Food consumption database

Liesbeth Temme, Herman Van Oyen
Scientific Institute of Public Health
Unit of Epidemiology

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- Linkage to food composition table (nutrients)
- Linkage to additive/contaminant data
- Challenges ahead
  - Food consumption data
  - Food composition data (nutrients and contaminant data)
  - Linking of data

Background
Belgian Food consumption survey

Latest scientific study including dietary habits in Belgium 1980-1984 (BIRNH-study)

Between 1984 and 2004: limited information

- Household budget surveys
- Food frequency questionnaire in Health Interview Surveys

Aim:

Support public health policy and scientific research in the field of :

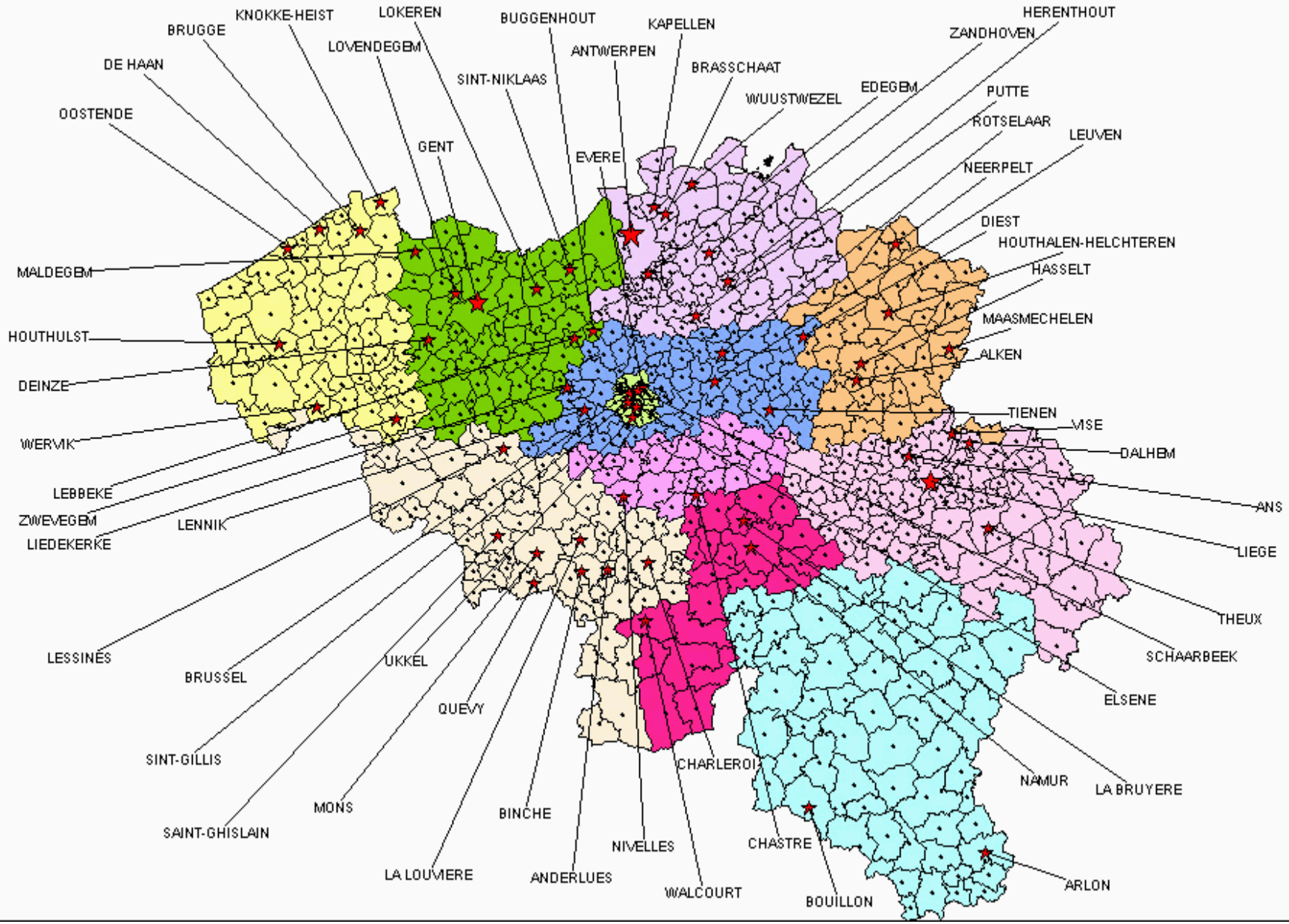
food intake

nutrient intake

additives, contaminants intake

Study population

- Multi-stage stratified sample from the National register
- 3200 inhabitants of the Flemish, Brussels and Walloon region
- Men and women, older than 15 years of age.
  Four age categories (15–18, 19–59, 60–74, ≥ 75 yr)
- Field work: february 2004 – april 2005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LOKEREN
BUGGENHOUT
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KAPELLEN
ZANDHOVEN
LOVENDEGEM
ANTWERPEN
DE HAAN
BRASSCHAAT
SINT-NIKLAAS
EDEGEM
WUUSTWEZEL
PUTTE
OOSTENDE
ROTSELAAR
LEUVEN
GENT
EVERE
NEERPELT
DIEST
HOUTHALEN-HELCHTEREN
MALDEGEM
HASSELT
MAASMECHELEN
HOUTHULST
ALKEN
DEINZE
TIENEN
VISE
WERVIK
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SINT-GILLIS
CHARLEROI
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LA BRUYERE
MONS
BINCHE
SAINT-GHISLAIN
NIVELLES
CHASTRE
LA LOUVIERE
ANDERLUES
ARLON
WALCOURT
BOUILLON

