

Papers produced from the Health Inequalities Audit Process

Diet, Nutrition and Obesity

Task 2. Obesity, Nutrition and Diet by
SES.

Opportunities for Creating Interactive
Maps.



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The attached paper has been produced as part of the Health Inequalities Audit process, within the scope of the Joint Action on Health Inequalities – Equity Action.

Diet, nutrition and obesity were identified as priority subjects by an iterative process, considering a range of health and non-health policy areas within the EC which were potentially amendable to a review process considering their contribution to the socio-economic gradient in health status. The review is to inform future discussions in the relevant policy areas of what would help to tackle differences in behaviours, and outcomes across the socio-economic gradient.

The areas covered in this paper were identified in a discussion between the Head of Service, Nutrition and Physical Activity and the lead on Health Inequalities both within DG Health and Consumers (European Commission), and with Chris Brookes, Coordinator of Equity Action, Tim Lobstein of the World Obesity Federation and Aileen Robertson, Public Health Nutritionist at the Metropolitan University College, Copenhagen.

The outcomes are intended to provide a review of the contribution of SES inequalities in aspects of diet, nutrition and obesity and helping to identify the scale of the inequalities, and therefore some of the benefits of addressing them.



TASK 2. OBESITY, NUTRITION AND DIET INEQUALITIES AND NATIONAL POLICY RESPONSES – OPPORTUNITIES FOR CREATING INTERACTIVE MAPS

By Tim Lobstein

Author's Profile

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Executive summary

This document examines potential sources of information to form the basis of a map-based set of resources in relation to obesity, nutrition and social inequalities in the European region.

Three types of mapping information are discussed: (i) displays of data derived from surveys of relevant information, such as obesity prevalence or food consumption data, differentiated by SES, (ii) comparisons of countries, categorised by inequality-related variables such as the Gini Index, and showing obesity or food consumption data, and (iii) mapping of policy-related features, such as the presence or absence of policy statements on SES, inequalities, food consumption, obesity, etc. Such maps may be geographically displayed, or displayed using some other conceptual schema to arrange the information graphically. Examples of geographically-organised information are provided.

For **obesity**, several datasets are available, probably the most comprehensive being the Eurostat data from the European Health Interview Surveys – currently based on the 2006-2009 round of surveys and soon on the 2013-2015 round – for adults, and the Health Behaviour of School Children for children aged 11, 13 and 15 years. Both sets of surveys use self-reported heights and weights, which are not as accurate as measured heights and weights and may underestimate the true prevalence of obesity, and this bias may be unevenly distributed across SES groups.

Other sources can be used to supplement these surveys, including several EU-funded research projects which took measured heights and weights of children in several Member States, and the Child Obesity Surveillance Initiative (COSI) programme of data collection, which recommends but does not require collection of information on SES.

For **diet and nutrition**, fewer consistent surveys are available. Food frequency questionnaires and food diary surveys have been undertaken by most Member States at least once in the last two decades, but the surveys are not directly comparable with each other, and not all collect information on SES variables. The *European Food and Nutrition Report 2009* provides some food consumption information by SES category (educational attainment) for 14 Member States. Eurostat provides the self-reported responses to two questions, about fruit consumption and salt (sodium) consumption, by income and educational attainment. The Health Behaviour of School Children provides information on breakfast, fruit and soft drink consumption according to family affluence, based on self-reported statements.

Specific EU-funded research projects can provide further information on food consumption patterns, including the detailed nutrition data collected by the EPIC survey, which took dietary data and blood nutrient indicators, along with SES variables, but the surveys are not designed to be nationally representative. The DAFNE database of Household Budget Surveys has details of food purchases according to household characteristics, but this database appears not to have been updated since the late 1990s, for most countries.

For policy statements, the two most promising sources of information are the NOPA collection of policy documents or links to policy documents, and the Equity Action database providing a portal for policy documents on health and SES issues. In both cases, each document would have to be inspected and the relevant information extracted.



