Chemicals in Plastic – Main Findings of the Technical Report for UNEP

Dr. Roland Weber
POPs Environmental Consulting,
International Panel on Chemical Pollution (https://www.ipcp.ch/)
73527 Schwäbisch Gmünd, Germany
roland.weber10@web.de
https://www.researchgate.net/profile/Roland-Weber-2

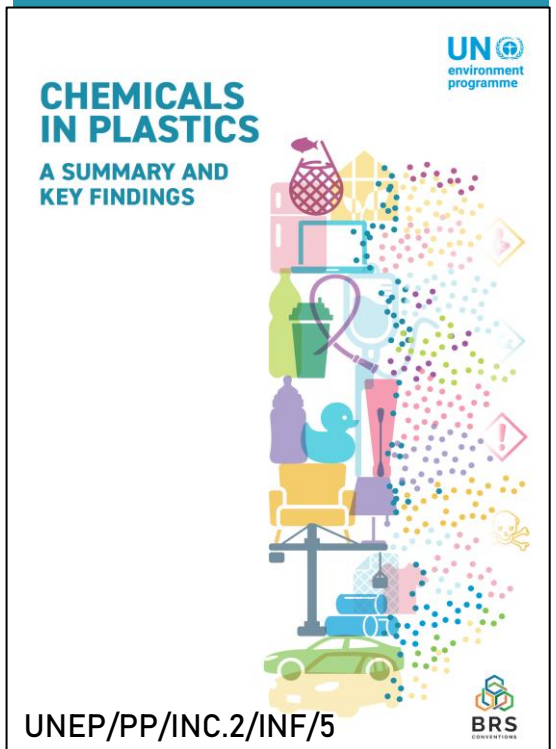
IPCP International Panel on Chemical Pollution

UN environment programme

Chemicals in Plastics : A Technical Report - Main objectives

- Provide scientific evidence, based on extensive literature review on the chemicals-related issues of the plastic pollution crisis.
- Close some of the knowledge gaps related to chemicals in plastics, with a particular focus on additives, their environmental fate and related human and environmental impacts.
- Identify levers, in order to protect human health and the environment and support a “toxic-free” circular economy.

UN environment programme



UNEP/PP/INC.2/INF/5

Chemicals in Plastics : A Technical Report - Main content

Describes the various chemicals-related issues of plastic pollution:

1) Chemicals of concern and impacted sectors that use plastics
2) Environmental fate and health effects of plastic-associated chemicals
3) Problems with the current state of chemical risk assessments
4) Options for addressing chemicals of concern in plastics
5) Strategies for substituting problematic chemicals
6) Managing existing plastic waste and plastics in a circular economy.

- Developed by UNEP in cooperation with the BRS Secretariat with lead authors from the International Panel on Chemical Pollution.

- The report is available with a summary and key findings : https://www.unep.org/resources/report/chemicals-plastics-technical-report

INF doc INC2: https://www.unep.org/events/conference/second-session-intergovernmental-negotiating-committee-develop-international/documents#OtherDocuments

Chemicals in Plastics : A Technical Report - Methodology

- Extensive literature review: The authors of the report published two peer reviewed studies on chemicals in plastics and the databases of both reviews were combined for the Technical Report.

