

Risk Perception and Crisis Communication – How to Deal with Uncertainty

Suzan Fiack

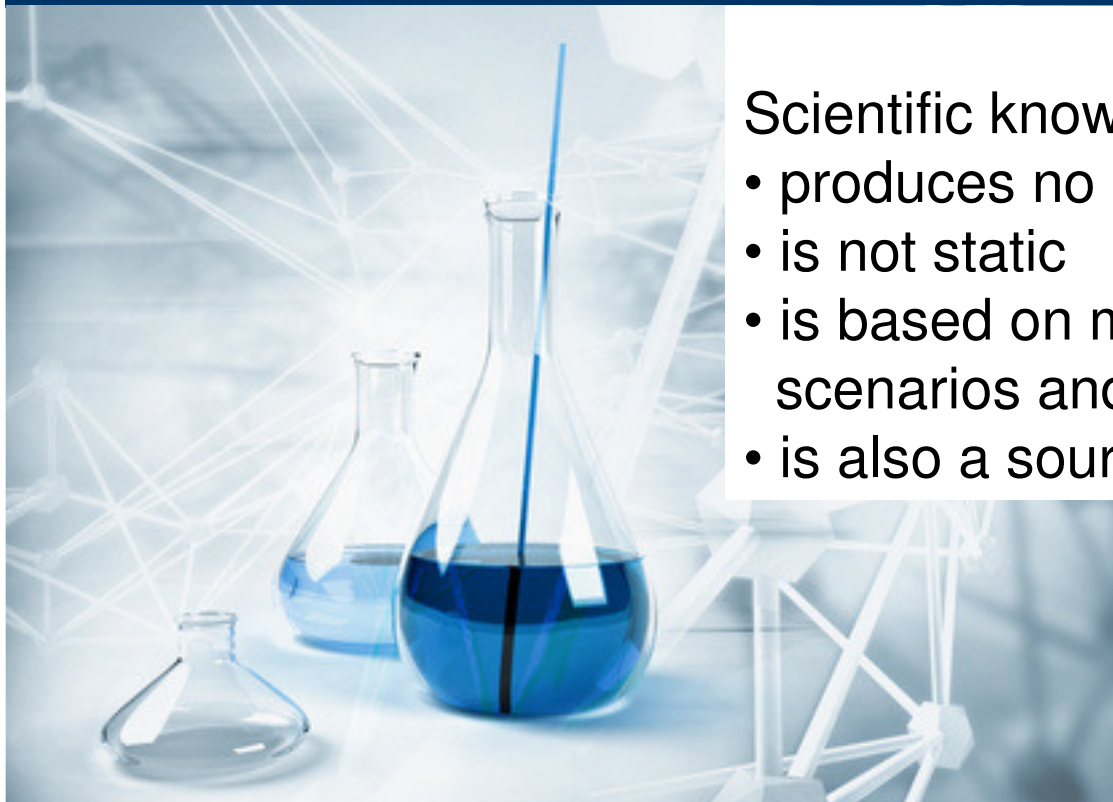
Risk Communication

Federal Institute for Risk Assessment

Science and Uncertainty

“More research brings more ignorance to the light of day”

(Douglas/Wildavsky)



Scientific knowledge:

- produces no absolute truths
- is not static
- is based on more or less well-founded assumptions, scenarios and probabilities
- is also a source of uncertainty

Dealing with uncertainty is important in the communication of scientific knowledge.

Dioxin, EHEC, Norovirus

Increased dioxin concentrations in eggs and meat - 2011

1



- Industrial fatty acids with high dioxin concentrations
- Illegal action
- High media attention, No health risk was expected

EHEC Outbreak - 2011

2



- Biggest bacterial outbreak of *Escherichia coli* in Germany since the Second World War with more than 50 deaths
- Very unusual EHEC strain O104:H4

Norovirus in frozen berries - 2012

3



- Around 11,000 children and adolescents suffered from severe vomiting and diarrhoea
- Laboratory detection of norovirus difficult

Challenges in Risk Communication: Interpretation of Maximum Levels

7. Januar 2011

Dioxin levels exceed the legal standard by 77-fold.

Challenges in Risk Communication: Health Based Guidance Values and Maximum Level

Dioxin 2011: What does this mean for the health of consumers?

