National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

Misperception and miscommunication

Barriers and opportunities for effective communication about risks from chemical substances

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Contents

Disclaimer

- Expressed (scientific) views in this presentation are my own
- This presentation is not about the justness of policy choices under epistemic uncertainty.

Misperception and miscommunication

Misperception

- Misperception, as approached in this presentation, is not about one societal group perceiving risks wrongly, it is about **different societal groups having different evaluations of the same societal issue.**

Miscommunication

- Communication, as approached in this presentation, is considered **multidirectional** (i.e dialogue) and aimed at **empowering target groups to make informed judgments and decisions**.

Three barriers to effective communication

1. Scientific information often does not align with public perspectives on hazards, risks, and uncertainty

2. A mismatch between the use and understanding of risk terminology

3. Current practices in uncertainty communication leave much room for misinterpretation of the evidence base for risk

1

Scientific information often does not align with public perspectives on hazards, risks, and uncertainty

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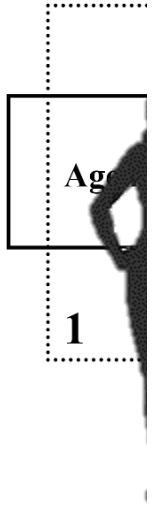
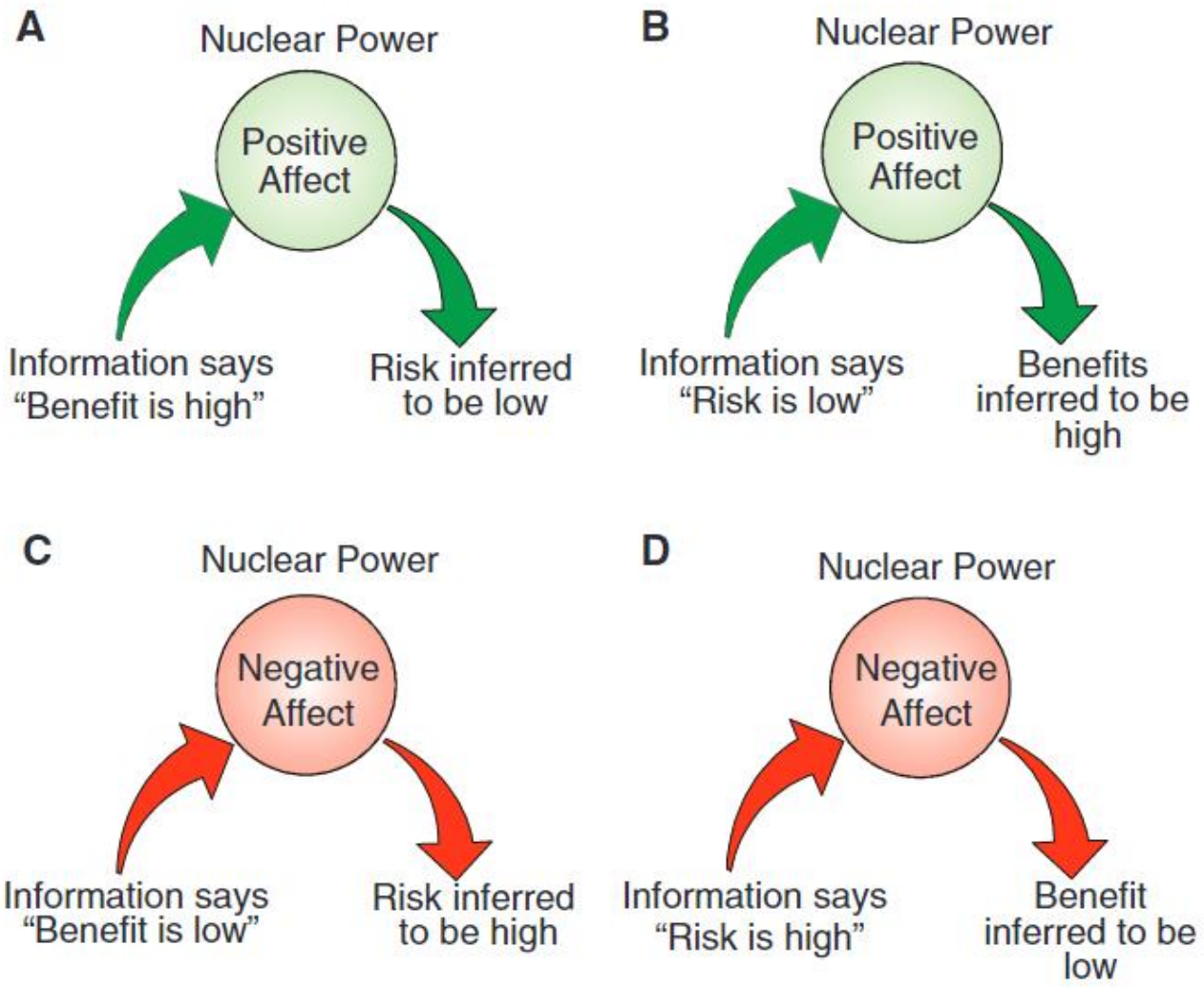
- Perspectives on hazards and risks
- Perspectives on uncertainty

