Action on PFAS as part of the EU Chemicals Strategy for Sustainability

- an opportunity for disease prevention

Xenia Trier, Ph.D.

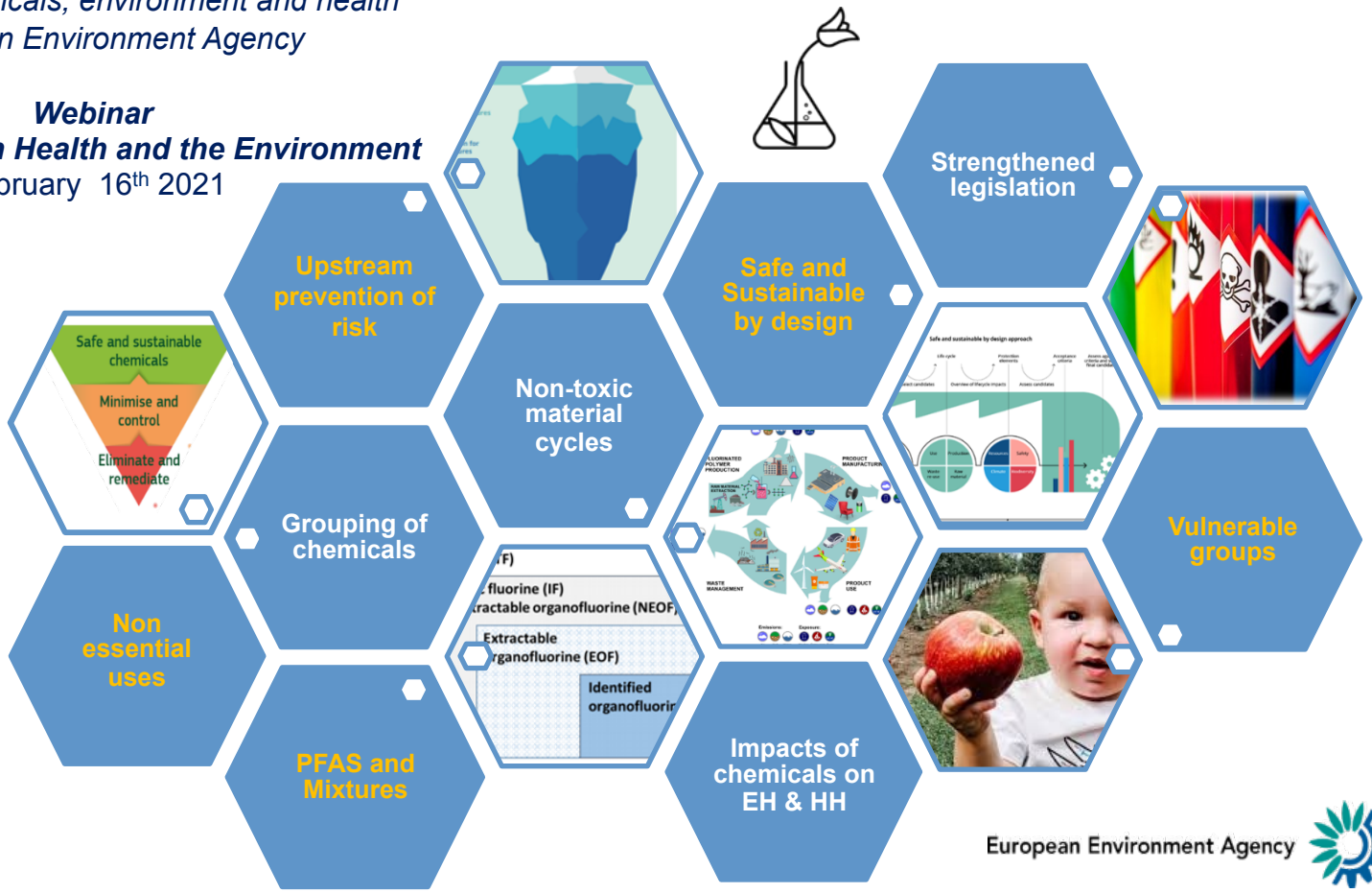
Expert on chemicals, environment and health

European Environment Agency

Webinar

Collaborative on Health and the Environment

February 16th 2021



European Environment Agency

The Chemicals strategy
- what is the importance to the EU and its citizens?

Europe is the second largest producer with **16.9%** of global sales

EU chemicals industry employs **1.2 million** people

59% of chemicals supplied to other sectors, such as health, constructions, automotive, electronics, textiles

84%

Europeans are worried about the impact of chemicals present in everyday products on their health

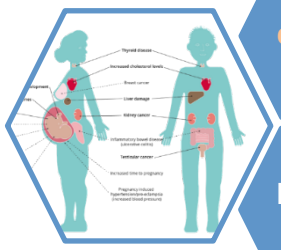
90%

Europeans are worried about the impact of chemicals on the environment

- an example..

