions where they were never used or manufactured. This has led to their detection even in remote areas, emphasizing the ubiquitous nature of PFAS exposure. In 2020, the European Food Safety Authority (EFSA) published a risk assessment where it was concluded that for more than half of the European population the PFAS exposure exceeded the tolerable weekly intake of 4.4 ng/kg bw per week of the sum of PFOS, PFHxS, PFOA and PFNA (EFSA, 2020). Effects on the immune system, based on decreased response to vaccination in children, was considered as the most critical human health effect.

In 2023, The International Agency for Research on Cancer (IARC) published a monograph classified PFOA as "carcinogenic to humans" (Group 1), while PFOS was classified as "possibly carcinogenic to humans" (Group 2B). (IARC, 2023; Zahm et al, 2024).

These findings underscore the urgent need for effective regulation of PFAS to mitigate exposure and protect human health and the environment.

Deliverable objectives

This report describes work done in Work Package 5 "*Regulation and taxation*" and in Subtask 5.7.2 "*Mapping and modeling the impact of policies for environmental chemicals - case PFAS*".

The overall objective of WP 5 is to improve compliance, coherence, wider implementation and enforcement of fiscal and regulative measures targeting major NCD-risks factors. The purpose of Task 5.7 is to map current European policies to reduce exposure to pollution and hazardous chemicals, and to evaluate their efficiency as tools for prevention of cancer and NCDs.

One of the primary objectives of subtask 5.7.2 is to identify and analyze legislative frameworks and their implementation concerning chemical exposure to PFAS, which are considered a group of particular concern.

Deliverable description

For subtask 5.7.2, a questionnaire was developed to map legislative frameworks implemented at the national level across EU Member States and selected non-EU European countries. It was distributed to experts from 33 European countries via established professional networks and direct personal contacts. The responses were expected to group countries into three categories: early adopters (national legislation before 2015), late adopters (after 2015), and countries relying exclusively on EU-level legislation.

The questionnaire responses, combined with our own review of national and EU PFAS legislative frameworks, were compiled and included information on legislative measures and regulatory actions in both EU countries and selected non-EU European countries. This database form the basis for a subsequent policy analysis focusing on objectives, scope, and enforcement mechanisms across selected EU Member States.

2. Methods

A questionnaire was designed to map the national legislative frameworks related to PFAS (questions in Figure 1).

OUR QUESTIONS

1) Is there any national **legislation** on PFAS in your country? This legislation may relate to restriction of specific substances, areas of application (e.g. F-gases) or maximum residue concentrations in products, foodstuffs or environmental compartments.

National legislation

2) If yes, which of the following categories does it belong to? You may tick multiple options below.

- a) Early adopters (national regulations before 2015) ☐
- b) Late adopters (national regulations after 2015) ☐
- c) No national legislation yet (countries without national PFAS regulations) ☐

3) Could you please describe your current PFAS legislation more specifically including name of legislation in national language and www-address to legislation.

More specific description of national legislation

4) If you have valid national legislation for PFAS compounds, does it differ and how, from valid legislation at EU level (e.g. stricter maximum values or scope of legislation)?

Differences in national legislation compared to EU-legislation

5) Does your country have plans for national level PFAS legislation or plans to change it?

National plans for PFAS legislation

6) Does your country have **NON-legislative national recommendations or restrictions** to reduce PFAS exposure e.g. in certain areas or for sensitive populations (e.g. avoid fish from a contaminated waterbody)?

National recommendations or restrictions

Figure 1: The information about national PFAS legislation requested in the questionnaire.

To gather relevant data, the questionnaire was distributed to selected experts expected to provide insights into PFAS legislation in their respective countries. As a first step, the European Union Reference Laboratory (EURL) for halogenated persistent organic pollutants (POPs) network was contacted. The aims of the present work were presented to the EURL network during a meeting in May 2024, where attendees were invited to share relevant contacts to support the distribution of the questionnaire. We also reached out for help to connect to experts on environmental pollutants in the JAPreventNCDs internal newsletter in November 2024.

Additional contacts were identified through personal networks across Europe. In cases where no suitable contact could be found, artificial intelligence tools (Copilot and ChatGPT) were used to search for information from ministries, national institutes, and research organizations (OpenAI, 2023; Microsoft, 2023).

Responses were received from 19 of the 33 countries contacted. Some countries, such as Spain, provided multiple responses (e.g., four separate submissions). For countries that did not respond, AI tools were used to gather publicly available legislative information. In addition,

country-specific information was found on Organization for Economic Cooperation and Development (OECD) web pages (OECD, n.d.).

To verify the accuracy of the AI-sourced data, emails were sent to newly identified experts in PFAS legislation, found through personal contacts and AI tools. The emails were addressed to experts in Denmark, Germany, the Netherlands, Norway, and Portugal. Verification emails were not sent to countries that, according to AI, do not have their own national legislation. Responses were received from all countries except the Netherlands.

All responses, including those obtained via AI, were compiled for this task. AI tools were also used to standardize the format and length of the responses to ensure consistency across entries.