Face-to-face interviews by trained dietitians

- First face-to-face interview at home
  - questionnaire about general health, lifestyle and physical activity
  - Standardized 24-h dietary recall
  - Measurement of waist circumference
  - Measurement of temperature of fridge and freezer
- Respondents complete self-administered questionnaires
  - Frequency of intake of foods
  - Questions on food safety aspects
- Second face-to-face interview (2-8 wk later)
  - Standardized 24-h dietary recall

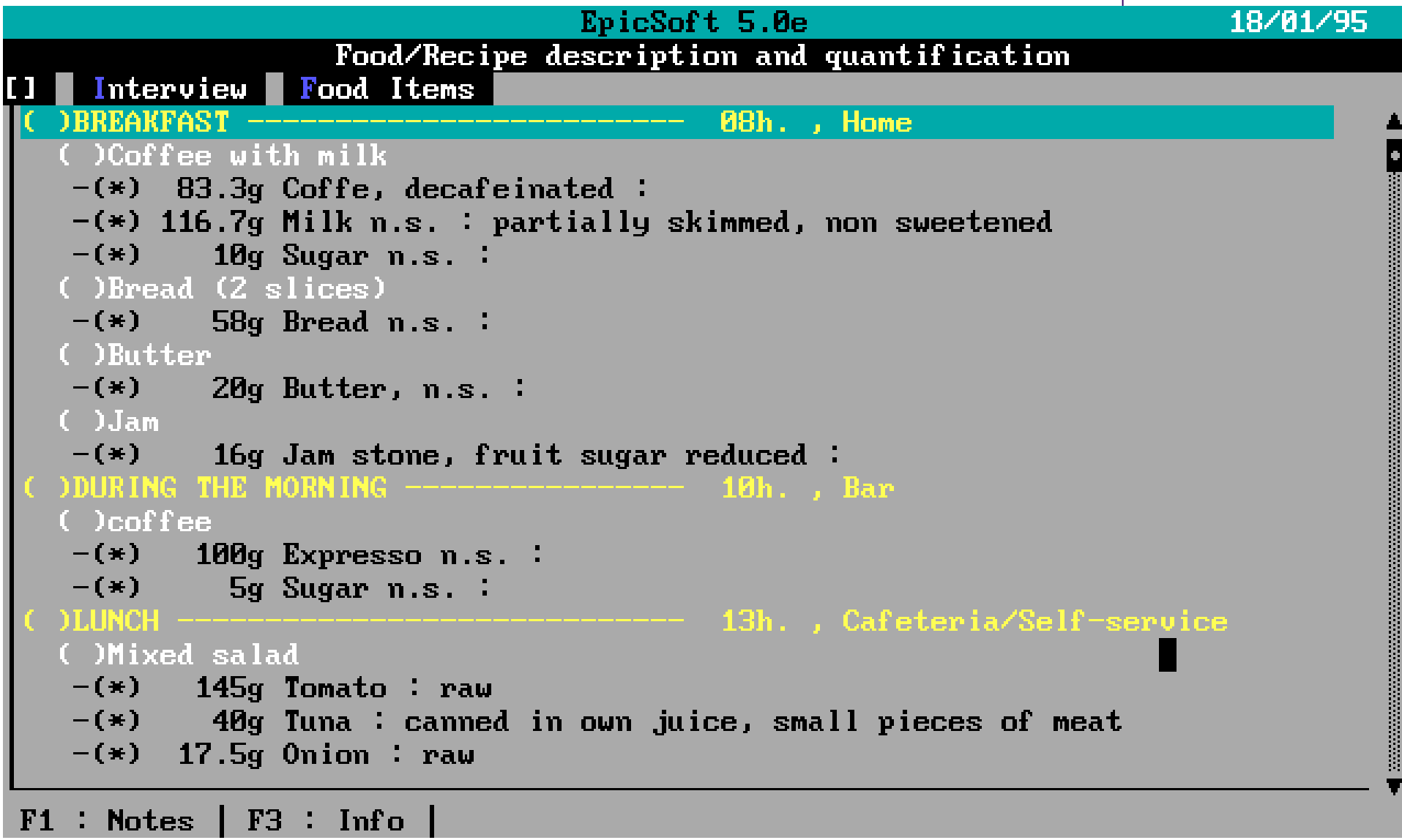
Dietary assessment

- Repeated 24h recall
- Non-consecutive days
- Interval of 2 to 8 weeks
- All days of the week represented (also on sundays)
- Four seasons equally represented
- EPIC-soft: highly standardized

EFCOSUM-project recommendations : European Food Consumption Survey Methods. Eur J Clin Nutr (2002), 56, Suppl 2.

