

Report of the Working Group on

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# MONITORING SCOTTISH DIETARY TARGETS

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FOOD  
STANDARDS  
AGENCY

SCOTLAND  
Buidheann  
Inbhe-Bidhe  
an Alba



healthy living



SCOTTISH EXECUTIVE

Although our life expectancy is increasing, we Scots still have the unenviable record of being amongst the unhealthiest nations in the western developed world. There are many reasons for this, but one of these is undoubtedly our diet. In recognition of this, in 1996 the Scottish Office published 'Eating for Health: A Diet Action Plan for Scotland', and this remains the framework for improving Scotland's diet. The burden of disease and premature death associated with a poor diet is increasingly being recognised, as is the potential to make significant improvements to our health and wellbeing through better nutrition.

Scotland's Diet Action Plan set out a range of dietary targets covering specific nutrients and various types of food which were intended for achievement by 2005. Subsequent to the Scottish Diet Action Plan, the publication of 'Improving Health in Scotland: The Challenge' (2003) committed the Scottish Executive to continue the further implementation of the Scottish Diet Action Plan well beyond 2005. This Report reflects the work of an Expert Group which set out to investigate ways of assessing what progress has been made towards the dietary targets to date, and to advise on what further surveillance is required beyond 2005. We have made a series of recommendations which identify robust monitoring and information gathering processes to measure Scotland's progress towards its national dietary targets as a vital component of health improvement in Scotland.

In preparing this report, we have been very fortunate to have available to us experts of national and international standing, and we all have good reason to be grateful to them for the considerable efforts expended in this endeavour.

Drew Walker

**Director of Public Health, NHS Tayside  
Chair of Working Group On Monitoring Scottish Dietary Targets**

**December 2004**

## EXECUTIVE SUMMARY

The Scottish Diet Report (The Scottish Office, 1993) revealed the extent of Scotland's poor diet and its adverse impact on health. Following its publication, a series of population based targets for dietary improvements in Scotland were announced in 1994. These targets became the basis of the Scottish Diet Action Plan, '*Eating for Health*' (The Scottish Office, 1996). More recently, the Scottish Executive's public health policy document 'Improving Health in Scotland: The Challenge' (2003) set out a commitment to further implementation of the Scottish Dietary Targets until at least 2010. '*Eating for Health: Meeting the Challenge*' (Scottish Executive, 2004) establishes a joint implementation strategy with delivery partners for the further and ongoing implementation of the SDAP, strengthening the delivery of co-ordinated action. As part of this renewed impetus on diet and health, progress towards the Scottish Dietary Targets must be measured.

The population based Scottish Dietary Targets are set for specific nutrients and foods and include the percentage of food energy to be provided by fat, saturated fat and non-milk extrinsic sugars, and population averages in grams for the intake of certain types of food (e.g. fruit and vegetables).

The Scottish Executive Health Department and the Food Standards Agency Scotland established a Working Group on Monitoring Scottish Dietary Targets in April 2003. The Working Group's remit was:

- To investigate and report ways of assessing progress made towards the Scottish Dietary Targets to date.
- To advise on surveillance requirements beyond 2005.

To address this remit, the Working Group commissioned a briefing paper on dietary assessment methodologies and a review of diet and nutrition surveys currently taking place in Scotland. Experts in the field of nutritional surveillance from the UK and Ireland were invited to attend and give presentations at meetings of the Working Group. A number of possible ways of monitoring progress towards the Scottish Dietary Targets and key methodological issues were discussed and recommendations made.

Following consideration of the information presented and the expert opinions expressed, the Working Group concluded that there is no single existing survey currently capable of assessing progress towards all the Scottish Dietary Targets in 2005. The Working Group considered a number of different possibilities for monitoring progress toward the Scottish Dietary Targets beyond 2005.

The key recommendations of the Working Group are listed below and summarised in Table 1 on page 4. The full list of recommendations is presented in Section 6 of this report.

## KEY RECOMMENDATIONS

Use should be made of existing surveys, particularly the Expenditure and Food Survey, to monitor progress towards the Scottish Dietary Targets in 2005. Where data is currently lacking, as is the case for the targets for sodium and non- milk extrinsic sugars in children, interim studies may need to be set up.

Future monitoring should take place every 3-5 years to provide data on ongoing progress towards the targets.

The Expenditure and Food Survey should continue to be used for monitoring the Scottish Dietary Targets beyond 2005.

For monitoring progress towards the Scottish Dietary Targets beyond 2005, the possibility of increasing the number of Scottish participants in any future UK nutritional surveillance programme should be considered so that the data generated is representative for Scotland. Increased sample sizes for sub groups such as lower socio-economic groups, the elderly and ethnic minority groups should also be considered.

The inclusion of dietary risk markers and information about lifestyle choices should be considered when planning any future nutritional surveillance in Scotland.

The possibility of setting up a new stand alone dietary survey, using the framework of the Republic of Ireland's Survey for Lifestyles Attitude and Nutrition, should be considered.

The views expressed in this report should form the basis of decisions when commissioning the Scottish Health Survey.

<b>Table 1: Summary of How Progress Towards Scottish Dietary Targets Might be Monitored in 2005 and Beyond</b>			
<b>Food or Nutrient</b>	<b>Target (from Scottish Diet Action Plan, 1996)</b>	<b>Sources of Data Available for Monitoring in 2005</b>	<b>Recommendations for Monitoring beyond 2005</b>
<b>Fruit and Vegetables</b>	Average intake to double to more than 400g per day.	EFS <sup>1</sup> supplemented with data from SHS <sup>2</sup> .	EFS supplemented with data from an enhanced eating habits module in the SHS and enhanced NDNS <sup>3</sup> .
<b>Bread</b>	Intake to increase by 45% from present daily intake of 106g, mainly using wholemeal and brown breads.	EFS supplemented with data from SHS.	EFS supplemented with data from an enhanced eating habits module in the SHS and enhanced NDNS.
<b>Breakfast Cereal</b>	Average intake to double from the present intake of 17g per day.	EFS supplemented with data from SHS.	EFS supplemented with data from an enhanced SHS and enhanced NDNS.
<b>Fats</b>	(i) Average intake of total fat to reduce from 40.7% to no more than 35% of food energy. (ii) Average intake of saturated fatty acids to reduce from 16.6% to no more than 11% of food energy.	EFS	EFS supplemented with data from an enhanced NDNS.
<b>Sodium</b>	Average intake to reduce from 163 mmol to 100mmol (the equivalent of 6g of salt)	Awaiting outcome of HSE <sup>4</sup> / SHS validation study.	Likely to be covered by an enhanced NDNS. Alternatively a new survey could be commissioned.
<b>Sugar</b>	(i) Average intake of non-milk extrinsic sugars in adults not to increase. (ii) Average intake of non-milk extrinsic sugars in children to reduce by half to less than 10% of total energy.	SHS, supplemented for children with data from SALSUS <sup>5</sup> and Health and Health Behaviours of Scottish School Children Survey. Possible new interim study to be set up.	Enhanced NDNS survey and a comprehensive dietary questionnaire attached to the SHS, possibly supplemented with data from the Longitudinal Survey of Children.
<b>Total Complex Carbohydrates</b>	Increase average non-sugar carbohydrates intake by 25% from 124g per day through increased consumption of fruit and vegetables, bread, breakfast cereals, rice and pasta and through an increase of 25% in potato consumption.	EFS	EFS supplemented with data from an enhanced NDNS.
<b>Fish</b>	(i) White fish consumption to be maintained at current levels. (ii) Oil-rich fish consumption to double from 44g per week to 88g per week.	EFS supplemented with data from SHS.	SHS questions on fish should be reviewed to include an estimation of portion size.

1 EFS – Expenditure and Food Survey 2 SHS – Scottish Health Survey 3 NDNS – National Diet and Nutrition Survey 4 HSE – Health Survey for England  
5 SALSUS – Scottish Adolescent Lifestyle and Substance Use Survey

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## LIST OF ABBREVIATIONS USED

<b>APOSS</b>	Aberdeen Prospective Osteoporosis Screening Study
<b>BMI</b>	Body Mass Index
<b>CMR</b>	Continuous Morbidity Recording
<b>CSFII</b>	Continuing Survey of Food Intakes by Individuals
<b>DAFNE</b>	Data Food Networking
<b>Defra</b>	Department for the Environment, Food and Rural Affairs
<b>DoH</b>	Department of Health
<b>DRV</b>	Dietary Reference Value
<b>ECHI</b>	European Community Health Indicators
<b>EFS</b>	Expenditure and Food Survey
<b>EPIC</b>	European Prospective Investigation of Cancer
<b>EU</b>	European Union
<b>FFQ</b>	Food Frequency Questionnaire
<b>FSA</b>	Food Standards Agency
<b>FSAS</b>	Food Standards Agency Scotland
<b>GP</b>	General Practitioner
<b>HEPS</b>	Health Education Population Survey
<b>HSE</b>	Health Survey for England
<b>ISD</b>	Information and Statistics Division of Scottish Executive Health Department
<b>LIDNS</b>	Low Income Diet and Nutrition Survey
<b>MAFF</b>	Ministry of Agriculture, Fisheries and Food
<b>MIDAS</b>	Management Information Dental Accounting System
<b>MONICA</b>	Monitoring Trends and Determinants in Cardiovascular Disease
<b>MRC</b>	Medical Research Council
<b>NatCen</b>	National Centre for Social Research
<b>NFS</b>	National Food Survey
<b>NDNS</b>	National Diet and Nutrition Survey
<b>NHANES</b>	National Health and Nutrition Examination Study (USA)
<b>NHS</b>	National Health Service
<b>NIDDM</b>	Non Insulin Dependent Diabetes Mellitus
<b>NME</b>	Non Milk Extrinsic
<b>NNSC</b>	National Nutritional Surveillance Centre (Republic of Ireland)
<b>NSP</b>	Non Starch Polysaccharides
<b>ONS</b>	Office of National Statistics
<b>PAF</b>	Performance Assessment Framework
<b>PTI</b>	Practice Team Information
<b>RCT</b>	Randomised Control Trial
<b>SACN</b>	Scientific Advisory Committee on Nutrition
<b>SALSUS</b>	Scottish School Adolescent Lifestyle and Substance Use Survey
<b>SCG</b>	Scottish Collaborative Group
<b>SDAP</b>	Scottish Diet Action Plan
<b>SEED</b>	Scottish Executive Education Department
<b>SEHD</b>	Scottish Executive Health Department
<b>SHBDEP</b>	Scottish Health Boards Dental Epidemiology Programme
<b>SHS</b>	Scottish Health Survey
<b>SLAN</b>	Survey for Lifestyles Attitude and Nutrition (Republic of Ireland)

## LIST OF ABBREVIATIONS USED - CONTINUED

<b>SNAP</b>	Scottish Needs Assessment Programme
<b>TNS</b>	Taylor Nelson Sofres
<b>UK</b>	United Kingdom
<b>USA</b>	United States of America
<b>WHO</b>	World Health Organisation

# 1. INTRODUCTION

## 1.1 Overview

1.1.1 In 1993 The Scottish Diet Report (The Scottish Office, 1993), revealed the extent of Scotland's poor diet and its adverse impact on health. Following its publication, a series of population based targets for dietary improvements in Scotland were announced in 1994. These Scottish Dietary Targets became the basis of the Scottish Diet Action Plan (SDAP), *'Eating for Health'* (The Scottish Office, 1996). The targets are a set of recommendations for the intake of specific nutrients, the percentage of food energy to be provided by fat, saturated fat and non-milk extrinsic (NME) sugars, and population averages in grams for the intake of certain types of food (e.g. fruit and vegetables).

1.1.2 The targets were intended for achievement between 1996-2005. However, the Scottish Executive's health policy document *'Improving Health in Scotland: The Challenge'* (Scottish Executive, 2003) sets out a commitment to further implementation until at least 2010. *Eating for Health – Meeting the Challenge* (Scottish Executive 2004) establishes a joint implementation strategy with delivery partners for the further and ongoing implementation of the SDAP, strengthening the delivery of co-ordinated action. As part of this renewed impetus on diet and health, progress towards the Scottish Dietary Targets must be measured.

## 1.2 The Working Group on Monitoring Scottish Dietary Targets

1.2.1 The Scottish Executive Health Department (SEHD) and the Food Standards Agency Scotland (FSAS) established a Working Group on Monitoring Scottish Dietary Targets in April 2003. Its membership was designed to include academic, health professional and public health policy representatives. Working Group members are given in Appendix 1.

1.2.2 The Working Group's remit was:

- To investigate and report on ways of assessing progress made towards the Scottish Dietary Targets to date.
- To advise on what further surveillance is required beyond 2005.

