tds exposure

European Commission

WP 7
Variation and Trends

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Stakeholder Meeting

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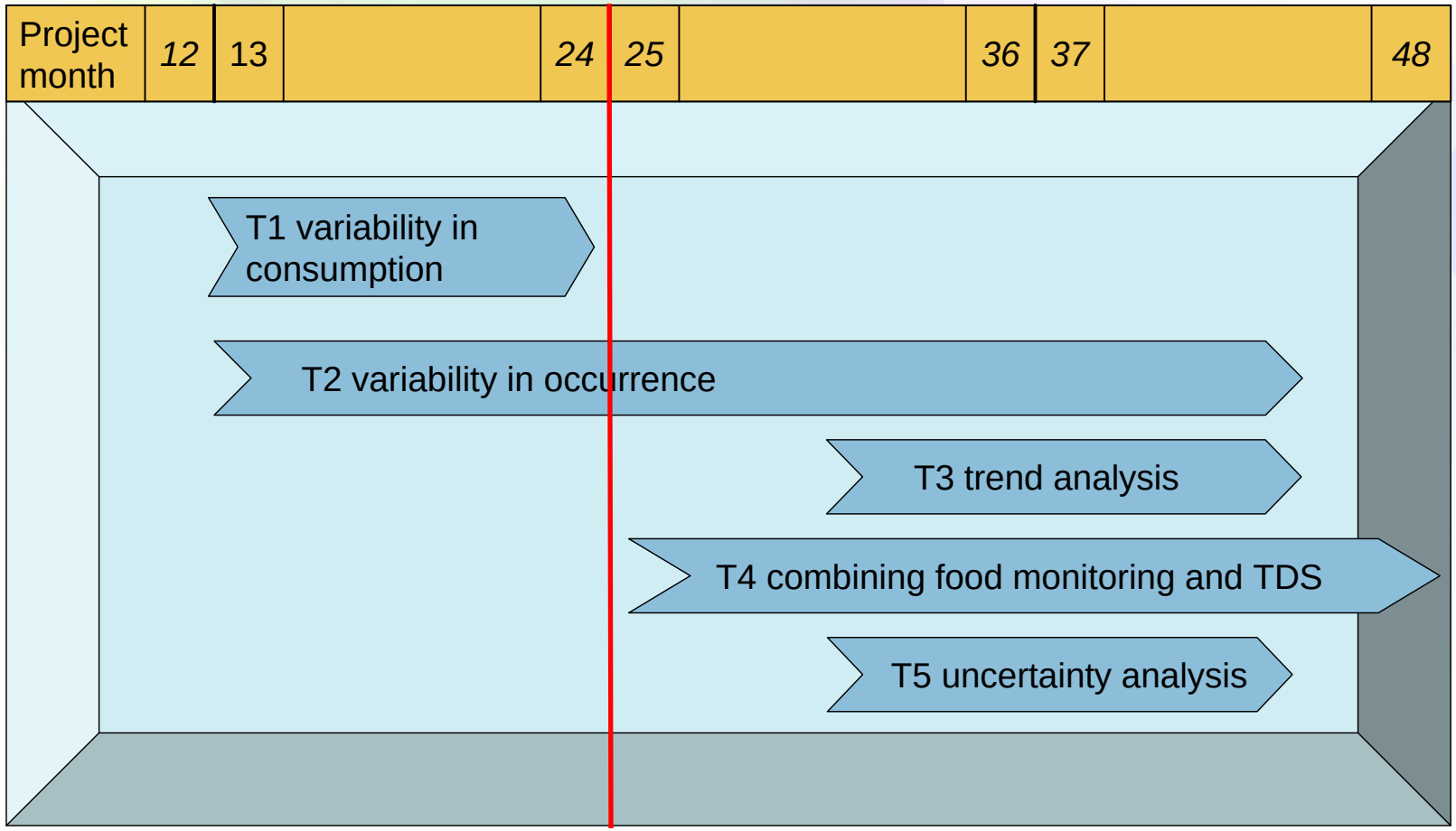
ORGANISATION OF WP7