Mapping inequalities

Three types of information are potentially useful for producing maps which link obesity, nutrition and diets, showing SES differentials. The first type is derived from surveys which measure SES variables in conjunction with obesity and/or diet and nutrition information. This provides graphics such as gradients of obesity prevalence, or food consumption, across SES, and can be provided on a 'per country' basis.

The second type of mapping information compares countries, categorising or ranking them by a national measure of inequality (e.g. Gini Index) and showing gradients of obesity or dietary pattern across this measure of inequality.

The third type of mapping information compares policy characteristics – e.g. presence or absence of statements on SES in obesity policies, or presence/absence of statements on diet and obesity in inequalities policies.

Maps may also be structured around geographical areas, where data country by country can be rapidly shown (e.g. through pop-up links to data displays). Alternatively maps can be based on conceptual schema, such as the UK Foresight map showing interactions between the drivers of obesity, in which pop-up links to policy documents could be created. In the present document we will focus on geographical maps.

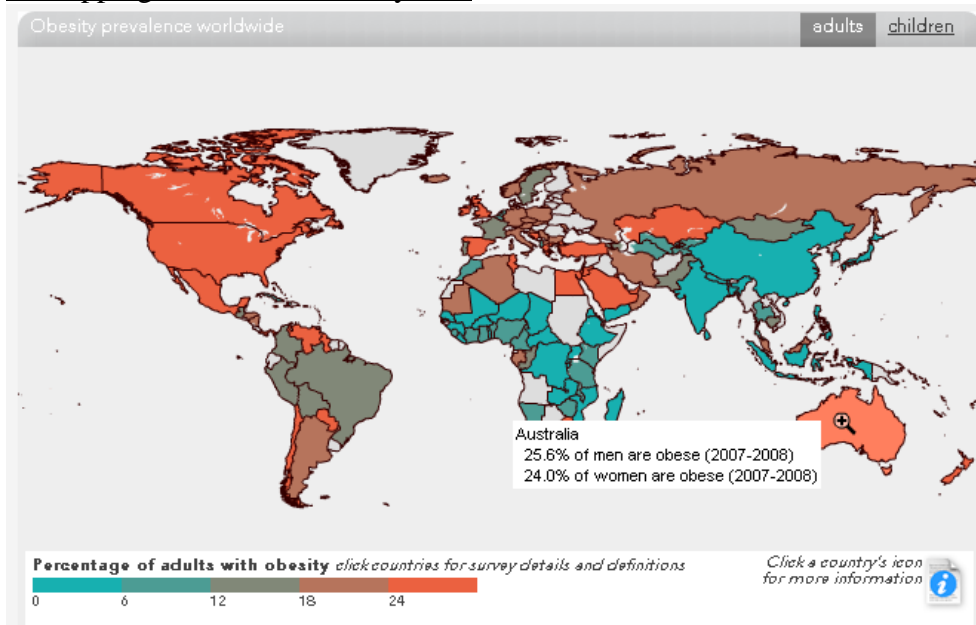
Examples of interactive maps can be found on the World Obesity Federation website, showing prevalence data (<http://www.worldobesity.org/aboutobesity/world-map-obesity/>) and policy-related information (<http://www.worldobesity.org/what-we-do/policy-prevention/projects/marketing-children/policy-map/>) and information on community interventions (<http://www.worldobesity.org/what-we-do/policy-prevention/projects/spotlight/intervention-atlas/>).

These examples are illustrated on the next page.