1.2.3 The Working Group met five times between June 2003 and January 2004 on the following dates:

Meeting 1 – 13<sup>th</sup> June 2003

Meeting 2 (workshop) – 4<sup>th</sup>/5<sup>th</sup> September 2003

Meeting 3 – 30<sup>th</sup> October 2003

Meeting 4 – 4<sup>th</sup> December 2003

Meeting 5 – 14<sup>th</sup> January 2004

- 1.2.4** Initially, the Working Group sought to identify other interested parties that would be able to contribute to discussions and invited them to attend meetings. A list of additional people who attended meetings is given in Appendix 2.
- 1.2.5** The Working Group commissioned a review of diet and health surveys currently taking place in Scotland and the United Kingdom (Wrieden W., Peace H., Armstrong J., 2003). The summary tables from this review can be found in Appendix 3 and the full review is available from the FSA library, Aviation House, London or [www.food.gov.uk](http://www.food.gov.uk).
- 1.2.6** The Working Group discussed the results of the review and considered the advantages and limitations of each dietary methodology with respect to monitoring progress towards the Scottish Dietary Targets. Various options were then proposed.
- 1.2.6** This report details the Working Group's findings and sets out recommendations for monitoring progress towards the Scottish Dietary Targets in 2005 and beyond.
- 1.2.7** An evaluation of food and health initiatives implementing the SDAP is being undertaken and reported separately by NHS Health Scotland, as part of its wider role of evaluating the Scottish Executive's Health Improvement Strategy.

## 2. BACKGROUND

### 2.1 The Scottish Dietary Targets

2.1.1 *'The Scottish Diet Report'* (The Scottish Office, 1993) contained over forty dietary targets, which were intended as population based targets. These quantitative targets were derived from the *'Dietary Reference Values for Food Energy and Nutrients for the United Kingdom'* (Department of Health, 1991) and a series of calculations using combined National Food Survey (NFS) data from 1989-1991. The NFS data was chosen because of the frequency with which data is collected, the survey's consistency, detailed breakdown of food groups and because it was one of the few sources of available nutrient data. The targets in the SDAP were taken from this original list following a consultation process and were chosen as they focused on principal areas of concern of the Scottish Diet. The Scottish Dietary Targets are shown in Table 2 below.

**Table 2: The Scottish Dietary Targets**

Food or Nutrient	Target
Fruit and Vegetables	Average intake to double to more than 400g per day.
Bread	Intake to increase by 45% from present daily intake of 106g, mainly using wholemeal and brown breads.
Breakfast Cereal	Average intake to double from the present intake of 17g per day.
Fats	(i) Average intake of total fat to reduce from 40.7% to no more than 35% of food energy. (ii) Average intake of saturated fatty acids to reduce from 16.6% to no more than 11% of food energy.
Sodium	Average intake to reduce from 163mmol per day to 100mmol (the equivalent of 6g Salt).
Sugar	(i) Average intake of non-milk extrinsic sugars in adults not to increase. (ii) Average intake of non-milk extrinsic sugars in children to reduce by half to less than 10% of total energy.
Total Complex Carbohydrates	Increase average non-sugar carbohydrates intake by 25% from 124g per day through increased consumption of fruit and vegetables, bread, breakfast cereals, rice and pasta and through an increase of 25% in potato consumption.
Fish	(i) White fish consumption to be maintained at current levels. (ii) Oil-rich fish consumption to double from 44g per week to 88g per week.
Breastfeeding*	The proportion of mothers breast-feeding their babies for the first 6 weeks of life to increase to more than 50% from the present level of around 30%.

\*Progress towards the breastfeeding target is reported elsewhere and therefore the Working Group on Monitoring Scottish Dietary Targets did not consider this target further.

## 2.2 What Actually Needs to be Measured?

**2.2.1** The Scottish Dietary Targets comprise both nutrient and food based targets. Where the nutrient based targets are expressed as a percentage of dietary energy, as is the case for fat and saturated fat for example, the dietary assessment method chosen to monitor progress towards these targets must be capable of measuring total energy intake and therefore total dietary intake. Where the targets are expressed as grams per day, as is the case for complex carbohydrates and the food based targets, then information regarding frequency of consumption and portion size is required.

**2.2.2** Since the publication of the SDAP there have been major changes in eating patterns and the range of products available for consumption. In reviewing the monitoring of the targets the Working Group made the following recommendations regarding what should be measured.

**2.2.3 Fruit and Vegetables:** The baseline fruit and vegetable intakes stated in the Scottish Diet Report were based on fresh and frozen fruit and vegetables but the SDAP target for fruit and vegetables is not limited to these foods. Measurement of this target should be compatible with the 5 a day message (Williams C., 1995).

The Working Group recommended that:

- Any future monitoring tool should be capable of measuring the intake of, not only, fresh and frozen fruit and vegetables, but also of canned and dried products as well as fruit juice.

**2.2.4 Bread:** Since this target was originally written the range of bread available has increased rapidly. For example 'luxury' breads, such as ciabatta and focaccia, containing higher levels of fat and salt, are now readily available. There are also new manufacturing techniques that means, for example, white bread may contain added fibre, thus increasing its nutritional value.

The Working Group recommended that:

- Any future monitoring tool should be capable of collecting information about the type of bread consumed.

**2.2.5 Breakfast Cereals:** The range of breakfast cereals available has greatly increased since the targets were set in 1996. Frequently these new products are higher in sugar, salt and fat than is desirable. The population should be encouraged to eat cereals that are high in fibre and low in salt, sugar and fat e.g. fibre rich flakes and porridge.

The Working Group recommended that:

- Any future monitoring tool should be capable of collecting information about the type of breakfast cereal consumed.

**2.2.6 Fish:** It was noted that the portion size for fish could vary widely depending how it is included in the diet e.g. as a sandwich filling or as part of a main meal.

The Working Group recommended that:

- Any future monitoring tool should be capable of measuring the consumption of fresh and canned oil rich fish and white fish separately. In addition, canned tuna should be measured separately from oil-rich fish, as the oil present in fresh tuna is lost during the canning process (Ministry of Agriculture, Fisheries and Food, 1998).

**2.2.7 Fats:** The SDAP indicates a target for fat in terms of the relative contribution of fat to total energy. It is possible that in any diet the relative contribution of fat to total energy is appropriate but that the absolute amount of fat consumed is too high.

The Working Group recommended that:

- Any future monitoring tool should be capable of measuring the percentage energy from fat.
- Total fat intake should also be recorded.

**2.2.8 NME Sugars:** This is the only target set specifically for children. Although the age range for children was not defined in the SDAP, for the purposes of this report, an age range from 18 months to 18 years has been assumed.

The Working Group recommended that:

- Any future monitoring tool should be capable of measuring the percentage energy from NME sugars.
- Total NME sugar should also be recorded.

**2.2.9 Total Complex Carbohydrates:** The term “total complex carbohydrate” is confusing and should be avoided in the future. The term “non sugar carbohydrate” would be more meaningful in nutritional terms as it may be defined as the sum of starch and non-starch polysaccharide (NSP).

The Working Group recommended that:

- Any future monitoring tool should be capable of measuring and reporting starch and NSP intakes separately.

**2.2.10 Sodium:** It is very difficult to quantify salt intake from dietary records and questionnaires due to the increased use of snack and other processed food, e.g. ready meals, which can have a very variable (but often high) salt content. It is accepted that measuring 24-hour urinary sodium excretion (as a marker of salt intake) is more accurate than calculating sodium intake by dietary assessment methods. However, the Working Group also appreciates that the use of 24-hour urine collections at the population level presents practical difficulties. The outcome of a validation study included in the Health Survey for England (HSE) on the use of spot urine collection to measure sodium intake is awaited.

The Working Group recommended that:

- The use of a spot urine methodology should be considered for future surveys of salt intake in the Scottish population.

## **2.3 Future Scottish Dietary Targets**

**2.3.1** It was outside the remit of this Working Group to recommend new dietary targets for Scotland. However, in preparing any new dietary targets, the Working Group recognised the need for clarity as well as the importance of considering information provided by up to date scientific reviews and reports by bodies such as the Scientific Advisory Committee on Nutrition (SACN) the World Health Organisation (WHO).

## **2.4 Appropriate Health Outcomes that will Demonstrate the Effectiveness of Achieving the SDAP Targets**

**2.4.1** The Monitoring Public Health Nutrition in Europe programme has been set up as part of the development of the European Union (EU) programme on health monitoring (see Section 5 for further information). It identifies the main causes of morbidity and mortality as cardiovascular diseases, cancer, non-insulin dependent diabetes mellitus (NIDDM), obesity and osteoporosis. The Working Group agreed that the most important health outcomes in Scotland, which may be linked to diet, are coronary heart disease, stroke, certain cancers, obesity, NIDDM and, in children, oral health in relation to NME sugars. As there is a time lag between diet consumption and longer-term health outcomes, interim measurements of risk markers were considered. Measurement of risk markers may be used to provide data predictive of chronic disease and to provide health indicators for the population.

The Working Party recommended that:

- The measurement of risk markers such as, but not limited to, blood lipids, insulin resistance, blood pressure, body weight, dental caries in children and behaviour related to dietary patterns should be considered when planning any future nutritional surveillance in Scotland.

**2.4.2** In addition, it should be borne in mind that diet is not the sole risk marker for many of the chronic diseases noted in 2.4.1 as the development of these diseases is multi-factorial.

The Working Party recommended that:

- Recording of information about lifestyle choices, such as physical activity and smoking, should be considered when planning any future nutritional surveillance in Scotland.

**2.4.3** Sources of data on the health outcomes highlighted in this section can be found in Appendix 4.

## 3. KEY METHODOLOGICAL ISSUES

### 3.1 Timescale

**3.1.1** There is no single survey currently taking place in Scotland capable of measuring progress towards all the Scottish Dietary Targets. Therefore, use will be made of data available from several different surveys for monitoring progress towards the targets in 2005. Where robust data is unavailable, as is the case for the targets for sodium and for NME sugars in children, interim studies may need to be set up. The use of a more comprehensive dietary assessment tool should be considered for monitoring progress towards the Scottish Dietary Targets beyond 2005.

The Working Group recommended that:

- To measure progress towards the Scottish Dietary Targets in 2005, the best and most accurate existing data sets should be used and, in addition, separate interim surveys should be carried out to measure progress towards the sodium target and the target for NME sugars in children.
- Future monitoring should take place at least every 3-5 years to provide data on ongoing progress towards the targets.

### 3.2 Sampling

**3.2.1** The Scottish Dietary Targets are for the whole Scottish population (with the exception of the NME sugars target for children) and the targets will therefore be monitored at population level.

**3.2.2** Recent policy has focused on inequalities and the Scottish Executive document *'Improving Health in Scotland: The Challenge'* (Scottish Executive, 2003) sets out a commitment to tackling health inequalities. It is therefore envisaged that a monitoring tool should be capable of relating progress towards the targets to specific sub-groups of the population e.g. lower socio-economic groups, the elderly and minority ethnic groups.

The Working Group recommended that:

- When planning any future nutritional surveillance programme, the possibility of increasing sample sizes for sub groups such as lower socio-economic groups, the elderly and ethnic minority groups should be considered.

**3.2.3** The Scottish samples contained within existing UK nutritional surveys, such as the National Diet and Nutrition Surveys (NDNS) and the Expenditure and Food Survey (EFS), are currently too small to be representative of the Scottish population.

The Working Group recommended that:

- When planning UK wide nutritional surveillance the appropriate sample size for Scotland should be carefully considered.

### **3.3 Survey Response Rates**

**3.3.1** The general decrease in response rates to surveys in the UK over recent years is problematic given that a high response rate is required to ensure a sample which is representative of the population. One potential way to improve response rates is to offer financial or other incentives, although it was recognised by the Working Group that there are possible ethical concerns regarding this approach.

**3.3.2** Existing surveys that offer incentives to participants include the Low Income Diet and Nutrition Survey (LIDNS), where respondents are given £40, and the Expenditure and Food Survey (EFS) which pays adults £10 for completed record books and children £5. The incentive does not need to be high; Taylor Nelson Sofres (TNS) offers participants points for buying items from a brochure or record vouchers for taking part in market research, while respondents who complete the Survey for Lifestyles Attitude and Nutrition (SLAN) are entered into a prize draw. For more details of these surveys see Sections 4 and 5.

The Working Group recommended that:

- A response rate of at least 60% should be the aim when employing weighed intake methodology while higher response rates should be expected from surveys in which the respondent burden is less.
- Ways of improving response rates should be investigated.