„Levels 77
times higher
than limit“



Fat



Feed



Animal



Egg

Maximum result 4-
times higher than
maximum level

n (measurements)	175
Mean	1,9
Min	0,1
Max	12,1
%>ML	19

TDI: 2 pg/kg
KG/Day

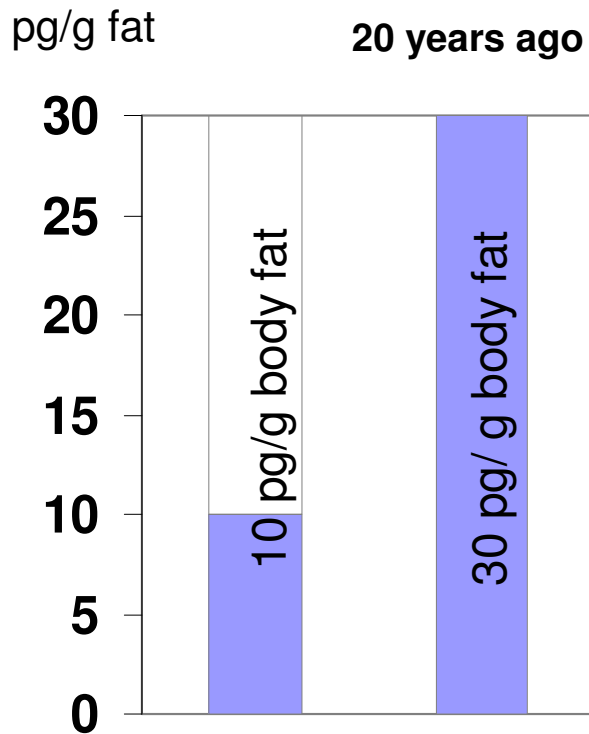


Human

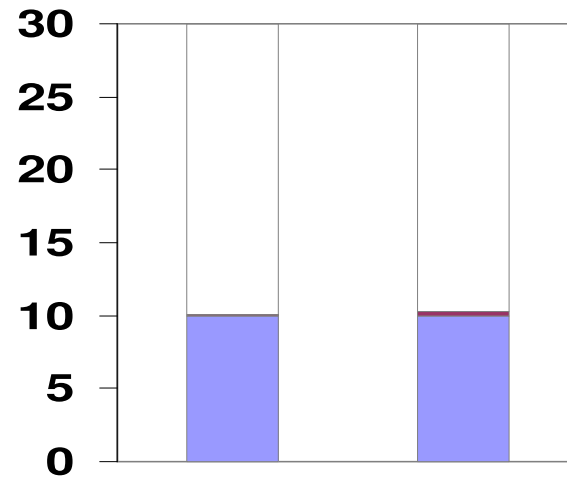
High consumption of
eggs (mean value):
10 % of the TDI
(12,6% children)

For Particularly Concerned Consumers: Worst Case instead of Mean Value

Average dioxin body burden of young adults

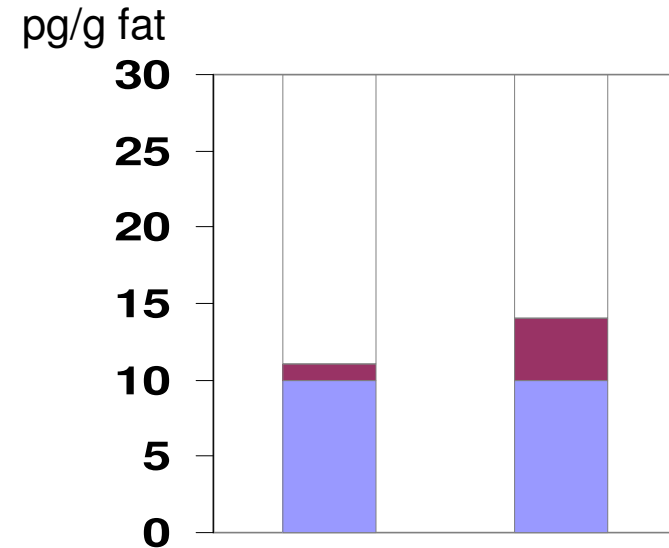


Consumption of 2 eggs/d for 1 month



dioxin ML: 3 pg/g egg (fat) 4-fold exceedance
dioxin ML: 12 pg/g egg (fat)

Consumption of 2 eggs/d for 1 year



dioxin ML: 3 pg/g egg (fat) 4-fold exceedance
dioxin ML: 12 pg/g egg (fat)

Body burden today (10 pg/g body fat)

Increase of body burden

Press conference at the „Green Week“

2011: Consumers do not have to worry



Even if eggs or pork meat with contents in the range of the highest measured values were consumed over a longer period of time during the past months, no health risk is to be expected.

The intake of dioxins through foods must be minimised as far as possible.

The exceeding of the legal maximum level in food and feed is not acceptable.

Challenges in Risk Communication: Understanding uncertainty / lack of knowledge



- **Uncertainty**
Not much data at the beginning (duration of dioxin analysis)
- **Lack of Knowledge**
Understanding of maximum levels: Even though foods are not tradable, no adverse health impacts are to be expected
- **Risk Perception**
Dioxin = “ultra toxin”

5. January 2011

"An acute health risk does not exist," said a spokesman of the Federal Institute for Risk Assessment (BfR).

He relied on the results of a study in which **FOUR EGGS** showed increased dioxin levels.

The fight against “poison”

┌ Risk perception
factor:
Accident
history

Seveso

- Chemical accident in 1976 north of Milan
- 2,3,7,8-tetrachlorodibenzodioxin (“dioxin”) released into the environment

Agent Orange

- Herbicide, used as a defoliant in the Vietnam War (1962 – 1971)
- Contamination with 2,3,7,8-tetrachlorodibenzodioxin (“dioxin”)
- Several hundred thousands of inhabitants and US soldiers affected

Yushchenko

- Assassination attempt in late 2004: the former President of Ukraine Yushchenko was confirmed to have ingested hazardous amounts of „dioxin“

Risk Perception Factors: Dioxin Incident 2011

Extent	Eggs and meat were affected by the dioxin incident in 2011. With the exception of vegans, many consumers have regular contact with these staple foods.
Voluntariness	Consumers are involuntarily exposed to the risk of “dioxin in food”.
Personal Control	Consumers have hardly any personal control over the risks – the dioxin concentration of an egg is not visible.
Immediacy	The effects of increased dioxin contamination are long-term rather than immediate.
Severity of consequences	The long-term effects of increased dioxin levels include disturbances of the central nervous system and hormone balance. It is assumed that some dioxins can increase the risk of contracting cancer .

