Evidence Based Risk-Ranking

- *A project in development*

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Aim

Presentation describes background to a joint Swedish-Finnish initiative aiming to **explore and possibly develop method for ranking** microbiological and chemical **risks in food**

Risk ranking is driven by the assumption that if **relative risks** of a range of problems can be established and well understood, then various **efforts can be directed** at the worst problems first

Support to risk analysis

We believe that risk-ranking of chemical and microbiological hazards in foods can support the process of risk analysis

1.Risk Assessment

harmonization of methods, increased comparability

2.Risk Management

help to improve the basis for priority-setting

3.Risk Communication

help to clarify levels of risks to the public and the media

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Microbiological hazards

- Many developments related to ranking and comparing hazards **have been developed**
- Risk **ranking** of microbiological hazards and **public health burden** have been **applied in international context** e.g. WHO/FAO, Efsa
- WHO/FAO examples include multi-criteria risk ranking of food-borne parasites

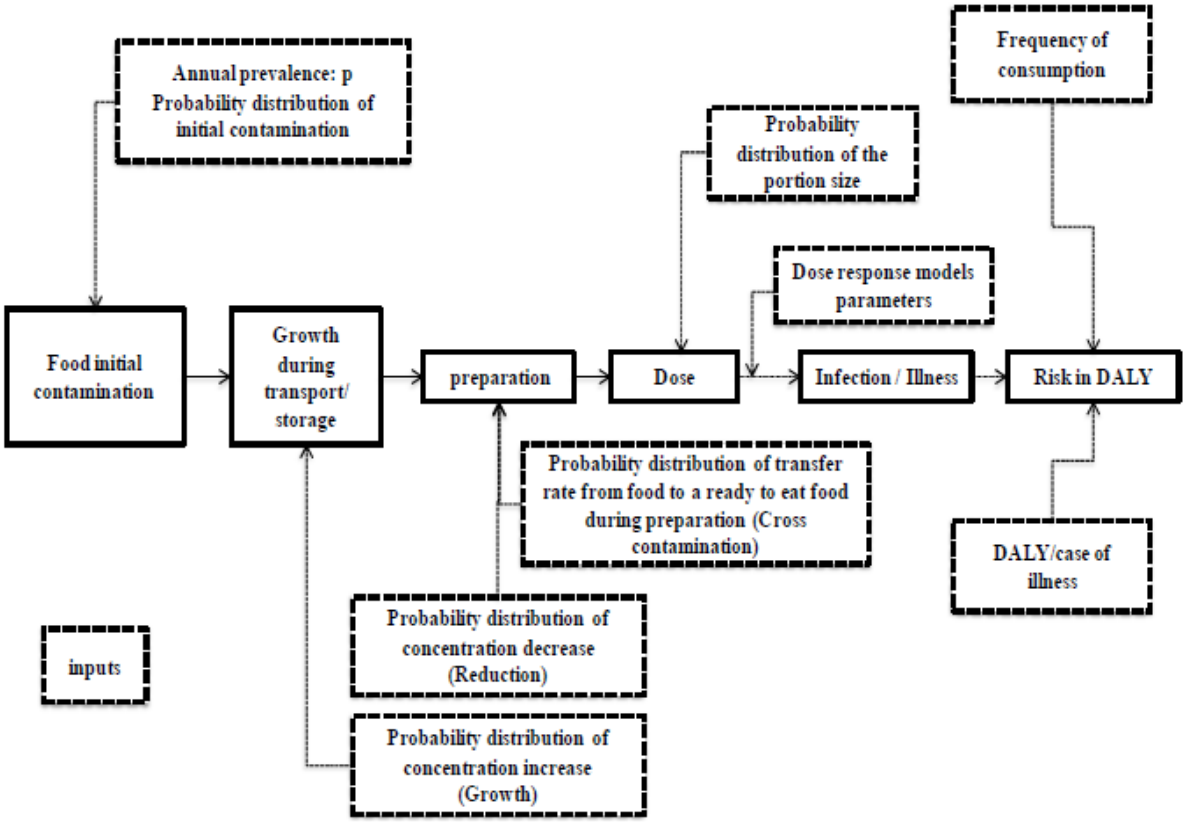
WHO DALY

- Disability-adjusted life year (DALY) **expresses a measure of overall disease burden**, expressed as number of **years lost due to ill-health, disability or early death**
- Developed in 1990s to **compare** overall **health and life expectancy**
- Includes equivalent years of 'healthy' life (poor health or disability)
- DALY is becoming **increasingly common** in the field of public health and health impact assessment (HIA)

Microbiological hazards, BIOHAZ panel

EFSA Scientific opinions

- dealing with **ranking of hazards in meat** (meat inspection) and food-hazard combinations (fruits and vegetables)
- developing a **framework for risk ranking**
- **comparing different approaches** and developing a toolbox for risk ranking and for addressing uncertainty



DALY: disability-adjusted life years.

