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## **EARNEST**

EARly Nutrition programming- long term follow up of Efficacy and Safety Trials and integrated epidemiological, genetic, animal, consumer and economic research

Instrument: Integrated Project

Thematic Priority 5.4.3.1: Food Quality and Safety

### **Final public report on activity 2.1.2**

**Title of activity: Evaluation of similarities and differences between European birth cohorts**

Period covered from 15.04.2005 to 14.10.2010

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Duration: 5,5 Years

Organisation Name of Lead Contractor for this report: FIMIM

## Evaluation of similarities and differences between European birth cohorts

### 1. Introduction

Only few recent studies describe patterns of dietary intake among pregnant women in Europe, and little is known about current levels of deficiency or excess of key foods or nutrients, or about compliance with dietary guidelines across diverse socio-demographic groups in different countries. To address this gap, a goal of the EARNEST project's theme 2 was to evaluate whether data from existing studies across Europe were comparable and could be used to describe dietary intake patterns among pregnant women. Previous studies described the post-hoc harmonization of dietary data collected using different methodologies to be a major challenge to validity of such comparative analyses. Thus, an important first step was to assess the feasibility of and determine best approaches for adequately standardizing and harmonizing these data.

In a first step, we first assessed similarities and differences in data available in the Theme 2 cohorts. This analysis enabled the development of a successful protocol for standardizing and harmonizing dietary data from other potential collaborating cohorts, and was essential for determining the food groups for which adequate standardization could be achieved. The subsequent protocol involved carefully constructed guidelines on the range and variety of foods to be included in constructing standardized food group and subgroup definitions, and collected data on the number and types of foods included in base questionnaires, which was influential in estimates of means and variability in intakes.

### 2. Mother child cohorts included in European maternal diet harmonization study

14 eligible and interested collaborating studies were identified and included in the final dietary data harmonization project, as shown in **Figure 1**. These studies, which represented all four regions of Europe, had recently collected data on maternal diet during pregnancy. **Table 1** shows that there was considerable heterogeneity in the sample sizes included and the timing when studies were conducted; data from smaller regional studies may be less representative of nation-wide dietary patterns, and consequently less is known about maternal diet in these areas. Particularly in Eastern Europe, few

**Figure 1. Countries included in European maternal diet harmonization study**



studies were available and most were relatively small. Despite these limitations, the compilation of available data provides a useful overview of variability in the quality of maternal diet during pregnancy across Europe.

**Table 1. Birth cohorts participating in maternal dietary data harmonization project**

Country: Cohort	N	Enrollment period
<b>Northern Europe</b>		
1. Denmark: DNBC	70,133	1996-2002
2. England: ALSPAC	11,877	1991-1992
3. Norway: MoBa	54,350	1998-2008
4. Scotland: SEATON	1,710	1997-1999
5. Sweden: ABIS	15,659	1997-1999
<b>Western Europe</b>		
6. France: EDEN	1,610	2003-2005
7. Germany: LISA	3,039	1998-99
8. Netherlands: Generation R	1,203	2002-2006
<b>Southern Europe</b>		
9. Italy: GEPSII	597	2003-04
10. Greece: RHEA	1500	2007-08
11. Portugal: Generation XXI	327	2005-07
12. Spain: INMA	2,585	2003-08
<b>Central/Eastern Europe</b>		
13. Poland-Krakow	528	2000-02
14. Poland-Lublin	256	2007
15. Austria: Vienna	618	2006-08

### 3. Assessment of similarities and differences in dietary data collected in core Theme 2 cohorts

The first stage of analysis assessed the comparability of dietary questionnaires used in the core pregnancy cohorts in Theme 2: the Danish National Birth Cohort (DNBC), the Norwegian Mother and Child Birth Cohort (MoBa), the Avon Longitudinal Study of Parents and Children (ALSPAC) and the Infancy and Environment (INMA) study in Barcelona, Spain. This analysis assessed whether there were: (1) any large differences in key food groups with respect to the number and types of items included; and (2) any differences in the disaggregation of food sub-types necessary for estimating key nutrients (e.g. whole grain vs. refined grain). Results are presented in **Table 2**.