Challenges in Risk Communication: Intuitive Toxicology

Laymen regard chemical substances as more dangerous than experts do.

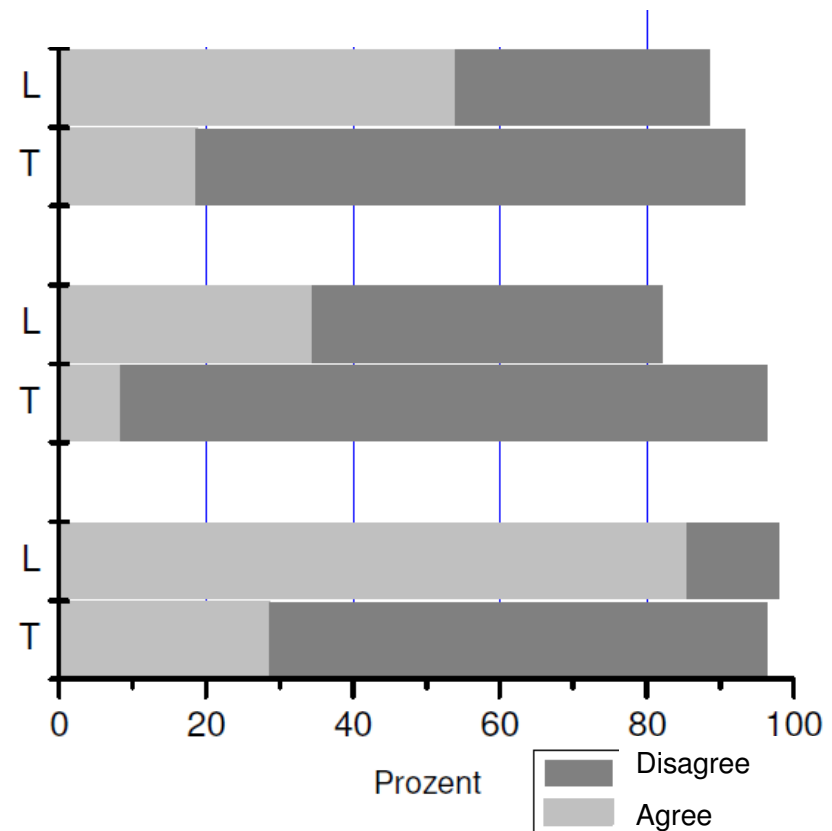


There is no safe level of exposure to a cancer causing agent.

If you are exposed to a carcinogen, then you are likely to get cancer.

If you are exposed to a toxic chemical substance, then you are likely to suffer adverse health effects.

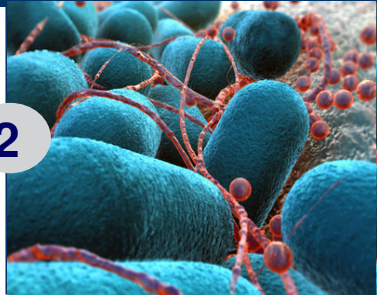
(Quelle: Kraus, Malmfors & Slovic 1992, 217).



Rough Overview

EHEC May to July 2011: a real crisis in consumer protection

EHEC Outbreak



2

- Biggest bacterial outbreak of *Escherichia coli* in Germany since the Second World War with more than 50 deaths
- Very unusual EHEC strain O104:H4

- May 2011: Increase in the number HUS cases
- Preliminary results of epidemiological studies (Robert Koch-Institute, RKI):

**Recommendation (BfR and RKI)
on 25 May 2011, by way of precaution,
not to consume raw tomatoes,
cucumber and leaf lettuce**



Rough Overview

EHEC May to July 2011: a real crisis in consumer protection

- **Combined forward/backward trade relations tracking strategy**
- Evaluation of company supply channels: carriers of the EHEC bacteria were with high probability sprouts from a farm in Germany,
New epidemiological data
- Recommendation **to consumers on 10 June 2011 not to eat any raw sprouts**
- At the end of June 2011, a cluster of EHEC O104:H4 cases in France was also traced back to the consumption of sprouts
- Connection between the German and French cases: a batch of fenugreek seeds produced in Egypt
- **High probability that fenugreek seeds used for sprout production were the cause**
- European Commission: Recall and destruction of certain fenugreek seed batches from Egypt, import ban on certain seeds and other plant-based foods from Egypt for a limited period



Challenges in Risk Communication: Uncertainty

May 2011: Epidemiological study carried out by the Robert Koch Institute (RKI) together with the Hamburg health authorities

Affected patients had eaten raw tomatoes, cucumber and leaf lettuce significantly more often than healthy study participants.



- All pointed from an early stage to **food contaminated** with EHEC as the source of infection
- Based on the results of this early survey (Robert Koch-Institut), vehicles such as **raw milk, raw meat, sprouts and shoots** did not appear to play a role.

┌ Can public institutions delay talking about risks until the data situation is “certain”?

What risks are involved in waiting longer?

Challenges in Risk Communication: Uncertainty

Preliminary results of the EHEC/HUS study

Joint Statement No. 014/2011 of the BfR and RKI of 25 May 2011

RKI and BfR **recommend, by way of precaution**, not to consume raw tomatoes, cucumbers and leaf lettuce, more particularly in Northern Germany, until further notice.

It cannot be excluded **that other foods play a role** as an infection source, too.