### **3.4 Dietary Survey Methodology**

- 3.4.1** There are various methodologies available for assessing dietary intake including detailed individual weighed records collected over seven days or more, food frequency questionnaires (FFQ), multiple pass 24 hour recall, household survey methods and simple food lists. Each is designed for a different purpose and each has its specific advantages and disadvantages that need to be taken into account when choosing a methodology to monitor progress towards the Scottish Dietary Targets. The Working Group commissioned a review of these methodologies and this resulted in a briefing paper entitled '*A Short Review of Dietary Assessment Methods used in National and Scottish Research Studies*'. Relevant sections from this review can be found in Appendix 5 and the full document is available from the FSA library, Aviation House, London or [www.food.gov.uk](http://www.food.gov.uk).
- 3.4.2** Several of the dietary methodologies reviewed were considered to be insufficiently detailed to monitor progress towards the nutrient based targets but could, however, potentially be used for monitoring certain food based targets.
- 3.4.3** When measuring nutrient intake it is essential to collect information about food type and quantity in sufficient detail to translate food intake into nutrients using food composition tables.
- 3.4.4** In most dietary methodologies, with the exception of weighed intake, the quantity of food eaten is not directly measured. Portion sizes may be estimated in a number of ways including by the use of photographic atlases showing portion sizes of commonly eaten foods (e.g. Nelson M. et al., 1997), data from manufacturers, portion sizes collected from previous weighed food records and household measures. However, none of these are as accurate as a weighed intake measure.
- 3.4.5** Almost all dietary methodologies, including weighed intake, are prone to mis-reporting which occurs when the participants of a study change their eating behaviour as a consequence of being asked to record their dietary intake. This may take the form of under reporting food intake due to social bias, forgetting / being unaware of what has been eaten or substituting easier foods to record. Individuals may also over-report consumption of certain foods e.g. fruit and vegetables because they know they should eat them as part of a healthy balanced diet. A recent FSA funded study (Stubbs J et.al, 2003) has reported, in detail, the issues surrounding mis-reporting and its implications for dietary studies.
- 3.4.6** When measuring sodium intake, the conversion of foods to nutrients using food composition tables is deemed to be unacceptable due to the widely varying sodium content of convenience foods in particular. Instead, the preferred method is to estimate dietary intake indirectly by measuring the urinary output of sodium.

**3.4.7** The Scottish Dietary Targets for total fat, saturated fat and NME sugars in children are expressed as percentage of total energy. Measurement of total dietary energy requires measuring the entire dietary intake. This is important to understand when choosing a methodology for monitoring progress towards these targets.

**3.4.8** In short, there is no perfect way of assessing food and nutrient intake.

The Working Group recommended that:

- When considering a methodology for monitoring progress towards the Scottish Dietary Targets, account should be taken of its appropriateness and limitations.

## 4. SURVEYS TAKING PLACE IN SCOTLAND THAT INCLUDE DIETARY METHODOLOGY

### 4.1 Review of Existing Surveys

**4.1.1** The Working Group on Monitoring Scottish Dietary Targets commissioned a review of diet and health surveys currently taking place in Scotland and the UK (Wrieden W., Peace H., Armstrong J., 2003). Information from the surveys was extracted and collated under the headings listed below and a report was produced for the workshop in September 2003.

#### Headings Used to Extract Information from Surveys

- Survey / Study Objective
- Location
- Date
- Age group, gender and status (e.g. healthy, pregnant etc) of participants
- Number in sample (including Scottish sample number)
- Method used to obtain sample
- Dietary Methodology
- Any other comments
- Future of the Survey

**4.1.2** The most relevant information and a summary of the advantages and disadvantages of each survey with respect to monitoring the Scottish Dietary Targets are included in this report in paragraphs 4.2.1- 4.8.9. The summary tables from the report can be found in Appendix 3 and the full report is available from the FSA library, Aviation House, London or [www.food.gov.uk](http://www.food.gov.uk).

### 4.2 The National Diet and Nutrition Survey

**4.2.1** The National Diet and Nutrition Survey (NDNS) was initially funded by the Ministry for Agriculture, Fisheries and Food (MAFF) and the Department of Health (DoH). Since 2000 the NDNS programme has been funded jointly by FSA and the DoH.

**4.2.2** To date there have been five surveys carried out as part of the NDNS programme. The full objectives of the programme can be found in the reports of the individual surveys:

- The Dietary and Nutritional Survey of British Adults (Gregory J. et al., 1990)
- National Diet and Nutrition Survey: Children Aged 1½ to 4½ (Gregory J. et al., 1995)
- National Diet and Nutrition Survey: People Aged 65 Years and Over (Finch S. et al., 1998)
- National Diet and Nutrition Survey: Young People Aged 4-18 Years (Gregory J. & Lowe S., 2000)
- National Diet and Nutrition Survey: Adults Aged 19-64 Years (Henderson L. & Gregory J., 2003)

- 4.2.3** Each survey takes around five years from planning to publication and the time between collection of data on each age group does not reflect the speed of dietary changes. This time lag limits the capacity to track changes over time and assess trends in detail.
- 4.2.4** The NDNS uses a four to seven day weighed food intake and has been analysed to give nutrient intakes. The data can also be used to measure progress towards food targets.
- 4.2.5** The Scottish sample was 123 in the most recent NDNS (Henderson L. & Gregory J., 2003). This is inadequate for detailed analysis of the results by age or socio-economic group within Scotland, and is too small to compare Scotland to the rest of the UK. Therefore it is unsuitable for monitoring progress towards the targets in 2005. For future monitoring purposes, an enhanced sample for Scotland in any future surveys should be considered.
- 4.2.6** Following a recent review of the NDNS programme by the FSA, it is possible that a year on year rolling programme with cumulative sampling covering all population groups will be adopted. This survey design would provide more timely data and flexibility to respond quickly to new requirements, whilst allowing comparison with previous surveys. The continuous nature of a rolling programme would also provide an opportunity to develop a national identity for the programme in each of the four countries of the UK. This may help to increase the low response rate, which was 47% for the UK in the recent survey of adults (Henderson L. & Gregory J., 2003). The rolling programme would also allow the addition of targeted groups, such as the elderly and ethnic minorities, to be studied.

**Table 3: Advantages and Disadvantages of NDNS for Monitoring Scottish Dietary Targets**

<b>Dietary Methodology:</b> Weighed records (4-7 days depending on survey)	
<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>• Methodology is well established</li> <li>• Measures food and nutrient intake</li> <li>• UK programme review suggests that NDNS might become a rolling programme- better for monitoring purposes</li> <li>• Risk markers measured</li> </ul>	<ul style="list-style-type: none"> <li>• Scottish sample is currently too small to be representative</li> <li>• High cost</li> <li>• Large respondent burden</li> <li>• Low response rate</li> <li>• Under-reporting</li> </ul>

The Working Group recommended that:

- Existing NDNS data should not be used to monitor progress towards the Scottish Dietary Targets in 2005.
- For monitoring progress towards the Scottish Dietary Targets beyond 2005, an enhanced Scottish sample should be seriously considered for the new NDNS programme.

### 4.3 The Low Income Diet and Nutrition Survey

- 4.3.1 The LIDNS is a UK-wide survey that is funded by the FSA, with the enhanced Scottish sample funded by FSAS.
- 4.3.2 A feasibility study was completed in July 2002 and the main stage fieldwork for LIDNS began in November 2003. The survey uses multiple pass 24-hour recall dietary methodology which reduces respondent burden and under-reporting.
- 4.3.3 Statistical advice given to FSAS during the planning of the survey was that the minimum sample size required for inter-country comparisons between Scotland and the rest of the UK was 400. To carry out the same in depth analysis within Scotland as within England would require a sample size of 3000 which could not be justified. FSAS were advised that nothing would be gained from a sample size between 400-3000 in Scotland and therefore the minimal figure of 400 was chosen.
- 4.3.4 Although LIDNS would be capable of measuring the food and nutrient based targets, the survey sample is not representative for Scotland. Therefore LIDNS will not provide suitable data for monitoring progress towards the Scottish Dietary Targets.

**Table 4: Advantages and Disadvantages of LIDNS for Monitoring Scottish Dietary Targets**

<b>Dietary Methodology:</b> Four non-consecutive multiple pass 24 hour recalls	
<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"><li>• Methodology less open to under-reporting than weighed intake methodology</li><li>• Reduced respondent burden</li></ul>	<ul style="list-style-type: none"><li>• One off survey</li><li>• Cannot be repeated regularly as such a large survey</li><li>• Sample is not representative of Scottish population</li><li>• Difficult to collect information on brands of food used</li><li>• High cost</li></ul>

### 4.4 National Food Survey / Expenditure and Food Survey

- 4.4.1 The NFS was established in 1940 and was replaced by the EFS in 2001. The data for the EFS is collected continuously from the whole of the UK and is reported annually (as was the NFS). The EFS is the joint responsibility of Defra and The Office for National Statistics for Great Britain (ONS).
- 4.4.2 The EFS uses till receipts and two-week food consumption diaries for each household member aged 7 and over to gather data. The data is presented per person, based on an average of all the household members weighted for the gender and age composition of the household. This means that the survey cannot be used to give separate information on children.

**4.4.3** The EFS data is representative as the population of mainland Scotland is sampled (including north of the Caledonian Canal which the NDNS does not cover but the LIDNS does). However, as the data is collected at household level the EFS does not provide information about sub-groups such as children. In 2000 the number of Scottish households included in the main NFS was 548 (1320 individuals), similar to the number of households surveyed (586) in the recent EFS 2002-03. A detailed description of the EFS structure and response rate (58% for the 2002-03 survey) can be found in: 'Family Spending A Report of the 2002-03 Expenditure and Food Survey' (ONS, 2004).

**4.4.4** EFS Family Food for 2001-02 and 2002-03 may be accessed on the following web addresses respectively:

<http://statistics.defra.gov.uk/esg/publications/efs/2002/default.asp>.

<http://statistics.defra.gov.uk/esg/publications/efs/2003/default.asp>.

The 2002-03 Report can also be obtained from The Stationary Office (Defra, 2004).

**4.4.5** The data can be used to monitor progress towards all the nutrient and food-based targets in the Scottish Diet Action Plan with the exception of the NME sugar target for children.

**4.4.6** It is possible that in 2008 the EFS will become part of a new continuous population survey. It is envisaged that this will lead to improved estimates of food and nutrient intakes and it is likely that some basic health outcomes will be included. Additional contextual information will be gathered so it may be possible to extract information for sub-samples. This work will be carried out by ONS and could potentially be used for monitoring the Scottish Dietary Targets beyond 2005.

**Table 5: Advantages and Disadvantages of EFS for Monitoring Scottish Dietary Targets**

<b>Dietary Methodology:</b> Household budget survey	
<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>• SDAP targets were devised using NFS data (EFS)</li> <li>• Measures all targets except NME sugars in children</li> <li>• Established method for measuring food consumption</li> <li>• Lower cost than other surveys</li> <li>• Sample representative (although small) and no exclusions per se.</li> <li>• Possible to sum 3 years data to increase sample size*</li> <li>• Records a higher energy intake than the NDNS</li> </ul>	<ul style="list-style-type: none"> <li>• Purchasing (not consumption) is recorded</li> <li>• Records household data not individual and there may be different patterns of consumption</li> <li>• Cannot link to individual health outcomes</li> <li>• No data on children</li> </ul>

\* NFS data was summed for the years 1989-1991 to provide the baseline food and nutrient data presented in the Scottish Diet Report (Scottish Office 1993). Selected recommendations contained within the Scottish Diet Report were then carried forward into the SDAP.

The Working Group recommended that:

- The EFS should be used to monitor progress towards the Scottish Dietary Targets in 2005 and beyond.
- The appropriateness of the EFS sample size for Scotland should be investigated and increased if necessary.
- The sampling requirements for Scottish dietary monitoring should be considered when planning the proposed continuous population survey.

## **4.5 The Scottish Health Survey**

**4.5.1** There have been two Scottish Health Surveys to date in 1995 and 1998 (Dong W. & Erens B., 1997 and Shaw A. et al., 2000), and fieldwork for the third SHS began in 2003. The survey covers a nationally representative sample of the population of approximately 13,000 subjects, and collects a range of information on health trends. Children were included in the sample for the first time in 1998 and the sample size was 3900. The sample size for the SHS 2003 will be similar to 1998.

**4.5.2** The SHS Eating Habits Module asks about the frequency of consumption of a limited selection of foods aggregated into 25 food groups, including bread, breakfast cereal and fruit and vegetables. Due to the limited nature of the questionnaire it does not provide sufficient quantitative information to directly monitor progress towards the Scottish Dietary Targets.

**4.5.3** The Working Group explored the possibility of utilising the current SHS data to obtain a measure of the nutrient-based SDAP targets but decided against this as:

- Some major food categories are missing from the eating habits module e.g. composite dishes such as pizza, quiche, soups and sauces.
- Detail regarding the type of food eaten is recorded for only four of the twenty-five foods groups.
- The portion size is given for less than half of the twenty-five foods groups included.
- There is a change in the food descriptions used each year for some foods e.g. vegetables, baked beans, tuna.
- There is a change in the fruit and vegetable consumption time frame in the 2003 survey.

