

## Application of dietary surveys for risk assessment in Nordic countries

Ovaskainen, M.; Fagt, Sisse; Elfa Gunnarsdottir, B.; Hallas-Møller, Torben; Ingi Halldorsson, T.; Helldan, A.; Knutsen, H.; Lillegaard, I. T.; Lindroos, A.; Mikkilä, V.; Sand, S.; Steingrimsdottir, L.

*Publication date:*  
2012

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*  
Ovaskainen, M., Fagt, S., Elfa Gunnarsdottir, B., Hallas-Møller, T., Ingi Halldorsson, T., Helldan, A., ... Steingrimsdottir, L. (2012). Application of dietary surveys for risk assessment in Nordic countries. Poster session presented at 10th Nordic Nutrition Conference, Reykjavik, Iceland.

## DTU Library

Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# Application of dietary surveys for risk assessment in Nordic countries

Ovaskainen M, Fagt S, Elfa Gunnarsdottir B, Hallas-Møller T,  
Ingi Halldorsson T, Helldán A, Knutsen H, Lillegaard IT,  
Lindroos A, Mikkilä V, Sand S, Steingrimsdottir L.  
DTU DK, THL & EVIRA FI, Univ of ICELAND IS, UIO NO,  
Norwegian institute of Public Health NO  
NORDIRA-project

## The NORDIRA project

serve as a platform for capacity building in the fields of dietary survey methods as well as food safety related risk assessment methods

share experiences within applications of combining data of dietary surveys and occurrence of chemical hazards

discuss methodological developments needed for improving, standardizing and harmonizing data collection methods and representativeness and quality of food consumption data in the framework of risk assessment

Examples of how dietary surveys are used in exposure assessment of non nutrients are shown in the following.....

# Case 1. Risk assessment of caffeine among children and adolescents in the Nordic countries Meltzer et al 2008. TemaNord 2008:551

## Calculating exposure to caffeine by deterministic model:

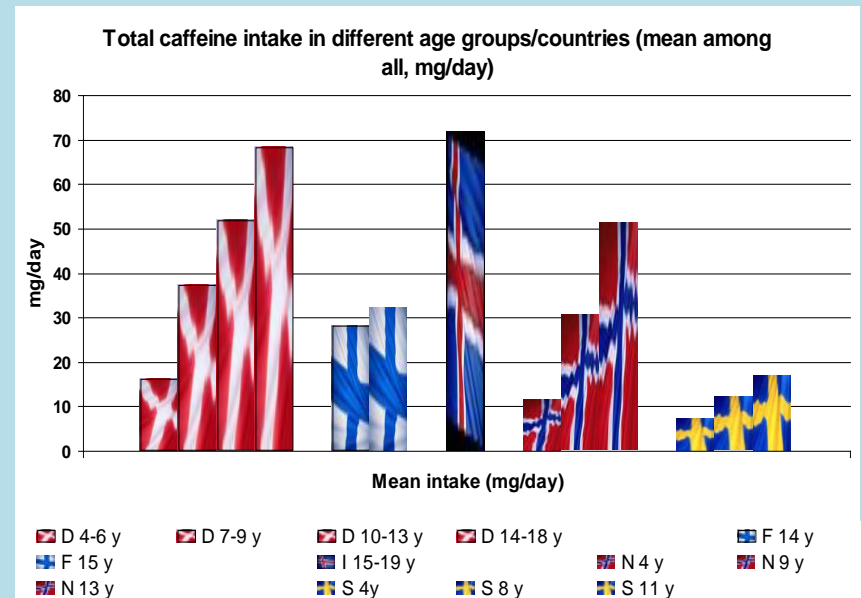
Intake from food =

Fixed value for food chemical concentration x  
fixed value for food consumption

Total intake = Sum of intake from all foods  
containing the chemical

## Food consumption data:

3-7 d food diary, 24 h recall



Conclusions: Current exposure of children in the Nordic countries to caffeine is of concern. Ten percent of children with the highest consumption exceeded the level where the tolerance may develop. Approximately 20 % of the teenagers might be exposed to levels of caffeine from caffeine-containing soft drinks inducing anxiety and jitteriness. Methodologically intake assessment of caffeine and estimation of exposure to caffeine from soft-drinks were partly based on assumptions due to lack of adequate information.

