

# Food consumption database



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# Contents

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- Methods
- 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

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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 :

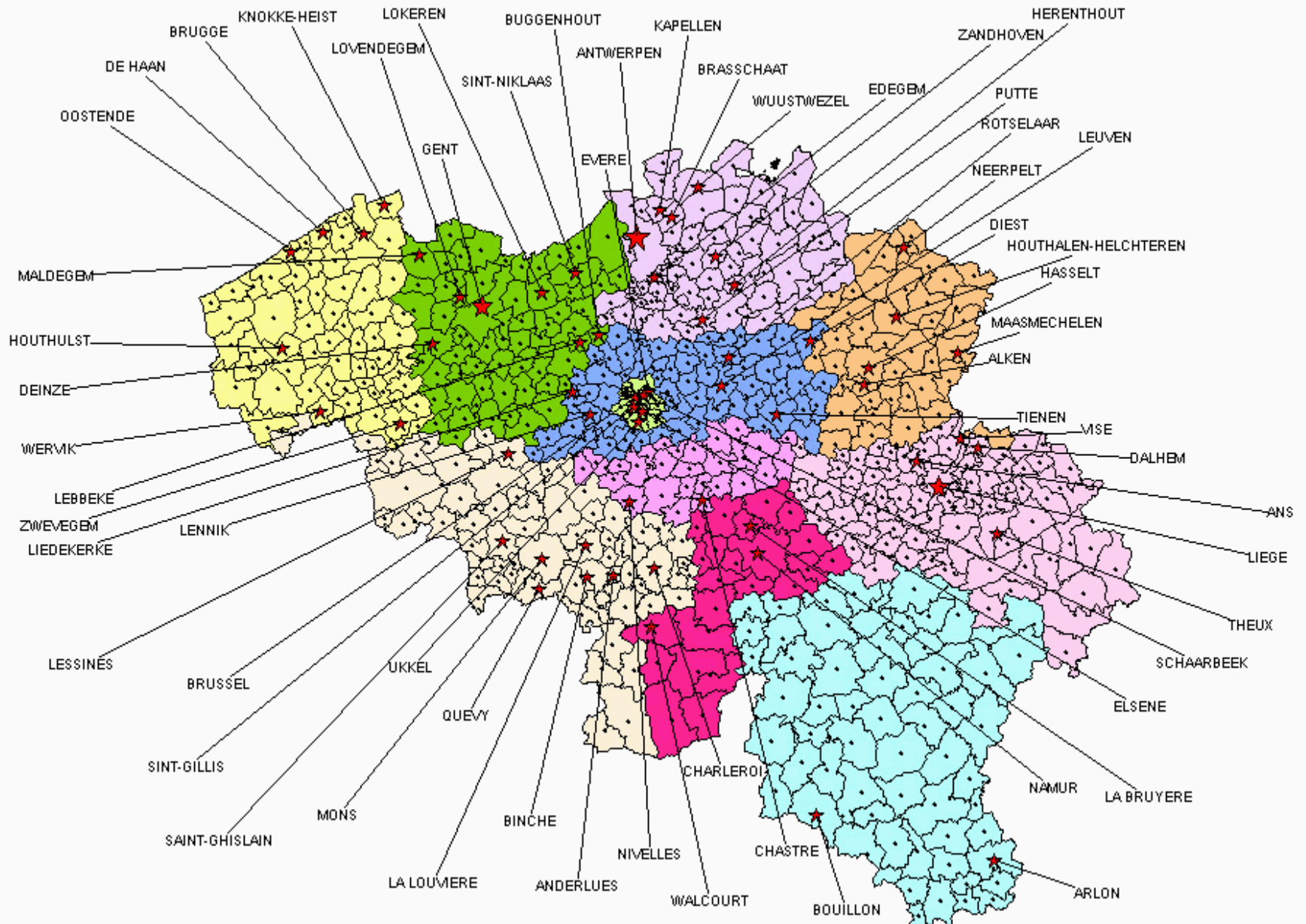
- food intake
- nutrient intake
- additives, contaminants intake