Challenges in Risk Communication: Uncertainty

26. May 2011

Hamburger Institut für
Hygiene und Umwelt



Detection of EHEC in cucumbers in Hamburg



66 HUS-Cases in Hamburg - Suspicion of O104 confirmed

The detection of EHEC in cucumbers in Hamburg, which were, amongst others, imported from Spain, resulted in several warnings through the European Rapid Alert System.

It has not yet been proven that the EHEC subtype on the analysed cucumbers is the same as in the stool specimen of the patients.

**Spanish Cucumbers are the EHEC Carrier
EHEC: Spanish cucumbers are to blame**

Challenges in Risk Communication: Variety of Expert Opinions



It is perfectly adequate to wash vegetables thoroughly. *(Expert in the field of hygiene in the journal The European, 9th June 2011)*

Until then, the very unlikely but theoretically conceivable worst case that the bacteria were released intentionally cannot be excluded either. *(Mikrobiologist in the journal Tagesspiegel, 25th May 2011)*

Never before have such dangerous intestinal germs been found on fruit and vegetables. If beef were the source of the dangerous germ, it could have something to do with the massive addition of antibiotics to animal feed. *(A WHO Expert in the journal La Repubblica, 4th June 2011)*

Translation: BfR

Understanding Uncertainty

Authorities are “struggling” in their efforts to *find* the source
(foodsafetynews, 9.June 2011)

E. Coli source still vague.
(Deutsches Ärzteblatt , 4. June 2011)

No guarantee for clarification



5. June
ZDF – German Television
**BfR President Professor Dr. Dr.
Andreas Hensel**

In most cases outbreak investigations do not deliver results.

Translation: BfR

Example EHEC press conference

10th of June: 'It's the sprouts.'

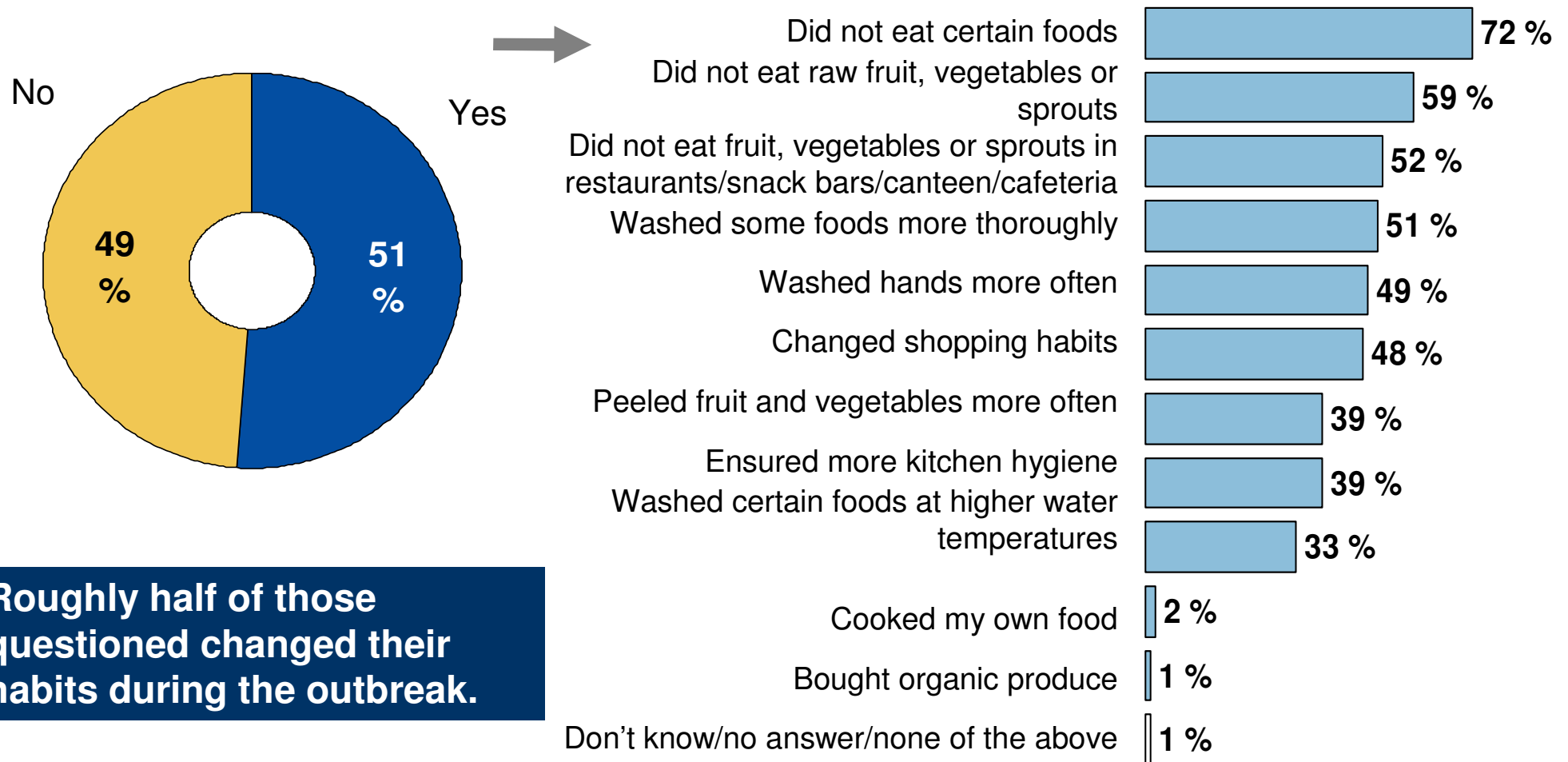
EHEC 2011:
10 Press releases
11 Opinions
~ 50 FAQ
> 300 Media requests
50 TV Interviews
5 Press conferences
> 500 requests from the public

As a precaution in addition to the standard hygiene measures, BfR, BVL and RKI recommend that sprouts should not be eaten raw until further notice.