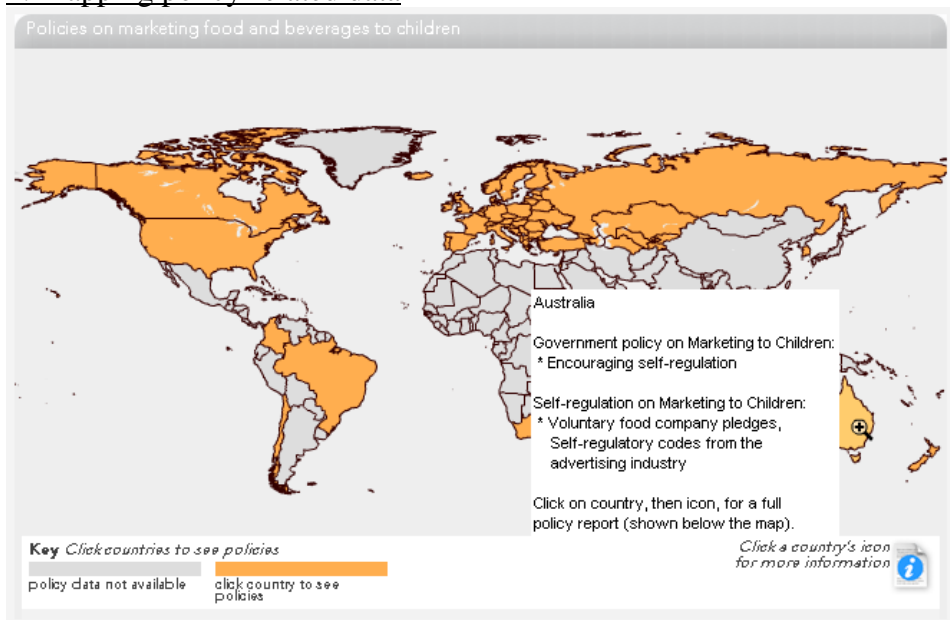
Examples of interactive maps from the World Obesity Federation website

1. Mapping statistical summary data



In this example, mouse roll-over shows summary prevalence data for obesity levels in adults from recent surveys (here showing Australia). Clicking on the country opens a panel which lists more detailed data and the sources.

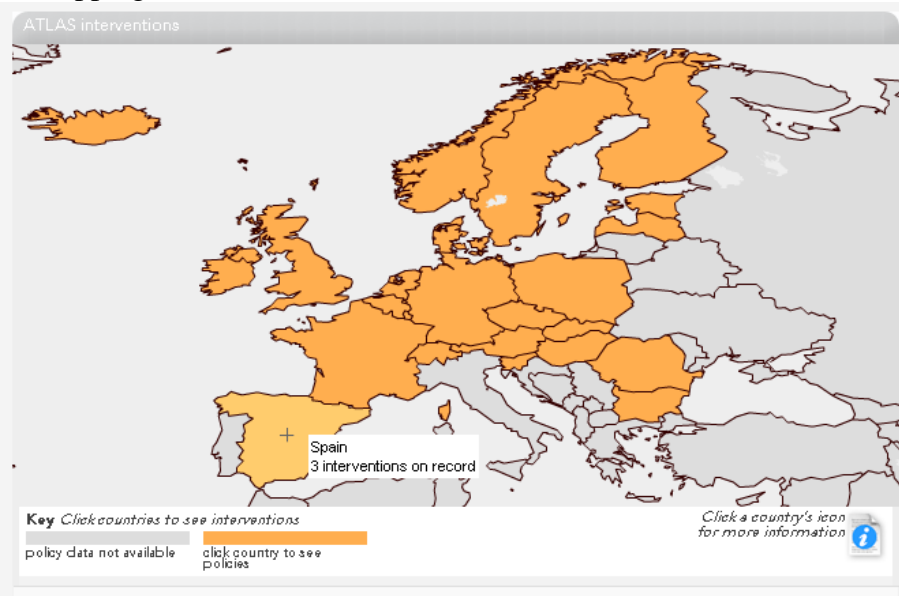
2. Mapping policy-related data



In the example above, mouse roll-over shows summary information on the current policies on marketing to children operating in a country (here showing Australia). Clicking on the country opens a panel which lists policy details and source documents.



