safefood

Examining Nutrition Surveillance on the island of Ireland

be safe be healthy be well

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Scientific advisory committee working group members

Aileen McGloin	*safe*food
Barbara Livingstone	University of Ulster
Catherine Hayes	Health Service Executive/Trinity College Dublin
Cecily Kelleher	National Nutrition Surveillance Centre, University College Dublin
Cliodhna Foley-Nolan	*safe*food
Ivan Perry	University College Cork
Kieron Moore	Department of Health Social Services and Public Safety, NI
Maria Jennings	Food Standards Agency, NI
Marian Faughnan	*safe*food
Pamela Byrne	Department of Agriculture, Food and Marine
Patricia Heavey	National Nutrition Surveillance Centre, University College Dublin
Teresa Maguire	Health Research Board
Ursula O'Dwyer	Department of Health

Abbreviations

BMI	Body Mass Index
CHO	Carbohydrate
COMA	Committee on Medical Aspects of Food and Nutrition Policy
DAFM	Department of Agriculture Food and Marine
DALYS	Disability Adjusted Life Years
DHSSPS	Department of Health Social Service and Public Safety
DOHC	Department of Health and Children
EFSA	European Food Safety Authority
ERSI	The Economic and Social Research Institute
F&V	Fruit and Vegetables
FAO	Food and Agricultural Organisation
FHRI	Food for Health Research Initiative
FFQ	Food Frequency Questionnaire
FSA	Food Standards Agency
FSAI	Food Safety Authority of Ireland
GUI	Growing Up in Ireland Study
HIQA	Health Information and Quality Authority
HSE	Health Service Executive
HSWS	Health and Social Wellbeing Survey
HRB	Health Research Board
IOI	Island of Ireland
IFS	Infant Feeding Study
IP	Intellectual Property
IUNA	Irish Universities Nutrition Alliance
MUFA	Monounsaturated Fatty Acids

NANS	National Adult Nutrition Survey
NCD	Non-Communicable Diseases
NCFS	National Children's Food Survey
NDNS	National Diet and Nutrition Survey
NFS	National Food Survey
NHANES	National Health and Nutrition Examination Survey
NI	Northern Ireland
NICHE	Northern Ireland Centre for Food and Health
NISRA	Northern Ireland Statistics and Research Centre
NNSC	National Nutrition Surveillance Centre
NPNS	National Pre-school Nutrition Survey
NSIFCS	North South Ireland Food Consumption Survey
NTFS	National Teens' Food Survey
NUIG	National University of Ireland Galway
PA	Physical Activity
PAL	Physical Activity Level
PUFA	Polyunsaturated Fatty Acids
ROI	Republic of Ireland
SLÁN	Survey of Health and Lifestyle
SSB	Sugar Sweetened Beverages
TCD	Trinity College Dublin
UCD	University College Dublin
UK	United Kingdom
WHO	World Health Organisation

1 Executive summary

The food we eat is a key determinant of our health and the monitoring of nutritional status is an essential element of monitoring public health. On the island of Ireland (IOI) there has been a wealth of nutrition data collected contributing to the nutrition surveillance picture, although no formal nutrition surveillance system currently exists in either jurisdiction. This report outlines recent and current activities contributing to nutrition surveillance on IOI and makes recommendations for the future. This is with a view to maximising the use of economic resources and harnessing and maintaining expertise in this important domain using a joint programming approach. This work was facilitated by a subgroup of ***safe***food's Advisory Committee in 2011/12.

Approach

The following activities were conducted:

- Collate information on current nutrition surveillance activities
- Perform a gap analysis
- Review the use of current nutrition surveillance data
- Develop recommendations and advise on prioritisation of the recommendations, including a focus on those with an all-island dimension
- Generate a vision for nutrition surveillance for the island of Ireland.

The current situation

In all, 56 initiatives were originally considered by the subgroup in June 2011 and 27 of these were identified as providing information on nutrition surveillance on the island of Ireland. The following factors were taken into consideration:- representation of target group, e.g. age range, socio-economic status; detail provided (group or individual level; food and/or nutrient level; anthropometric information; biomarker information); self-reported or measured; key use (food intake, nutrient intake, contaminants) and accessibility of data/results. These initiatives were reviewed in terms of gaps and duplication for four age categories – 0-4 years, 5-17 years, 18-64 years and 65+ years.

Within each age group there were a number of initiatives (past and future as of April 2012) contributing to nutrition surveillance. They are summarised in the table at the end of the executive summary. A brief synopsis of the areas with gaps and duplication are as follows.

0-4 years

There is limited nutritional assessment of children aged 9-18 months in both jurisdictions, a time in which feeding patterns are being established. In NI regular data on feeding patterns up to 9 months of age is being collected but no such data is being routinely collected in ROI in this age group. In NI, body weight status, and food and nutrient information is being collected among 1.5-4 year olds, but due to the small numbers included in these studies, limited information on this age group can be extracted. In ROI, data on anthropometry, food and nutrient intake has been collected in a number of initiatives resulting in some overlap, particularly in anthropometry. The National Pre-school Nutrition Survey (NPNS) provides detailed food and nutrition information for 1-4 year olds in ROI.

5-17 years

There has been a gap in the routine collection of anthropometry across the 5-18 year old age group in ROI, whereas in NI data is routinely collected in this age group. Future routine data collection on anthropometry at entry into primary school is being planned in ROI from 2013. Detailed food and nutrition information is not being collected on a regular basis in either jurisdiction. The data generated to date, primarily in ROI, has been from once-off studies. There are a number of initiatives in this age group which overlap.

18-64 years

On-going, detailed information is being collected on food and nutrition intake, but is providing 'snapshots' rather than monitoring on-going trends across the island. In both jurisdictions data on weight status has been collected on a regular basis i.e. approximately every five years in the last decade. Most of the initiatives include anthropometric measurements resulting in some duplication. There is a gap in routine nutritional assessment of pregnant women.

65+ years

The vast majority of the surveys described in the 18-64 year olds also include those 65 years and more. Another consideration is that for most studies only the 'healthy elderly' are studied and it has been suggested that there is a need to monitor the nutritional status of the frailer older person.

The surveys and research projects undertaken to date have developed relatively independently over time. They have had a range of funding sources (from Government Departments to Health Agencies), a variety of methodologies (from food frequency questionnaires (FFQ) to seven-day food diaries) and a selection of drivers (from food science to the agricultural industry to public health). There has been a practice of once-off surveys as distinct from a harmonised approach. This has left some gaps with incomplete coverage and occasional duplication. It has resulted in snapshots in time that are not necessarily always comparable. Some of the information is contained in silos which are not readily accessed, sometimes for practical reasons and sometimes for intellectual property (IP) reasons. This does not facilitate the easy transfer of information.

In conclusion, there is now a solid bank of surveys and research studies cataloguing food intake, lifestyle behaviours and clinical measurements on most groups of the population on IOI. It provides a useful foundation, both in terms of data and expert personnel, on which to build a modern nutrition surveillance system that will serve us into the future. A number of challenges in the development and implementation of a nutrition surveillance system that is fit for purpose for IOI into the future were identified. These include the following issues:

- Prioritising measures to be monitored
- Developing an integrated approach
- Cost
- Privacy/confidentiality
- Maximising technology
- Changing society
- Flexibility.

Recommendations

The advisory group made the following recommendations:

- At a cross-border departmental level, establish close co-operation on nutrition surveillance to maximise the use of resources on the island of Ireland and ensure the collection of timely and robust data that is comparable north, south, east and west.
- A core set of measures of a) anthropometry b) food intake and c) nutrition biomarkers should be shared and agreed where possible.
- A continuous/rolling methodology should be employed replacing the current interval approach to data collection.
- An IOI methodology hub for nutrition surveillance should be developed for standardised protocols.
- Where relevant, nutrition information is collected on foot of research that is wholly funded by the State, the IP should be managed in accordance with the IP Policy in both jurisdictions (The National Statistics Office co-ordinate Intellectual Property in the United Kingdom (UK) and The National Intellectual Property Policy in ROI is due to be launched in 2012).
- A dissemination strategy which optimises timely use of surveillance data should be employed.
- A data storage and management system with formalised governance arrangements should be in operation.

Vision for nutrition surveillance

The following vision for a future nutrition surveillance system was identified:

A. A nutrition surveillance system that is integrated into existing regional and national health information systems.
B. An all-island approach that is co-ordinated by the relevant partners from NI and ROI would be beneficial from a logistics perspective and to maximise resources (financial and expertise) on the island.
C. A nutrition surveillance system should be driven by public health policy requirements while also serving constituents in agriculture and food science and industry.
D. It should include the following core set of measures:
    a. Anthropometry - Weight and Height

b. Food Intake – Two options were identified:
    i. As a very basic marker of diet quality, a measure of fruit and vegetable intake is necessary. Use of the Food Frequency Questionnaire (FFQ) method would provide trend analysis but the FFQ has limitations and it should be noted that this method overestimates fruit and vegetable intake. This approach would also not provide any measure of nutrient intake and would not meet the needs to risk exposure/chemical contamination of the diet.
    ii. The alternative approach for assessing food intake identified is a four-day diet diary. This approach is robust and also meets chemical risk assessment needs. However, it is costly and burdensome on the respondent.
c. Collection of data on socio-demographic and lifestyle information.

Note: - Biomarkers and clinical assessment – these measures, when included in surveillance systems, result in a lower response rate to participation. The advisory group recommend that these could be 'add ons' to a basic nutrition surveillance system for research or investigative purposes.

E. It should be publicly funded as an on-going function with a multi-annual budget while retaining some flexibility to react to emerging issues.
F. It should have a credible public profile with credibility akin to the population census.

Summary

The imperatives to maximise the use of resources (both financial and expertise) for nutrition surveillance has never been stronger than they are today. Greater co-ordination between agencies and jurisdictions can maximise efficiency. There is much evidence of similarities in food-related lifestyles in the two jurisdictions on the IOI. These considerations pose the possibility of a virtual nutrition surveillance conglomerate for the IOI.