European Environment Agency

Soil improvers that contaminated a German community with PFAS



PFAS in drinking water

Polluted soil and food

Polluted blood

Diseases?

Lost income

House prices

Uncer-tainty

Eco-system impact

Who to blame?

Health costs

Justice!

Italy, Sweden, US..

Industry?

Regula-tion?

Source?

Soil improver

Mill sludge

Clean up?

Filters on drinking water

Soil?

Clean circular economy?

Safer chemicals!

European Environment Agency

EEAs work on chemical pollution

- and call for safer chemicals..

Reports, briefings

Workshops

Conferences

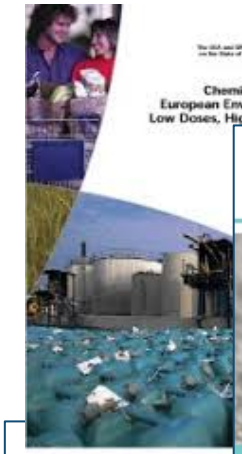
Articles

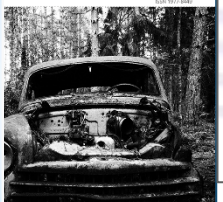
Inputs to texts and processes, EC/Nat./ Scientific

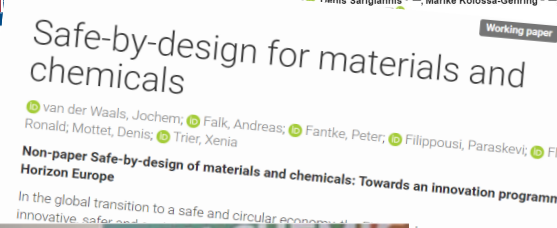
Bilateral discussions

Advisory

Networks: ETC, EPA, EIONET

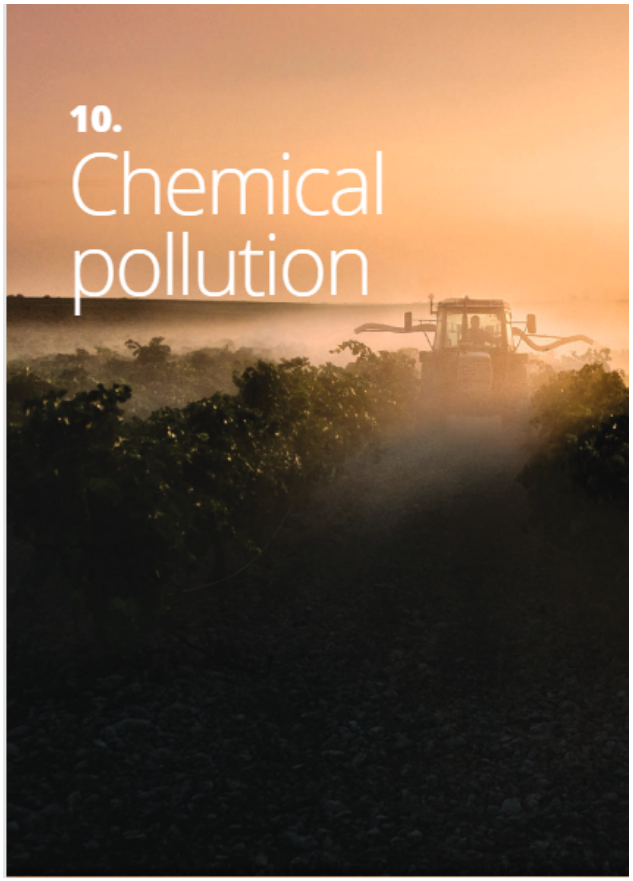






EEAs State and Outlook on the Environment SOER2020

https://www.eea.europa.eu/publications/soer-2020



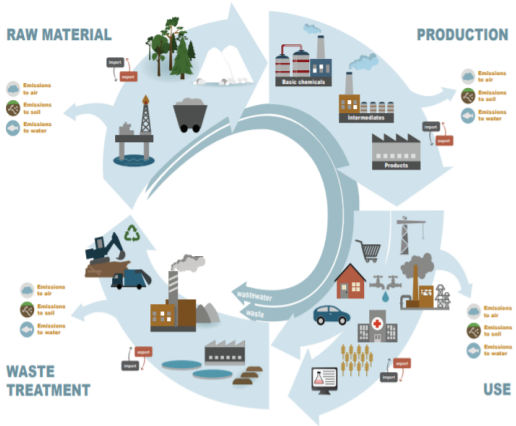
https://www.eea.europa.eu/publications/soer-2020/chapter-10_soer2020-chemical-pollution/view