Figure 10: Risk assessment framework and inputs

EFSA BIOHAZ Panel, 2015. Scientific Opinion on the development of a risk ranking toolbox. EFSA Journal 2015;13(1):3939

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Chemical hazards

- Methods for risk ranking **less frequently applied for chemicals** as compared to microbiological hazards
- In a systematic review *"Knowns and unknowns on burden of disease due to chemicals: a systematic review"* Pruss-Ustun et al 2011, suggest that **further attention should focus on investigating the population health impact** from chemical exposures since it may be of a relevant size.
- Efforts to calculate health impacts have e.g. focused on carcinogenic substances (e.g., Jakobsen et al. 2016)

A model to compare chemical hazards

- During 2014-15 NFA developed a “Risk Thermometer” that can be **used to compare chemical hazards**, based on a **severity-adjusted margin of exposure** methodology (SAMOE)
- The model **adjusts TDI/ADIs for the severity of the critical effect**

- **Default value-based severity factors are transparently defined** prior to the assessment.
- The most important advantage so far has been **a better understanding of relative risks has been established** amongst risk management

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Joint project combining experiences from Swedish NFA and Finnish EVIRA

During the period 2017 -2019 we would like to

- **Identify differences and commonalities in methods**, concepts, and data for chemical and microbiological risk assessment
- Explore the possibility to **calculate health impact** associated with chemical exposure
- **Organize European workshop** on risk ranking of hazards in food

Joint project between NFA and EVIRA

WP 1: Identify differences and commonalities in methods, concepts, and data for chemical and microbiological risk assessment

- A literature **review** of selected studies **summarizing similarities and differences in approaches** (e.g. bottom-up, top-down), concepts (e.g. exposure, acute, chronic), assumptions (e.g. safe levels), and data

➢ Deliverable: a report summarizing and illustrating chemical and microbiological risk ranking methods

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Joint project between NFA and EVIRA

WP 2: Apply and develop methods for risk ranking of chemicals in foods

- **Case studies** where available risk ranking methods (e.g., the Risk Thermometer) are applied to selected chemicals
- Explore the possibility to **calculate health impact associated with chemical exposure**, e.g., in terms of disability adjusted-life years (DALY)

➢ Deliverables: paper(s) published in research journals or project report(s)

Joint project between NFA and EVIRA

WP 3: Organize European workshop on risk ranking of hazards in food

- **Discussion with invited experts** from EU member states (risk assessors, managers, and communicators)
- Keynote speaker invited, and outcome of NFA-EVIRA project presented and discussed

➢ Deliverable: summary report, including recommendations to EU funding bodies on future research needs

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Conclusions

We believe the project may

- Contribute to the development of tools for **improving the basis for decision making and risk communication**

- **Increase harmonization** between chemical and microbiological risk assessment
- **Stimulate sharing of experience** between Sweden and Finland as well as among EU MS
- **Identify future research needs**

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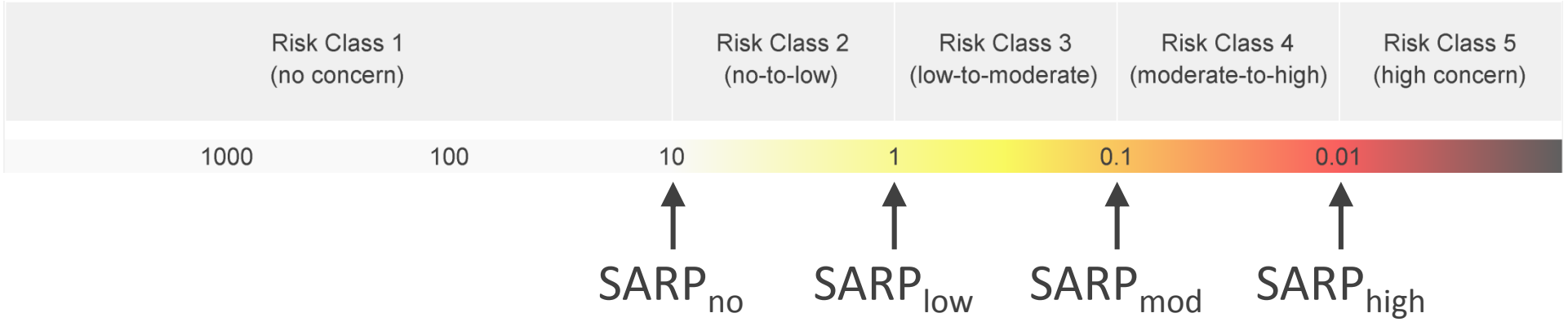
Default value-based severity factors (SFs)

