

Effective management of nuclear emergencies: which social factors may play a key role?

**C. Turcanu,
T. Perko, B. Carlé**

**Institute for Environment, Health and Safety
PISA: Programme for Integration of Social Aspects into Nuclear
Research**

cturcanu@sckcen.be

SCK • CEN

STUDIECENTRUM VOOR KERNENERGIE
CENTRE D'ETUDE DE L'ENERGIE NUCLEAIRE

Social factors in nuclear / radiological emergencies

Fukushima Fallout: Cancer Fears and Depression Plague Japanese Refugees

By Cinthia Briseño and Heike Sonnberger

Ever since the nuclear disaster at the Fukushima power plant, many Japanese people have been living in the fear of cancer. Experts find it difficult to estimate how many people will actually fall ill, but they are concerned about the psychological consequences of the catastrophe.



- Social and psychological aspects are key issues in emergency management
 - NERIS SRA also outlines these issues as an important research topic
 - What can help mitigating the effects of an accident?
 - What can influence social trust?
- Which factors influence the acceptance and compliance with emergency management actions & advice?

Methodology

- Large scale public opinion survey
 - “SCK•CEN Barometer“
 - Computer-assisted personal interviews (35 to 45 min at respondent’s home)
 - Representative with respect to **gender, age, region, level of urbanisation**
 - Permanent topics risk perception, trust, confidence + focus topics
 - Editions: 2002, 2006, 2009, 2011, 2013, 2015 (forthcoming)
 - Analysis: descriptive, but also **causal**



- Media content analysis
 - Belgian and other European newspapers (see also PREPARE posters!)



Knowledge influences the recall,
but not the **acceptance** of
emergency management actions



Recall & acceptance of emergency management actions & advice

- Case study: a radiological incident in Belgium (INES 3, 2008)
→ comparison between:

General population
(N=1031)

vs. Population from affected area
(N = 104)



Recall and acceptance of emergency management

A radiological incident in Belgium (INES 3, 2008)

Recall

5 items, e.g. What did the authorities advise the local population? (*Not to eat fresh vegetables from garden*)

- Influenced by: **prior knowledge** about the nuclear domain (both pop. groups) and **risk perception** of an accident in a nuclear installation (only general population)
- Not influenced by: gender, education, age, trust in authorities to protect against various radiation risks

Acceptance

6 items, e.g. to what extent you agree/disagree that it would have been better to evacuate people in the 3 km radius

- Situation **perceived as worse** than communicated by authorities
- Driven mainly by: **psychological characteristics of risk** (disaster potential), and (only in the general population) by **trust** and **attitudes**, and their interaction effect with knowledge

Compliance with emergency management advice

Experiment with a TV clip



Compliance with emergency management advice

Experiment with a TV clip

✓ In case of a nuclear alarm I would **use the phone** to inform family and friends about the situation (after clip)

