

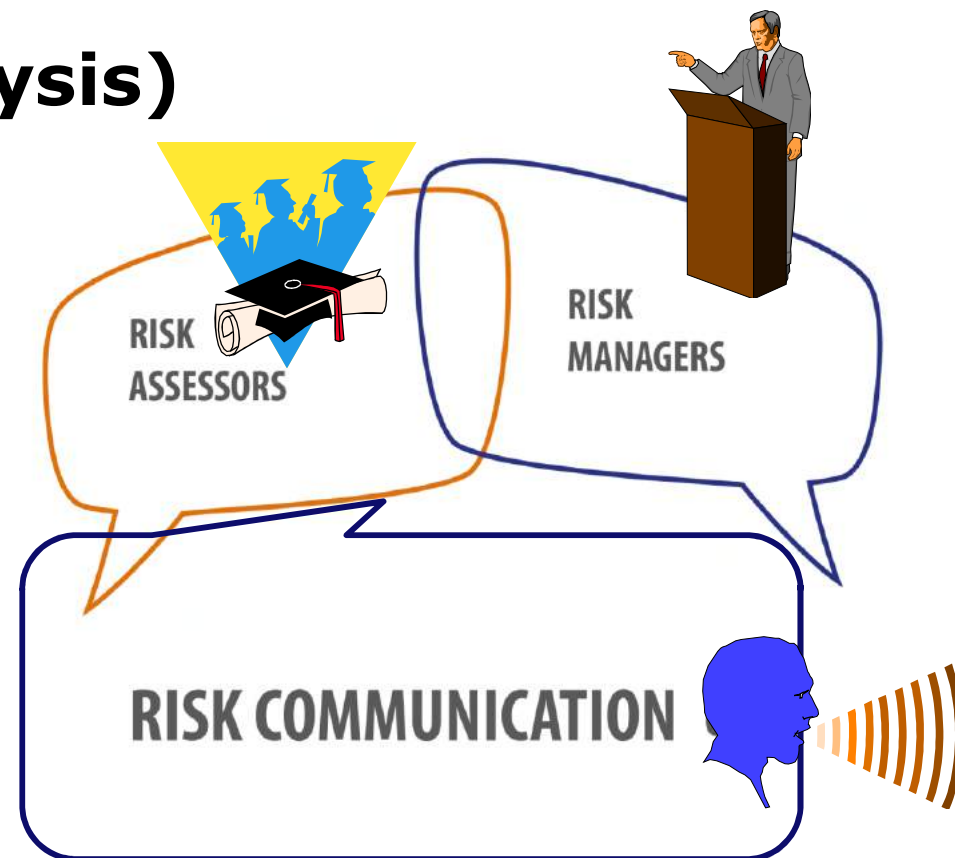


General introduction into risk-benefit of food and nutrition

Hans.Verhagen@efsa.europa.eu
Parma Summerschool 11 June 2019

RISK ANALYSIS: FUNCTIONAL AND INSTITUTIONAL SEPARATION

- **Risk Assessment**
(scientific advice and analysis)
- **Risk Management**
(regulation and control)
- **Risk Communication**



Risk-Benefit: same separation between assessment, management and communication

"LIFE WOULD BE PRETTY DULL WITHOUT RISK"

"voluntary risk taking and its pleasures"*

- **Three dominant discourses:**

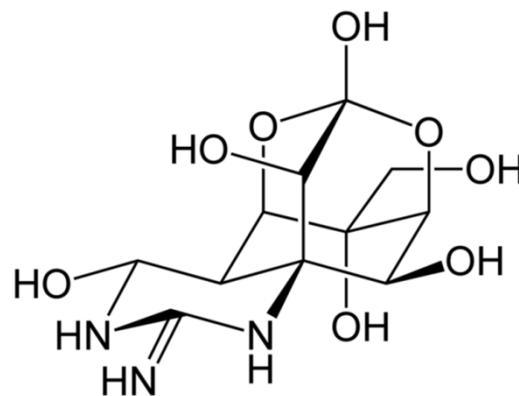
- 1. Self improvement**
- 2. Emotional engagement**
- 3. Control**

*Lupton & Tulloch, Health, Risk and Society, 4 [2002] 113-124

"LIFE WOULD BE PRETTY DULL WITHOUT RISK"



"LIFE WOULD BE PRETTY DULL WITHOUT RISK"



Pufferfish (fugu)

**Gall bladder:
tetrodotoxin
(neurotoxin)**

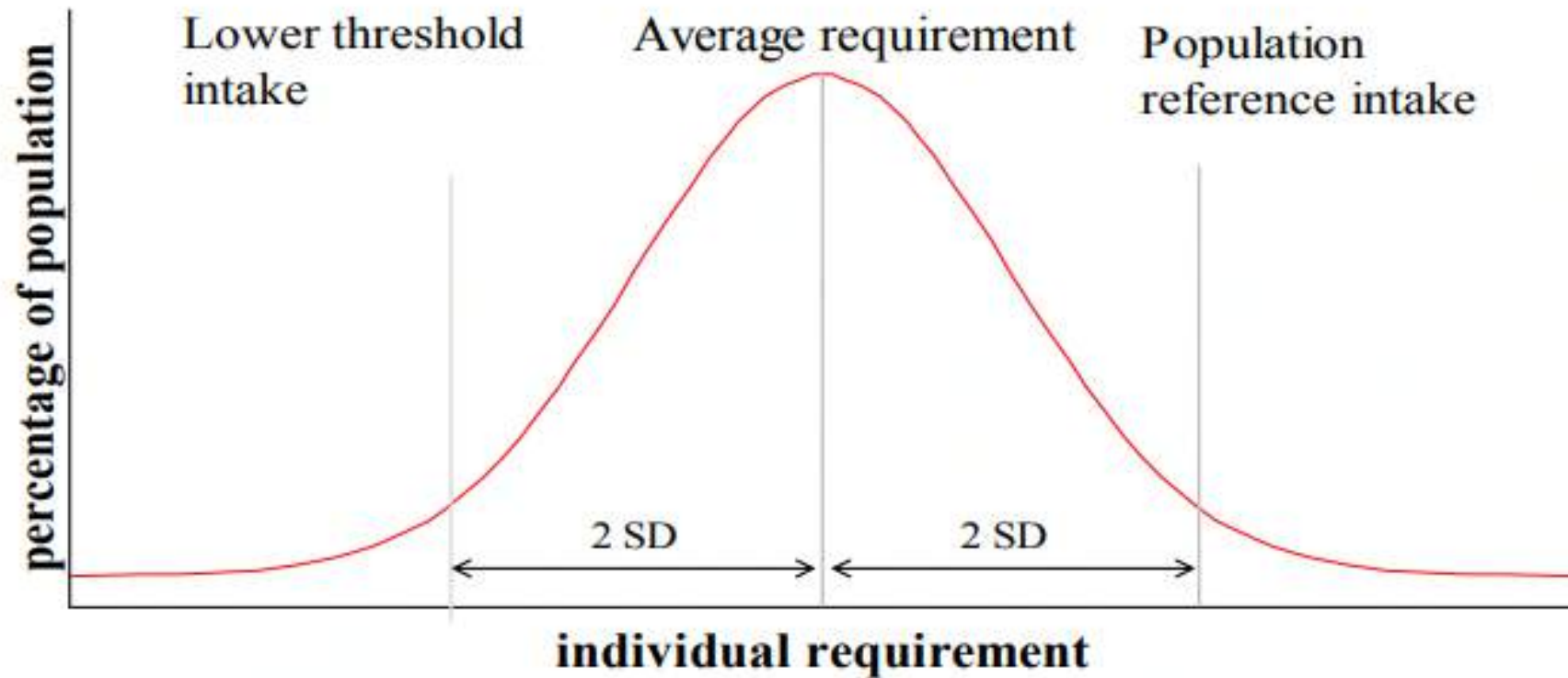
**Emerging risk: *Vibrio spp* in
Northern Waters and
detection of tetrodotoxin in
European bivalves (UK, NL,
BE) → EFSA 2017 Opinion**

CHEMICALS IN FOOD

- Contaminants
- Additives
- Pesticides
-
- Natural toxins
- Non-nutrients
- Macronutrients
- Micronutrients
-



DIETARY REFERENCE VALUES



DIETARY REFERENCE VALUES



DRV Finder

The DRV Finder is an interactive tool that gives quick and easy access to EFSA's DRVs for nutrients. It is intended for end users of these values, such as nutrition and health professionals, risk managers, policy-makers, food manufacturers and scientists.