3. Mapping of interventions



In this example, mouse roll-over shows the number of interventions for which details have been collected (here showing Spain). Clicking on the country opens a panel which lists the interventions, and gives further links to detailed description for each one:

ATLAS record for: Spain

There are 3 interventions recorded:

Please click on the titles for more information

Title	Summary
PAAS <i>(Integral Plan for Health Promotion through Physical Activity and Healthy Eating (PAAS))</i>	Aims to decrease the rise in overweight in the general population by implementing a national plan targeted on PA and healthy diet.
Healthy eating as a family	Aims to promote healthy eating as a family by educating teachers and parents.
NAOS strategy – Family and community component	Aims to promote a healthy diet and increase physical activity.



Overview of data sources

Obesity

European surveys of obesity are undertaken through specific research programmes, national health and nutrition surveys, and sampling of data collected primarily for other purposes, such as hospital admissions. The latter are particularly unreliable as they will not be representative of populations. National health and nutrition surveys offer a better source of information, with proper sampling frames and trained survey staff, but because of their resource costs they are unlikely to be undertaken routinely (e.g. annually). At present, it appears that only the UK undertakes annual sampling across all age groups, and then only in England.

Surveys of obesity and overweight are derived from direct approaches to schools or households, and heights and weights are either recorded from professionally measured anthropometry or derived from questionnaires asking individuals to report their own, and/or their children's heights and weights. These latter, self-reported measures are more prone to bias, with evidence that women tend to underestimate their weights and men to overestimate their heights, and the self-reporting bias is not uniform across social groups or age groups or between countries, and may change over time.^{1 2 3} Even surveys which collect measured weights and heights, such as the Health Survey for England, have limitations: in particular, nearly half of those approached decline to participate, and those that do participate may opt out of specific sections of the survey (and such self-excluders may be differentially spread across BMI categories and across SES groups). In contrast, the National Child Measurement Programme collects measured heights and weights in all children at age around 5 and 10 years in England, annually (from 2006), with few refusals (inclusion rates around 92%-95%).

The most comprehensive data on BMI categories according to SES variables (income quintile, educational attainment) are shown in the Eurostat on-line database. Data are available for 2008 based on the 2006-2009 European Health Interview Surveys collected in 17 Member States. The next round (2013-2015) is currently underway and will collect information from all Member States. Data collection methods differ across Member States, with some using face-to-face interviews and some using self-administered questionnaires. Heights and weights are self-reported in most member state surveys, although the UK survey (and possibly others) uses equipment to weigh and measure respondents during the interview. These variations are not mentioned in the database tables. SES variables include educational attainment in three levels and household income in five levels.

For children, the most comprehensive data on BMI categories are collected in the Health Behaviour of School Children surveys (2008-2009 survey). This reports overweight and obesity, collected from self-reported heights and weights. SES data is according to higher or lower family affluence. The published report provides only a summary for each country showing whether overweight is greater in higher or lower SES households, for boys and girls separately. Presumably the underlying data could be used to identify overweight and obesity prevalence levels according to family affluence level.

¹ Connor Gorber S, Tremblay M, Moher D, Gorber B. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. *Obes Rev.* 2007 Jul;8(4):307-26.

² Lyons AA, Park J, Nelson CH. Food insecurity and obesity: a comparison of self-reported and measured height and weight. *Am J Public Health.* 2008 Apr;98(4):751-7.

³ Connor Gorber S, Tremblay MS. The bias in self-reported obesity from 1976 to 2005: a Canada-US comparison. *Obesity (Silver Spring).* 2010 Feb;18(2):354-61



Eurobarometer collected data on heights and weights of respondents in the Health and Food survey conducted in 2005, using self-reporting by interview.⁴ SES variables for education and occupation are also collected. The main report gives an overview for all countries combined for respondents' average height, weight and a ratio of the two, by SES variable. Presumably the original data could provide BMI, overweight and obesity, by each Member State. However, the Eurostat data should be equivalent, and are more recent (2008).