Summary of key information collected in initiatives and surveys contributing to the nutrition surveillance picture on the island of Ireland by age group

(a) 0-4 years

Study Name	Year	Age	Anthropometry		Diet		Socio-economic & Lifestyle	Clinical
			M	SR	Food Level Only	Food & Nutrient Level		
Northern Ireland								
Millennium Cohort Study	2008	9 mths, 3 and 5 yrs	✓		Interview: Fruit and vegetables (F&V) and Breakfast		Parent/guardian employment, education and income	
National Diet and Nutrition Survey	2008-12	1.5 yrs +	✓			Four-day diary	Parent/guardian employment and housing reference	
Infant Feeding Survey	2010	6 wks-10 mths			Questionnaire: Self-reported breast-feeding practices		Mother's employment, education and smoking	
Health Survey Northern Ireland	2010-11	2+ yrs	✓		Interview on child health completed by parents-attitude towards child's weight			
Republic of Ireland								
Lifeway's Cross Generation Study	2007-08	4-5 yrs	✓		FFQ		Means-tested free primary care, employment, education, and smoking	
Growing Up In Ireland – Infant Cohort	2007-08 2010-11	9mths-3 yrs	✓		24 hour recall		Parental/guardian employment, education and income	

Study Name	Year	Age	Anthropometry		Diet		Socio-economic & Lifestyle	Clinical
			M	SR	Food Level Only	Food & Nutrient Level		
National Pre-school Nutrition Survey	2010-11	1-4 yrs	✓			Four-day diary	Health and lifestyle data on child and parent(s)/guardian(s)	

*highlighted text donates information available in the future; *M – Measured, SR – Self-Reported

(b) 5-18 years

Study Name	Year	Age(y)	Anthropometry		Diet		Socio-economic & Lifestyle	Clinical
			M	SR	Food Level Only	Food & Nutrient Level		
Northern Ireland								
Millennium Cohort Study	2008	7	✓		Interview: F&V and Breakfast		Parent/carer and partner employment, education and income. Physical Activity (PA)	
National Diet and Nutrition Survey	2008-12	1.5 +	✓			Four-day diary	Participant employment and housing reference. PA.	
Young Person's Behaviour and Attitude Survey	2010	11-16			FFQ: meats, fish, F&V, snacks and beverages		PA	

Study Name	Year	Age(y)	Anthropometry		Diet		Socio-economic & Lifestyle	Clinical
			M	SR	Food Level Only	Food & Nutrient Level		
Child Health System	Ongoing	4.5-5.5 & 12-13	✓					
Republic of Ireland								
National Children's Food Survey	2003-04	5-12s	✓			Seven-day food diary	Parent/carer education. PA	
National Teen's Food Survey	2005-06	13-17	✓			Seven-day food diary	Parent/carer education, smoking, alcohol and PA	
Health Behaviour in School-Aged Children	2006	9-18		✓	Questionnaire: breakfast, F&V, sweets, chocolate and Sugar Sweetened Beverages (SSBs)		Social class, smoking, alcohol, PA and self-care	
Growing Up in Ireland – Child Cohort	2007-08	9	✓		FFQ: F&V, protein, carbohydrate (CHO), fats and sugar consumption		Parent/carer economic, income, education, ethnicity, smoking and PA	
Lifeways Cross Generation Study	2007-08	4-5	✓		FFQ		Means-tested free primary care	
WHO Childhood Surveillance Initiative	2008-10	6-9	✓		FFQ: meats, F&V, sugar consumption, confectionary foods and beverages		PA and TV-watching of children. Education and employment of parents	
Childhood Obesity: Six- year old Irish NS	2004-07	6	✓					

Study Name	Year	Age(y)	Anthropometry		Diet		Socio-economic & Lifestyle	Clinical
			M	SR	Food Level Only	Food & Nutrient Level		
children								
Island of Ireland								
Survey of Children's Oral Health	2001-02	4-16			Questionnaire: snacking habits and beverages		Screen watching, Medical card ownership	

*highlighted text donates information available in the future; *M – Measured, SR – Self-Reported

(c) 18+ (incl. 65+ yrs) years

Study Name	Year	Age (y)	Anthropometry		Diet		Socio-economic & Lifestyle	Clinical
			M	SR	Food Level Only	Food & Nutrient Level		
Northern Ireland								
Health and Social Wellbeing Survey	2005-06	16+	✓		FFQ: Processed meat, chicken products, potato, chips, biscuits and confectionary, savoury snacks, SSBs and F&V		Education and employment. PA, alcohol and smoking	BP, Blood sample

Study Name	Year	Age (y)	Anthropometry		Diet		Socio-economic & Lifestyle	Clinical
			M	SR	Food Level Only	Food & Nutrient Level		
National Diet and Nutrition Survey	2008-12	1.5+	✓			Four-day diary	Employment, socio-economic background, PA	Blood and urine sample
Sport and Physical Activity Participation Survey	2009-10	16+		✓	Questionnaire: F&V		Social class status, disability. PA, smoking and alcohol	
Health Survey Northern Ireland	2010-11	2+		✓	FFQ: F&V, potatoes, confectionary, processed meat, savoury snacks and SSBs		Employment, education, smoking, alcohol and PA	
Republic of Ireland								
Cork and Kerry Heart Disease and Diabetes Study Phase 1 and 2	1998	50-69		✓	FFQ		Alcohol, smoking and PA	BP, fasting blood lipids, glucose, insulin, homocysteine, urinary micro-albumin excretion
Survey of Lifestyle and Nutrition (SLÁN)	1998	9+		✓	FFQ: major food groups		PA, alcohol and smoking	
SLÁN	2002	10+		✓	FFQ: major food groups		PA, alcohol and smoking	

Study Name	Year	Age (y)	Anthropometry		Diet		Socio-economic & Lifestyle	Clinical
			M	SR	Food Level Only	Food & Nutrient Level		
Public perception of food risk	2006	18+		✓	FFQ		PA	
Lifeways Cross Generation Cohort Study	2007-08	4+	✓		FFQ		Means-tested free primary care	Blood sample from grandparents
The Survey of Health, Ageing and Retirement in Europe	2007-10	50+		✓			Income, housing and education, alcohol, smoking, hunger and appetite, PA	
SLÁN	2007	18-44	✓ 18-44yrs	✓	Semi-quantitative FFQ		Educational, occupation, alcohol, smoking, PA	Blood, urine sampling, BP and cholesterol levels in those aged 45+
National Adult Nutrition Survey	2008-09	18-90	✓			Four-day semi-weighed food record	Employment, alcohol, smoking and PA	BP, Blood for nutritional status and metabolic indicators and urine sample – sodium

Study Name	Year	Age (y)	Anthropometry		Diet		Socio-economic & Lifestyle	Clinical
			M	SR	Food Level Only	Food & Nutrient Level		
Salt Intake	2008-09	18-81	✓		FFQ: SLÁN data		Socio-demographic status (from SLÁN 2007)	Urine samples and BP of those aged 45+ (from SLÁN data)
TILDA	2006-16	50+	✓		Dietitian services were assessed via questionnaire		Employment, smoking and PA	Blood sample, bone density, cardiovascular tests
HRB Cluster 4 weight management service	Ongoing from 2001	18+	✓				PA and psychological data collected	
Island of Ireland								
North South Ireland Food Consumption Survey	1997-99	18-64	✓			Seven-day estimated food record	Social class, employment, alcohol, smoking and PA	
The Trinity Ulster and Department of Agriculture (TUDA)	2008-13	60+	✓		Questionnaire		Questionnaire on lifestyle	Blood sample, BP, bone density, B-vitamin status biomarkers

*highlighted text donates information available in the future; *M – Measured, SR – Self-Reported

2 About nutrition surveillance

2.1 Introduction

The term 'surveillance' is derived from the French word meaning to 'watch over'. When applied to public health it refers to the on-going close monitoring of the occurrence of selected health conditions in a population (1). The development of effective health policies depends on the availability of good data. While 'snapshot' data on population health e.g. obesity, is often derived from once-off surveys and research, routine surveillance provides the most robust information (2). Surveillance and monitoring programmes identify population subgroup differences and/or trends in parameters being investigated over time by systematic repeated measures. This information is then used in the planning, implementation and evaluation of public health practice. Surveillance has been applied to many areas of public health, ranging from infectious diseases, and more recently to non-communicable diseases (NCD) such as coronary heart disease.

The importance of nutrition surveillance has been recognised globally since the 1990s. The World Declaration on Nutrition, signed by 159 countries including the Republic of Ireland (ROI) and the UK, recognised that each individual has the right to nutritionally adequate and safe food (3). It sought to strengthen global action in both developed and developing countries. Within the declaration one of the seven themes identified was the '*assessing, analysing and monitoring nutrition situations'* i.e. nutrition surveillance.

While there is no formal surveillance programme agreed on the island of Ireland (IOI), many surveys and initiatives contribute to nutrition surveillance in Northern Ireland (NI) and the ROI. Most of the activities have emerged from research and they have been 'one-off surveys' that aren't strictly surveillance as defined above. Despite this, the data generated to date has been invaluable. Some of the key highlights include (a) the historic trend data on weight status of most of the population in NI and ROI (see Section 2.8) (b) the Irish Universities Nutrition Alliance (IUNA) data which has been used to generate upper limits for vitamins and minerals at a European level and (c) food intake data used to investigate the risk of exposure to dioxins following the Irish dioxin crises in 2008.

It is appropriate to reflect on the insights gained from a wealth of research that has been carried out in this area to date. The current report outlines recent and current activities contributing to nutrition surveillance on IOI and makes recommendations for the future. This is with a view to maximising financial resources and

harnessing and maintaining expertise in this important domain using a joint programming approach. This work was facilitated by a subgroup of *safe*food's Advisory Committee in 2011.

2.2 Importance of nutrition surveillance

Good nutrition is a vital component for health and can have a major impact on public health in the population. The evidence linking nutrition and health continues to strengthen. Some key facts include:

- Five of the top seven leading risk factors for ill health in Europe are diet-related and include blood pressure, alcohol, cholesterol, high body mass index (BMI), and low fruit and vegetable intake (4).
- Nutritional imbalances account for over one hundred times more deaths than foodborne communicable diseases (5).
- Between 30 and 40 per cent of cancers are attributable to diet, physical activity and excess body weight (6).
- It has been estimated that in the EU, 4.4 per cent of disability-adjusted life years (DALYS) are lost due to poor nutrition, with an additional 3.7 per cent and 1.4 per cent due to obesity and physical inactivity respectively– a total of 9.6 per cent of DALYS which is similar to the nine per cent attributed to smoking (7).
- For obesity alone the direct health costs in the ROI in 2004 were €13.3 million with estimated indirect costs of €4 billion per year (8). In the UK, the costs of excess-weight and obesity (i.e. the treatment of obesity and its consequences) to the National Health Service have been estimated at £1 billion while the total impact on employment may be as much as £10 billion (9).

In order to understand trends in a population's health and nutrition and take appropriate action to promote health, the collection of accurate and relevant information in a periodic and systematic manner is required. It not only requires the collection of information on food and nutritional intake but also on their determinants such as social class and educational status. Nutrition surveillance can serve a number of functions (10):

- National and sectoral planning and policy design
- Programme monitoring and evaluation
- Timely warning of food shortages (this is mainly relevant in developing countries)
- Problem identification and advocacy e.g. emerging nutritional issues
- Monitoring effects of structural-adjustments policies (occurs when governments reduce regulations and spending).

Individual surveillance systems rarely serve all the above functions but are based on priorities of identified needs. In the UK and Ireland nutrition surveillance data has also served another function. Due to the fact that many initiatives have collected detailed food intake data it has allowed food safety organisations to assess food safety and in particular toxicological risks. Nutrition surveillance data has also been widely used for research purposes on IOI.

2.3 *safe*food and the nutrition surveillance group

***safe*food** is a North-South body, responsible for the promotion of food safety on the island of Ireland. It was established in 1999 under the terms of the British-Irish Agreement Act 1999 and the North-South Co-operation (Implementation Bodies) Northern Ireland Order 1999. One of the key functions of the organisation is surveillance of foodborne disease, including nutrition surveillance.

To assist ***safe*food** in undertaking this work, a ***safe*food** Advisory Committee of 13 experts with the support of a Scientific Advisor, provides scientific and technical guidance. The members are representative of the key disciplines involved in food safety, nutrition, consumer behaviour and communications on the island. A nutrition surveillance sub-group was established by the ***safe*food** Advisory Committee in March 2011.