Category/ context	Item	(Strongly) disagree	(Strongly) agree	Neither
General beliefs about 'chemical substances'	Most chemical substances are harmful for health	12	**67**	21
	When someone often ingests a chemical substance, an increasing amount stays in the human body	6	**65**	29
	It is easy to prove that a chemical substance is the cause of a complaint or disease	**65**	10	24
Factors affecting whether a chemical substance can cause adverse effects is influenced by	The properties of the substance such as the composition or structure	4	**80**	16
	The properties of the substance such as color or scent	**40**	28	32
	How much of the substance is present in the direct environment[1]	2	**89**	8
	How often you ingest* the substance[1]	2	**92**	7
	What amount of the substance you ingest, each time you come into contact with it[1]	2	**90**	8
	For how long during your life you ingest the substance[1]	2	**90**	8
	How much you weigh[3]	26	**43**	32
	How healthy you are[3]	26	**45**	28
	How sensitive you are[3]	20	**55**	26

Perspectives on hazard and risk

The public, policy makers and schientists have different perspectives, criteria and frameworks with which the assess risks





Perspectives on uncertainty

"Knowledge is as an island, surrounded by a sea of ignorance.
As our island of knowledge grows, so does the shore with our ignorance"

John Archibald Wheeler, 1992

"When it is an E-number, it has been approved, in a sense that is has no adverse effects on health. So, it surprises me that it is still being researched."

Peter (age 49, high education level, Dutch), 2019

BPA

Values, beliefs and attitudes about chemical substances in general and chemical substances in food	Hazard: Severity	Hazard: Worry	Risk: Magnitude	Risk: Worry
Beliefs and attitudes about chemical substances in genera				
Beliefs				
Most chemical substances are harmful for health			.32	.34
All chemicals are equally harmful* (dose-re-sponse insensitivity)		.30	.38	.34
Attitude*				
Chemicals	.34	.37	.44	.39
Values, beliefs and attitudes about chemical substances in food				
Values				
Food should be natural (no artificial additives)	.38	.36	.40	.32
It should be 100% certain that chemical substanc-es in food are safe	.42	.40		
Acceptability of scientific uncertainty about risk	-.54	-.42		
Beliefs				
Foods packaging/ food additives are harmful for health			.37	.34
Somebody can eat packaged food every day without getting complaints or ill on the long term				
Attitudes*				
food packaging** / food additives	.34	.37	.35	.34