Duration: 30 – 35 min.

Example of EPIC-soft screen



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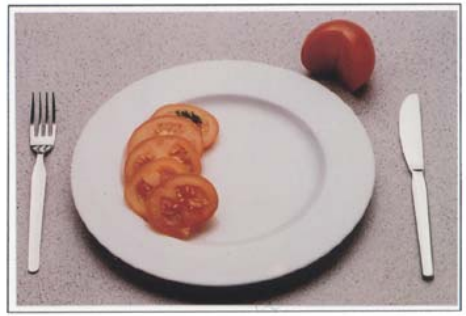

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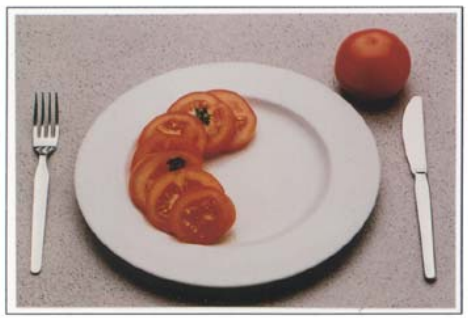

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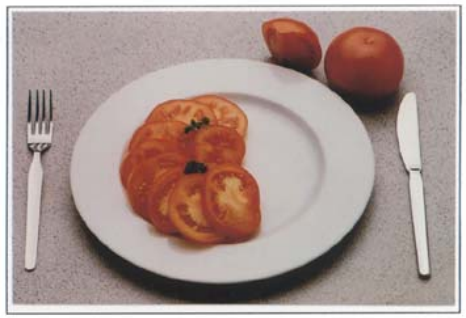

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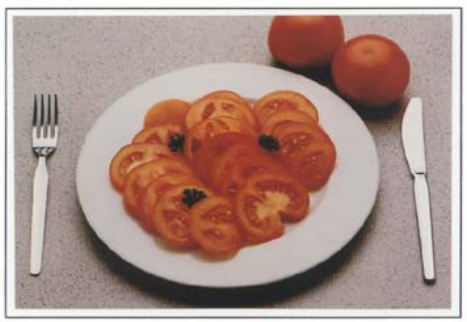

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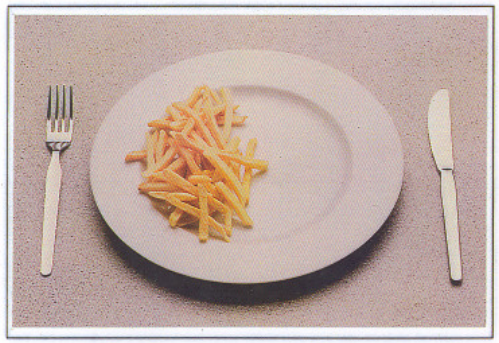
French fries 3



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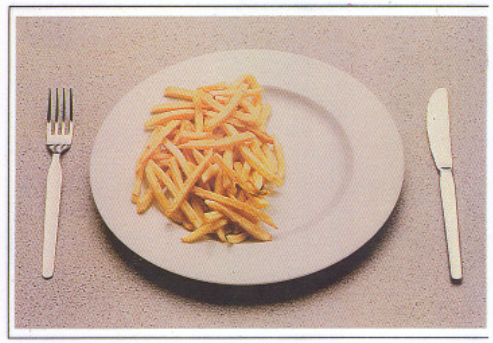

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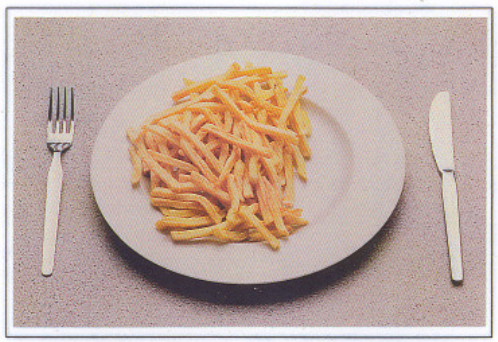

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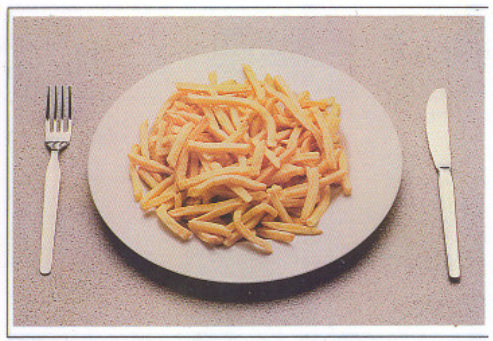

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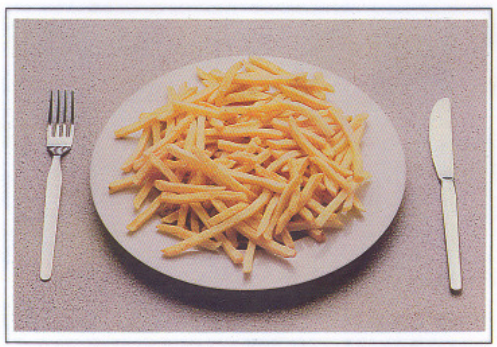

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Dataset of foods with facets

- Conservation method?
- Preparation method ?
- With / without cream ?
- Brandname ?

