UCD Institute of Food & Health

New frontiers in Dietary Exposure Assessment

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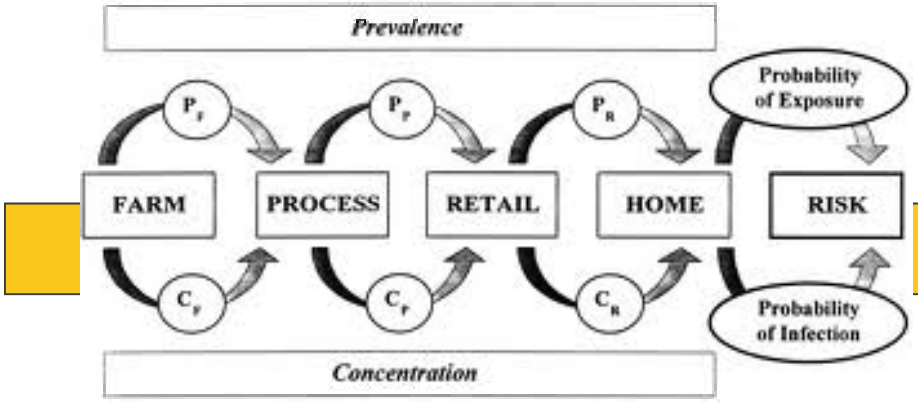
National Food Safety Authorities