2

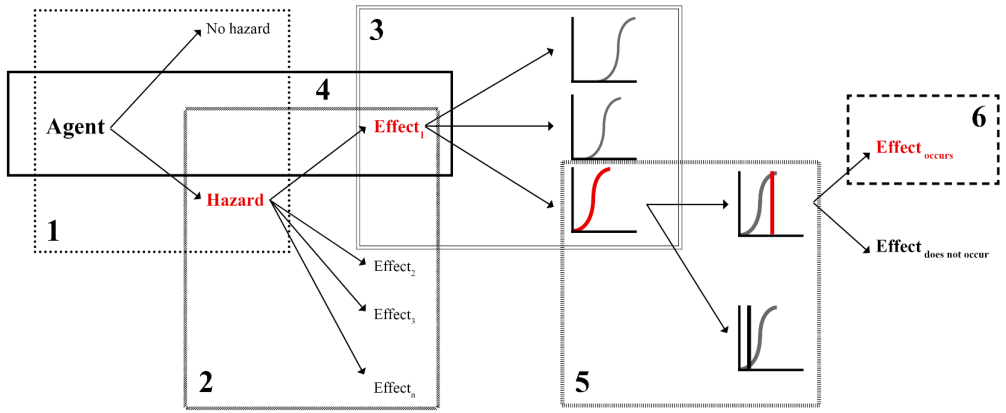
A mismatch between the use and understanding of risk terminology

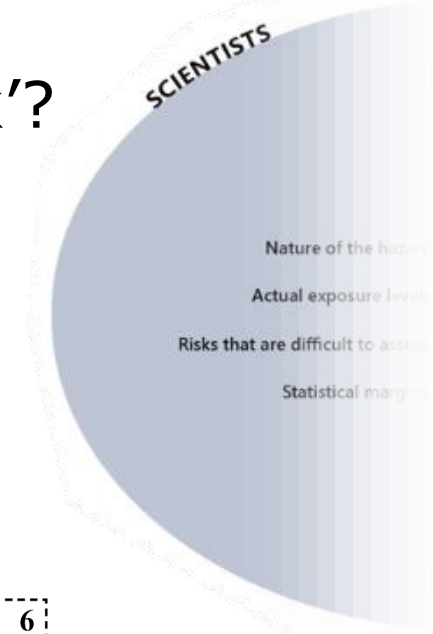
A mismatch between the use and understanding of risk terminology

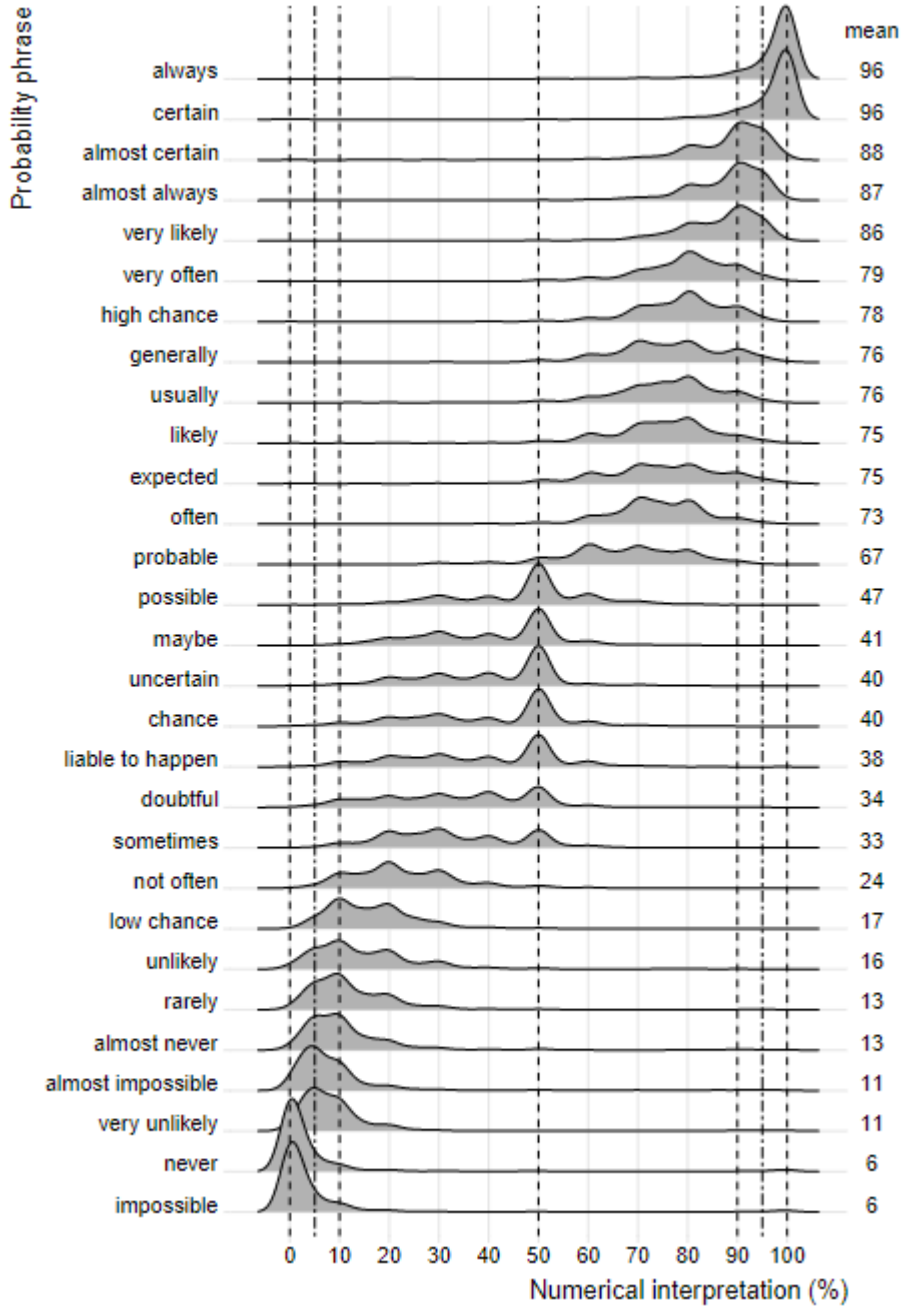
- Role of semantics is often trivialized, but
- **"Risk"**
  - Synecdoche (figure of speech) – hazard, probability, effects
  - B1 classification
  - Technological and social construct
  - Pejorative
- **"Safe"**
  - Absence of a hazard?
  - Absence of risk?
- **"Harmful(ness)"**
  - Toxicity of a chemical substance?
  - Numbers of people getting complaints or ill?
  - Severity of complaits or illness?