Control group

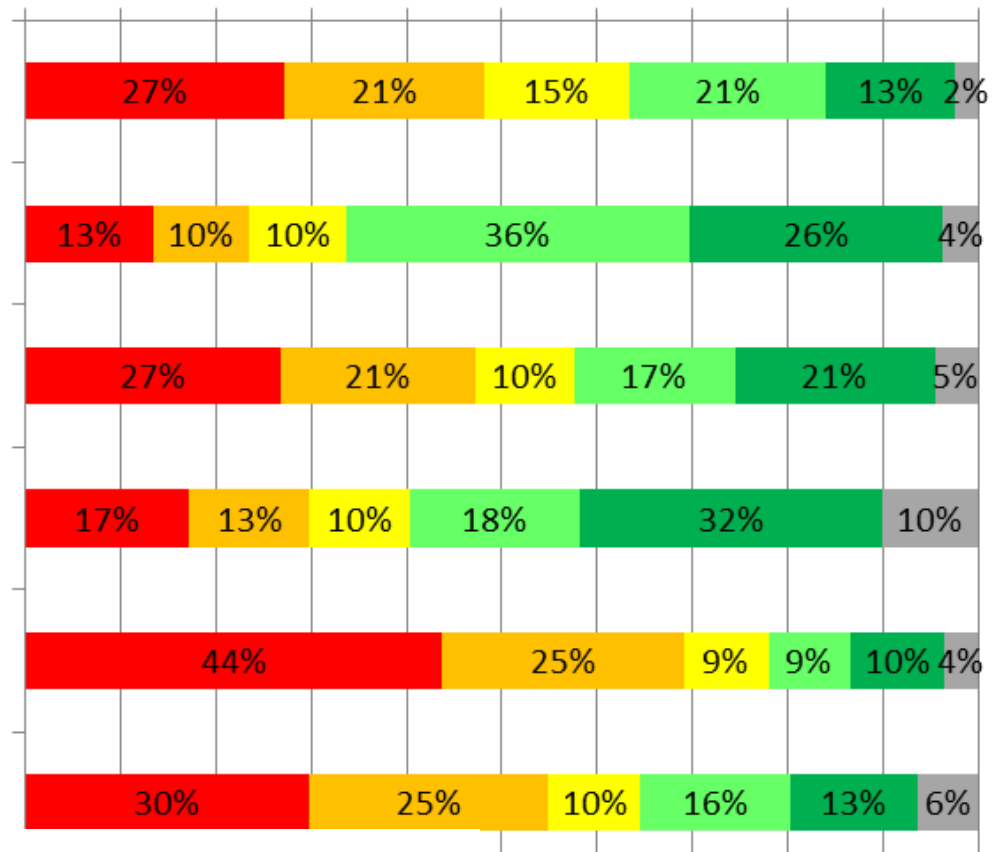
✓ Even if it is not recommended to drive a car or go outside, I would **go pick up children** from school (after clip)

Control group

! Even if it is not recommended to drive a car or go outside, I would go away and **leave the area** (after clip)

Control group

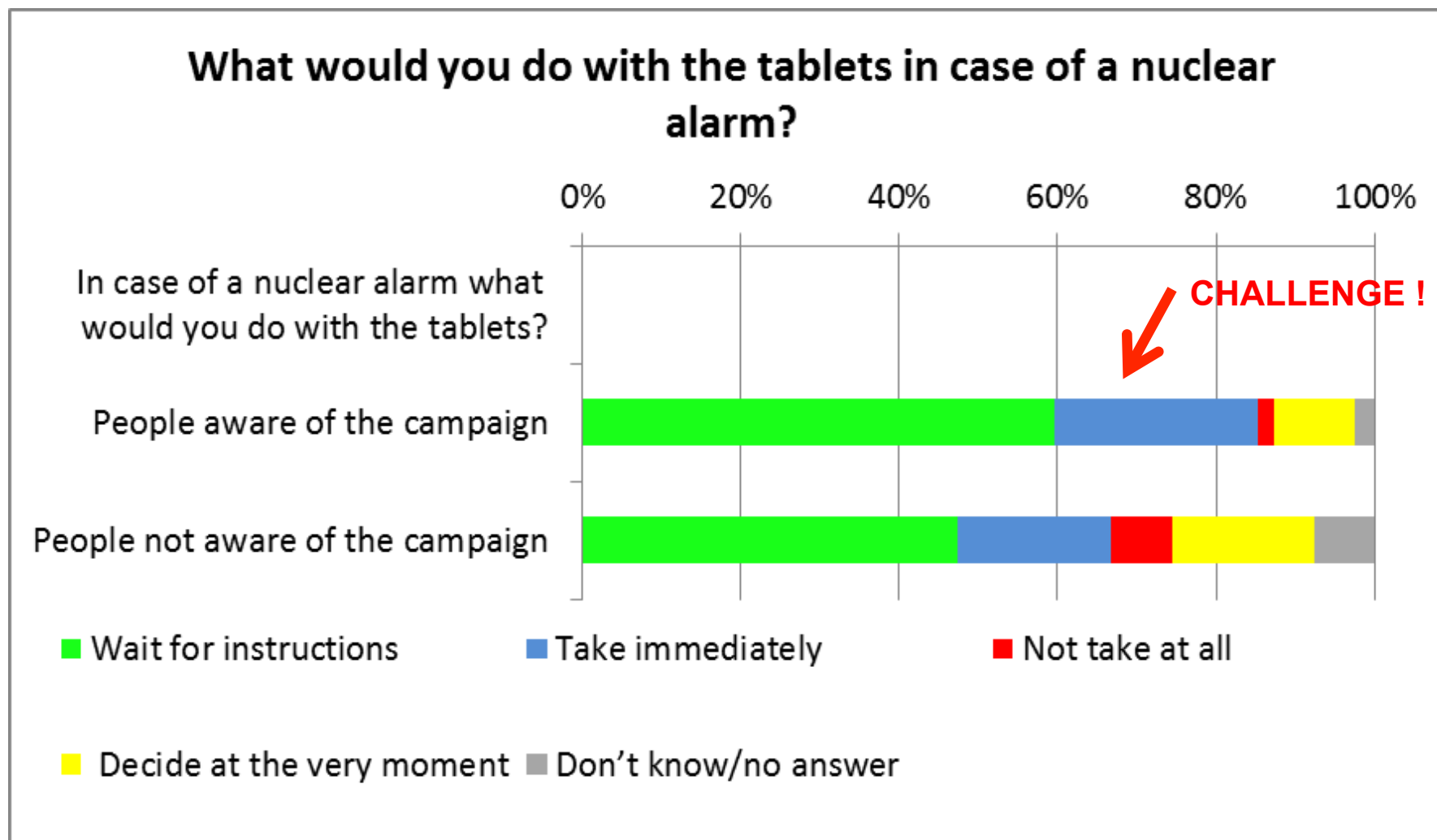
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%