For example

- Change in unspecific biomarker, SF = 1
- Change in liver pathology, SF = 10
- Increase in cancer risk, SF = 100

Risk Thermometer used to support NFA risk management (e.g., arsenic in rice 2015, NFA food control program 2015)

NFA Risk Thermometer



- Severity-adjusted reference points (SARPs) derived by adjusting the TDI by severity factors (SFs)
- SFs depend on the severity of the (critical) effect the TDI is based on
- Health effect classification scheme has been developed

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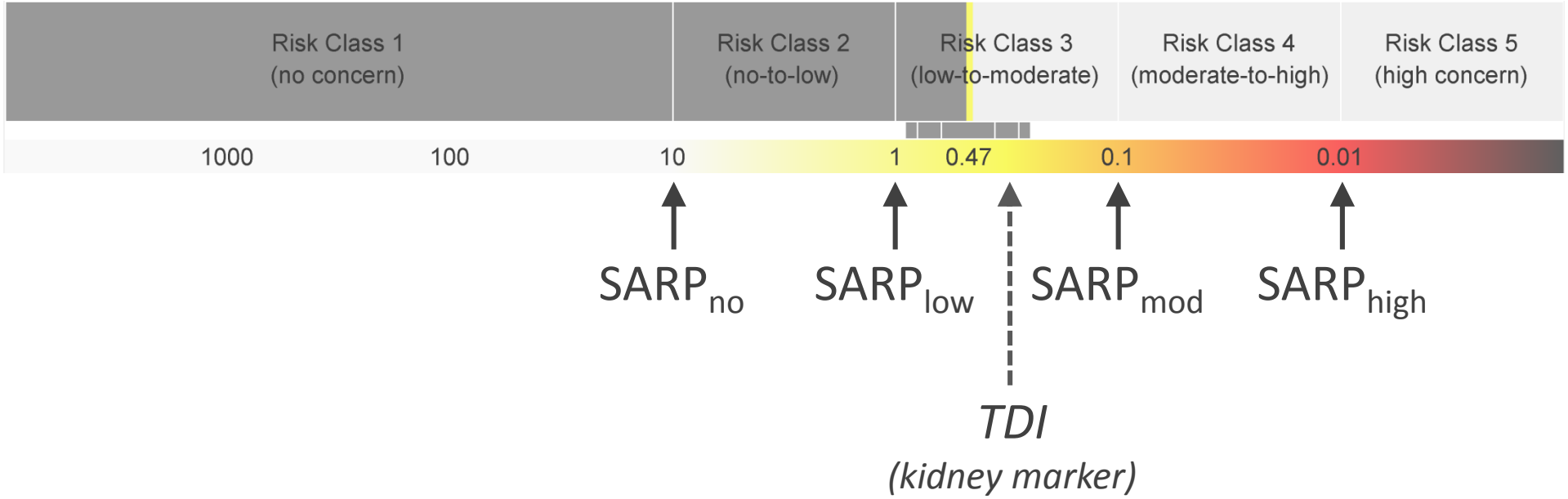
Cadmium from foods

