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FOCUSING ON EXPOSURE ASSESSMENT

Chemicals in Food

Introduction and Importance of Consumption

Acknowledgment: An Important Part of the Course Material developed based on FAO Course in Risk Assessment

Prof. Samuel Godefroy, Ph.D. *| Full Professor, Food Risk Analysis and Regulatory Policies*

Review of a Risk Assessment Approach…

Foundations of Exposure Assessment

Consumption Data

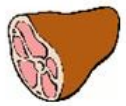
Sources, Limitations

Dietary Intakes/Dietary Exposure Assessment

Occurrence of Food Chemicals

Food consumption

Dietary Intakes/Exposure Assessment

	Amount brought by each food		Amount Consumed (g/day)		Occurrence data (µg/g)	Body weight (kg)		Intake / Exposure (µg/kg/day)
Overall Diet		=	141,9	X	0,0093	/ 65	=	0,020
	+ 	=	198,4	X	0,0009	/ 65	=	0,003
	+	=	191,5	X	0,0076	/ 65	=	0,022
	+	=	541,4	X	0,0025	/ 65	=	0,021
	+	=	315,0	X	0,0007	/ 65	=	0,003
						Total	=	0,070 (µg/kg/day)

Overview: Types of Food Consumption Data – Pros and Cons

Méthods	Data	Consumption Estimates	Food Chain Level	Drawbacks
Population-based methods	❑ Food Balance Sheets ▪ Total food available for consumption as a physical residual in the market. ▪ Total supply = total demand ❑ Time scale: year	❑ Median, mean	❑ Raw, semiprocessed products	❑ No information on distribution of consumption ❑ No information on individual exposure and subgroups at risk ❑ High level of uncertainty
Household-based methods: **Always available, generated on a regular basis by national institute of statistics**	❑ Purchase or expenditures records ▪ Values and quantities of food purchased, own produced and received at household level ❑ Large sample size ❑ Time scale: weeks	❑ Mean ❑ High Percentile	❑ Raw, semiprocessed and processed products	❑ No intra-household distribution ❑ Not individual food intakes ❑ Food eaten outside home difficult to capture
Individual-based methods	❑ Food record survey ❑ 24-hour recall survey ❑ Food frequency questionnaire ❑ Meal-based diet history survey ❑ Food habit questionnaire ❑ Small sample size ❑ Time scale: days	❑ Mean ❑ High percentile	❑ Raw, semiprocessed and processed products	❑ Expensive, time and resource consuming ❑ Susceptible of under- or over reporting

