



Uses of PFAS



A chemicals strategy for a sustainable chemicals revolution

A balanced approach for future chemicals policy with science at its heart



Enablers

- Research and new knowledge
- Data
- Evidence
- Digital

Resources

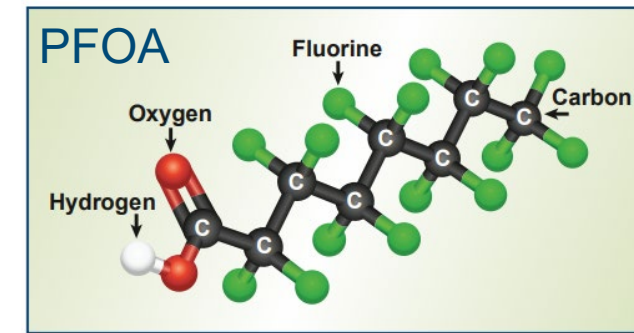
- Funding
- Skills and workforce
- Infrastructure

Governance

- An efficient and accountable decision-making framework

What is the real concern about harms from PFAS?

- **Concerns** from evidence around the world relating to PFAS pollution are valid
- **Localised PFAS pollution events** linked to health effects: high cholesterol, ulcerative colitis, thyroid disease, testicular cancer, kidney cancer and pregnancy-induced hypertension.
- What are everyday **exposures?** and **risks?** **We don't know enough.**
- **Obligation to prevent problems for future generations** as per the **UN Sustainable Development Goals**
- **Over decades - unchecked expansion >4700* persistent PFAS** with **little to no safety data generated**
- **Are all PFAS toxic** to humans and wildlife via bioaccumulation? **We don't know.**
- **PFAS must be regulated (reviewed and if necessary, controlled)** urgently, to prevent a potentially damaging and intractable issue now and for the next generations.



C8 Perfluorooctanoic acid

*figure according to EU sources

What are the key scientific challenges for evaluating risks from PFAS?

If only a Safe & Sustainable by Design approach had been taken 40, even 10 or 20, years ago.

This topic has grown into being one of the most complex and seemingly intractable toxicological challenges of our day, in terms of how to generate exposure and toxicology evidence to inform risk assessment.

- i) **Data gaps and unknowns are extensive re: toxicology** for hundreds of PFAS in global use; (N.B. safety data are not required when substances are used at low tonnage <1tpa in REACH or exempt as polymers with low bioavailability).
- ii) **Sparse data on real exposure levels to PFAS** (in water, environmental species and in humans) makes assessing risk a challenge
- iii) Addressing these scientific gaps using traditional toxicology approaches for individual PFAS
- too costly, take decades and involve tens of thousands of animals

What are the key scientific challenges for evaluating risks from PFAS?

Continued

iv) Degree of Urgency to Know and Most Relevant Application of Scientific Resources

To guide the science in the most impactful way, **a collaborative steer is needed from wider society** to focus efforts on those of the 4700 **PFAS that are most important for the future benefit of society**.

To evaluate the **risk:benefit outcomes** for the range of PFAS use scenarios

urgent **targeted investment in skills development and new scientific approaches are needed**
e.g. **new approach methods (NAMs)** (see US EPA and US NTP work on PFAS data generation)
and **national environmental (bio)monitoring programmes** – to help evaluate true scale of risk
and potentially **new risk-based paradigms** to integrate new types of data