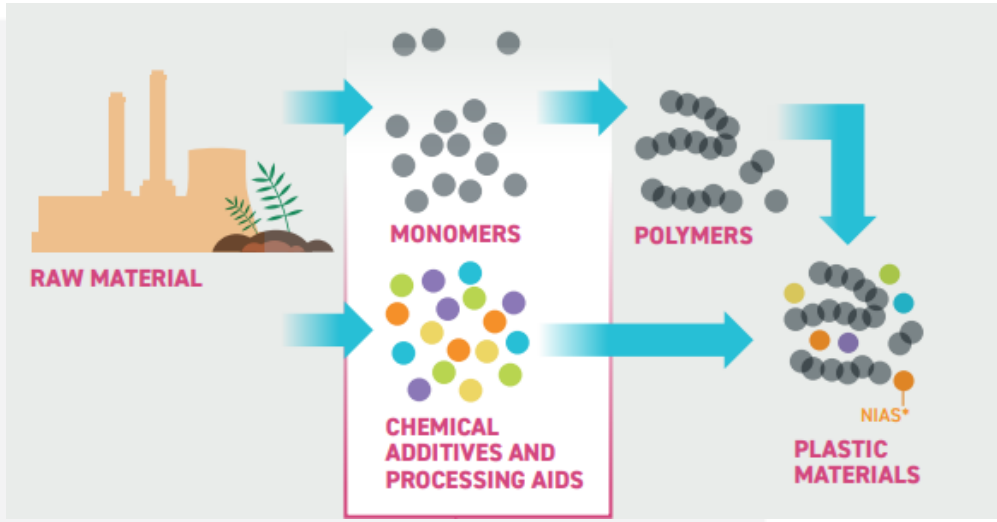
- Supported by consultative process and input from additional experts/reviewers.

https://doi.org/10.1016/j.cogsc.2021.100513

https://doi.org/10.1021/acs.est.1c00976

ANATOMY OF PLASTICS

WHAT'S IN MY PLASTICS?



1. **MONOMERS AND POLYMERS**
constitute main building blocks of plastic material

2. **ADDITIVES**
bring desired functionality to the plastic material

3. **OTHER INTENTIONALLY ADDED SUBSTANCES**
such as starting materials and catalysts

4. **NON-INTENTIONALLY ADDED SUBSTANCES**