Stepwise Approach For Dietary Intakes/Dietary Exposure Assessments

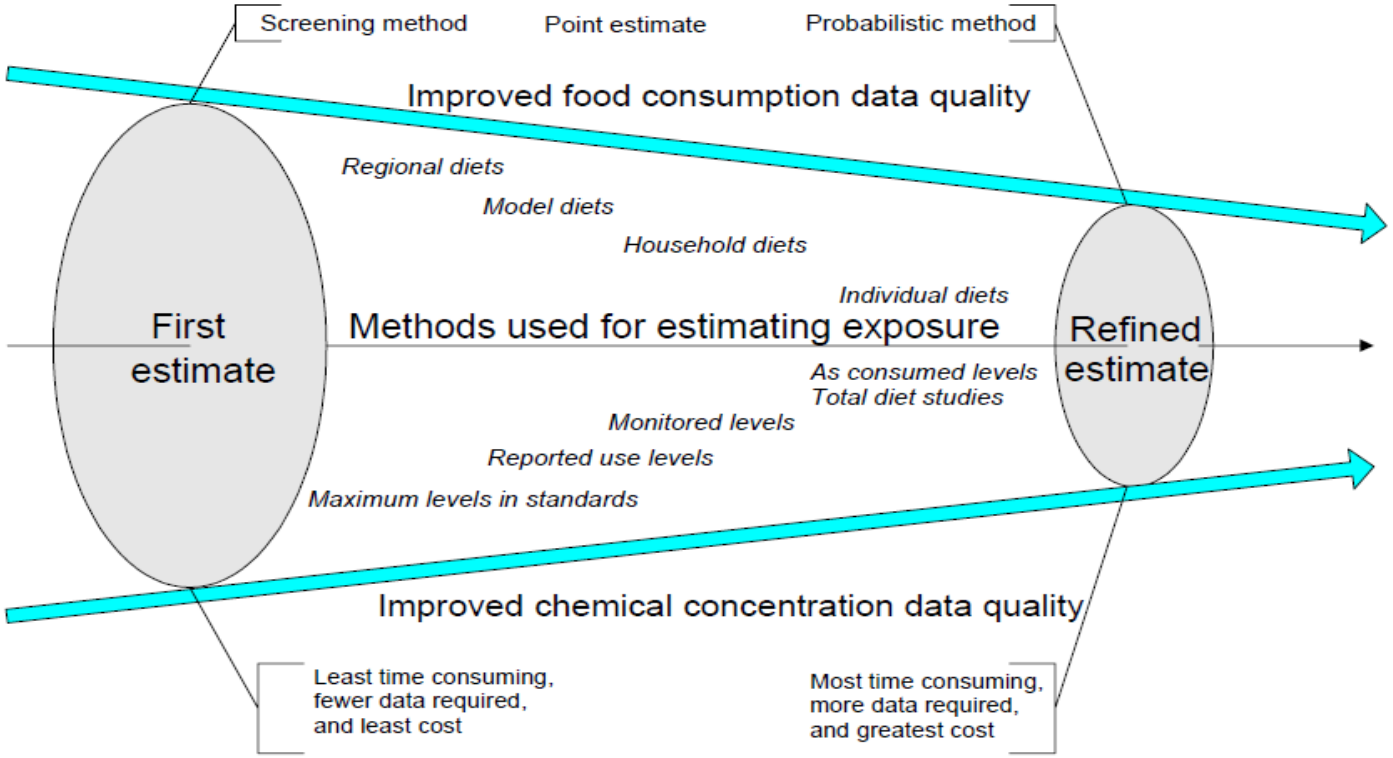
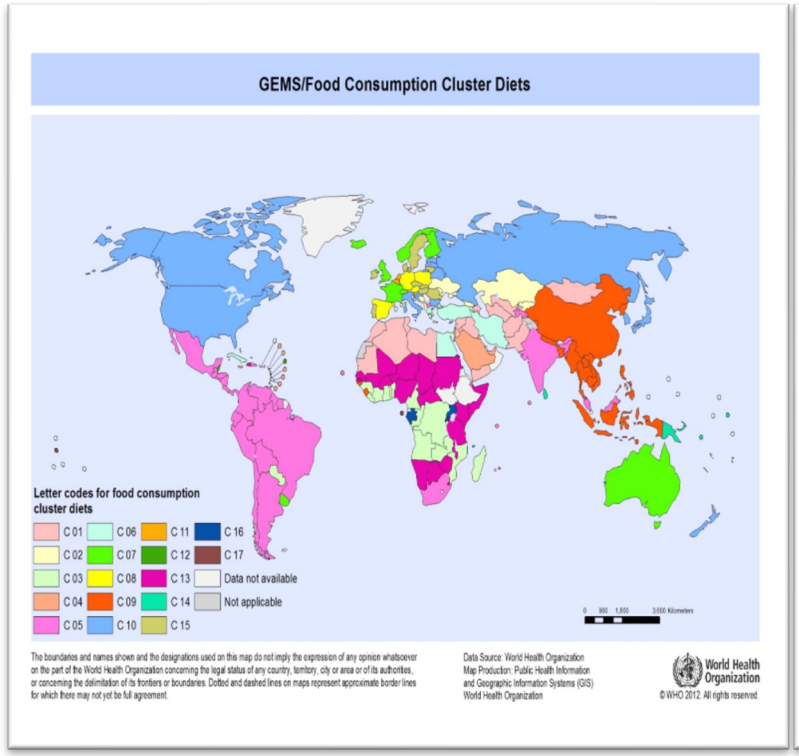
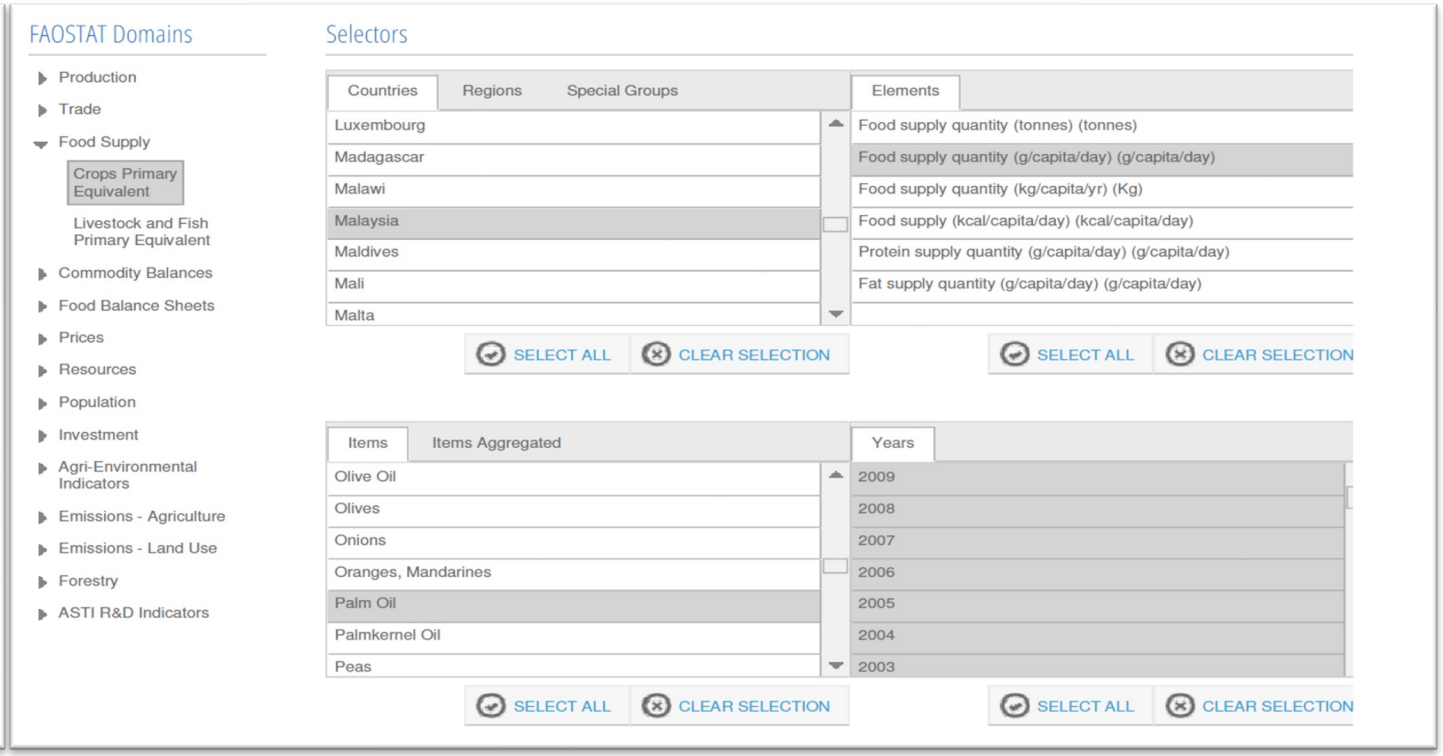