3. Results and discussion

Overview of existing and upcoming PFAS legislation in the EU

Restrictions on PFAS began to emerge as research revealed their persistence, long-range transport, and widespread environmental contamination (UNEP, 2023; OECD, 2022). Early efforts were industry-driven and voluntary. In 2000, 3M announced a global phase-out of PFOS and related compounds, completed by 2002. In 2006, major PFOA manufacturers joined the U.S. EPA Stewardship Program, committing to reduce PFOA emissions and product content by 95% by 2010 and eliminate production and use by 2015 (U.S. EPA, PFOA Stewardship Program, 2006). These voluntary actions laid the foundation for subsequent EU regulations, which progressively evolved from targeted restrictions on individual PFAS to comprehensive group-wide bans under REACH and POP regulations.

Primary prevention of pollution is a key objective of current and upcoming legislation, aiming to limit future contamination. However, as large amounts of PFAS have already been released into the environment, maximum limits in food and drinking water remains essential to minimise exposure. Due to their persistence, PFAS levels in soil, water, and food will remain elevated for decades, reinforcing the need for both preventive and remedial regulatory actions.

Legislative frameworks for PFAS in the EU are described in Table 1. This table summarises key EU legislative frameworks addressing PFAS, including both implemented measures and upcoming proposals. The information is organised by regulatory area to highlight actions on prevention, exposure management, and future developments. Some legislations, such as those covering consumer products, food packaging, and firefighting foams, span multiple categories due to their cross-sector relevance. This overlap reflects the complexity of PFAS regulation across different applications and environmental compartments.

Table 1: Summary of key EU legislative frameworks addressing PFAS across different sectors.

Area	Key Measures	Legal Basis / Reference
Prevention of primary pollution		
Global bans of Persistent Organic Pollutants (POPs)	Restrictions on primary production and use of PFOS (2009), PFOA (2019), PFHxS and related compounds (2022) were added to Stockholm Convention	Stockholm Convention
	The implementation of Stockholm Convention via the Persistent Organic Pollutants (POP) Regulation and subsequent Commission Delegated Regulations in the EU	POP Regulation (EU) 2019/1021 (entered into force July 15, 2019) - PFOS originally regulated in 2008 under previous POP regulation; updated in 2019 and tightened in 2025 - PFOA added in 2020 and updated in 2025 - PFHxS added in 2023
Bans and restrictions under REACH – e.g. consumer products	Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)	REACH Regulation (EC) 1907/2006 (entered into force June 1, 2007; PFOS was regulated in 2008 and other PFAS restrictions were introduced later (see rows below)
	Restriction of PFOA, its salts and PFOA-related substances in articles such as apparel and textiles (water- and stain-resistant coatings), carpets and furniture, paper and packaging, printing inks, certain medical devices and firefighting foams	Regulation (EU) 2017/1000 (entered into force July 4, 2020)
	Restriction of C9-C14 PFCAs* (PFNA, PFDA, PFUnDA, PFDoDA, PFTrDA, PFTDA) in textiles, footwear, coatings, household goods, electronics, and other articles	Regulation (EU) 2021/1297 (entered into force August 25, 2021; updated in 2024 and 2025)
	Restrictions on PFHxA and related substances in textiles, food packaging, cosmetics, and in some firefighting foam applications	Regulation (EU) 2024/2462 (entered into force October 10, 2024)

Cosmetic products - bans	Ban of PFOS in cosmetics	Regulation (EC) 1223/2009 on Cosmetic Products (Annex II) (entered into force July 11, 2013) Broader PFAS bans affecting cosmetics come from POPs and REACH legislation
Firefighting foams – bans and restrictions	Ban on placing on the market and use of all PFAS in firefighting foams	Regulation (EU) 2025/1988 (entered into force October 23, 2025; full prohibition by 2030 for most uses; transition periods up to 10 years for certain critical uses)
Area	Key Measures	Legal Basis / Reference
Management of exposure and pollution		
Drinking water	Maximum limit 0.5 µg/L for total PFAS Maximum limit 0.1 µg/L for sum of 20 individual PFAS*: PFBA; PFPeA; PFHxA; PFHpA; PFOA; PFNA; PFDA; PFUnDA; PFDoDA; PFTTrDA; PFBS; PFPeS; PFHxS; PFHpS; PFOS; PFNS; PFDS; PFUnDS; PFDoDS; PFTTrDS	Drinking Water Directive (EU) 2020/2184 (entered into force January 12, 2021)
Food	Maximum levels for PFAS (PFOS, PFOA, PFNA, PFHxS) in specific food categories, e.g meat, offal, eggs and fish	Commission Regulation (EU) 2023/915 (entered into force May 25, 2023)
	Mandatory monitoring by Member States	Commission Recommendation 2022/1431 (entered into force August 26, 2022)
Environment	Establishing Environmental Quality Standards (EQS) for PFOS (annual average-EQS and maximum allowable concentration 0.65 ng/L and 36,000 ng/L for inland surface waters, and 0.13 ng/L and 7,200 ng/L for transitional and coastal waters, respectively) and for fish 9.1 µg/kg ww.	Environmental Quality Standards Directive 2008/105/EC (entered into force January 13, 2009)