#SOER2020

European Environment Agency

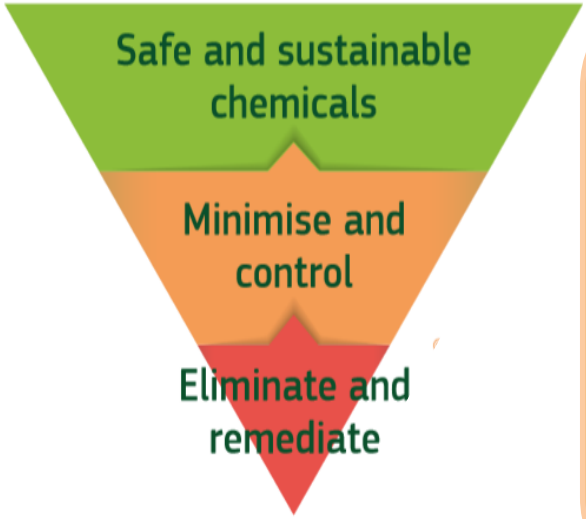
SOER2020: Systemic view on chemical pollution

- Human activities lead to point source and diffuse chemical pollution
- Pollution occurs along lifecycles and moves across boundaries
- Accumulation of chemicals and effect of particular concern, e.g. PFAS
- Total burden of mixtures of chemicals impacts people and environment
- Risk assessment cannot keep up with diversity of chemicals/exposures
- **Upstream prevention most effective to avoid harm to planet and people**
  => reduce complexity, and transition to safe and circular by design!



Read our Report [Europe's environment – State and Outlook](https://www.eea.europa.eu/publications/soer-2020/chapter-10_soer2020-chemical-pollution/)
https://www.eea.europa.eu/publications/soer-2020/chapter-10_soer2020-chemical-pollution/

The EU Chemicals Strategy for Sustainability (CSS) towards a toxic-free environment



