# Background and purpose of LIDNS

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## 1.1 General introduction

This chapter provides a brief overview of the background, rationale, aims, and limitations of the Low Income Diet and Nutrition Survey (LIDNS). Details of the survey design and methods are given in Chapter 2.

LIDNS was designed to provide a comprehensive picture of the food consumption and nutritional status of a nationally representative sample of respondents living in low income households in the United Kingdom.[1] It also assessed numerous socio-economic, environmental, behavioural and attitudinal factors, and lifestyle and health characteristics which relate to food consumption, nutritional status and nutrition-related health. The purpose of the survey was to provide an evidence base that would contribute to the development of food policy, which in turn would help to reduce health inequalities. The need for such a survey is outlined in Section 1.2.

LIDNS was commissioned by the Food Standards Agency ('the Agency') and was carried out by a consortium of three organisations, led by the Health Research Group at the National Centre for Social Research, and including the Nutritional Sciences Research Division at King's College London, and the Department of Epidemiology and Public Health at University College London Medical School. Haematological and biochemical analyses of blood samples were carried out in the Department of Haematology, Royal Victoria Infirmary, Newcastle-upon-Tyne, and the Biotechnology and Biological Sciences Research Council (BBSRC) Institute of Food Research, Norwich. Fieldwork in Northern Ireland was carried out by the Northern Ireland Statistics and Research Agency.

### 1.1.1 Sample selection and survey design

Briefly, a nationally representative sample of low income (materially deprived) households[2,3] was identified using a doorstep screening questionnaire.[4] The aim (wherever possible) was to include two respondents per household. Single person households were eligible, as were two-person households (in which both respondents were asked to take part). In households with more than two persons, two respondents were randomly selected. If children were present, one adult and one child were selected. Each respondent was asked to provide four 24 hour (24h) recalls of diet on random days within a 10 day period. In addition, information regarding socio-economic status, environment, health behaviours, attitudes, lifestyle and health characteristics, and some objective measures of health and nutritional status were obtained. Further information on the survey methods is given in Chapter 2.

### 1.1.2 Methods development for LIDNS

In order to inform the design of any future survey of this population subgroup, the then Ministry of Agriculture, Fisheries and Food (MAFF) commissioned two research projects. The first project,[5] conducted in 1998, was a scoping study that had three aims: 1) to review methods for

identifying and sampling low income households; 2) to review the strengths and weaknesses of dietary assessment methods in relation to the characteristics of low income households in the UK; and 3) to make recommendations regarding the best methods to be used in a national survey of diet and nutrition in low income households. The study concluded that a doorstep screening approach was likely to produce the highest response rate of a representative cross-section of low income households. It also suggested that findings from three dietary assessment methods – repeat 24h recalls, a food checklist, and the semi-weighed method – should be compared with those from a reference measure (the weighed inventory).

The second project,[6] conducted between 2000 and 2002, was a methodological study of low income households in London (the Low Income Diet Methods Study – LIDMS) which field tested the methods for sampling, for screening for low income households, and for dietary assessment. In addition to the policy objectives that underpinned the design and objectives of LIDNS, the findings from the scoping study and LIDMS were strong influences on the methods chosen by the Agency.

Before LIDNS was conducted nationally, a feasibility study was carried out in a nationally representative sample (see Appendix A, LIDNS CD). This was the first full scale test of all aspects of the methodology, including the sampling, doorstep screening, other logistics of the mainstage survey and the validity of the repeat 24h recall in low income households. The findings have been reported elsewhere.[7]

## 1.2 Diet, low income and health inequalities in the UK

### 1.2.1 Evidence

Successive Government reports over the last 15 years have highlighted a persistent nutrition-related health disadvantage amongst the poor.[8 9 10 11 12] Data on household food acquisition in the general population have been collected systematically since 1950 in the National Food Survey (NFS),[13 14] but these data do not provide information about food consumption at the individual level. Data on food consumption and nutritional status at the individual level have been provided since 1990 by the National Diet and Nutrition Surveys (NDNS).[15 16 17 18 19]

The NDNS were analysed by indicators of low income (receipt of state benefits) and have found differences in food consumption and nutritional status in low income households. The NDNS, however, are also general population surveys and as such were not designed to include the numbers of low income respondents that would allow detailed analyses of this population subgroup, or include insights into such issues as cooking facilities and skills, access to food and attitudes to healthy eating in low income households.