such as solvents, cleaning agents, or impurities from manufacturing or recycling

BREAKDOWN
most widely produced plastic additivies*
*Source: Geyer et al. 2017

Plasticizers
to make plastic softer and flexible
e.g. phthalates, chlorinated parafins

Fillers
that occupy space without changing functional properties
e.g. mica, talc or clay

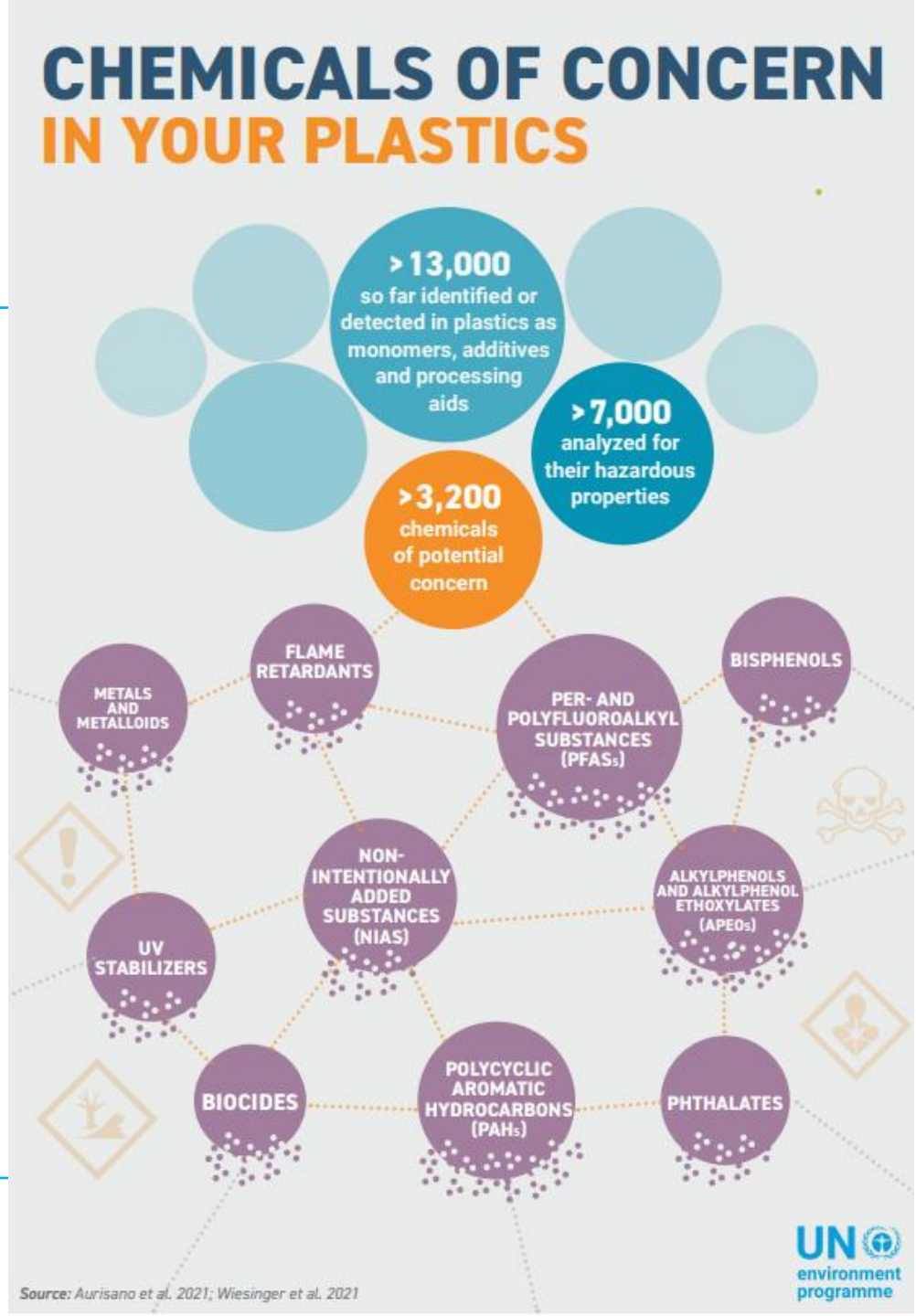
Flame retardants
to reduce flammability and prevent spread of fire - e.g. brominated and chlorinated flame retardants