EFSA



Risk Assessors

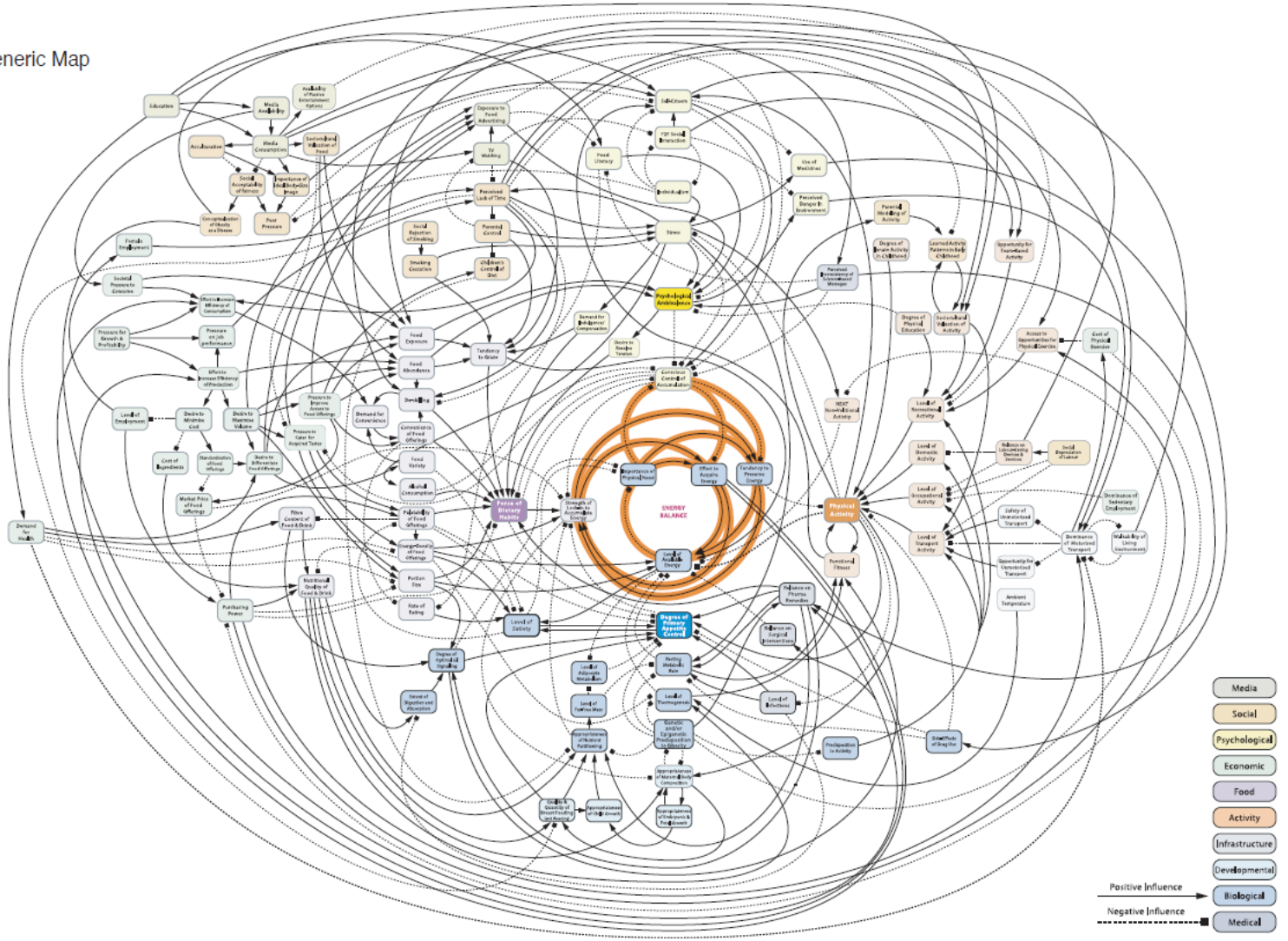
Food Processors

EU Commission

Lammerding & Fazil 2000

Map 0

Full Generic Map



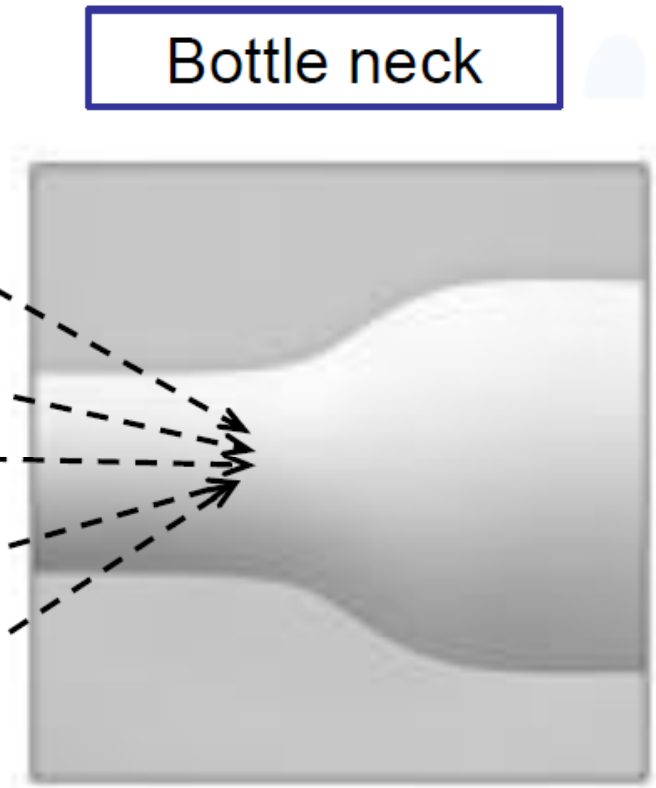
Access national food intake data

Food categorisation for exposure Ax

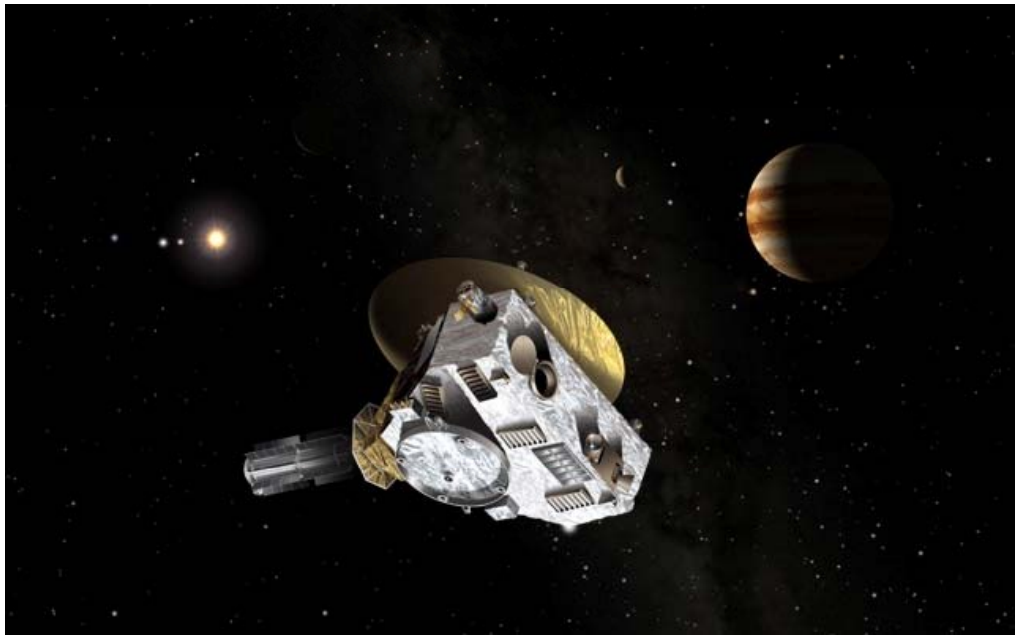
Knowledge chemical occurrence

Limited chemical concentration data

Limited data packaging substances



New horizons in food chemical exposure



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SEVENTH FRAMEWORK PROGRAMME

Food additives

Food contact materials

Flavouring compounds

Food intake data

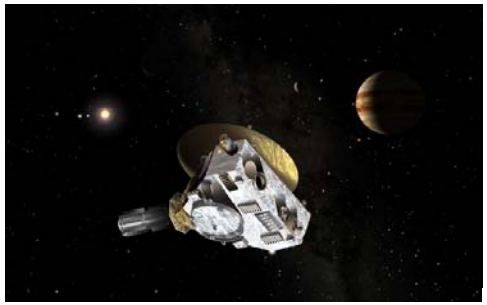
Food chemical occurrence data

Food chemical concentration data

Algorithms

Software code

New horizons in food chemical exposure