We need a **regulatory framework** in which to evaluate the new types of data

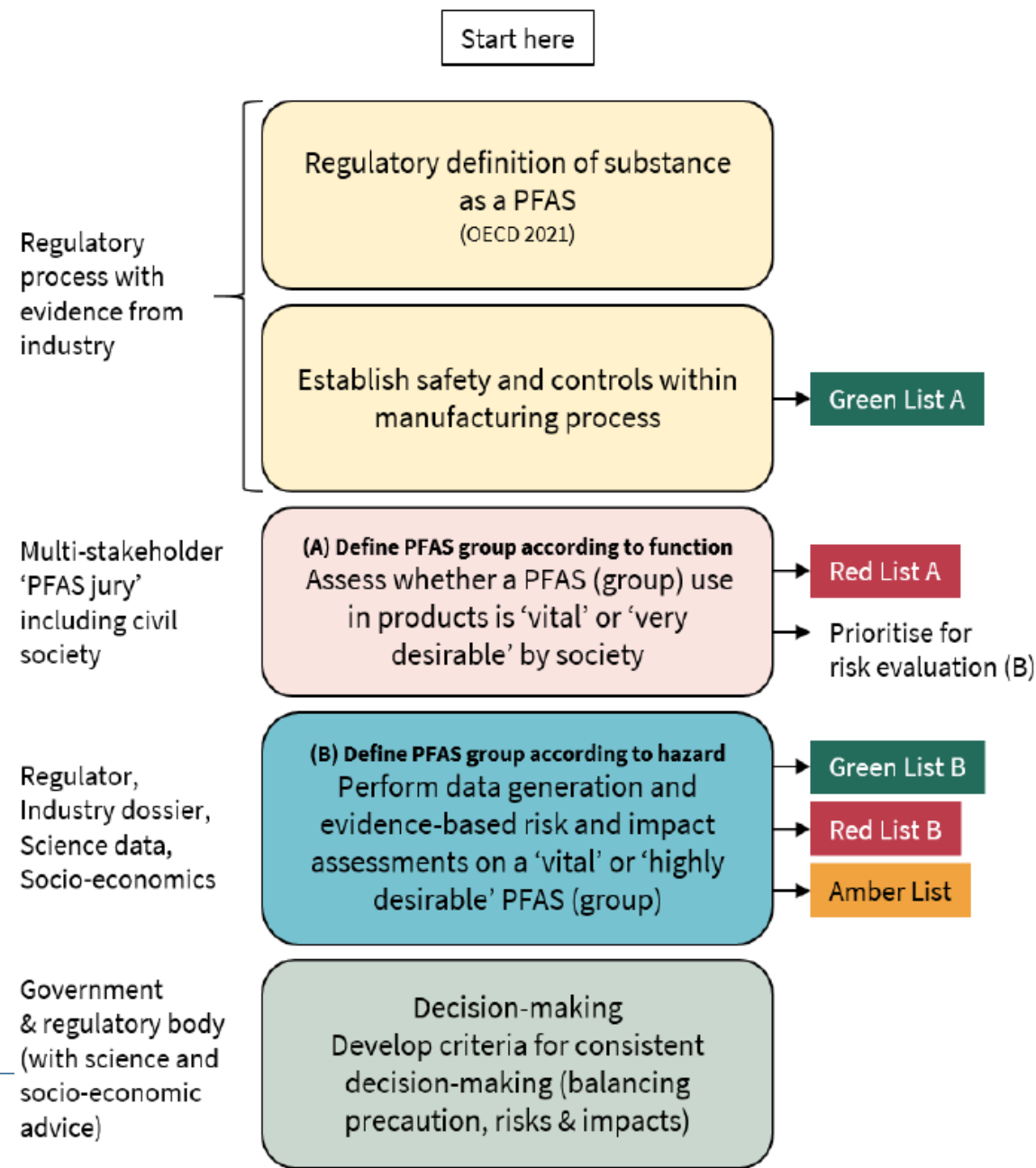
We need **global collaboration** to share data and harmonise our understanding of the real issues

PFAS-specific regulation: The building blocks and potential outcomes of a science-informed, risk-based framework for action

How regulatory action and scientific efforts can evolve hand-in-hand, as part of a defined framework

- to support urgent and effective risk-based control of those PFAS that are both persistent AND toxic

Concept of a 'PFAS Jury' – a citizens' forum to help government decide which PFAS-containing products are the most important to society and which should have a scientific risk assessment/ risk management evaluation