**4.5.4** A review process for the fourth SHS has recently begun and the timescale and elements of the survey are under discussion. The consultation process will assess demand and need for the SHS, review how extensively previous survey data has been utilised, determine views from local NHS Boards and ascertain what information is collected at local level. The process will also establish whether the current format should continue, whether there is demand for a more frequent survey or whether the focus of the survey should change on a rotational basis. These factors will affect the timescale of future studies and it is unlikely that there will be another survey before 2007 and certainly not before 2005.

**4.5.5** The large representative sample size makes the SHS a robust framework on which to attach a dietary assessment methodology capable of monitoring the Scottish Dietary Targets. However the SHS questionnaire is currently at full capacity, so any additions to the existing eating habits module would be at the expense of other topics and would potentially increase the total cost of the survey. Competing priorities for the SHS will need to be carefully considered.

**4.5.6** One possible approach would be to remove the current limited eating habits module from a future SHS and replace it with a more comprehensive dietary intake questionnaire. It was recognised that, realistically, a subset of the Scottish Health Survey participants may be asked to complete a comprehensive dietary intake questionnaire, though ideally this would be done for all participants.

**4.5.7** It should be noted that if a completely revised eating module were considered some of the longitudinal comparisons with previous SHS would be lost.

**Table 6: Advantages and Disadvantages of SHS for Monitoring Scottish Dietary Targets**

<b>Dietary Methodology:</b> Frequency of consumption questions for a limited selection of foods.	
<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>• Sample representative of Scottish population</li> <li>• Large numbers mean it is possible to do sub-analysis</li> <li>• Potential to use additional dietary measures with a sub group e.g. food frequency questionnaires</li> <li>• Measures confounding factors e.g. smoking, physical activity</li> <li>• Dietary information can be related to health outcomes</li> </ul>	<ul style="list-style-type: none"> <li>• Unable to measure nutrients</li> <li>• Provides food frequency information on a limited food list</li> <li>• Limited portion size assessment and definition of foods</li> <li>• Additional dietary measure would add to respondent burden</li> </ul>

The Working Group recommended that:

- The views expressed in this report should form the basis of decisions when commissioning the Scottish Health Survey.
- The possibility of replacing the existing SHS eating habits module with a comprehensive dietary intake questionnaire, capable of monitoring the Scottish Dietary Targets, should be explored for monitoring the targets beyond 2005.

## 4.6 Local Health and Lifestyle Surveys

**4.6.1** The fifteen NHS Boards of Scotland carry out periodic Local Health and Lifestyle Surveys of a sample of their population (some have only done one or two while others have done several). These surveys gather information on the health-related knowledge, attitudes and behaviour of the population to assist with local planning. There is a large quantity of data available although it has not been collated and analysed for the whole of Scotland.

**4.6.2** Many of the surveys incorporate core questions developed by the Scottish Needs Assessment Programme (SNAP), including some on dietary intake. However, there are inconsistencies between the Health Boards with respect to the dietary questions which makes it difficult to compare data between NHS Boards and to aggregate survey data across Scotland. Whilst some of the surveys may be helpful in monitoring progress towards the food-based targets none can measure the nutrient-based targets.

**Table 7: Advantages and Disadvantages of Local Health and Lifestyle Surveys for Monitoring Scottish Dietary Targets**

<b>Dietary Methodology:</b> Various and limited food lists	
<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>• Large quantities of data available which covers all parts of the Scottish population</li> <li>• Some local surveys measure some food targets</li> </ul>	<ul style="list-style-type: none"> <li>• No consistency of type of dietary data collected or method used between NHS Boards</li> <li>• Large costs involved</li> <li>• Unable to measure nutrients</li> </ul>

The Working Group recommended that:

- The dietary questions in Local Health and Lifestyle Surveys should be standardised between NHS Boards.
- The possibility of merging these surveys and the SHS should be investigated as a better use of resources.

#### **4.7 Market Research**

**4.7.1** There are several market research companies in the UK. TNS were invited to give a presentation to the September meeting of the Working Group.

**4.7.2** TNS operates Great Britain's leading continuous consumer panel, collecting data since 1974. The TNS Super-Panel was launched in 1991 and consists of 15,000 households with around 1350 in Scotland. The sample is demographically and regionally balanced to give a representative picture of the marketplace. The households record all purchases they bring into the home using scanners and data is downloaded twice weekly to TNS via electronic terminals in the house.

**4.7.2** The sample is recruited on a volunteer basis and selected to meet demographic and regional targets. Incentives for taking part are low (points for buying items from a brochure or music vouchers depending on age group) which raises questions about respondent bias in such a panel. It is potentially quite positive that respondents are prepared to do so much for so little apparent reward (apart from the 'common good').

**4.7.3** A wide range of standard and special analysis can be carried out on this data, including Scotland only analysis, but while the quantity of data is large, the quality may be a problem (as indicated above). The food-based targets could be measured but not the nutrient-based targets. Portion size is based on consumer input and there are problems with recording ingredients and home cooked foods.

**4.7.4** TNS also manage the Family Food Panel Complete, which is the UK's largest and only continuous monitor of food and drink consumption. The panel is comprised of 11,000 individuals in 4,200 households who record all food and drink consumed for two weeks every six months. The survey also records the weight and height of respondents which can be used to look at body mass index (BMI) and obesity. Lifestyle and attitude questions can also be linked to show if people's diets are reflecting what their attitudes suggest.

**Table 8: Advantages and Disadvantages of TNS Panels for Monitoring Scottish Dietary Targets**

<b>Dietary Methodology:</b> Household records of purchases and individual records of consumption	
<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"> <li>• Data is representative for Great Britain</li> <li>• Can bring out dichotomy between what people say and do</li> <li>• Records out of house consumption data</li> <li>• Records product brand</li> <li>• Respondent burden not undue</li> <li>• Large quantity of historical data available</li> </ul>	<ul style="list-style-type: none"> <li>• Based on which TV region is watched so Scottish data would include some of Borders area in England</li> <li>• Portion sizes are based on consumer input so could vary dramatically from person to person</li> <li>• Does not record ingredients and home-made food</li> <li>• Does not record nutrient intake</li> <li>• It is a self-selecting sample</li> <li>• Quality of data is the concern not quantity</li> <li>• Purchasing data is only at household level</li> </ul>

**4.7.5** The FSA recently initiated a research study (Elliot P. et al., 2003) to examine whether commercially available data sets on household food consumption could be used to carry out nutritional surveillance. The results of this feasibility study suggest that it would be possible to monitor food purchasing patterns reliably at household level using TNS data and these could be used to inform nutritional surveillance. As the data currently stands it would not be possible to correlate food purchases with health data.

**4.7.6** The Working Group also noted the possibility of purchasing tailored questions on specific foods of interest from the Market Research UK Omnibus e.g. FSAS has already purchased questions on the consumption and purchase of fish.

The Working Group recommended that:

- Market research data might be considered an appropriate methodology where information regarding the consumption of specific foods is required.

## 4.8 Other Surveys

4.8.1 The surveys described in this section, while not sufficiently robust for monitoring the Scottish Dietary Targets, may provide useful additional proxy indicators or contextual information relevant to monitoring the Scottish Dietary Targets.

4.8.2 The **Scottish Health Education Population Survey (HEPS)** is an annual survey that was established in 1996 by NHS Health Scotland (there is a one year gap in data for 2000) with the aim of providing national level data on health related knowledge, attitudes, motivations and behaviours. HEPS contributes to monitoring the performance of health education / promotion in Scotland and provides information for planning future public health strategies.

4.8.2 There are two survey waves, in March and September each year, with a yearly total sample size of 1800 adults aged 16-74. The response rate is generally around 72%.

4.8.3 The questions relating to diet cover awareness of the recommended fruit and vegetable intake, changes to diet in the context of a healthy lifestyle, changes made to the diet in the last year, barriers to healthy eating and the frequency of eating five food groups:

- fruit, salad and vegetables not including potatoes
- starchy food e.g. bread, rice, pasta, potatoes
- sugar and foods containing a lot of sugar e.g. cakes, sweets, soft drinks
- fatty or fried foods e.g. crisps, chips
- fish (not fried).

4.8.4 HEPS has recently undergone a period of review and the decision has been taken to continue with the survey as it provides trend data on key indicators. The questions included will be thoroughly reviewed but it would be preferable to add questions rather than alter what is there so longitudinal trend data can still be obtained.

**Table 9: Advantages and Disadvantages of HEPS for Monitoring Scottish Dietary Targets**

<b>Dietary Methodology: In-home interviews</b>	
<b>Advantages</b>	<b>Disadvantages</b>
<ul style="list-style-type: none"><li>• Provides qualitative data on fruit and vegetables that could supplement other surveys</li><li>• Could be used to determine intermediate outcomes (e.g. behavioural change)</li><li>• Provides contextual information</li></ul>	<ul style="list-style-type: none"><li>• Does not give detailed level of dietary assessment</li></ul>

- 4.8.5** The **Health and Health Behaviours of Scottish School Children** survey is part of a WHO study and is managed by the Child and Adolescent Health Research Unit at the University of Edinburgh. It samples children aged 11, 13 and 15 and in 1998 the total sample size was 5632. The survey includes questions on dietary behaviours and asks about the frequency of consumption of bread, milk (and type consumed), fruit, vegetables, processed meat, chips, crisps, sweets, cakes, sugary drinks and coffee. This survey runs every four years with the next planned for 2006.
- 4.8.6** The **Scottish School Adolescent Lifestyle and Substance Use Survey (SALSUS)** is by design focused on smoking, drinking and drug use but does contain questions on healthy eating, body image and dieting. There are a few contextual questions and some which ask about the frequency of consumption of fruit and vegetables, sweets, cakes, biscuits, pastries, crisps, chips / other fried potatoes, soft drinks and alcohol. This survey was carried out in 2000, 2004 and there are plans for another survey in 2006.
- 4.8.7** The Scottish Executive Education Department (SEED) has the lead for a new survey – the **Longitudinal Survey of Children**. It is envisaged that the survey will collect data over a period of up to twenty years, tracking a number of cohorts of children. The aim will be to meet a wide variety of research purposes through a core set of questions supplemented by modules targeting specific issues. At the time of writing (2004) the questionnaires are being drafted. Piloting will take place towards the end of the year and fieldwork will begin in early spring 2005.
- 4.8.8** Four independent random population surveys were carried out in Scotland in 1986, 1989, 1992 and 1995 by the Cardiovascular Epidemiology Unit, University of Dundee, as part of the WHO **MONitoring trends and determinants in Cardiovascular Disease (MONICA)** programme. The surveys provide food and nutrient data on over 6000 Scots aged 25-74. The surveys used a 65 item semi-quantitative FFQ that was updated for specific new items as necessary. Care must be taken when comparing data from different years. No further dietary surveys are planned for Scotland with respect to the MONICA project.
- 4.8.9** The **Aberdeen Prospective Osteoporosis Screening Study (APOSS)**, designed and run by the University of Aberdeen Department of Medicine and Therapeutics, began in 1990 with a sample of 5118 perimenopausal, early and late menopausal women aged 45-54. Diet at baseline was assessed using a validated FFQ designed specifically for the study of nutrients associated with bone health. It contains ninety-eight foods organised into twenty sections and contains sub-sections on both present and past food intake (up to twelve and thirty years previously). Additional sections of the questionnaire are designed to collect data on dietary supplement use, dietary habits and physical activity. This project is ongoing.

## 5. SURVEYS OUTWITH SCOTLAND THAT INCLUDE DIETARY METHODOLOGY

### 5.1 The Health Survey for England

- 5.1.1** The HSE is an annual survey commissioned by the DoH and is designed to monitor health trends in England. The survey focuses on different health issues each year and, since 2001, a fruit and vegetable questionnaire has been included as a core module with the aim of obtaining annual trend data.
- 5.1.2** The fruit and vegetable module was designed to assess levels of fruit and vegetable consumption within the population and to compare it with the Five-a-day message ([www.doh.gov.uk](http://www.doh.gov.uk)). The module includes selected foods and expresses consumption in portions as defined within the Five-a-day programme. The respondents are asked about their consumption of these foods over a single day, defined as the 24 hours ending the previous midnight.
- 5.1.3** This module has been included in the SHS 2003 and will provide additional information for monitoring progress towards the SDAP target for fruit and vegetables.