WP-leader: BfR

Partners: ANSES, RIVM, NIPH/SZU, INRAN, UGENT, FERA, NIPH/ FHI, MATIS, URV



VARIATION IN CONSUMPTION - BACKGROUND

- Selection of foods to be analysed in TDS is based on average consumption of a reference population
- Questions arising with regard to such approach:
  - ? Does the food list derived also contain all relevant foods of sub-populations of interest, e.g. age, sex, vegetarians, high exposed?
  - ? Is the derived food list appropriate to cover 90% of exposure and not only 90% of average consumption?
  - ? Can TDS data of one country be applied to consumption survey data of another country?

Data for Cd from German LExUKon-Project

Food group	% of total average consumption	% of total Cd exposure	Rank consumption (out of 545 foods)	Rank Cd exposure (out of 545 foods)
Beef liver	0,006%	0,11%	190	89
Crustaceans	0,011%	0,27%	167	47
Squid	0,003%	0,13%	247	76
Spinach	0,005%	0,11%	207	88
Morels	0,004%	0,20%	230	57
Poppy seeds	0,001%	0,15%	302	69
Sunflower seeds	0,006%	0,64%	188	30
Linseeds	0,002%	0,14%	265	73
Sesame	0,002%	0,11%	268	87
Pumpkin seed	0,002%	0,12%	279	84