Dietary reference values (DRVs) are science-based nutrient reference values for healthy populations. They vary by life-stage and gender. They have many purposes, such as assessing the nutritional quality of diets of individuals or groups, designing diets (e.g. school meals), creating nutrition guidelines, dietary counselling, setting reference values for food labelling, and for the development of nutrition and food policies. DRVs are not nutrient goals or recommendations for individuals.

Do you want to find DRVs per "Population" or per "Nutrients"?

TARGET POPULATIONS **NUTRIENTS**

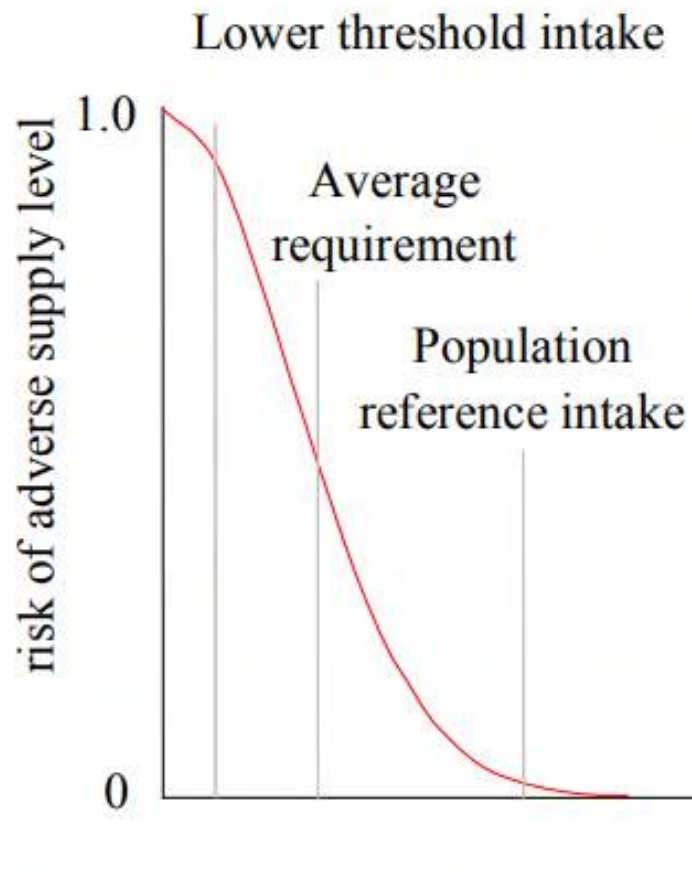
TECHNICAL REPORT

Approved: 4 December 2017
doi: 10.2903/sp.efsa.2017.e15121

Dietary Reference Values for nutrients
Summary report
European Food Safety Authority (EFSA)

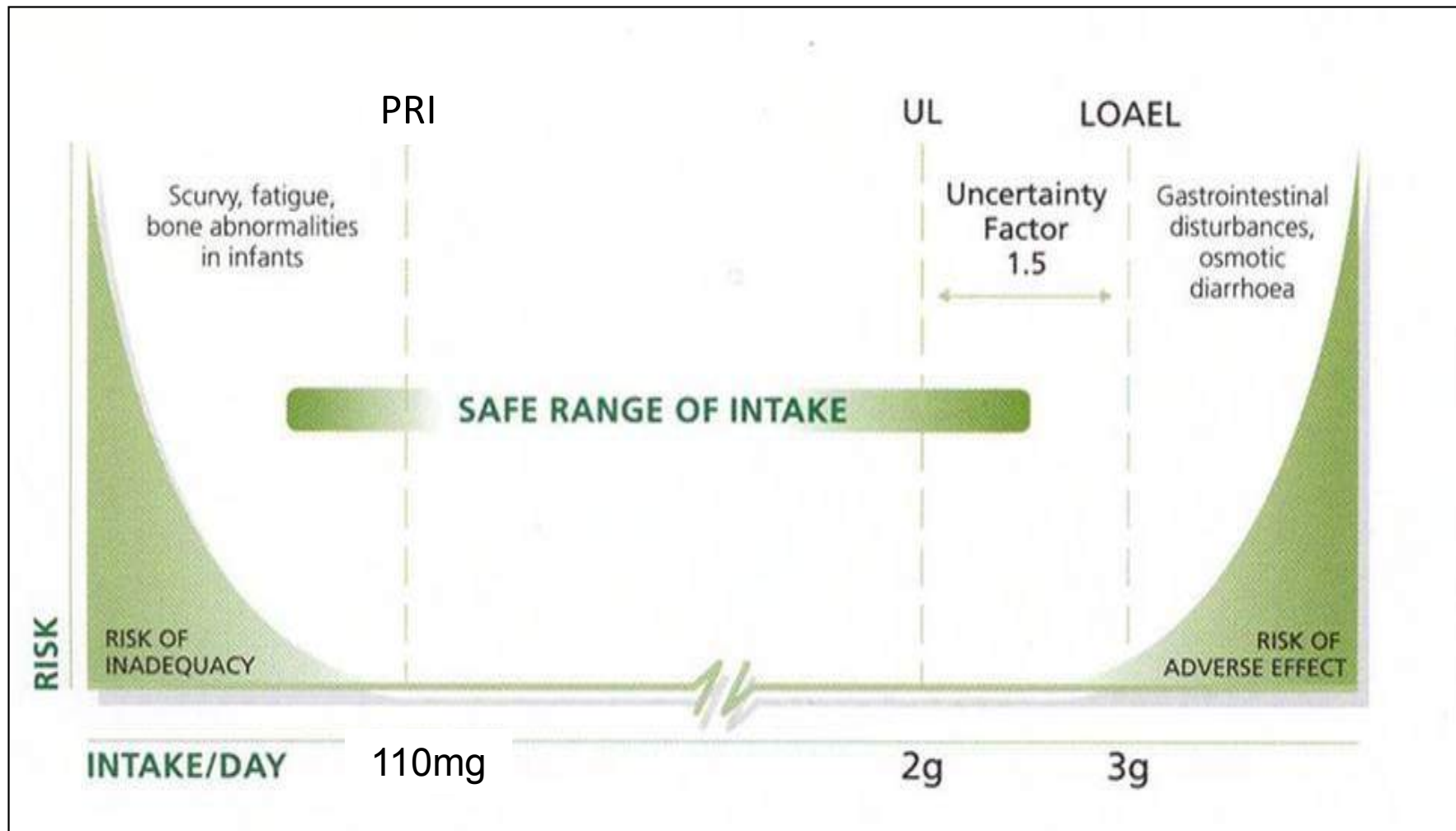
**TOLERABLE UPPER INTAKE LEVELS
FOR VITAMINS AND MINERALS**
Scientific Committee on Food
Scientific Panel on Dietetic Products, Nutrition and Allergies