1. Chemicals are produced/used in a way that maximises their benefits to society while avoiding harm to planet & people

2. Production and use of *safe and sustainable chemicals* becomes the EU market norm and a global standard

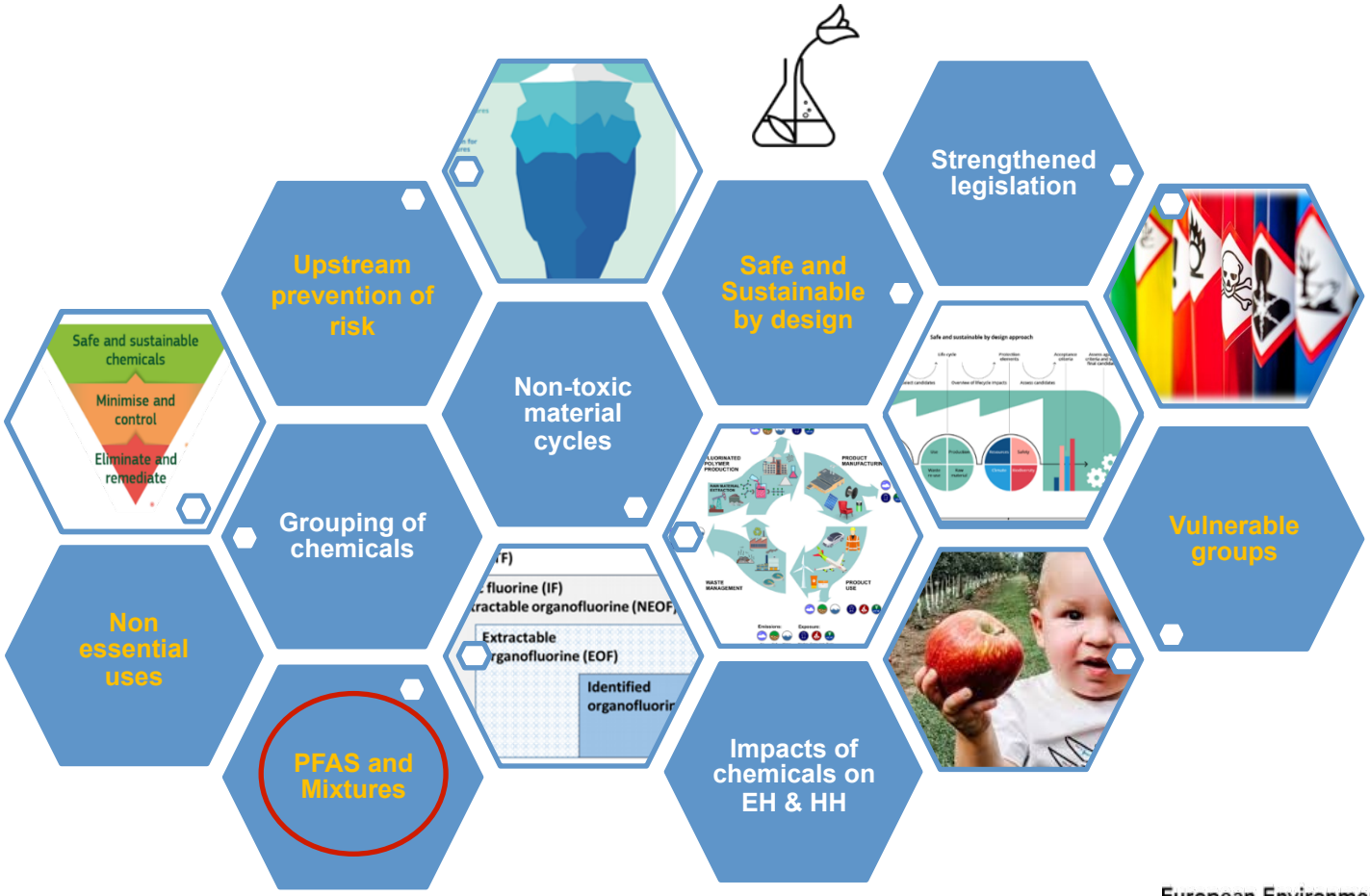
Credit: Elena Montani, DG ENV

Documents:

- **The Chemical SS:** https://ec.europa.eu/environment/strategy/chemicals-strategy_en
- **Annex to CSS with actions and timelines:** https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A667%3AFIN#document2
- **Mixtures staff working document (SWD):** https://ec.europa.eu/environment/pdf/chemicals/2020/10/SWD_mixtures.pdf
- **PFAS staff working document (SWD):** https://ec.europa.eu/environment/pdf/chemicals/2020/10/SWD_PFAS.pdf

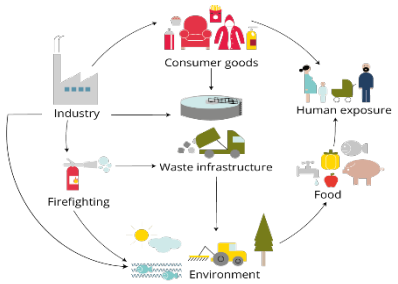
Avoiding harm to planet and people

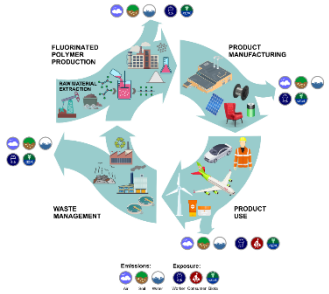
The EU Chemicals Strategy for Sustainability – focus areas