## Case 2. Estimated intake of benzoic and sorbic acids in Denmark. Leth et al. Food Additives & Contaminants 2010

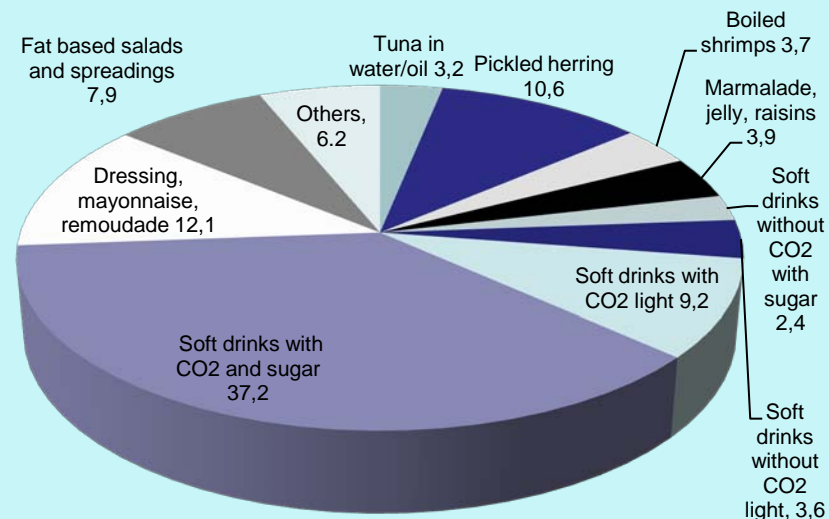


### Occurrence data:

Monitoring content of benzoic and sorbic acids in all food groups were allowed from 2001 to 2006. In all 1526 samples.

### Food consumption data:

The Danish National Survey of Dietary Habits and Physical Activity 2000-2004 Intake estimation was based on deterministic calculations.



Conclusions: The median intake of benzoic and sorbic acids were well below the acceptable daily intakes (ADI). Soft drinks and mayonnaise contributed most to the intake of benzoic acid (Figure) and sliced bread to the intake of sorbic acid. About 10 % of subjects exceeded the ADI for benzoic acid and 5-10 % for sorbic acid. A reduction of the maximum limits should be considered especially for the food groups contributing most for the intake. It was found relevant to estimate exposure to additives both by high intake calculation and average intake calculation.