TOLERABLE UPPER INTAKE LEVELS



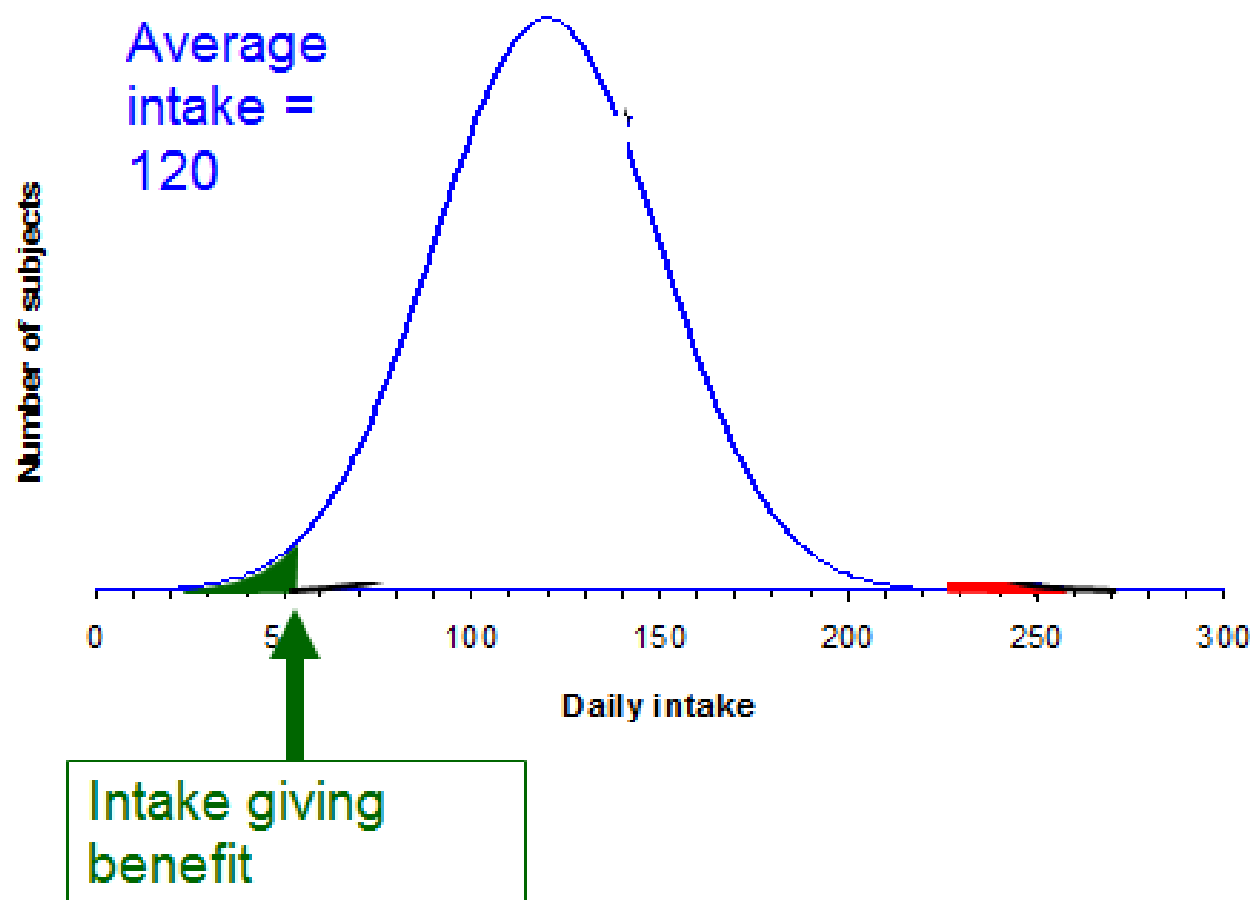
DIETARY REFERENCE VALUES

Example: vit C



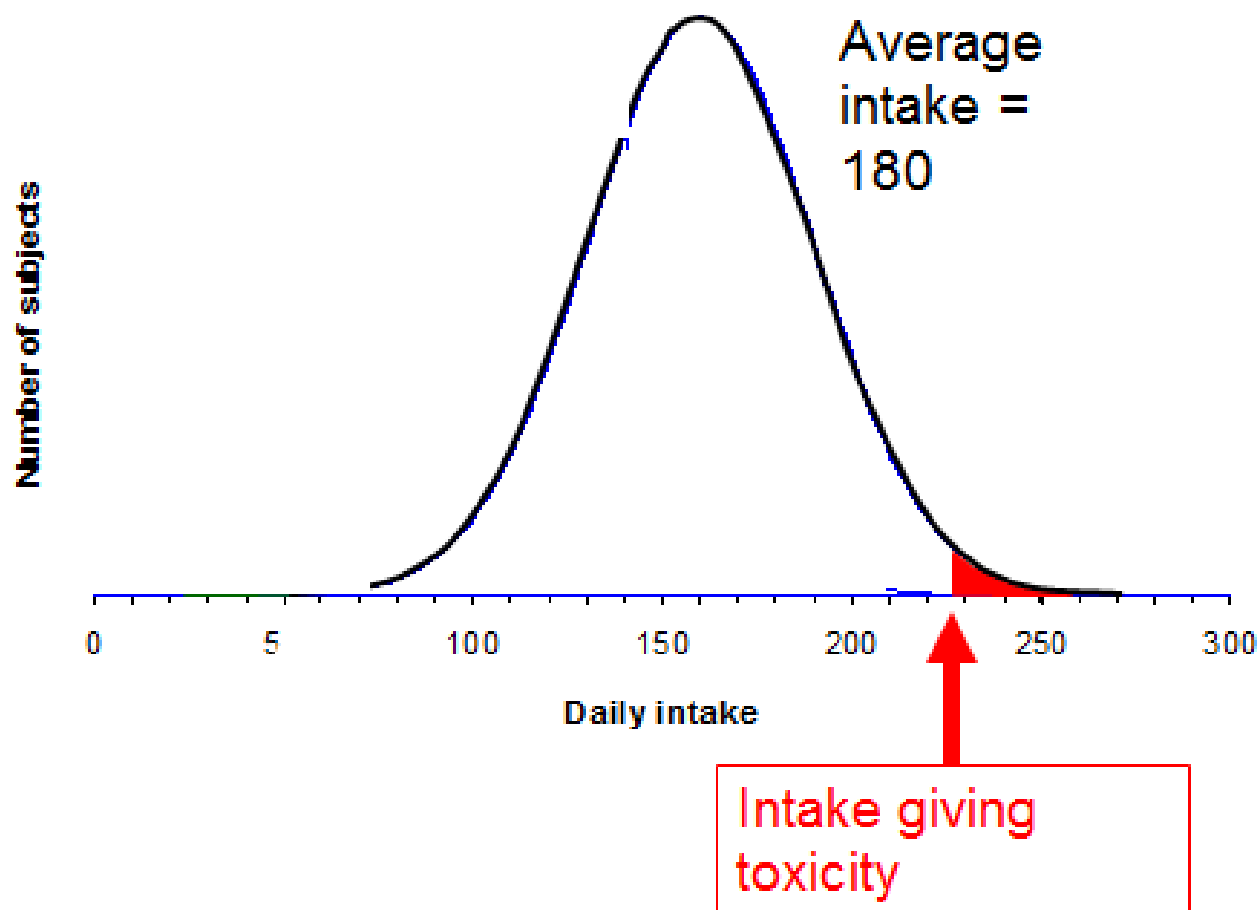
DIETARY REFERENCE VALUES

Population distribution *versus* intake



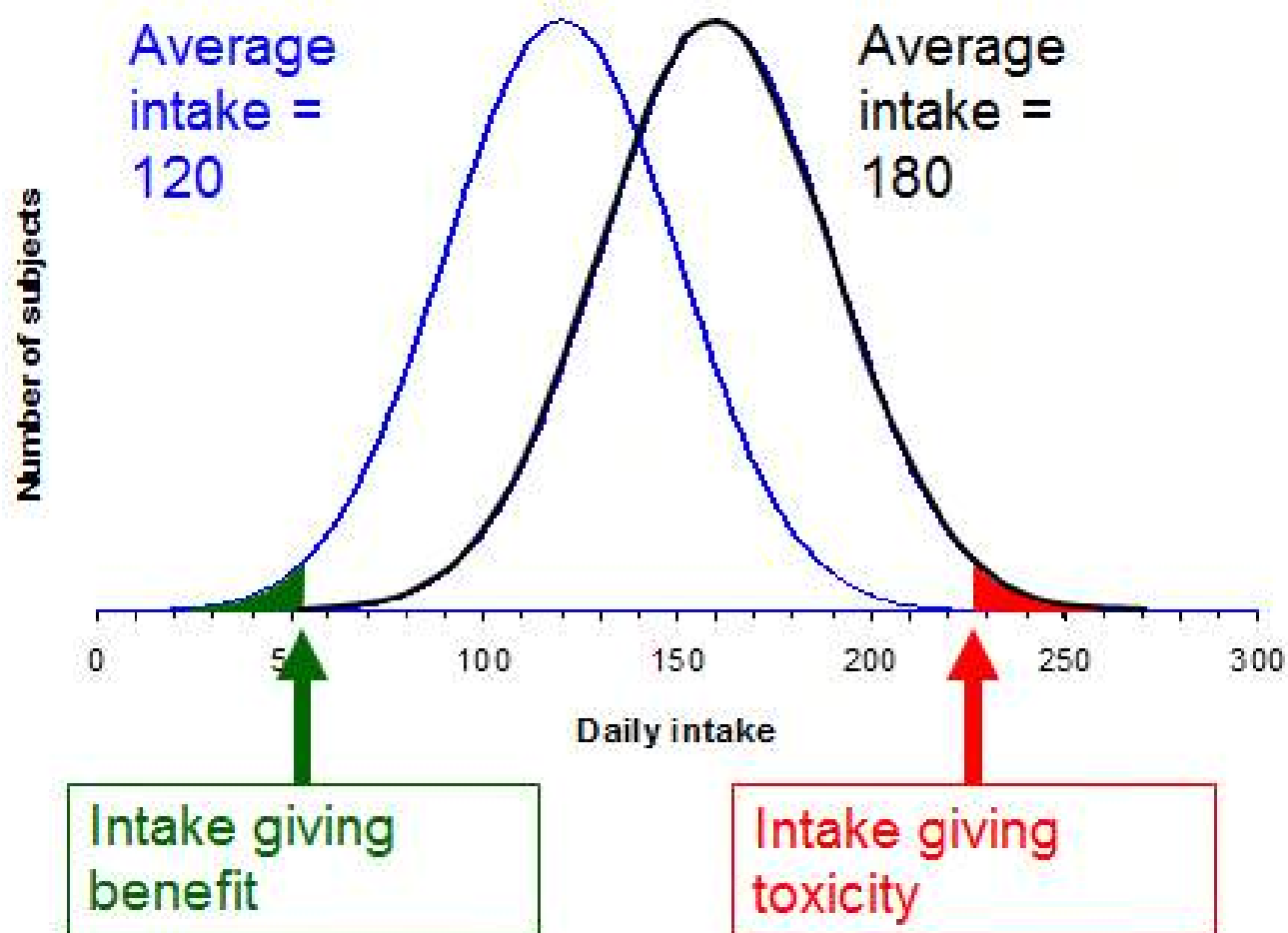
DIETARY REFERENCE VALUES

Population distribution *versus* intake

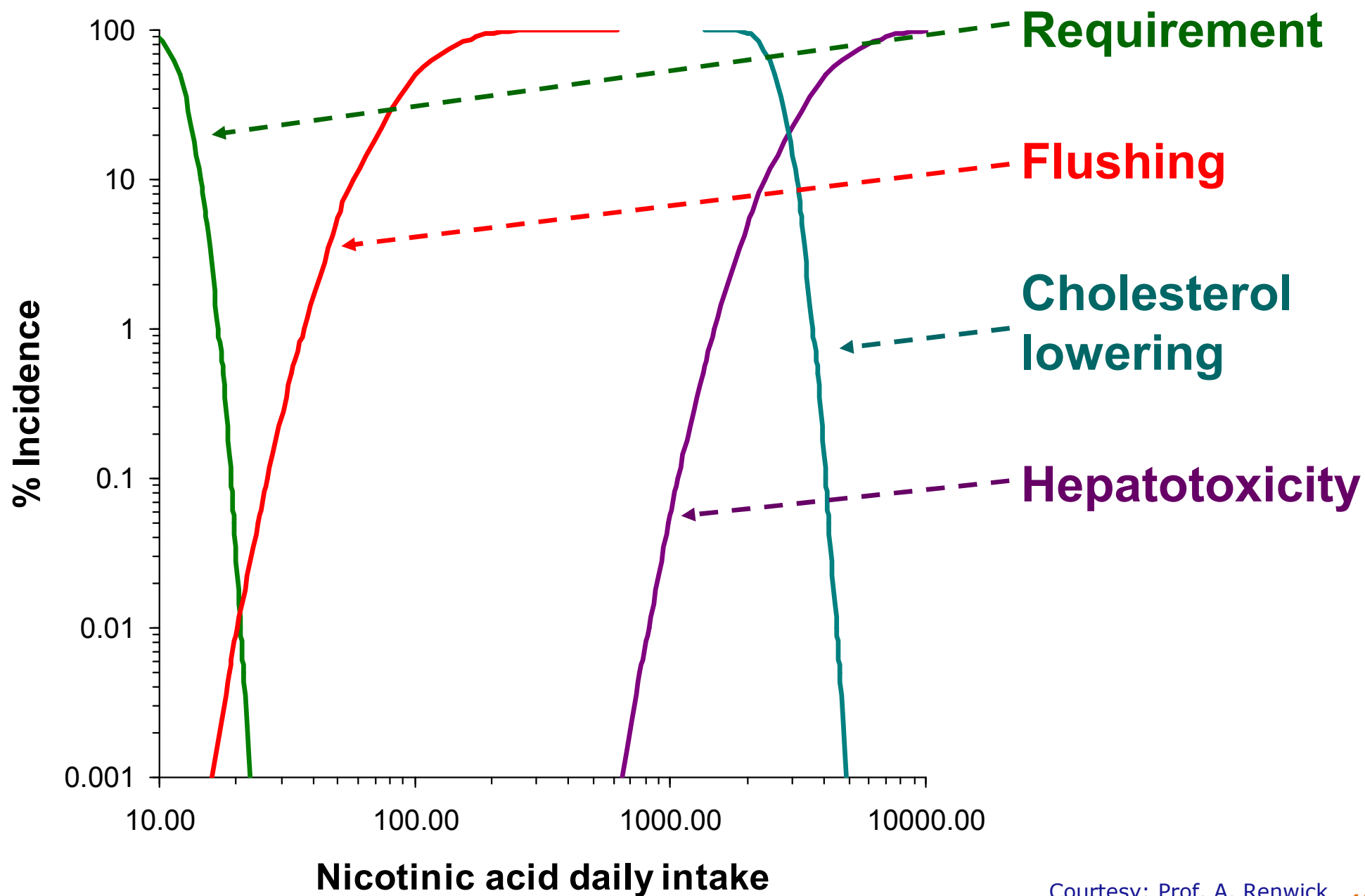


DIETARY REFERENCE VALUES

Population distribution *versus* intake



RISK-BENEFIT – NICOTINIC ACID



FOLIC ACID FORTIFICATION OF FLOUR



Available online at www.sciencedirect.com



Food and Chemical Toxicology 46 (2008) 893–909



www.elsevier.com/locate/foodchemtox

Integrated risk–benefit analyses: Method development with folic acid as example

Jeljer Hoekstra *, Janneke Verkaik-Kloosterman, Cathy Rompelberg, Henk van Kranen, Marco Zeilmaker, Hans Verhagen, Nynke de Jong