Facet:
01 = Source
02 = Physical stat/form as quantified
03 = Cooking method
04 = Preservation method
05 = Packing medium
06 = Flavoured/added component
07 = Sugar content
08 = Fat content
09 = Type of packing
10 = Food production
11 = Enriched/fortified
12 = Brandname/productname
13 = Skin consumed
14 = Visible fat consumed
15 = Type of fat used
16 = Type of milk/liquid used

Food frequency questionnaire

FFQ.01. **In onderstaande tabel staat een hele reeks voedingsmiddelen(groepen). Probeer (zo exact mogelijk) weer te geven hoe vaak u de opgesomde producten eet of drinkt. Denk hierbij aan uw gemiddelde over een volledig jaar.**

		Nooit	Minder dan 1 dag per maand	1 – 3 dagen per maand	1 dag per week	2 – 4 dagen per week	5 – 6 dagen per week	1 maal per dag	2 – 3 maal per dag	Meer dan 3 maal per dag
01	Water (leidingwater, flessenwater, …)	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐8	☐9
02	Koffie, thee	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐8	☐9
03	Fruitsap, groentesap	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐8	☐9
04	Light-frisdranken	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐8	☐9
05	Frisdranken	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐8	☐9
06	Sportdranken (Isostar, Aquarius, …)	☐1	☐2	☐3	☐4	☐5	☐6	☐7	☐8	☐9

Analysis

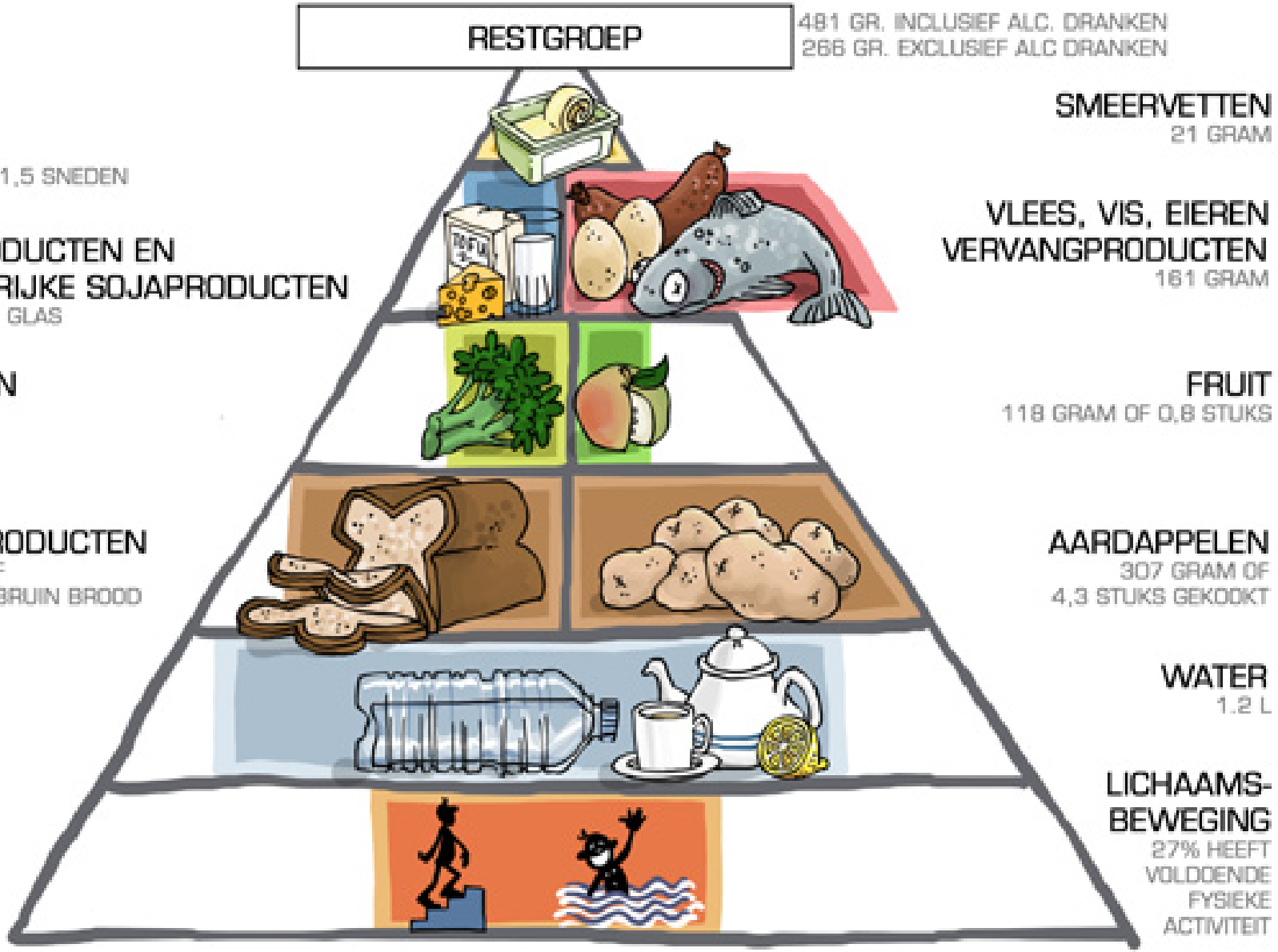
- Weighted for the Belgian population
  - season
  - interview day
- Nusser method:
  - estimate the distribution of habitual dietary intake