# Case 3. Cumulative risk assessment of pesticides in Finnish adults.

Laakso et al. EVIRA Research 3/2010

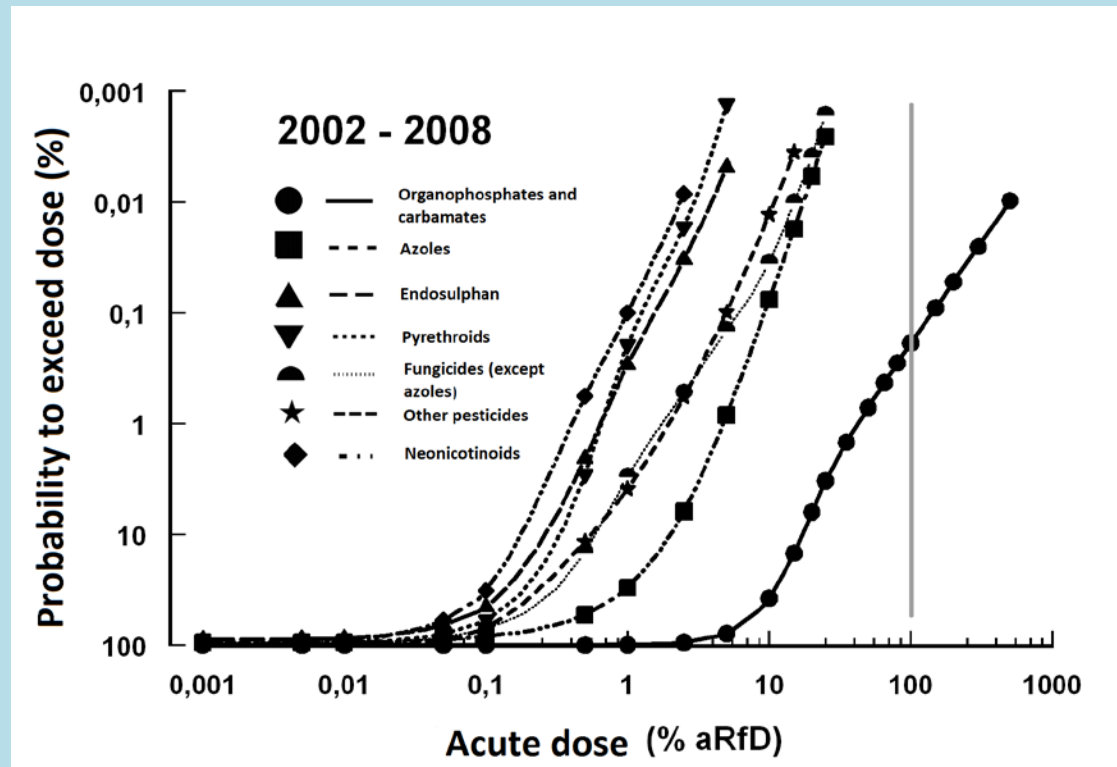


## Occurrence data:

Residue analysis of legal and illegal pesticides in 10600 samples.

## Food consumption

data: FINDIET2002, FINDIET2007, 48-h recall, food diaries ([www.thl.fi](http://www.thl.fi))



Conclusions: No concern with chronic exposure by probabilistic model.

Organophosphates and carbamates resulted in exceeding acute dose limit (Figure).

Probability of an aRfD exceedance decreased from 2002 to 2007 in adults.

Monitoring of subpopulations recommended. Dietary recommendations support increasing vegetable consumption.

For chronic exposure, food consumption for different time periods is necessary.

# Case 4. Norwegian Fish and game study (NFG), Lake Mjosa Study.

Knutsen et al. Mol. Nutr Food Res.2011, Birgisdottir et al Mol. Nutr Food Res. 2012



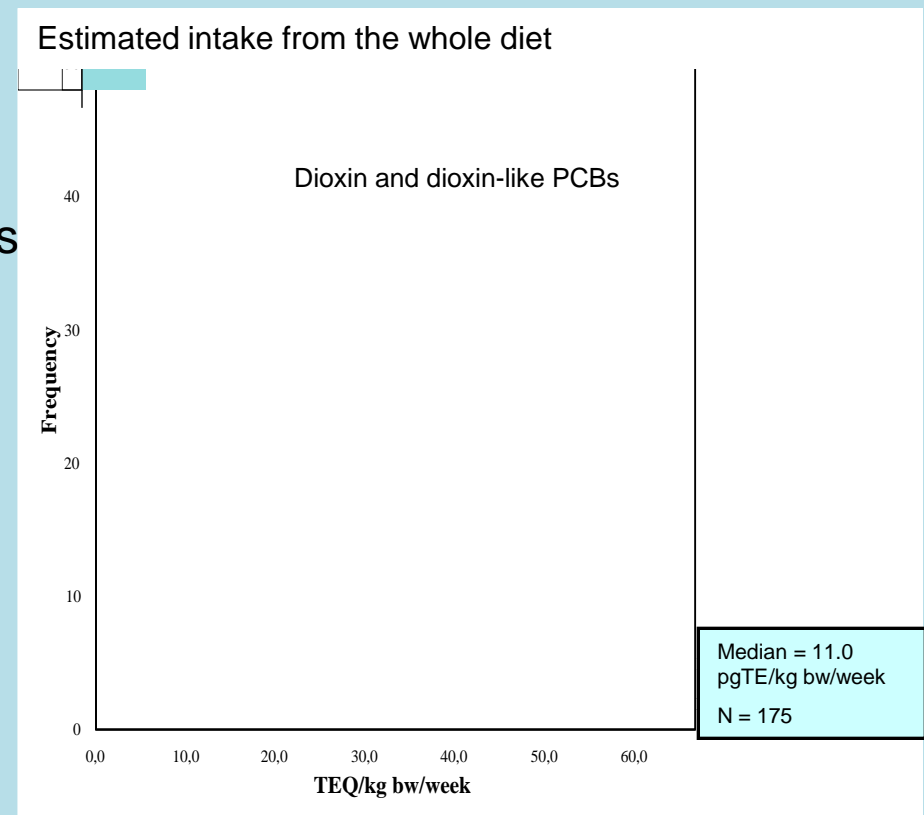
NFG: Nation wide part: qualitative food questionnaire.