A common coding of food intake data

Data on food chemical concentration

Data on food chemical occurrence

Food flavouring exposure tool

Food contact material database

Validated and publicly available exposure modeling software

Food Categorization

Raw data should be as disaggregated as possible

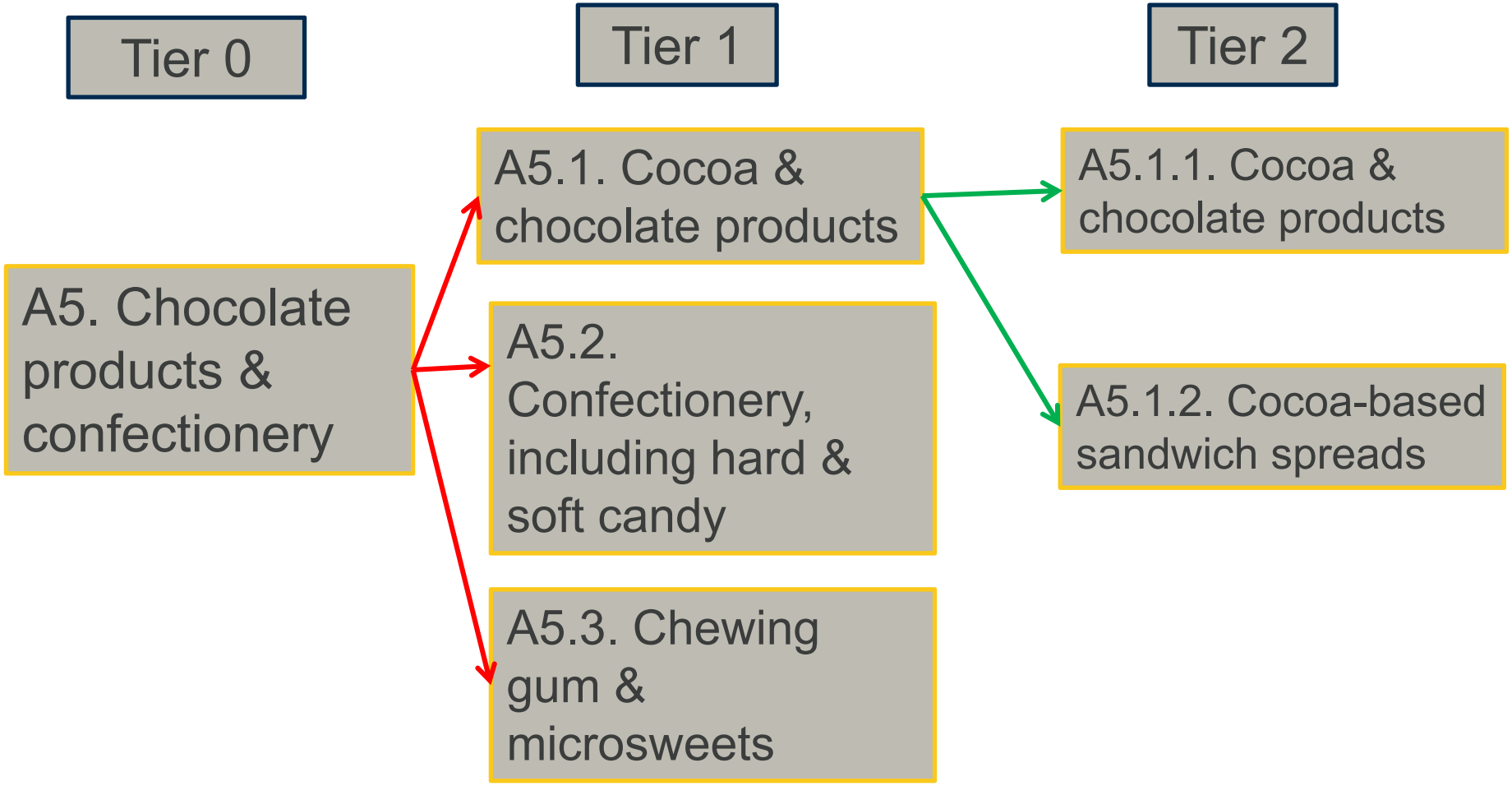
- Example 1. Additive X in Wafer-biscuits only
  - Level 1: Snacks
  - Level 2: Biscuits
  - Level 3: Wafer-Biscuits
  - Level 4: Brand of Wafer-Biscuits

- Example 2. Colour Y in Red Lemonade only
  - Level 1: Beverages
  - Level 2: Carbonated Beverages
  - Level 3: Cola
  - Level 4: Brand of Cola

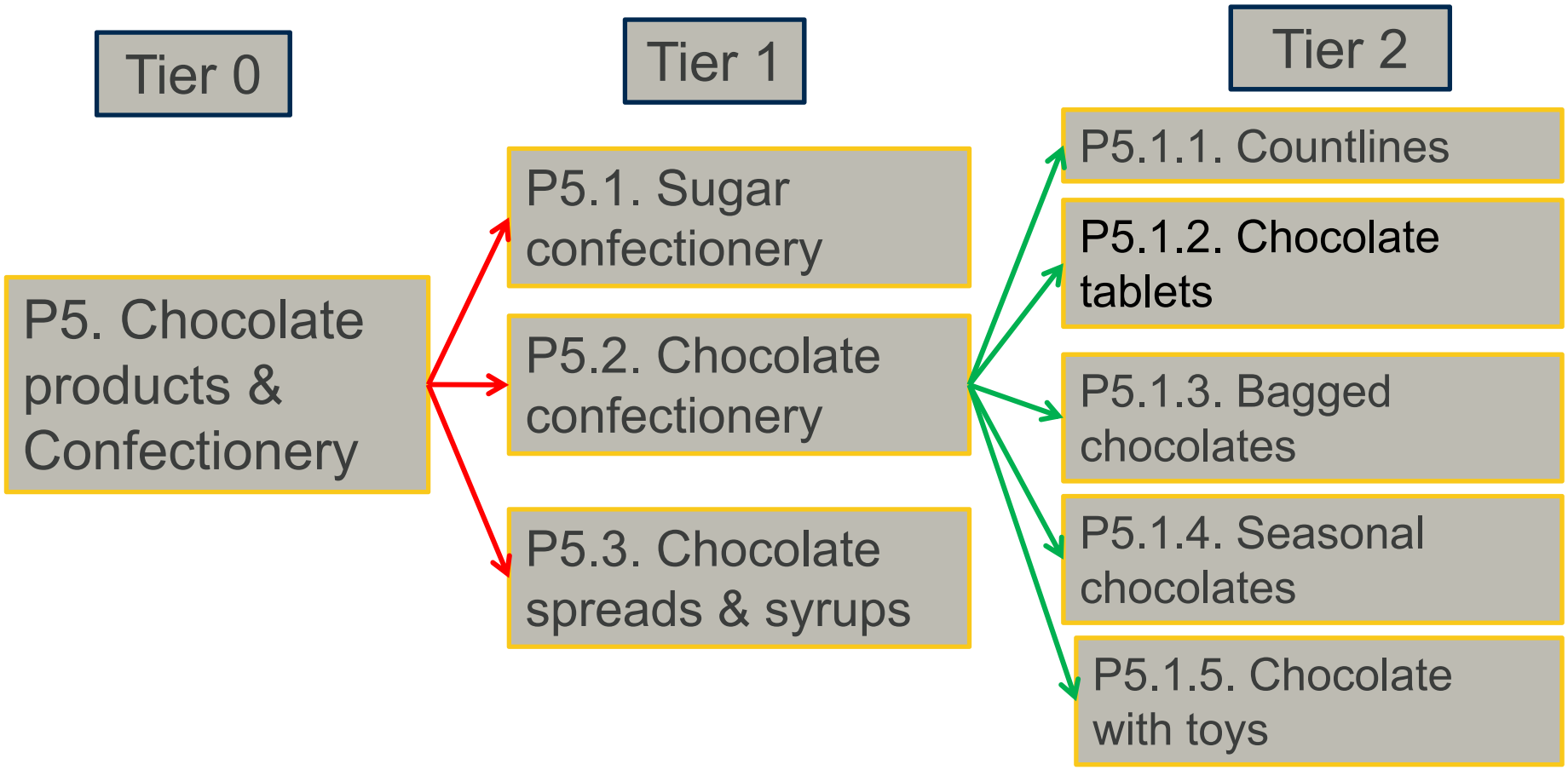
Task: Collate information on food consumption databases from 8 regions