The purpose of this all-island nutrition surveillance group was to review current nutrition surveillance on the IOI and make recommendations for maximising the use of resources. Under the terms of reference for the group, a number of specific objectives were set out which are as follows:

1. Collate information on current nutrition surveillance type activities – the scope was to include any data that provided information on the nutritional status of population in NI or ROI at one point in time or on an on-going basis since 1998.
2. Perform a gap analysis.
3. Review the use of current nutrition surveillance data.
4. Develop recommendations and advise on prioritisation of the recommendations including a focus on those with an all-island dimension.
5. Generate a vision for nutrition surveillance for the island of Ireland.

A number of experts were invited to participate in the group in addition to Advisory Committee members (Appendix 1). Representation was sought from funding bodies, generators and users of nutrition surveillance information on IOI. Representatives were invited to participate in person at meetings of the group or remotely by phone and email.

2.4 Nutrition assessment tools for nutrition surveillance

The range of nutritional assessment measures routinely used in nutrition surveillance systems are outlined in Table 1. The specific measures chosen will depend on the population targets being monitored. Measured values are more accurate than self-reported. For example in the Survey of Health and Lifestyle (SLÁN) 2007 (11), of those that had their height and weight measured 35 per cent of respondents had BMI's within the healthy range, 39 per cent were overweight and 25 per cent were obese. Comparison of self-reported and measured data in SLÁN 2007 revealed self-reported data underestimated the true prevalence of overweight and obesity (48 per cent perceived themselves to be within a healthy range and 36 per cent and 14 per cent to be overweight and obese respectively). However, clinical measures including anthropometric measures are costly and burdensome to participants.

Table 1: Types of nutrition assessment tools

Type of measure	Purpose	Examples
Anthropometry	Identification of long-term energy deprivation and excess i.e. obesity.	Weight, height, waist circumference; skinfolds
Dietary assessment	To estimate food and/or nutrient intake Note: Different methods used will provide different information – some will provide data at a household level rather than at an individual level; food group level rather than individual food level; others will provide data to estimate nutrient intakes.	Household budget surveys - to estimate food consumption at a household level. Food records – estimates food and nutrient intakes at individual level. FFQ – estimates food intake at population level.
Socio-demographic and lifestyle information	To identify relationships between nutritional status and other socio-demographic and lifestyle factors.	Social class, educational status, physical activity, alcohol and smoking habits.
Biomarkers	To provide an objective measure of nutritional status where an appropriate biomarker is available.	Urinary salt to measure total salt intake; Serum ferritin for iron levels.
Clinical assessment	To ascertain the clinical consequences of imbalanced nutrient intakes.	Blood pressure and blood cholesterol levels.

The dietary assessment tool chosen for any surveillance system is a complex decision. Each method has its advantages and disadvantages, provides different types and levels of information, varying degrees of respondent burden, resource implications, sample size requirements and biases. Table 2 provides an overview of commonly used methods used to assess the food consumption of individuals.

2.5 Evaluation of surveillance systems

Berkelman, Stroup (1) identified a number of attributes for evaluating public health surveillance systems. These are:

- Timeliness – refers to the time between the data collection points and also to the surveillance cycle i.e. time between the collection of data and reports. It should allow for timely warning and timely response.
- Representativeness – refers to how well the cases studied in the system reflect the actual population under surveillance. In the case of nutrition surveillance this will include reviewing the response rates and representativeness in terms of a range of socio-demographic factors including age, gender, social class and educational attainment.
- Sensitivity and specificity – this refers to the ability of the methods used in the surveillance system to correctly classify participants by the measures being used.
- Acceptability – this refers to the acceptability of the system to all parties involved including the general public and individuals who participate. It takes into account how easy procedures are to follow, confidentiality of case information and the return of useful information to participants involved.
- Flexibility – this refers to the ability of a surveillance system to adapt to changing needs. In the case of nutrition surveillance a system needs to be flexible enough to adapt to emerging issues e.g. include a new measure or focus on a specific age group.
- Simplicity – this is a desirable attribute through the entire cycle of surveillance.
- Costs – this refers to the costs in terms of personnel, equipment and supplies. Although difficult to judge relative to the public health value, it is valuable to have an estimate. In the case of nutrition surveillance the total costs are usually related to estimated costs of the consequences of nutritional imbalance to health and society if available.

Table 2: Commonly-used methods to assess the food consumption of individuals

Method and Procedures	Uses	Advantages	Limitations
24-hour Recall (single or multiple days) Subject or caretaker recalls food intake of previous 24-hours in an interview. Quantities are estimated in household measures using food models as memory aids and/or to assist in quantifying portion sizes. Nutrient intakes calculated using food composition data.	Useful for assessing average or usual intakes of a large population, provided that the sample is truly representative and that the days of the week are adequately represented. Used for international comparisons of relationship of nutrient intakes to health and susceptibility to chronic disease.	Inexpensive, easy, quick, with low respondent burden so that compliance is high. Large coverage possible; can be used with illiterate individuals. Not reliant on long-term memory. Interview length: 20-45 minutes.	Element of surprise so less likely to modify eating pattern. Single 24-hour recalls likely to omit foods consumed infrequently. Relies on memory and hence unsatisfactory for the elderly and young children. Multiple 24-hour recalls needed to estimate usual intake of individuals
Estimated Food Record Record of all food and beverages as eaten (including snacks), over periods from one to seven days. Quantities estimated in household measures/use of food photographs, etc. Nutrient intakes calculated using food composition data.	Used to assess actual or usual intakes of individuals, depending on number of measurement days. Data on usual intakes used for diet-counselling and statistical analysis involving correlation and regression.	Accuracy depends on conscientiousness of subject and ability to estimate quantities. No requirement for memory retrieval as recording current diet.	Literate, co-operative respondents required as burden is high. Longer time frames result in higher respondent burden and a lower co-operation. Respondents may change usual eating patterns to simplify recording and/or impress investigator. High processing costs. Expensive.
Weighed Food Record All food consumed over defined period is weighed by the subject, caretaker, or assistant. Nutrient intakes	Used to assess actual or usual intakes of individuals, depending on the number of measurement days.	Food intakes weighed so estimation of quantities consumed not required.	Literate, co-operative (willing and motivated) respondents required as burden is high. Time consuming. Condition must allow weighing. Subject may change their usual eating

Method and Procedures	Uses	Advantages	Limitations
calculated from food composition data.			pattern to simplify weighing or to impress investigator. High processing costs. Expensive.
Dietary History Interview method to obtain retrospective information on usual food intakes and meal patterns over varying lengths of time. Gives more information than 24-hour recalls. Not a standardised technique.	Used to describe usual food and/or nutrient intakes over a relatively long time period which can be used to estimate prevalence of inadequate intakes. Such information used for national food policy development, food fortification planning, and to identify food patterns associated with inadequate intakes.	Respondent literacy not required.	Labour intensive, time consuming and results depend on skill of interviewer. Report of past intakes may be influenced by current diet. Trained interviewers required. Average interview length: 1-1.5 hours. High processing costs.
FFQ Uses comprehensive list or list of specific food items to record intakes over a given period (day, week, month and year). Record is obtained by interview, or self-administered questionnaire. Questionnaire can be semi-quantitative when subjects asked to estimate usual portion sizes of food items or qualitative.	Designed to obtain qualitative, descriptive data on usual intake of foods or classes of foods over a long time period. Useful in epidemiological studies for ranking subjects into broad categories of low, medium and high intakes of specific foods, food components or nutrients, for comparison with the prevalence and/or mortality statistics of a specific disease. Can also identify food patterns associated with inadequate intakes of specific nutrients.	Method is rapid with low respondent burden and high response rate. Useful for large numbers (poor precision in small scale studies due to large random errors). Relatively straightforward to complete. Administration simpler and less costly than other individual methods. More rapid data processing.	Accuracy is lower than other methods. Needs to be developed for the specific population group to ensure important food items are covered. Responses governed by cognitive, numeric and literacy abilities of respondents in addition to the length and complexity of the food list. Gives no information on meal patterns.

2.6 Overview of existing international surveillance systems

Internationally, there are many different nutrition surveillance systems on-going. Among developed countries, the US (12), UK (13) and Denmark (14) have the longest running systems. The US National Health and Nutrition Examination Survey (NHANES) is by far the longest running nutritional surveillance system in the world, having been established in 1960. The UK's National Diet and Nutrition Survey (NDNS) have been running since 1992. Both systems have undergone periodic reviews (15) and are currently conducted on a continuous annual basis. Denmark's system has been on-going since 1985 and currently generates new data every five years.

Appendix 2 (12-14) outlines the key features of these long standing nutrition surveillance systems and will provide insights for the recommendations of the current report.

2.7 Historical overview of nutrition surveillance on the IOI

In the 1940s the first nutrition surveillance activities at a population level were carried out in the UK and the ROI. They generated data pertinent to the development of food standards, nutritional guidelines and legislation around nutrition.

In the UK, The National Food Survey (NFS) was set up in the 1940s to monitor the diet of the urban 'working class' population. In 1950 it was extended to cover all households in the general population and to collect data on food consumption and expenditure (16). Following the successful completion of the Dietary and Nutritional Survey of British Adults 1986-87 (17), the UK established the NDNS in 1992, which is now carried out on an annual rolling basis. NI wasn't represented in the NFS or NDNS until the Low Income NDNS in 2007 (18) and the more recent rolling NDNS (13). Prior to this the main nutrition surveillance activities in NI included the Young Hearts Study (19) which focused on a small cohort of teenagers and the North South Ireland Food Consumption Survey (NSIFCS) (2001), which was a cross-sectional study of adults on IOI (20).

In the ROI, the first recorded survey - *The National Nutrition Survey of Ireland in 1948* - was conducted by the Department of Health and found the population on the whole to have a nutritionally adequate diet, although certain subgroups of the population had low intakes of some nutrients (21). The next survey was completed in 1988-89 by the Irish Nutrition and Dietetic Institute (22). The 1990s saw the beginning of a series of cross-sectional food and nutrition surveys by the IUNA in different population subgroups (23) and the first Survey of Lifestyle and Health (SLÁN) (11) in Ireland. These surveys provided more detail on the nutritional status of the Irish population than had previously been available.

In ROI the National Nutrition Surveillance Centre (NNSC) was established in 1992 in the National University of Ireland, Galway (NUIG) with grant support from the Department of Health and Children (DOHC) and more recently from the Health Service Executive (HSE). The Centre moved to University College Dublin (UCD) in 2003 where it is affiliated with the School of Public Health and Population Science.

The aims of the centre are:

- To provide accurate, reliable and timely information in an accessible form at short notice.
- To monitor trends in health status correlated with all aspects of the food chain and advise on these findings for health planners.
- To provide a source of information and research expertise, particularly in nutritional epidemiology and surveillance methodology, to those wishing to mount specific projects such as micro-surveys.

Overall, historically NI has seen very little nutrition surveillance activities and has primarily used data generated within the rest of the UK. IN ROI, nutrition surveillance activities have been sporadic but more recently a number of cross-sectional and longitudinal surveys have provided insights into the nutritional status of the population.