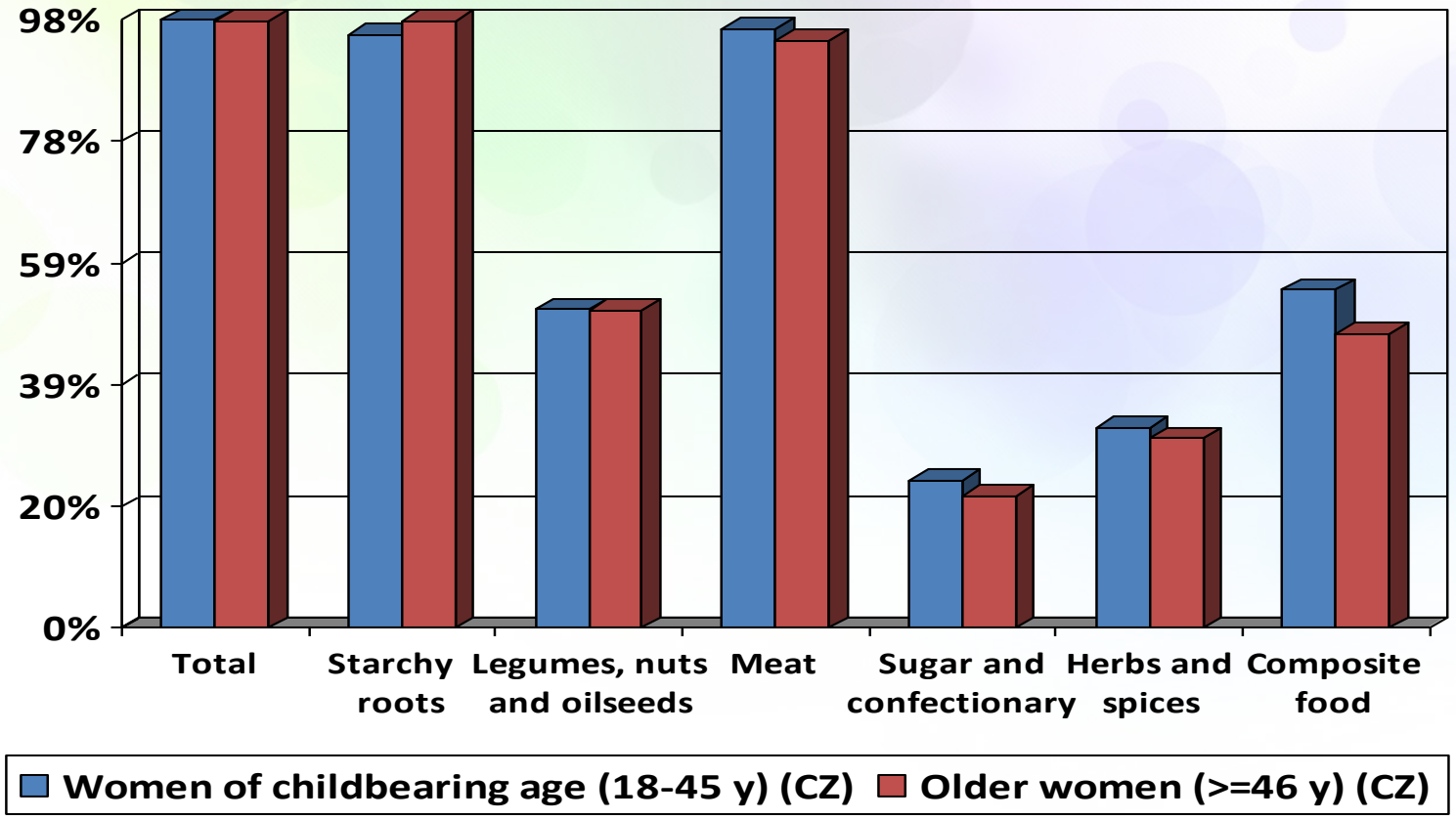
COVERAGE IN SUB-POPULATIONS

	Czech Republic	France	UK
Survey and age range	SISP04 (4-90 years)	INCA2 (3-79 years)	NDNS (19-64 years)
3-10 years	97,1%	90.4%	-
11-17 years	97,1%	91.3%	-
>= 18 years	97.6%	89.7%	31.8%
Adult men	97.6%	90.2%	31.4%
Adult women	97.6%	89.3%	32.1%
Women of childbearing age	97.7%	89.6%	31.4%
Older women	97.5%	88.9%	33.2%
Vegetarians	-	-	31.7%
non-Vegetarians	-	-	31.8%

COVERAGE AT FOOD GROUP LEVEL

- Presented here just for Czech Republic
- In report also available for France and UK
- Food Ex1 – Level 1
  - "Legumes, nuts and oilseeds", "Sugar and confectionary", "Herbs, spices and condiments" and "Composite foods" does have coverage below 90%
  - Special Nutrition was not included in the food list
  - Men versus women differ most for: legumes, nuts and oilseeds (61.4% for male, 51.3% for female) and herbs, spices and condiments (36.7% for male, 31.2% female)
  - Women of childbearing age (54.3%) and older women (47.3%): composite food
  - The most striking differences between the children (40.6%), teenagers (53.0%) and adults (56.1%): legumes, nuts and oilseeds
- Differences become higher for lower level of aggregation

Are sub-groups adequately represented in TDS food lists?
Differences in total diet and at food group level - Example CZ



FOOD ITEMS NOT INCLUDED IN FOOD LIST

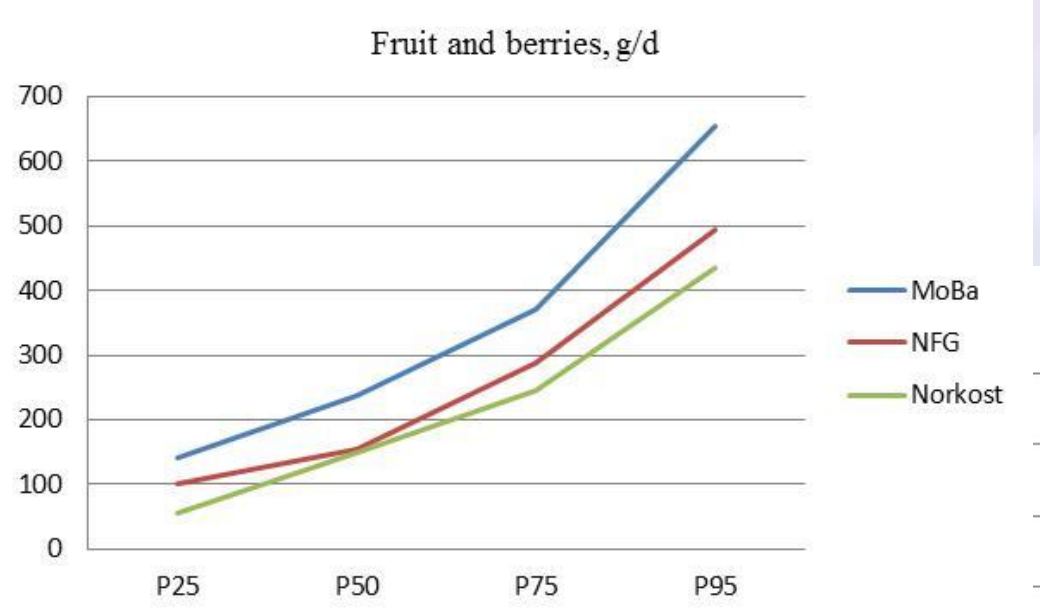
- Presented here just for France
- In report also available for Czech Republic and UK