Behavioural changes due to EHEC during the outbreak

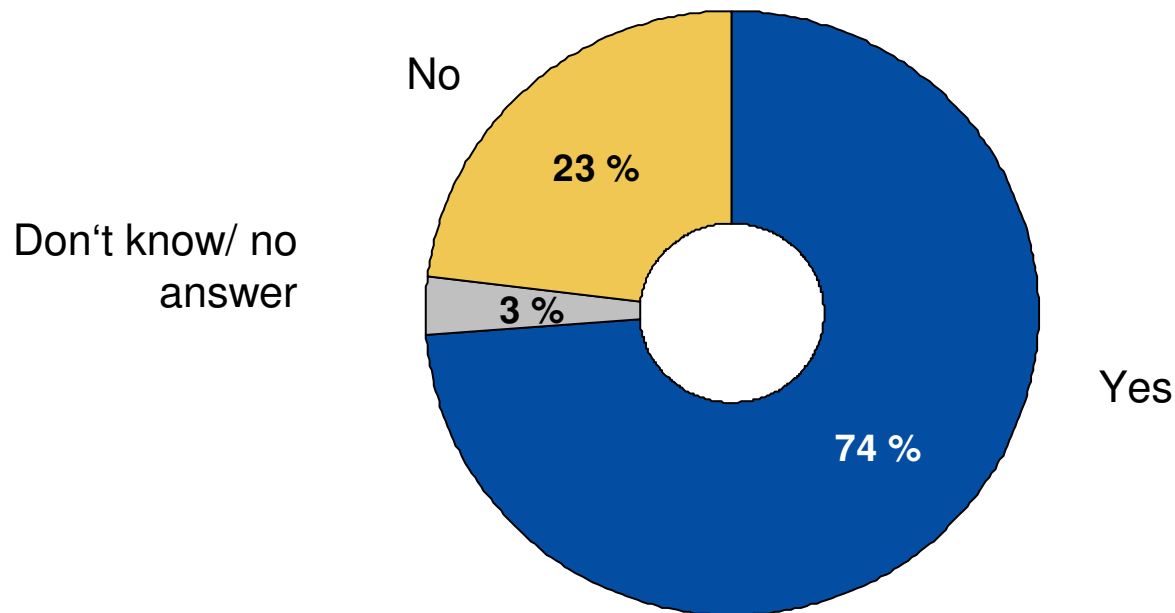
Did you change your habits during the EHEC outbreak in order to protect yourself from the bacteria? What did you do to protect yourself?



Roughly half of those questioned changed their habits during the outbreak.

Comprehension of Consumption Recommendations

Did you understand why the initial recommendation not to eat green salad, tomatoes and cucumber was repealed in the light of new information?

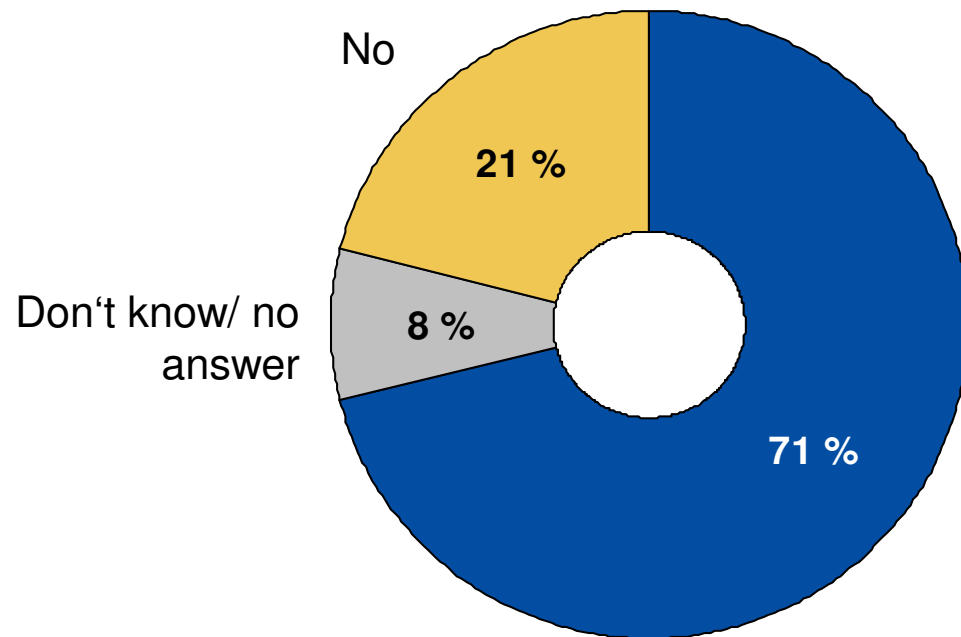


The reversal of the consumption recommendation was understood by 74 % of those questioned.

n = 931; information in percent

Assessment of State Measures

Have the responsible authorities in Germany done enough to protect the general public from the EHEC pathogen in your opinion?

