From Food Survey To Food Safety: Using Data On National Food Consumption To Prioritise Hazards

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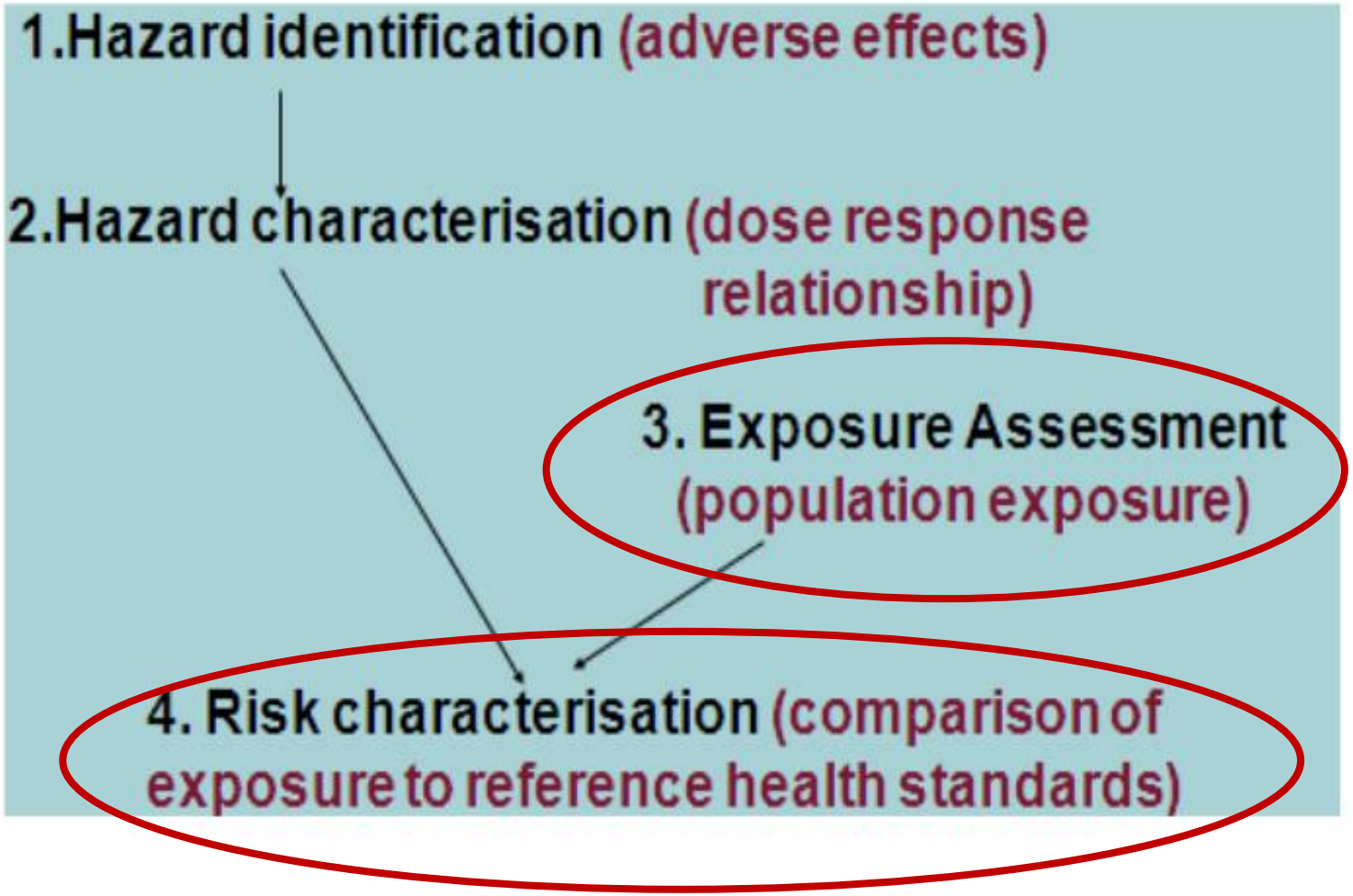
The Importance Of Food Consumption Data In Risk Assessment

- Effective food risk assessment fundamentally relies on robust, population-specific food consumption data collected systematically over time
- To assess population exposure the following are required:
  - Accurate and representative food consumption data
  - Concentration data for foods
  - Health reference standards