■ strongly disagree
 ■ disagree
 ■ neither agree, nor disagree
■ agree
 ■ strongly agree
 ■ don't know/ no answer

Compliance with emergency management advice

An iodine information campaign (Belgium 2011)

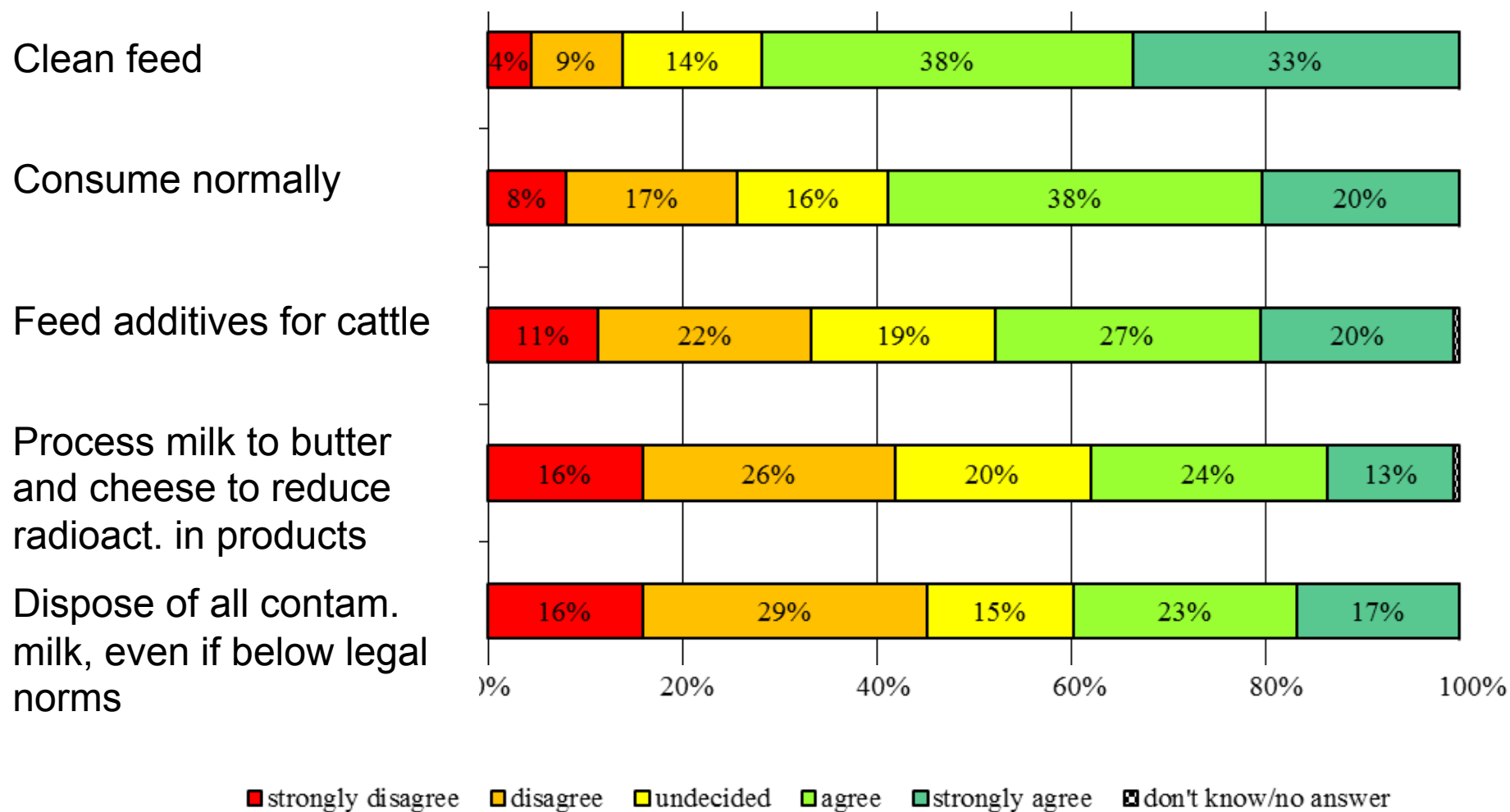


Acceptance does not (always)
imply risk-accepting behaviour



Acceptance of management options

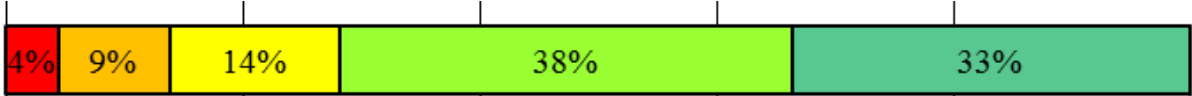