# Study population

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- 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,  $\geq 75$  yr)
- Field work: february 2004 – april 2005



# Face-to-face interviews by trained dietitians

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- **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

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- 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

EpicSoft 5.0e

18/01/95

Food/Recipe description and quantification

[1] Interview Food Items

( ) BREAKFAST ----- 08h. , Home

( ) Coffee with milk

-(\*) 83.3g Coffe, decaffeinated :

-(\*) 116.7g Milk n.s. : partially skimmed, non sweetened

-(\*) 10g Sugar n.s. :

( ) Bread (2 slices)

-(\*) 58g Bread n.s. :

( ) Butter

-(\*) 20g Butter, n.s. :

( ) Jam

-(\*) 16g Jam stone, fruit sugar reduced :

( ) DURING THE MORNING ----- 10h. , Bar

( ) coffee

-(\*) 100g Espresso n.s. :

-(\*) 5g Sugar n.s. :

( ) LUNCH ----- 13h. , Cafeteria/Self-service

( ) Mixed salad

-(\*) 145g Tomato : raw

-(\*) 40g Tuna : canned in own juice, small pieces of meat

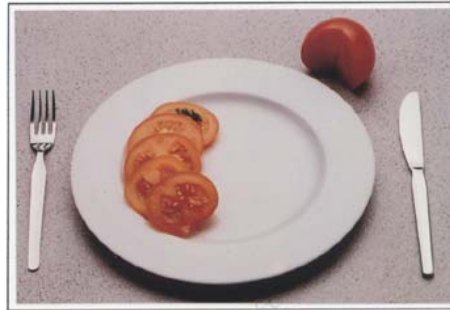
-(\*) 17.5g Onion : raw

F1 : Notes | F3 : Info |





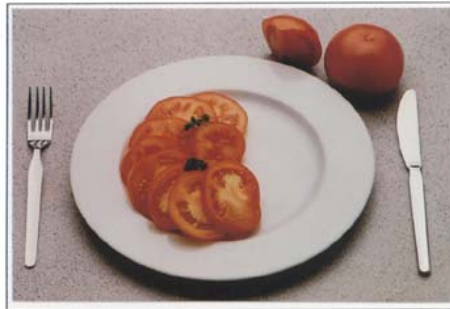
15 - 1



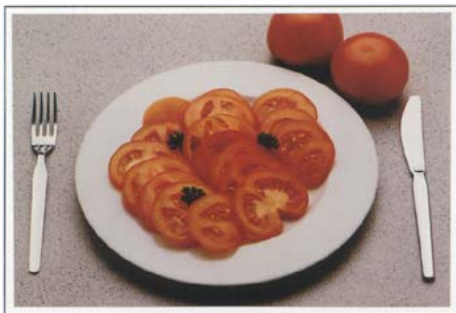
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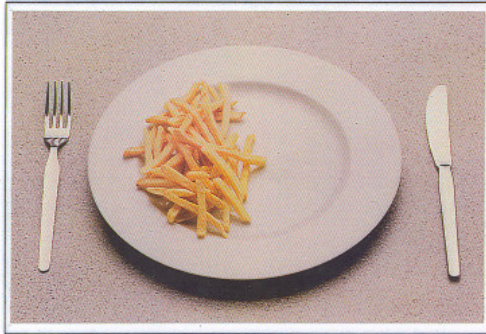
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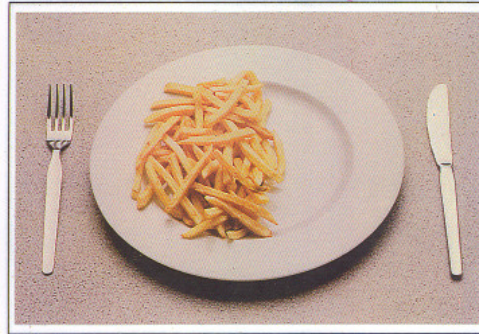
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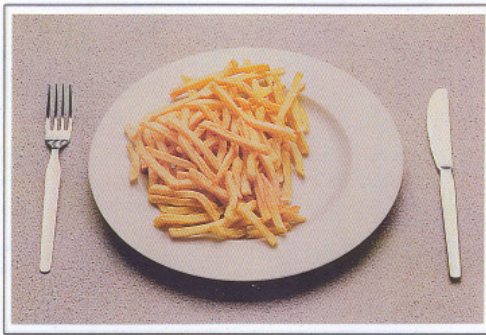
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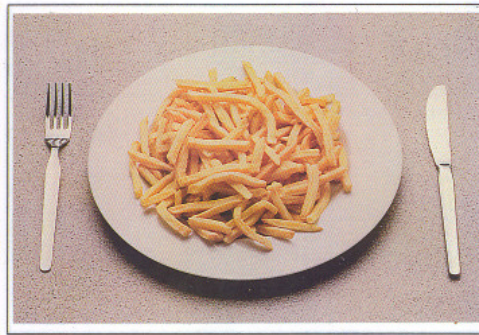
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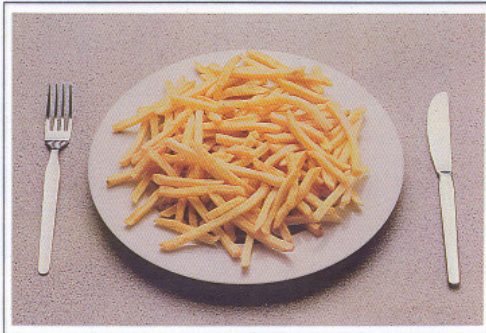
3 - 2