Age group	Finland	France	Hungary	Ireland	Italy	Poland	Portugal	UK
0 - 1.5				4d diary	3d diary	1d recall		
1.5 - 3				4d diary	3d diary	1d recall		4d diary
3 - 5		7d diary		4d diary	3d diary	1d recall		4d diary
5 - 12		7d diary		7d diary	3d diary	1d recall		7d diary
12 - 18		7d diary		7d diary	3d diary	1d recall		7d diary
18 - 25		7d diary	3d record	4d diary	3d diary	1d recall	7d diary	7d diary
25 - 65	3d diary	7d diary	3d record	4d diary	3d diary	1d recall	7d diary	7d diary
65+	3d diary	7d diary	3d record		3d diary	1d recall	7d diary	4d diary

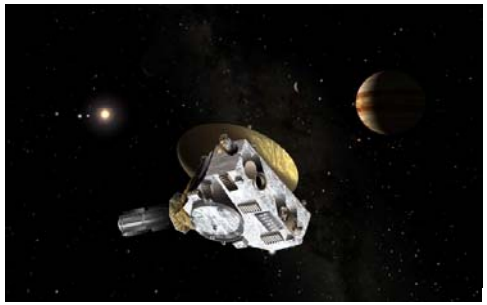
Additives example: Tier 0, 1,2



Packaging example: Tier 0, 1,2



New horizons in food chemical exposure



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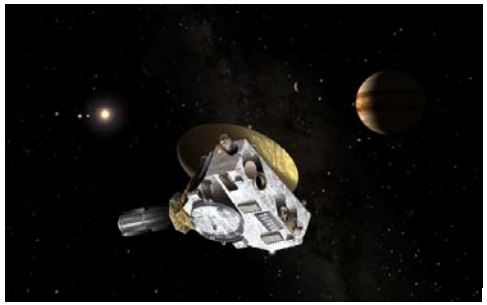
Food additive concentration data

- Data collected by FoodDrinkEurope
  - ✓ 23 National Federations
  - ✓ 26 European Sector Associations
  - ✓ 19 Major food companies
- Likely technological use
- Additive concentration data
  - ✓ Typical range for all food groups
  - ✓ Extreme ranges (high and low)

New horizons in food chemical exposure



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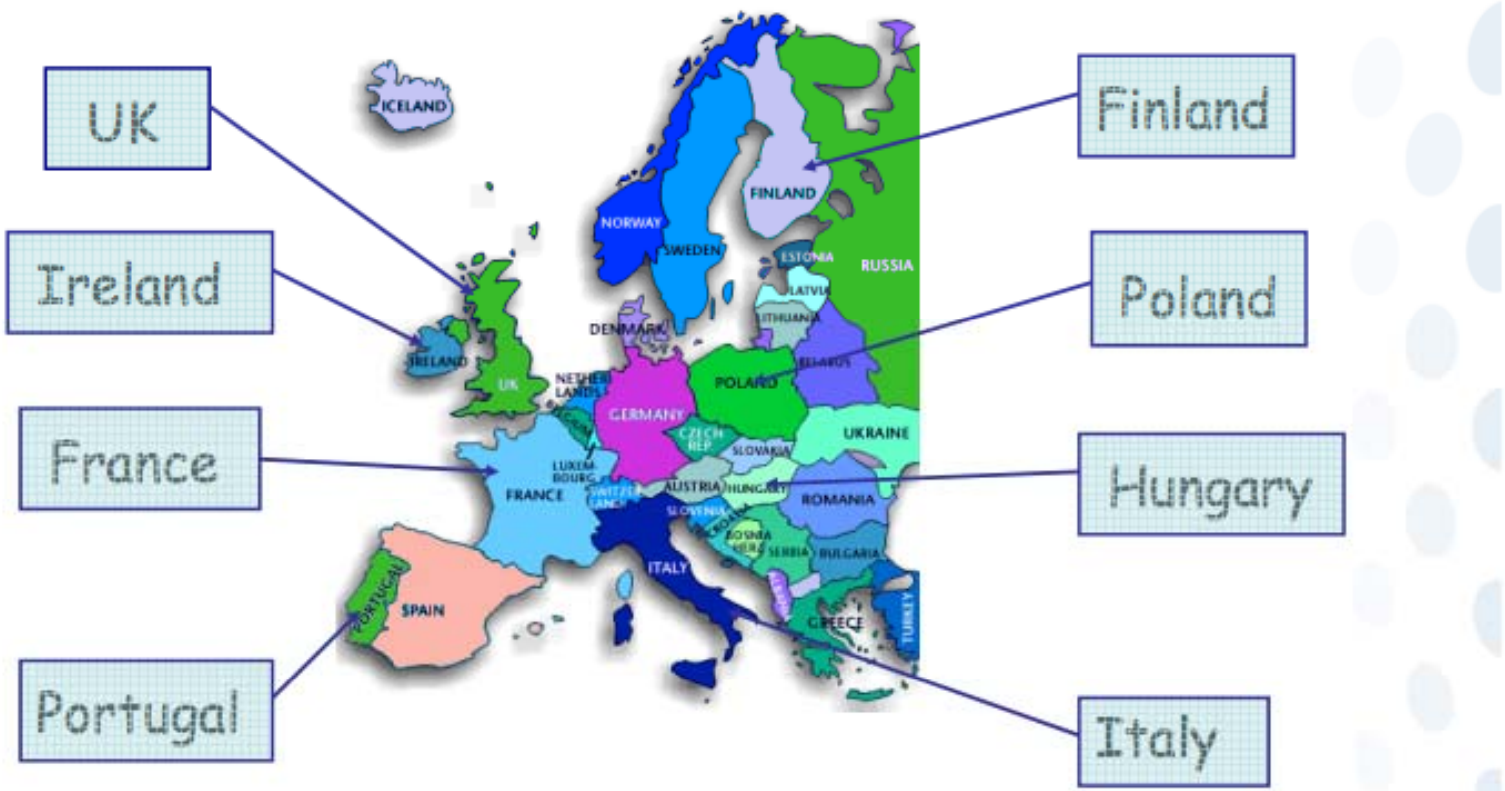
Countries involved in the food intake and food chemical occurrence data