Case study: milk below legal norms



Acceptance of management options

Case study: milk below legal norms

Clean feed



Consume normally

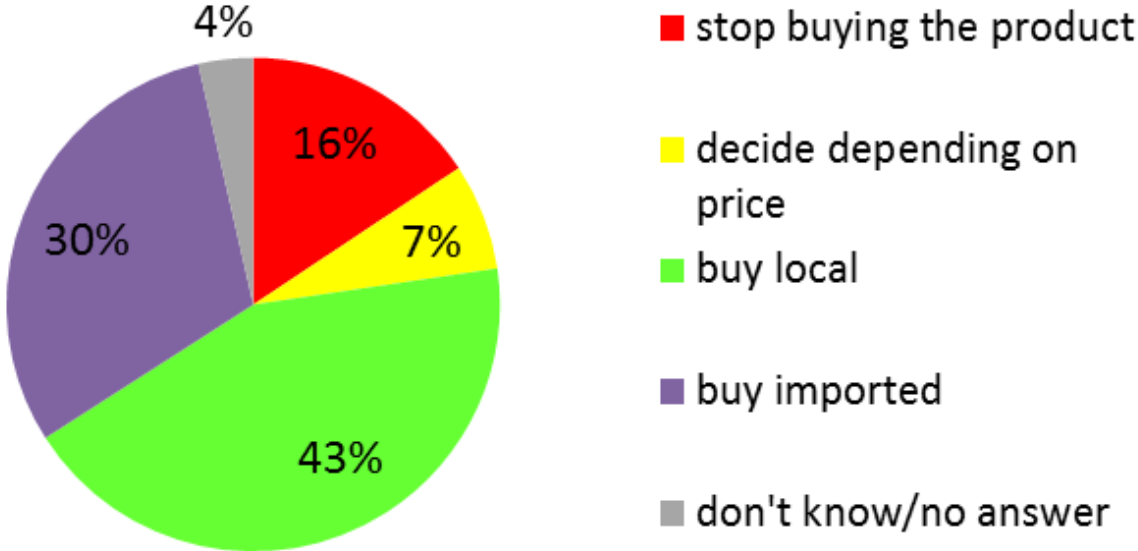


Feed a

Process and check for radioactivity

Dispose milk, even if below norms

They agree or strongly agree that products with residual radioactivity below legal norms can be consumed as usual. However, they would