Area	Key Measures	Legal Basis / Reference
Future developments		
Universal PFAS restriction proposal	A proposed EU-wide restriction under REACH to phase out all PFAS in non-essential uses, with limited derogations for essential applications, aiming to significantly reduce PFAS emissions and exposure across products and sectors.	ECHA restriction proposal (2023, updated 2025; under evaluation by ECHA's scientific committees)
Food contact materials	PFAS-specific migration limits in packaging and packaging waste are under development. From August 12, 2026, food-contact packaging containing PFAS above the allowed limits cannot be placed on the EU market.	Regulation (EU) 2025/40 on Packaging and Packaging Waste (entered into force February 11, 2025)
	Updated and harmonised EU rules on plastic and recycled food contact materials, including migration limits and stricter safety and traceability requirements (PFAS-specific migration limits will be addressed in future legislation)	Regulation (EU) 2025/351 (entered into force March 16, 2025)
Toys	A proposed ban on intentional use of all PFAS in toys along with other hazardous substances.	EU Toy Safety Regulation that will replace the current Toy Safety Directive 2009/48/EC (expected to be formally adopted in late 2025 or early 2026)
EQS proposal	Proposal for an EQS of 4.4 ng/L for the sum of 24 PFAS (as PFOA equivalents) in surface water and groundwater, and designation of trifluoroacetic acid (TFA) as a new priority substance and introduction of effect-based monitoring methods.	Draft revision of the Water Framework Directive (2000/60/EC), the Groundwater Directive (2006/118/EC), and the Environmental Quality Standards Directive (2008/105/EC)

*PFBA, Perfluorobutanoic acid; PFBS, Perfluorobutanesulfonic acid; PFCA, perfluorocarboxylic acid; PFPeA, Perfluoropentanoic acid; PFHxA, Perfluorohexanoic acid; PFHpA, Perfluoroheptanoic acid; PFOA, Perfluorooctanoic acid; PFNA, Perfluorononanoic acid; PFDA, Perfluorodecanoic acid; PFUnDA, Perfluoroundecanoic acid; PFDoDA, Perfluorododecanoic acid; PFTrDA, Perfluorotridecanoic acid; PFPeS, Perfluoropentanesulfonic acid; PFHxS, Perfluorohexanesulfonic acid; PFHpS, Perfluoroheptanesulfonic acid; PFOS, Perfluorooctanesulfonic acid; PFNS, Perfluorononanesulfonic acid; PFDS, Perfluorodecanesulfonic acid; PFUnDS, Perfluoroundecanesulfonic acid; PFDoDS, Perfluorododecanesulfonic acid; PFTrDS, Perfluorotridecanesulfonic acid

PFAS legislation in consumer products

The EU regulates consumer products primarily through a comprehensive chemical safety legislation to protect human health and the environment. The cornerstone of this framework is the REACH Regulation (EC) No 1907/2006, which governs the registration, evaluation, authorisation and restriction of chemicals. REACH applies to all chemical substances manufactured or imported into the EU and includes mechanisms for restricting hazardous substances in consumer products.

Several PFAS are listed on the REACH Candidate List of substances of very high concern (SVHC) due to their persistence, bioaccumulation or mobility, and toxicity, which pose risks to human health and wildlife. These include PFOA, PFHxS, C9–C14 PFCAs (PFNA, PFDA, PFUnDA, PFDoDA, PFTrDA, PFTDA), and HFPO-DA (GenX), PFBS, and PFHpA added in 2019-2023. Their identification as SVHCs under Article 59 of REACH (Regulation (EC) No 1907/2006) triggers legal obligations for companies, such as notification to ECHA and providing safe-use information when these substances are present above 0.1% w/w in articles (ECHA, Candidate List of SVHCs, 2025).

Persistent organic pollutants (POPs) are regulated under the POPs Regulation (EU) 2019/1021, which implements the Stockholm Convention. The individual PFAS compounds PFOS, PFOA, and PFHxS were listed for global ban in 2009, 2019, and 2022, respectively, and subsequently added to the EU POPs Regulation.

Under REACH, Regulation (EU) 2017/1000 (effective 4 July 2020), introduced a ban on PFOA, its salts, and PFOA-related substances in a wide range of articles, including apparel and textiles with water- or stain-resistant coatings, carpets, furniture, paper and packaging, printing inks, certain medical devices, and firefighting foams.

Restrictions for C9–C14 PFCAs (including PFNA, PFDA, PFUnDA, PFDoDA, PFTrDA, and PFTeDA), their salts, and related substances are set out in Regulation (EU) 2021/1297 (effective 25 August 2021) and updated in 2024 and 2025. These apply to textiles, footwear, coatings, household goods, electronics, and other consumer products.

Regulation (EU) 2024/2462 (effective 10 October 2024), introduced new restrictions on PFHxA and related substances in consumer products, covering textiles, food contact materials, cosmetics, and firefighting foams.

The Cosmetic Products Regulation (EC) No 1223/2009 prohibits only PFOS in Annex II; it does not impose a group-wide PFAS restriction. Broader PFAS bans affecting cosmetics come from POPs and REACH legislation, not from the Cosmetics Regulation itself.”

At the EU level, other consumer products are addressed under sectoral regulations such as the Toys Regulation and the Packaging and Packaging Waste Regulation, which will ban PFAS in food packaging from August 2026.

The forthcoming EU Toy Safety Regulation, which will replace Directive 2009/48/EC, introduces stricter chemical safety requirements for toys. Among its key provisions is a ban on all PFAS added for intentional use in toys, alongside restrictions on endocrine disruptors, bisphenols, and allergenic fragrances. Limited exemptions may apply for components inaccessible to children, such as certain electronics. The regulation is expected to be formally adopted in late 2025 or early 2026, with a transition period of approximately 4.5 years before full application.