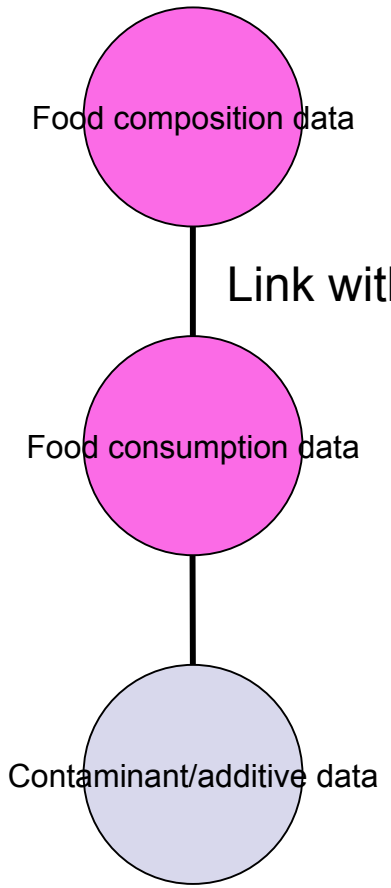
RESULTS
Characteristics of the study population

Age (years)	% of sample
15-18	24.8
19-59	27.0
60-74	25.3
>=75	22.9
Gender	
Male	50.0
Female	50.0
Education	
Low	27.8
Middle	35.0
High	37.2

DE ACTIEVE VOEDINGSDRIEHOEK

Illustratie: Liesbeth Beckers, Gent, België.




Food composition data
Link with Nubel/IPL/Nevo codes, facets
Food consumption data
Contaminant/additive data

Link with food composition data

- Food composition data (NUBEL/IPL/NEVO tabel)
  - Cooked or raw, conversion needed?
  - With or without peel, correction needed?
  - Food groups and descriptions are not similar in food consumption compared with food composition databases
    - Large number of unspecified foods
    - Information on brands is lacking (e.g. yoghurts with fruits)

Percentage of energy delivered by fats, carbohydrates and proteins

Percentage of energy	Belgium	Dutch speaking	French speaking	DRI
Energy (kcal/day)	2011	2048	1956	
Fats	38	38	38	≤ 30 %
Saturated fatty acids	16	15	17*	≤ 10 %
Mono-unsaturated fatty acids	14	13	14*	[10-14,7] %
Poly-unsaturated fatty acids	7	8	6*	[5,3-10] %
Carbohydrates	46	46	45*	> 55 %
Mono- and disaccharides	20	20	20	
Proteins	16	16	16	> 10 %