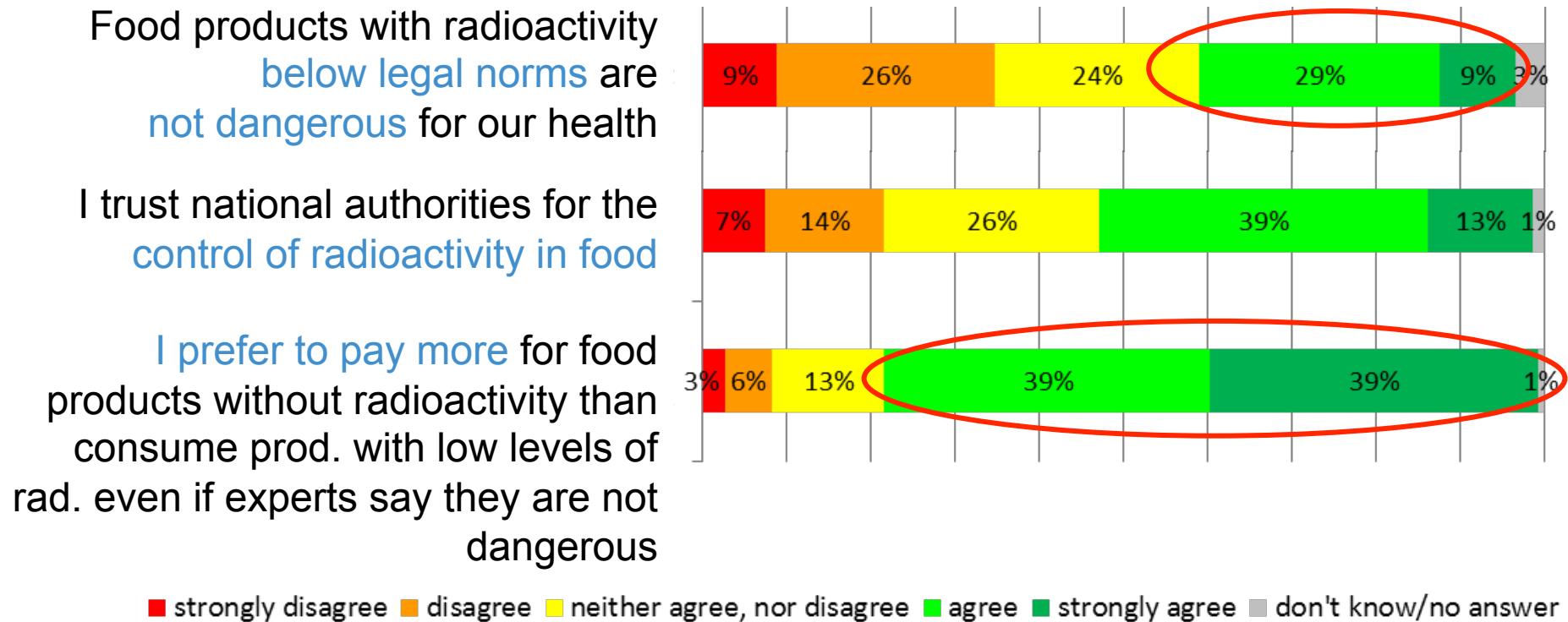


Concern about residual
radioactivity



Risk avoiding attitude

Accidental radioactive contamination in food



Planned consumer's behaviour

Perception of food products from Fukushima

- Willingness to consume food products from affected areas depends on:

- Attitude towards the product

- Anxiety
- Justification
- Health concerns

- Subjective norms

- Would their close environment support this?

- Trust in legal norms

- Behaviour in past food crises

- Trust in the control on food safety

Most
influencing
factors

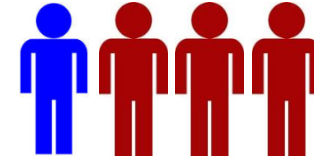
Also correlated
with intended
behaviour, but
low predictive
power

The public has little need for
technical detail; what is needed is
information on how to cope with
the hazard

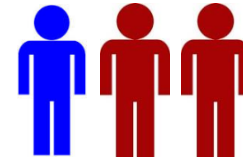


Knowledge about ionising radiation is low

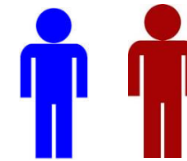
- Does exposure to radiation always lead to a contamination with radioactive material?