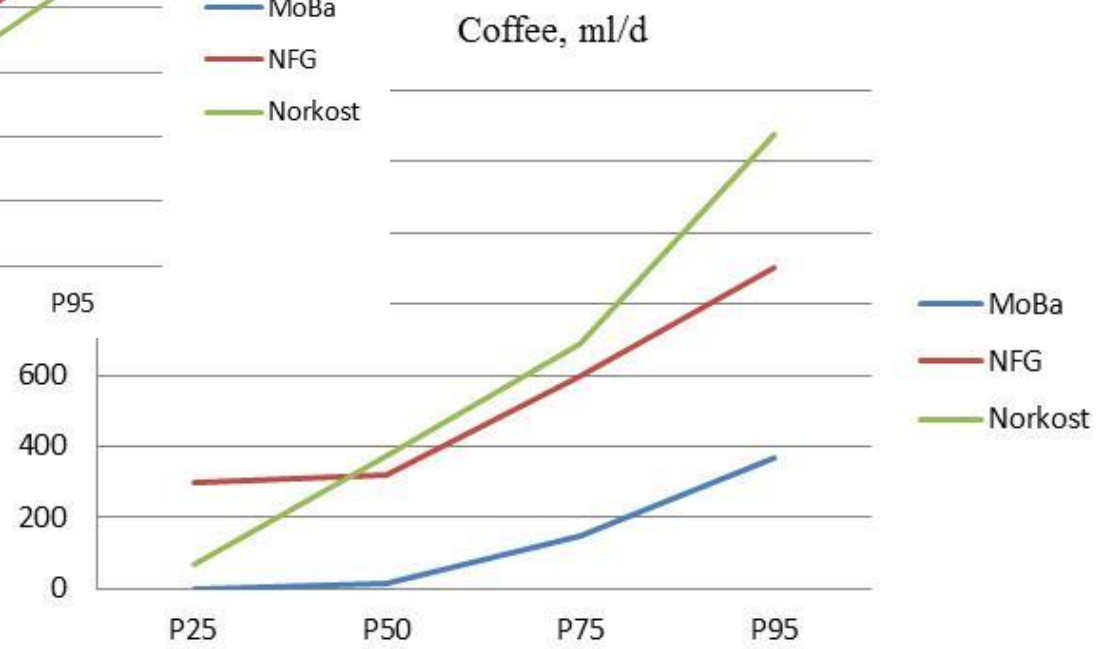
Matrix code	Food item	% Individuals (n=1918)	Mean consumers only (g/day)	Mean of total population in g/day
A.01.001653	Vinegar, wine	30%	3.5	1.1
A.01.000253	Pastries and cakes	27%	29.6	7.9
A.01.000454	Cultivated mushroom (Agaricus bisporus)	26%	17.4	4.5
A.01.001633	Salt	20%	0.9	0.2
A.01.001577	Still mineral water	19%	363.3	69.3
A.01.000332	Garlic, bulb (Allium sativum)	19%	1.0	0.2
A.01.001651	Mustard, mild	19%	2.2	0.4
A.01.000317	Vegetables and vegetable products (including fungi)	18%	19.9	3.6
A.01.000894	Cod and whiting (Gadus spp.)	18%	22.1	3.9
A.01.000320	Beetroot (Beta vulgaris subsp. vulgaris)	17%	15.7	2.7
A.01.001621	Pepper, black and white (Piper nigrum)	17%	0.8	0.1
A.01.001586	Parsley, herb (Petroselinum crispum)	16%	1.9	0.3
A.01.000361	Lettuce, excluding Iceberg-type lettuce (Lactuca sativa)	16%	12.5	2.0
A.01.001687	Cream sauce	15%	6.5	1.0
A.01.001578	Carbonated mineral water	15%	173.9	26.5