Four Pillars Of Risk Assessment Framework

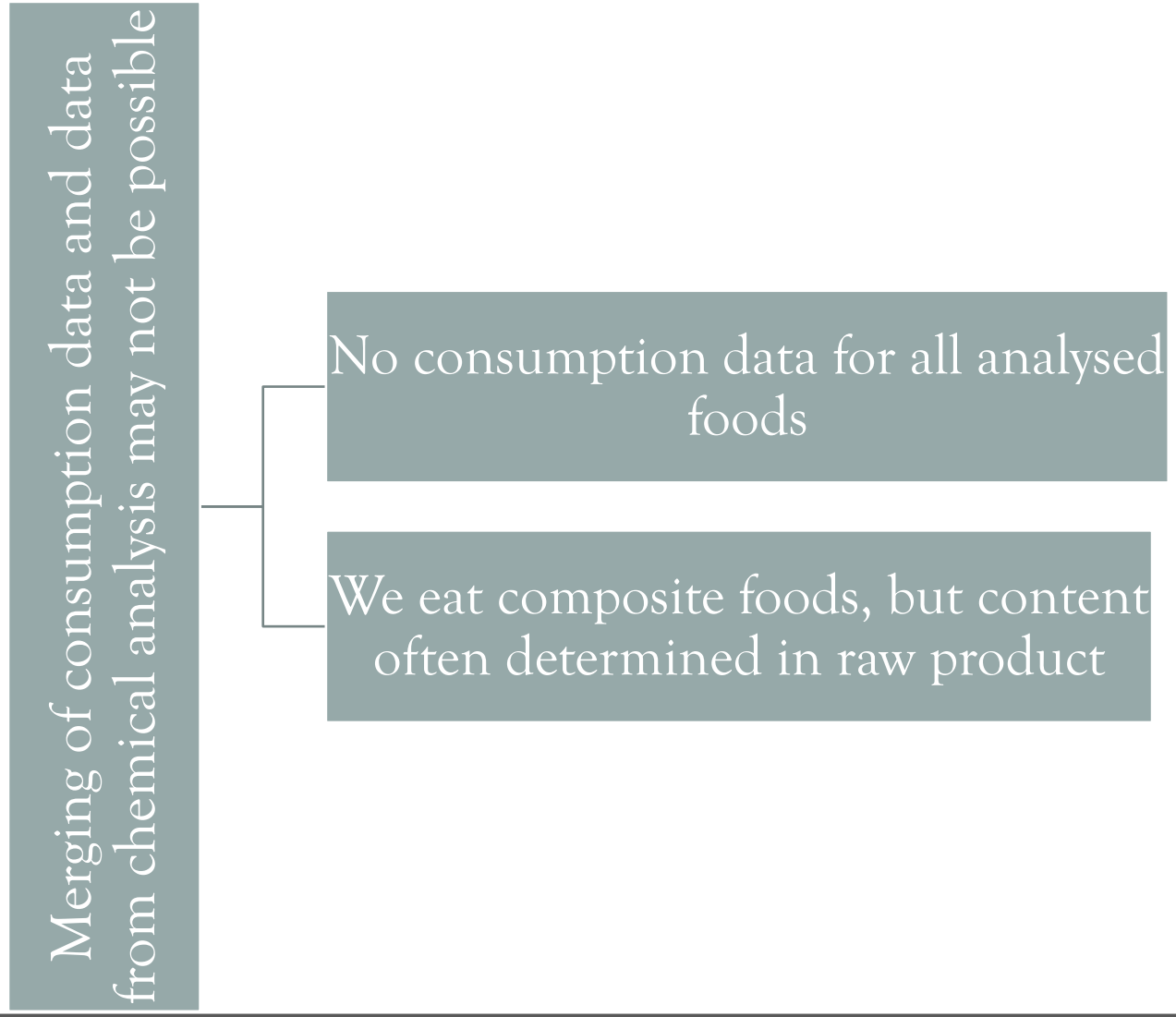


Dietary exposure assessment of chemicals & other in food

Overall Considerations in Risk Assessment

- **Assessment Types:**
  - Acute exposure
  - Chronic exposure
  - Type of questionnaire
- **Consumption types**
  - Small intakes
  - Relatively large amounts
    - Examples bulk sweeteners, modifies starches, nitrites/nitrates
  - Merging of consumption data