(A) Grouping based on sector, function and product types

(B) Grouping based on science, hazard and risk

A proposed framework for risk-based PFAS regulation

A 'traffic-light' decision-tree approach

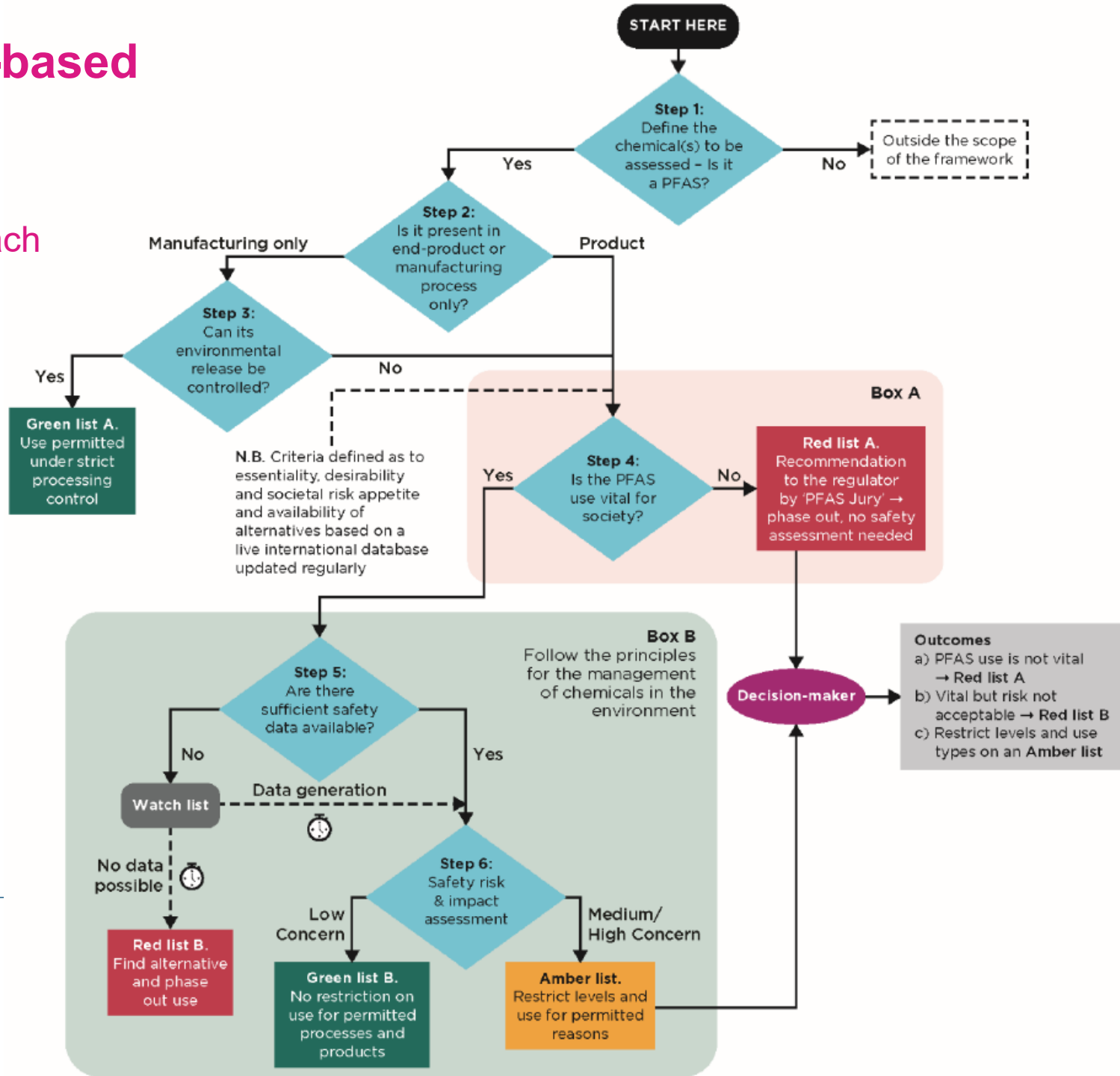


https://www.rsc.org/globalassets/04-campaigning-outreach/tackling-the-worlds-challenges/environment/rsc_principles_for_chemicals_in_the_environment.pdf

An approach to best direct the science is needed.