A number of reports[20 21 22 23 24] have investigated the relationships between income and material circumstances and diet and wider aspects of food such as shopping and cooking. Whilst these have provided useful quantitative and qualitative information, none was based on sufficiently large or representative samples to be able to generalise about policy priorities. They did, however, highlight the complexity and diversity of the circumstances in which poor people live and make decisions about food, and the ways in which wider policy decisions regarding transport or planning may impact on diets.

### 1.2.2 Policy

In the 1980's two reports on the causes of health inequalities in Britain were published[25 26] (and later republished in a single volume).[27] These highlighted the mainly social, economic and structural reasons for the increasing 'health gap' between the rich and poor and contained wide-reaching policy recommendations. Governments of the time noted that the improvement of the nutritional health of those on a low income was 'a matter for personal change and local initiatives and projects rather than national action by Government'.[28]

In 1998, the Acheson Report[29] returned to the issue of inequalities in health and suggested that central Government could play a role in reducing nutrition-related health inequalities. The report emphasised that the alleviation of food poverty required not only changes in behaviour at the individual and family levels, but also coordinated and multi-sectoral action at the national and local levels, and that monitoring of changes in diet and nutrition-related health outcomes was a key element of the policy process.

The Department of Health's 'Our healthier nation'[30] explicitly recognised the role of poverty in explaining poor health. It included policy objectives to 'improve the health of the worst off in society and to narrow the health gap' and national and local targets to reduce inequalities in life expectancy, infant mortality and cancer and cardiovascular disease mortality through central, local and individual action. This has been followed by 'Choosing health: making healthy choices easier'[31] which summarizes programmes already in place or planned, including many targeted at low income households and deprived areas.[32 33 34 35] Similar initiatives to address nutrition-related health inequalities have also been introduced in Scotland[36] and Wales.[37]

## 1.3 Main aims of LIDNS

### 1.3.1 Main aims

Over the many years of policy discussion, two key features of the policy recommendations relating to nutrition and health inequalities have persisted: the need for an adequate evidence base from which to monitor the effects of policy; and the need for an effective monitoring programme that would help to explain how changes in diet are related to changes in health in different subgroups within the population. LIDNS is a significant step in relation to these recommendations. The survey design has been driven by both scientific and policy-related objectives. The objectives of the survey were to provide for the first time in a nationally representative sample of low income households:

- A clearly defined and representative sample of low income and materially-deprived households in the UK, in which the socio-economic, demographic and health measures provide the basis for comparison with other national surveys (e.g. Expenditure and Food Survey (EFS),[38] General Household Survey (GHS),[39] Health Survey for England (HSE),[40] Scottish Health Survey (SHS),[41] Family Resources Survey[42] (FRS) and the NDNS[15-19])
- Evidence on food consumption and nutrient intake in the context of the economic, social, behavioural and attitudinal factors that in part determine food choice
- The first national survey that provides a basis for linking policy aims and objectives with nutrition-related behaviours in low income households.

These objectives fit into the broader framework currently being developed for monitoring public health nutrition in the context of a European Health Monitoring System.[43]

The specific aims of LIDNS were to:

- Provide quantitative data on the food and nutrient intakes, sources of nutrients and nutritional status of the low income population (Chapters 4-9, 12, 14)
- Describe the characteristics of individuals with intakes of specific nutrients above or below the national average (Chapters 4-9, 10)
- Assess the diets of the low income population to determine the extent to which they are sufficiently nutritious (Chapters 4-9)
- Evaluate the extent to which the diets of the low income population vary from expert recommendations (Chapters 4-9)
- Provide physical measurements of health-related factors closely associated with diet, namely height, weight and other anthropometric measurements and blood pressure for a representative sample of low income individuals (Chapters 12 and 13)

- Measure blood indices that provide evidence of nutritional status or dietary biomarkers (Chapter 14)
- Assess physical activity levels of the low income population (Chapter 15)
- Provide basic information on smoking and oral health status in relation to diet (Chapters 16 and 17)
- Examine the relationship between dietary intake and factors associated with food choice in the low income population (Chapters 18-20)
- Examine possible relationships between diet and risk factors in later life (Chapter 17).