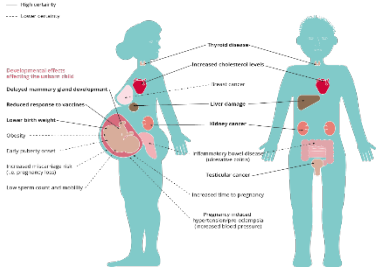


European Environment Agency

Multiple lines of evidence of harm of PFAS





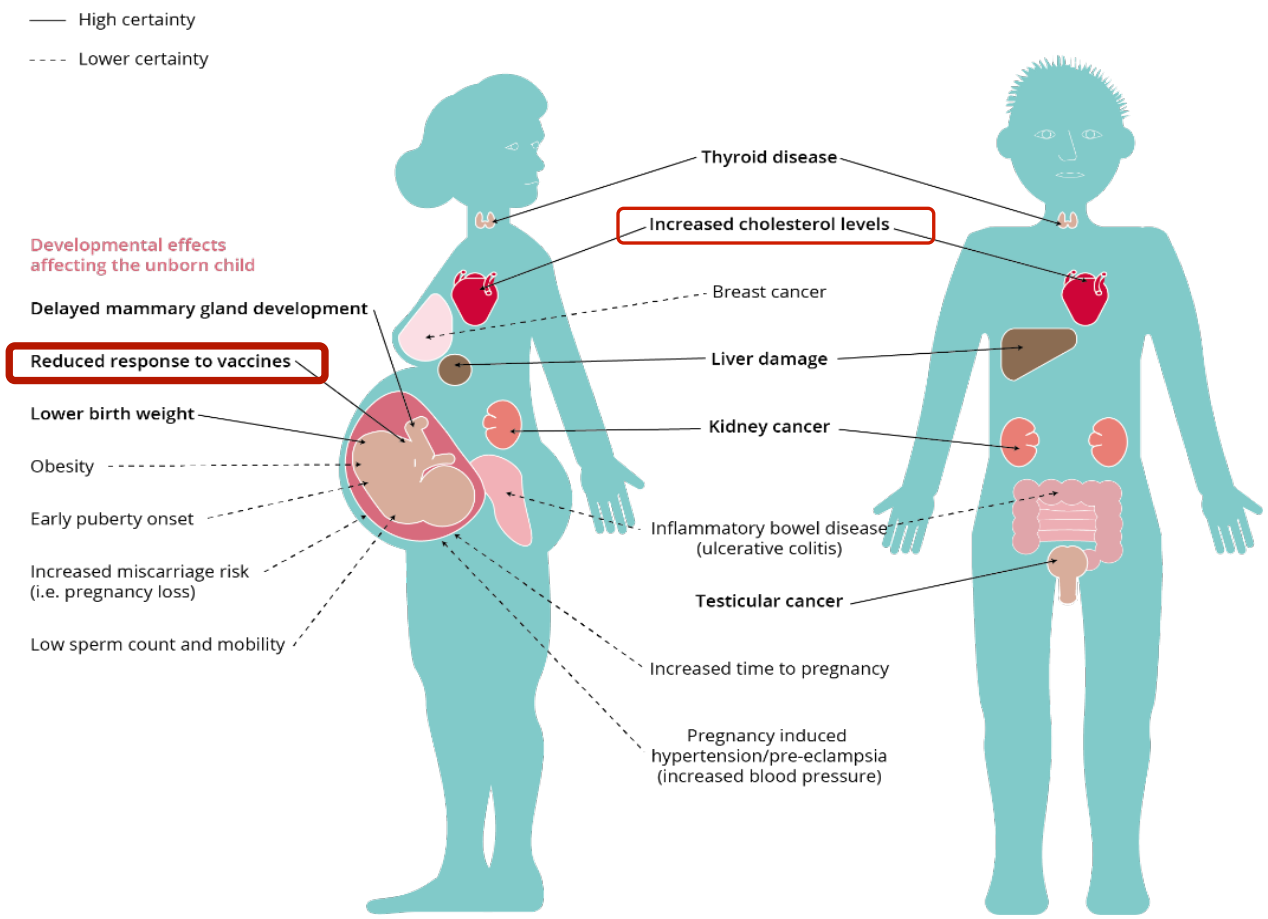


- >5000 PFAS
- Widespread PFAS uses (200 use categories)
- Emission along lifecycles
- PFAS incl. degradation products are persistent
- PFAS accumulate
- Many PFAS have Planetary Boundary Threat characteristics
- Toxic – various types, mixtures, severe effects
- Costly – diseases, ecosystem services, remediation, house prices

[1] EEA (2019): Emerging risks in Europe – PFAS: https://www.eea.europa.eu/publications/emerging-chemical-risks-in-europe
[2] Kwiatkowski et al.(2020): Scientific basis for managing PFAS as a chemical class
[3] Glüge et al. (2020): An overview of the uses of per- and polyfluoroalkyl substances (PFAS): https://pubs.rsc.org/en/content/articlelanding/2020/em/d0em00291g#!divAbstract
[4] EEA (2021): A systemic view of impacts of fluorinated polymers across their lifecycles *(forthcoming)*.
[5] Diamond et al. (2015): Exploring planetary boundary threats from chemical pollution

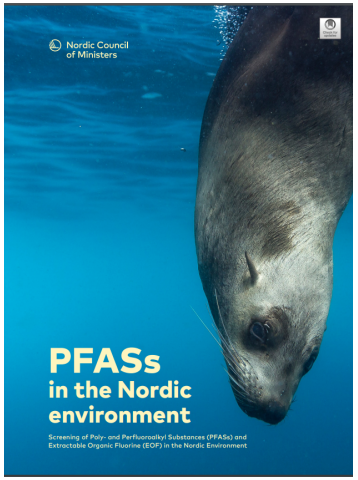
What are the human health concerns of PFAS?

- **Toxic –** various types of toxicity (eg PFOA, PFOS, FTOHs, diPAPs ..) [3,6]
- **Costs –**
- health, remediation, property, company liability, environment [7]
- Estimated annual health costs: **52-84 bio EUR/year in Europe[7]**



Sources: EEA, Emerging chemical risks in Europe – PFAS, inputs from Jamie deWitt. Primarily based on the toxicological profile for perfluoroalkyls (US ASTDR 2018); the US Monograph on Immunotoxicity (National Toxicology Program, 2016), Cancer studies (C8 Health Project Reports 2012, IARC 2017 , Barry, 2013), and developmental effects (Fenton 2009, White 2011). The sources evaluated one or more of the substances: PFOA, PFNA, PFDeA, PFOS, PFHxS, PFOSA, Me-PFOSA-AcOH. [6] *Rosenmai et al. (2016) Fluorinated alkyl substances and technical mixtures in food paper-packaing exhibit endocrine-related activity in vitro.* [7] *Nordic council of ministers: Cost of inaction of PFAS. http://norden.diva-portal.org/smash/get/diva2:1295959/FULLTEXT01.pdf*

