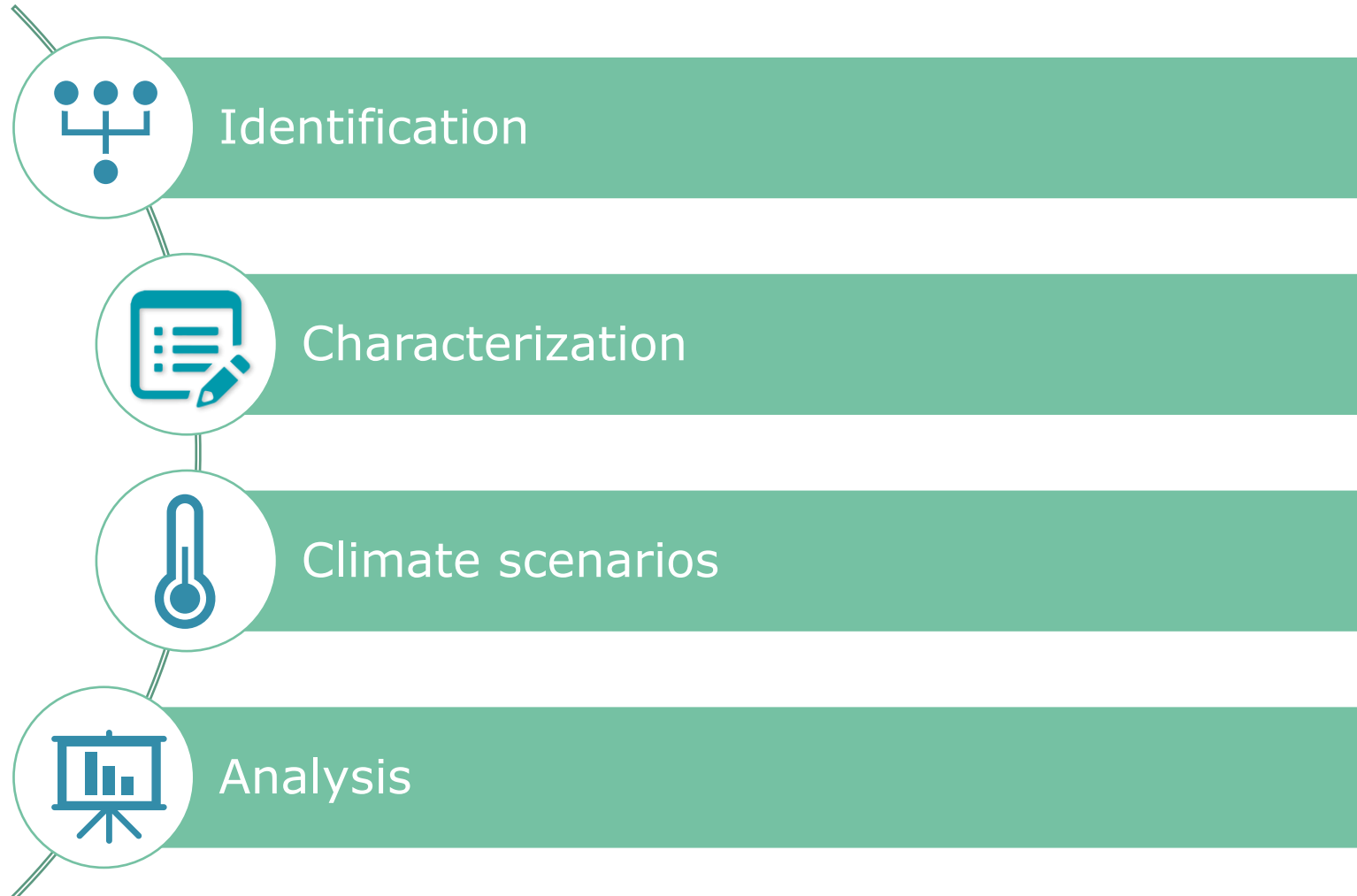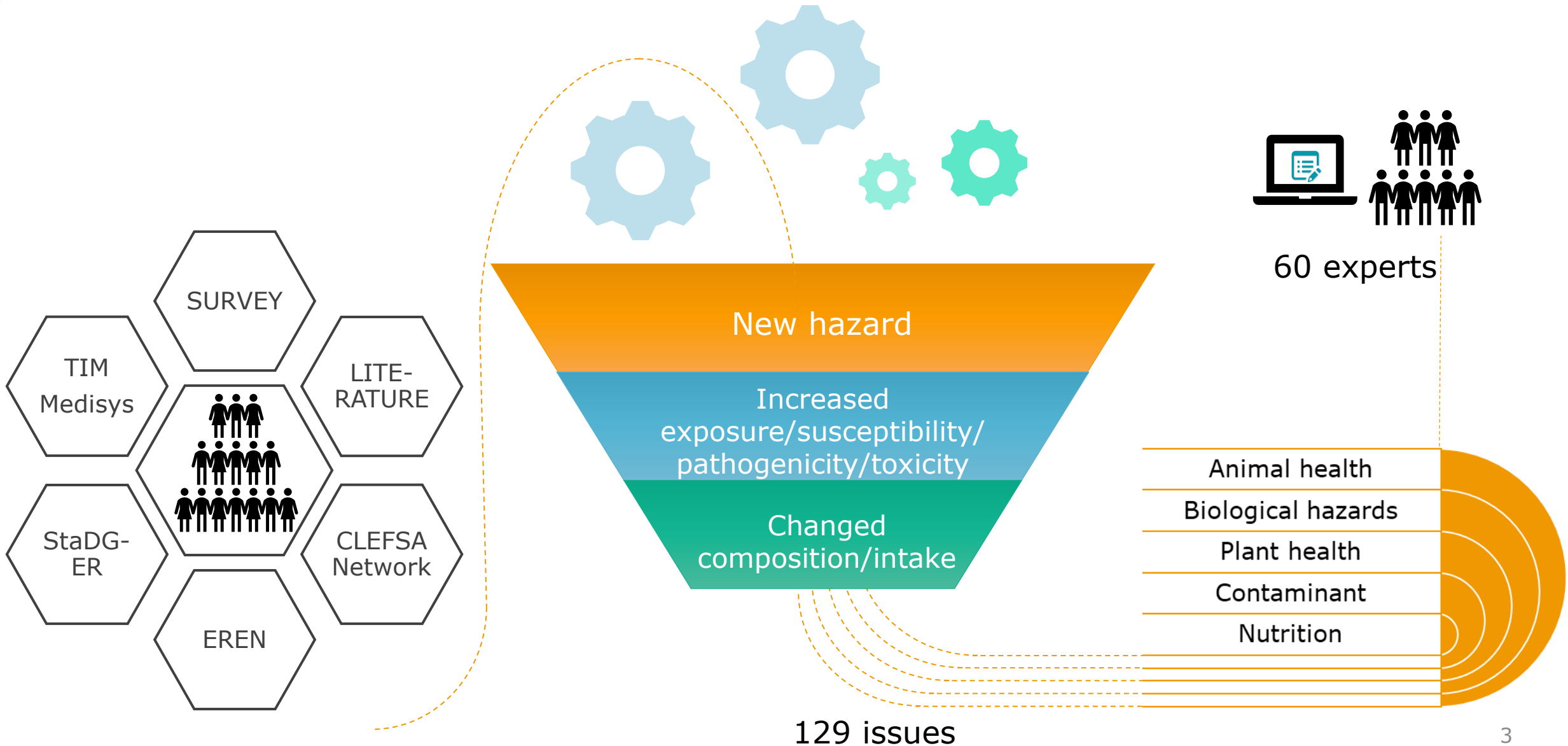# Project methodology: issue identification, characterisation, analysis