Uncertainty

- What is an ‘uncertain risk’?







3 Current practices in uncertainty communication leave much room for misinterpretation of the evidence base for risk

Current practices in uncertainty communication leave much room for misinterpretation of the evidence base for risk

- **Misinterpretation due to vague and ambiguous language**

  "the risk is uncertain"

- **Misinterpretation due to scientific jargon**

  "possibly carcinogenic"

- **Misinterpretation due to contextual information**

  "substance is non-degradable"

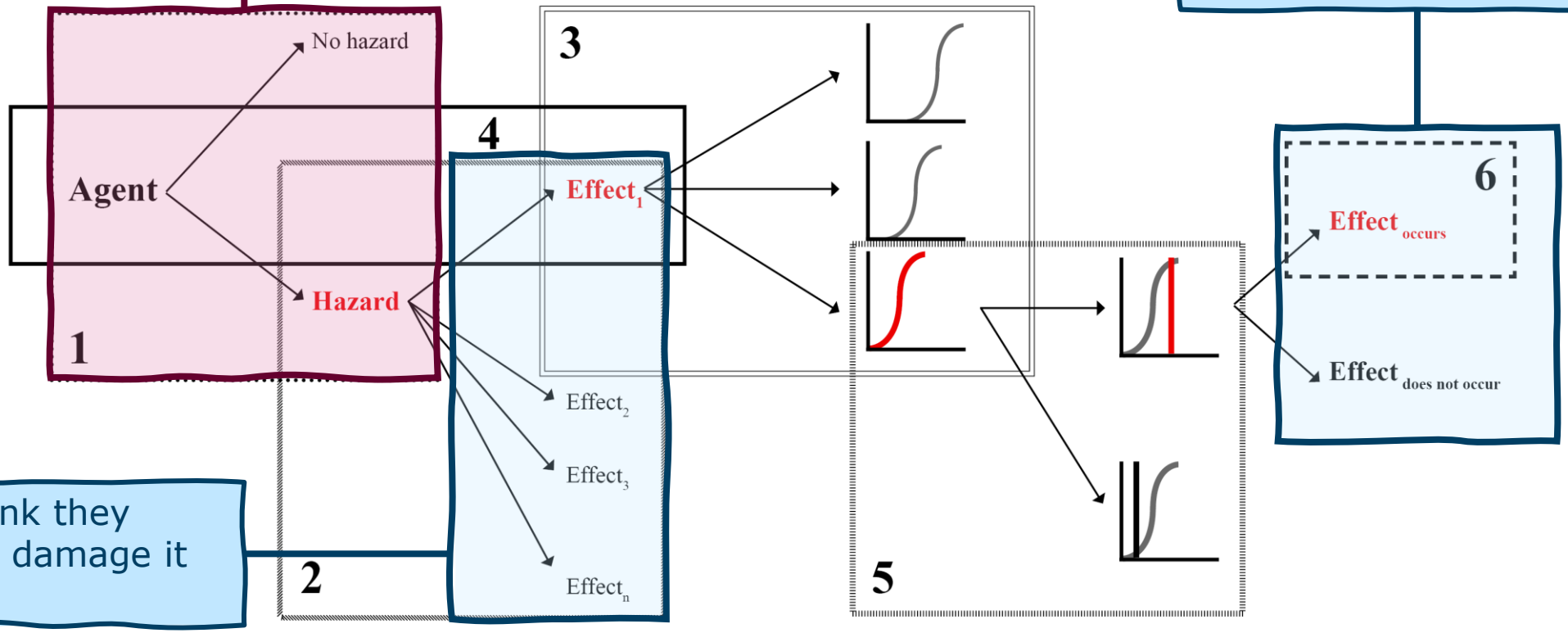
Misinterpretation due to vague and ambiguous language