SHARE – the Survey of Health, Ageing and Retirement in Europe – has undertaken a several waves of research across 18 Member States, with the last in 2010-2011, and the next one is due 2013-2015. The 2010-2011 survey covered adults aged 50-64, 65-74, and 75+ years, and included questions on height and weight (self-reported), along with SES variables (income, educational attainment).

Surveys are more commonly undertaken by research institutes and specialist agencies, but such surveys rarely use comparable sampling frames across more than one country, and they do not routinely include SES variables. One of the largest studies, the European Prospective Investigation into Cancer (EPIC) study of diet and cancer covered ten Member States with samples of adults (age ranges varied in different samples), collecting self-reported heights and weights. SES measures included educational attainment levels. Samples were not structured to represent national populations.

The ENERGY and TOYBOX projects in children aged around 10 years and 5 years old respectively. The COSI programme has also sampled children in a comparable way, across an increasing number of countries and over several years in a row, but the collection of SES information appears to be voluntary and the data has not been published.

The EURO-PREVOB and the HOPE studies included some reviews of policies in relation to obesity. The NOPA database would provide a more recent source for this analysis.

Diet and nutrition

Several sources of information are available: (i) specific research projects into food purchases or consumption patterns, (ii) nationally-run surveys of food intake and nutrition, (iii) household purchase surveys looking at household-level income, purchasing and budget factors, and (iv) national measures of food supplies and markets.

Specific research projects are normally found through searches of the published scientific literature. While these means of data collection are usually the lowest cost, they are rarely comparable between different time periods within a country, or across different countries. The EPIC study of diet and cancer covered ten Member States with samples of adults (age ranges varied), collecting self-reported dietary patterns using quantitative dietary questionnaires of food frequency questionnaires. SES measures included educational attainment levels. Samples were not structured to represent national populations. The IDEFICS, ENERGY and TOYBOX studies all provide information on dietary patterns in children, which can be cross-correlated with SES and obesity variables.

National diet and nutrition surveys are more robust and representative, but the cost of mounting such surveys means that not all countries have been able to run a comprehensive survey, let alone a series of such surveys

⁴ Eurobarometer 2006 *Health and Food* http://ec.europa.eu/health/ph_publication/eb_food_en.pdf



to gather trend data over time. The major review by Elmadfa in 2009⁵ lists available national surveys and is able to make comparable estimates for dietary intake according to SES (educational attainment) for 14 EU member states, using national surveys which were reported between 1996 and 2005. Care must be taken when making comparisons between member states' surveys as methodologies may differ: some use 24-hour recall, some use 3-day recall, some use a 7-day diary, some sample adults in restricted age groups while others are broader-ranging, some use interviews and others rely on questionnaires, some show picture of portion sizes and others make estimates based on recipes of ingredients, some attempt to survey around the year while others may be affected by seasonal dietary patterns.

In 2008, the European Food Safety Agency (EFSA) attempted to provide some standardised data across Member States, using national surveys to create a Concise Food Consumption Database. This was limited to 15 common food and beverage items. The Concise Food Consumption Database has since been expanded to form the *Comprehensive* Food Consumption Database,⁶ which uses 20 categories of foods and beverages, each with levels of subcategory allowing some 160 classifications in all. Food consumption data are derived from national and regional surveys and cover infants (2 surveys from 2 Member States), toddlers (8 surveys from 8 Member States), children (16 surveys from 14 Member States), adolescents (14 surveys from 12 Member States), adults (21 surveys from 20 Member States), elderly (9 surveys from 9 Member States) and very elderly (8 surveys from 8 Member States) for a total of 32 different dietary surveys carried out in 22 different Member States. While EFSA does not appear to show data for differential dietary patterns according to SES, it does indicate that four of the Member States' surveys (Austria, Ireland, the Netherlands, UK) contain such information.