2.8 Population goals

Population goals for nutrition can include goals focused on food and/or nutrients and anthropometry. Anthropometric measures are becoming increasingly important in nutrition surveillance due to the prominence of obesity as a public health issue. Weight and height are used to calculate BMI (defined as weight (kg)/height squared (m^2)) and allow monitoring of body weight status of populations. Waist circumference and skin folds are also common anthropometric measures used to compliment BMI. Given the link between NCDs and diet, most countries set population dietary goals for macronutrients and certain micronutrients aimed at preventing long-term NCDs. In the UK, the Committee on Medical Aspects of Food and Nutrition Policy (COMA) set dietary reference ranges and population targets in 1991 (24), which are supported by more recent population targets set by the World Health Organisation (WHO) (25). In 1999, the Food Safety Authority of Ireland (FSAI) developed recommended nutrient intakes for the ROI (26). The population targets for fat, carbohydrate and fibre are currently being reviewed by the European Food Safety Authority (EFSA) (27).

In addition to major population goals, it is also important to monitor current nutrition issues specific to population subgroups e.g. folic acid for women of childbearing age or vitamin D for infants of breastfeeding mothers, and to identify any emerging nutrition issues.

2.8.1 Current nutrition public health issues on the island of Ireland

Table 3 outlines the key comparable data available on the island of Ireland. It demonstrates that overweight and obesity are key public health issues on IOI. Two out of every three adults and one in four children/young people on the island of Ireland are carrying excess weight. Appendix 3 outlines details of current foods and nutrient intakes on IOI from comparable studies (i.e. using similar methodology). These data are summarised in Table 4 against the level of achievement of various dietary recommendations across different population groups on the IOI.

Low fruit and vegetable, fibre and monounsaturated fat intakes and high intake of salt is seen across all population groups. Intakes of a number of specific micronutrients are low among specific population groups, for example inadequate iron intake in females and low calcium intakes in children and young adults (11, 18, 20, 28, 29). In targeting specific groups with nutrition messages, these micronutrients need to be considered (Table 5). Recently folate for women of childbearing age and Vitamin D for babies and infants has received attention at a policy level in both jurisdictions.

Food poverty, defined as the "inability to access a nutritionally adequate diet and the related impacts on health, culture and social participation "(30) is another emerging nutrition issue.

A number of nutritional issues and associated key targets have been identified in key nutrition-related policies in NI and ROI. These are described in Table 6.

Table 3: Snapshot of data on overweight and obesity rates of population subgroups on the IOI

Study	Jurisdiction	Age (y) of population	N	Prevalence (% population)			Year of data collection
				Healthy Weight	Overweight	Obese	
Children							
Health and Social Wellbeing Study (31)	NI	2-15	882	74	19	8	2005-2006
Health Survey Northern Ireland (32)	NI	2-15	463	66	19	8	2010-2011
National Pre-school Nutrition Survey(33)	ROI	2-4	500	80	15	3	2010-11
Growing Up in Ireland (34)	ROI	3	10880	76	19	6	2011
National Children's Food Survey (28)	ROI	5-12	594	80 (Boys) 77(Girls)	12 (Boys) 9 (Girls)	8 (Boys) 4 (Girls)	2003-2004
National Teens' Food Survey (29)	ROI	13-17	441	51 (Boys) 82 (Girls)	11 (Boys) 11 (Girls)	8 (Boys) 6 (Girls)	2005-2006
Adults							
North South Ireland Food Consumption Survey (20)	IOI	18-64	1379	34 (Men) 51 (Women)	46 (Men) 33 (Women)	20 (Men) 16 (Women)	1997-1999
Health and Social Wellbeing	NI	16+	3378	32(Men)	39 (Men)	25 (Men)	2005-2006

Study	Jurisdiction	Age (y) of population	N	Prevalence (% population)			Year of data collection
				Healthy Weight	Overweight	Obese	
Study (31)				38(Women)	30 (Women)	23(Women)	
Northern Ireland Health Survey (32)	NI	16+	2353	39	36	23	2010-2011
Survey of Lifestyles, Attitudes and Nutrition in Ireland (11)	ROI	18+	1207	32 (Men) 44 (Women)	44 (Men) 31 (Women)	16 (Men) 16 (Women)	2006
National Adults Nutrition Survey(35)	ROI	18-64	1274	30 (Men) 47 (Women)	44 (Men) 31 (Women)	26 (Men) 21 (Women)	2008-2010

* Does not take into account underweight individuals

Note: Based on studies where height and weight was measured (and not self-reported) and where a range of ages where included. The exception to this is the Growing Up in Ireland cohort of three-year olds, which was included due to fact no other data available in under five-year olds in ROI.

Table 4: Broad summaries of the achievement (√) and non-achievement (x) of dietary recommendations across different population groups on the island of Ireland (13, 20, 28, 29, 35).

	Children (5-12 yrs)	Teenagers (12+yrs)	Adults
F&V (>400g)	x	x	x
Carbohydrate content (>50% energy)	√	x	x
Added Sugar (<10% energy)	x	x	√
Fat content (≤35% energy)	√	x	x
Total Polyunsaturated Fatty Acids (PUFA) (<6% energy)	√	√	√
Monounsaturated fatty acids (MUFA) (12% energy)	x	x	x
Fibre (≥18g/d)	x	x	x
Salt (≤ 6g/d)	x	x	x

Table 5: Examples of specific nutrient focus for different population groups where intakes have been found to be low (13, 20, 28, 29, 35).

Population group	Specific nutritional focus
Pregnancy	Folate (up to 12 weeks pregnancy), avoidance of high intake of Vitamin A, adequate iron, calcium and Vitamin D intake
Breastfeeding	Encourage greater uptake. Health benefits for both mother and baby.
Weaning to 12 months	Adequate iron, Vitamin C, Vitamin D and low salt diet
Children 1-4 years	Iron, adequate fibre and fluid intake
Children	Iron
Teenagers	Iron and calcium; folate for female teenagers
Female Adults 18-50 yrs	Folate, iron and calcium
Female adults 50 yrs+	Calcium and Vitamin D
Older adults	Vitamins B12, D

Table 6: Key nutrition-related policies identified on Island of Ireland

Policy	Key nutrition-related target	Nutrition surveillance measures identified
Northern Ireland		
A Fitter Future for All - Framework for preventing and addressing overweight and obesity in Northern Ireland (2012-2022)(36)	Overall strategy target – Adults • To reduce the level of obesity by four per cent and overweight and obesity by three per cent by 2022. Children • A three per cent reduction of obesity and two per cent reduction of overweight and obesity by 2022. Baseline:24 per cent of adults and eight per cent children Health and Social Wellbeing Survey (HSWS) 2005-06	Anthropometric • % of overweight/obese expectant mothers, children and adults Food and nutrition • % of children, young people and adults eating five portions of fruit and vegetables per day Socio-demographic and lifestyle • % of adults experiencing food poverty • % adults who are sedentary • % of children and adults meeting the levels of physical activity recommended by the Chief Medical officer Clinical • Occurrence of obesity-related diseases • % of young children with dental decay Other • % of early year providers and schools compliant with nutritional standards • Level of exposure of children and young people to advertising of high salt, sugar, fat products and alcohol
Investing for Health (2002)(37)	To stop the increase in the levels of obesity in men and women so that by 2010, the proportion of men who are obese is less than 17per cent, and of women, less than 20 per cent. By 2010 to increase the levels of five- year old children with no dental decay experience to 55	No clear measures identified. Superseded by Fitter Futures for All and Public Health Investing for Health Strategy has been reviewed and will be updated in 2012.

Policy	Key nutrition-related target	Nutrition surveillance measures identified
	per cent and to reduce the gap between the best and worst decayed/missing/ filled scores by 20 per cent.	
Republic of Ireland		
Cardiovascular Strategy (2010-2019)(38)	Halt the rise in overweight and obesity in adults and children Improve dietary quality for adults and children – specific targets set against measures listed in next column.	Anthropometry • Height and weight in adults and children Targets for adults over 10-year time frame: • Healthy weight: increase from 38 per cent to 43 per cent • Overweight: maintain overall levels at 38 per cent • Obesity: decrease from 23 per cent to 18 per cent Food and Nutrition Targets • % adults consuming five fruits and vegetables • Total fat intake • Saturated fat and trans fatty acids (as % dietary intake) • Added sugars (% dietary energy) • Servings of foods for 'top shelf' of Food Pyramid • Dietary salt Socio-demographic and lifestyle • % the proportion of the population undertaking regular physical activity

Policy	Key nutrition-related target	Nutrition surveillance measures identified
Report of Expert Working Group – Broadcasting Authority of Ireland (2010) (39)	Saturated fat - less than 10 per cent of dietary energy Trans fat - less than two per cent of energy (less than one per cent of energy by 2020). Fruit and vegetables - More than 400g/day Salt - < 6g/day for adults and less for children (less than 5g/day for adults by 2020) Total fat - < 35 per cent of energy (less than 30 per cent of energy by 2020). Polyunsaturated fat - n-6 polyunsaturated fat: four– eight per cent energy n-3 polyunsaturated fat - 2g/day of linolenic acid and 200mg/day of very long-chain fatty acids Dietary fibre - > 25g/day (or 3MJ) of dietary fibre for adults and less for children (1) and more than 50 per cent of energy from complex CHOs (more than 55 per cent /day by 2020). Folate from food - More than 400 µg/day Sugary foods - Reduce overall quantity of sugary foods and reduce frequency of sugar intake to four or fewer times each day. - Less than 10 per cent of energy (WHO/ Food and Agricultural Organisation(FAO)) Obesity and overweight adults - BMI* 20-25 kg/m^2, Physical Activity level (PAL)** of more than 1.75 PAL Obesity and overweight children - WHO growth charts (DOHC/HSE)	No specific indicators identified
The Irish Heart Foundation Nutrition Guidelines for Heart Health (2007)(40)	Four populations goals identified • Reduce saturated fat intake to < 10 per cent of dietary energy and trans-fat < two per cent. • Increase fruit and vegetable intake to be greater than 400grams a day. • Reduce salt intake to < 6grams a day. • Reduce BMI to less than 25kg/m2, however a first priority set the goal of halting the increase in levels of overweight and obesity in the Irish population	No specific

Policy	Key nutrition-related target	Nutrition surveillance measures identified
Obesity Taskforce Report (2005)(8)	Halt the rise in overweight and obesity in Irish population	No specific measure for nutrition surveillance identified but the following recommendation made: • A national database of growth measurements (height, weight, waist circumference, BMI) for children and adults should be developed by the Population Health Directorate in order to monitor prevalence trends of growth, overweight and obesity.

3 Review of current surveillance activities on the island of Ireland

3.1 Approach

The terms of reference (Appendix 1) were agreed at the first meeting of the Nutrition Surveillance Group held on 21st April 2011. Those unavailable to attend the meeting were invited to contribute by phone and email.

3.1.1 Collate information on current nutrition surveillance activities

A list of all potential initiatives that contributed to nutrition surveillance since 1998 was compiled into a template agreed at the first meeting. A broad view of nutrition surveillance was taken to include any study that provided information on the nutritional status of the population or population subgroup at a point in time or on an on-going basis. Information collected in this table included the following details when available:

- Study name
- Lead research institution
- Collaborating research institutions
- Year(s) data was collected
- Year of publication
- Frequency
- Population sampled
- Aim
- Objectives
- Sample size
- Demographic

- Sampling method
- Response rate
- Accessibility of data
- Outputs
- Level and source of funding
- Strengths
- Limitations
- Top three priorities for future surveillance.