Excerpt from case text read aloud to the interviewee	"About what do you think uncertainty exists?"
"The RIVM investigates the health risks of SAS in food. At this point, these are uncertain."	"I don't think they know what damage it can cause." (Female, age 58, low education level, Dutch,)
	"[It means] that there is no visible risk at the moment. However, it cannot be ruled out that in the long term there are risks." (Male, age 53, intermediate education level, Dutch)
	"So: the first uncertainty is: who gets it? The second uncertainty is: if you get it, how serious is it?" (Female, age 59, high education level, Dutch)

Misinterpretation due to vague and ambiguous language

"The RIVM investigates the health risks of SAS in food. At this point, these are uncertain"

"So: the first uncertainty is: who gets it? The second uncertainty is: if you get it, how serious is it?"



"I don't think they know what damage it can cause"

Current practices in uncertainty communication leave much room for misinterpretation of the evidence base for risk

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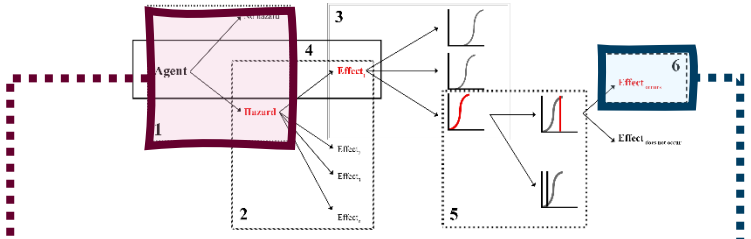
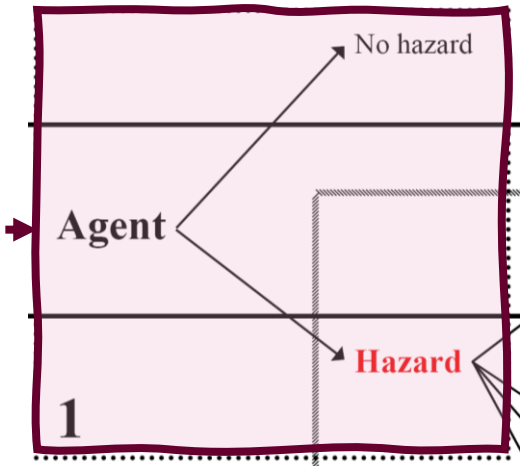
Misinterpretation due to scientific jargon



"The substance is possibly carcinogenic"

- According to IARC:

> "This category is used for agents […] for which there is limited evidence of carcinogenicity in humans […]."