**Table 2. Comparison of diet questionnaires from EARNEST Theme 2 cohorts**

	INMA-Spain	ALSPAC-UK	DNBC-Denmark	MOBA-Norway
Years enrolled	2000-2005	1991-92	1997-2002	1999-2001
#	3.300	14.000	95.000	100.000
MAIN METHOD USED	FFQ	FFQ	FFQ	FFQ
Week(s) of pregnancy administered	10-13 & 28-32	Month 4	last month	22 weeks
Interviewer vs. self administered	Interviewer	self	self	self
Frequency categories	9 categories:	5 categories:	7 categories	7 to 10
Never	Nev (or <1x/mo)	Never/rarely	never	never
x times/month	1-3	Once/2 wks	1; 2-3	0; 1;2;3
x times/week	1; 2-4; 5-6	1-3; 4-7	1-2; 3-4; 5-6	1-2; 3-4; 5-6

x times/day	1; 2-3; 4-5; 6+	>1/day †	1; 2-3;4-5;6-7;8+	1;2;3;4;5;6+
<b>Special diets (vegetarian)</b>	Y	Y	Y	Y
<b>Supplement use</b>	Y	Y	Y	Y
<b>Food groups Y/N (# items)</b>	<b>89</b>	<b>58</b>	<b>&gt;220</b>	<b>&gt;240</b>
MEATS	Y 13	Y 5	Y 38	Y 37
FISH/SEAFOOD	Y 10	Y 3	Y 20	Y 24
DAIRY, EGGS	Y 9	Y 4	Y 14	Y 20
FRUITS, VEG, POTATOES	Y 21	Y 10	Y 68	Y 56
LEGUMES	Y 1	Y 2	Y 6	Y 2
CEREAL PRODUCTS	Y 6	Y 7	Y 9	Y 15
SNACKS & SWEETS	Y 9	Y 8	Y 23	Y 23
ADDED FATS	Y 4	Y 6	Y 3	Y 11
BEVERAGES	Y 16	Y 13	Y 20	Y 28
<b>Food group details, selected subgroups (Y/N) (# items)</b>	<b>89</b>	<b>58</b>	<b>&gt;220</b>	<b>&gt;240</b>
MEATS				
Meats-red, processed, game	Y 7	Y 2	Y 24	Y 23
Meats-organ	Y 2	Y 1	Y 3	Y 4
Poultry	Y 2	Y 1	Y 5	Y 6
Meat/poultry mixed dishes	Y 2	Y 1	Y 6	Y 4
FISH/SEAFOOD				
Fish-fresh, some processed	Y 4	Y 2	Y 15	Y 10
Fish-preserved	Y 3		Y 3	Y 7
Seafood (all non-fish)	Y 3	Y 1	Y 1	Y 4
Fish mixed dishes			Y 1	Y 3
FRUITS, VEG, POTATOES				
Fruits-fresh	Y 7	Y 1	Y 12	Y 15
Fruits-dried	Y 1		Y 2	Y 3
Vegetables	Y 11	Y 6	Y 34	Y 26
Vegetable mixed dishes			Y 13	Y 9
Potatoes (excl fries)	Y 1	Y 2	Y 5	Y 2
Potatoes (fries)	Y 1	Y 1	Y 2	Y 1

Notes: FFQ=Food frequency questionnaire. Questionnaires with >200 items include similar questions about basic food groups as do shorter instruments, as well as probes for subtypes/recipes (e.g. beef: beef stews, beef steaks, etc.) which are counted in the total # items. †Additional categories included for some items e.g. bread.