Members contributed to the compilation of the information directly or put *safe*food in contact with the relevant person or organisation.

The initial list of studies (Appendix 5) was reviewed at the second meeting held on 29th June 2011. A number of studies were excluded from the final list based on the following exclusion criteria:

- Qualitative research
- Didn't contribute to nutrition surveillance
- Focused on disease
- Microbiological studies
- Intervention studies
- Not conducted on IOI.

It was agreed to include studies that provided information on physical activity given the fact that obesity is a priority public health nutrition issue.

3.1.2 Gap analysis

To complete the gap analysis it was considered necessary to subdivide the information available further at the second meeting. Firstly it was subdivided into target population groups as follows:

- 0-4 years (pre-school age)
- 5-17 years (school going age)
- 18-64 years
- 65+ years

Some studies spanned more than one age group. These were classed into a specific age group or multiple age groups, based on whether they provided sufficient data on nutritional status of that age group(s).

Within each of the population groups the information was further sub-divided into:

- Jurisdiction (i.e. NI, ROI or IOI)
- Nutrition surveillance activities, detailed food and nutrition surveys, longitudinal studies, and other one-off studies.

Each initiative was assessed on the following:

- Representation of target group (age range, SES, etc.)
- Detail provided – group or individual level; food and/or nutrient level; anthropometric information; biomarker information
- Self-reported or measured
- Key use – food intake, nutrient intake, contaminants
- Accessibility of data/results.

Within each group an analysis of the data available from a nutritional surveillance perspective was conducted based on the above criteria. Existing gaps and duplications were identified.

The Expenditure and Food Survey and Continuous Household Survey in NI and Household Budget Survey in ROI are not included in the below tables because they don't provide data specifically on food consumption. However these surveys provide valuable surveillance on social, economic and environmental issues that provide a backdrop for nutrition surveillance.

The Nutrition Surveillance Group reviewed and discussed the approach and findings for the gap analysis at meetings prior to final agreement of text for this report.

3.1.3 Review the use of current nutrition surveillance data

In the gap analysis the key uses of nutrition surveillance information were listed. These were analysed to identify key uses/users and the main measures that are required for each area. This was discussed at meetings and final text agreed.

During discussions it was highlighted that the storage and accessibility of nutrition surveillance data was a key issue that needed to be addressed. It was agreed that a subsection in the findings would be included to highlight the current situation and future scope.

3.1.4 Develop recommendations and a vision for surveillance for the island of Ireland

Based on previous objectives and discussions of the Advisory Group *safe*food drafted a vision and recommendations for the future of nutrition surveillance on the IOI. These were discussed at the third and fourth meetings of the group before being finalised. The learning from other international surveillance systems (including the NDNS) and best practice in public health surveillance were taken into consideration when making recommendations.

3.2 Findings

3.2.1 Collation of information on current nutrition surveillance activities on the IOI

Initially information on 56 studies was collected. These are listed in Appendix 5 and in a template available on request from *safe*food in excel format. Following a review by the nutrition surveillance subgroup a total of 28 studies were deemed to be suitable for inclusion in the gap analysis (Table 7).

Table 7: List of studies included in gap analysis

	Name of study	Lead institution(s)	Years of data collection
1	Child Health System (41)	DHSSPS NI	Continuous since 1997
2	Health and Social Wellbeing Survey (31)	DHSSPS NI	1997, 2001, 2006
3	North South Ireland Food Consumption Survey of Adults (20)	IUNA	1997-1999
4	Survey of Health and Lifestyle (11, 42, 43)	UCG/UCC	1998, 2002, 2007
5	Diet obesity and health in adults - Cork and Kerry heart disease and diabetes study (phase 1 and 2) (44)	UCC	1998, 2007-2008
6	HRB centre for diet and health, cluster 4: weight management service clinical database (45)	Loughlinstown/UCD	Continuous since 2001
7	Lifeways Cross-Generation Cohort Study (46)	UCD and NNSC	2001, 2007
8	North South Survey of Children's Dental Health (47)	UCC	2001/2002
9	National Children's Food Survey (28)	IUNA	2003/2004
10	Childhood Obesity: the extent of the problem among six-year old Irish national school children (48)	HSE	2004-2007
11	National Teens' Food Survey (29)	IUNA	2005/2006
12	Public Perception of Food Risk (49)	UCD	2006
13	Health Behaviour in School-Aged Children (HBSC) Ireland (50)	NUIG	2006
14	The Survey of Health, Ageing and Retirement in Europe (51)	UCD	2006, 2010
15	Growing Up in Ireland (34)	The Economic and Social Research Institute (ESRI)/ Trinity College Dublin (TCD)	2007/2008
16	Millennium Cohort Study (52)	ESRC	2008
17	National Adult Nutrition Survey (35)	IUNA	2008/2009
18	National Diet and Nutrition Survey (13)	FSA, Dept. of Health	2008-2012

	Name of study	Lead institution(s)	Years of data collection
19	The Trinity, Ulster and Department of Agriculture (TUDA) Cohort Study (53)	JINGO Consortium	2008-2013
20	WHO childhood obesity surveillance initiative (phase 1+2) (54)	NNSC	2008, 2010
21	Sport and Physical Activity Participation Survey (55)	Dept. Culture Arts and Leisure/ Sport NI	2009/2010
22	A cross-sectional analysis of an Irish population estimating dietary salt intake and its association with other lifestyle risk factors (56)	UCC	2008/2009
23	Health Survey Northern Ireland (32)	DHSSPS NI	2010/2011
24	Infant Feeding Survey (57)	DHSSPS NI	2010
25	National Pre-school Nutrition Survey (33)	IUNA	2010/2011
26	Young Person's Behaviour and Attitude survey (58)	NISRA	2010
27	TILDA (59)	TCD	2011

3.2.2 Gap analysis

In this section the focus was on representation, timeliness and measures. Other attributes are dealt with later in the report. The following was found for each age group:

0-4 years

There is limited nutritional assessment of children aged 9-18 months in both jurisdictions, a time in which feeding patterns are being established. In NI regular data on feeding patterns up to 9 months of age is being collected but no such data is being routinely collected in ROI in this age group. In NI, body weight status and food and nutrient information is being collected among 1.5-4 year olds but due to the small numbers included in these studies limited information on this age group can be extracted. In ROI, data on anthropometry, food and nutrient intake has been collected in a number of initiatives resulting in some overlap particularly in anthropometry. The National Pre-school Nutrition Survey (NPNS) provide detailed food and nutrition information for the 1-4 year olds from June 2012.

The studies contributing to nutrition surveillance in this age group are detailed in Table 8. In the 0-4 year old age group data has been captured in the early months of life and then not until 1.5 years onwards in both jurisdictions. There is a gap in collection between these ages, a critical time in terms of learning and establishing eating patterns.

In NI, the Infant Feeding Study (IFS) captures feeding practices up to nine months of age (6-10 weeks; 4-6 months; 8-10 months) from infants in NI on a five-yearly basis. The UK-wide Millennium Cohort Study also included collected measured anthropometry and some information on food intake in NI children (n=2000) at nine months of age. In ROI, although not captured in this audit, information on breastfeeding practice has been collected (60-62). The longitudinal Growing Up in Ireland study (GUI) also provided a snapshot in 2007/8 on feeding practices and measured anthropometry once off in a cohort of nine-month old children. Overall in infants <one years of age, information collected on food intake focuses on self-reported feeding practice and food intake by parents. Anthropometric measures are collected in routine health check-ups but not collated centrally (not included in this report).

In ROI, the National Pre-school Nutrition Survey has provided a detailed snapshot on weight status, and food and nutrition intake in toddlers. Longitudinal studies have also provided snapshots on nutritional status. In NI, the NDNS is collecting information on one and a half to five years olds. However, it is unlikely with the small numbers of participants in this age group in NI, that a statistically robust sample will be available to analyse the nutritional status of this population group. However the HSWS and Health Survey NI have provided five yearly data on the body weight status in this age group. Other longitudinal studies like the GUI are providing some detail on the nutritional status of this age group, primarily on anthropometry, with some information on food intake and lifestyle behaviour. Overall, in one and a half to four year olds no regular data on nutritional status in this age group is being collected across the IOI.

Studies have been broadly representative of the general population of under five year olds. Overall, in NI systems are currently in place for collecting data on infant feeding practices and anthropometry routinely among 0-4 year olds. However the detailed food and nutrient information being collected in the NDNS is of limited value for specifically assessing nutritional status in this age group. In ROI data for this age group is not collected on a routine basis and data has emerged only from one-off research studies.

5-17 years

There has been a gap in the routine collection of anthropometry across the 5-18 year old age group in ROI, whereas in NI data is routinely collected in this age group. Future routine data collection on anthropometry at entry into primary school is being planned in ROI from 2013. Detailed food and nutrition information is not being collected on a regular basis in either jurisdiction. The data generated to date, primarily in ROI, has been from once-off studies. There are a number of initiatives in this age group which overlap.

Table 9 provides details on the studies that contribute to nutrition surveillance in 5-17 year olds on the IOI. In NI, regular information is being collected on body weight status across school-aged children through the Child Health System and the Health Survey NI (previously the HSWS), on an on-going and five-yearly basis respectively. In ROI, the WHO Childhood Surveillance Initiative has strategically measured children in early years of primary school at aged seven years across 163 schools in 2008 and in seven-nine year olds in 2010. The Lifeways Cross Generation Study has provided some longitudinal data. Otherwise in ROI, body weight status information has been collected in one-off cross-sectional surveys or longitudinal surveys. Every study in this age is collecting anthropometric measures resulting in a wealth of data on the weight status of primary-aged school children in particular, often within similar age groups.

In relation to food and nutrition intake the National Children's Food Survey (NCFS; 2003/4) and National Teens' Food Survey (NTFS; 2005/6) has provided detailed food and nutrition intake in 5-18 year olds. However no future surveillance is planned for this age group in ROI. Some top line information of food intake has and will continue to emerge from longitudinal studies.

In NI, the NDNS has included 5-18 year olds. However, it is unlikely with the small numbers of participants in this age group that a statistically robust sample will be available to analyse the nutritional status of this population group in detail. Other surveys including the Health Survey NI and longitudinal surveys are collecting information on self-reported food intake which has limitations.

All initiatives are broadly representative of the target population. Overall, in NI body weight status measure for 5-18 year olds is collected on a regular basis. This isn't the case in ROI. The most robust food and nutrition intake information is being collected in one-off surveys in the ROI.

18-64 years

On-going, detailed information is being collected on food and nutrition intake, but this is providing 'snapshots' rather than monitoring on-going trends across the island. In both jurisdictions data on weight status has been collected on a regular basis i.e. approximately every five years in the last decade. Most of the initiatives include anthropometric measurements resulting in some duplication. There is a gap in routine nutritional assessment of pregnant women.

Details of the studies that have provided insights into the nutrition status of adults aged 18-64 years are described in Table 10. In NI, regular information is being collected on weight status among adults in the Health Survey NI (previously the HSWS) on a five-yearly basis. In ROI, body weight status was being collected on a four/five-yearly basis. An annual health and lifestyle survey in ROI is being planned. In the last SLÁN survey height and weight was measured whereas previously it had been self-reported. Two IUNA cross sectional survey, conducted ten years apart, provided information data on measured height and weight and other anthropometric measurements. In the future there is potential for nutrition surveillance measures to be included in the Public Health Framework in ROI.