Other
including colorants, antioxidants, heat and light stabilizers, lubricants, biocides or antistatic agents

Chemicals in Plastics : A Technical Report - Key Findings

1. Chemicals are an integral part of plastics. Over 13,000 substances have been associated with plastics. >3200 are chemicals of potential concern.

2. Ten groups of chemicals are identified as being of concern due to their hazardous properties.



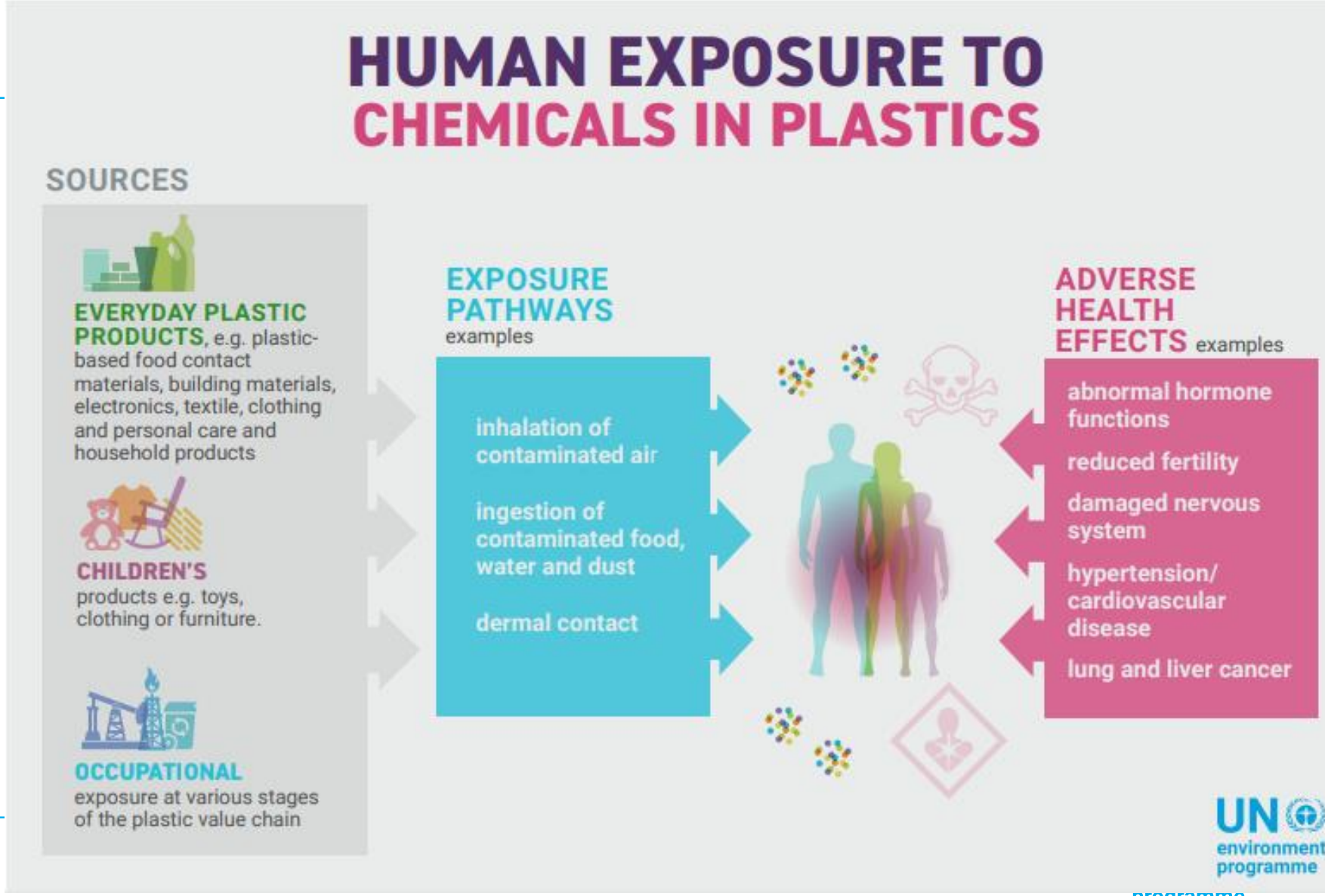
Chemicals in Plastics : A Technical Report - Key Findings

3. Chemicals of concern have been found in plastics across a wide range of sectors and products value chains.

Chemicals in Plastics : A Technical Report - Key Findings

4. Chemicals of concern in plastics can impact our health and our environment

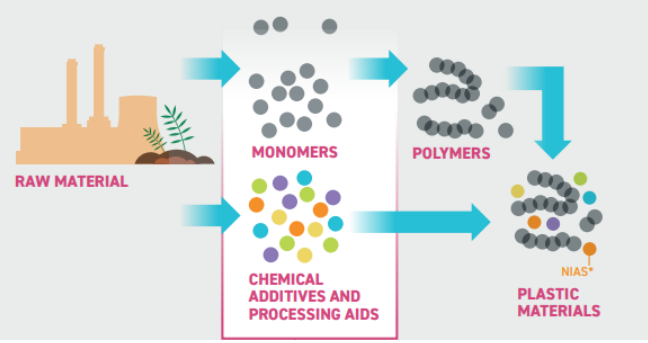
5. Women and children are particularly susceptible to these hazardous chemicals. Men are not spared either.



Chemicals in Plastics : A Technical Report - Key Findings

6. Chemicals of concern can be released from plastic along its entire life cycle.

Chemical additives are typically not bound to the polymer and therefore can be released from plastics over time, leading to ecosystem and human exposures.