### 5.2 Survey for Lifestyles, Attitudes and Nutrition (Republic of Ireland)

- 5.2.1** The SLAN is the national nutrition survey of the Republic of Ireland. It is managed by the National Nutritional Surveillance Centre (NNSC) which is part of the Department of Public Health Medicine and Epidemiology at University College Dublin. The NNSC has been given a grant in the region of £500,000 to cover four years of surveillance, data collection and further development.
- 5.2.2** The sample population for the survey is adults aged 18+ and is taken from each of the twenty-six counties of the Republic of Ireland so it is representative. The total sample size for 2003 was 5992.
- 5.2.3** The SLAN consists of a self-completion questionnaire with sections on general health, lifestyle choices including physical activity and tobacco use, a semi-quantitative FFQ and additional questions on dietary habits, special diets, food supplement use, food labelling, methods for cooking vegetables and whether people think their diet could be healthier.
- 5.2.4** The FFQ component of the SLAN is an adapted version of the semi-quantitative FFQ used in the EPIC study and includes 149 food items and is capable of estimating nutrient intakes.

The Working Group recommended that:

- As this methodology has the potential to provide an excellent framework for monitoring progress towards the Scottish Dietary Targets, as well as offering good value for money, its use in Scotland should be considered.
- Alternatively, the FFQ component of the SLAN (or an equivalent FFQ) could be used to replace the current eating habits module of the SHS.

### **5.3 Monitoring Public Health Nutrition in Europe: Nutritional Indicators and Determinants of Health Status**

**5.3.1** The aim of this programme is to establish a European surveillance system that will allow comparability of health status across the EU. The European Community Health Indicators (ECHI) framework consists of over fifty projects covering a variety of topics relevant to health, including nutrition. It is intended that the monitoring will integrate and co-ordinate with existing systems in participating countries.

**5.3.2** A range of indicators which impact on public health nutrition were identified e.g. environmental factors, food and nutrient intake, nutritional status, physical activity, socio-demographic factors, inequality, genetic factors and interactions, life stages and vulnerable / critical periods. After a review process it was agreed that the ECHI framework for food and nutrient intake will cover:

- Energy from food
- % energy from fat
- % energy from saturated fatty acids
- % energy from protein
- Consumption of bread / cereals
- Consumption of fruit excluding fruit juice
- Consumption of vegetables excluding potatoes
- Consumption of fish
- Consumption of micronutrients
- Breastfeeding
- Contaminants

**5.3.3** Progress towards these indicators will be measured using current health surveys, household budget surveys and individual nutrition surveys and data will be compared between countries.

**5.3.4** Although the recommendations in the Monitoring Public Health in Europe programme are for a UK sized country, countries with a similar (or smaller) population to Scotland e.g. Sweden and Norway, are involved so it would be possible to implement them here as well. Monitoring of the Scottish Dietary Targets for fats, bread, breakfast cereal, fruit and vegetables and fish will provide data that can be contributed to the programme without further expense.

The Working Group recommended that:

- Data collected in relation to the Scottish Dietary Targets should be contributed to the ECHI programme.

## 6 CONCLUSIONS AND KEY RECOMMENDATIONS FOR MONITORING PROGRESS TOWARDS THE SCOTTISH DIETARY TARGETS

### 6.1 Monitoring Progress Towards the Scottish Dietary Targets in 2005

The Working Group concluded that there is no single existing survey currently capable of assessing progress towards all the Scottish Dietary Targets in 2005.

The Working Group recommended that:

- In 2005, use should be made of existing surveys, particularly the EFS, to monitor progress towards the Scottish Dietary Targets.
- Where data is lacking, as is the case for the targets for sodium and non-milk extrinsic sugars in children, interim studies may need to be set up.

### 6.2 Monitoring Progress Towards the Scottish Dietary Targets Beyond 2005

The Working Group considered the information and expert opinion at its disposal to recommend possible ways of monitoring progress towards the Scottish Dietary Targets beyond 2005.

The Working Group recommended that:

- Future monitoring should take place at least every 3-5 years to provide data on ongoing progress towards the Scottish Dietary Targets.
- When considering a methodology for monitoring progress towards the Scottish Dietary Targets, account should be taken of its appropriateness and limitations.
- The EFS should continue to be used to monitor progress towards the Scottish Dietary Targets beyond 2005.
- Increasing the number of Scottish participants in any future UK nutritional surveillance programme, including the new NDNS programme, should be considered so that the data generated is representative for Scotland.
- When planning any future nutritional surveillance programme to monitor progress towards the Scottish Dietary Targets, the possibility of increasing sample sizes for sub groups such as lower socio-economic groups, the elderly and ethnic minority groups should be considered.
- The views expressed in this report should form the basis of decisions when commissioning the Scottish Health Survey.

- The possibility of replacing the existing eating habits module of the SHS with a comprehensive FFQ should be considered for monitoring progress towards the Scottish Dietary Targets.
- The possibility of setting up a new stand alone dietary survey, using the framework of the Irish SLAN, should be considered for Scotland.
- Possible ways of increasing survey response rates need to be explored. A response rate of at least 60% should be the aim when employing weighed intake methodology while higher response rates should be expected from surveys in which the respondent burden is less.
- Information from certain Scottish surveys, while not sufficiently robust for monitoring progress towards the Scottish Dietary Targets, should be used to provide proxy indicators of dietary intake and contextual insights related to the monitoring process. These include, 'The Scottish Health Education Population Survey', 'The Health and Health Behaviours of Scottish School Children', 'The Scottish School Adolescent Lifestyle and Substance Use Survey' and the 'Longitudinal Survey of Children'.
- The possibility of merging the Local Health and Lifestyle Surveys and the SHS should be investigated as a better use of resources. If the SHS and Local Health and Lifestyle surveys are not merged, the dietary questions in Local Health and Lifestyle Surveys should be standardised between NHS Boards to provide information for monitoring progress towards the Scottish Dietary Targets.
- Market research data might be considered an appropriate methodology where information regarding the consumption of specific foods is required.
- The measurement of risk markers such as blood lipids, blood pressure, obesity in children, growth and development of children, dental caries and behaviour related to dietary patterns should be considered when planning any future nutritional surveillance in Scotland.
- The inclusion of information about lifestyle choices, such as physical activity and smoking, should be considered when planning any future nutritional surveillance in Scotland.
- Data collected in relation to Scottish Dietary Targets should be contributed to the nutrition component of the European Community Health Indicators (ECHI) framework.

### 6.3 Future Monitoring Targets

A number of specific recommendations were made concerning any monitoring tool that may be used in a survey designed to monitor the Scottish Dietary Targets.

#### **The Working Group recommended that:**

Any future monitoring tool should be capable of:

- Measuring the intake of, not only, fresh and frozen fruit and vegetables, but also of canned and dried products as well as fruit juice.
- Recording information about the type of bread consumed.
- Recording information about the type of breakfast cereal consumed.
- Measuring the consumption of fresh and canned oil rich fish and white fish separately. In addition, canned tuna should be measured separately from oil-rich fish, as the oil present in fresh tuna is lost during the canning process (Ministry of Agriculture, Fisheries and Food, 1998).
- Measuring the percentage energy from fat.
- Measuring total fat intake to ensure it is at an appropriate level.
- Measuring the percentage energy from NME sugars.
- Measuring total NME sugar to ensure that it is at an appropriate level.
- Measuring starch and NSP intakes separately.
- In addition, the use of a spot urine methodology should be considered for future surveys of salt intake in the Scottish population.

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# APPENDIX 1: WORKING GROUP ON MONITORING SCOTTISH DIETARY TARGETS

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## APPENDIX 3: MONITORING THE SCOTTISH DIET ACTION PLAN TARGETS – REVIEW OF NATIONAL SURVEYS AND SCOTTISH RESEARCH STUDIES

**A.3.1** The Working Group on Monitoring Scottish Dietary Targets commissioned a review of the diet and health surveys currently taking place in Scotland and the UK. The report was compiled by Dr Wendy Wrieden (University of Dundee), Mrs Heather Peace (University of Aberdeen), Mrs Julie Armstrong (Glasgow Caledonian University) and Ms. Karen Barton (University of Dundee).

**A.3.2** The report is structured as follows:

**Section 1** National Food and Dietary Surveys including: the EFS, the NDNS of adults, people aged 65 and over, young people aged 4 to 18 years and children aged 1 ½ to 4 ½ years, the LIDNS, the Irish Food and Consumption Survey and the dietary analysis of the TNS Super-Panel data.

**Section 2** National Health Surveys of Scotland and England, and the Health and Health Behaviours of Scottish Schoolchildren.

**Section 3** Scottish Health and Lifestyle Surveys carried out by Local NHS Boards.

**Section 4** Research Studies. This includes ongoing studies and studies published within the last 5 years. This search has been conducted as widely as time allows and only the largest / most relevant included in the report (e.g. cohort studies).

**Section 5** Market Research relevant to dietary monitoring.

**A.3.3** The information for the published surveys was extracted using the headings given in Section 4 of the Working Group report. The information for research studies was gathered from a literature search and through contacting researchers in university departments, research institutes and the Medical Research Council (MRC) Social and Public Health Sciences Unit. The market research information was gathered through contacts with TNS, Data Monitor, the Seafish Industry, the Meat and Livestock Commission, Quality Meat Scotland and the Food and Drink Federation.

**A.3.4** The summary tables from the report '*Monitoring the Scottish Diet Action Plan Targets - review of national dietary surveys and Scottish research studies*' are included on the following pages and the full report is available from the FSA library, Aviation House, London or [www.food.gov.uk](http://www.food.gov.uk).

National Food and Dietary Surveys							
Survey Description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	Checklist	Future of Survey
<u>Expenditure and Food Survey</u>  This is a household survey based on food purchase data.	UK	Annually 2001 onwards.  (Previously the National Food Survey ran from 1940-2000.)	Households and individuals aged 7 years and over.	Details of methodology, including details of Scottish sample, to be published in March 2004.	Household food purchases (with till receipts) recorded in individual two-week diaries for each household member aged 7 years of age and over.	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group</li> </ul>	Survey ongoing.
<u>NDNS adults</u>  Aim is to provide detailed quantitative information on the current dietary behaviour, nutritional status and oral health.  Adults living in private households in Great Britain.	GB	2000/2001	19-64  Males and females.	123 weighed food diaries.	Weighed Food Record 7 days.  Plus interview on usual dietary behaviour (n=191).	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group</li> </ul>	NDNS programme currently under review.
<u>NDNS young people</u>  Aim is to provide detailed quantitative information on the current dietary behaviour, nutritional status and oral health. Young people living in private households in Great Britain.	GB	1997	4-18  Males and females.	137 weighed food diaries.	Weighed Food Record 7 days.	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group</li> </ul>	NDNS programme currently under review.

National Food and Dietary Surveys Continued							
Survey description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	Checklist	Future of Survey
<p><u>NDNS older people</u></p> <p>Aim is to provide detailed quantitative information on the current dietary behaviour, nutritional status and oral health.</p> <p>People aged 65 years and over (older adults) both in the community and in institutions.</p>	GB	1994/1995	65-85+  Males and females.	102 (free-living) but results in report combined with North of England.	<p>Weighed Food Record 4 days.</p> <p>Weighting factors used to correct for sex, age, people living alone and different co-operation rates.</p>	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group</li> </ul>	NDNS programme currently under review.
<p><u>NDNS children aged 1½ to 4½</u></p> <p>Aim is to provide detailed quantitative information on the current dietary behaviour, nutritional status and oral health.</p> <p>Pre-school children living in private households.</p>	GB	1992/1993	1½ to 4½  Males and females.	165	4-day weighed record (weighted to give estimate for 7 days).	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group</li> </ul>	NDNS programme currently under review.

National Food and Dietary Surveys Continued							
Survey description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	Checklist	Future of Survey
<u>Low Income and Diet Survey (LIDNS)</u>  Aims to provide detailed quantitative information on the food and nutrient intakes, sources of nutrients and nutritional status of low-income groups, in relation to their socio-economic and deprivation status.	UK	Feasibility study 2002, main study 2003-2004.  Report due 2006.	2 years +  Males and females.	Minimum of 400.	Multiple pass 24 hour recalls on 4 non-consecutive days (including weekends and selected to reflect benefit cycles).	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group.</li> </ul>	Survey currently underway
<u>TNS Superpanel</u>  Feasibility study to determine if the TNS superpanel data could be used for nutritional surveillance.	GB Nationally representative sample of households.	1991-2000	Household based survey.	2865	Households record all their purchases for in home consumption- includes most foods including both packaged grocery and fresh foods. Data is collected twice weekly via electronic terminals in the home, with purchases being recorded via home-scanning technology. Product description data for over 39,000 food items was converted into estimates of energy and nutrient content.	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group</li> </ul> <p>For in-house consumption - records approximately 70% of intake.</p>	Survey ongoing.
<u>North /South Ireland Food Consumption Study</u>	Northern Ireland and Republic of Ireland	1997-1999	18-64 Males and females (pregnant and lactating women excluded).	662 men and 717 women completed food diary- response rate of 63%	7 day non-weighed diary with additional questionnaires used to complement and interpret the food diary data. (No blood sampling.)	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group</li> </ul>	Survey complete.