### 1.3.2 Defining 'low income'

The Scoping Study[5] recognised that sample selection based on income alone would not capture all of the aspects of material deprivation likely to influence nutrition. Defining a single cut-off point for 'low income' is not appropriate, and establishing equivalised income[44] is too complex to be carried out on the doorstep for purposes of screening.

There is an extensive literature on low income in the UK,[5 24 45] much of which assesses the relationships between numerous markers of material deprivation and receipt of benefit with levels of income. Classic measures such as households receiving less than 50% of average income (Households Below Average Income (HBAI) after housing costs) are essentially census based and difficult to interpret on the doorstep. Also, HBAI captures varying proportions of households in different population subgroups (e.g. lone-parents versus couples with children versus pensioners) and does not address issues of income relating to disability. For the purposes of LIDNS, a more meaningful measure was needed that reflected deprivation in relation to food access and affordability. It was also important to be able to align information from LIDNS with other data relating to deprivation in the UK (e.g. comparison with data in the HSE, GHS or FRS). The critical issue, therefore, was how to interpret an acceptable conceptual definition of 'being on a low income' into a workable operational definition suitable for use as a doorstep screening questionnaire.

The aim of LIDNS was to identify (approximately) the bottom 15% of the population in terms of 'low income' using a valid index of material deprivation that could be readily assessed on the doorstep (to allow interviewers to identify and recruit households eligible for inclusion in the survey) and that was roughly equivalent between households. The doorstep screening questionnaire was also seen to be a better approach than trying to follow up samples in existing registers (e.g. via the Department for Work and Pensions) or surveys (e.g. FRS)[42] in which the characteristics of income or deprivation might be known but in which incomplete population coverage and low co-operation rates might lead to poor representativeness of the final sample.

## 1.4 Limitations of the survey

The LIDNS findings provide a valuable evidence base for use in the development of policies to reduce income-related nutritional health inequalities. In a survey of this scope and complexity, however, it is inevitable that there will be some limitations in the data.

The principal aim of the survey was to characterise the food consumption and nutritional status of the low income (materially deprived) population in the UK and to identify factors associated with poorer or better nutrition within this group. The extent to which this was achieved depends on the representativeness of the sample and the extent to which the measurements achieve validity in relation to the constructs being assessed. Details of the potential errors, steps taken to minimise them, and limitations of the present findings are discussed in detail in the relevant chapters. The following discussion provides a brief overview.

### 1.4.1 Definition of 'low income' and 'material deprivation', and the representativeness of the LIDNS sample

Section 1.3.2 highlighted the main challenges in developing a suitable tool for identifying those households in the UK whose eating habits and nutritional health are likely to be adversely affected by lack of money or by a limiting physical or social environment. The screening questionnaire aimed to strike a balance between: a) questions that were not too intrusive and that could be answered by any adult living in the household; b) the time taken to answer the questions; and c) questions that provided a useful and discriminating measure of low income and material deprivation. Ultimately, the screening questionnaire provided only a snapshot of living circumstances at any given point in time, as many households move in and out of employment and benefit, and circumstances are continually changing.[45]

The three sets of factors that govern the representativeness of the achieved LIDNS sample - sampling procedures, sample sizes, and response rates - are discussed in detail in Chapter 2. Together with the results provided in Chapter 3, which compares the LIDNS sample with data from other surveys, it appears that the achieved sample provides a good representation of the low income population in the UK (see especially Chapter 2, Sections 2.12 and 2.13). The principal limitation therefore relates to sub-analyses within countries or ethnic groups (e.g. by sex and age) where the cell sizes may be less than 30. Fewer than 30 observations is associated with substantially increased variations in standard errors and lower power, reducing the ability to distinguish genuine differences between subgroups.

Comparisons made throughout the report between LIDNS and other nationally representative sample surveys (e.g. NDNS, EFS, FRS, HSE) strongly support the conclusion that the LIDNS sample is indeed deprived in relation to the remainder of the population. While no population sample can claim to be representative of the entire low income population (and some of the sampling limitations have been set out above and in endnote 3), the data are sufficient to provide insights into the nutritional situation of participants who represent low income groups in the UK and thus to provide baseline data, as per the aims of the survey.