- Vegetables grown near a nuclear power plant are not good for consumption because of radioactivity

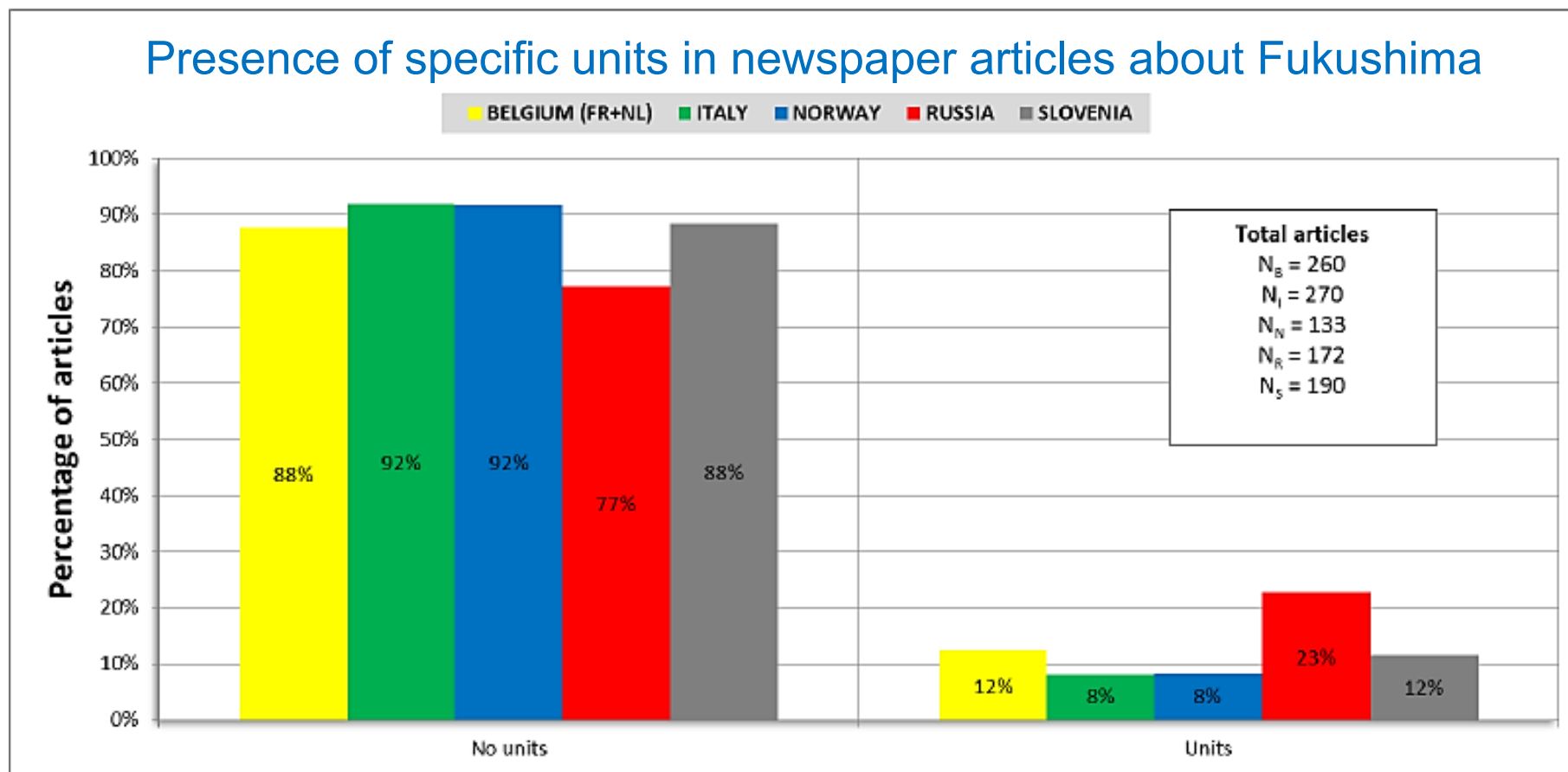


- Natural radioactivity is never dangerous because we are used and adapted to it



Gap in public understanding of scientific information

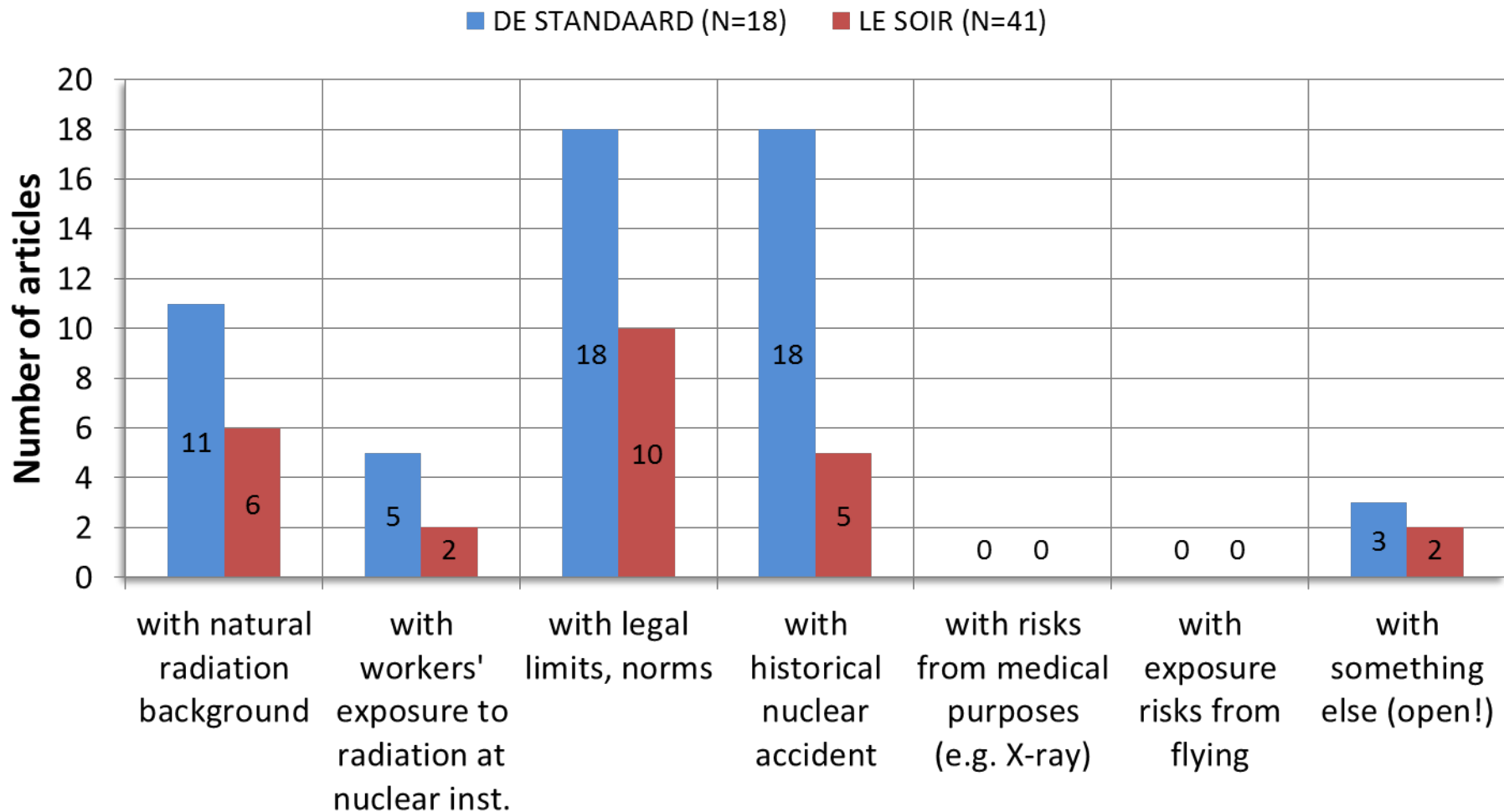
- Media seldom reports scientific units used for radioactivity measurement or dose assessment



Source: Perko T., Cantone M., Prezelj I., Tomkiv Y., Galego E., Melekhova E., Turcanu C., e.a. (2015). Media reporting on the Fukushima nuclear accident in European countries and Russia. Project report. PREPARE(WP6)-(14)01. European Commission.

Risk comparisons used more often by media than mere reporting of scientific quantities

Risk comparisons in Belgian newspapers about Fukushima



Source: Perko T., Turcanu C., Geenen D., Mamane N., Van Rooy L. (2011). Media content analysis of the Fukushima accident in two Belgian newspapers (11/03-11/05 2011). Open SCK•CEN Report BLG-1084. Copyright © 2015 SCK•CEN

Mutual understanding between
experts and the public remains
a communication challenge



Lack of mutual learning

Knowledge Deficit Model

Researchers', industries, authorities views:



- The general public should be 'educated' by 'explaining them the facts' and by assisting people to 'better understand' nuclear technology.
- "Let's educate emotional and radio-phobic people."