Population Surveys							
Survey Description	Location	Date	Age Group/ Gender/	Scottish sample (number of respondents)	Methodology	Checklist	Future of Survey
<p><u>Scottish Health Survey</u></p> <p>Scottish National, cross sectional study.</p> <p>To monitor health in Scotland and measure progress towards targets for health.</p> <p><a href="http://www.show.scot.nhs.uk/scottishhealthsurvey/">http://www.show.scot.nhs.uk/scottishhealthsurvey/</a></p>	Scotland - nationally representative sample.	<p>1995</p> <p>1998</p> <p>2003 (on - going)</p>	<p>Adults 16-64 (74 in 1998 and 2003).</p> <p>Children 2-15 (in 1998 and 2003).</p>	<p>7932 (1995)</p> <p>9,047 (1998 adults)</p> <p>3893 (1998 children)</p>	<p><b>Food List:</b></p> <p>Eating habits module 2003 survey.</p> <p>Frequency of consumption of – Bread, cereals, milk, spread (type).</p> <p>Starchy foods, meat (red, poultry, processed), fish (white, oily), cheese, energy dense snacks, drinks.</p> <p>Fruit and vegetables (type and quantity).</p> <p>Other data collected: lifestyle behaviours, demographic, current health status.</p>	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group</li> </ul> <p>Multiple factors - allows confounding and interactions to be considered e.g. physical activity / diet / social.</p>	<p>2003 Survey nearing completion.</p> <p>Future of SHS under review.</p>

Population Surveys Continued							
Survey Description	Location	Date	Age Group/ Gender/	Scottish sample (number of respondents)	Methodology	Checklist	Future of Survey
<u>Health and Health Behaviour of Scottish School Children</u>  Scottish branch of international study based at Research Unit in Health and Behavioural Change, University of Edinburgh.  <a href="http://www.hbsc.org/">http://www.hbsc.org/</a>	Scotland : Stratified by region.	1986  1990  1994  1998  2002	11, 13, 15 years old.  Males and females.	In 1998 total n=5632  Numbers; age 11 = 2092 age 13 = 1813 age 15 = 1727  Sample unit is school classes (primary 7, secondary 2 and 4).  Stratified by region.	<b>Food List:</b>  Dietary behaviours questions: fruit, vegetables, sugared drinks, sweets, crisps, chips, cakes, processed meat, bread, milk (type of), coffee.	<ul style="list-style-type: none"> <li>✓ Food frequencies</li> <li>✓ Food quantities</li> <li>✓ Macronutrients</li> <li>✓ Micronutrients</li> <li>✓ Time of day</li> <li>✓ Food group</li> </ul>	Another survey planned for 2006.

Population Surveys Continued							
Survey Description	Location	Date	Age Group/ Gender/	Scottish sample (number of respondents)	Methodology	Checklist	Future of Survey
<p><u>Health Education Population Survey</u></p> <p>Cross sectional – Postal Address File as sample frame.</p> <p>To monitor progress towards achieving lifestyle changes in the population. Aims to assess health – related knowledge, attitudes and behaviours and health status.</p> <p>To inform planning and development of future health promotion initiatives.</p>	National Scottish sample.	Twice per year in March and September.  1996-2002	Adults 16-74	1742 in year 2002.  Male 856 Female 886	<p>Computer Assisted Interviewing (CAPI) in respondents home.</p> <p>Frequency of consumption of fruit, salad and vegetables the previous day and other foods over a week.</p> <p>Knowledge of recommended intake for fruit, salad and vegetables, changes made to the diet, motivations and barriers to change.</p> <p>Other data collected: self assessed health, breast feeding, physical activity, alcohol, smoking, oral health, accidents and safety, social capital, sexual health, mental health, drugs.</p>	<p>Fruit and vegetable intake is used as a proxy for a generally healthy diet.</p> <p>Commissioned by NHS Scotland.</p> <p><a href="http://www.hebs.scot.nhs.uk/">http://www.hebs.scot.nhs.uk/</a></p>	Decision has been made to continue this survey.

Population Surveys Continued							
Survey Description	Location	Date	Age Group/ Gender/	Scottish sample (number of respondents)	Methodology	Checklist	Future of Survey
<u>Health Survey for England</u>  Annual, large scale health survey of English population.	England	Annual - began in 1990	Aged 2 and over.	Numbers differ depending on different population samples and measurements e.g. in 2000 around 1000 elderly care home residents seen by nurse- (not clear how many completed food habits questionnaire).	Only fruit and vegetable questions <b>core</b> to the survey since 2000.  Depending on the focus of the survey in a particular year other dietary questions may be added. E.g. Focus in the early 1990s was on CVD so a fat and fibre questionnaire was included.  In 2000 a dietary questionnaire targeting the eating habits of the elderly was included.	<a href="http://www.doh.gov.uk/public/hse01.htm">Http://www.doh.gov.uk/public/hse01.htm</a>  <a href="http://www.data-archive.ac.uk/findingData/hseAbstract.asp">Http://www.data-archive.ac.uk/findingData/hseAbstract.asp</a>	Survey carried out annually.

Population Surveys Continued							
Survey Description	Location	Date	Age Group/ Gender/	Scottish sample (number of respondents)	Methodology	Checklist	Future of Survey
<u>Welsh Health Survey</u>  Methodology: Self completion questionnaire.	Wales	First survey 1995 Second survey 1998 Third survey Oct 2003	Adults aged 18 and over.	1998 survey:  Around 30,000 individuals returned completed questionnaires. Overall response rate–61%.  A separate study showed that non- responders were more likely to be younger, female and reported themselves to be in better health than those who returned their questionnaires.	1998 survey only contained 4 questions on the frequency of consumption of fruit and vegetables.  The fruit and vegetables section has been expanded to obtain quantitative information about portion sizes so that adherence to guidelines may be monitored.  Additional food sections were considered but not adopted.	<a href="http://www.wales.gov.uk">http://www.wales.gov.uk</a> - go to subject index, health, publications and then surveys.	New survey started October 2003.

Ongoing Scottish Research Studies						
Study Description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	Contact
<u>WCRF Concordance Study</u>  University of Dundee	Tayside, Scotland	2001-2002 Cross-sectional surveys.	18-70  Males and females.	Questionnaire sent out to 2400. Valid Responses 851 (35%).	<b>DALDI FFQ</b> Developed specifically for the project which included areas specific to each of the guidelines in the WCRF 1997 report.	<i>Professor Annie Anderson or Marieke Vossenaar, University of Dundee</i>
<u>MIDSPAN Renfrew – Paisley Family Health Study</u>  University of Glasgow	Renfrew and Paisley, Scotland, UK	1996 (Data not published)	30-59  Males and females.	2338 1040 Men 1298 Women	Cohort Study  FFQ developed and validated by Yarnell et al 1983.	<i>Professor Graham Watt, University of Glasgow</i>
<u>The West of Scotland Twenty-07 Study</u>  MRC SPHSU, Glasgow	Central Clydeside Conurbation (CCC), Scotland, UK	1987-2007	15, 35 and 55 years at original cohort, followed up for 20 years.  Males and females.	Initial Regional Sample ~ 3000 (CCC)  Plus Initial Localities (Affluent and Deprived) Sample ~ 1500	Cohort Study  Various FFQs with most being adapted from Yarnell et al 1983.	<i>Professor Sally Macintyre, Mary-Kate Hannah, MRC Social and Public Health Sciences Unit, Glasgow</i>
<u>SHARP Study</u>  MRC SPHSC Glasgow	Scotland, UK	2002-2003	Males and females old enough to be a tenant of a Housing Association.	At least 600.	For tenants moving into a housing association new build property.  Questions on daily portions of vegetables, fresh fruit and fruit juice.	<i>Contact Catherine Ferrill, MRC Social and Public Health Sciences Unit, Glasgow</i>

Ongoing Scottish Research Studies Continued						
Study Description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	Contact
<u>The West of Scotland 11-16 and 16+ Studies</u>  MRC SPHSC Glasgow	Central Clydeside Conurbation (CCC), Scotland, UK	1994 - Date	Males and females aged 11 at original cohort.	2586 at original cohort.	Cohort Study  Brief food list with times of day (13 foods highlighting F&V consumption) and brief FFQ (10 foods).	<i>Dr Helen Sweeting, MRC Social and Public Health Sciences Unit, Glasgow</i>
<u>Food, Health and Shopping in Glasgow</u>  MRC SPHSC Glasgow	Shettleston, Glasgow, Scotland, UK	Sept 2001  Sept 2002	Males and females.	600 (2001)  118 Males 295 Females (2002)	Cohort study evaluating the health impacts of a major food superstore.  Questionnaire on shopping habits, which includes questions on portions of fruit and vegetables consumed daily.	<i>Dr Steven Cummins, MRC Social and Public Health Sciences Unit, Glasgow</i>
<u>Seaton Study</u> of diet in pregnant women in Aberdeen to assess the influence of maternal diet on asthma and allergy in children.  Study ongoing, began 1998	Aberdeen	Began in 1998. Study ongoing.	Women of child bearing age and offspring.	Recruitment through Aberdeen Maternity Hospital.  <b>2000</b> pregnant women.  <b>1200</b> offspring.	<b>In Mothers</b>  <b>SCG-MRC/FFQ</b> used to collect data on maternal diet. Also, blood levels of Vitamin C, E and b carotene.  <b>In Offspring</b>  Postal questionnaire on infant feeding administered after birth.  <b>PS/FFQ</b> administered to the offspring.	<i>Contact: Professor Anthony Seaton, University of Aberdeen. Dietary aspects: Dr Geraldine McNeill</i>

Ongoing Scottish Research Studies Continued						
Study Description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	Contact
<u>SOCCS Study of diet and colorectal cancer</u>	Across Scotland	2000-2005	Males and females.	<b>2000</b> cases and <b>2000</b> controls during the period 2000-2005.	<b>SCG-MRC/FFQ</b> used to assess fatty acid intake and other nutrients.	<i>Prof. Harry Campbell, University of Edinburgh</i>
<u>Diet &amp; Pregnancy</u>  To determine the relationship between nutrient intake and various outcomes in relation to pregnancy, including fertility, spontaneous abortion, maternal health, birth weight, health of the baby and consequences for disease susceptibility in later life.  Measurements of relevant maternal and offspring genotypes to investigate gene/nutrient interactions.	Aberdeen	2000-2005	Women of childbearing age including, normal fertile women and women under going IVF treatment.	Recruitment through Aberdeen Maternity Hospital.  Measurements carried out prior to conception and in early, mid and late pregnancy.  Currently <b>2000</b> women have been studied- <b>5000</b> expected by 2005.	<b>SCG-MRC/FFQ</b>  Plus a wide range of nutrients and metabolites also measured in body fluids and tissues.  Current focus is on folate, other B vitamins and fatty acids.	<i>Dr Paul Haggarty, Rowett Research Institute</i>

Ongoing Scottish Research Studies Continued						
Study Description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	Contact
<u>MAVIS study</u>  Study to investigate the influence of vitamin and mineral supplementation on infection.	Grampian	Ongoing	Males and females aged 65 years or over.	Randomised control trial of <b>900</b> men and women aged over 65 years.  Recruited through GP practices in Grampian.	NAQ used to assess nutritional risk of micronutrient deficiency at baseline.	<i>Dr Alison Avenell, HSRU, University of Aberdeen</i>
<u>RECORD study</u>  Medical Research Council Randomised Evaluation of Calcium and or vitamin D in the secondary prevention of osteoporotic fractures.	UK wide study (1081 subjects in Scotland)	1999-2002 Trial due to report results in late spring 2004.	Males and Females aged 70 or over.	Patients aged 70 or over who have sustained a fracture likely to be related to osteoporosis during the previous two years were eligible for trial entry.  5292, UK wide, participants in total, with <b>1081</b> in <b>Scotland</b> .  Recruitment data (including dietary data) collected March 1999-April 2002.	Ca & Vit D FFQ specifically directed at calcium intake, Vitamin D status and vitamin D exposure.	<i>Prof. Adrian Grant, HSRU, Aberdeen Nutrition components, Dr Alison Avenell also HSRU</i>