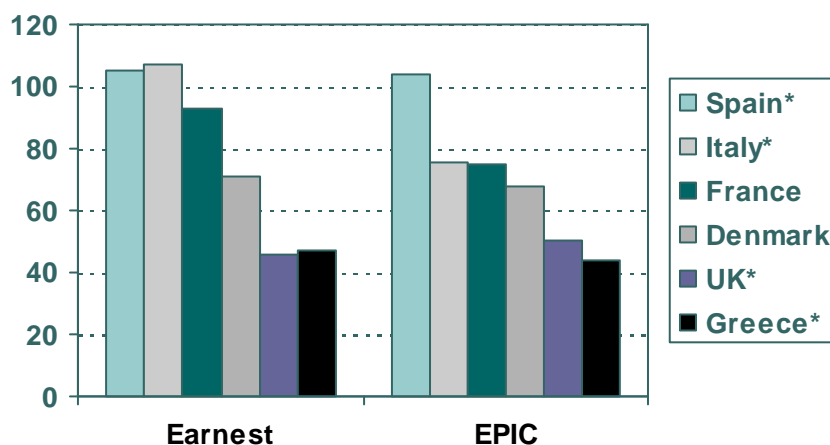
This analysis indicated that major food groups of interest shown in the table were included in some detail in all 4 studies. Furthermore, we determined that:

- The substantially higher number of items included to estimate intakes of particular food groups in the MoBa and DNBC cohorts was generally due to the use of probes which may enhance the accuracy of reporting and ability to detect differences in intakes. The number of items included in the briefer instruments used in INMA and ALSPAC seemed sufficient to rank women in terms of higher vs. lower intakes of these food groups.
- For some food groups (e.g. fish), differences in the number of items used to assess food group intakes reflect variability in the variety of items typically consumed in each country.
- There are some differences in the ability of survey instruments to disaggregate certain food sub-types (e.g. reasonable ability to disaggregate whole vs. refined grains, but more limited for standard vs. reduced fat dairy products--see Appendix 1). This will be a limitation.
- In a few cases, variability in intake estimates might be substantially reduced if both the number of frequency categories and the number of food items used were small: this may potentially influence disparities in estimates among smaller population subgroups within countries.

## 2. Assessment of comparability of harmonized dietary data in early participating cohorts

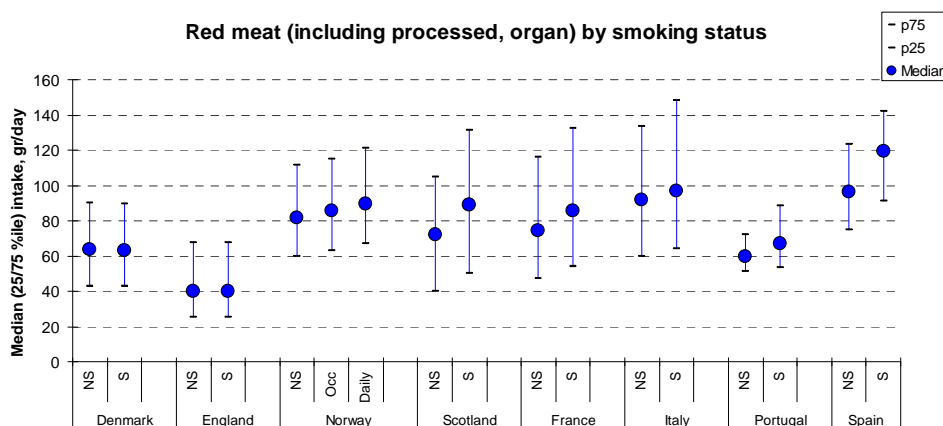
Using the protocol developed as described above, harmonized data from Theme 2 cohorts and several other cohorts were evaluated to assess the quality of the resulting data. As shown below for meats (**Figures 2**), results were compatible with expected patterns of intake across countries, indicating that the standardization/harmonization protocol was adequate. Further analyses by subgroups, for example smoking status (**Figure 3**) indicated that, as expected, in most countries smokers tend to have higher intakes of red and processed meats.

**Figure 2. Comparison of mean intakes reported in selected EARNEST Theme 2 cohorts vs. the European Prospective Investigation in Cancer and Nutrition (EPIC)**



\* EPIC data shown for these countries is mean of men and women because of higher underreporting in women

**Figure 3. Red meat intakes among smokers vs. non-smokers during pregnancy in selected countries**



In conclusion, although harmonisation and standardisation of the dietary intake data between European cohorts is complex, analysis of large existing European cohorts of pregnant women showed that this is feasible. The availability of protocols for standardisation and harmonisation developed within the EARNEST project will serve for future joint analyses of European mother-child cohorts.