Emotional Deficit Model

Citizens' views:



- We miss the recognition by industry, research and authorities of being a competent stakeholder.
- We miss empathy.

Conclusions (1)

- Accidental situations lead to increased risk perception, distrust in risk management organisations and large social and psychological impact
- Gaps between the lay public and technical experts, in terms of:
 - Understanding of “risk”
 - Perception of risk
 - Knowledge of the issue
- Stigma associated to products with residual radioactivity, but also with affected areas and people



- Integrate social sciences in radiation protection and emergency management research

Conclusions (2)

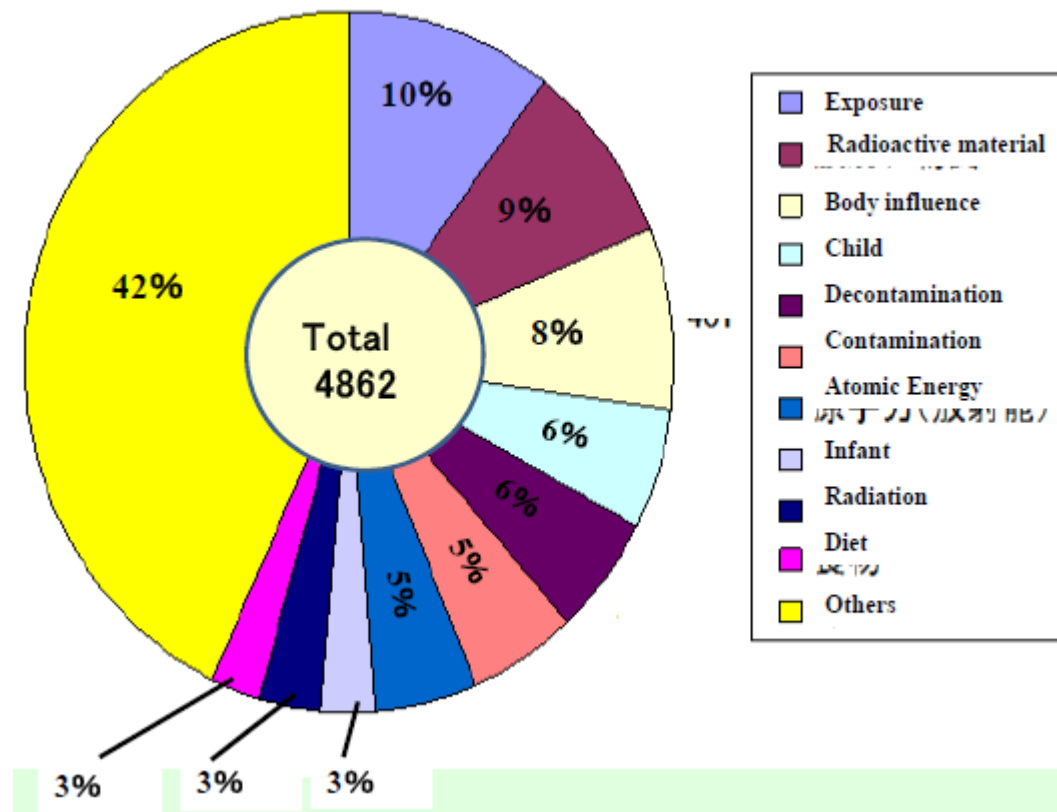
- Understand how to anticipate and mitigate the social and psychological impact of accidental situations
- Develop two-way communication, targeting people's needs:
 - Information about hazard effects and hazard management
 - Enabling informed decision-making
- Stakeholder involvement and public dialog

Paraphrasing Raimo:

Do we use all the tools we have in the most efficient way?

People want to know about the potential effects and protective actions

- Results* from a Q&A website in Japan (Kono et al, 2012)
 - Main concerns: **exposure**, **radiation and radioactive material**, effects on **health**, effects on **children**, **diet**, other



*Questions asked via dedicated website, active between March 2011 till February 2012, but inactive from May 26 to June 5, and from July 2 till August 21 due to overload