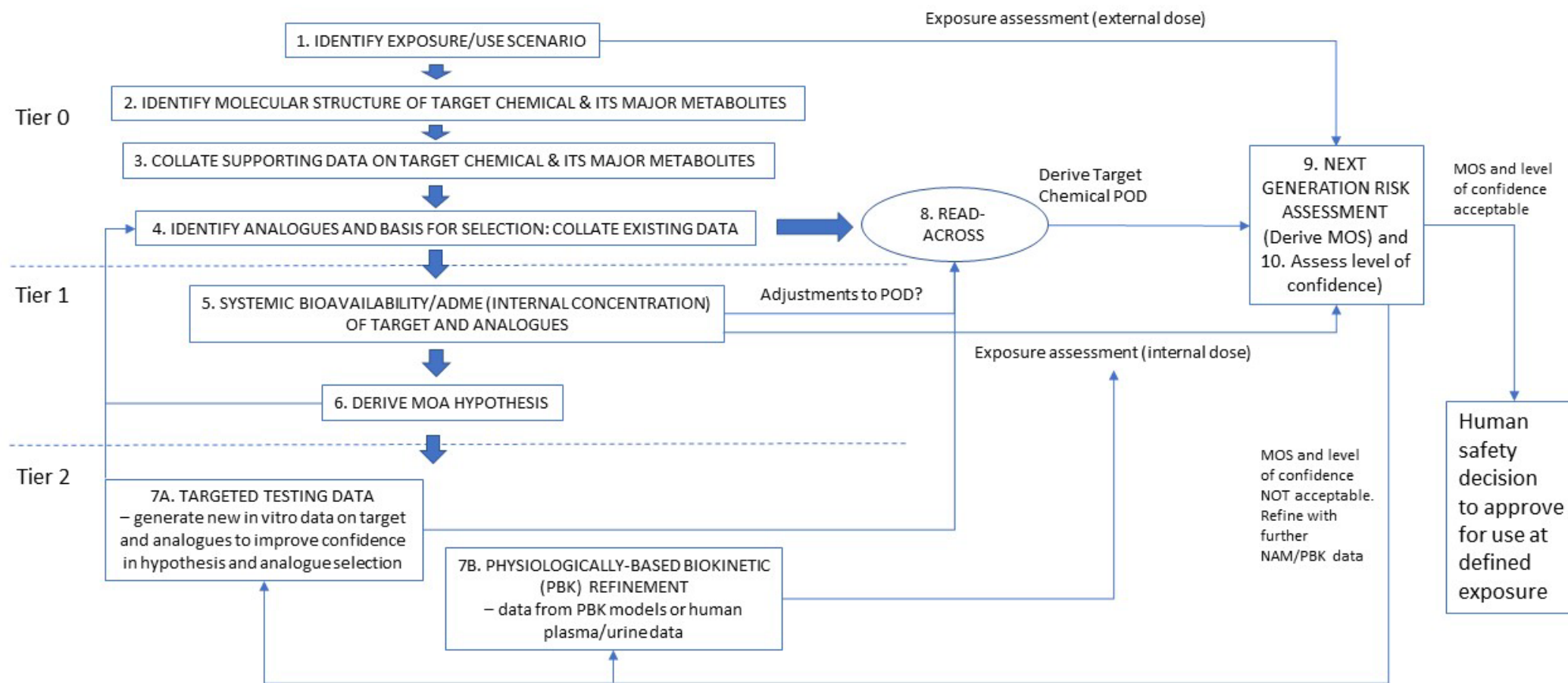
Grouping/read-across applied

- group by function?
- group by hazards?
- group by exposures?



10-step framework – Use of read-across (RAX) in Next-Generation Risk Assessment

Alexander-White et al (2022) Reg Tox Pharm 129:105094. doi: 10.1016/j.yrtph.2021.105094. PMID: 34990780.



Acknowledgement: Work funded by Cosmetics Europe Long-Range Science Strategy (LRSS) Programme

PROJECT

GRACIOUS is a three and a half year EU project that runs from 2018 to 2021. It has a budget of about 7.1 million.

CONSORTIUM

GRACIOUS brings together 23 partners spanning Europe and the USA, including representatives from academia, industry, policy makers and regulators.



**Grouping , Read-Across,
Characterisation and Classification
framework for regUlatory
risk assessment of manufactured
nanomaterials and Safer design
of nano-enabled products**