Pregnant women

- Are normally not adequately covered by food surveys
- Therefore comparison between cohort study of pregnant women in Norway (MoBa) with general Norwegian population
  - Task leader: NIPH/ Norway
  - Only aggregated data from Norwegian General Population available
  - Analyses finalized and report already drafted

WORK PROGRESS AND ACHIEVEMENTS



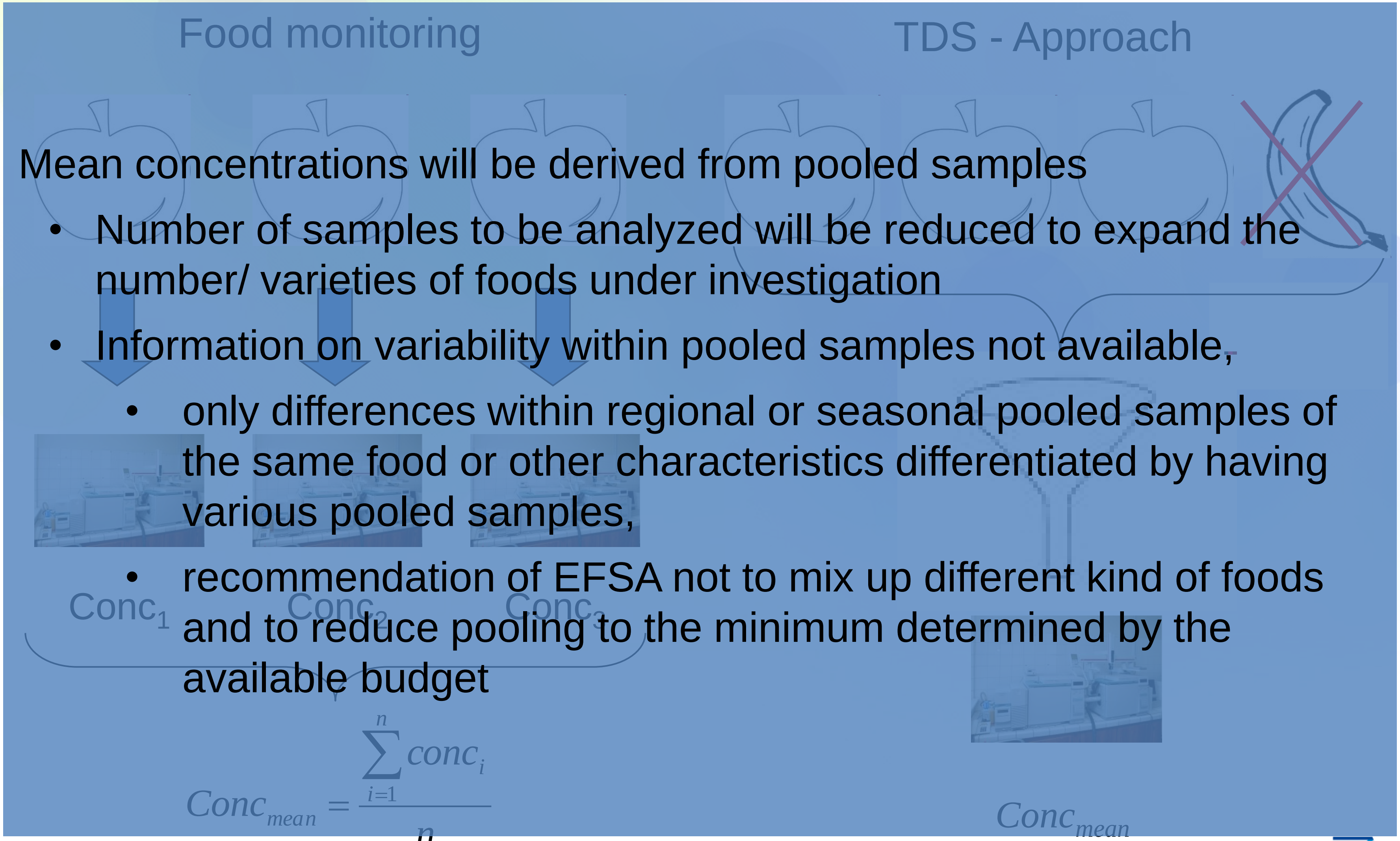


MAIN PRELIMINARY CONCLUSIONS

Analysis of variability in consumption data

- Concentration data of another country can't easily be applied to National food survey: There is a need for National TDS data
- Effort in planning TDS can be lowered by looking mainly to coverage of total population and not to each sub-population
- This seems also be true for pregnant women.
- High aggregation can cause problems in using results for sub-populations.
- It can be recommended to construct the food list by looking for 90% in each of the food groups and not only on 90% of the overall diet