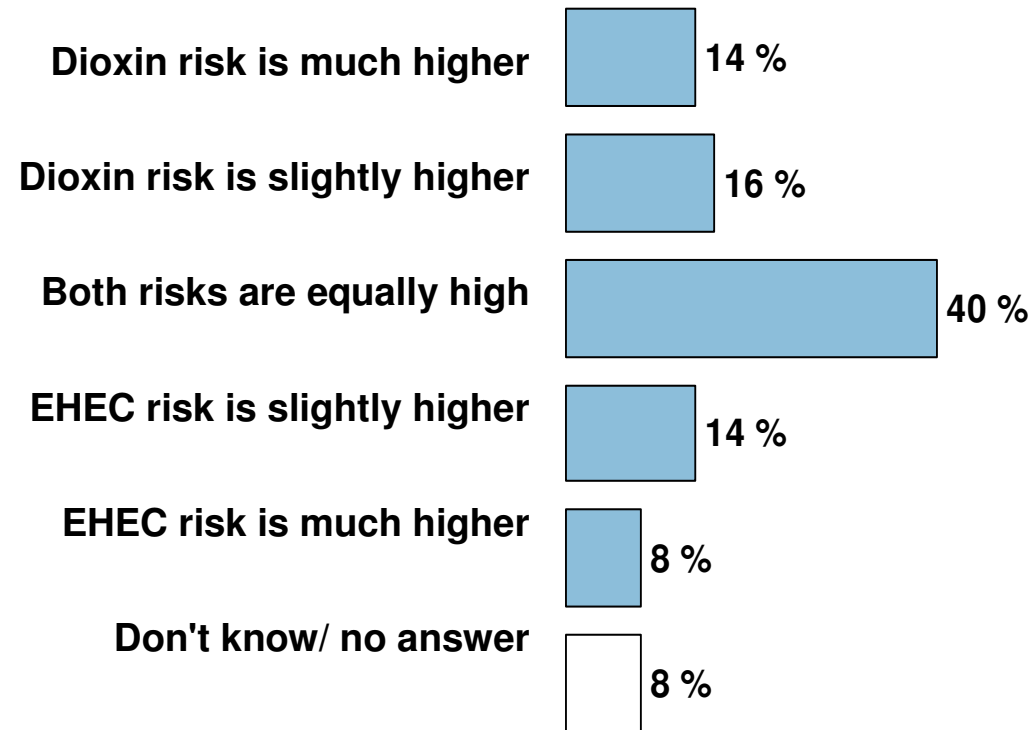


The vast majority of those questioned stated that the responsible bodies have done enough to protect the general public from the EHEC pathogen.

n = 931; information in percent

Comparative Risk Estimation: EHEC vs. Dioxin

How would you estimate your own personal risk of damaging your health when comparing the two incidents, dioxin in foodstuffs and EHEC?



n = 803; interviewees who had heard or read about dioxin; information in percent

Norovirus

Norovirus in frozen berries - 2012

3



- Around 11,000 children and adolescents suffered from severe vomiting and diarrhoea
- Laboratory detection of norovirus difficult

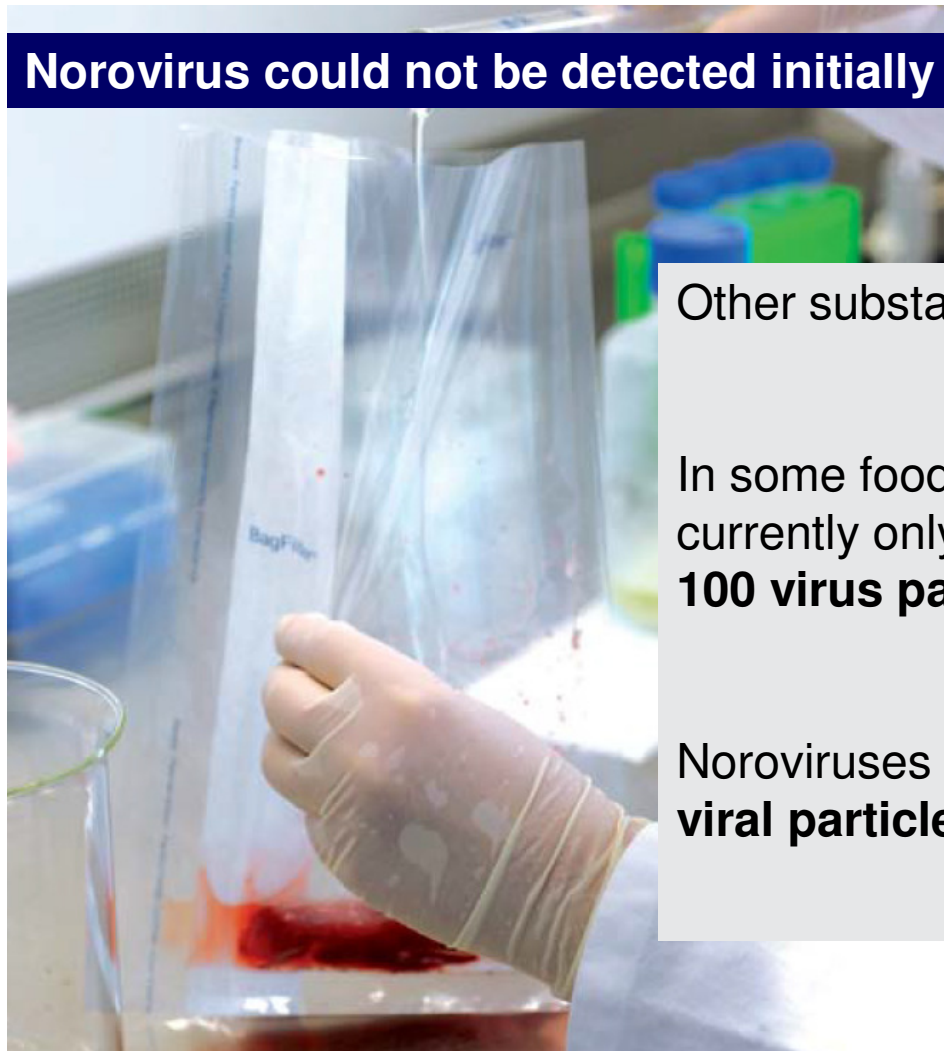
Authorities are still completely in the dark. *(Sueddeutsche.de, 1st October)*