Figure 1 Stepwise approach to obtaining realistic dietary exposure assessments
Note: Data and methods selected from the right-hand side of the diagram are likely to result in a more realistic dietary exposure estimate or "refined estimate"; however, it may not be the "refined estimate" in terms of the "most appropriate" one to suit the purpose of a specific dietary modelling exercise.

Long Term Food Consumption: National Per Capita





Database available : Based on *per capita* data submitted to FAO/Stat (Consumption by year) http://faostat3.fao.org/faostat-gateway/go/to/home/E

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Per Capita Consumption: GEMS/Food Cluster Diets

- Based on FAO Food Balance Sheets
- Average per capita consumption:
  - http://www.who.int/foodsafety/chem/gems/en/index1.html
- Used for long term dietary exposure assessment
- 1989: Five regional diets
- 1997: Thirteen cluster diets
- 2012: Review of the cluster diets based on new statistical approach
  - Non-negative Matrix Factorization

Food and Agriculture Organization of the United Nations

Long Term Food Consumption: Clustered Per Capita

- Database available
  - https://www.who.int/nutrition/landscape_analysis/nlis_gem_food/en/

Map - Countries by Cluster - 2012
jpg, 605kb

List - Countries by Cluster - 2012
pdf, 297kb

Data - Consumption - 2012
xls, 1.58Mb

Average vs. High Consumption

- Within a risk assessment process, mean consumption levels are often not sufficient

- It is fundamental to consider also non-average individuals, in particular high consumers
  - Those who consume relatively large quantities of foods

Short Term Exposure

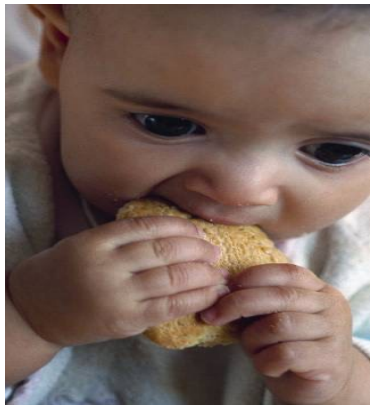
- Based on National individual food consumption data submitted to GEMS/Food
- **Consumption during a day or an eating occasion**
- **Generally 97.5th percentile for consumers only**
- Necessary to check the number of consumers