Additional PFAS restrictions may follow under the upcoming REACH revision (expected late 2025) and the comprehensive PFAS restriction proposal currently under review. The REACH revision aims to accelerate category-wide bans on harmful chemicals and apply “essential use” criteria to ensure substances are only allowed where no safer alternatives exist. It will also serve as the legislative mechanism to implement the universal PFAS restriction proposal submitted by five countries (Germany, Sweden, Denmark, Norway, and the Netherlands) to ECHA in January 2023. This proposal, developed under the REACH regulation, seeks to ban or severely limit all PFAS as a group and has been revised based on over 5,600 comments received during public consultation. On 20 August 2025, ECHA published an updated version of the proposal, expanding its scope to include eight additional sectors not covered in the original submission, such as printing, sealing, machinery applications, and certain medical, military, and industrial uses. The revision will significantly expand the scope beyond current EU rules, covering more than 10,000 PFAS substances under a broad structural definition (ECHA, 2025). These actions reflect the EU’s Chemicals Strategy for Sustainability, which emphasizes essential use and a transition toward a toxic-free environment (European Commission, Chemicals Strategy for Sustainability, 2020).

Several EU Member States and other European countries have adopted national measures to restrict PFAS in consumer products, often going beyond EU-level regulations. These actions target items such as textiles, cosmetics, ski waxes, and food packaging.

- Denmark has prohibited PFAS in paper and cardboard food packaging since 2020. From 2026, the sale and import of clothing, footwear, and textile waterproofing agents containing PFAS will be banned, with an exemption for personal protective equipment. Denmark has also introduced a total fluorine threshold of 50 mg F/kg for certain consumer products as part of its national PFAS restrictions.
- France will ban PFAS in cosmetics, waxes, clothing, shoes, and textile waterproofing agents from January 2026. A broader ban on all textile products containing PFAS, including home and industrial textiles, is planned for 2030.
- The Netherlands banned four PFAS (PFOS, PFOA, PFHxS, and PFNA) in paper and cardboard food contact materials in 2022. Since November 2024, PFAS have been classified nationally as substances of very high concern, triggering stricter controls for industrial and consumer uses compared to some EU standards.
- Belgium has proposed legislation to ban PFAS in food contact materials, cosmetics, waxes, apparel, shoes, and textile waterproofing agents from 2026. From 2030, the ban would extend to all remaining textile products, including home textiles, industrial textiles, sportswear, and outdoor gear.
- Norway introduced a national ban on PFOA in consumer products, including textiles and paper goods, in 2014. These measures have largely been superseded by EU and international regulations.
- Switzerland has banned PFOS, PFOA, PFHxS, and long-chain PFCAs in consumer products under its Chemical Risk Reduction Ordinance (PFAS-related update 2022). These restrictions align with EU and Stockholm Convention requirements and are not stricter than current EU rules.

PFAS legislation in firefighting foams

PFAS have historically been used in firefighting foams, particularly in aqueous film-forming foams. Due to their persistence and environmental risks, an EU-wide regulation has been prepared, and in October 2025 a REACH restriction proposal for PFAS in firefighting foams was adopted by EU Member States (Regulation (EU) 2025/1988). The regulation sets a maximum concentration of 1 mg/L for the sum of all PFAS in firefighting foams and presented transition periods up to 10 years for critical uses.

In addition, Denmark, France and Norway have national PFAS legislation in firefighting foams.

- Denmark banned the sale, import, and use of firefighting foams containing more than 1 ppm PFAS from January 2024.
- Norway implemented a national ban on PFOS in firefighting foams in 2011, with a stricter limit introduced in 2013. These measures have since been superseded by EU-level regulations and international conventions.

PFAS legislation in food contact materials

PFAS use in food contact materials is increasingly regulated at EU level, with several legislative instruments addressing migration limits and product restrictions. Regulation (EU) 2024/2462 introduces restrictions on PFHxA and related substances in food packaging and other applications. This regulation entered into force on 10 October 2024.

The Packaging and Packaging Waste Regulation (EU 2025/40; entered into force 11 February 2025) will apply from August 2026, prohibiting PFAS in food packaging across the EU. Additional EU-level measures are expected under Regulation (EU) 2025/351, which will set stricter safety and traceability requirements for plastics and recycled food contact materials.

Some member states have introduced stricter or more comprehensive measures in food packaging. Denmark and the Netherlands have banned PFAS in paper and cardboard food packaging (Denmark in 2020 and the Netherlands in 2022).

PFAS legislation in food products

The EU commission has set maximum levels for PFOS, PFOA, PFNA, and PFHxS as well as for the sum of these four PFAS in specific food categories. These limits entered into force January 2023, under Commission Regulation (EU) 2023/915, which replaced the earlier Regulation (EU) 1881/2006 (Commission Regulation (EU) 2023/915). Member States are obligated to adhere to this harmonized EU regulation rather than adopting separate national legislation.