3 - 3



3 - 4



3 - 5



# Dataset of foods with facets

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- 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, ...)	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>8</sub>	<input type="checkbox"/> <sub>9</sub>
02 Koffie, thee	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>8</sub>	<input type="checkbox"/> <sub>9</sub>
03 Fruitsap, groentesap	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>8</sub>	<input type="checkbox"/> <sub>9</sub>
04 Light-frisdranken	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>8</sub>	<input type="checkbox"/> <sub>9</sub>
05 Frisdranken	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>8</sub>	<input type="checkbox"/> <sub>9</sub>
06 Sportdranken (Isostar, Aquarius, ...)	<input type="checkbox"/> <sub>1</sub>	<input type="checkbox"/> <sub>2</sub>	<input type="checkbox"/> <sub>3</sub>	<input type="checkbox"/> <sub>4</sub>	<input type="checkbox"/> <sub>5</sub>	<input type="checkbox"/> <sub>6</sub>	<input type="checkbox"/> <sub>7</sub>	<input type="checkbox"/> <sub>8</sub>	<input type="checkbox"/> <sub>9</sub>

# Analysis

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

# RESULTS

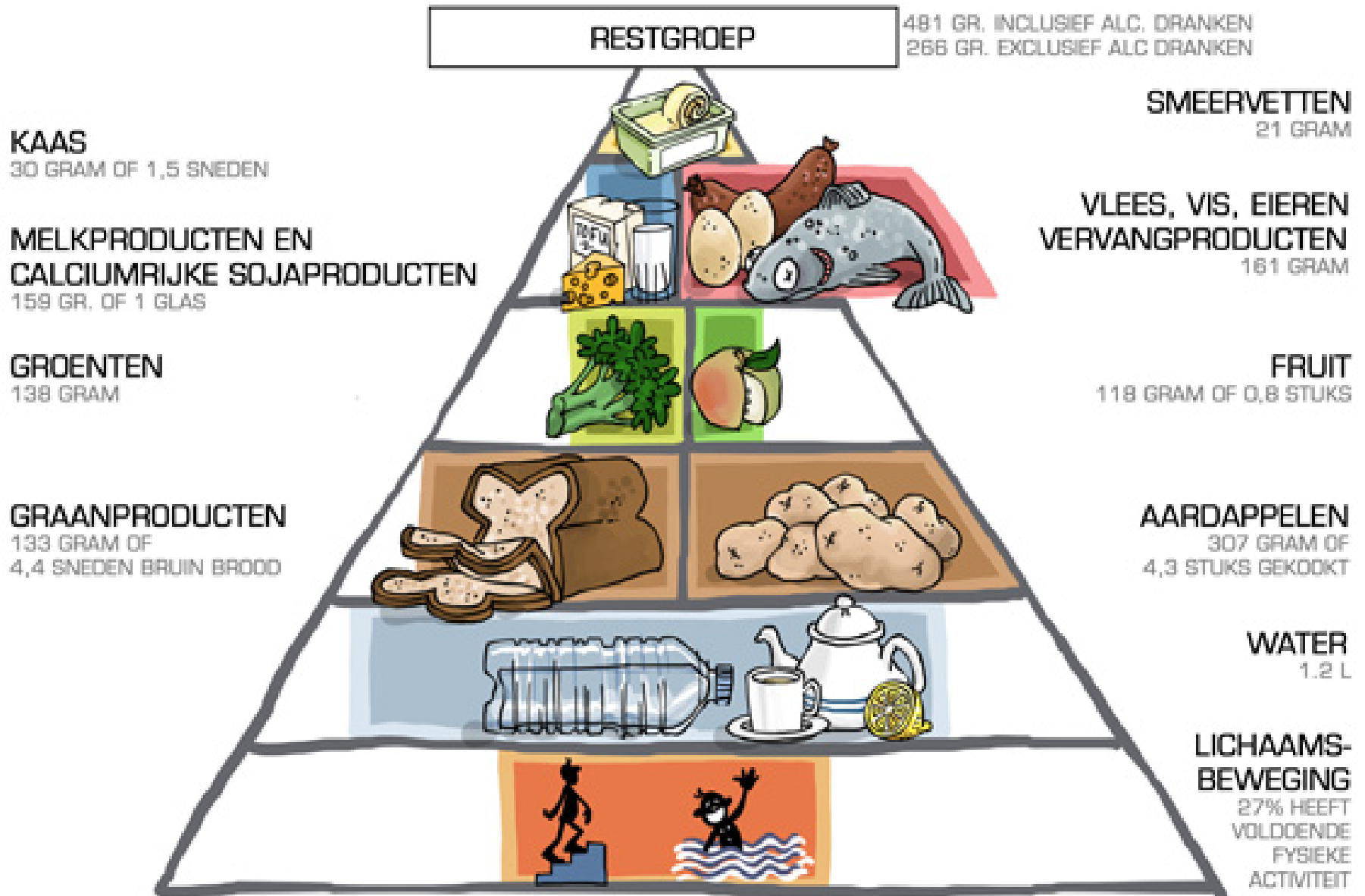
## Characteristics of the study population