F. Barrucci (AMU), G. De Sanctis (GMO)

Trusted science for safe food

efsa
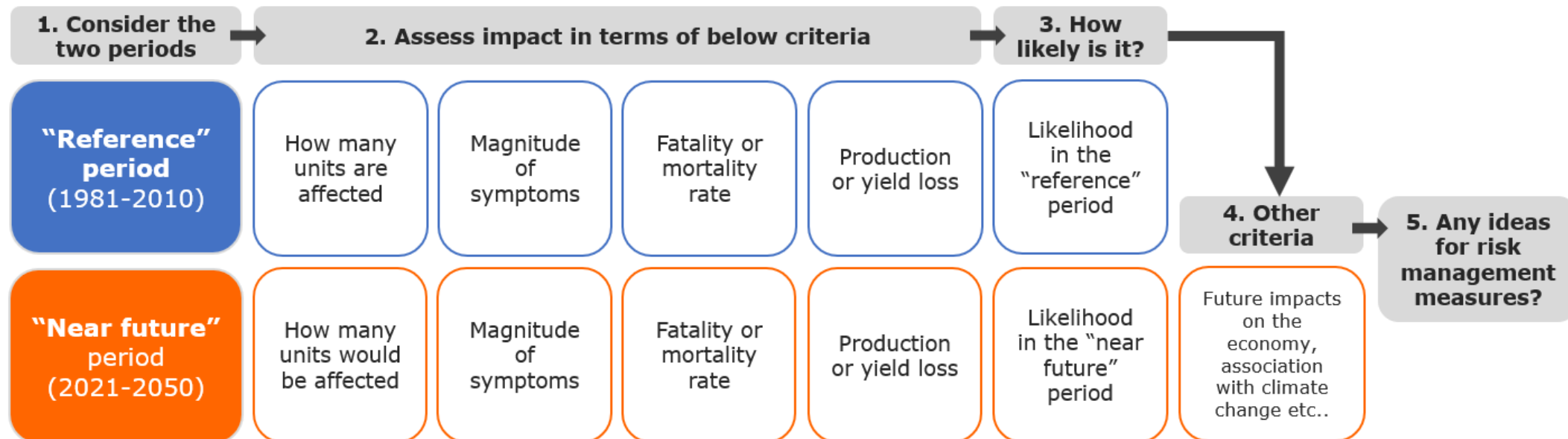
European Food Safety Authority

Overview

Identification

Characterization

Climate scenarios

Analysis

Identification of emerging risks/issues

SURVEY

TIM Medisys

LITE-RATURE

StaDG-ER

CLEFSA Network

EREN

New hazard

Increased exposure/susceptibility/pathogenicity/toxicity

Changed composition/intake

60 experts

Animal health
Biological hazards
Plant health
Contaminant
Nutrition

129 issues

Characterization

Expert knowledge used to identify relevant issues from the vast, incomplete and uncertain information retrieved

For each emerging issue...

1. Consider the two periods	2. Assess impact in terms of below criteria				3. How likely is it?	4. Other criteria	5. Any ideas for risk management measures?
"Reference" period (1981-2010)	How many units are affected	Magnitude of symptoms	Fatality or mortality rate	Production or yield loss	Likelihood in the "reference" period		
"Near future" period (2021-2050)	How many units would be affected	Magnitude of symptoms	Fatality or mortality rate	Production or yield loss	Likelihood in the "near future" period	Future impacts on the economy, association with climate change etc..	

Climate scenarios

European Centre for Medium-Range Weather Forecasts: Ensemble of 11 climate models

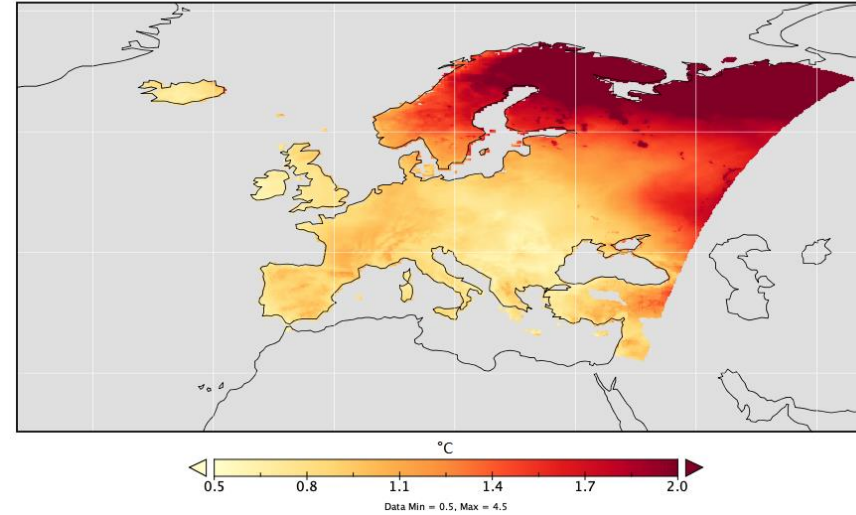Reference period: 1981-2010

Near future period: 2021-2050

Climate variables:
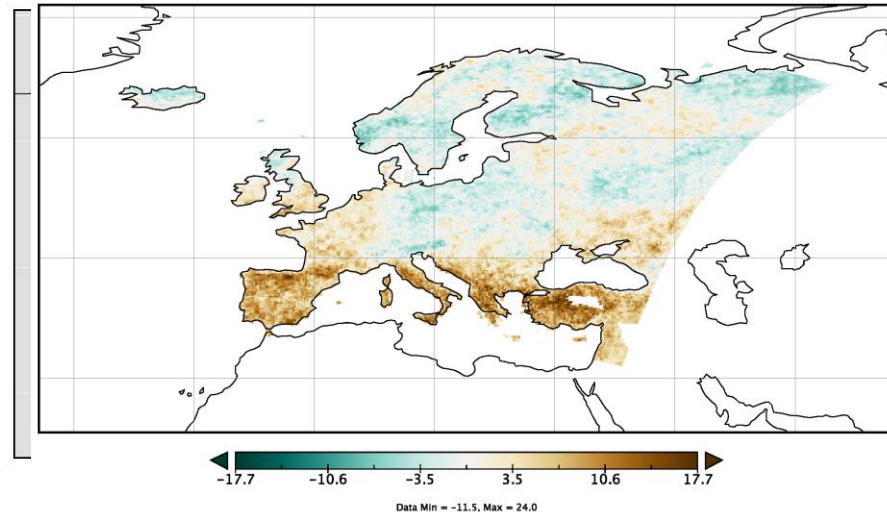- T (annual, seasonal)
- Prec (annual, seasonal)