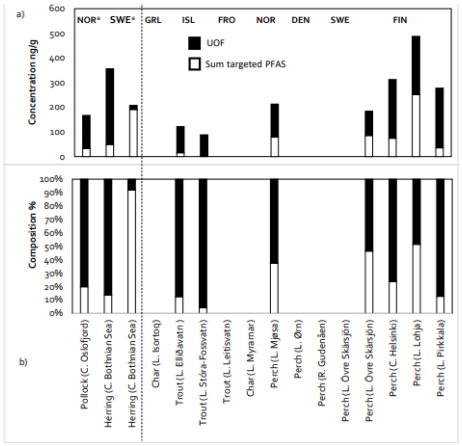
Managing vs. risk assessing class of PFAS



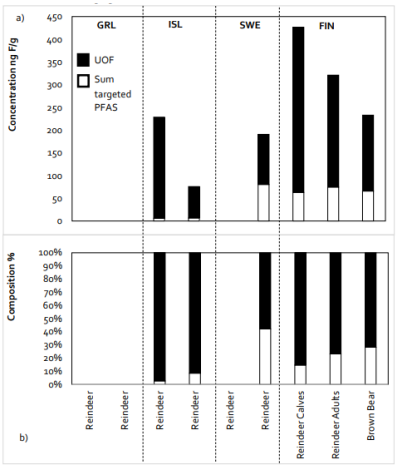
- **Black:** Unidentified PFAS
- **White:** Identified PFAS

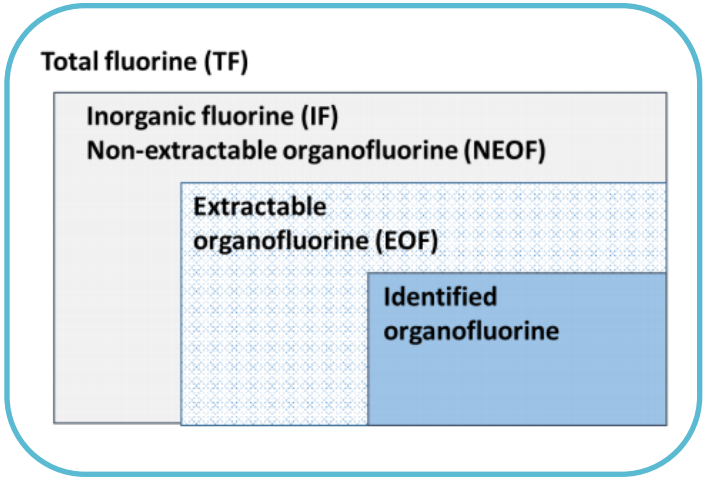
- **Risk managing the class of PFAS**
  => Early Actions on Early Warnings
  => may be supported by risk assessment,
  but **full risk assessment** for each of >5000 PFAS
  would delay action

Fish



Terrestrial Mammals





https://pubs.acs.org/doi/10.1021/acs.estlett.0c00255

Scientific basis for managing PFAS as a chemical class: https://pubs.acs.org/doi/10.1021/acs.estlett.0c00255

European Environment Agency

Adressing groups and classes of PFAS in Europe

EU Drinking water directive (DWD) [1]

- **20 single PFAS (some PFAS)** [2]
- **Total PFAS (sum/class of PFAS)** [3]

EFSA opinion: Risk of PFAS in food [4]

- **Group of PFAS:** PFOA, PFNA, PFHxS, PFOS
- **Tolerable weekly intake (TWI) =** 4.4 ng PFAS/kg bw/week
- **Protecting**: Children year 0-1, breastfed. Levels set for PFAS levels in mothers

Market place and industry

- From PFOA-free to **PFAS/PFC-free**
- In food contact materials, textiles, cosmetics, sports equipment, etc.
- Small and large business[1,2] , ChemSec business group (e.g. COOP, H&M, ..)
- 2021: **Danish Industry pledges to phase out all non-essential uses of PFAS** [5]

[1] EC 2020 (DWD). https://data.consilium.europa.eu/doc/document/ST-5813-2020-INIT/en/pdf
[2] EC Oct 31st 2020: C4-C13 PFCA, C4-C13 PFSA. 100 ppt (0.1 ug/L) for 'Sum of PFAS'.
[3] 0.5 ug organic fluoride/L water. Method to be decided, e.g. Extractable organic fluorine cobustion ion chromatography (EOF-CIC). *After adoption (2020), '....once technical guidelines for monitoring this parameter are developed in accordance with Article 11(6). Member States may then decide to use either one or both of the parameters 'PFAS Total' or 'Sum of PFAS'*
[4] EFSA 2020: https://www.efsa.europa.eu/en/news/pfas-food-efsa-assesses-risks-and-sets-tolerable-intake
[5] Danish Industry 2021. CHEMICALS IN A SUSTAINABLE FUTURE – AN INITIATIVE FROM DI. THE Confederation of Danish Industry Short version (danskindustri.dk)