Currently the detailed food and nutrition data on adults has emerged from one-off cross-sectional surveys. The all-island NSIFCS provided information from 1997-99. IUNA followed up with National Adult Nutrition Survey (NANS) ten years later but only in ROI. SLÁN has provided information at food intake level primarily. In NI, the NDNS will provide detailed information of food and nutrition intake. Other data at a food intake level is available from one-off and longitudinal surveys. Additional data, including nutritional biomarker and clinical assessment data, is being collected in research studies, particularly in the older age categories.

Surveys have been broadly representative of their target audience. However, one key group where there is a gap in data collection is in pregnant women. Some information is collected in the IFS (described in 0-4 year section). In ROI, the Health Research Board (HRB) Centre for Health and Diet Research are conducting a project on diet, obesity and health in pregnancy (63). It is likely that among this age group information is being collected at medical/clinical appointments.

65 years+

Table 11 describes the studies that contribute to the nutritional surveillance picture of those aged 65 years or more on IOI. With the exception of NSIFCS all other surveys described in the 18-64 year olds also include those 65 years and more. Therefore the same gaps exist.

Another consideration is that for most studies only the 'healthy elderly' are studied and it has been suggested that there a need for assessing the nutritional status of the frailer older person.

Table 8: Nutrition surveillance activities for the 0-4 years

Name	Primary objective	Sample size/ representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
			SURVEILLANCE ACTIVITIES			
NORTHERN IRELAND						
Infant Feeding Survey (IFS) (Data collected 2010)	To provide national figures on the incidence, prevalence and duration of breast feeding and other feeding practices adopted by mothers in the early weeks up to about nine months after the baby's birth.	• The 2010 survey was based on an initial representative sample of 30,188 mothers of babies born in the UK between mid-August and late November 2010. • The samples were drawn from birth registration records. In NI all births in the sample period were selected. • At Stage 1 a total of 15,724 mothers returned the questionnaire, representing a response rate of 52 per cent.	• Self-reported questionnaire which asked mothers if they smoked during pregnancy and looked at prevalence of breastfeeding during three stages during a 9-12 month period. Stage 1 is carried out when the babies are approximately 6-10 weeks old, Stage 2 when they are approximately 4-6 months old, and Stage 3 when they are approximately 8-10 months old.	Repeated every five years in a different cohort.	To measure trends in breast feeding and bottle feeding across UK countries.	Preliminary 2010 report available from http://www.ic.nhs.uk/webfiles/publications/003_Health_Lifestyles/IFS_2010_early_results/Infant_Feeding_Survey_2010_headline_report2.pdf
Health		• This provides data on two				

Name	Primary objective	Sample size/ representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
Survey NI **National Diet and Nutrition Survey (NDNS)** (Data collected 2008-2012)	Provide detailed information on food consumption, nutrient intakes and nutritional status.	years upwards. • Aimed to collect data from a UK representative sample of 1,000 people per year aged 1.5 years + (500 adults and 500 children). • In order to achieve equal numbers of adults and children in the sample, at some addresses only children were selected to take part. • In addition extra addresses were selected in Scotland and NI to boost the sample size in these countries. • NI specific data in 2012/13.	There were two main stages to the survey: Stage 1: Interviewer visit: **Dietary assessment:** Four-day food diary; Interview with main food provider; Detailed background interview. **Anthropometric measures:** Height and weight; Physical activity monitor; Doubly labelled water sub-study. Stage 2: Nurse visit: **Clinical assessment:** Blood sample; 24-hour urine collection; Physical measurements; Blood pressure.	Rolling 2008-2012	Provide evidence base to Department of Health; Food consumption at individual level; Food chemical exposure assessments.	The headline results of the first two years (UK wide) of the NDNS rolling programme are available on UK Department of Health website. Data will be made available on the National UK Data Archive.
DETAILED FOOD AND NUTRITION SURVEYS						
REPUBLIC OF IRELAND						
National Pre-school Nutrition Survey	To assess the nutritional status of pre-school children.	N=500 Representative of ROI	Dietary assessment. Anthropometry for both child and	Surveys undertaken as funding is available.	Suitable for use by: (1) FSAI to address food safety and	Summary results available at www.iuna.net.

Name	Primary objective	Sample size/ representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
			parents. Health and lifestyle information including eating behaviour on both child and parents.		nutrition issues at national level and for Irish input to EU food policy and regulation; (2) DOHC /HSE /*safe*food to address issues related to prevention of obesity and cardiovascular diseases; (3) the Irish food industry to address issues related to the nutritional role of specific food categories in the diets of pre-school children.	UCC/UCD hold datasets.
LONGITUDINAL STUDIES						
NORTHERN IRELAND						
Millennium	To chart initial	• The first MCS survey began	• Interviews with	Longitudinal	To highlight	Most MCS

Name	Primary objective	Sample size/ representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
Cohort Study (MCS) (Most recent data collected 2008)	conditions of the social, economic and health advantages and disadvantages facing new children in the 21st century and their consequences.	in 2001. • Followed a cohort of 19,000 children aged nine months across UK (2000 in NI). • The sample was designed to provide a proper representation of the total population of UK including NI. • Same cohort followed up at three yrs in 04/05, five yrs in 06, and seven yrs in 08. • Sample decreased to 1,300 in NI by 2008.	parents using a questionnaire on child and parents' health. • These include questions on fruit and vegetable intake, breakfast consumption and physical activity. • Measures taken of child cohort - height, weight and body fat, waist and actigraph.	study, next data collection planned for 2012 when cohort will be 11 years.	difference across UK countries and across different socio-economic groups.	data can be accessed by registering with the UK Data Archive, which is administered by the Economic and Social Data Service (ESDS).
REPUBLIC OF IRELAND						
Lifeways Cross Generation Cohort Study (Data collected 2007/8)	To determine health status, diet and lifestyle of the mother, father, index child and grandparents and to establish patterns and links across generations.	• Sampling began in 2001 when women were pregnant and then again when child was four/five years. • 1,124 pregnant women recruited at their first maternity hospital booking visit. • Women selected randomly and all women were Irish-born. • Comparison between the Lifeways sample and a nationally representative	The database comprises of: baseline self-reported health data for all mothers, a third of fathers and at least one grandparent; clinical hospital data at recruitment; three year follow-up data from the families' General Practitioners, and; linkage to hospital and vaccination	The same participants were sampled again in 2007 when the child was four/five years. Papers on the data are still being published.	Knowledge about health status in a variety of situations; detailed information on GMS eligible families; information about health care utilisation; help guide	Reports available from http://www.ucd.ie/phpps/research/clinicalepidemiologygroup/lifewayscross-generationcohortstudy/

Name	Primary objective	Sample size/ representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
		sample of women from the SLÁN 2002 national surveys shows the Lifeways sample is representative on socio-demographic characteristics including employment situation. • These pregnancies resulted in 1,055 babies. • 355 fathers and 1,231 grandparents were then recruited.	databases. Dietary Assessment: FFQ completed by the parent on behalf of the child's food intake. Anthropometric measurements: Measured height and weight.		policy.	
Growing Up In Ireland- Infant Cohort (Data collected 2007/8)	To paint a full picture of children in Ireland and how they are developing in the current social, economic and cultural environment.	• 11,100 infants aged nine months and their families. • The sample was randomly selected from the Child Benefit Register. • The response rate for the survey was 65 per cent of all families selected or 69 per cent of those who were successfully contacted by an interviewer.	• Interviews with primary care giver including questions on the child's health - in relation to types of solid food and drink intake other than milk. • Also the development, daily routines and childcare arrangements of the child. • Interviews with parents about their own health-	Longitudinal study, all participants interviewed at nine months, three years and possibly at five years (dependent on funding).	Facilitate comparison with findings from similar studies of children; will also address developmental trajectories over time and explore the factors that most affect those trajectories and the life chances of	Raw data is available via ISSDA on http://www.growingup.ie/index.php?id=223

Name	Primary objective	Sample size/ representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
			alcohol consumption, lifestyle and parental experiences. • Measured anthropometric data obtained: length, weight, head circumference of infant.		children as they grow from nine months to early childhood.	

Table 9: Nutrition surveillance activities for the 5-18 years

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
SURVEILLANCE ACTIVITIES						
Northern Ireland						
National Diet and Nutrition Survey (NDNS) (Data collected 2008-2012)	Provide detailed information on food consumption, nutrient intakes and nutritional status.	• Aimed to collect data from a UK representative sample of 1,000 people per year aged 1.5 years+ (500 adults and 500 children). • In order to achieve equal numbers of adults and children in the sample, at some addresses only children were selected to take part. • In addition extra addresses were selected in Scotland and NI to boost the sample size in these countries.	NI specific data in 2012/13. There were two main stages to the survey: <u>Stage 1: Interviewer visit:</u> **Dietary assessment:** Four-day food diary; Interview with main food provider; Detailed background interview. **Anthropometric measures:** Height and weight; Physical activity monitor; Doubly labelled water sub-study. <u>Stage 2: Nurse visit:</u> **Clinical assessment:** Blood sample; 24-hour urine collection; Physical measurements; Blood pressure.	Rolling 2008-2012.	Provide evidence base to Department of Health; Food consumption at individual level; Food chemical exposure assessments.	The headline results of the first two years (UK wide) of the NDNS rolling programme are available on UK Department of Health website Data will be made available on the National UK Data Archive
Young	To evaluate the	• 7,616 11-16 year-olds in NI	Socio-demographic	Approximately	Policy	Data

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
Person's Behaviour and Attitude Survey (YPBAS) (2010)	behaviour and attitudes of young people on a range of topics including nutrition, sport and physical.	took part. • To ensure the achieved sample reflects the composition of the population of pupils in post-primary education with regard to key characteristics the data is weighted accordingly.	and lifestyle information; • Self-completion questionnaire on sports, physical activity and nutrition. • Individuals were asked fruit and vegetable, chocolate, savoury snacks, fizzy drink intakes as well as lunch choices in school, body weight perception and healthy eating education.	every three - four years. First study began in 2000.	development.	available http://www.csu.nisra.gov.uk/survey.asp99.htm
Child Health System (Data collected continuously	Database for the statutory universal child health promotion programme in NI.	4.5-5.5 years; 12-13 years.	• Birth and pre-natal data. • Call, recall and recording system for pre-school immunisation programme. • Pre-school developmental assessments. • School health activity. • Information	Continuous input of routine surveillance data.	To inform the development of the Fit Futures: Focus on Food, Activity and Young People Strategy and to measure progress against the relevant	Data is available on request from individual health Boards in NI.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
			relating to children with Special Needs. • From September 2007, the DHSSPSNI has provided funding to collect and record BMI measurements through the School Nursing Service, of all year eight/nine pupils.		health targets.	
Republic of Ireland						
Health Behaviour in School-Aged Children (HBSC) Ireland (Data collected 2006)	The overall study aims are to gain new insight into, and increase our understanding of, young people's health and well-being, health behaviours and their social context.	• Cross-national research study conducted in collaboration with the WHO Regional Office for Europe. • Random sample of 13,738 children in ROI aged 9-18 years. • The data are representative of the population distribution across regions with slight variations from the 2002 census.	• Self-completion questionnaire on general health, smoking, alcohol, drug use, food and dietary behaviour (fruit consumption, soft drinks, breakfast), physical activity and self-care. • Anthropometric: Self-reported height and weight. Researchers used	Every four years. HBSC 2010 involves more than 200,000 children from 43 countries. HBSC began in 1982. Data available from ROI since 1998.	Cross-country comparisons; policy development.	2006 Report available from http://www.nuigalway.ie/hbsc/documents/hbsc_2006_english_version.pdf