Extreme weather events
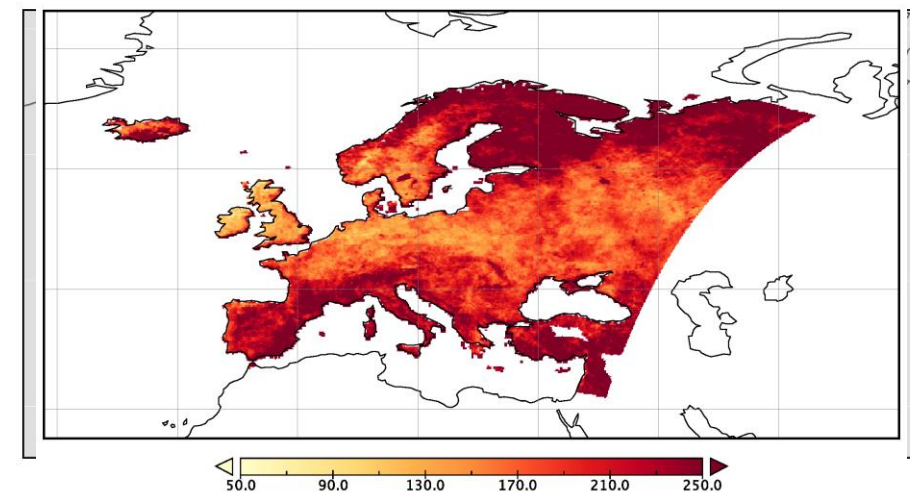- T spells (cold, warm)
- Heavy rainfall events
- Drought

Annual temperature

°C

Data Min = 0.5, Max = 4.5

Max consecutive number of dry days

Data Min = -11.5, Max = 24.0

Max consecutive number of days of warm spell

The Emerging Risks Workbench

HOME   Emerging issue   Impact   Likelihood   Other qualifying criteria   Risk managment

IMPACT

Please, provide your scores on severity, duration and/or frequency of the potential effects of the hazard considered in the identified issue, considering 'reference' and 'near future' conditions, the latter characterised by the selected climate change scenario.

CRITERIA A: Number of individuals or units affected in Europe

Please consider the ' reference ' conditions

Please provide evidence and reasoning to support the selection of credible range and most probable value in 'reference' conditions

⟵ Rationale

Please provide the **lower** and **upper** limit of the credibility range for the number of individuals or units affected in Europe:
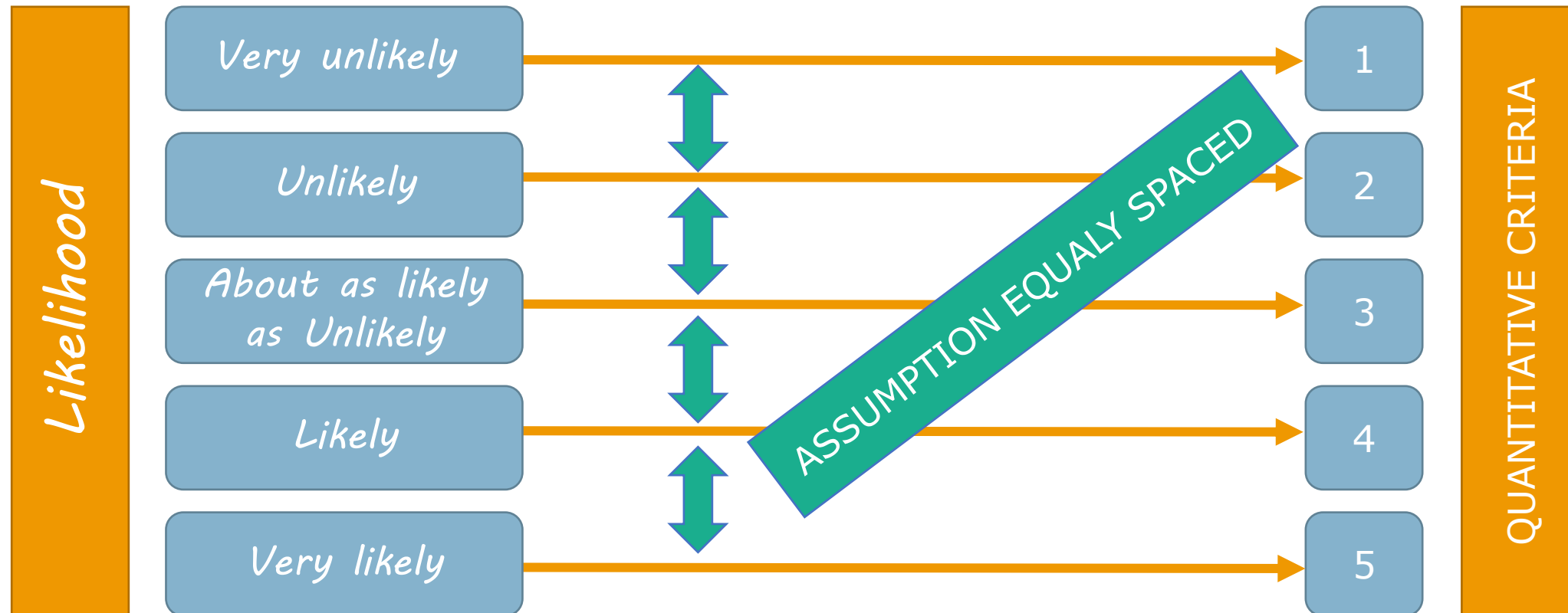
None or Few units   Large number of units   Very large number of units

⟵ Range

Please provide the **most probable** value for the number of individuals or units affected, this value should reflect an average situation:

○ None or Few units
⦿ Moderate number of units   ⟵ Most probable value
○ Large number of units
○ Very large number of units

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Expressing the uncertainty in a **quantitative** form

Likelihood

Very unlikely	→	1
Unlikely	→	2
About as likely as Unlikely	→	3
Likely	→	4
Very likely	→	5

ASSUMPTION EQUALY SPACED

QUANTITATIVE CRITERIA

Fitting Pert distribution

Lower bound	Very Unlikely	1
Upper bound	About as likely as not	2
Most probable value	Unlikely	3