- Missing 10% foods has to be checked carefully to have also high coverage for exposure and not only for consumption.

Variability in concentration data - Background



Mean concentrations will be derived from pooled samples

- Number of samples to be analyzed will be reduced to expand the number/ varieties of foods under investigation
- Information on variability within pooled samples not available,
  - only differences within regional or seasonal pooled samples of the same food or other characteristics differentiated by having various pooled samples,
  - recommendation of EFSA not to mix up different kind of foods and to reduce pooling to the minimum determined by the available budget

Substance XY in bread

Imagine you receive the information that bread was analyzed and a mean content of 10 mg/kg of substance XY was detected.

What questions would you have?

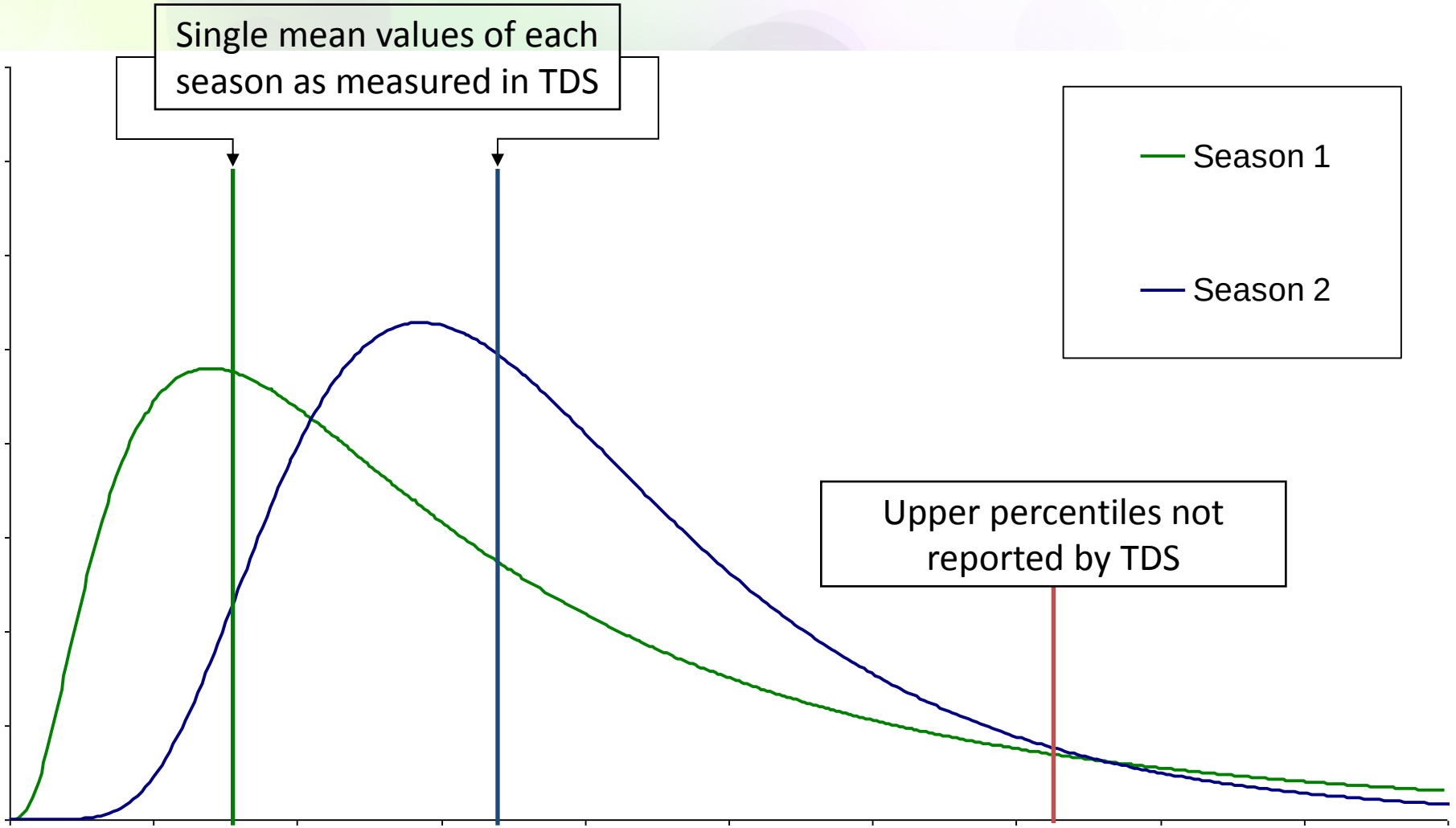
Variation within batch?