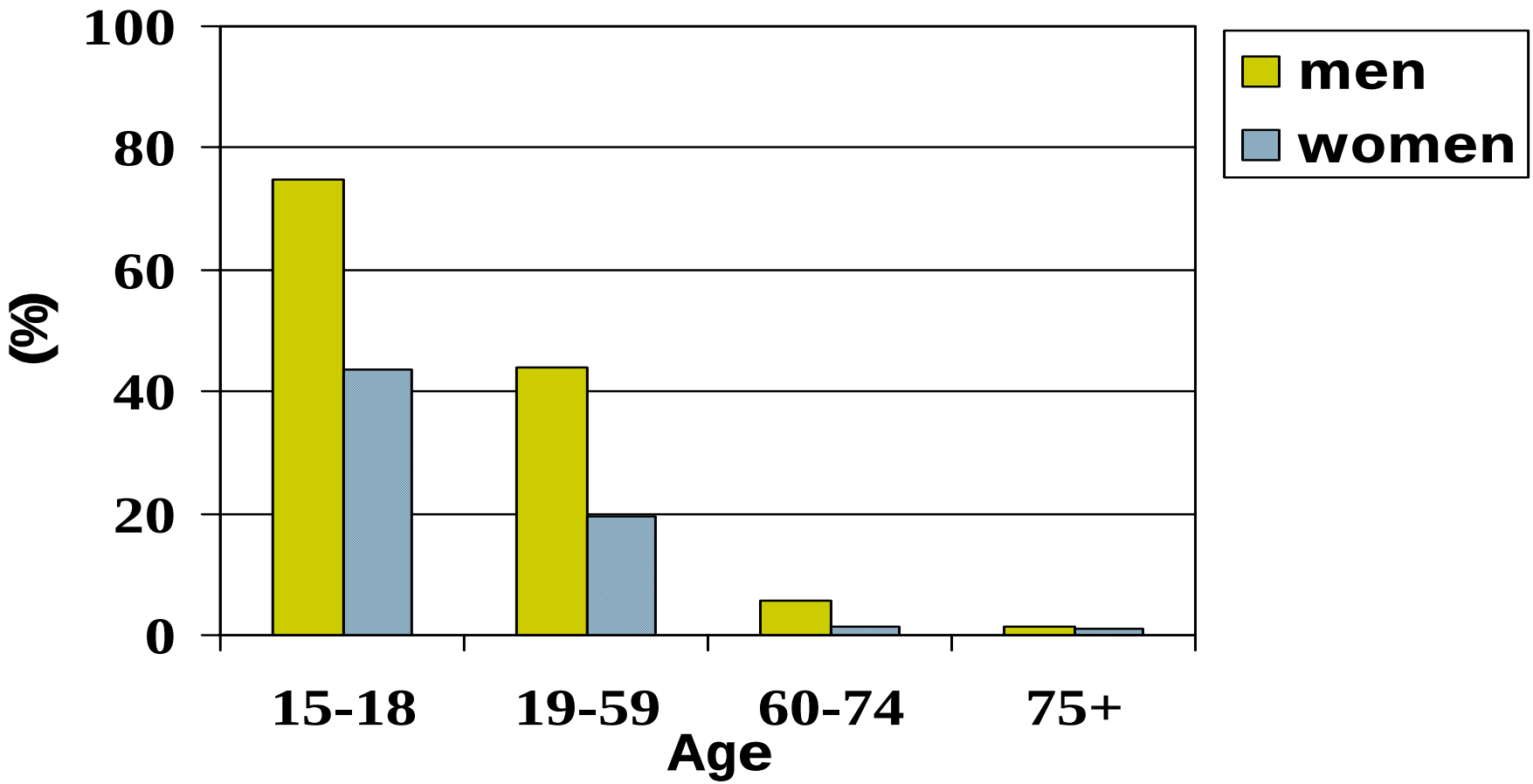
Food sources contributing to intake of

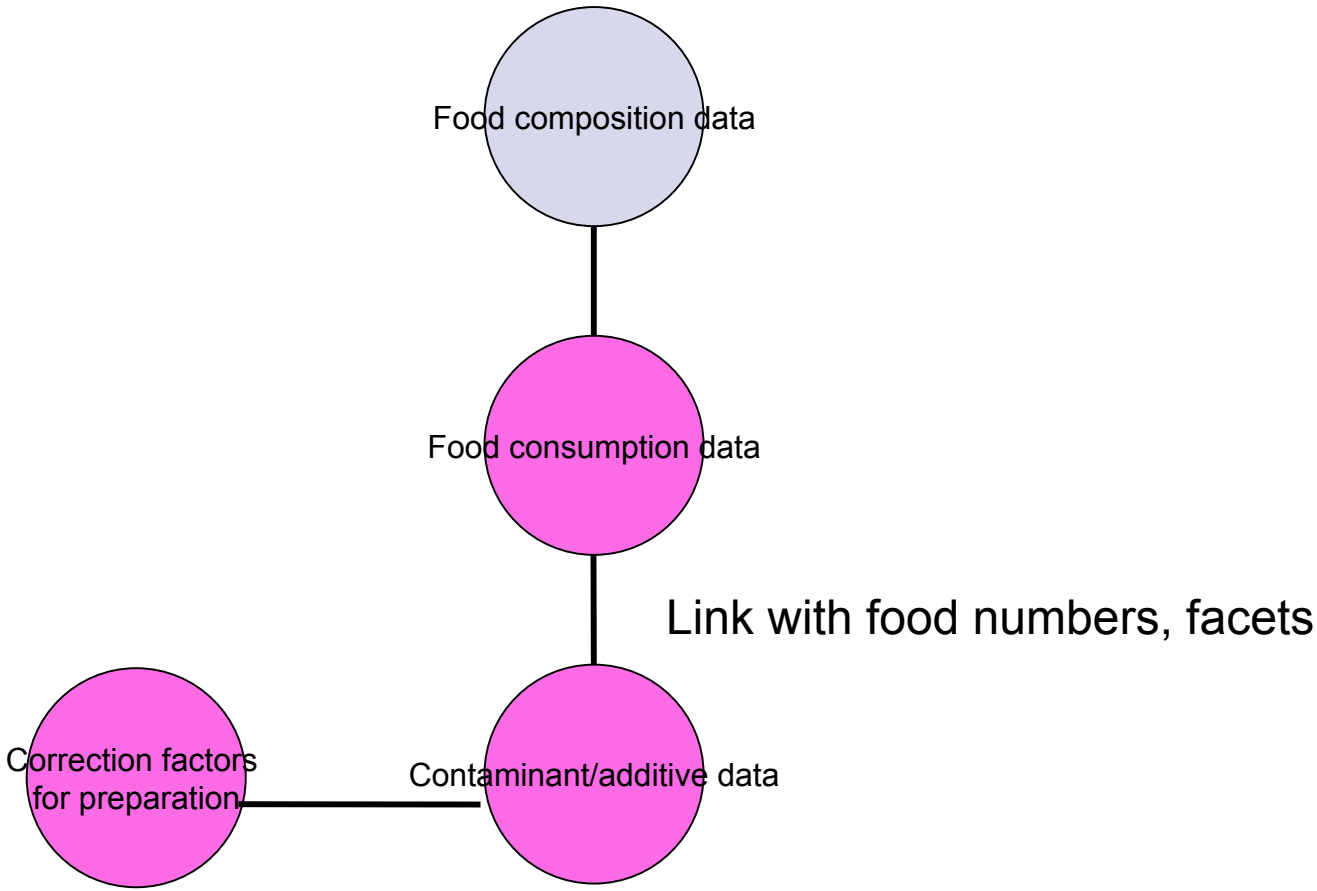
- Saturated fatty acids
  - Fat 25 % (butter 13%, margarine 8%)
  - Dairy products 22% (cheese 14%, milk 3%)
  - Meat products 16% (processed meat 6%)