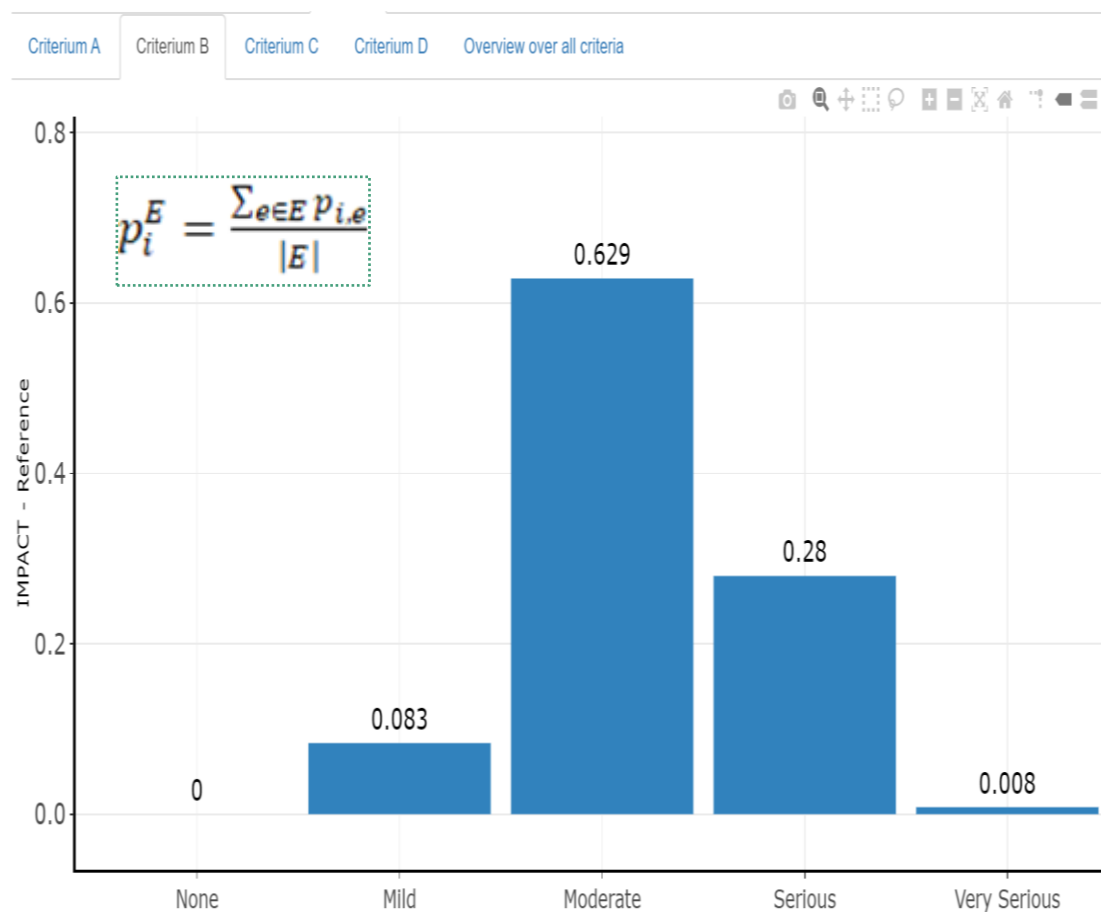ASSUMPTION: PERT DISTRIBUTION
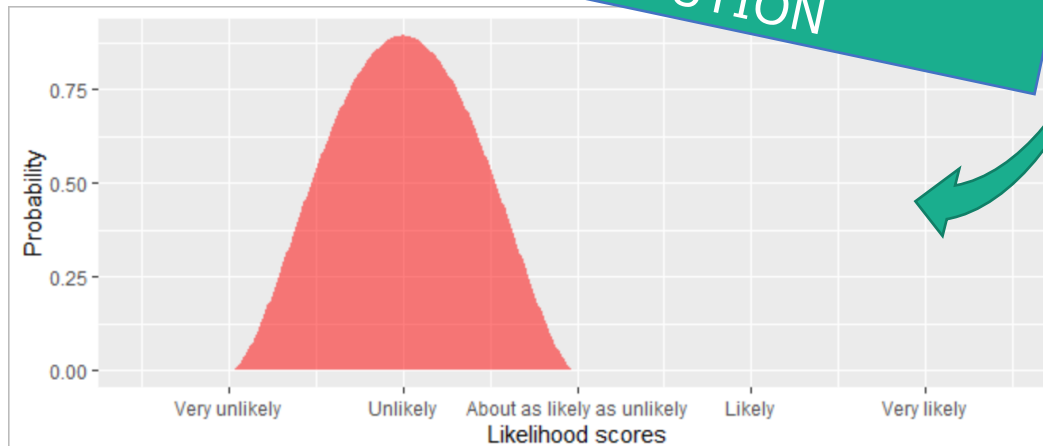
Probability distribution

$$\int_t^{t+1} F(t)\,dt$$

efsa
European Food Safety Authority
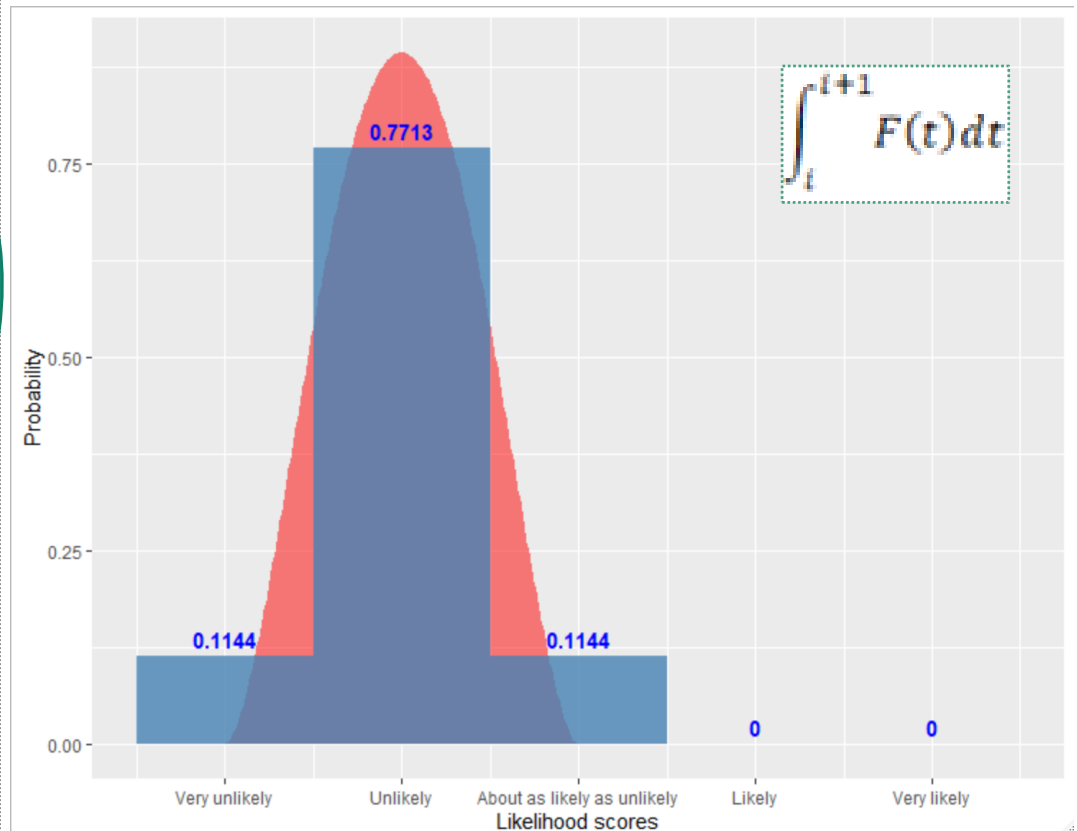
Individual contributions (*saxitoxin eg.*)
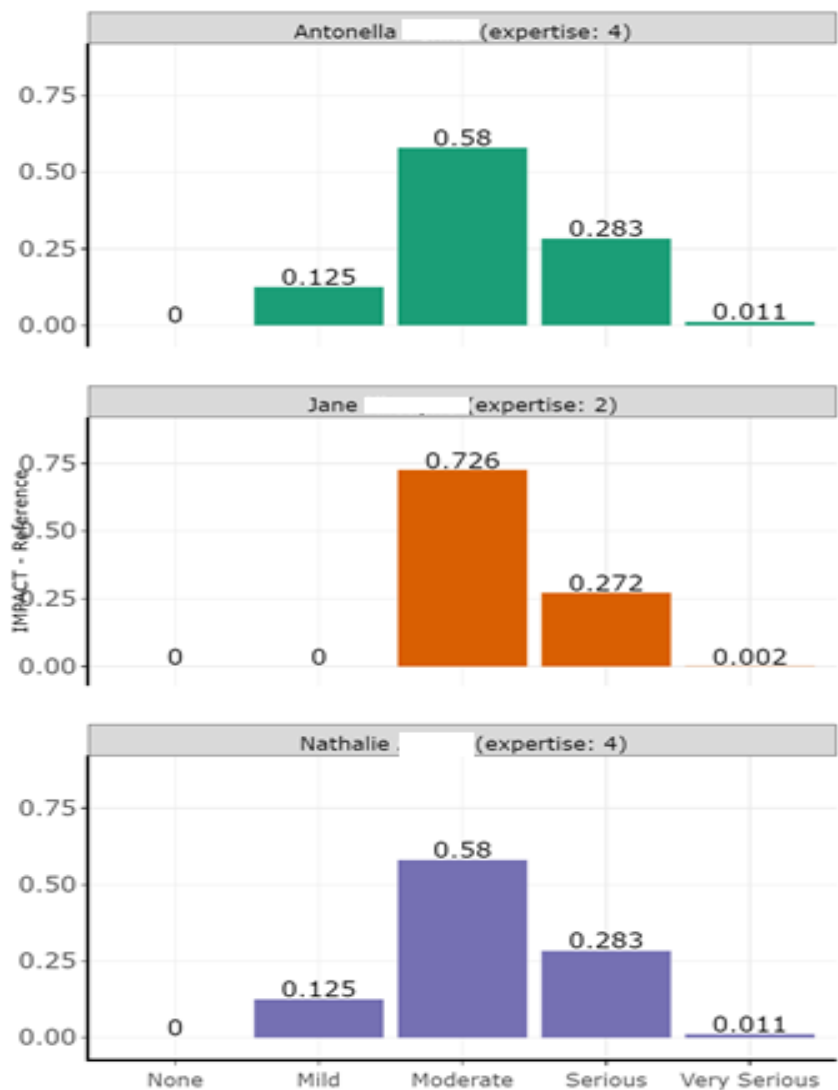
Antonella (expertise: 4)