Gathering of Occurrence data

Field work → Coordinating centre

11 food categories

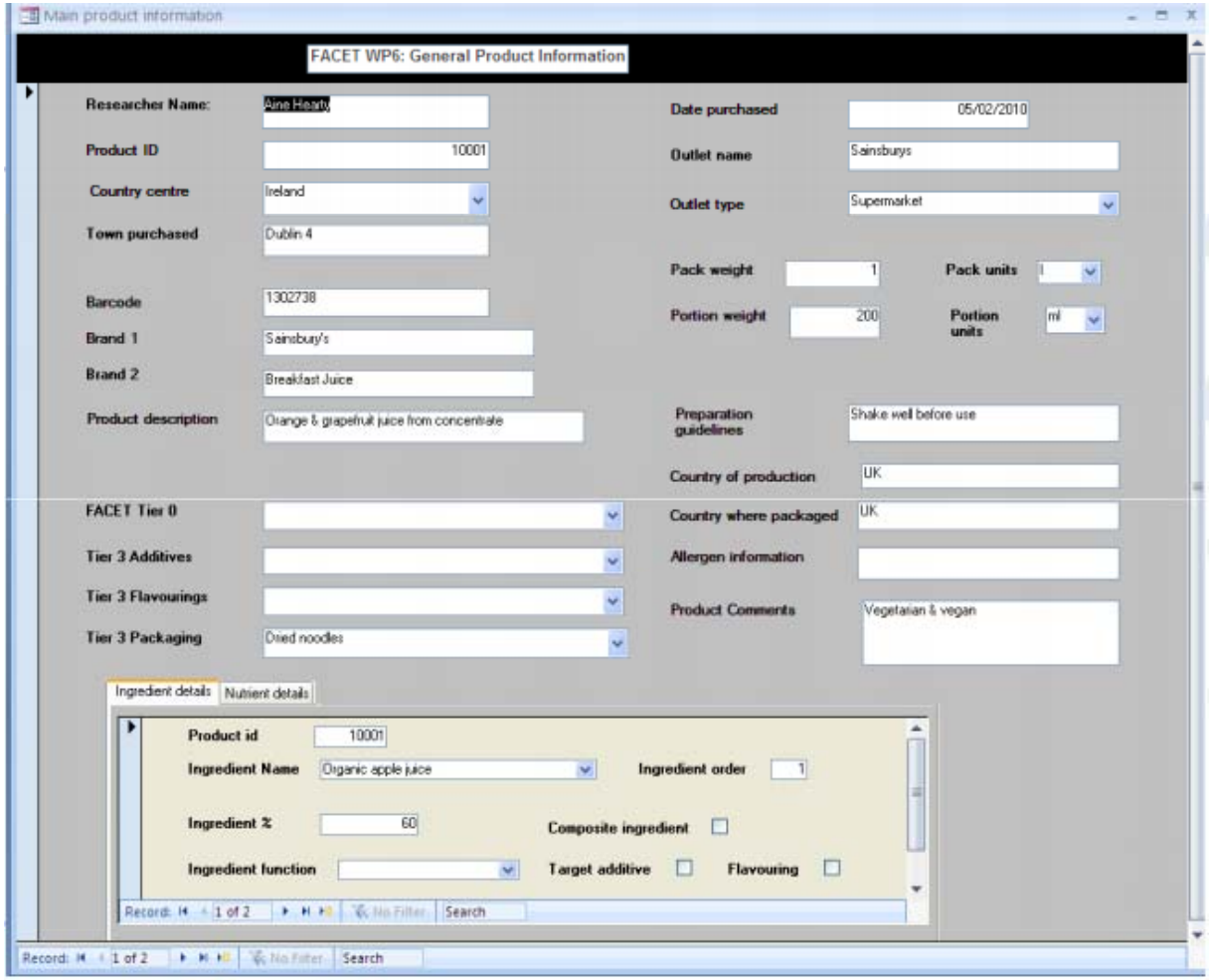
3778 products

Food category Brand

Food label data & food packaging

Database

Food chemical occurrence data recorded on a purpose built database (publicly available)