Experts work at full speed to identify the source of gastrointestinal infections in Eastern Germany. *(Nordbayerischer-kurier.de, 8th October)*

Translation: BfR

Norovirus

Norovirus could not be detected initially in samples of suspected strawberries.

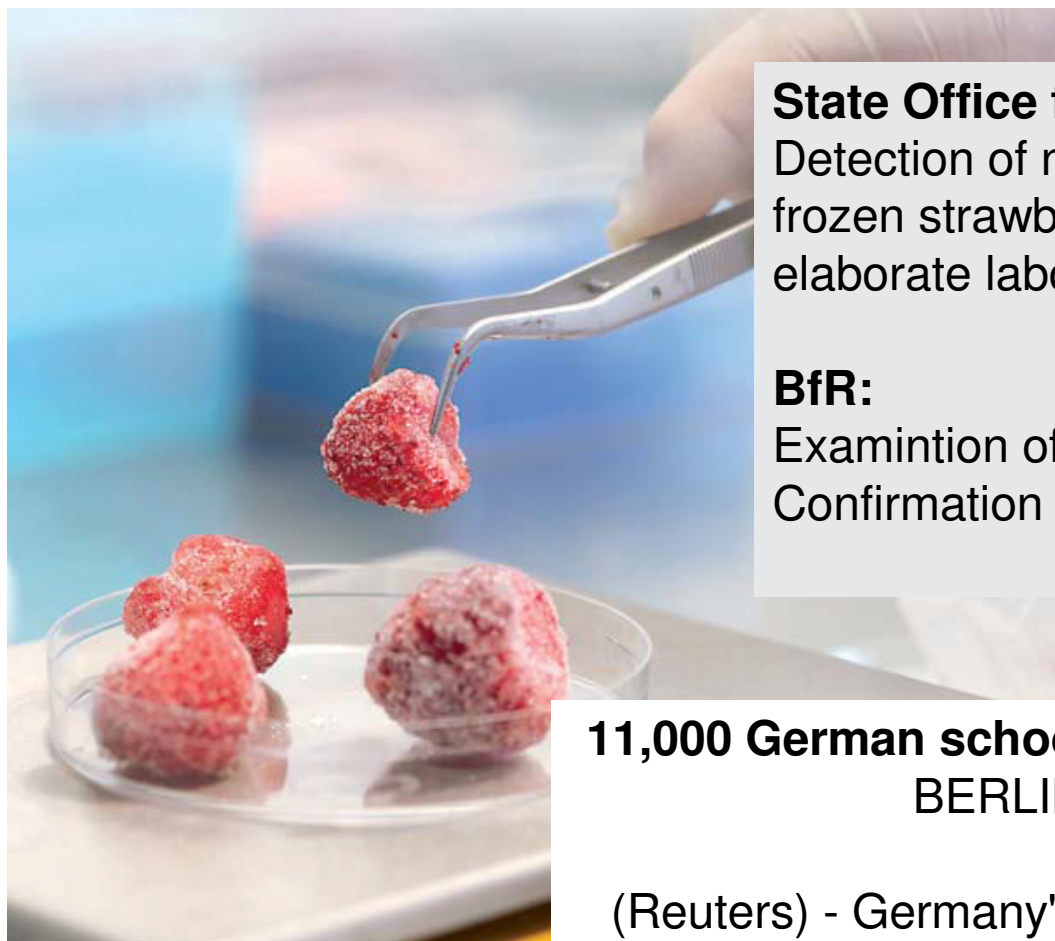


Other substances in food can disturb the detection.

In some foods, for example in berries, you can currently only detect noroviruses, **when more than 100 virus particles** are present.

Noroviruses are highly contagious and **as few as 10 viral particles** may be sufficient to infect an individual.

Norovirus found...



State Office for Consumer Protection in Saxony-Anhalt:

Detection of noroviruses in a sample of the suspect deep-frozen strawberries for the first time with the help of an elaborate laboratory protocol.

BfR:

Examination of the strawberry sample in its virological lab.
Confirmation of the finding.

11,000 German schoolchildren probably laid low by strawberries

BERLIN | Fri Oct 5, 2012 6:18pm EDT

(Reuters) - Germany's biggest outbreak of food poisoning, in which more than 11,000 schoolchildren have been laid low by diarrhoea and vomiting, is "very likely" to have been caused by a batch of frozen strawberries, authorities said on Friday.

Challenges in Risk Communication: Understanding uncertainty

Uncertainty can occur in many different ways:

Not enough data, lack of knowledge, different expert opinions, uncertainty regarding the risk level, exposure etc.



Making uncertainty a subject of discussion is often not understood.

It sometimes strengthens trust in the information source, but it is also regarded at times as a sign of incompetence and dishonesty.