National Institute for Public Health and the Environment (RIVM), Bilthoven, The Netherlands

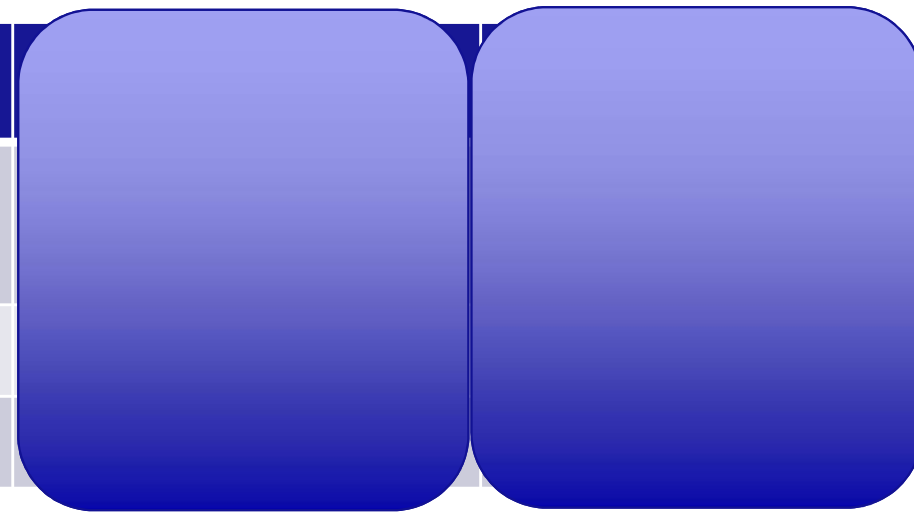
Received 18 June 2007; accepted 10 October 2007

- Neural Tube Defects (benefit)
- Masking B12-deficiency (risk)
- Colorectal Cancer (benefit and risk)
- Folate deficiency (benefit)



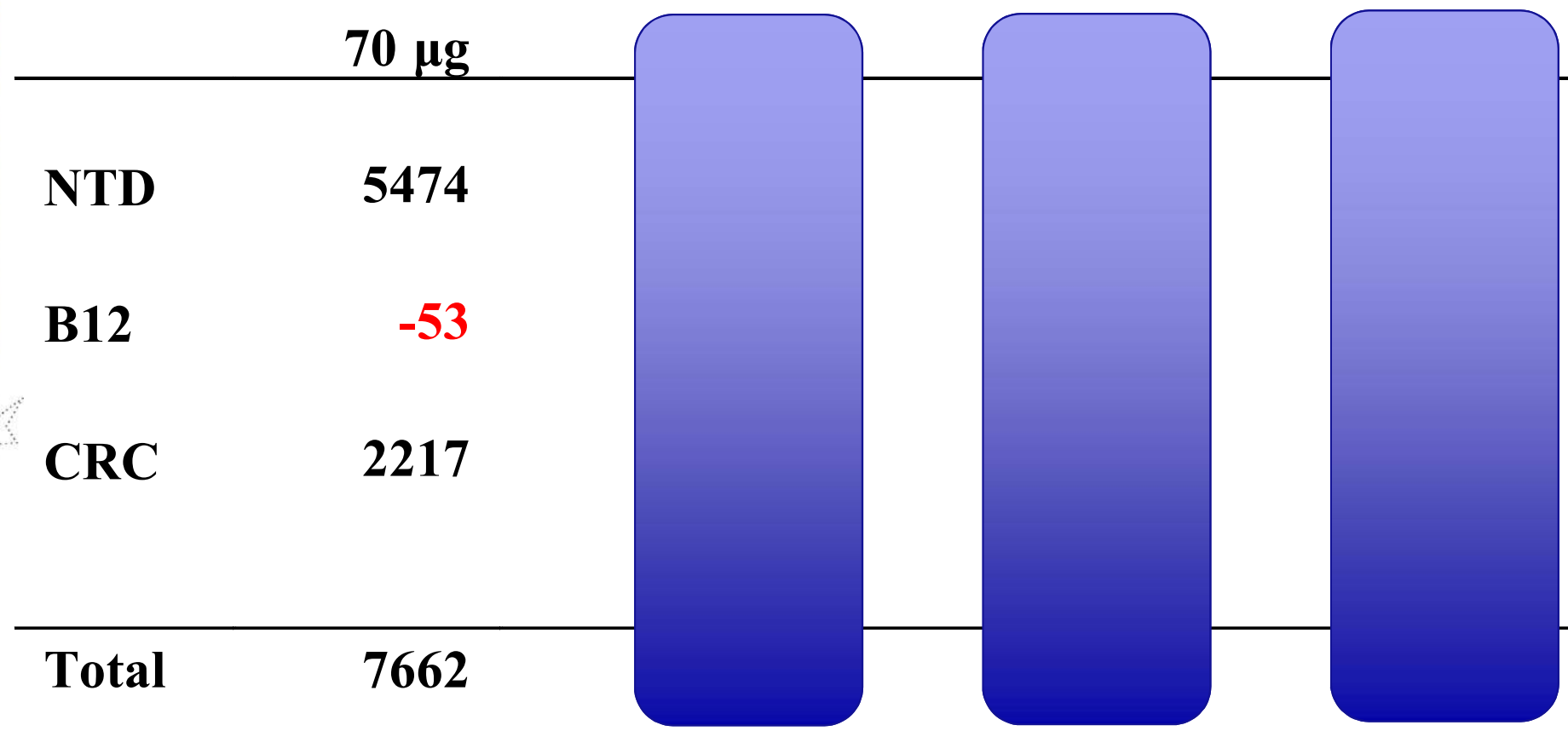
Public health effects of fortification at 70 µg per 100 g of flour

	Incidence (#)
Neural tube defects	- 83
B ₁₂ deficiency	53
Colorectal Cancer	- 405



FOLIC ACID FORTIFICATION OF FLOUR

Public health burden (DALYs)





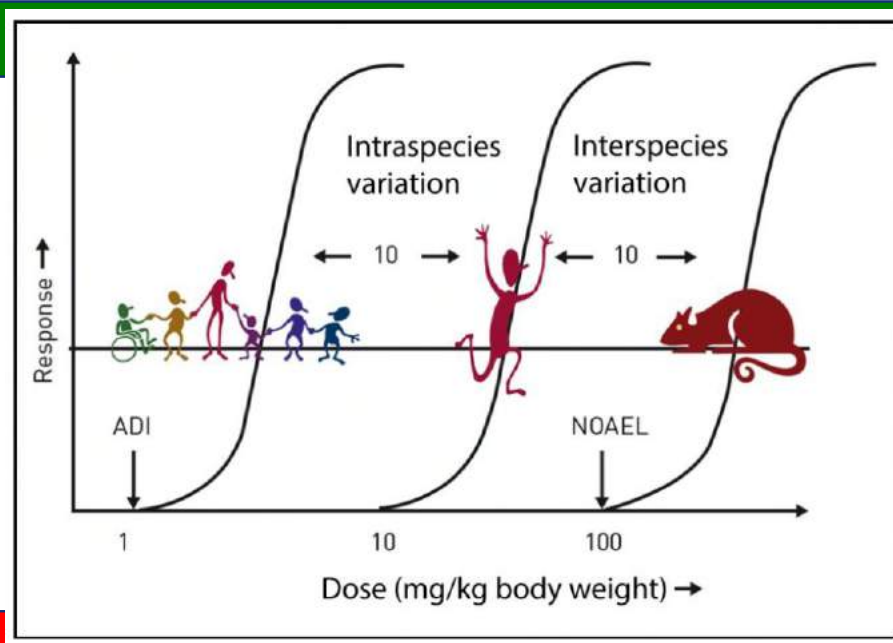
FOLIC ACID FORTIFICATION OF FLOUR

Public health burden (DALYs)