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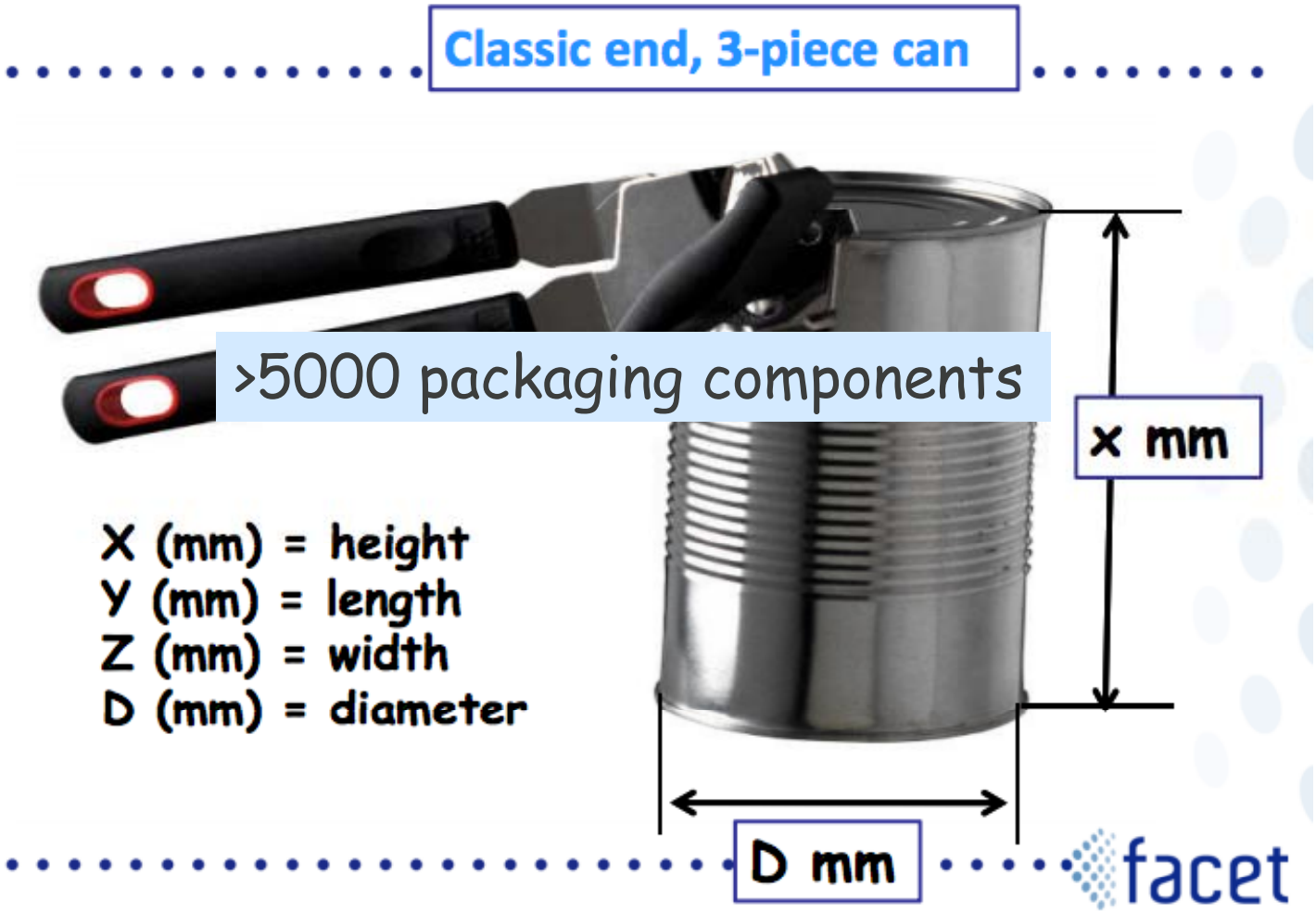
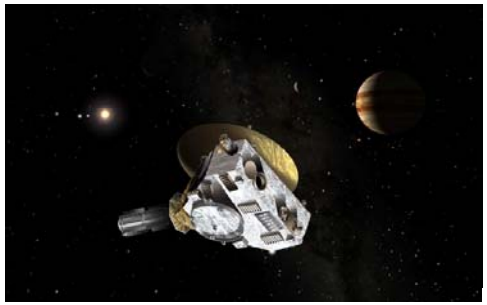
Target Additives & Flavourings recorded per country (Phase 2)

		Additives	Flavourings
Hungary		407	794
Finland		510	851
France		387	681
Ireland		422	726
Italy		201	589
Poland		354	624
Portugal		359	461
UK		580	1270
Total		**3220**	**5196**

Samples of all packaging were analysed for material in contact with food and for pack dimensions