- According to 'Tom' (37, intermediate education, Antillean-Dutch):

> "That there are people who got cancer […] But, we do not exactly know how many. So, it is possible"

Current practices in uncertainty communication leave much room for misinterpretation of the evidence base for risk

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Misinterpretation due to contextual information

"Bisphenol A possibly has effects on, for example, reproduction and development, metabolism and immune system."

(RIVM website)

"Well, I think, that they know it is not entirely healthy, otherwise they would not be able to list them [adverse effects]."

'Catherine' (age 51, intermediate education level, Dutch)

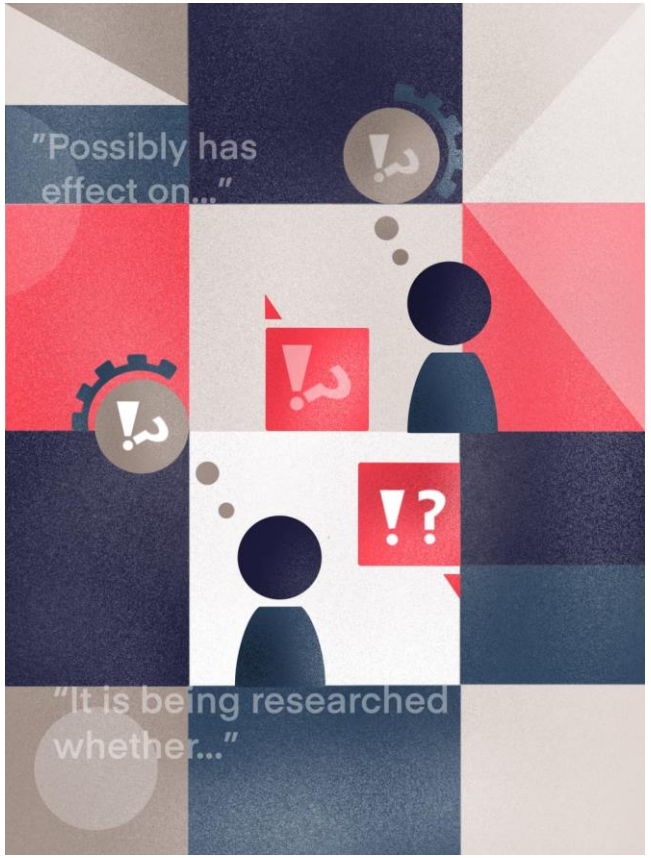
"Possible health risks of nanomaterials in food can primarily be expected from exposure to nanomaterials that cannot be digested in the gastrointestinal tract."

(RIVM website)

"If it is non-degradable, I think "What is your risk if you excrete it?" But apparently you don't excrete it, and then perhaps it accumulates [..,] Well, [...] I can imagine that's no good."

'Astrid' (43, intermediate education level, Dutch)

What are the opportunities for effective communication about risks from chemical substances?



Recommendation 1: Facilitate understanding of risk terminology used in communication

1. Develop information deliberatively, by involving representatives of target audiences. A case specific approach is recommended.
2. Explicitly reflect on whether terms used in communication have the same meaning for the target audience as for the communicator.
3. Communicate epistemic uncertainties as clear and exact as possible to all audiences, including the general public.

Recommendation 2: Align with public perspectives on hazards, risks, and uncertainty

4. Distinguish between communicating information that supports appraisal of the hazard and communication that supports appraisal of the risk.

5. Identify the (level of) uncertainty people expect. When there is a mismatch with the actual (level of) uncertainty, address the mismatch in the communication

Recommendation 3: Minimize room for (mis)interpretation of the evidence base for risk

4. Reflect on how audiences evaluate terminology used in communication in terms of epistemic uncertainty

5. Reflect on whether contextual information can evoke incorrect conclusions about the evidence base for risk.

What could OECD do to help support development of risk communication activities for PFAS?

- **Apply opportunities** for effective communication about risks from chemical substances **to practice**

- **Support social scientific research** on risk perception of, and risk communication about the hazards, risks and uncertainty on PFAS

- **Collect, synthesize and include** scientific evidence and best practices in risk communication for informed judgment and decision making on PFAS, on the OECD web portal

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