	70 µg	140 µg	280 µg	420 µg
NTD	5474	7710	9812	10855
B12	-53	-76	-120	-165
CRC	2217	4146	167	-21740
Total	7662	11812	9899	-11006

PARADIGM SHIFT

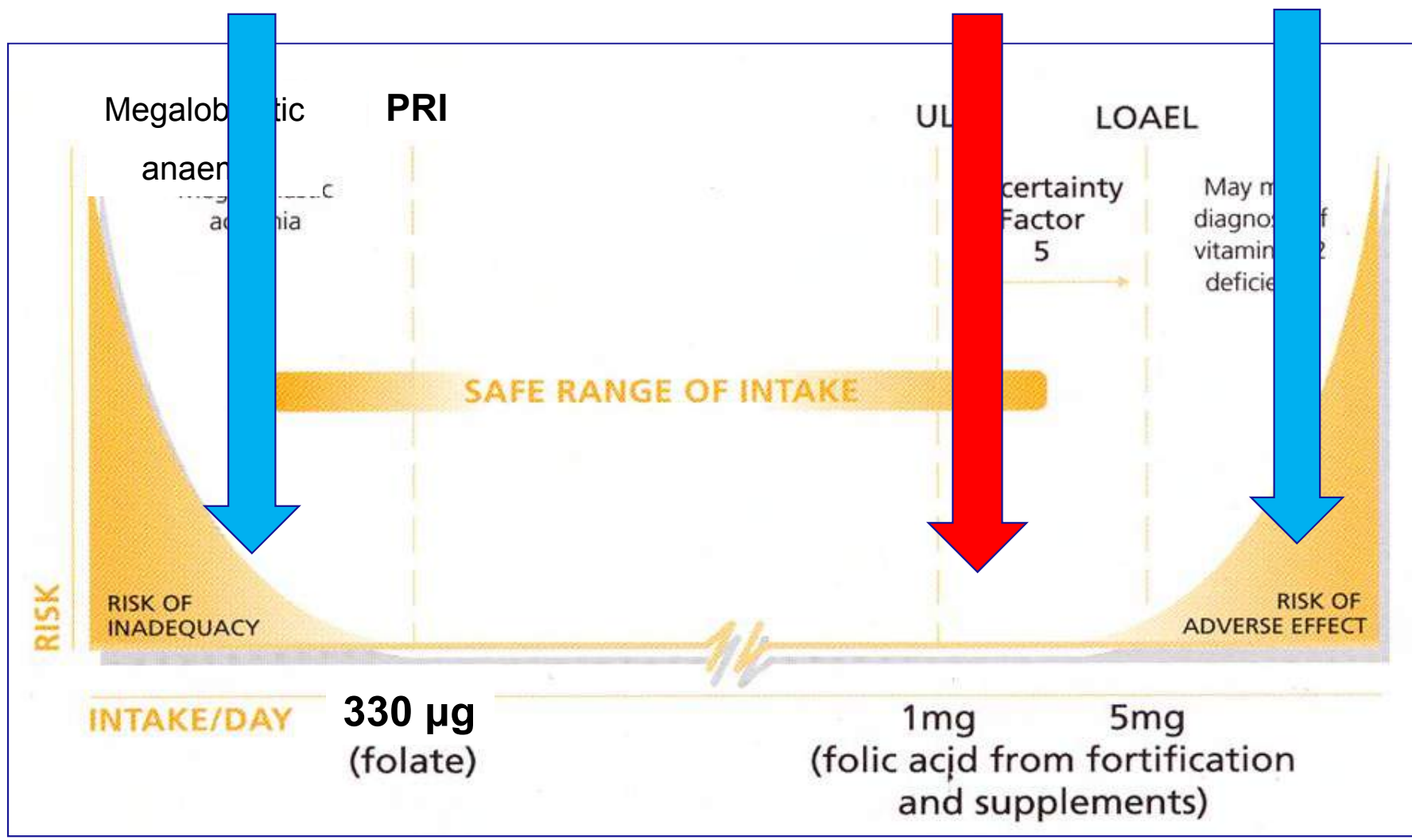
Nutrition / epidemiology: effective dose levels
 (minimum effective dose ...to elicit an effect)



Toxicology: ineffective (= safe) dose levels
 (point of departure/reference point = no effect / safety factor)

RISK-BENEFIT ASSESSMENT

Compare **effects** with **effects**



Beneris

QALIBRA

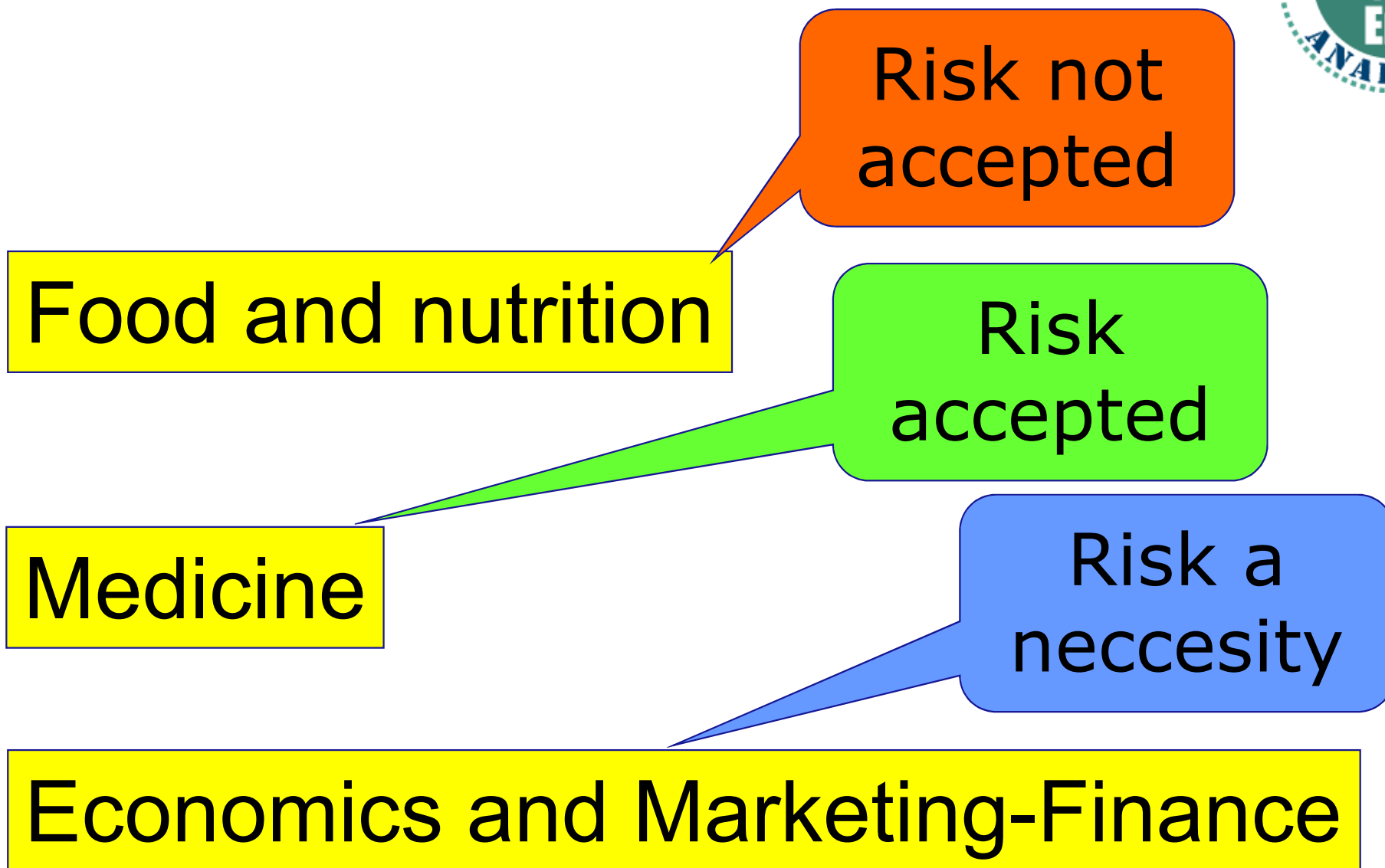
BRAFO

Best Practises for Risk - Benefit Analysis of Foods (BEPRARIBEAN)