- Mono- and disaccharides
  - Non-alcoholic drinks 25% (soft drinks 18%)
  - Sugar and confectionary 19% (sugar, jam 10%, chocolate (snacks) 6%)
  - Fruits 15%

Usual intake of soft drinks

Percentage of population consuming more than 330 ml / day




Food composition data
Food consumption data
Link with food numbers, facets
Correction factors for preparation
Contaminant/additive data

Example of nitrate

- Nitrate occurs in most vegetables.

- The concentration is affected by species, fertiliser use, variety and growing conditions

- Nitrate occurs in groundwater, used as a source of tap water

- Nitrate is permitted as additive in meat products and cheeses

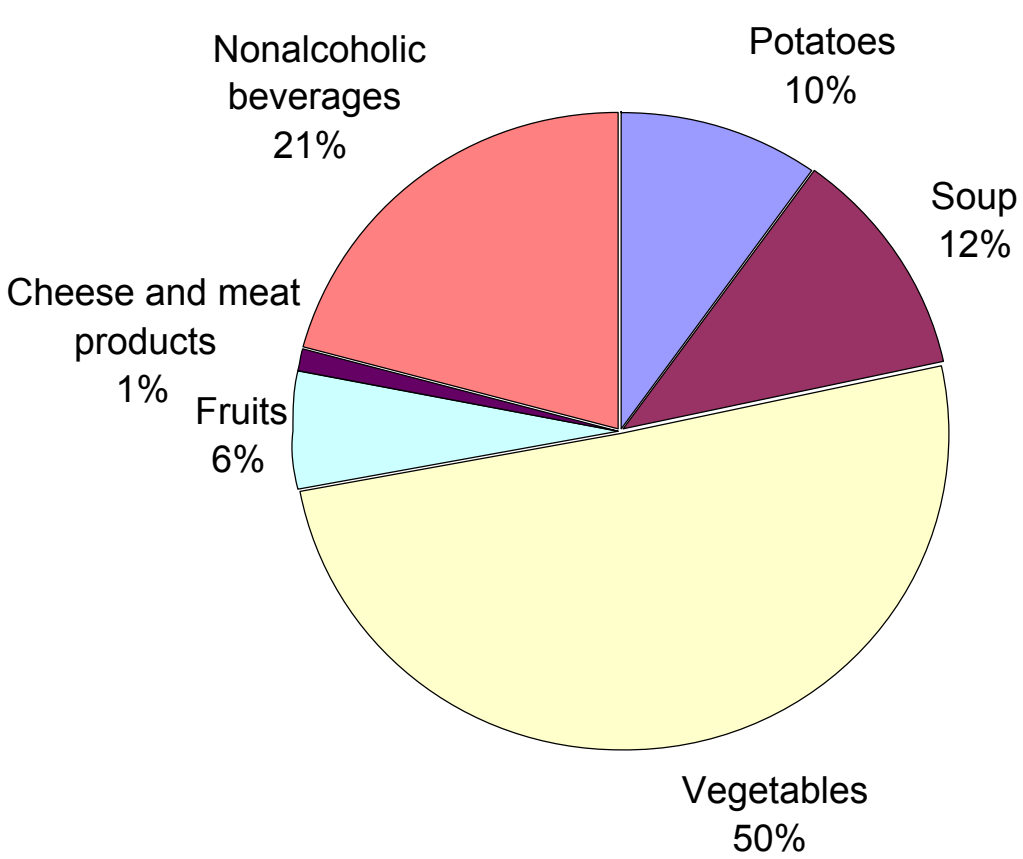
- Nitrate toxicity is related primarily to the *in vivo* conversion to nitrite and further into N-nitroso compounds after ingestion (National Academy of Sciences 1977; Swann 1975).