High pollutant intake: In-depth study including FFQ and questionnaires, laboratory samples (2003)

Lake Mjosa Study: FFQ, questionnaires and laboratory samples (2004-2005)

Estimating dietary intake of dioxins, PCBs PBDEs etc., PFCs and metals (Hg, Cd, Pb, As etc.)

Conclusions: Some people exceed tolerable intake for dl-compounds (Figure). Despite high nutrient content dietary fish liver and seagull eggs should be restricted due to dl-compounds and possible vitamin A-D antagonism.



## Case 5. Assessment of dietary cadmium exposure

(Sand & Becker 2012)



### Occurrence data:

Monitoring programmes, market basket surveys

Between 1999-2008

### Food consumption data:

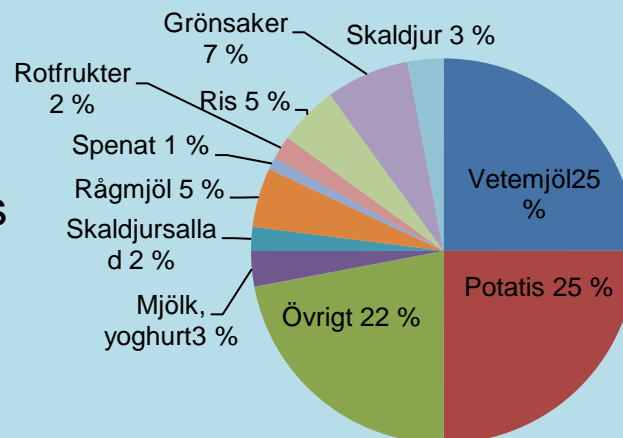
Riksmaten 1997-1998

### Conclusions:

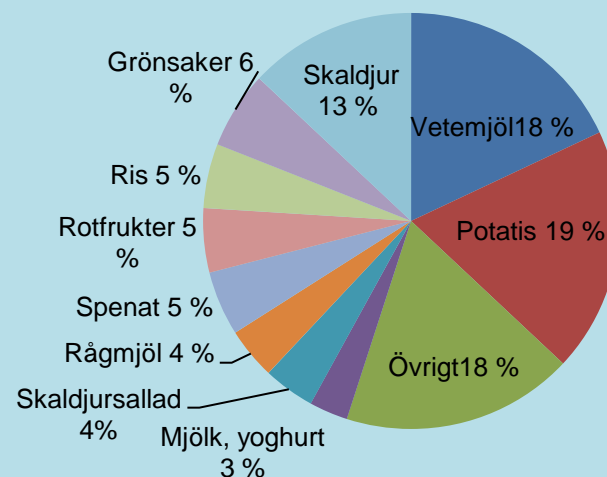
Contributors of cadmium intake differ by intake percentiles (Figure).

Potatoes and wheat flour are most important products for the Cd intake. Seafood, root vegetables and spinach contribute relatively more to the Cd intake among high intake individuals compared to the situation among median intake individuals. Matching level of occurrence data and consumption data matters.

### 45-55th percentile



### 97.5-100th percentile





# Learnings from the NORDIRA-project

- ❖ Matching occurrence data and food consumption data is case-specific
- ❖ Matching is working if foods described in similar details
- ❖ None food classification is satisfying all needs, tailored risk assessment is necessary
- ❖ Parallel consumption data is challenging **I DO NOT UNDERSTAND THIS SENTENCE – in what way challenging**  
(daily record, recall, monthly frequencies)
- ❖ Else?