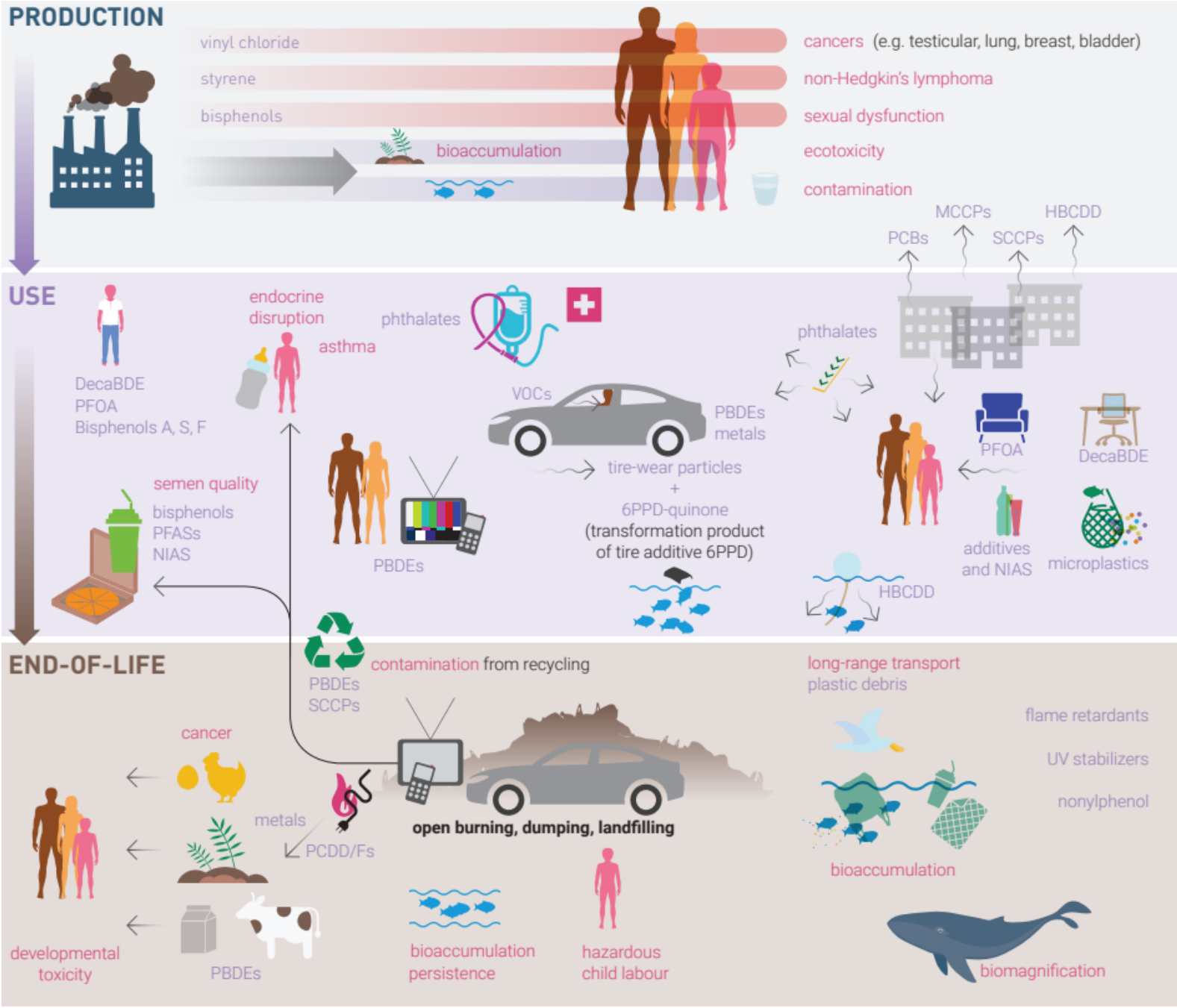


Chemicals in Plastics : A Technical Report - Key Findings

6. Chemicals of concern can be released from plastic along its entire life cycle.

Epidemiological evidence of elevated cancer levels in factory workers with exposed to certain monomers.

While for high income countries exposure has been documented for the use phase, for LMI-countries additionally the end-of-life phase with dumping and open burning result in environmental releases and human exposure.



Thank you for your attention

Contacts:
Sandra Averous-Monnery (sandra.averous@un.org)
Stephanie Laruelle (stephanie.laruelle@un.org)
Malgorzata Stylo (Malgorzata.stylo@un.org)
Kei Ohno (BRS) (kei.ohno@un.org)
Roland Weber (Roland.Weber10@web.de)
Peter Fantke (pefan@dtu.dk)