Risk Governance: Consideration of aspects beyond risk assessment

- International Risk Governance Council framework

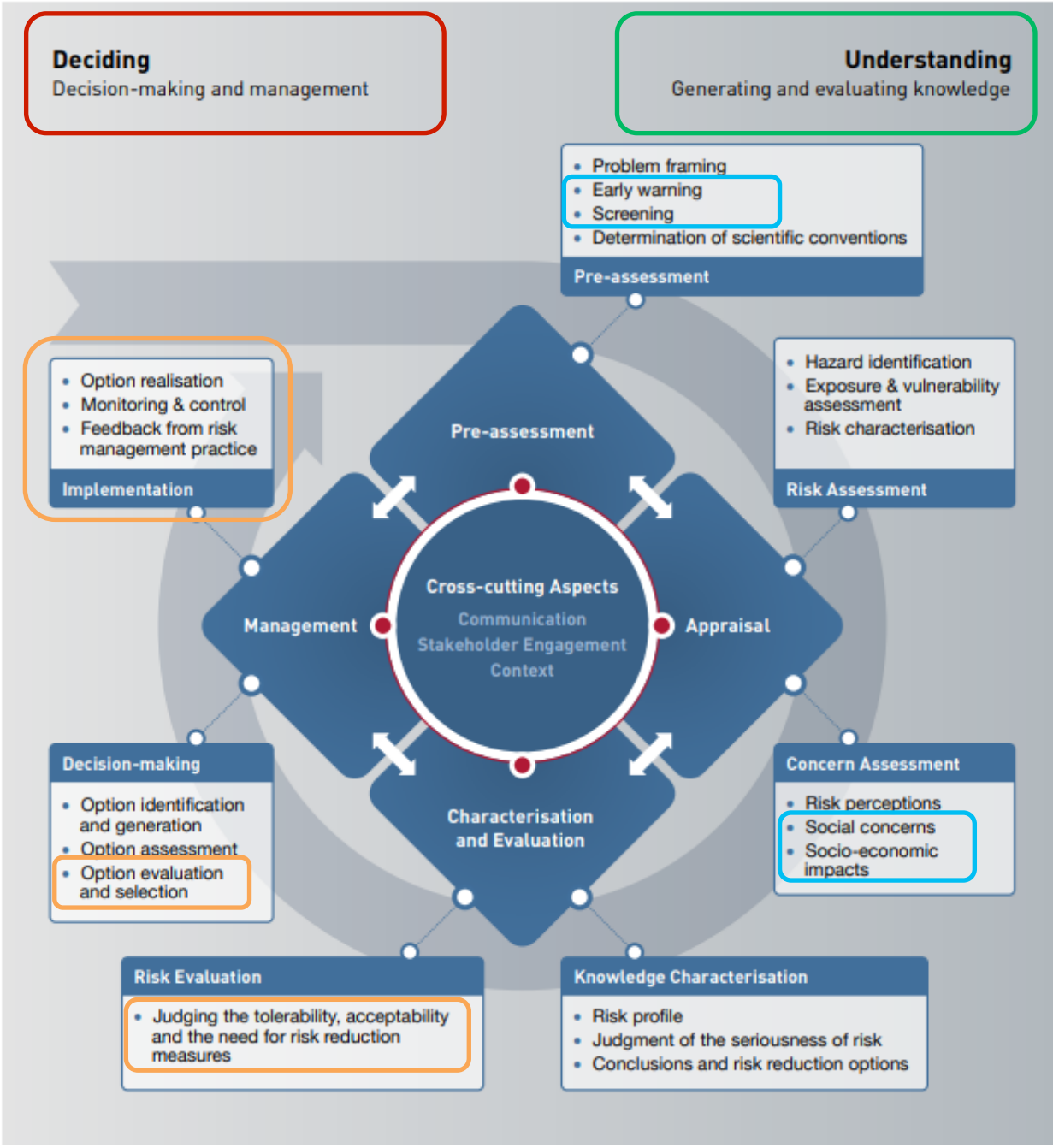
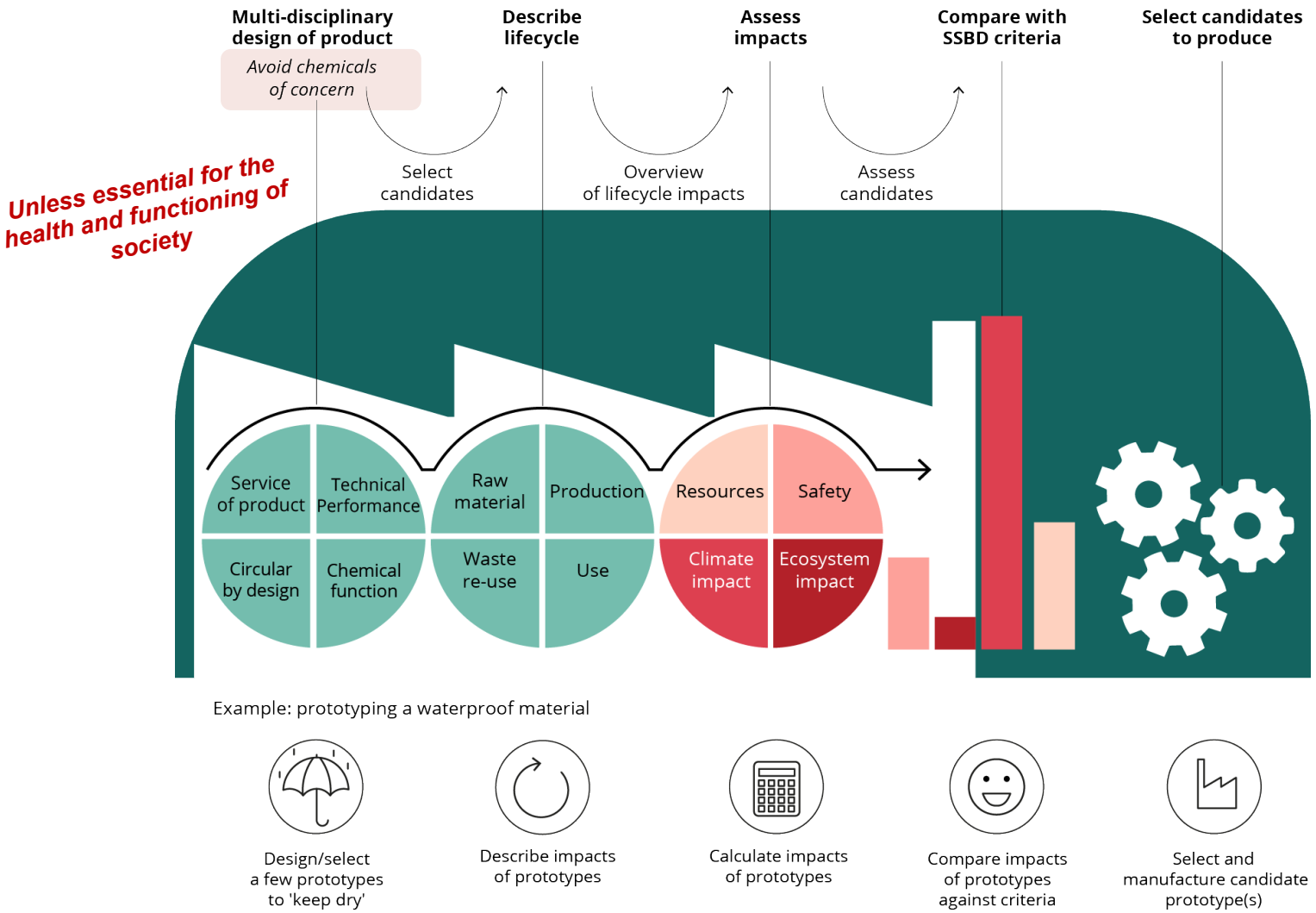