### 1.4.2 Variables measured (and not measured) and respondents' ability to provide relevant information

The key measurements in LIDNS relate to food consumption (based in this case on 24h recalls), estimates of nutrient intake based on food composition tables, anthropometric measurements, estimates of physical activity level, and blood biochemistry, as well as economic, social, behavioural and attitudinal measurements. The potential sources of error are discussed in the relevant chapters.

The Scoping Study,[5] LIDMS,[6] and the Feasibility Study[7] together addressed the question of the appropriate (and epidemiologically *relevant*)[46] measurements to include in LIDNS. The relevance of the 24h recall for collecting dietary data, questionnaire-based estimates of physical activity, the use of the food composition tables created by the Agency, and careful protocols for the anthropometric measurements have all been established. Similarly, the relevance of biochemical measurements of nutritional analytes in blood to assess nutritional status have been reviewed elsewhere[47] and are discussed in Chapter 14. Previous surveys on the role of social and economic factors in relation to nutrition in low income families informed the choice of questions included in LIDNS.

### 1.4.3 Number of observations and quality assurance

The collection of four 24h recalls struck the balance between the need to reflect the true variation in every individual's pattern of food consumption and nutrient intake, on the one hand, and respondent burden on the other. Four days of data provides measures of within-subject variability that help to establish how well respondents have reported their usual diet. This knowledge helps the interpretation of measures of association between consumption and factors influencing consumption and is referred to accordingly throughout the report. The validity of the dietary measurements is discussed in Chapter 11. The collection of a single blood sample again struck the balance between respondent burden and the need for information to

interpret the dietary data appropriately and describe nutritional status. Issues of analytical quality control were addressed through carefully drafted Standard Operation Procedures and ISO2000 accreditation. Fieldworkers' adherence to agreed procedures was monitored closely, as was the quality of coding of the dietary data. The whole of the final dataset was subject to rigorous range and continuity checks.

### 1.4.4 Addressing limitations of methodology

A decision was taken at the start of the project to report findings as measured and, apart from re-weighting for non-response, not to make any adjustments to the data.[48] This has the benefit of making the findings in LIDNS directly comparable with findings from national surveys published on a similar basis. The broad effects of the limitations discussed in this section on the interpretation of the findings are addressed within individual chapters.

## Notes and references

1 The term 'low income' is used in this report to reflect not simply low levels of income but also wider aspects of material deprivation. These wider aspects were used both in relation to sampling (e.g. by focusing on neighbourhoods which ranked amongst the most materially deprived based on 2001 census data, using indices of multiple deprivation) and by including questions on receipt of benefit, car ownership, household composition and employment status in the screening process. See also Chapter 2.

2 The term 'household' has been used throughout the report to indicate what are in fact 'catering units'. The Catering Unit (CU) is the primary grouping for this study and is defined as a 'group of people who eat food that is bought and prepared for them (largely) as a group'. CUs are either entire households, as defined in censuses and surveys, or (more rarely) form parts of households. Hence, although people may share accommodation and even be related, they may not be in the same CU. For example, adult children sharing a house with their parents may shop, cook and eat by themselves, in which case the parents would be in one CU and the children in another. Almost all households in LIDNS contained only one catering unit.

3 The sample does not include people living in hostels, B&B accommodation, the homeless or travellers. These groups represent a small subset of low income households whose living circumstances and access to food are likely to present special difficulties in terms of both sampling and assessment. Moreover, because of the multiplicity of factors affecting their nutritional health, the policy issues affecting these groups are likely to be different from, and more complex than, those affecting the majority of low income households.

4 The use of the words 'low income' on fieldwork documents (paper and computer) potentially could have influenced respondents' reporting. All references to 'low income' were therefore removed from paperwork and computer screens likely to be seen by the respondent. Instead of using 'Low Income Diet and Nutrition Survey' to identify the project, all fieldwork documents were labelled 'Social and Resource Influences on Eating Habits (SARIEH)'.

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