The following food categories have specific limits for individual PFAS and for the combined sum:

- Meat of bovine animals, pigs, and poultry
- Sheep meat
- Offal of bovine animals, sheep, pigs, and poultry
- Meat of game animals (except bear meat)
- Offal of game animals (except bear offal)
- Muscle meat of fish (different limits for different species and depended on whether the fish is intended for the production of food for infants/young children)
- Crustaceans and bivalve molluscs
- Eggs

Only Belgium has had its own national temporary guideline values for PFOS and PFOA in milk, which were established due to local PFAS contamination. Currently, Belgium follows the official EU maximum levels, but the national guideline values may still be used as an additional monitoring tool in contaminated areas.

PFAS legislation in drinking water

The EU drinking water directive (2020/2184) introduced two limit values for PFAS: 0.1 µg/L for the sum of 20 specified PFAS and 0.5 µg/L for total PFAS. The directive entered into force 12 January 2021, and all EU Member States were required to transpose it into national law by 12 January 2023. However, one country has not transposed the directive at all, and several countries have only partially or incorrectly implemented it.

Most EU Member States have transposed both parameters into national legislation, while some have adopted only the Sum of 20 PFAS. A few countries have gone further by expanding the scope of PFAS monitoring:

- Denmark: Sum of 22 PFAS (includes 6:2 FTSA and PFOSA)
- Italy: Sum of 30 PFAS, including additional industrial PFAS such as GenX, ADONA, and several perfluoropolyether derivatives
- Sweden: Sum of 21 PFAS, adding 6:2 FTSA to the EU list.

In response to the EFSA's 2020 Tolerable Weekly Intake (TWI) for PFOS, PFOA, PFNA, and PFHxS (4.4 ng/kg bw/week), several countries have introduced additional binding or guideline values for the Sum of 4 PFAS (EFSA 2020). Denmark has the lowest binding value for the sum of 4 PFAS in drinking water, 2 ng/L, while Sweden and Belgium have 4 ng/L, and Italy and Germany 20 ng/L. In Norway, a limit value (4 ng/L) for sum 4 PFAS in drinking water has been proposed by the Norwegian Food Safety Authority and is currently on public hearing. Switzerland has set maximum concentrations in drinking water for PFOS (0.3 µg/L), PFHxS (0.3 µg/L), and PFOA (0.5 µg/L) and the Swiss authorities are currently considering aligning their legislation with the EU Drinking Water Directive.

The National Institute for Public Health and the Environment (RIVM) in the Netherlands has recommended a drinking water guideline value of 4.4 ng/L expressed as PFOA equivalents (RIVM 2021). This recommendation was derived from the EFSA's TWI for four PFAS, but

RIVM's approach extends beyond these four compounds. (RIVM 2021, 2023; EFSA 2020). Unlike EFSA, which assumes equal toxicity for the four PFAS in its group TWI, RIVM applies a Relative Potency Factor (RPF) approach to account for differences in toxicity among PFAS. This method expresses concentrations as PFOA equivalents and enables cumulative risk assessment for mixtures beyond the four EFSA substances (RIVM 2023).

In addition, trifluoroacetic acid (TFA), a highly persistent PFAS breakdown product, is being addressed in several countries. Denmark and Italy have adopted binding drinking water parameters for TFA (9 µg/L and 10 µg/L respectively). Guideline values have also been issued by Germany and France (60 µg/L), Luxembourg (12 µg/L), Belgium (Wallonia and Flanders) (2.2 µg/L and 16.5 µg/L respectively) and the Netherlands/ RIVM (2.2 µg/L).

In summary, most EU Member States have transposed the two PFAS limits from the EU Drinking Water Directive into national legislation, while some have adopted only the sum of 20 specified PFAS. A few countries have gone further by expanding the scope of PFAS monitoring beyond the Directive's requirements. Additionally, several European countries have introduced extra limits or guideline values for the sum of four PFAS and, in some cases, for other PFAS compounds.

PFAS legislation in environment

Environmental legislation in the EU addresses PFAS contamination in natural waters and ecosystems by setting standards for surface and groundwater quality, regulating emissions, and requiring monitoring of these substances. The aim is to limit the release and accumulation of persistent and bioaccumulative PFAS compounds, thereby reducing risks to aquatic life, soil health, and ultimately human exposure through the environment. These measures complement drinking water regulations and form part of a broader strategy to manage PFAS pollution across multiple environmental compartments.

Currently, PFAS are addressed under the Environmental Quality Standards (EQS) Directive (2008/105/EC), which entered into force on 13 January 2009. This directive established EQS values for priority substances in surface waters, including PFOS. The EU is currently revising its water legislation through a proposal (2022/0344 COD) to amend the Water Framework Directive (2000/60/EC), the Groundwater Directive (2006/118/EC), and the EQS Directive (2008/105/EC) to address the broader PFAS group. Key proposals include new EQS for surface water and groundwater (4.4 ng/L for the sum of 24 PFAS, expressed as PFOA equivalents using RPFs) and designation of TFA as a new priority substance. Also, effect-based monitoring methods to complement chemical analysis are considered under the broader Water Framework Directive and its implementation strategies.

EU PFAS regulation for wild-caught fish focuses on four substances (PFOS, PFOA, PFNA and PFHxS) and sets maximum levels both for individual compounds and for their combined concentration in Commission Regulation (EU) 2023/915. The primary objective is food safety control: fish products exceeding these limits cannot be placed on the market or used as food ingredients.