Jane (expertise: 2)

Nathalie (expertise: 4)

Averaged over all experts (*saxitoxin eg.*)

Criterium A   Criterium B   Criterium C   Criterium D   Overview over all criteria
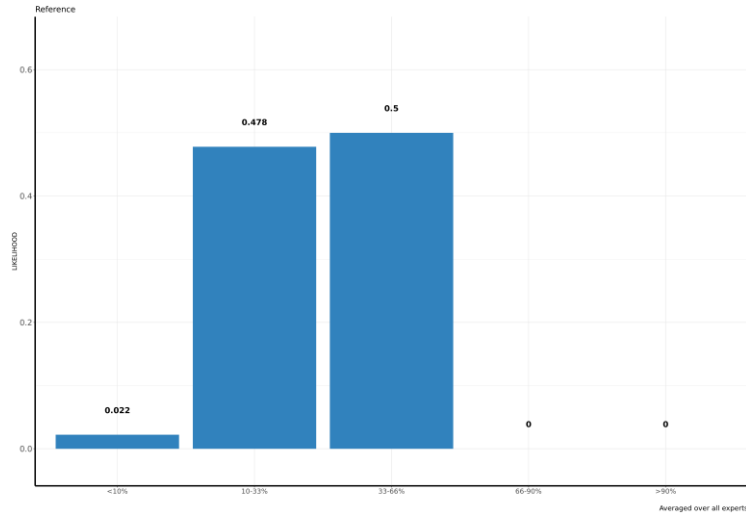
$$p_i^E = \frac{\sum_{e \in E} p_{i,e}}{|E|}$$

Averaged over all experts (*saxitoxin eg.*)

Averaged over all sub criteria (*saxitoxin eg.*)