www.h2020gracious.eu

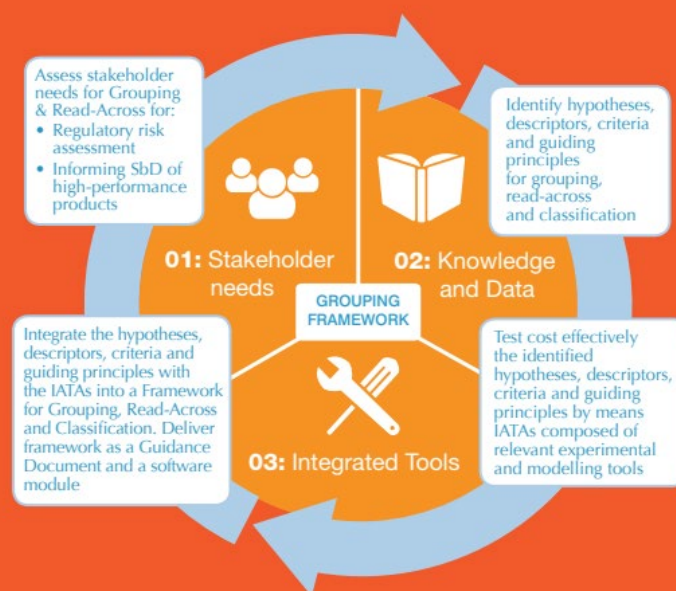


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 760840

Concepts and potential approaches from other areas that could be applicable to PFAS?

OBJECTIVES

- Integrate key stakeholder needs with state-of-the-art thinking on grouping and read-across of nanomaterials/nanoforms in order to design, develop and refine a sustainable Framework.
- Develop knowledge and generate data as the basis to derive hypotheses, criteria and guiding principles for grouping, leading to classification and read-across, as building blocks for the GRACIOUS Framework.
- Refine and integrate tools to build the GRACIOUS Framework, Guidance Document and software module.



Key Messages

Government, Science and Society-led criteria for prioritising action on PFAS

(Government working with industry, academia, NGOs and a Citizens' PFAS Jury)

A new pragmatic and proportionate way of performing a risk assessment

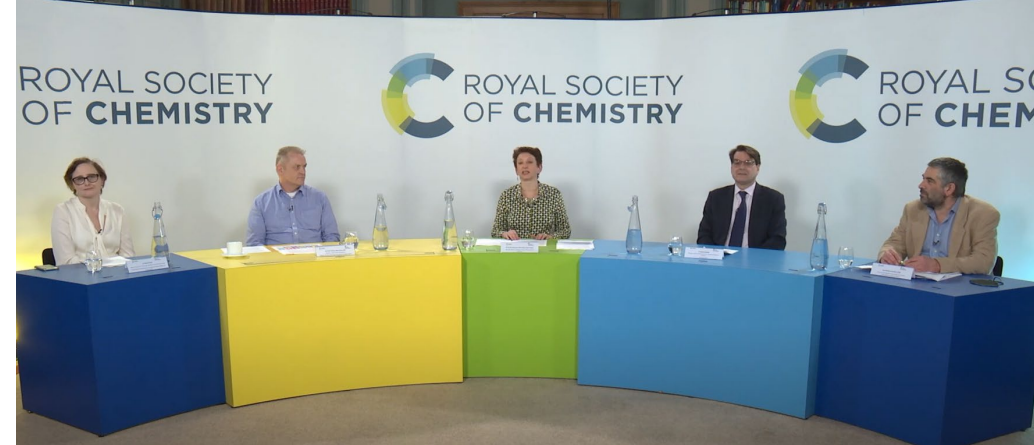
(Application of New Approach Methods in Toxicology/(Bio)monitoring/Grouping Approaches/Risk paradigms)

Blanket bans/restrictions on all PFAS on persistence alone is not a realistic option

- takes less scientific resource but could have massive unintended consequences for society
- the level of industry and societal backlash to policy based on persistence alone could be too high
- in reality leading to postponement of any real action to reduce PFAS pollution.

Doing nothing is not an option - good evidence of the toxicity of some PFAS, gives due cause for concern and we must protect public health and environmental species now and for future generations.

We need a **Sound Chemicals Management Framework using Science-informed Risk-Based Regulation**



“We need a global science panel
for chemicals and waste and
pollution prevention”

RSC ‘Burlington Consensus’, January 2022

<https://www.youtube.com/watch?v=YaTaMmZBnv4>

Will PFAS be on the
international
UNEP agenda?

PFAS pollution is a
global issue and
knows no
boundaries

2 March 2022

United Nations Environment
Assembly UNEA5 agreed!!



Photo: UNEP

Thank you

Full RSC policy position at
<https://www.rsc.org/globalassets/22-new-perspectives/sustainability/a-chemicals-strategy-for-a-sustainable-chemicals-revolution/pfas-policy-position-dec-2021.pdf>