Environmental legislation addressing PFAS varies significantly across Europe, with several countries implementing stricter national measures that go beyond EU requirements. National

measures aim to control PFAS contamination in soil, groundwater, surface water, sludge, and industrial emissions, and often include classification, monitoring, and remediation protocols.

- Among EU Member States, Austria stands out for having adopted limit values for PFAS in fertilizers and in sewage sludge used on agricultural soils, specifically for the sum of PFOS and PFOA, as part of its broader national measures under the PFAS Action Plan (2024–2028).
- Denmark has taken extensive measures to address PFAS contamination in the environment. The National Action Plan (2024) includes 21 initiatives aimed at cleanup, prevention, and containment. These cover bans on PFAS in textiles and restrictions on the use of sewage sludge containing PFAS, funding for remediation of contaminated sites, partnerships with businesses to accelerate PFAS phase-out, and strengthened monitoring in groundwater, soil, wildlife, and surface waters. Denmark also provides guidance for municipalities on PFAS management, supports research through a dedicated PFAS center, and runs public awareness campaigns.

In addition, Denmark has introduced soil quality criteria (0.01 mg/kg for the sum of 4 PFAS and 0.4 mg/kg for the sum of 22 PFAS), groundwater limits (0.002 µg/L for the sum of 4 PFAS and 0.1 µg/L for the sum of 22 PFAS), and guideline values for sludge. For surface waters, Denmark applies quality criteria for PFAS in water, sediment, and biota, which are partly based on scientific recommendations and technical guidance from the EU Joint Research Centre (JRC) (European Commission, JRC, 2021). Denmark has also set its own national criteria for TFA in surface waters (560 µg/L in freshwater and 56 µg/L in saltwater), as these were not included in JRC proposals.

- France has introduced environmental measures for PFAS, including mandatory monitoring of PFAS in industrial emissions (air and water) and a discharge limit for PFOS in industrial wastewater (25 µg/L). In addition, a regulation adopted in 2024 requires PFAS analysis in atmospheric emissions from waste incineration and related facilities. These actions aim to strengthen control of PFAS releases and improve environmental protection.
- Germany has introduced binding limit values for PFAS in groundwater under the Federal Soil Protection Ordinance, including PFOA (0.1 µg/L), PFOS (0.1 µg/L) and PFBA (10 µg/L). While there are no fixed numeric limits for PFAS in soil, Germany applies risk-based assessment guidelines. PFAS are also regulated in sewage sludge and fertilizers under the Sewage Sludge Ordinance (2017), and the country has developed comprehensive guidelines to support remediation and disposal of PFAS-contaminated materials.
- In the Netherlands, PFAS are classified as SVHCs, and companies must prevent emissions or implement reduction plans under the Environmental Management Act. There are reporting obligations for activities involving soil, dredged material, or building materials through the national portal. While fixed numeric soil standards are not yet established, provisional quality requirements apply for PFAS in soil and surface water under the PFAS Action Framework. Additionally, PFAS are addressed in waste and remediation guidelines to manage contaminated materials.

- Sweden has non-binding groundwater thresholds for the sum of 24 PFAS to classify groundwater status. Sweden also regulates PFAS11 as a specific group of pollutants for surface water bodies. PFAS contamination is a major issue in Sweden because of extensive historical use of PFAS-containing firefighting foams at airports, for example in Ronneby, where drinking water was heavily contaminated. Sweden is developing guidelines for PFAS-contaminated soil management. These guideline values consider both human health risks for people staying in the area and environmental risks within the site and downstream, including impacts on soil, groundwater, and surface water. These guidelines also include recommendations for remediation measures at highly contaminated sites, such as former firefighting training areas.
- Norway has established a binding limit value for PFOS in polluted soil under national legislation, currently set at 0.1 mg/kg dry weight, with a proposed stricter limit under consideration.

Other European countries, including Lithuania, Slovenia, Belgium, Spain, and Malta, have legislation, guidance, and monitoring programs for PFAS in environments, but these measures generally complement EU rules rather than impose stricter limits.

PFAS legislation in plant protection products

There is currently no comprehensive EU-level ban or restriction on PFAS in plant protection products. While some PFAS-containing pesticides have been banned, regulatory pressure from upcoming EU restrictions and re-evaluation of PFAS active ingredients under the pesticide approval process is increasing due to growing concerns over environmental contamination. A key issue is TFA, a highly persistent and mobile PFAS degradation product that is increasingly detected in groundwater, largely originating from PFAS-based pesticides.

- Denmark has acted on PFAS in pesticides. In July 2025, the Danish Environmental Protection Agency withdrew the authorisation of 23 plant protection products containing PFAS-based active substances, including fluazinam, fluopyram, diflufenican, mefentrifluconazole, tau-fluvalinate, and flonicamid. The decision was driven by evidence that these substances degrade into TFA. Additional products are under review, and the total number of banned pesticides may increase further. This proactive measure goes beyond EU requirements and reflects Denmark's strong focus on protecting groundwater and reducing PFAS emissions from agricultural sources.

The EU is currently reviewing PFAS use in plant protection products under its Chemicals Strategy for Sustainability, but significant knowledge gaps and regulatory delays remain. Further action is expected, but timelines and scope are still uncertain (European Commission, Chemicals Strategy for Sustainability, 2020).