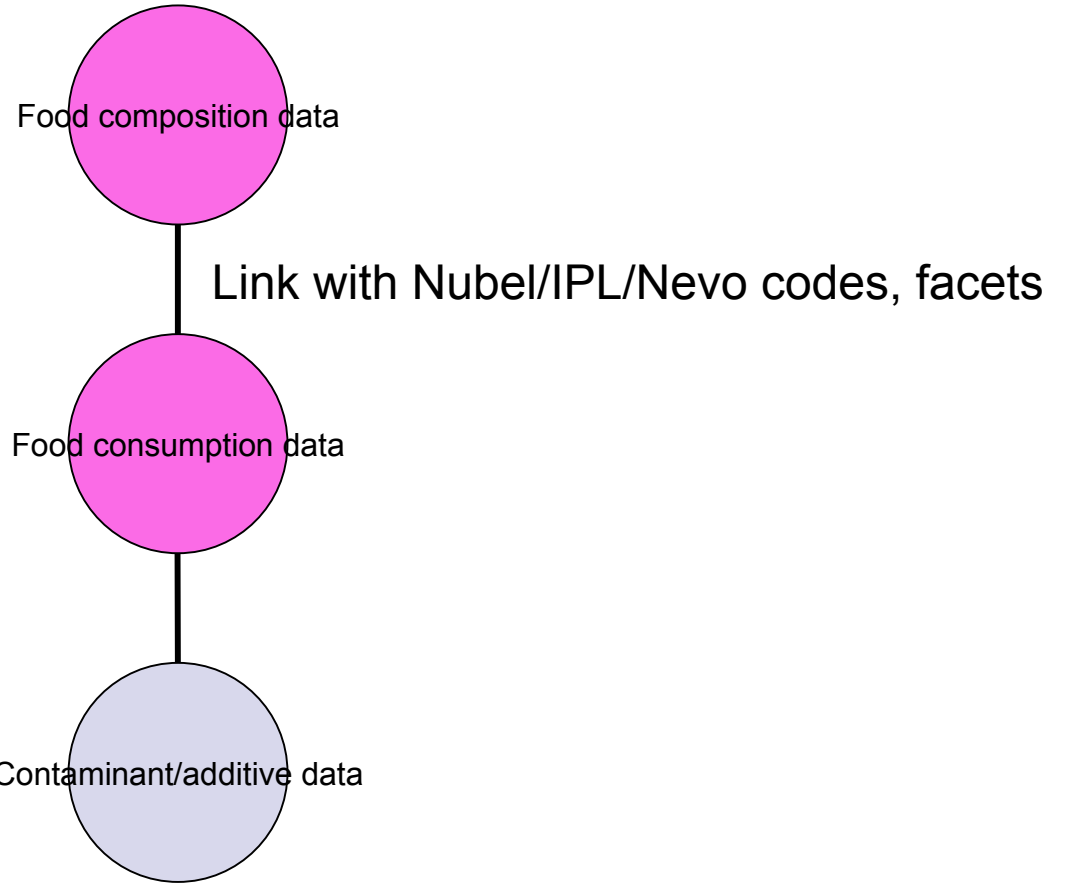


<b>Age (years)</b>	<b>% of sample</b>
15-18	24.8
19-59	27.0
60-74	25.3
>=75	22.9
<b>Gender</b>	
Male	50.0
Female	50.0
<b>Education</b>	
Low	27.8
Middle	35.0
High	37.2

# DE ACTIEVE VOEDINGSDRIEHOEK

Illustratie: Liesbeth Beckers, Gent, België.







# Link with food composition data

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- 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