Target Populations

Adult population

Pregnant women

Small children

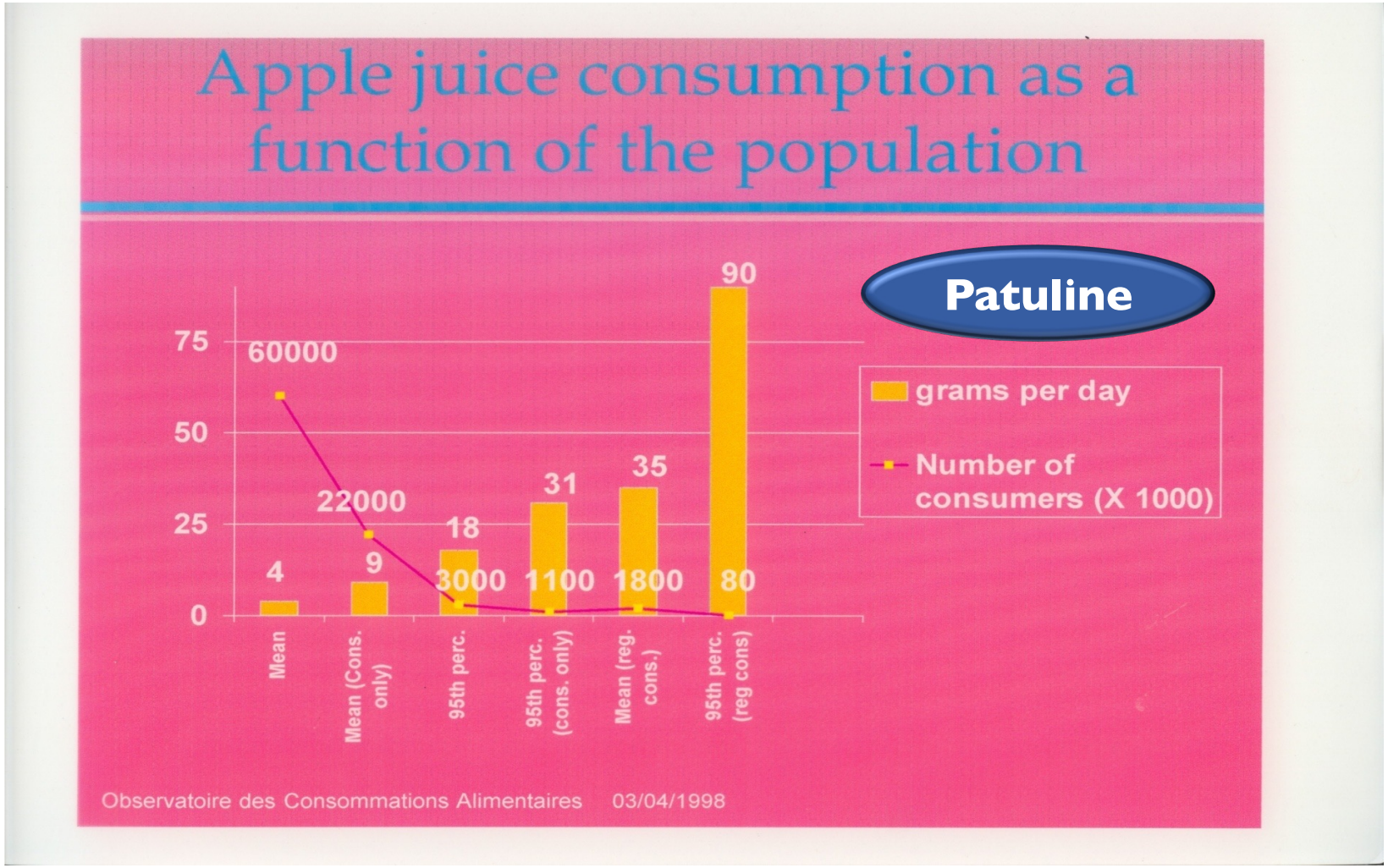


Infants

Elderly

Special groups: vegetarians, diabetics, ethnic groups and different socio-economic strata …

Apple Juice Consumption



thank you
danke
謝謝
ngiyabonga
teşekkür ederim
gracias
merci
obrigado
bedankt
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go raibh maith agat
sukriya
kop khun krap
terima kasih
grazie
arigatô
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dank je
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