New horizons in food chemical exposure



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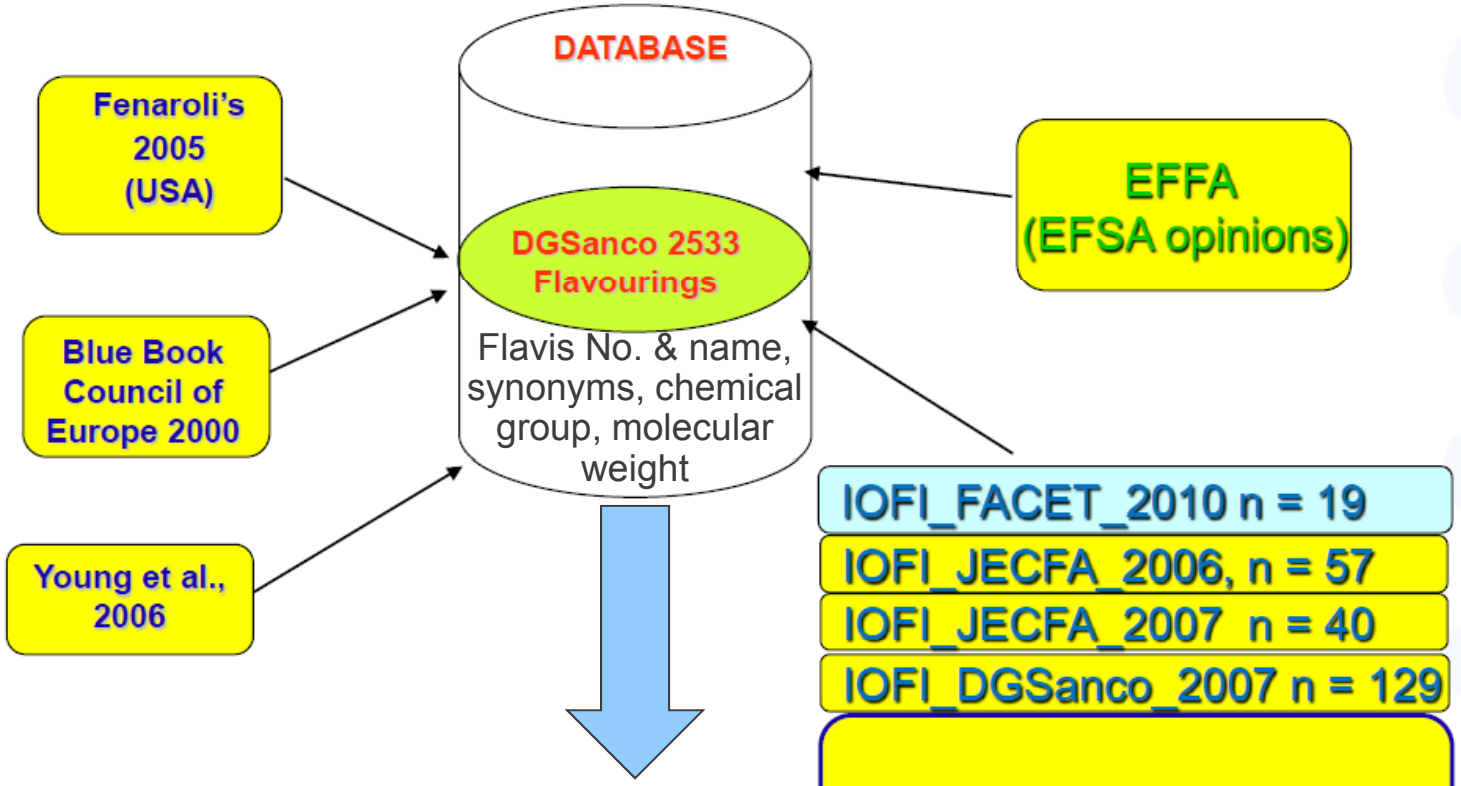
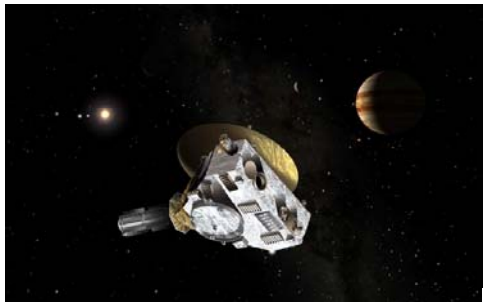
Development of a database of reported use levels for 2700 flavouring substances



MSDI, TAMDI, mTAMDI & SPET based on use levels

New horizons in food chemical exposure



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Food packaging material

Food packaging material

Packaging material uses and characterization

6475 substances with 247 packaging material descriptions

Chemical occurrence in these packaging matrices

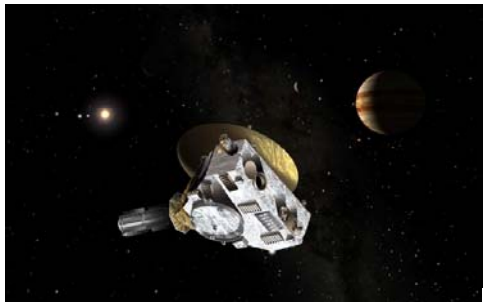
QSAR tool & Migration Modelling Tool

Migration modeling from package to food

Food consumption

Exposure

New horizons in food chemical exposure



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Determimistic exposure

Food additive intake =

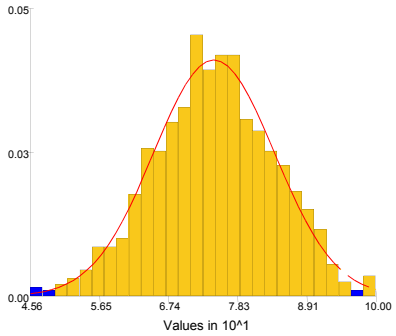
$$\sum \text{Raw Food Amount} \times \text{Occurence} \times \text{Chemical Concentration}$$

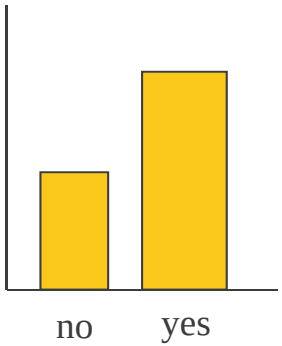
Raw Food Amount	Occurence	Chemical Concentration
Dietary Survey databases	100% if legally permitted	Maximum Permitted level