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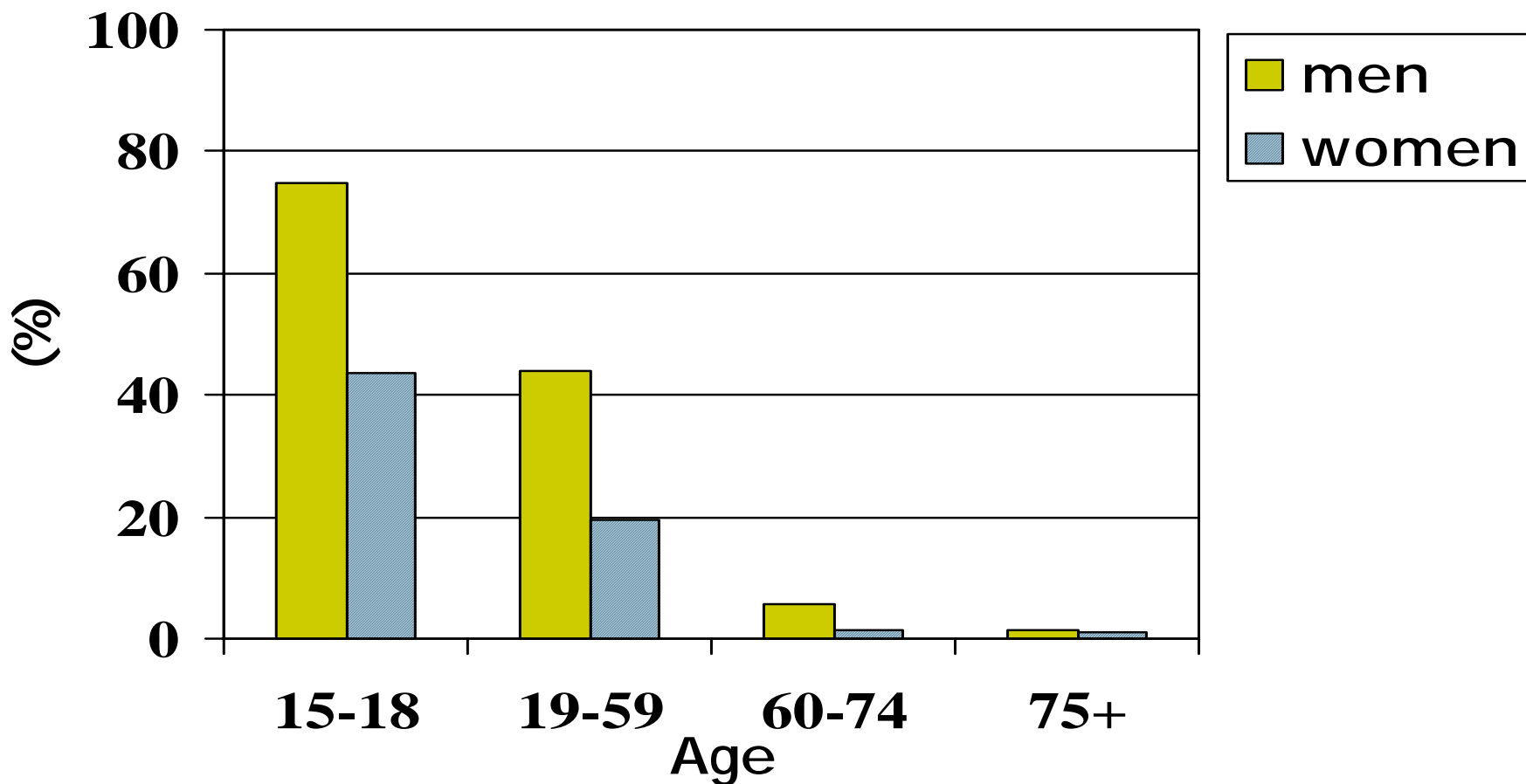