Chemical characterization data in food: Continuously analyses



RISK RANKING FRAMEWORK

Purpose

Systematic and structured approach for ranking microbial and chemical risks to inform food safety decisions

Critical Data Requirements

- High-quality, representative food consumption data
- Population-specific exposure data
- Comprehensive hazard characterization data

Key Features

- Transparent and evidence-based framework
- Focuses on relative risk comparisons
- Adaptable to changing conditions

Dynamic Considerations

- Evolving food supply and knowledge
- Emerging hazards and production systems
- Changing population demographics and consumption patterns

Implementation Requirements

- Ongoing activity core to risk-based systems
- Political will and governmental support
- Regular updates and reassessment

FAO Guide to Ranking Food Safety Risks at the National Level, 2020; ISSN 2415-1173

Population Considerations in Risk Assessment

- Population Coverage:
  - General population
  - Critical Groups:
    - Infants and children
    - Pregnant women
    - Elderly
    - Vegetarians
    - Other vulnerable groups with different exposure patterns

EVOLUTION OF FOOD CONSUMPTION DATA COLLECTION

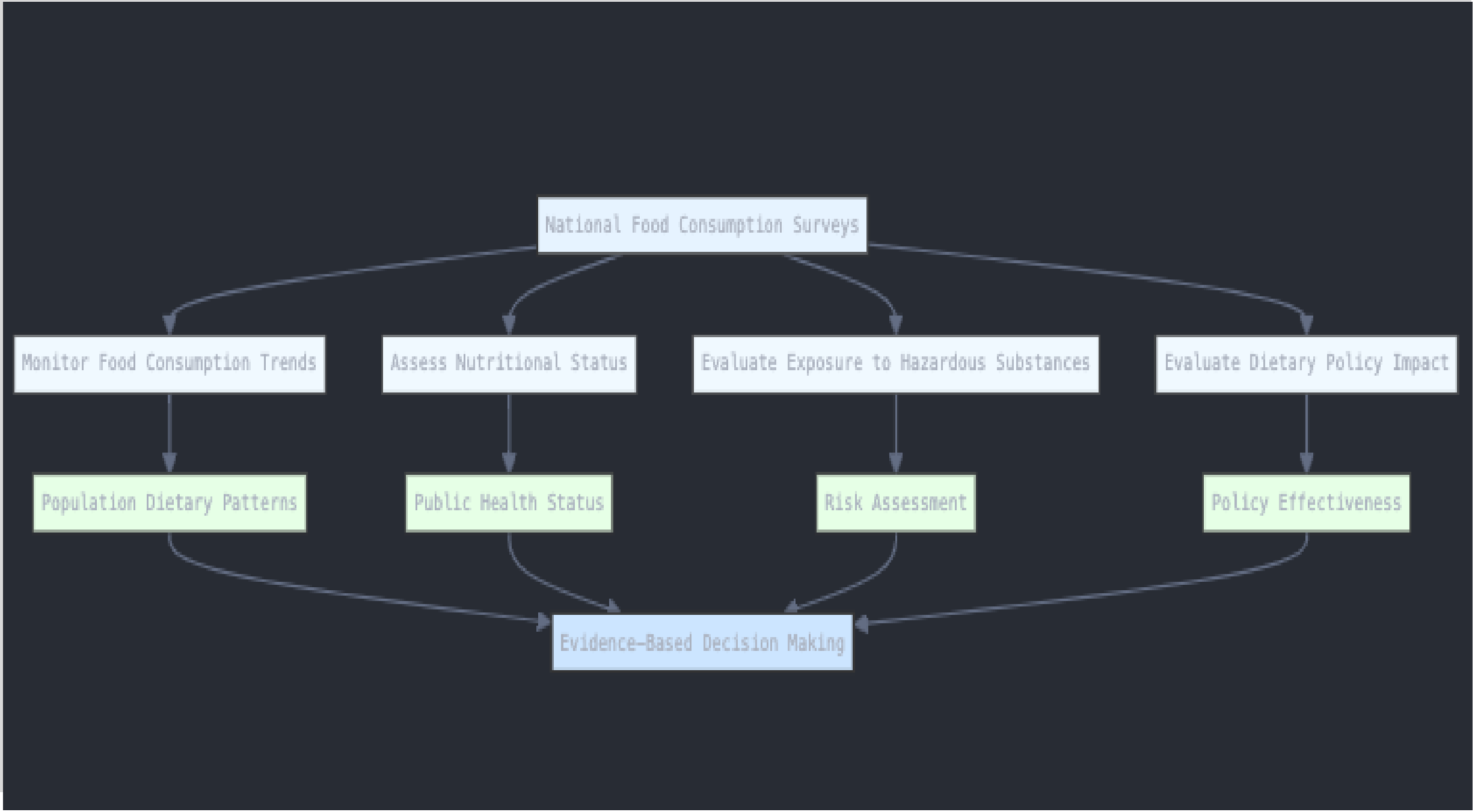
- Usual data sources
- Web-based technologies since 2014
- Enhanced detail in food preparation data
- Balance between data detail and participant burden
- Validation studies (24h recall vs 7-day diary)
- EFSA recommendations