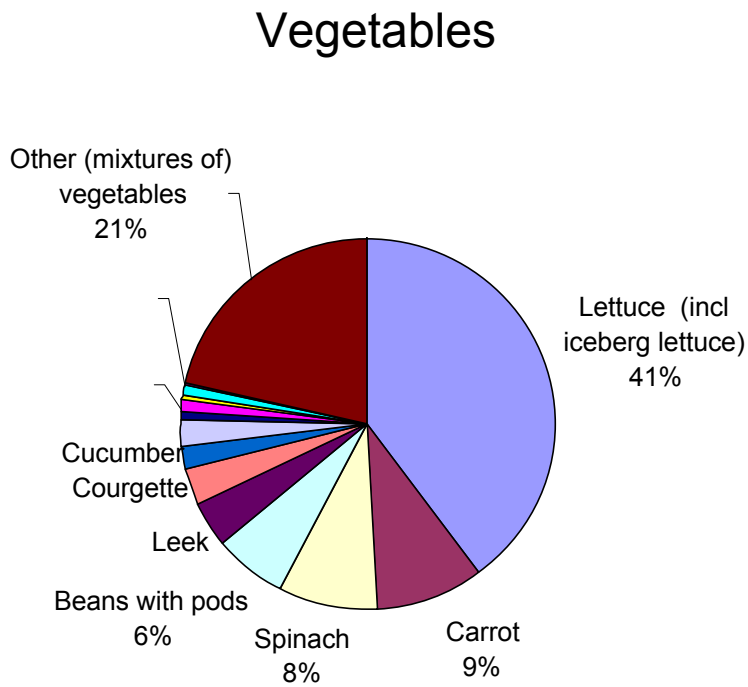
Nitrate content of selected foods

Vegetables	Prerаration factors*	NO3- (mg/kg)
Lettuce	-14% (without ext. leaves)	2351
Spinach, fresh	-31% (stewed)	909
Leek		492
Carrots	-25% (stewed)	218
Fruit		
Melon		221
Banana	-62% (peeled)	153
Apple		11
Water		
Tap water (average)		21
Mineral water (average)		3

*Dejonckheere et al, 1994

Average contribution of foods to nitrate exposure





The average nitrate intake is 1.38 mg/kg bw/day (38% of ADI); P97.5=2.76 mg/kg bw/day

Challenges –
food consumption data

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Need for food consumption databases

- Food consumption data are needed to assess intake of foods, nutrients, healthy and harmful substances
- To evaluate intake against recommendations and acceptable daily intakes

- Need for flexible systems to assess multiple factors (risks and/or benefits)
- Detailed data to evaluate the effects of product innovations (e.g. ‘healthy’ innovations or functional food components (benefits and risks))

What…..if……

- What if Belgians choose for products with the food and nutrition logo??

- What is the effect (on intake) of the introduction of a new functional food??

Challenges – Food consumption data

Now

Food consumption data mainly derived from individual dietary surveys (record, recall, FFQ).

Only periodic monitoring possible in a limited number of subjects, limited number of intake days

Challenge

More continuously assess (changes in) consumption (for example introduction of new labeling or product innovation) and the consumption of occasionally consumed foods

Refinement of data with

- Other individual consumption data (e.g. FFQ)
- Other aggregated consumption data
  - Household purchase data
  - Market share data

Challenges – Food composition data

- Detailed and up-to date food composition databases
  - Rapid changing food supply
  - Increased use of fortified foods
  - Keep track on nutrient/ingredient changes in new versions of the same dietary item

- Uniform detailed food coding (EUROFIR project)

Challenges – Linkage of data and data analyses

- Harmonization of food codes
  - Food consumption
  - Food composition (nutrient, ingredient, additives and contaminants)
    - Ingredient databases for composite foods
    - Linkage of data via EAN barcodes ??
- Conversion of foods as eaten in raw agricultural commodities
- Take into account concentration differences in the same food (for example between brands)

Summarizing

- Food consumption data are important to support nutritional and food safety policy
  - Policy formulation
  - Monitoring nutritional and food safety interventions

- Challenges ahead to develop detailed and continuous food consumption databases

More information, reports & data?

Report

http://www.iph.fgov.be/epidemio/epifr/foodfr/table04.htm

http://www.iph.fgov.be/epidemio/epinl/foodnl/table04.htm

Contact

Stefanie.Vandevijvere@iph.fgov.be

Liesbeth.Temme@wur.nl

Organisation Food consumption Survey

Federale Overheidsdienst Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu

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