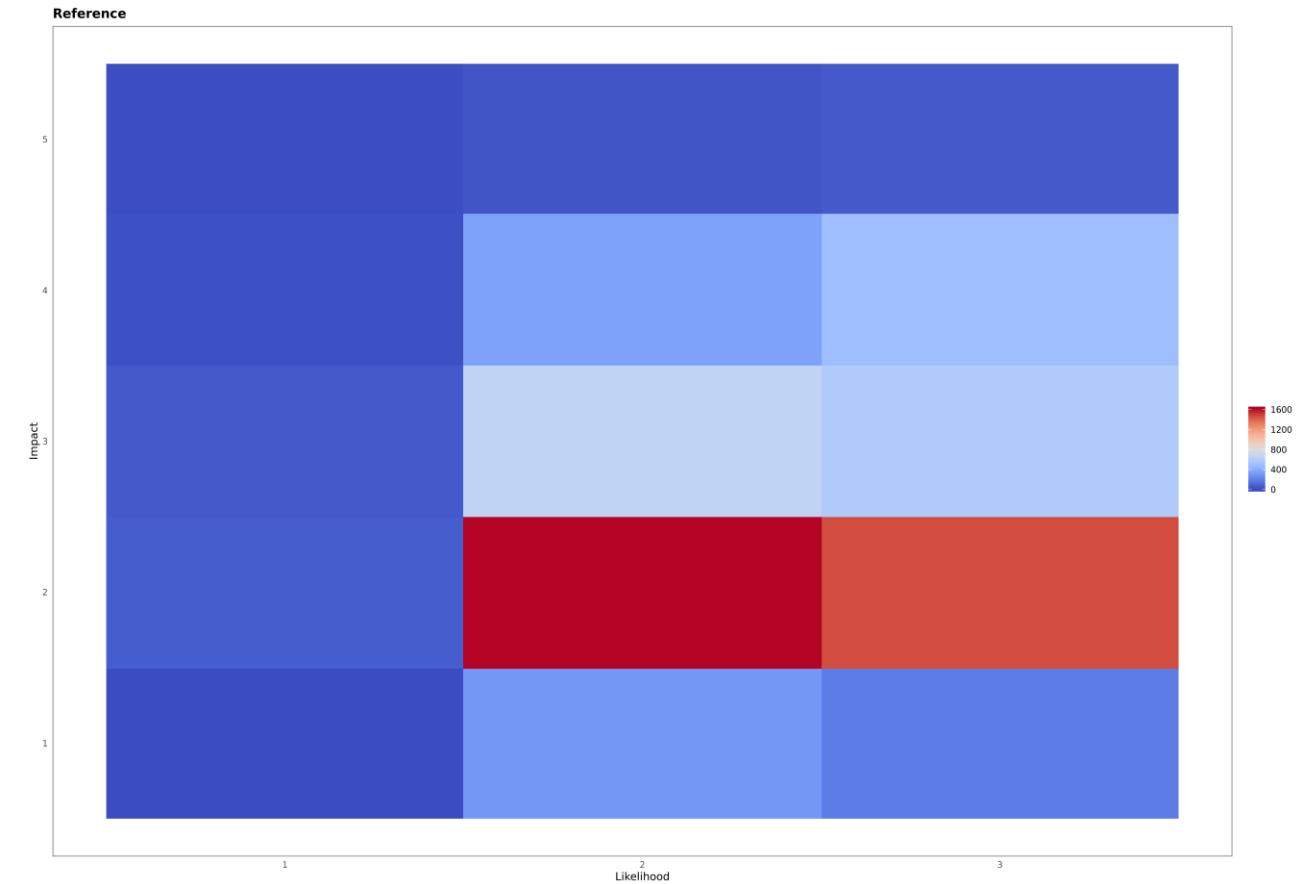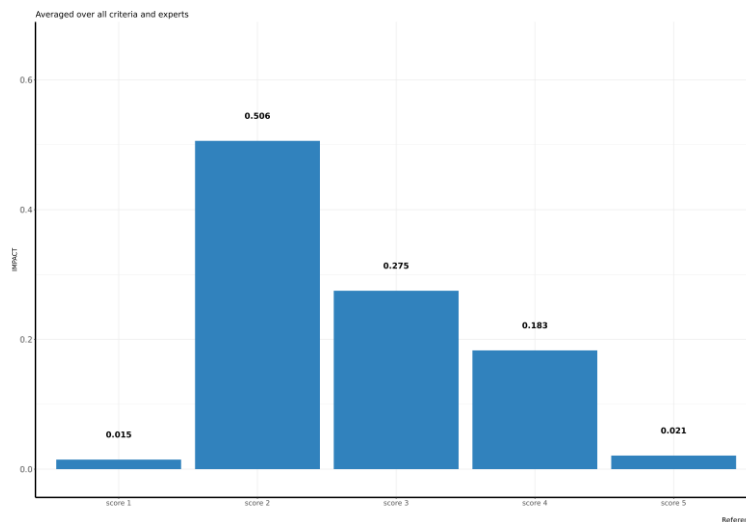$$p_i^{Impact} = (p_i^{Impact_A} + p_i^{Impact_B} + p_i^{Impact_C} + p_i^{Impact_D})/4$$