DATA SOURCES

Food consumption data should be available in a format that allows matching of the consumption data with the concentration data used in the dietary exposure assessment

- Food balance sheets
  - include the amounts of foods available for human consumption derived from national statistics on food production, disappearance or utilization.
- Data collected using population-based methods
  - represent the total annual amount of a commodity available for domestic consumption per year.
- Data from individual food consumption surveys
  - Often not publicly available at the individual level
  - Rely on summary statistics

Mbabazi, J., Journal of Environmental Studies, 2011. **68**(2): p. 251-252.


National Food Consumption Surveys
Monitor Food Consumption Trends
Assess Nutritional Status
Evaluate Exposure to Hazardous Substances
Evaluate Dietary Policy Impact
Population Dietary Patterns
Public Health Status
Risk Assessment
Policy Effectiveness
Evidence-Based Decision Making

Data Requirements for Effective Risk Assessment

Need to consider:

- Varied data collection methods across Member States
- Difficulty in conducting EU-wide analyses
- Complications in country-to-country comparisons

Ongoing Requirements:

- Regular updates needed due to changing consumption patterns
- Continuous monitoring of dietary trends

Ioannidou, S,et al.,; Food Policy, 2020. **96**: p.

National Nutrition Surveys

Availability of detailed, harmonised and high-quality food consumption data collected at an individual level is essential to improve the quality of exposure assessments.

- Primary Development Focus of National Dietary Surveys:
  - Monitoring population nutritional status
  - Analysing nutritional epidemiology
  - Assessing intake of energy and nutrients (macro and micro)

  Developed in 2009

- Refined in 2014 to indicate criteria for the collection of high-quality dietary information that can be used to perform exposure assessments of food-borne hazards and nutrient intake estimations
  - Ensuring data suitability for chemical and biological exposure assessment
  - Supporting food safety risk assessment processes

EFSA; *Guidance on the EU Menu methodology.* EFSA Journal, 2014. **12**(12): p. 3944.

National Nutrition Surveys

Main Challenges:

- Achieving representativity
- Obtaining high-quality food consumption data
- Achieving accurate food descriptions for exposure assessment
- Maintaining balance between data quality and participant burden
- Avoiding low response rates
- Harmonising food lists across the Member States & improving the food descriptors, based on the EFSA FoodEx2 food classification and description system

EFSA; *Guidance on the EU Menu methodology.* EFSA Journal, 2014. **12**(12): p. 3944.

	Advantages	Limitations
Food frequency questionnaire (retrospective method)	No change in the survey respondents' behaviour	No/few food details (preparation, cooking, brands)
	Relatively low burden on survey respondents	Respondent cooperation and accuracy decrease with the questionnaire length
	Quick to fill in	Questionnaire formulation and validation is a heavy burden
	Self-administration possible	Long questionnaires overestimate intake and short ones underestimate it
	Possibility of machine readability of responses → reduction in data entry costs	Not very accurate in assessing caloric and/or nutrient intake (hence classification of individuals into consumption terciles, for instance)
24 hours dietary recall (retrospective method)	No change in the survey respondents' behaviour	The previous day may not be a typical one
	Relatively low burden on survey respondents	This method does not account for variability between different days of the week, unless repeated
	Usually carried out with an interviewer, so subject literacy is not an issue	Well-trained interviewers (ideally dieticians) with a neutral interview approach required
	Quick to fill in (± 30 min)	Intake underestimation (with marked variations between individuals)
	Conducted in person or by phone	
Dietary records (prospective method)	Clearly illustrates dietary diversity (especially when conducted over a long period)	Subjects must be literate, otherwise interviewers are needed, which substantially increases the cost
	Accurate in the description of foods, portion sizes (or weights when the foods are weighed)	Heavy time-consuming method
	Few logistical resources required	Possible change in behaviour (food and quantity)
		Data validity declines with the length of the period
		Underestimation of intake