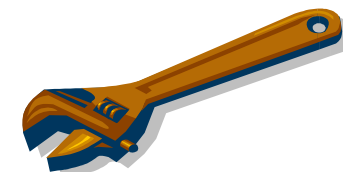
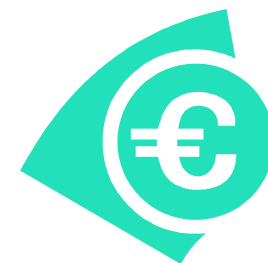
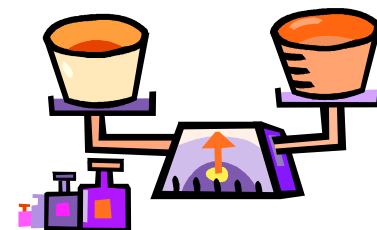


Best Practises for Risk - Benefit Analysis of Foods (BEPRARIBEAN)

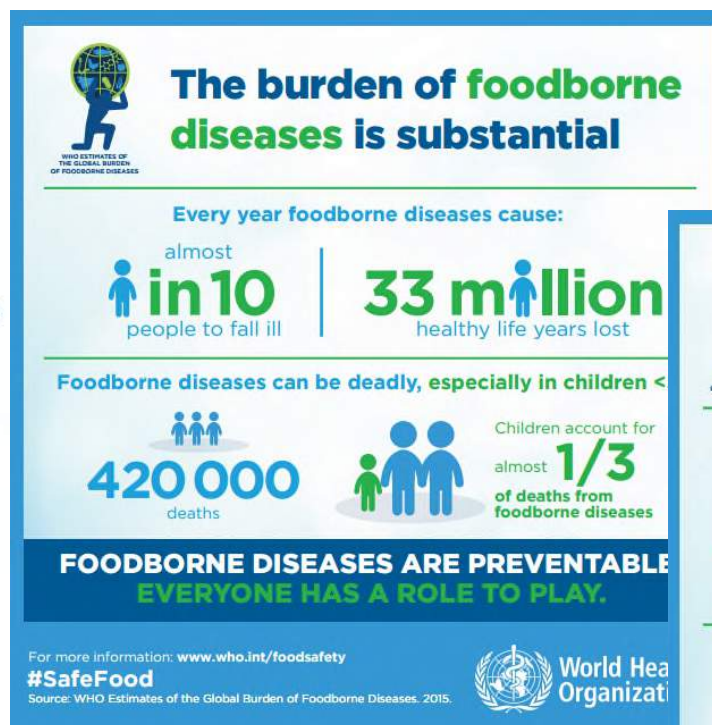


Risk – Benefit characteristics

1. Problem formulation: at least 2 scenario's
2. A common currency to describe the health impacts
3. Tiered approach



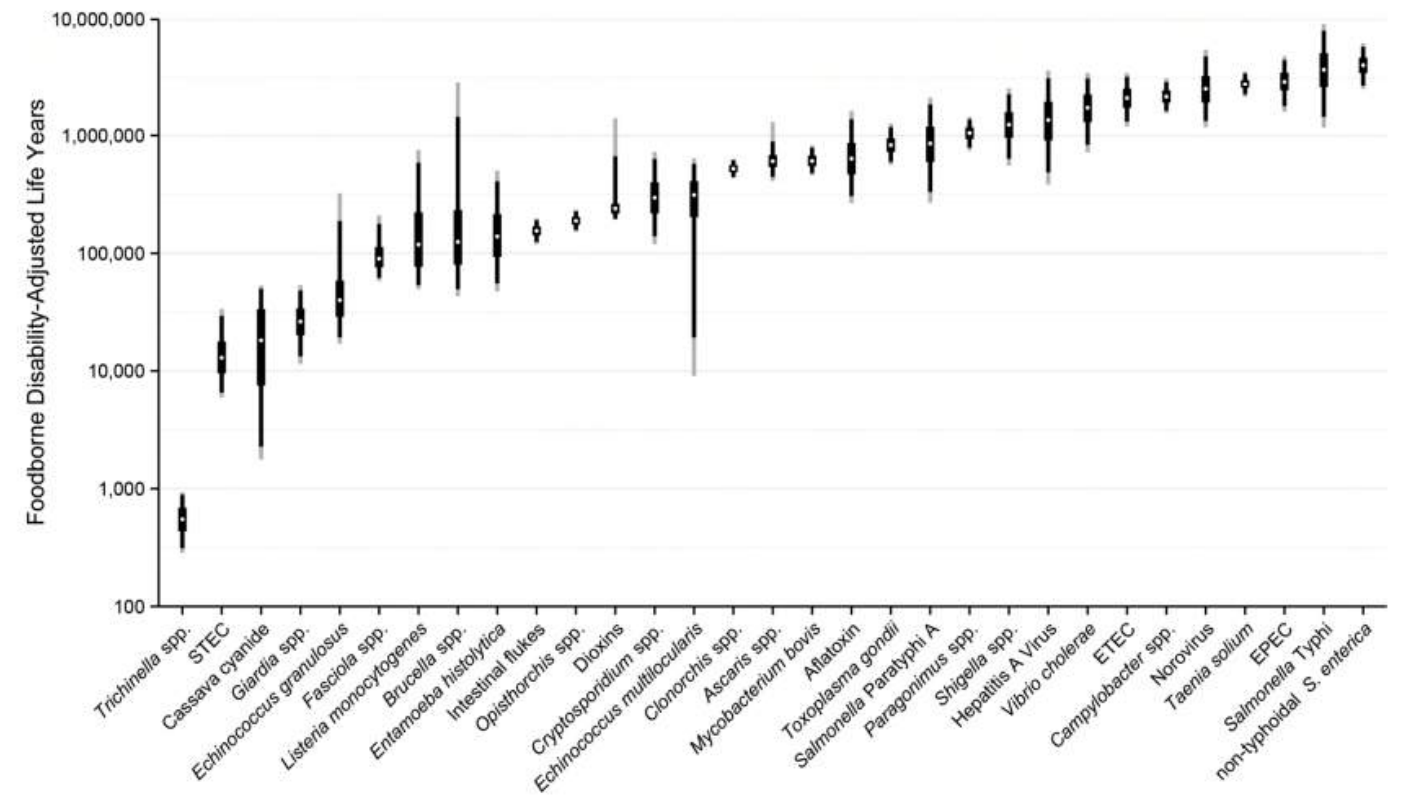
RISK-BENEFIT & RISK RANKING & RISK-RISK



RISK-BENEFIT & RISK RANKING & RISK-RISK



Ranking of foodborne hazards-global DALYs

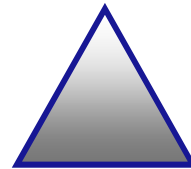


RISK-BENEFIT & RISK RANKING & RISK-RISK

unsafe food



**unhealthy
diet**



2004/2006



RISK-BENEFIT & RISK RANKING & RISK-RISK

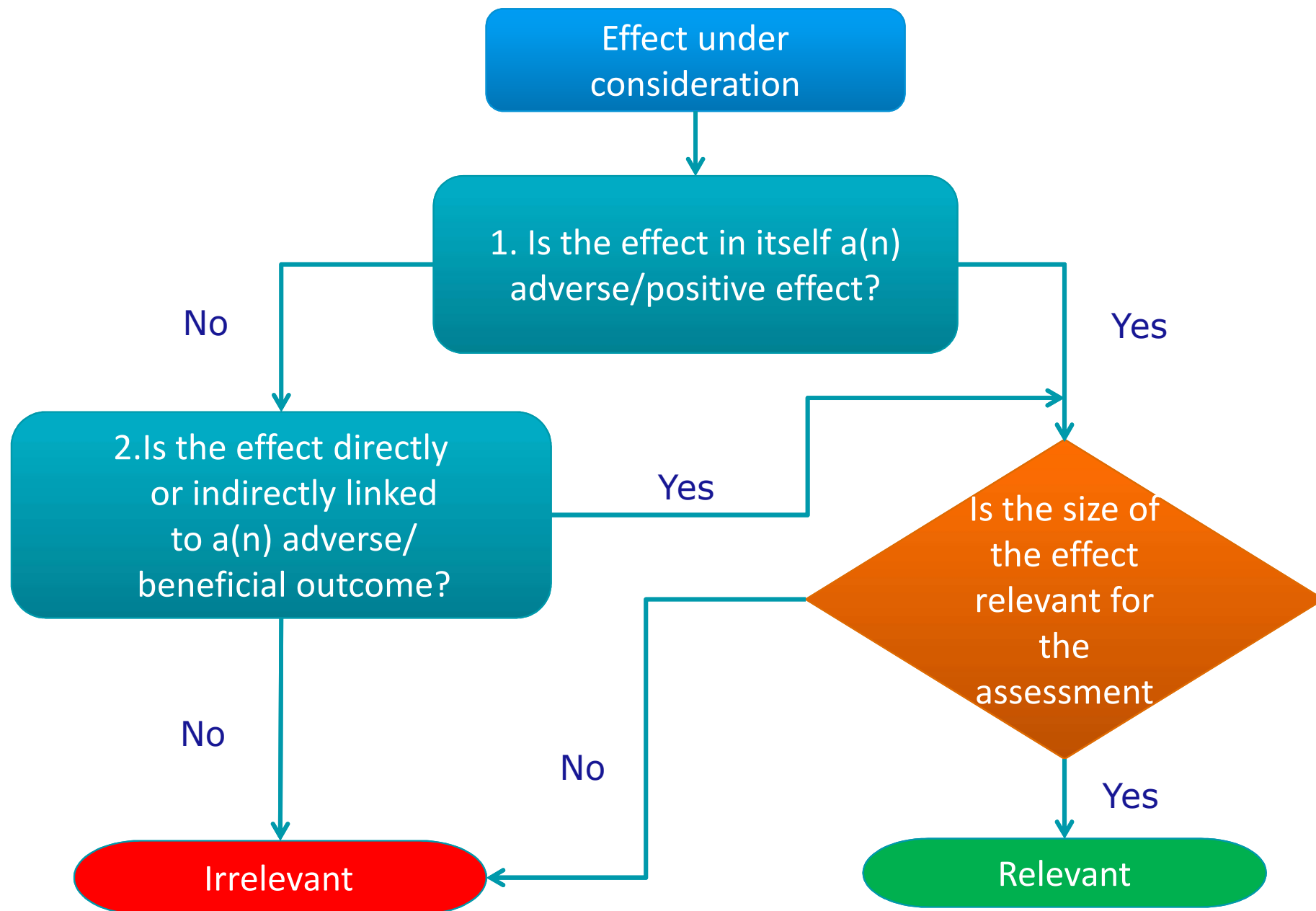
Comparing health loss and potential health gain
by **healthy diet** and **unsafe food** in the Netherlands

Factor	DALY's / year	Deaths / year	Cases / year
Diet composition #	245,000	13,000	ca. 40,000
Bodyweight	<u>215,000</u>	7,000	ca. 40,000
Healthy diet	> 350,000		
Micro-organisms	1,000-4,000	20-200	300-750 x10 ³
Allergens	ca. 1,000	< 1	ca. 32,000
Chemicals	<u>500-1,000</u>	100-200	200-300
Food safety	2,500-6,000		

dietary composition (5 factors)