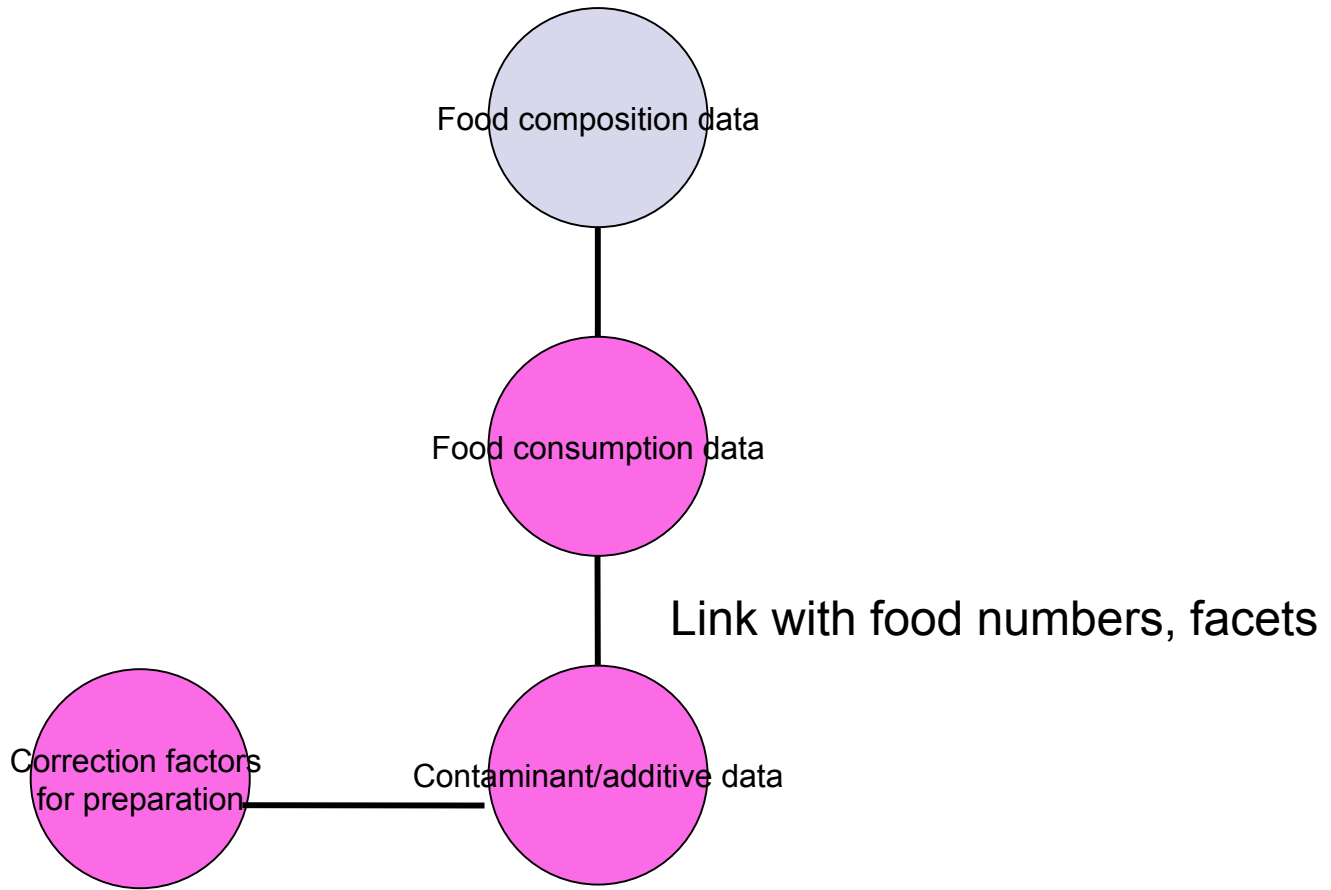
- Saturated fatty acids
  - Fat 25 % (butter 13%, margarine 8%)
  - Dairy products 22% (cheese 14%, milk 3%)
  - Meat products 16% (processed meat 6%)
- Mono- and disaccharides
  - Non-alcoholic drinks 25% (soft drinks 18%)
  - Sugar and confectionary 19% (sugar, jam 10%, chocolate (snacks) 6%)
  - Fruits 15%

# Usual intake of soft drinks



Percentage of population consuming more than 330 ml / day





# Example of nitrate

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- 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).