Mapping of countries based on national legislation

Information on PFAS-related legislation across European countries was compiled, and includes experts' responses to our questionnaire as well as supplementary data obtained through AI-

assisted research and confirmed by experts afterwards. AI was used also to standardize the length and format of received responses. Our initial idea was to classify countries based on when national PFAS legislation came into force using three categories: 1) Early responders: Countries with national PFAS legislation enacted before 2015, 2) Late responders: Countries that introduced national PFAS legislation after 2015, and 3) EU-only followers: Countries without national PFAS legislation, relying solely on EU-level regulations.

However, our question was ambiguous, and it was interpreted differently by respondents: some considered transposition of EU legislation (e.g., the Drinking Water Directive) as national legislation, while others did not. This ambiguity made it challenging to draw a clear line between national legislation and reliance on EU rules. Nevertheless, we retained the original responses in the database and added the date of response to reflect the legislative situation at that time.

The database covers legislative developments in 32 European countries. The mapping was based on identifying those with stricter or broader national PFAS legislation compared to existing EU-level requirements (figure 2). These include countries that have binding values or implementation that are stricter or earlier than EU requirements, national product bans and restrictions that go beyond EU-regulations, and regional or guideline-based measures that exceed EU standards.

Our questionnaire data shows that PFAS legislation in drinking water is the most widely adopted area of national regulation across Europe, mainly because Member States are required to transpose the EU Drinking Water Directive into their national laws. National legislations rarely go beyond the EU Drinking Water Directive; most countries simply follow EU parameters without introducing stricter or additional national standards. Consumer products are the second most regulated area following environmental protection with several countries setting limit values or monitoring requirements. Food contact materials, especially related to packaging, are increasingly regulated, while food products are subject to limited national regulation since EU regulations apply directly and do not require separate national legislation.



Figure 2: Map showing countries with national PFAS legislation that goes beyond EU-level regulations. Countries with stricter or broader national measures are marked in green, while countries relying solely on EU-level regulations are marked in blue.

National action plans for PFAS

Several EU Member States have adopted dedicated national or regional action plans to address PFAS contamination (HEAL 2025). These plans typically include measures for environmental monitoring, human biomonitoring, market surveillance, remediation, and public awareness. Notably, Austria, Denmark, and France have national PFAS action plans and Flanders and Wallonia in Belgium have regional strategies. Besides, Finland, Norway, and Sweden include PFAS actions within broader chemical or environmental strategies.

At the EU level, PFAS regulation is evolving through both revisions of existing laws and new frameworks. The EU Chemicals Action Plan (2025) is part of this effort and sets out measures to strengthen chemical safety and sustainability. It includes actions to minimise PFAS emissions, accelerate the development of a group-wide PFAS restriction under REACH, and integrate PFAS controls into broader environmental legislation.

Together, these national and EU-level initiatives aim to reduce PFAS exposure and support a transition toward a toxic-free circular economy.

Deviations from the Health and Environment Alliance's (HEAL) PFAS Policy Overview

After data collection and during the drafting of this report, the HEAL published a report “The PFAS policy landscape across Europe and beyond: A comparative overview” (Heal 2025).

The HEAL report provided a valuable overview of PFAS policy developments, with a strong focus on consumer products, drinking water, and food safety. Our report complements and expands that perspective by addressing additional areas such as environmental legislation (soil, groundwater, surface water, sludge, and industrial emissions) and PFAS in plant protection products, which are only briefly mentioned by HEAL (2025). Furthermore, while HEAL (2025) highlights the universal PFAS restriction proposal under REACH, the present report goes further by explaining its technical scope, the concept of essential use, and its link to the upcoming REACH revision as the legislative mechanism for implementation. This report also introduces the EU Chemicals Action Plan (2025) and its role in shaping future PFAS regulation.

Methodologically, this report combines expert questionnaire responses and verification with document-based research, supported by AI tools (e.g., Copilot) to collect and standardize legislative information. The HEAL report relies primarily on reviews of official sources. These differences reflect complementary approaches: HEAL offers a broad advocacy-oriented view, while this report offers a more technical and policy-focused analysis.

Future Developments and Knowledge Gaps in Europe

A major upcoming development is the universal PFAS restriction proposal under REACH, submitted in January 2023 by Denmark, Germany, the Netherlands, Norway, and Sweden. It aims to phase out all PFAS in non-essential uses and marks a shift from regulating individual substances their salts, and related substances to group-based restrictions. Current EU regulation restricts specific PFAS (e.g., PFOS, PFOA, PFHxS, C9–C14 PFCAs) under POP and REACH, while the new proposal introduces a group-wide ban covering more than 10,000 PFAS substances, with essential-use derogations and stricter emission controls. The proposal was updated in August 2025 after public consultation, and final opinions from European Chemical Agency (ECHA) are expected in 2026.

The EU is also advancing PFAS regulation through broader initiatives. The EU Chemicals Action Plan (2025) supports the transition to a green circular economy and includes

- An EU-wide PFAS monitoring system
- Pollution hotspot mapping
- Remediation best practices
- Public-private initiatives for legacy PFAS contamination
- Alignment with Safe and Sustainable by Design principles

These measures complement the upcoming REACH revision, which will implement the universal PFAS restriction proposal and accelerate the phase-out of non-essential PFAS uses across sectors (European Commission, EU Chemicals Action Plan, 2025).