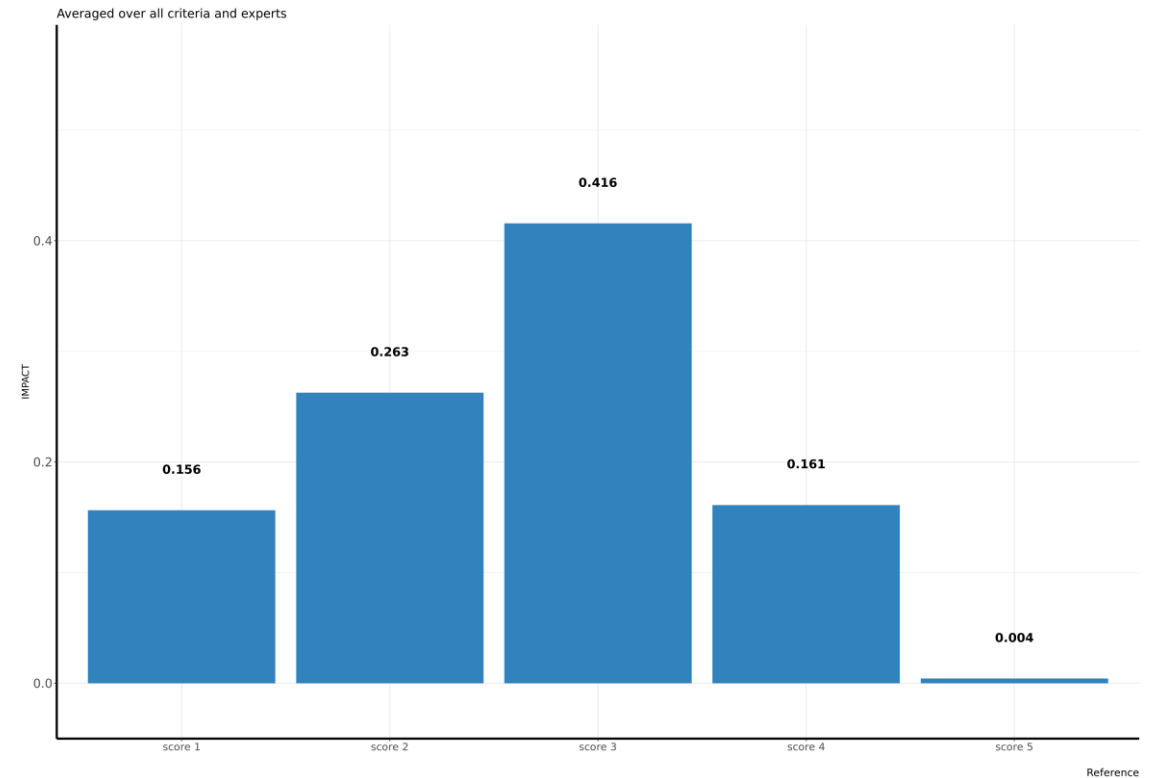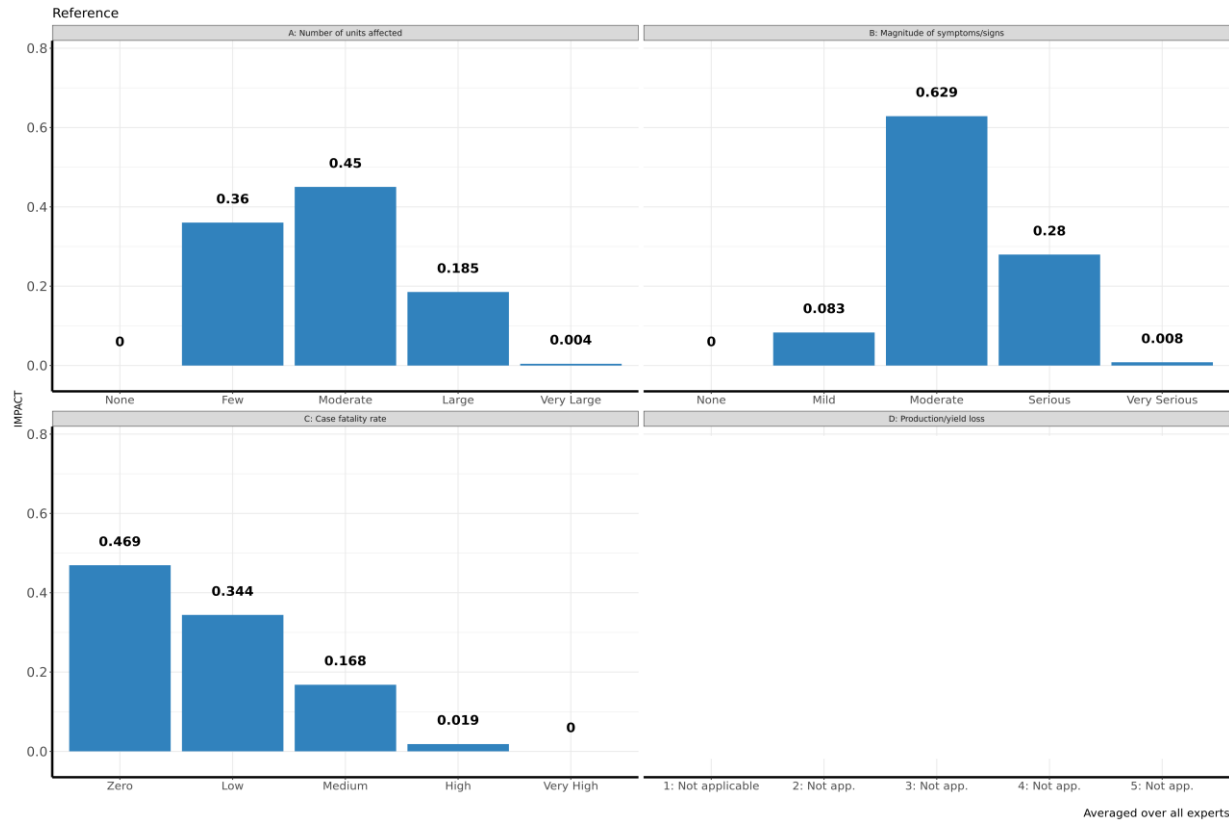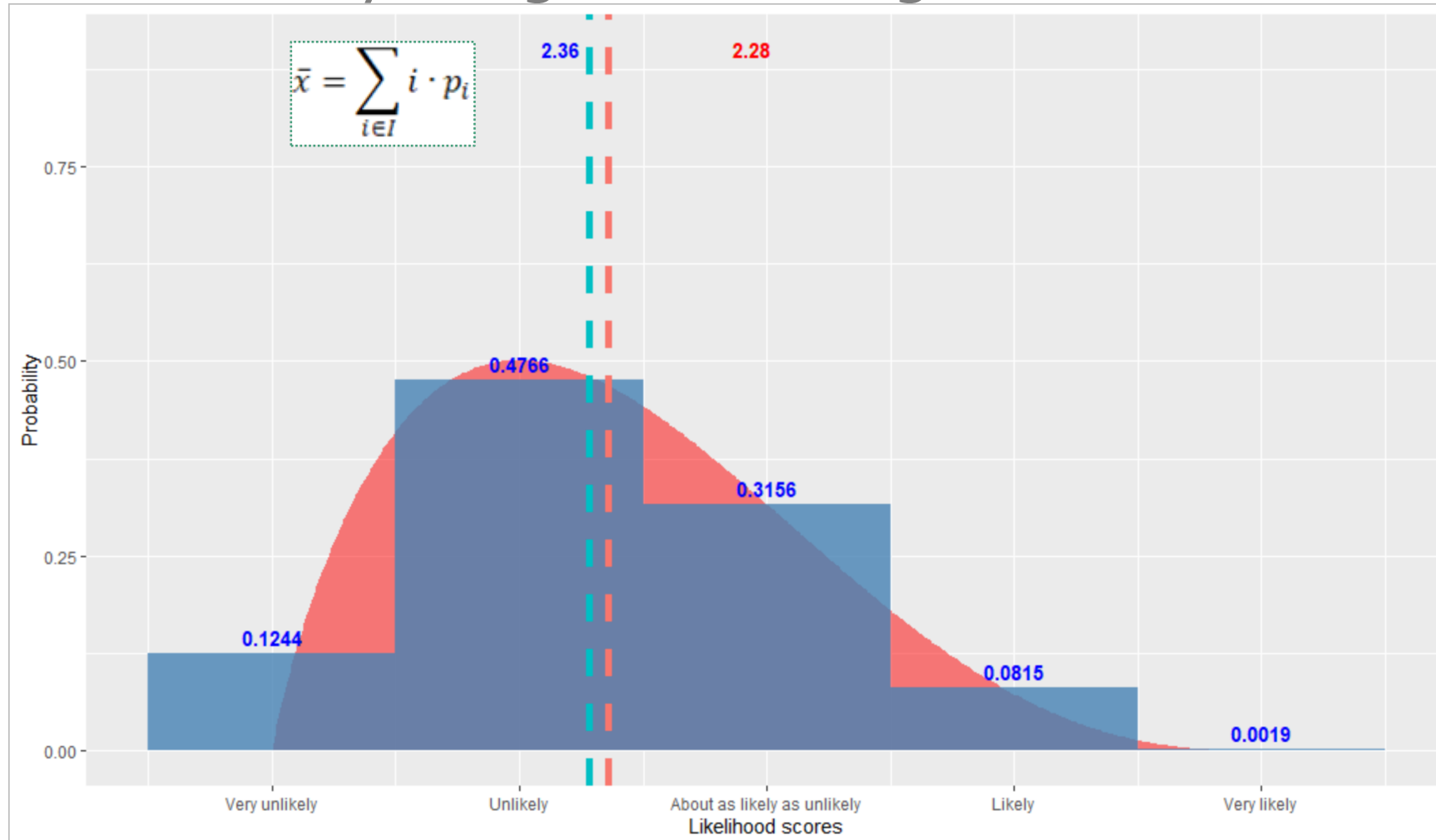
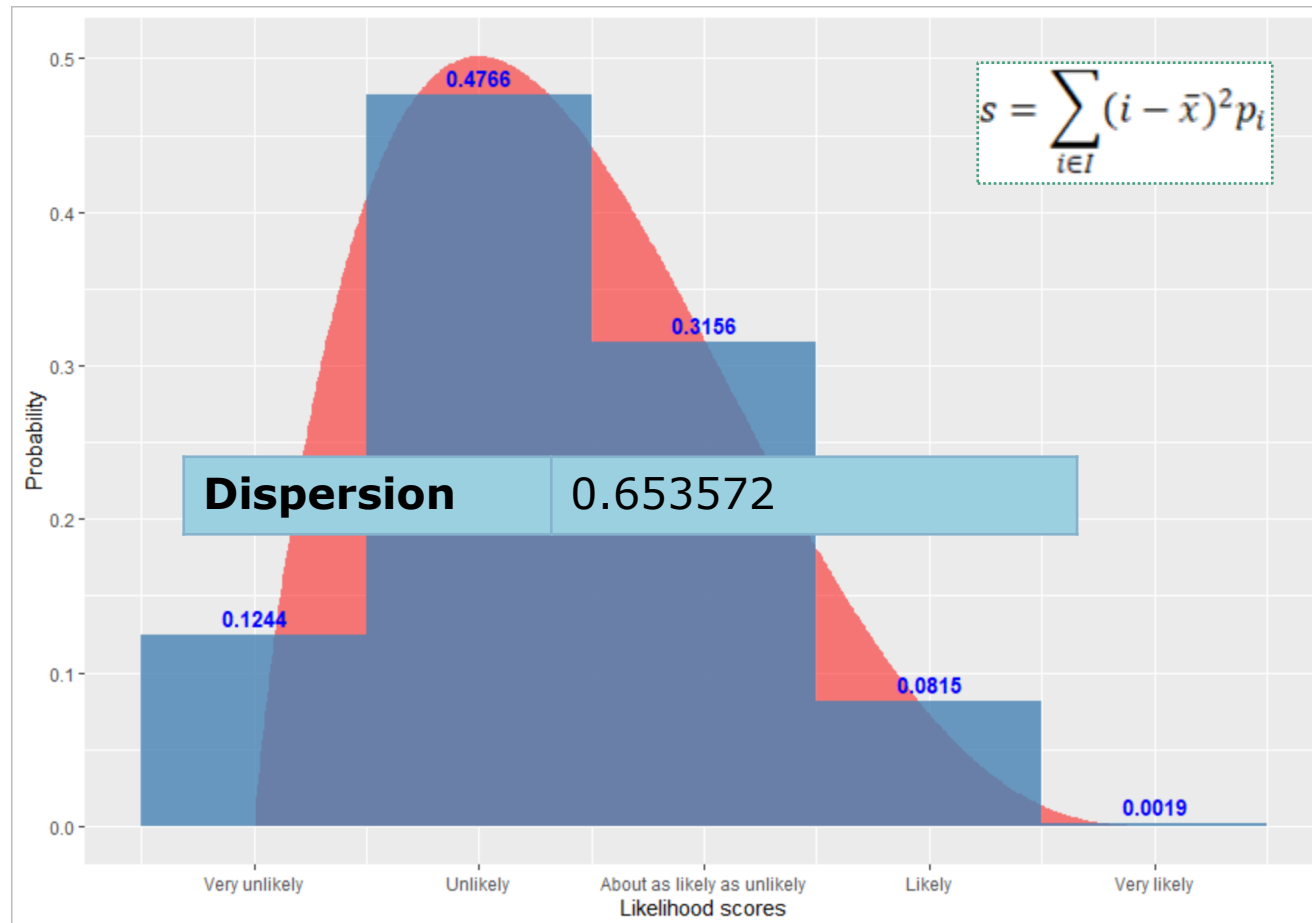Impact (*Toxoplasma Gondii eg.*)