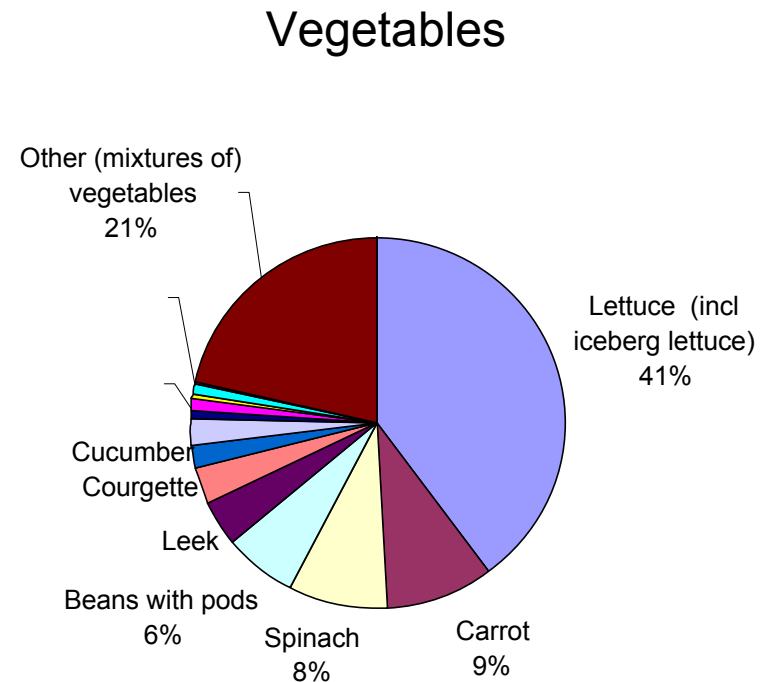
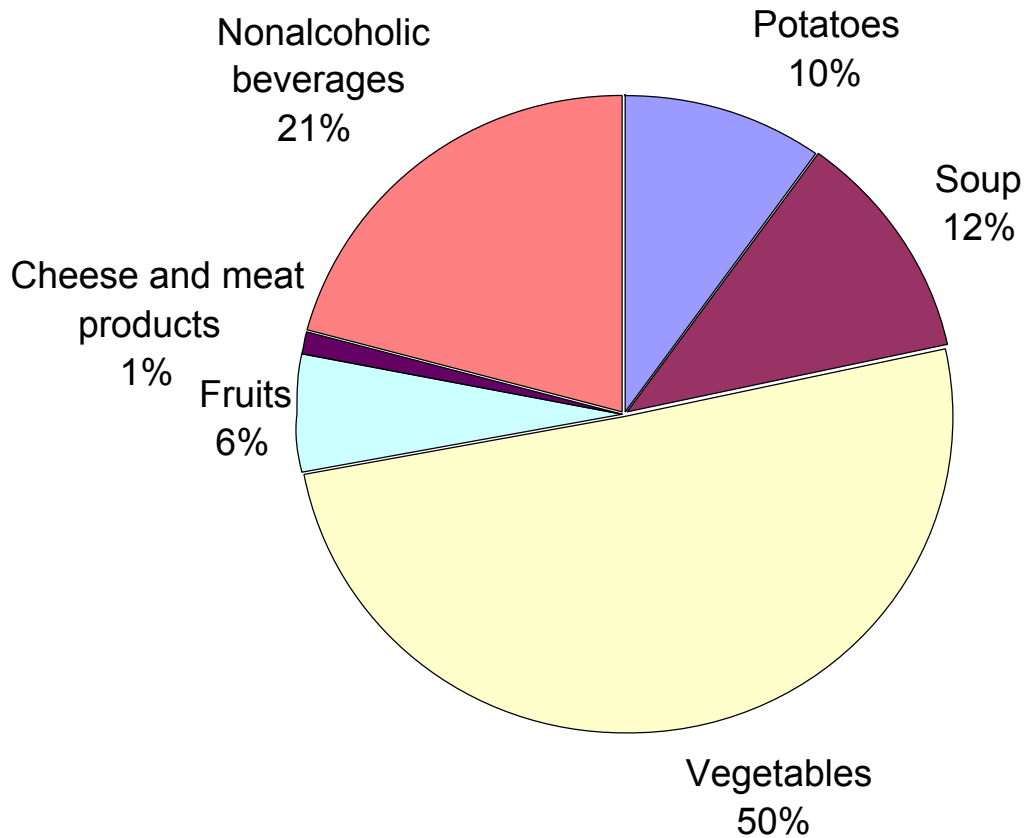


# Nitrate content of selected foods

Vegetables	Prereration factors*	NO <sub>3</sub> <sup>-</sup> (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



# Need for food consumption databases

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- 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.....

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- 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

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## 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

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- 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

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- 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

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- 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?

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## Report

<http://www.iph.fgov.be/epidemie/epifr/foodfr/table04.htm>

<http://www.iph.fgov.be/epidemie/epinl/foodnl/table04.htm>

## Contact

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# Organisation Food consumption Survey



Federale Overheidsdienst Volksgezondheid,  
Veiligheid van de Voedselketen en Leefmilieu



Wetenschappelijk Instituut Volksgezondheid (WIV)



Vakgroep Maatschappelijke Gezondheidskunde  
(UGent)



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Publique



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Statistiek en Economische Informatie

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