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
			this to calculate BMI.			
WHO Childhood Obesity Surveillance Initiative (Data collected 2008, 2010)	Measure trends in overweight and obesity in children in order to understand progress of the epidemic and also to allow inter-country comparisons.	• 2,800 children drawn from 160 schools aged six-seven years sampled in 2008. • Once a nationally representative sample of primary schools was selected at the implementation of the system, the same schools will remain the nationwide sentinel sites for the system.	Anthropometry measurements taken: Weight; height; waist circumference.	Every two years. Once a nationally representative sample of primary schools is selected at the implementation of the system, the same schools will remain the nationwide sentinel sites for the system.	Policy development ; comparison of obesity rates across European countries.	Heavey P, McGloin A, Kilroe J, Daly L, O'Mahoney D & Kelleher C (2009) Childhood Obesity Surveillance Initiative in Ireland. Main Report. Dublin: HSE and DOHC.
DETAILED FOOD AND NUTRITION SURVEYS						
REPUBLIC OF IRELAND						
National Children's Food Survey (NCFS) (Data collected 2003/4)	Aimed to investigate habitual food and drink consumption, health and lifestyle characteristics and assessed body weight status.	594 children, aged 5-12 years. Representative of ROI. Schools were selected from a database of primary schools obtained from the Department of Education and Science. All schools in the database that contained at least eight students in each of the eight classes were classified according to (a) size (b) gender served (c) disadvantaged/not	Dietary assessment: Seven-day weighed food diary. Socio-demographic, lifestyle information, food and physical activity: seven questionnaires completed by parents and children.	Once-off.	The database represents a valuable resource which will be used by agencies concerned with public health policy and planning and by the food	Summary results available at www.iuna.net. UCC/UCD hold datasets.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
		disadvantaged and (d) location. A number of schools were randomly selected from each category so that in the final sample, the percentage of children attending each of the categories of schools reflected the percentage of children attending each of the categories of schools according to the database.	Anthropometric measurements: Measured weight, height, waist and hip circumference, leg length for both parents and children. Accelerometer measured physical activity of children involved.		industry.	
National Teens' Food Survey (NTFS) (Data collected 2005-6)	The survey investigated habitual food and drink consumption, health and lifestyle characteristics and assessed body weight status teenagers	441 teenagers aged 13-17. Representative of ROI. Schools were selected from a database of secondary schools available from the Department of Education and Science. All schools in this database were classified into secondary, vocational or comprehensive/community schools. Schools were further classified according to gender served, whether disadvantaged or not disadvantaged and location. A number of schools were randomly selected from each category so that in the final	Dietary assessment: Seven-day semi weighed food record. Parents and teenagers completed seven questionnaires relating to health and lifestyle. Anthropometric measurements: Weight, height, waist and hip circumference (carried out by a researcher).	Once-off.	The database represents a valuable resource which will be used by agencies concerned with public health policy and planning and by the food industry.	Report available from http://www.iuna.net/?p=29

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
		sample, the percentage of teenagers surveyed attending each of the categories of schools was equal to the percentage of children attending each of these categories of schools according to the database.	Accelerometer measured physical activity.			
LONGITUDINAL STUDIES						
NORTHERN IRELAND						
Millennium Cohort Study (MCS) (Most recent data collected 2008)	To chart initial conditions of the social, economic and health advantages and disadvantages facing new children in the 21st century and their consequences.	• The first MCS survey began in 2001. • Followed a cohort of 19,000 children aged nine months across UK (2,000 in NI). • The sample was designed to provide a proper representation of the total population of UK including NI. • Same cohort followed up at three yrs in 04/05, five yrs in 06, and seven yrs in 08. • Sample decreased to 1,300 in NI by 2008.	• Interviews with parents using a questionnaire on child and parents' health. • These include questions on fruit and vegetable intake, breakfast consumption and physical activity. • Measures taken of child cohort - height, weight and body fat, waist and actigraph.	Longitudinal study, next data collection planned for 2012 when cohort will be 11 years.	To highlight difference across UK countries and across different socio-economic groups.	Most MCS data can be accessed by registering with the UK Data Archive, which is administered by the Economic and Social Data Service (ESDS).

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
REPUBLIC OF IRELAND						
Growing Up In Ireland-Child Cohort (Data collected 2007/8)	To paint a full picture of children in Ireland and how they are developing in the current social, economic and cultural environment.	8,570 nine year olds. The information in this report is based on a nationally representative random sample.	Three types of questionnaires used; school-based, home-based and postal. • Interviews with primary care giver including questions on the child's health, physical activity, weight, food and drink intake also development, daily routines and childcare arrangements. • Interviews with children about their own food intake, exercise and lifestyle. • Self-reported anthropometric measurements-height, weight, BMI was calculated.	Longitudinal study, all participants interviewed at nine years old and at 13 years old.	Facilitate comparison with findings from similar studies of children; will also address developmental trajectories over time and explore the factors that most affect those trajectories and the life chances of children as they grow.	Raw data is available via ISSDA on http://www.growingup.ie/index.php?id=223
Lifeways Cross Generation	To determine health status, diet and lifestyle of the	• Sampling began in 2001. • 1,124 pregnant women recruited at their first	The database comprises of: baseline self-	The same participants were sampled again in	Knowledge about health status in a	Reports available from

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
cohort study (Data collected 2007/8)	mother, father, index child and grandparents and to establish patterns and links across generations.	maternity hospital booking visit. • Women selected randomly and all women were Irish-born. • Comparison between the Lifeways sample and a nationally representative sample of women from the SLÁN 2002 national surveys shows the Lifeways sample is representative on socio-demographic characteristics including employment situation. • These pregnancies resulted in 1,055 index babies. • 355 fathers and 1,231 grandparents were then recruited.	reported health data for all mothers, a third of fathers and at least one grandparent; clinical hospital data at recruitment; three year follow-up data from the families' General Practitioners, and; linkage to hospital and vaccination databases. Dietary Assessment: FFQ completed by the parent on behalf of the child's food intake. Anthropometric measurements: Measured height and weight (taken by a researcher).	2007 when the child was four/five years. Papers on the data are still being published.	variety of situations; detailed information on GMS eligible families; information about health care utilisation; help guide policy.	http://www.ucd.ie/phpps/research/clinicalepidemiologygroup/lifewayscross-generationcohortstudy/
OTHER						
ISLAND OF IRELAND						
North South Survey of	Examine dental health.	• 20,000 children between 4-16 years were randomly	Fluoridation status; dental caries.	Once-off.	Oral hygiene assessment.	Report available

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
Children's Oral Health (2001/02)		selected using a cluster sampling technique. • The overall response rate for ROI was 68 per cent and 53 per cent for NI.	Anthropometric data: Height and weight were measured by fieldworkers. Dietary information: A questionnaire on dietary and screen watching habits was completed by parents of eight-year olds and by 15-year olds themselves. Data on infant formula consumption over a three day period for 78 infants was also collected. Information on snacking habits for a nationally representative sample of adults (n=3,000) along with their general health status (ASA) and history of disease was also collected.			from http://www.dohc.ie/publications/pdf/coral.pdf?direct=1

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
REPUBLIC OF IRELAND						
Childhood Obesity: The extent of the problem among six year old Irish national school children (2004-7)	Aimed to provide an assessment of the prevalence of obesity of six-year-old children in one region of Ireland.	5,453 six-year-old children in 189 schools between 2004 and 2007.	Anthropometric measurements taken: - height - weight.	Once-off.	Resource planning.	Report abstract available from http://www.ncbi.nlm.nih.gov/pubmed/21083692

*It should be noted that studies that looked at individuals aged 16+ years are included in nutrition surveillance activities for 18-65 year old age group.

Table 10: Nutrition surveillance activities for the 18-65 years

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
			SURVEILLANCE ACTIVITIES			
NORTHERN IRELAND						
National Diet and Nutrition Survey (NDNS) (Data collected 2008-2012)	Provide detailed information on food consumption, nutrient intakes and nutritional status.	• Aimed to collect data from a UK representative sample of 1,000 people per year aged one and a half years + (500 adults and 500 children). • In order to achieve equal numbers of adults and children in the sample, at some addresses only children were selected to take part. • In addition extra addresses were selected in Scotland and NI to boost the sample size in these countries. • NI specific data in 2012/13.	There were two main stages to the survey: Stage 1: Interviewer visit: **Dietary assessment:** Four-day food diary; Interview with main food provider; Detailed background interview. **Anthropometric measures:** Height and weight**;** Physical activity monitor; Doubly labelled water sub-study. Stage 2: Nurse visit: **Clinical assessment:** Blood sample; 24-hour urine collection; Physical measurements; Blood pressure.	Rolling 2008-2012.	Provide evidence base to Department of Health; Food consumption at individual level; Food chemical exposure assessments.	The headline results of the first two years (UK wide) of the NDNS rolling programme are available on UK Department of Health website Data will be made available on the National UK Data Archive.
Health and	To capture	Representative sample	All the surveys begin	The Survey was	Policy	Top line results

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
Social Wellbeing Survey *Replaced by Health Survey Northern Ireland* (Data collected 2005/2006)	information on a range of health issues including cardiovascular disease, mental health and ill-health, physical activity, smoking and drinking.	of all adults aged 16+ living in NI. Survey based on systematic random sample of 5,000 addresses from the Land and Property Services Agency's property database. 4,245 respondents.	with a household section that includes the following:- Household grid Relationship grid Tenure Car and telephone access. All adults aged 16 and over in each household are then asked individual sections relating to:- Health and ill-health; Mental health and wellbeing; Cigarette smoking and drinking; Physical activity. Physical measures: height and weight was measured to determine BMI. This was collected by trained interviewers following a strict protocol.	previously conducted in 1997, 2001, and 2006. This survey has now been replaced by Health Survey Northern Ireland.	development.	available from http://www.csu.nisra.gov.uk/survey.asp51.htm
Health Survey Northern	Monitoring health of the NI population.	4,085 aged 16years+- random sample of private addresses.	Respondents were asked how often they eat certain types of	Annual.	Policy development.	First publication available from http://www.dhssp