Publicly available Euromonitor data do not appear to show food consumption patterns differentiated by SES variables. Euromonitor does not appear to collect its own primary survey data, and Euromonitor food consumption figures appear to be derived from nationally reported surveys and EFSA-collated data described above, and household and FAO food balance sheet sources described below.

Household budget surveys (HBSs) are systematically conducted by national statistical offices in representative samples and include data on food availability at household level, and usually include an estimate of household income or educational attainment level, which allows some differentiation by SES group. The use of the national HBSs for nutrition monitoring purposes has been evaluated through the EU-supported Data Food Networking (DAFNE) initiative, which built up a regularly updated food-based databank. This provided information on (a) the identification of dietary patterns prevailing in Europe and of their sociodemographic determinants,⁷ and the database is held at the University of Athens (<http://www.nut.uoa.gr/dafnesoftware/>) but appears not to have been maintained since 2005, and has information on very few HBS surveys after 1999.

Eurostat also makes use of Household Budget Surveys, but according to its website the last round of such surveys was in 2005.⁸ However, the Eurostat database using responses from the European Health Interview Surveys provides details of SES variables (household income quintile and educational attainment level) along with self-reported information on dietary components in respect of two variables: the consumption of fruit and the consumption of vegetables.

⁵ Elmadfa I (ed). *European Nutrition and Health Report 2009*. Karger 2009.

⁶ See details at <http://www.efsa.europa.eu/en/efsajournal/doc/2097.pdf>

⁷ Trichopoulou A, Naska A, Costacou T and DAFNE III Group: Disparities in food habits across Europe. *Proc Nutr Soc* 2002;61:553–558.

⁸ See http://epp.eurostat.ec.europa.eu/portal/page/portal/household_budget_surveys/introduction



The Health Behaviour of School Children report provides information on breakfast consumption, fruit consumption and soft drink consumption, and reports whether such consumption is found more frequently among children of higher or lower family affluence. Presumably the survey could be reanalysed to give actual levels of consumption by family affluence.

Eurobarometer's 2006 *Health and Food* report, cited above, provides some data of self-reported attitudes to healthy diets and self-reported consumption of fatty foods, fruit and vegetables, reported by SES variables (occupation and educational attainment) summarised for all Member States combined. Presumably disaggregated data by individual member State could be extracted.

Eurobarometer's 2009 report *Public Health Attitudes, Behavior, and Prevention* includes similar variable on dietary attitudes and behaviour as the 2006 report, but does not appear to include height, weight or BMI information.

SHARE – the Survey of Health, Ageing and Retirement in Europe – has undertaken a several waves of research across 18 Member States, with the last in 2010-2011, and the next one is due 2013-2015. The 2010-2011 survey covered adults aged 50-64, 65-74, and 75+ years, and included questions on self-reported estimates of intake quantities per week of four food categories: dairy foods, meat, legumes and fruit/vegetables, along with SES variables (income, educational attainment).

The Food and Agriculture Organization of the United Nations (FAO) collects data from governments on food supplies, production, imports, exports and population size to calculate food quantities moving into domestic consumption, and reports this annually. The FAO Food Balance Sheets show amounts in total and per capita for some 70 food items, and provides food energy, protein, fat estimates from the food quantities. There is no differentiation by any population sub-category.

Policy analysis

There appears to be no comparative analysis of policies in Member States for their approach to SES and obesity issues, since the review commissioned by DG Sanco from Robertson et al in 2007.⁹ This review highlighted the importance of assessing SES issues within health and obesity policies and also health and obesity issues within policy documents addressing SES inequalities. It emphasised (as has the Marmot papers subsequently) then importance of looking at life-course and developmental stages and the need to implement policies for infants and young children. Follow-up analysis of health policy responses is also found in the 2010 report *Poverty and social exclusion in the WHO European Region: health systems respond*.¹⁰

Data sources for mapping Member States for their references to SES in health policy documents include the NOPA database hosted by the European Office of the World Health Organization and the Equity Action

⁹ Robertson A, Lobstein T, Knai C. *Obesity and socio-economic groups in Europe: Evidence review and implications for action*. SANCO/2005/C4-NUTRITION-03, Brussels 2007.