Variation within same manufacturer?

Variation within same type of bread of different manufacturers?

Variation of concentrations in all type of bread?

Distribution of concentration of substance XY in bread



VARIATION IN CONCENTRATION - TWO APPROACHES

- Approach 1
  - Use data of the food monitoring programs
  - Describe variation in the data
  - Look for factors to extrapolate from mean to high percentiles
  - Apply extrapolation factors to TDS data
  - Selection of substances was selected to fit for WP9 pilots: Cu, Se, Mn, Hg
- Approach 2
  - Use Icelandic fish data (mainly for cod)
  - Other as usually in food monitoring programs a lot of influencing factors are described there
  - Find statistical models to predict concentrations based on known influencing factors
  - Use models to calculate high concentrations in TDS

PRELIMINARY RESULTS FOR APPROACH 1
Example: Cu in German food monitoring

Nuts and oilseeds	sd : mean	P95 : mean
Almond, sweet	0,2	1,3
Peanut	0,3	1,4
Pistachios	0,2	1,3
Poppy seed	0,2	1,3
Pumpkin seeds	0,1	1,2
Sesame seed	0,2	1,2

Meat and offal	sd : mean	P95 : mean
Veal liver	0,6	2,0
Beef liver	0,7	2,5
Pork liver	0,6	2,4
Duck meat	0,4	1,8
Goose meat	3,4	1,4
Pork kidney	0,3	1,7
Beef kidney	0,6	1,2