The cause of uncertainty is not seen in the nature of the matter itself but mostly in social factors.

A simple appraisal (Is it safe?) is often preferred to the statement of uncertainties.

Challenges in Risk Communication: Dealing with uncertainty

1. Don't wait to be confronted. Acknowledge uncertainty up-front.



Dealing with Uncertainty
Copyright © 1993 by Peter M.
Sandman

2. Put bounds on uncertainty. What range of possibilities is credible?



3. Clarify that you are more certain about some things than others.

4. Explain what you have done or are doing to reduce the uncertainty.



5. If the remaining uncertainty is very small or very difficult to reduce further, say so. Don't over-promise.

....

BfR risk profile on ...

A	Affected group	Group of persons					
B	Probability of health impairment	Practically impossible	Improbable	Possible	Probable	Certain	
C	Severity of health impairment	No impairment	Slight impairment [reversible / irreversible]	Moderate impairment	Serious impairment		
D	Validity of available data	High: the most important data is available and there are no contradictions		Medium: some important data is missing or contradictory	Low: much important data is missing or contradictory		
E	Controllability by the consumer	Control not necessary	Controllable through precautionary measures	Controllable through avoidance	Not controllable		

BfR Risk Profile- Further examples: Perchlorate finds in food

		BfR Risk Profile: Health assessment of perchlorate residues in foods Opinion no. 22/2013			
A Affected group	General population, children, people with thyroid disease or iodine deficiency 				
B Probability of health impairment due to one-time consumption of large portions of products with high concentrations	Practically impossible	Improbable	Possible	Probable	Certain
C Severity of health impairment due to one-time consumption of large portions of products with high concentrations	No impairment	Slight impairment [reversible]	Moderate impairment [reversible/irreversible]	Serious impairment [reversible/irreversible]	
D Validity of available data	High: the most important data is available and there are no contradictions	Medium: some important data is missing		Low: much important data is missing or contradictory	
E Controllability by the consumer [1]	Control not necessary	Controllable through precautionary measures	Controllable through avoidance	Not controllable	



Text fields with dark blue background highlighting characterise the properties of the risk assessed in this Opinion.

Notes

The Risk Profile is designed to visualise the risk described in the BfR Opinion. It is not designed to permit risk comparisons. The Risk Profile should only be read together with the Opinion.

BfR Risk Profile- Further examples:

Melons: Health Hazard through Contamination with Pathogenic Bacteria

		BfR Risk Profile: Melons: Health Hazard through Contamination with Pathogenic Bacteria Opinion no. 21/2013		
A Affected group	1) General population 2) Pregnant women, infants, elderly and ill people 			
B Probability of health impairment due to one-time consumption of large portions of products with high concentrations	Practically impossible	Improbable	Possible	Probable Certain
C Severity of health impairment due to one-time consumption of large portions of products with high concentrations	The severity of impairment can vary			
D Validity of available data	High: the most important data is available and there are no contradictions	Medium: some important data is missing	Low: much important data is missing or contradictory	
E Controllability by the consumer [1]	Control not necessary	Controllable through precautionary measures	Controllable through avoidance	Not controllable

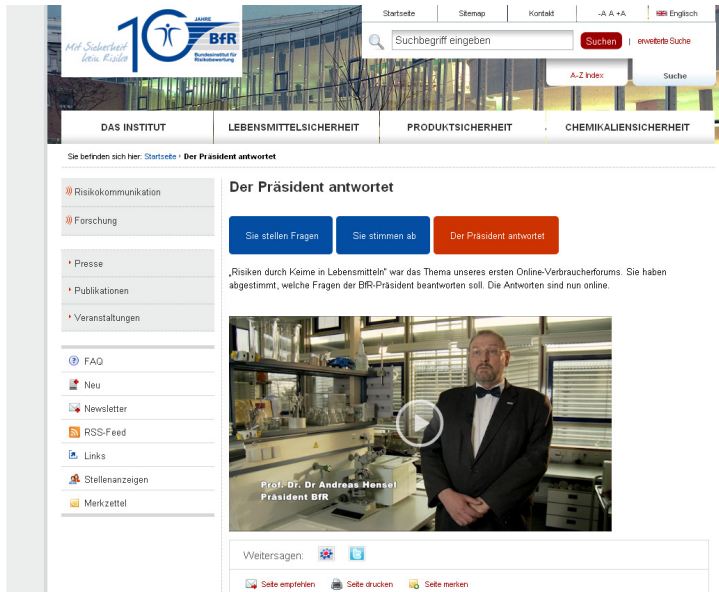
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Notes

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New Formats

Videos based on questions from consumers



SIE FRAGEN, DER PRÄSIDENT ANTWORTET

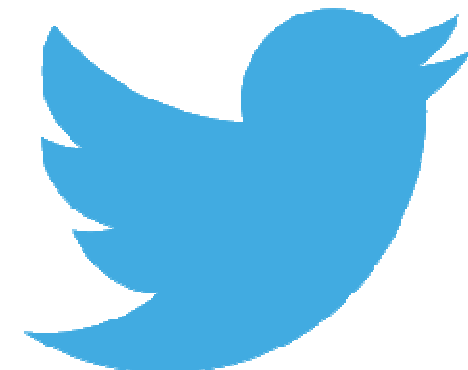
- 1 Sie stellen Fragen
- 2 Sie stimmen ab
- 3 Der Präsident antwortet

Mobile Website / Apps

New
2013



Twitter



What is certainty?



Thank you

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Thank you for your attention

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