Figure 2: Detailed visual representation of the IRGC Risk Governance Framework.

IRGC. (2017). An introduction to the IRGC Risk Governance Framework

Safe and Sustainable by Design design approach



EEA briefing 2021: Delivering chemicals and products that are safe and sustainable by design.
https://www.eea.europa.eu/highlights/designing-safe-and-sustainable-products

Conclusions

- The **total burden of chemicals harm people and the planet**
  - Vulnerable children, workers, communities, ecosystems most affected,
  - Focus on *accumulation of effects and of chemicals*, e.g. persistent PFAS
- **Risk assessment cannot keep up with increasing diversity of chemicals**
- Difficult to foresee future exposures in a circular economy and climate change => **extra precaution needed to ensure clean material cycles**
- EU chemicals strategy for sustainability calls for **additional risk governance tools** to achieve **upstream prevention of pollution**:
  - *Avoiding non-essential uses of chemicals of concern*
  - *Managing chemical groups – e.g. PFAS and microplastics as a class*
  - *Applying Mixture Allocation Factors (MAF) across regulations*
  - *Transition to Safe and Sustainable by Design (SSBD) chemicals & products*

Thanks for listening!

Xenia Trier, Ph.D.
xenia.trier@eea.europa.eu
Chemicals, Environment and Human Health Expert
Air Pollution, Environment and Health (HSR1)
Health and Sustainable Resource Use
Kongens Nytorv 6, 1050 Copenhagen K, Denmark
eea.europa.eu
eionet.europa.eu
Phone: (+45) 33367100
Direct: (+45) 33367102

#SOER2020

European Environment Agency

Read our Report Europe's environment – State and Outlook