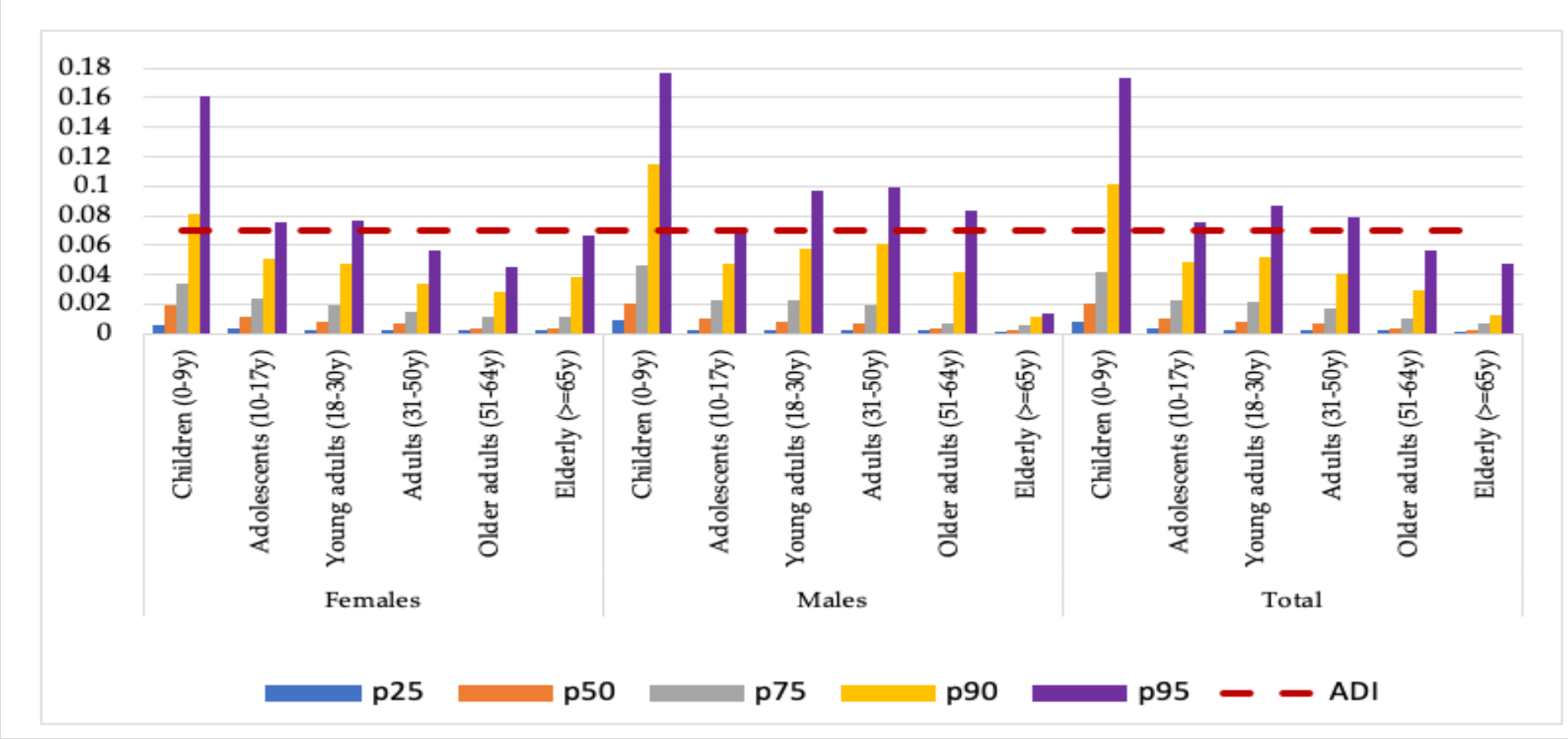
Studying Food and Eaters: A Cocktail of Perspectives and Methods; Lepiller O, Fournier T, Bricas N, et al., editors. Versailles (FR): Éditions Quae; 2024 Jan.