Likelihood (*Toxoplasma Gondii eg.*)

ASSUMPTION: impact and likelihood are indipendent

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Probability weighted average
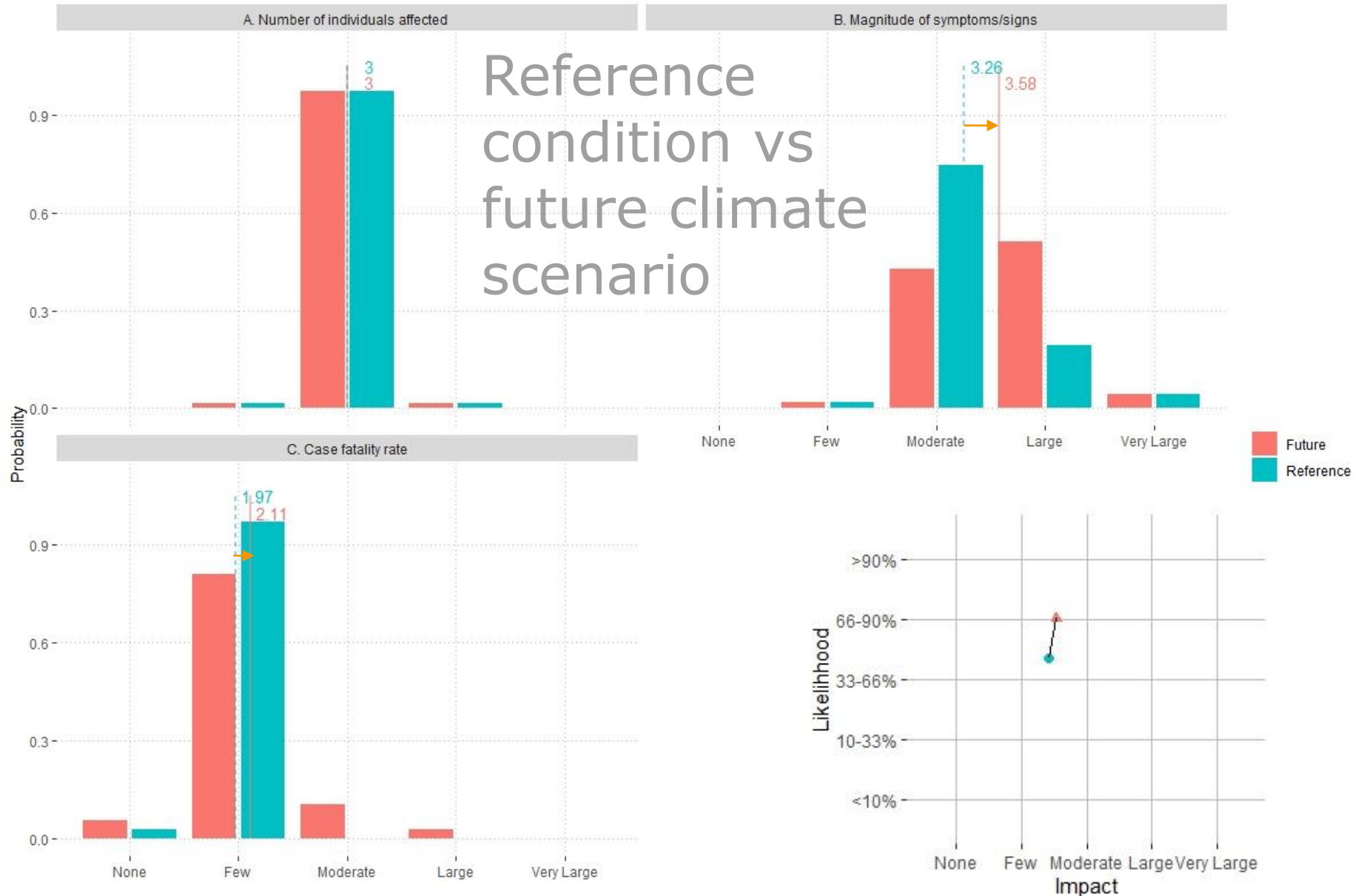

$$\bar{x} = \sum_{i \in I} i \cdot p_i$$

- Dispersion

$$s = \sum_{i \in I} (i - \bar{x})^2 p_i$$

| Dispersion | 0.653572 |

Reference condition vs future climate scenario

Hepatitis A (human health)

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Overall visualisation

Impact

Very high

High
#71 Dirofilaria spp.

Moderate

Low
#72 Heartworms and lungworms

Zero /
Not applicable
#73 flukes
#80 Roundworms

Very unlikely
<10%
Unlikely
<33%
About as likely
as unlikely
~50%
Likely
>66%
Very likely
>90%

Likelihood

Delta
<0.1
0.1-0.2
0.2-0.3
0.3-0.4
>0.4

Dispersion
<0.1
0.1-0.2
>0.2