¹⁰ Copenhagen, WHO Regional Office for Europe, 2010

http://www.euro.who.int/_data/assets/pdf_file/0006/115485/E94018.pdf



*European Portal for Action on Health Inequalities*¹¹ which includes information on the mention of health inequalities in social inclusion policies as well as SES determinants in health policy documents.

Other potential sources of information include specific research studies on policy-related issues, including the EURO-PREVOB and HOPE studies, and analysis of related issues, such as cardiovascular prevention policies analysed in the Euroheart project.

Table 1. Fourteen sources of data for possible mapping of SES differentials in obesity, nutrition and diet

Source	Data
Health Behaviour of School Children	Primary research. A series of HBSC reports on young people (aged 11, 13 and 15 years), the most recent in 2009/2010, in 43 countries in Europe and North America. Self-reported questionnaires covering relations with family, peers and school, physical health and satisfaction with life, health behaviours (patterns of eating, tooth brushing and physical activity) and risk behaviours (use of tobacco, alcohol and cannabis, sexual behaviour, fighting and bullying). Includes heights and weights, and describes health and social indicators by gender, age group and levels of family affluence.
Elmadfa: European Nutrition and Health Report 2009	Derived data from published national surveys. Identifies national surveys of diet and nutrition which have SES variables included – e.g. France, Germany, Sweden, UK. Reports differential dietary patterns by educational attainment level, as estimated from national surveys.
Eurostat	BMI categories and fruit and vegetable consumption available by SES variables (income quintile and educational attainment) for 17 member states (all member states in the next round 2013-2015). Survey uses self-reported measures in most member states, but not all.
Eurobarometer	Two reports in the last decade provide information on heights and weights and dietary patterns, by SES variables (occupation, educational attainment) (see text above). Published data are for all Member States combined, so disaggregation would be required.
NOPA	Databank providing links to policy documents relating to national nutrition and obesity policies. Each document would need to be searched for SES-related content.
Euro Health Net	This is a portal for linking through to policy document relating to inequalities and social exclusion policy documents.
COSI	Primary research. Children aged 6-9 years, surveyed 2008-ongoing, 21 countries, measured heights and weights, questionnaires for diet and PA. Some countries record index of family SES but differential results have not been published and would need to be sought from each country team.
EPIC	Surveys of dietary patterns and biomarkers as potential predictors of cancer. Includes self-reported height and weights, dietary intake measures and SES variables including educational attainment. Samples not designed to be nationally representative.
ENERGY	Primary research. Children aged 10-12yrs, surveyed 2010 and interventions in schools and families, with SES, diet, PA and measured anthropometric data. Seven EU countries, SES = parental educational status, parental ethnicity/country of birth

¹¹ *European Portal for Action on Health Inequalities* EuroHealthNet on behalf of the Equity Action Partnership http://www.health-inequalities.eu/HEALTHYQUITY/EN/policies/policy_database/



	status.
IDEFICS	Measured heights and weights and nutrition intake data for 16 000 children aged 2-10 years, in 8 Member States. SES variables from parents' self-reported questionnaire.
TOYBOX	Primary research. Children aged 4-6yrs, surveyed 2012 and interventions in kindergartens and families, with SES, diet, PA and measured anthropometric data. Six EU countries, SES = neighbourhood deprivation, parental ethnicity/country of birth status.
EURO-PREVOB	Included development of policy-analysis methodology. Potentially useful methods, but policy data better through NOPA sources.
HOPE	Systematic reviews of obesogenic determinants, including SES. No raw data, but some policy analysis.
Euroheart	Included policy analysis for cardiovascular prevention.