Population-specific Data Matter

- Understanding what different segments of population actually consume across
  - age groups,
  - sex,
  - and cultural backgrounds

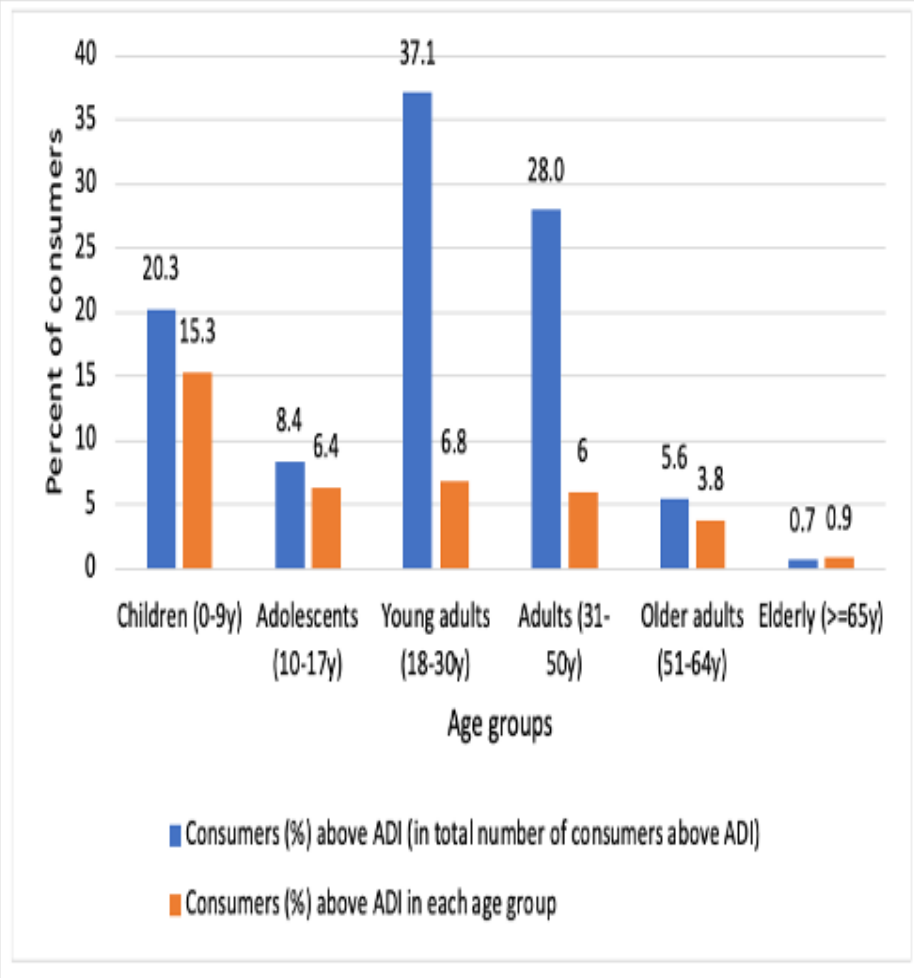
  is crucial for identifying and prioritizing population specific potential food hazards.

Distribution of daily total nitrite intake (mg/kg bw/day) by sex and age group, in comparison to ADI of 0.07mg/kg bw/day for nitrite.