**Ongoing Scottish Research Studies Continued**

<b>Study Description</b>	<b>Location</b>	<b>Date</b>	<b>Age Group/ Gender/ Status</b>	<b>Scottish sample (number of respondents)</b>	<b>Methodology</b>	<b>Contact</b>
<u>Aberdeen Prospective Osteoporosis Screening Study (APOSS)</u>	Aberdeen	1990 - present	Women aged 45-54 years at baseline.	5118, of which <b>1064</b> diets assessed at baseline.  Includes perimenopausal, early and late menopausal women.  At second visit, 3883 returned and <b>3239</b> diets obtained.  Sample was randomly chosen from the Community Health Index.	<b>APOSS/FFQ</b>	<i>Prof David Reid, University of Aberdeen. Dietary aspects, Dr Helen MacDonald</i>
<u>Mechanisms by which fruit and vegetables influence postmenopausal bone health : an RCT in a well-characterised population</u>	Aberdeen	Began in 2003.  2 year intervention study ongoing.	Postmenopausal women > 5 years past menopause and not on HRT.	Recruitment: 260 in total (65 in each intervention arm).  Women taken from APOSS.  In upper half of dietary acidity (previously assessed by FFQ).  Stratified according to APOE and VDR genotypes.	Non weighed record (Epic Food Diary / McCance & Widdowson Food Composition).	<i>Dr Helen MacDonald, University of Aberdeen</i>

**Ongoing Scottish Research Studies Continued**

<b>Study Description</b>	<b>Location</b>	<b>Date</b>	<b>Age Group/ Gender/ Status</b>	<b>Scottish sample (number of respondents)</b>	<b>Methodology</b>	<b>Contact</b>
<u>Case only study of genotype and phenotype, measures of folate and colorectal lesions</u>	Grampian, Tayside and Fife	Ongoing	Males and females aged 50-60.	Recruitment ongoing during 2002-3 from individuals participating in the East & North of Scotland.  Faecal Occult Blood Screening Pilot found to have positive FOB test & with adenomatous polyp or colorectal cancer.  650 to be recruited from Grampian, Tayside and Fife.	Dietary Questionnaire closely resembling the EPIC FFQ (developed by Prof David Foreman (Leeds)).  Plus blood analysed for polymorphisms in a range of folate metabolising genes and for folate, B <sub>12</sub> , homocysteine and riboflavin in all participants.  Some data also on genetic and phenotypical measures of selenium metabolism.	<i>Linda Sharp, Amanda Cardy and Prof Julian Little, Department of Medicine &amp; Therapeutics, University of Aberdeen</i>

**Ongoing Scottish Research Studies Continued**

<b>Study Description</b>	<b>Location</b>	<b>Date</b>	<b>Age Group/ Gender/ Status</b>	<b>Scottish sample (number of respondents)</b>	<b>Methodology</b>	<b>Contact</b>
<p><u>Case only study of interactions between diet, lifestyle and family history in breast cancer</u></p> <p>Part of an EU project taking place in 8 countries.</p> <p>UK locations include, Scotland and NE England.</p>	EU (including Scotland)	1999-2003 (ongoing)	Females under 40 years.	<p>Women diagnosed with breast cancer.</p> <p>UK sample 300 (Entire study, 3-5000).</p>	<p><b>SCG-MRC/FFQ</b> (UK sample).</p> <p>Plus mouthwash DNA collected from UK participants to be analysed later for gene involved in nutrient metabolism.</p>	<i>Linda Sharp and Mark Taylor, Dept Medicine &amp; Therapeutics, University of Aberdeen</i>
<p><u>Identification of phenotypic correlates of human obesity: refining the obese genotype</u></p>	Aberdeen	Ongoing	<p>Males and females 20-50.</p> <p>BMI 20-40.</p>	<p>Recruitment through newspaper advertisement 150 subjects.</p>	7 day weighed intake.	<i>Dr Leona O'Riley Rowett Research Institute</i>
<p><u>Identification of phenotypic correlates of human obesity: refining the obese genotype</u></p>	Aberdeen	Ongoing	<p>Males and females 20-50.</p> <p>BMI 20-40.</p>	<p>Recruitment through newspaper advertisement 150 subjects</p>	7 day weighed intake.	<i>Dr Leona O'Riley Rowett Research Institute</i>

Ongoing Scottish Research Studies Continued						
Study Description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	Contact
<u>Characterisation of the factors involved in the development of obesity</u>	Aberdeen	Ongoing	Males and females aged 2-6 years.  Any BMI.	Recruitment through newspaper advert and nursery advert display.  150 subjects.	7 day weighed intake.	<i>Dr Diane Jackson Rowett Research Institute</i>
<u>Eating patterns and activity levels</u>	Glasgow & Edinburgh	1995-96	Males and females.	N=100 Healthy controls	7 day unweighed intake.	<i>Dr Sandra Drummond QMUC</i>
<u>Weight loss during energy restriction and promotion of activity</u>	Edinburgh	2003-2004 Starting	20-60 Females.	N=120	7 day baseline unweighed and 4 day follow-up.  Cholesterol, LDL HDL, glucose insulin will be determined.	<i>Dr Sandra Drummond QMUC</i>
<u>Weight loss and its maintenance during high CHO for 3/12 and maintenance over 9/12</u>	Edinburgh	2001-2003	20-50 Females.	N=135 BMI>25	7 day baseline unweighed and 4 day follow-up.	<i>Dr Sandra Drummond QMUC</i>

Ongoing Scottish Research Studies Continued						
Study Description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	Contact
<p><u>Current and future impact of malnutrition in Scottish children and adolescents: further analysis of the Scottish Health Survey.</u></p> <p>Analysis of interactions between obesity and potential explanatory variables (e.g. diet, activity). In addition it will explore potential co-morbidities for obesity.</p>	Scottish Health Survey Database	2002-2003	<p>Male and females.</p> <p>Children 3-15 years.</p> <p>Young people 16-24 years.</p>	<p>Children 3892.</p> <p>Young people 927.</p>	<p>Database of the Scottish Health Survey 1998.</p> <p>Limited food frequency questionnaire.</p>	<i>Julie Armstrong Glasgow Caledonian University</i>
<p><u>Diet Trials – A comparison of weight loss over 3/12 with popular diets (Atkins, Weight Watchers &amp; Slim Fast) and analysis of blood lipids and body composition (DEXA)</u></p>	Multicentre – Nottingham, Edinburgh, Surrey, Northern Ireland (Surrey lead)	2002-2003	20-65 Males and females.	N=120 BMI>25	3-day diaries unweighed Cholesterol, HDL, glucose, insulin, TAG, body composition measured.	<i>Prof A de Looy QMUC</i>
<p><u>Influence of breakfast clubs on dietary intake, body composition and cognitive performance in school children</u></p>	Edinburgh and Lothians	2000-2003	<p>Children 7-9.</p> <p>Males and females.</p>	N=105	<p>3-day diaries unweighed – using photographic atlas for comparison of portion size.</p> <p>Validated against school dinners – weighed.</p>	<i>Mr Michael Clapham QMUC</i>

Recently Completed Scottish Research Studies						
Study description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	References
<u>UK Women's Cohort Study</u> – <u>University of Leeds</u> <u>Paper on F &amp; V</u> <u>Consumption</u>	England, Scotland, Wales	1995-1998	35-69 Females.	35374 Total UK, 58% Response Rate.	Revised EPIC FFQ.	Pollard et al., 2001
<u>MONICA (included diet history survey)</u>	North Glasgow	1986,1989, 1992,1995	25-64y + 65-74y in 1992  Males and females.	1260 (1986) 1397 (1989) 1517 (1992) 1836 (1995)	Cross-sectional surveys using FFQ adapted from Yarnell et al., 1983.  65 different foods and drink.  FFQ included more foods in later surveys.	Bolton-Smith et al., 1991  Wrieden et al., 2000
<u>Fibre intake, constipation, and risk of varicose veins in the general population: Edinburgh Vein Study</u>	Edinburgh, Scotland, UK	1994-1996	18-64 Males and females.	1503 689 Men 814 Women	Tinuviel FFQ.	Lee et al., 2001
<u>Dietary Fats and 16-year coronary heart disease mortality in a cohort of men and women in Great Britain</u>	GB	1984-1985	40-75 Males and females.	1676 1225 Men 1451 Women	30 Food Group FFQ similar to Yarnell et al 1983.	Boniface et al., 2002
<u>Evaluation of effects of dietary exchange of individual saturated fatty acids on haemostasis and vascular function</u>	Tayside and Fife, Scotland, UK	1999-2002	Males 40- 75y.  Women Post Menopausal – 75y.	101 48 Men 53 Women	7 day weighed food record at baseline.	Belch et al., 2003

Recently Completed Scottish Research Studies Continued						
Study description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	References
<u>Study of growth before birth and adult health</u>	Aberdeen	1999-2000 Study complete.	20-50 Males and females.	260 twins.  90 controls matched for age and gestational age.  All subjects were born in Aberdeen Maternity Hospital.	<b>SCG-MRC/FFQ</b> used to assess intake of fats, NSP and antioxidant intake in relation to risk factors for coronary heart disease.	Contact:  <i>Dr Geraldine Mc Neill, University of Aberdeen</i>
<u>Case-control study of polymorphisms in folate and xenobiotic metabolising enzymes and colorectal cancer</u>	Grampian Health Board Area	1998-2000	Males and females.	Cases recruited from Aberdeen Royal Infirmary.  Controls were randomly selected from the Community Health Index and frequency matched to cases on age and sex.  270 cases and 400 controls.	<b>SCG-MRC/FFQ</b> (including use of flavanoid database).  Plus blood samples collected from a sub-group (100 cases and 200 controls) and analysed for plasma folate, Vitamin B <sub>12</sub> and homocysteine.  Mouthwash DNA sample collected from all, analysed for polymorphisms in MTHFR gene.	Sharp et al., 2001; Sharp et al., 2002
<u>Pilot case-control study of polymorphisms in nutrient metabolism and breast cancer</u>	Aberdeen	1998-1999	50-69 Controls Cases unspecified	Cases recruited from the Aberdeen Royal Infirmary Breast Units.  Controls randomly selected from 2 GP lists in Grampian.  62 cases, 66 controls.	<b>SCG-MRC/FFQ</b>  Plus mouthwash DNA collected and analysed for polymorphisms in genes involved in metabolism of folate, retinal and vitaminD.	Sharp et al., 2002; Schofield et al., 2001; Miedzybrodska et al., 2001; Baird et al., 1999 a,b& c

Recently Completed Scottish Research Studies						
Study description	Location	Date	Age Group/ Gender/ Status	Scottish sample (number of respondents)	Methodology	References
<u>Pilot case-control study of polymorphisms in MTHFR and colorectal cancer</u>	Grampian	Recruitment Completed 1997	Males and females 37-77yrs.	Cases were recently diagnosed invasive colorectal cancer and controls were selected from general practice lists in Grampian area.  79 cases and 79 controls.	<b>SCG-MRC/FFQ</b>  Plus mouthwash DNA analysed for polymorphisms in MTHFR gene.	<i>Howe et al, 1997</i>  <i>Contact Prof Julian Little and Linda Sharp</i>
<u>Interactions between diet and polymorphic genes involved in nutrient metabolism in the aetiology of cleft lip and palate</u>  Case-control study	Scotland, Northern Ireland, England	1997-2000	Parents and children.	Children born with cleft lip/palate between 1997 and 2000 and their parents.  Control children and parents selected from CHI (Scotland), Health Board Register (N. Ireland) and GP practices (England).  Total number of cases 221, controls 251.	<b>SCG-MRC/FFQ</b>  Plus mouthwash DNA analysed for polymorphisms in MTHFR (and other genes). Blood samples analysed for folate biomarkers.	<i>Contact Prof Julian Little</i>
<u>The effect of folic acid supplementation on plasma homocysteine in an elderly population</u>  Randomised double blind placebo control trial	Aberdeen	1997-2000	65-75 Males and females.	Sample drawn from GP practices in Aberdeen.  368 Subjects.	Dietary folate intake assessed at baseline and after 6 weeks of supplementation using the <b>Scottish Heart Health / MONICA FFQ</b> .  Analysis carried out at the Rowett Research Institute.	Rydlewicz et al., 2001

## APPENDIX 4: SOURCES OF DATA ON HEALTH OUTCOMES

- A.4.1** There are several sources of data on the health outcomes that were given in Sections 2.4.1 and 2.4.2 of the Working Group report and these are outlined in the following paragraphs.
- A.4.2** Two sources of data on health outcomes are Continuous Morbidity Recording (CMR) and Practice Team Information (PTI). CMR covers seventy General Practitioner (GP) practices in Scotland. Every time a patient consults their GP in one of these practices the reason for the visit will be recorded, and then coded (up to ten reasons can be recorded). It is thus possible to see how many people are presenting with cancer or coronary heart disease for example. The PTI records interventions and reason for contact if the patient sees a Practice Nurse, District Nurse or Health Visitor but not a GP.
- A.4.3** Neither the CMR nor the PTI records data on cholesterol, body mass index (BMI), height or weight, but the PTI is designed to record activity, along with associated morbidity, and so records if such readings were taken. The CMR data is only representative at national level and cannot be broken down to a regional level (as it is in the SHS). PTI data from April 2003 onwards is only representative at national level and cannot be broken down at regional level. In the case of the CMR, recording is limited by the codes available and also by the fact that most people will not present at their GP complaining of obesity, it is more likely to be recorded as a side note, if at all.
- A.4.4** The Information and Statistics Division (ISD), on behalf of the National Health Service (NHS) host the Scottish Cancer Registry. Data on the incidence and prevalence of various cancers can be accessed from the ISD website: [www.isdscotland.org](http://www.isdscotland.org)
- A.4.5** Each Health Board in Scotland maintains a diabetes register. These vary in quality and coverage but could be used to provide an indication of the incidence and prevalence of NIDDM in Scotland.
- A.4.6** The Management Information Dental Accounting System (MIDAS), is the General Dental Service payments system, from which information on patients, treatments, practitioners and payments can be derived. The drawback of this system is that some core child treatments must be provided as part of the capitation fee and so they are not recorded. Thus, there is no way of determining whether or not these treatments have taken place without accessing the patient's record card or looking in their mouth.
- A.4.7** The Scottish Health Boards Dental Epidemiology Programme (SHBDEP) is a source of trend data on decayed, missing and filled teeth in children. The teeth of children aged 5 and 12 are examined throughout Scotland on a rolling programme and the data is analysed by the Dental Health Services Research Unit at the University of Dundee. Results are fed back to Health Boards and published. It is possible to analyse some of the data by deprivation category.