BIOLOGICAL RELEVANCE



WEIGHT OF EVIDENCE APPROACH

The Weight of Evidence



Three basic steps
of weight of evidence assessment

Integrate
the evidence

Weigh
the evidence

Assemble
the evidence

WEIGHT OF EVIDENCE CONCLUSION

Assess consistency across lines of evidence

Assess the relevance and reliability of each line of evidence

LINES OF EVIDENCE

Identify, filter and organise the evidence

Includes preliminary consideration of relevance and reliability

AVAILABLE INFORMATION



UNCERTAINTY IN RISK ASSESSMENT



Uncertainty? Don't scientists know everything?

SCIENTIFIC OPINION



ADOPTED: dd mmmm yyyy

PUBLISHED: dd mmmm yyyy

AMENDED: dd mmmm yyyy

doi:10.2903/j.efsa.20YY.NNNN

Guidance on Uncertainty in EFSA Scientific Assessment

EFSA Scientific Committee^{1, 2}

European Food Safety Authority (EFSA), Parma, Italy

PROMETHEUS

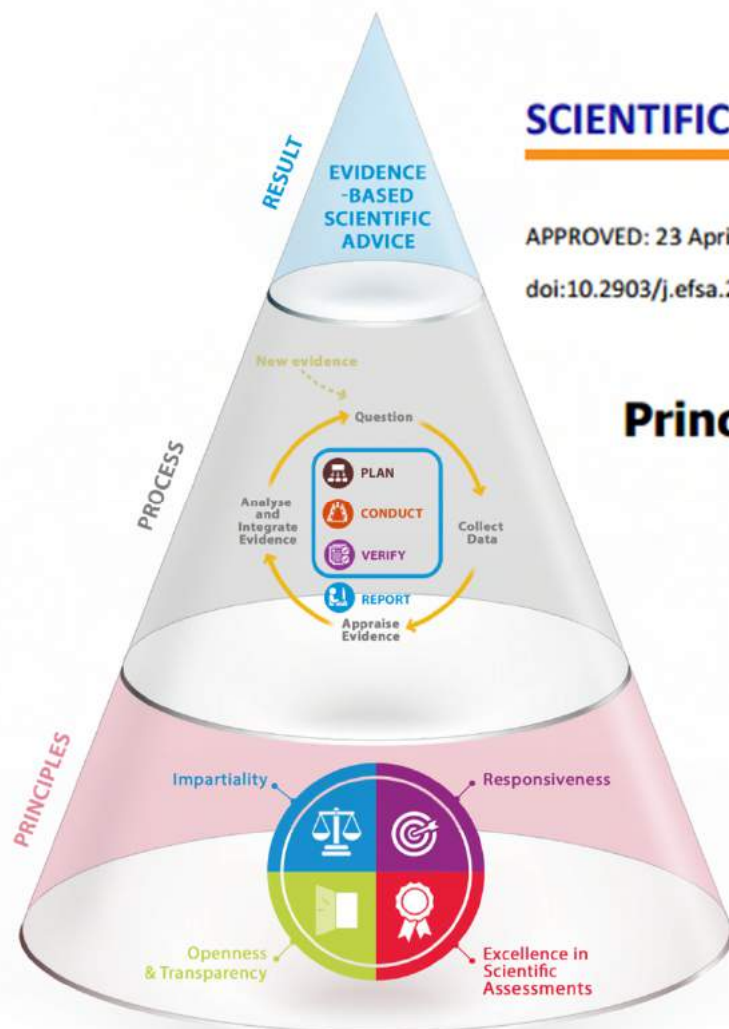
PROmoting METHods for Evidence Use in Scientific assessments

SCIENTIFIC REPORT

APPROVED: 23 April 2015

PUBLISHED: 03 June 2015

doi:10.2903/j.efsa.2015.4121



Principles and process for dealing with data and evidence in scientific assessments

European Food Safety Authority (EFSA)



“Life would be pretty dull without risk - benefit”

Thank you ☺