Additional sectoral legislation is under development. The proposed Toys Regulation will ban the intentional use of PFAS in toys and components, complementing existing bans in consumer products under REACH and the Cosmetics Regulation, which already prohibits PFOS, PFOA, and related salts. Currently, EU rules restrict specific PFAS in certain products, while upcoming measures aim for broader group-based bans and essential-use criteria, marking a shift from substance-by-substance regulation to comprehensive coverage. PFAS use in pesticides remains under risk assessment at EU level, with Denmark is already introducing national bans.

A harmonized EU-wide framework for PFAS in most food products and feed is missing. Food is the most important exposure pathway for several PFAS compounds, and therefore setting maximum levels for food is essential. Current PFAS-regulation only concerns four PFAS substances (PFOS, PFOA, PFNA, PFHxS) and their sum, and applies only to selected food products of animal origin (Commission Regulation (EU) 2023/915). Many food categories, such as fruits, vegetables, cereals, and dairy, are not covered by binding limits. Some of these food groups can substantially contribute to overall PFAS exposure. According to EFSA, for PFOS and PFOA, 'Fish and other seafood' was the most important contributor to mean exposure, followed by 'Eggs and egg products', 'Meat and meat products', and 'Fruit and fruit products'. For PFOA, 'Vegetables and vegetable products' and 'Drinking water' were also significant contributors. For several other PFASs, 'Fish and other seafood', 'Fruit and fruit products', 'Vegetables and vegetable products', 'Drinking water', and 'Starchy roots and tubers' were among the main sources (EFSA, 2020). The EU has issued recommendations for broader PFAS monitoring in food, but these are non-binding and have not been widely implemented in national legislation (Commission Recommendation (EU) 2022/1431). There is also no EU-level regulation for PFAS in animal feed, which is a key pathway for contamination. Upcoming EU legislation is expected to introduce harmonized maximum levels for PFAS in feed to complement existing food standards and reduce contamination risks across the food chain.

The EU plays a critical role in providing basis for future PFAS regulation. EFSA's updated TWI for four PFAS (PFOS, PFOA, PFNA, and PFHxS) provides a science-based foundation for risk assessment and underpins the need for development of EU standards for drinking water and food. Since current maximum limits in the Drinking Water Directive are not based on EFSA's TWI published in 2020, these values should be revisited to align with the latest scientific evidence. EFSA has also launched a public consultation on an Acceptable Daily Intake (ADI) for TFA, a PFAS degradation product, complementing its earlier work on the risk assessment for PFAS.

While EU-level initiatives are progressing, disparities between Member States remain significant. Based on our questionnaire data and subsequent mapping of countries by national legislation, Eastern and some Southern European countries generally show greater development needs in national PFAS regulation compared to Northern and Western Europe. In many of these countries, PFAS regulation remains limited to a few sectors, with fewer proactive measures. This contrasts with Northern and Western Europe, where several countries have adopted stricter thresholds, broader substance coverage, and proactive bans in consumer products and environmental media.

Key areas for improvement include:

- Developing national standards for PFAS in consumer products

- Enhancing monitoring and remediation programs
- Launching public awareness campaigns to reduce exposure

Addressing these needs will be essential for effective PFAS risk management across the food chain, environment, and consumer products, and for ensuring harmonized protection across the EU and compliance with upcoming legislation.

Beyond harmonizing PFAS regulation within the EU, there is a growing need for international regulatory alignment. One aspect could be the inclusion of more PFAS compounds under the Stockholm Convention, which would be important also from the perspective of long-range environmental transport. Many consumer products and food items are imported from regions where PFAS restrictions are less stringent or absent. Without global standards, products entering the EU market, particularly through direct consumer orders from international web shops, may not comply with EU legislation, creating loopholes that undermine health and environmental protection. Strengthening international cooperation and trade requirements, such as mandatory compliance checks for imported goods, will be essential to ensure that PFAS restrictions are effective and do not lead to unequal exposure risks.

4. Conclusion

Our findings indicate that PFAS regulation in drinking water is the most consistently implemented area across Europe, primarily due to the mandatory transposition of the EU Drinking Water Directive into national law. However, national legislation rarely goes beyond the EU Drinking Water Directive; in most cases, it simply adheres to EU parameters without introducing stricter or additional national standards. Consumer products represent the second most regulated area following environmental protection with several countries setting limit values or monitoring requirements. Food contact materials, especially related to packaging, are increasingly regulated. National regulation of food products remains limited, as EU regulations apply directly. Current EU legislation on PFAS in food remains limited in scope, as it sets maximum concentration levels for only four PFAS and their combined sum in a restricted range of food products.

More generally, PFAS regulation in Europe is evolving rapidly, with a combination of EU-wide standards and national initiatives shaping the policy landscape. While the EU provides harmonized baseline standards as well as bans in production and use, food safety, drinking water, consumer products, and environmental protection, several Member States have adopted stricter or more comprehensive measures. These include lower threshold values, broader substance coverage, and additional monitoring and risk management requirements. National initiatives often reflect growing concern over PFAS contamination and aim to address local exposure risks more comprehensively, complementing EU harmonization efforts. Most current regulations focus on legacy PFAS such as PFOS and PFOA and a few related compounds, while future measures aim to introduce group-wide restrictions covering thousands of PFAS substances.

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