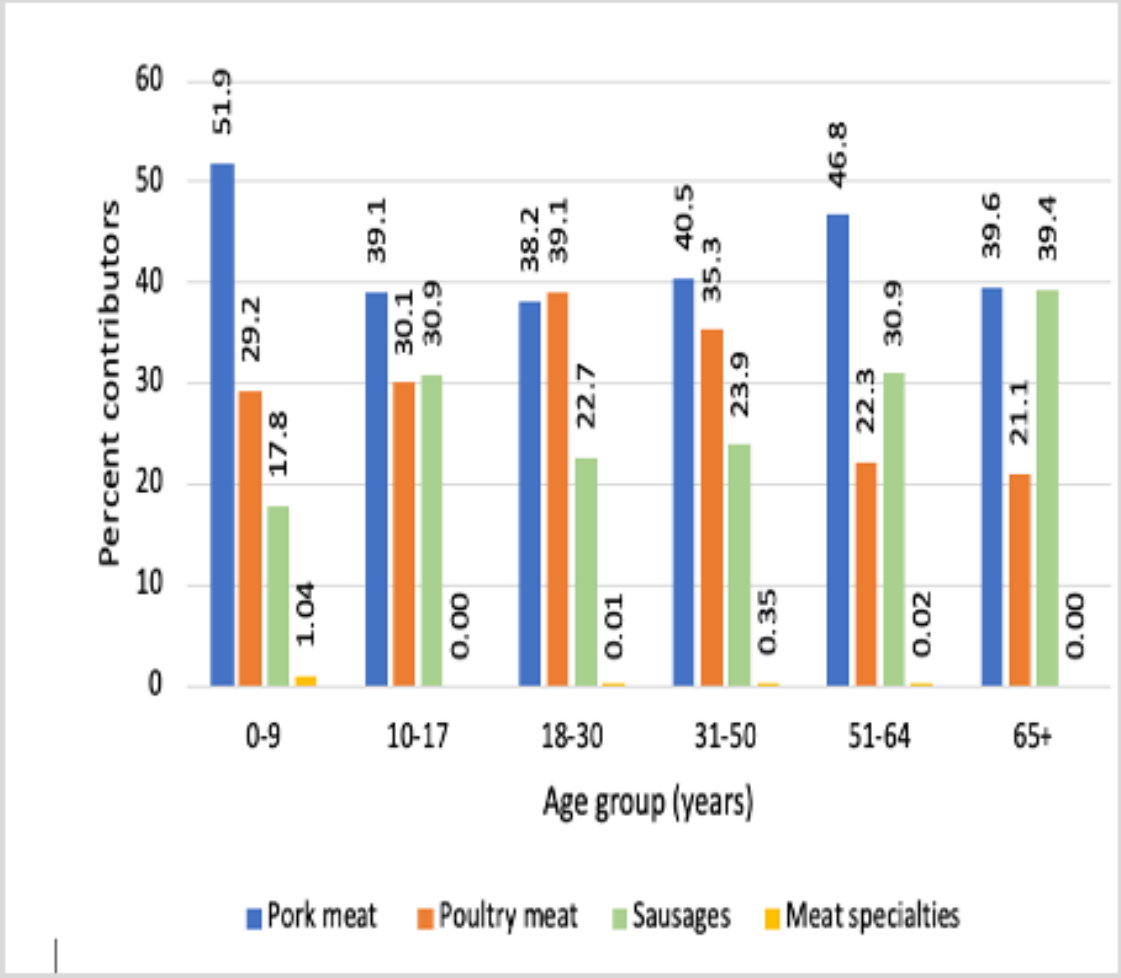


Kotopoulou, S.; Zampelas, A.; Magriplis, E. Title. *Int. J. Environ. Res. Public Health* **2022**, *19*

Proportion of the population per age group that exceeds the ADI of 0.07mg/kg bw/day for nitrite in total exceeders and within the same age group.



Main processed meat food groups contributing to total nitrite intake among consumers of the same age group.



Kotopoulou, S.; Zampelas, A.; Magriplis, E. Title. *Int. J. Environ. Res. Public Health* **2022**, *19*

Future Perspectives and Conclusions

- Beyond nutritional aspects
- Enhanced exposure risk assessment capabilities
- Call to action for comprehensive data collection
  - Participants feedback (focus group interviews) to improve future survey design and assessment methods
  - Risk assessors of non-nutrients are asked about their needs before data collection

Key messages

1. Population-specific food consumption data are essential for effective risk assessment and hazard prioritization.

2. High-quality, harmonized data collection methods that consider both nutritional aspects and chemical exposure are important for protecting public health across different demographic groups.

Conclusion

- Comprehensive food consumption data is essential for accurate risk assessment,
  - These require systematic collection and frequent updates to capture evolving consumption trends.

- Data are required for vulnerable populations and certain demographic groups
  - may exhibit distinct exposure patterns or heightened sensitivity to dietary hazards.

- Harmonization of consumption data methods between MS is essential for comparisons.

- A balance between data quality with participant burden should be maintained and comments/inputs from both participants and risk assessors should be considered

Thank you!