adult average consumer



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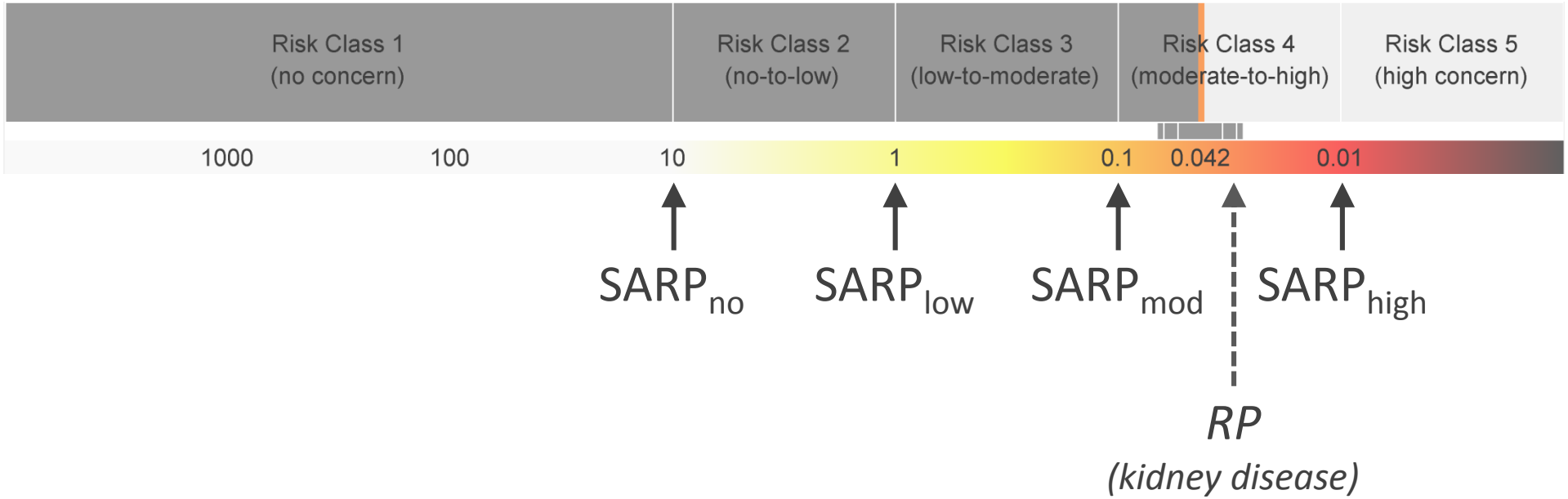
Lead from foods

adult average consumer



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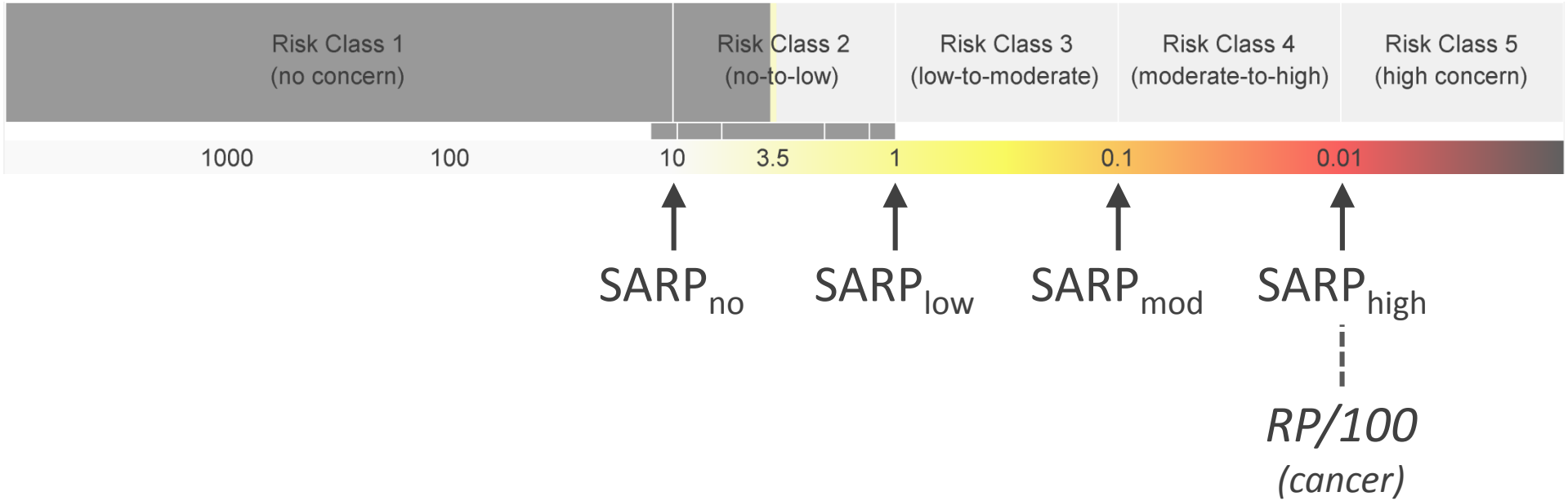
Polycyclic aromatic hydrocarbons (PAH4) from foods

adult average consumer



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