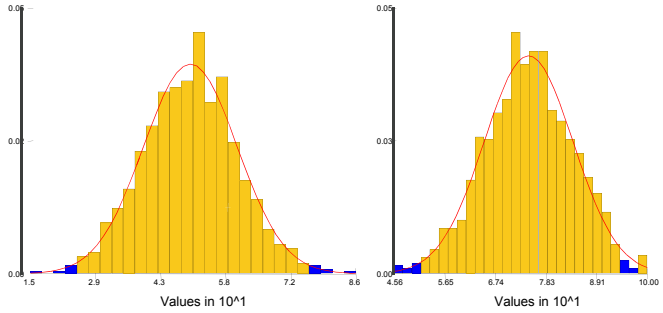
Probabilistic Modelling

Dietary Survey databases ★ **True Probability of presence** ★ **True Concentration data** = **Exposure**

Iterative Monte Carlo simulation







	Model 1	Model 2	Model 3	Model 4
Food intake data	Full	Full	Full	Full
Occurrence data	100%	True	Max	True
Concentration data	Max	Max	True	True

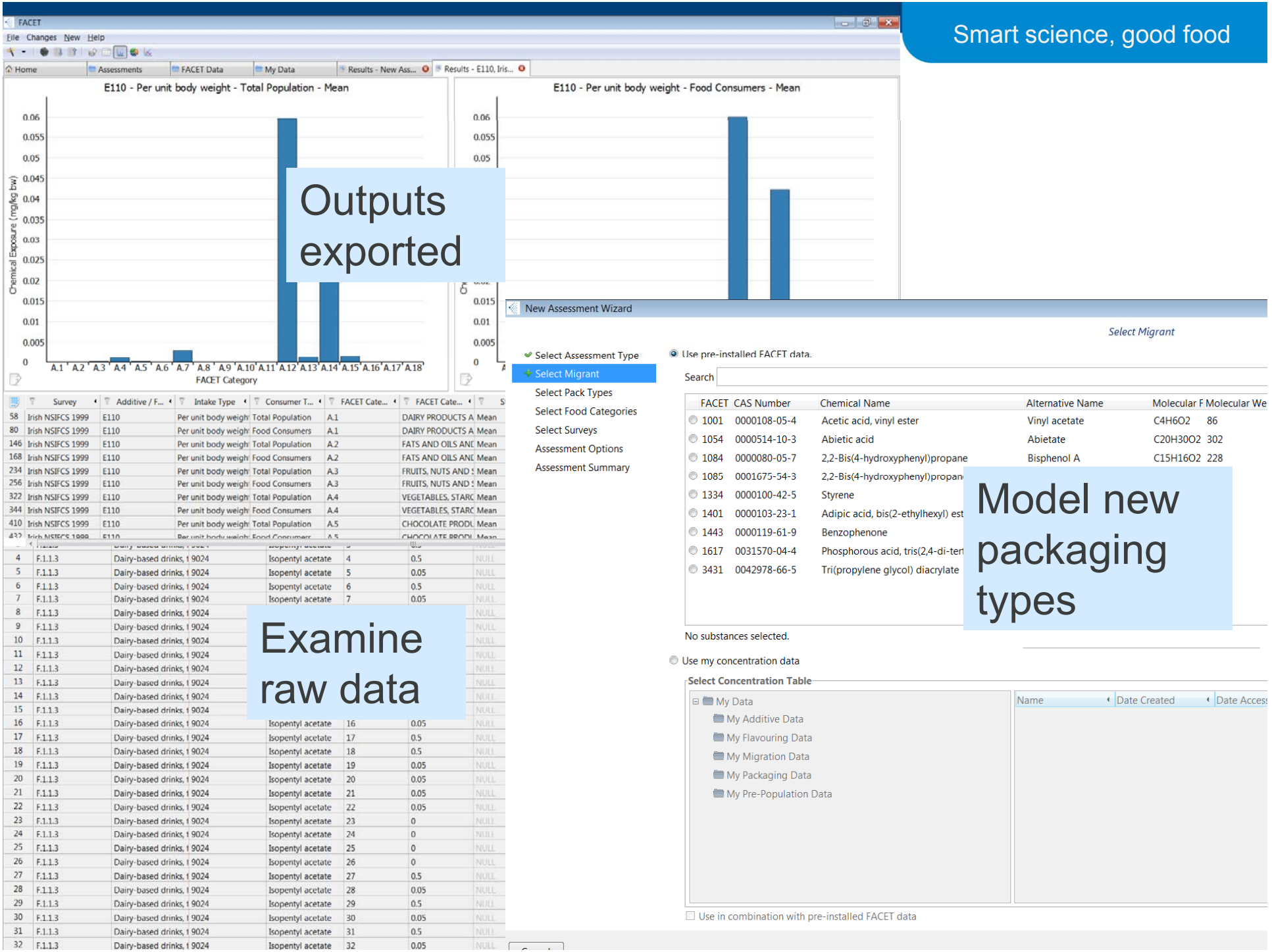
	Model 1	Model 2	Model 3	Model 4
Food intake data	Full	Full	Full	Full
Occurrence data	100%	True	Max	True
Concentration data	Max	Max	True	True
Intake at the 97.5th %tile (mg/kg/d)				
E 104 (QY)	3.4	0.12	0.74	0.05
E110 (SY)	2.6	0.07	0.47	0.03
E124 (P4R)	2.6	0.04	0.90	0.01

	Model 1	Model 2	Model 3	Model 4
Food intake data	Full	Full	Full	Full
Occurrence data	100%	True	Max	True
Concentration data	Max	Max	True	True

Intake at the 97.5th %tile (mg/kg/d)

			% diff		% diff		% diff
E 104 (QY)	3.4	0.12	96.5%	0.74	78.2%	0.05	98.5%
E110 (SY)	2.6	0.07	97.3%	0.47	81.9%	0.03	98.8%
E124 (P4R)	2.6	0.04	98.5%	0.9	65.4%	0.01	99.6%

Smart science, good food



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SEVENTH FRAMEWORK PROGRAMME

Sustaining FACET

JRC
EUROPEAN COMMISSION

Project Management Committee

Software de-bugging

Training on software

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