- A.4.8** The IDS(S)37 is the new Community Dental Service scheme and will record information on dental health education and promotion, formal, evaluated dental health programmes and the national dental inspection programmes. This latter part will hold high-level data and it is likely that the information will categorise children's needs for dental intervention into three groups: number with zero caries, number requiring dental referral and number requiring treatment for caries. However this has still to be agreed with the service.
- A.4.9** As part of the Child Health Surveillance System in Scotland, anthropometric data on children (height or length, weight, head circumference) is routinely collected at a number of stages during childhood (mainly pre-school years). This allows longitudinal follow up of children's growth and, potentially, their nutritional status. These national data sets are managed by ISD.
- A.4.10** The SHS measures lifestyle choices (e.g. smoking, physical activity), risk factors (e.g. obesity, blood pressure) and various health outcomes (e.g. coronary heart disease, asthma) and due to the methodology used this could be linked to an individual's dietary intake. The SHS can also be used to carry out analysis by deprivation, socio-economic group and other characteristics of the population.
- A.4.11** The use of proxy measures of health was considered but was deemed inappropriate. Although people living in poorer areas may use services more often than people living in affluent areas this does not fully reflect their level of need or morbidity, and would underestimate the level of health (or illness) in these groups.

## APPENDIX 5: BRIEFING PAPER ON DIETARY ASSESSMENT METHODS

**A.5.1** The Working Group on Monitoring Scottish Dietary Targets commissioned a review of the methodologies used in diet research surveys. The report was compiled by Dr Wendy Wrieden (University of Dundee), Mrs Heather Peace (University of Aberdeen), Mrs Julie Armstrong (Glasgow Caledonian University) and Ms. Karen Barton (University of Dundee). The relevant sections are included here and the full report is available from the FSA library, Aviation House, London.

### **A Short Review of Dietary Assessment Methods Used in National and Scottish Research Studies**

#### **Introduction**

The appropriate tool for dietary assessment will depend on the purpose for which it is needed. The purpose may be to measure nutrients, foods or eating habits. To monitor the Scottish Dietary Targets it is necessary to measure both nutrient and food intake although exploration of eating habits may be helpful to understand the process of achieving dietary change. Many different methods have been developed for the purpose of assessing dietary intake. These range from detailed individual weighed records collected over a period of 7 days or more to food frequency questionnaires, household survey methods and simple food lists. Each has merits, associated errors and practical difficulties to be considered when choosing one method above another. Several of the dietary assessment tools described do not collect sufficient detail to assess nutrient intake (and thus progress towards nutrient based targets) but may be capable of assessing and estimating intake of specific foods (and thus some of the food-based targets).

#### **1. Methods designed to measure food and/or nutrient intakes**

In general the procedure for measuring energy and nutrient intake involves:

- I. A report of all food consumed by an individual
- II. Identification of the foods such that an appropriate item can be chosen from standard food tables. In detailed studies a duplicate portion of the food may be chemically analysed to find out the nutrient content
- III. Quantification of the portion size of each food item
- IV. Determination of the frequency with which each food is eaten
- V. Calculation of the nutrient intake (portion size (g) x frequency x the nutrient content per g).  
(Rutishauser and Black, 2002)

To measure food intake alone it is possible to miss out steps (II) and (V). Indeed if we are only interested in the intake of certain foods it may not be necessary to have a report of all food consumed. However quantification of the amounts eaten is necessary if comparison with a food based target or recommendation is required e.g. the 400g of fruit and vegetables in the Scottish Diet Action Plan Targets.

## 1.1 Weighed Food Records

This involves an individual or an investigator weighing each and every item of food and drink prior to consumption. A detailed description of the food and its weight is recorded in a specially designed booklet. Usually a space is left to record any leftovers so that the precise weight of food eaten can be calculated. Weighed records can be kept for 3,4,5 or 7 days. The 7 day weighed record has often been taken as the 'gold standard' against which less detailed and demanding methods can be compared. It is now recognised that the method also has limitations and it is necessary to use physiological and biochemical methods (e.g. the use of doubly labelled water which measures energy expenditure- energy intakes less than the energy expenditure are likely to be invalid) to check that any method of measuring food intake is measuring what it is supposed to measure. Weighed food records of 7 days or 4 days were used in the NDNS programme.

### Strengths

- Widely used method
- Precision of portion sizes

### Weaknesses

- High respondent burden
- Mis-reporting
- Expensive
- Food composition data limited

## 1.2 Estimated Food Records

This is similar to the weighed food record method except that the quantification of the foods and drink is estimated rather than weighed. This estimation is carried out using

- household measures such as cups or spoons
- food photographs
- food models

The investigator converts these estimates into weights that can then be used to calculate food and nutrient intake. The EPIC study used a 7 day estimated food diary with portion sizes being recorded using household measures and colour photographs.

### Strengths

- Widely used method
- Lower respondent burden than weighed food diaries

### Weaknesses

- Estimation of portion sizes
- Mis-reporting
- Expensive
- Food composition data limited

### 1.3 24 Hour Recall

This method requires a trained interviewer to ask the respondent to remember in detail all the food and drink they consumed during a period of time in the recent past (often the previous 24 hours). As a retrospective method it relies on an accurate memory of intake, reliability of the respondent not to under / misreport, and an ability to estimate portion size. This may be helped by the interviewer prompting the respondent to remember eating and drinking episodes by time periods (e.g. starting on awakening), or linking to day time activities (e.g. arriving at work). In addition the interviewer may use prompts to assist the respondent to estimate portion sizes of the items consumed. The interviewer records the dietary information which at the end is checked for omission / errors and is then coded for analysis. The primary limitation of this method is that recording consumption for a single day is seldom representative of a person's usual intake due to day-to-day variation. An extended and more accurate version of this method is the Multiple Pass 24-hour recall.

#### Strengths

- Low respondent burden
- Suitable for large scale surveys
- Can be administered by telephone

#### Weaknesses

- Estimation of portion sizes
- Single observation provides poor measure of individual intake
- Bias in recording "good/bad" foods
- Memory dependent

### 1.4 Multiple Pass Recall

This method was developed in the United States of America (USA) to assess diet and nutrition in large population studies; 1999-2000 National Health and Nutrition Examination Study (NHANES) and the Continuing Survey of Food Intakes by Individuals (CSFII). In the USA it has been used to assess the diets of children and adults. The diet is assessed over a period of three to five days during which the respondent is asked to recall and describe all food and drinks consumed in the 24 hour prior to the interview. Interviews can be a combination of face to face and telephone. The *multiple pass* refers to the steps involved during interview to allow revisiting and checking of dietary information: in the *first pass*, a quick list of foods consumed is obtained; in the *second pass*, information about the meal / snacks consumed (including time and place) are recorded. The *third pass* prompts for foods that may have been forgotten. Finally a review of the record and further details of foods consumed and portion sizes is completed. The method has been modified over the past five years with the specific aim to minimise under-reporting and the burden on respondents.

The method was adapted and validated for measuring energy intake in a Scottish sample of pre-school children. In the validation study (Reilly et al., 2001) of 41 pre-school children aged 3-4 years (23 boys, 18 girls) recall interviews with parents were used to assess diet over 3 consecutive days (two weekdays, one weekend) using both face to face and telephone interviews. For the first recall interview (face to face) the time averaged 15 - 20 minutes. For the second and third recall interview (telephone) it was < 10 minutes. Portion sizes were estimates from household measures and published food portions. The group estimate of energy intake was significantly ( $p < 0.01$ ) greater than energy expenditure (measured using doubly-labelled water) by 11%. The method was found to be quick for investigators and respondents and well tolerated. The bias in estimating energy intake may be reduced by using children's portion sizes to estimate food weights.

Data entry can be labour intensive. The multiple pass methodology is currently being used in the UK wide LIDNS.

#### Strengths

- Improved precision compared with 24 hour recall
- Low respondent burden
- Suitable for large scale surveys
- Can be administered by telephone

#### Weaknesses

- Estimation of portion sizes
- Bias in recording “good/bad” foods
- Memory dependent

### **1.5 FFQs and semi-quantitative FFQs**

At its simplest, the FFQ consists of a list of foods and a selection of options relating to the frequency of consumption of each of the foods listed (e.g. times per day, daily, weekly, monthly). FFQs are designed to collect dietary information from large numbers of individuals (100 individuals or more) and are normally self-administered, though interviewer administered and telephone interview are possible modifications (Haraldsdottir et al., 2001). FFQs normally ask about intake within a given time frame (e.g. in the past 2-3 months, 1 year or longer) and therefore aim to capture habitual intake. The length of the food list can vary depending on the nutrients or foods of interest. If a range of different nutrients and energy values are required, the list of foods may be upwards of 150 foods whereas the Ca/VitDFFQ described below contains just 11 food items since the major sources of the nutrients of interest are found in relatively few food types.

Many FFQs also attempt to collect information about portion size in addition to frequency of consumption. These may be referred to as semi-quantitative FFQs. Where portion size information is not obtained standard food portion sizes (MAFF, 1993) are often used to calculate nutrient intakes as is done for many of the FFQs based on the Caerphilly questionnaire (Yarnell et al., 1983). Although there are difficulties implicit in calculating the absolute nutrient intake of individuals from food frequency questionnaires, they are useful in gathering information on groups of individuals as well as for looking at habitual intake of a range of foods.

Food lists are a type of FFQ used in the SHS and the various Health and Lifestyle Surveys carried out by individual health boards. These are brief questionnaires designed to measure specific dietary behaviours (Cade et al., 2002). It is not possible to measure nutrient intake from these questionnaires and depending on the foods and frequencies specified it may be difficult to look at adherence to specific dietary targets. However, Lean et al., (2003) described how the dietary questions from the SHS could be used for limited monitoring of the Scottish Dietary Targets. They measured relative validity using the MONICA FFQ and found that there was a bias to underreporting fruit and vegetables and starchy foods, but not fish using the SHS questionnaire.

#### Strengths

- Low respondent burden
- Suitable for large scale surveys
- Can be self completed
- Can be posted

## Weaknesses

- Estimation of portion sizes (though use of food photographs may improve precision)
- Possible over-reporting of 'healthy' foods (e.g. fruit and vegetables)
- Requires to be validated in relation to reference method

## 1.6 Household Food Surveys

A number of surveys aim to collect information about dietary intake at the household level. The most notable of these, in terms of monitoring long term UK dietary intake, is the EFS and its predecessor the NFS, which together provide information on UK food expenditure and food and nutrient intake trends over a period of more than 40 years. Some market research surveys relating to food purchases trends are conducted at the household level.

Recently, a feasibility study has highlighted the potential of utilising large quantities of readily available data generated from supermarket checkouts in dietary surveys (Ransley et al., 2001). The association between fat and energy measured by supermarket till receipts and 4 day weighed records was found to be strong. Till receipts are also collected as part of the new EFS.

## Strengths

- Suitable for large scale surveys
- Designed for monitoring diet trends at the population level (e.g. the NFS/EFS)

## Weaknesses

- Data not collected at the individual level

## 1.7 Methods measuring nutritional status (non biological)

Nutritional assessment tools are frequently used in clinical practice but few have been developed scientifically for use in public health studies. The Nutrition Assessment Questionnaire was developed to identify individuals at risk of marginal and poor micronutrient status (as opposed to dietary intake) living within the community.

## References for Extract from A Short Review of Dietary Assessment Methods Used in National and Scottish Research Studies

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