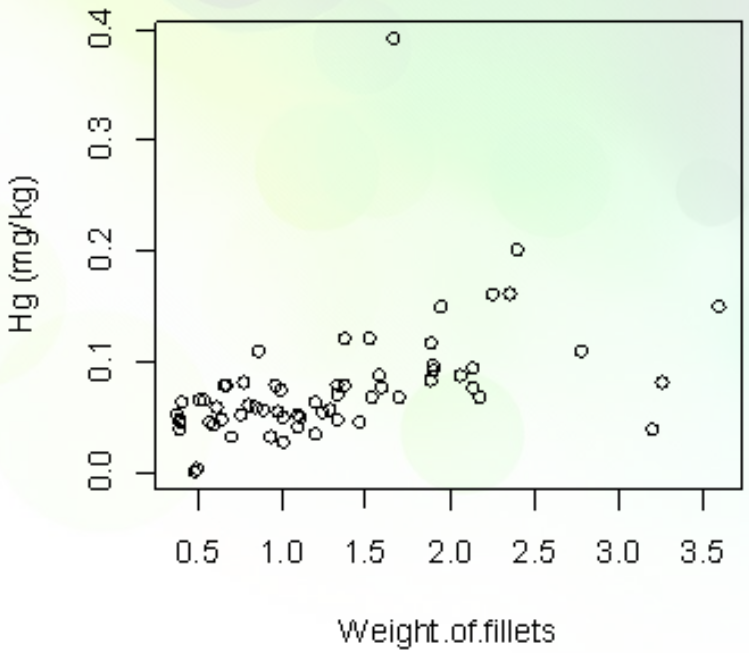
Fruits	sd : mean	P95 : mean
Kiwi	0,3	1,4
Peaches	0,4	1,6
Apricots	0,3	1,7
Bananas	0,3	1,5
Pear	0,5	1,7
Currants (red, black and white)	0,3	1,6
Gooseberries	0,3	1,6
Raspberries	0,5	1,8
Table grapes	1,1	3,5

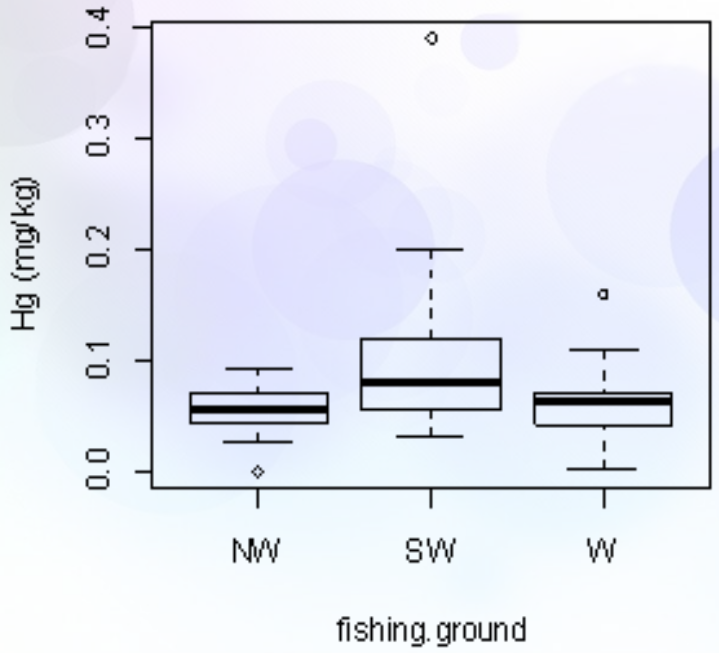
- Examples selected by having only 0 - 3% non-detects
- Similar foods seem to have similar factors

ISSUES TO BE DISCUSSED

- Test other approaches for extrapolation than using a simple factor
- Same food in TDS and food monitoring
  - Number of samples needed for robust results
  - Dealing with non-detects
  - Influence of different years
- Food analysed in TDS will have a substitute in the same food category in food monitoring
- Food analysed in TDS is analysed in food monitoring of another country
- Food analysed in TDS is analysed in food monitoring for a substance from the same substance group (e.g. heavy metals)

PRELIMINARY RESULTS FOR APPROACH 2
Variation in single cods of Icelandic Fish Database





- Linear model, to identify explanatory variables ($p < 0.05$) for variation of Hg-concentrations in cod contains two factors
    - fishing ground and vessel

MAIN PRELIMINARY CONCLUSIONS

Analysis of variability in concentration data

Approach 1

- It will be possible to do the planned simulations in concentration data with German data and for selected foods also in other countries
- Number of substances will be higher than planned in DoW
- Preliminary results are encouraging, that extrapolation will be possible at least under well defined circumstances

Approach 2

- If influencing factors are described it will be possible to apply linear models to explain variation in concentration data