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
Ireland (Data collected 2010/11)			food; self-reported. Physical measures (height and weight) are taken of those people resident aged two and over; measured.			sni.gov.uk/health_survey_northern_ireland_-_first_results_from_the_2010-11_survey.pdf
REPUBLIC OF IRELAND						
SLÁN 1998	Produce baseline information for the ongoing surveillance of health and lifestyle related behaviours in the Irish adult population.	6,539 adults were sampled. The sample was generated randomly from the Irish electoral register. The North Eastern Health Board requested an augmented sample in that area in order to have precision estimates comparable with the average national sample. An extra sample of 1,076 was generated and sent postal questionnaires. Able to pull out age specific data for 55+ years.	A self-administered questionnaire, an adapted version of the semi-quantitative food frequency questionnaire (SQFFQ) used in EPIC study was developed for use in SLÁN. There were eight sections in the questionnaire which covered general health (including self-reported height and weight), exercise, tobacco, illegal substances, accidents, household details and dietary habits.	Repeated in different sample in 2002.	Inform the Department of Health and Children's policy and programme planning; assist national and regional setting of priorities in health promotion activities.	Raw data available from ISSDA.
SLÁN 2002	Produce data of a	5,992 adults sampled.	There were eight	Repeated in different	Inform the	Raw data available

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
	nationally representative cross-section of the Irish population; Maintain a survey protocol which will enable lifestyle factors to be re-measured so that trends can be monitored.	The sampling procedures followed those used in 1998. Able to pull out age specific data for 55+ years.	sections in the questionnaire which covered general health (including self-reported height and weight), exercise, tobacco, illegal substances, accidents, household details and dietary habits.	sample in 2008.	Department of Health and Children's policy and programme planning; assist national and regional setting of priorities in health promotion activities.	from ISSDA.
SLÁN 2008	The overall aim of SLÁN was to provide nationally representative data on the general health, health behaviours and health service use of adults living in Ireland.	10,364 aged 18+. The sample was representative of the general population in Ireland when compared with Census 2006 figures and was further weighted to match the Census for analysis. Able to pull out age specific data for 65+ years.	Dietary Assessment.- FFQ. Anthropometric measurements - some measured and some self-reported - BMI; waist circumference; physical examination.	Previous SLÁN surveys have taken place in different samples in 1998 and 2002.	Inform the Department of Health and Children's policy and programme planning; assist national and regional setting of priorities in health promotion activities.	Raw data available from ISSDA. 2007 report available from http://www.SLÁN06.ie/SLÁN2007MainReport.pdf
DETAILED FOOD AND NUTRITION SURVEYS						
ISLAND OF IRELAND						
North-South Ireland Food	To assess habitual food intake and	The survey involved a random sample of 1,379 adults aged 18-64 on	Anthropometric: Weight, height, BMI,	Once-off.	To compile an extensive	Summary report available from

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
Consumption Survey of Adults (Data collected 1997-99)	beverage consumption and to investigate relationships between food and nutrient intake and factors such as lifestyle and health.	the entire island of Ireland. 958 adults were surveyed in the Republic of Ireland (South) and 421 were surveyed in Northern Ireland (North). The survey was completed in 2000.	waist and hip circumference. Dietary assessment: seven-day food diary. Physical activity: self-administered questionnaire.		electronic data base for use by agencies concerned with public health policy and planning for health protection and by the food industry.	http://www.iuna.net/docs/NSIFCSummary.pdf. Series of peer reviewed articles also available.
REPUBLIC OF IRELAND						
Diet Obesity and Health in Adults - Cork and Kerry Heart Disease and Diabetes Study (Phase 1and 2) (Data collected 1998)	Causes and prevention of obesity, diabetes, CVD and related metabolic disorders.	• A group of 1,018 men and women aged 50 to 69 were recruited from 17 general practice lists in Cork and Kerry with a response rate of 70 per cent. • Follow up in 2006/07 of all 1,018 men and women recruited to Phase 1 of the Study in 1998. • Re-screen surviving members of the	Data on a wide range of risk factors were obtained from participants using standard internationally validated questionnaire instruments and measurement techniques. Data are available on measures of height, weight and central obesity, lifestyle and behavioural risk. Dietary assessment Willett FFQ adapted for use in Irish population (same as used in SLÁN).	Follow up in 2007, 2008.	Risk factor assessment.	Available from UCC.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
		cohort in late 2008 and in 2008-09 a further cross-sectional study involving a sample of 2,000 men and women in the same age group and drawn from the same population using the same primary care sampling strategy was carried out.	Clinical assessment blood pressure; fasting blood lipids; glucose, insulin, homocysteine; urinary micro-albumin excretion and other established and potential risk factors for CVD and type 2 diabetes.			
National Adult Nutrition Survey (NANS) (Data collected 2008/09)	What patterns exist in Irish food consumption, and how do they affect public health.	1500 aged 18-90 years. A sample of adults was randomly selected from a database of names and addresses held by Data Ireland (An Post). For groups that were not highly represented in the database, particularly 18-35 year olds, a second level of recruitment was introduced.	Dietary assessment: Four-day semi weighed food record. Socio-demographic and lifestyle information: Three self-administered questionnaires Anthropometric	Once-off.	The database represents a valuable resource which will be used by agencies concerned with public health policy and planning and by the food industry.	Summary results available at www.iuna.net. UCC/UCD hold datasets.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
			measurements: Weight, height, waist, hip circumference, body composition, blood pressure (measured by the researcher).			
A Cross-sectional study of an Irish population estimating dietary salt intake, and its association with other lifestyle related risk factors (Data collected 2008/09)	The overall aim of this study was to provide accurate and well validated estimates of dietary salt intake in the Irish population to support the ongoing evaluation of policy initiatives over the past decade designed to reduce it.	**Phase 1:** Analyses of the existing SLÁN-07 data. **Phase 2:** 24-hour urine collections were obtained from a total of 599 adults aged 18 to 81 years based on three sub-samples - 1. A general population sample drawn from participants on the SLÁN-07 survey who agreed to re-screening in 2008-09 (n=54) and participants of the 1998 Cork and Kerry Diabetes and Heart Disease Study (n=65) who were re-screened in 2007. 2. A group of student volunteers (n=169) from two large academic institutions in the Republic of Ireland. 3. An occupational group,	Clinical assessment: 24 hour urine samples. Dietary data from the FFQ, physical measurements (height, weight, abdominal circumference and blood pressure).	Once-off.	Policy development to lower salt intakes.	Full report available from ***safe*food** website http://www.safefood.eu/getattachment/Publications/Research-reports/Salt--Hard-to-shake/Salt_Hard_to_Shake_Main_Report_Final.pdf.aspx

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
		sampled from an occupational setting (n=311) from a total staff of approximately 1600 workers.				
			LONGITUDINAL STUDIES			
REPUBLIC OF IRELAND						
Public Perception of Food Risk (Data collected 2006)	This project aims to understand the public's perception of food risks and to develop effective strategies to communicate risk.	Minimum of 1,500 adults aged 18+years.	Self-reported BMI; diet; physical activity questionnaire. The research team will monitor changes in public risk perception on a monthly basis using a web-based interactive survey. They will combine this with qualitative data from focus group work. The public's views will be compared with those of risk assessment experts.	Monthly waves of longitudinal data.	Policy development.	Peer reviewed journals and data available from UCD Geary Institute.
Lifeways Cross Generation Cohort Study (Data collected 2007/8)	To determine health status, diet and lifestyle of the mother, father, index child and grandparents and to establish patterns and links	• Sampling began in 2001. • 1,124 pregnant women recruited at their first maternity hospital booking visit. • Women selected	The database comprises of: baseline self-reported health data for all mothers, a third of fathers and at least one grandparent; clinical hospital data at recruitment; three-year	The same participants were sampled again in 2007 when the child was four/five years. Papers on the data are still being published.	Knowledge about health status in a variety of situations; detailed information on GMS eligible	Reports available from http://www.ucd.ie/phpps/research/clinicalepidemiologygroup/lifewayscross-generationcohorts

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
	across generations.	randomly and all women were Irish-born. • Comparison between the Lifeways sample and a nationally representative sample of women from the SLÁN 2002 national surveys shows the Lifeways sample is representative on socio-demographic characteristics including employment situation. • These pregnancies resulted in 1,055 index babies. • 355 fathers and 1,231 grandparents were then recruited.	follow-up data from the families' General Practitioners, and; linkage to hospital and vaccination databases. Dietary Assessment: FFQ completed by the parent on behalf of the child's food intake. Anthropometric measurements: Measured height and weight of children.		families; information about health care utilisation; help guide policy.	tudy/
TILDA (Data collected 2011)	To determine the health, social, economic status of people. As well as biological and environmental components of	8,178 individuals recruited aged 50 and over using a population sift. Stratified sampling was used to ensure a representative sample.	Questionnaires and Health assessments: • Face-to-face interview on health, wellbeing, finance and family	Participants in the first wave of the TILDA study will have a follow-up interview every two years and health assessment every three to four	Comparable data with other international longitudinal studies.	http://www.tcd.ie/tilda/publications/

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
	successful ageing and contributions that older people are making to society and economy.		circumstances. • Questionnaire to complete and return on quality of life, relationships, emotional well-being and health behaviour. • A health assessment (measured height weight, blood samples for storage for future waves, hip and waist measurements, bone density, grip strength, cognitive tests, cardiovascular tests and vision tests).	years for a ten-year period.		
			OTHER			
ISLAND OF IRELAND						
The Trinity, Ulster and Department of Agriculture (TUDA) Cohort Study (Data	To create a database on diet, lifestyle and genetic make–up of adults with diagnosed high blood pressure (hypertension), low bone mineral	6,000 people aged 60+. Males and females >60y with either cognitive impairment (n=2000), osteoporosis/osteopenia (n=2000) or hypertension (n=2000)	Clinical Assessment: Blood sample; Blood pressure, DXA scan (bone mineral density.) Anthropometric measurements: height,	Once-off.	Future research purposes.	Data still being collected- http://www.ucd.ie/jingo/researchprogrammes/

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
collected 2008-13)	density and early memory loss.		weight and waist/hip (measured). Number of cognitive function tests. Health and lifestyle questionnaire to obtain information on diet (including data on nutritional factors e.g. B-vitamin status biomarkers), general health, drug and supplement use.			
NORTHERN IRELAND						
Sport and Physical Activity Participation Survey (SAPAS) (Data collected 2009/10)	To provide statistically robust data on participation, club membership, volunteering, and coaching attitudes to sport and spectating amongst a representative sample of NI adults.	• A stratified random sampling approach was applied for selection of households. • 4,653 aged 16+ years.	Face-to-face or in-home survey using the CAPI approach on participation, club membership, volunteering, coaching attitudes to sport and spectating.	Once-off.	Surveillance tool for the Obesity Prevention Strategy.	Findings available from http://www.sportni.net/NR/rdonlyres/A24CB4FF-8233-4AD1-B050-02ADFD1C3DF7/0/SAPASPresentationtoParticipationSMIG.pdf
REPUBLIC OF IRELAND						
HRB Centre for Diet and	To establish a national obesity	Over 1,200 morbidly obese patients referred	BMI- Morbidly obese patients attending the	Ongoing. A national database will be	Policy development.	Available on direct application to

Name	Primary objective	Sample size/representativeness	Measures	Frequency/future of study	Key uses	Accessibility of data
Health-cluster 4: weight management service clinical database (Data collected-continuous)	cohort based on a database of severely obese adult and paediatric patients referred to all specialist referral centres for obesity in Ireland.	to weight management clinic who decide to attend. Approximately an extra 200 individuals added each year.	weight management service clinic are those recruited in to study.	developed.		clinics.

Table 11: Nutrition surveillance activities for the 65+

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
			SURVEILLANCE ACTIVITIES			
NORTHERN IRELAND						
Health and Social Wellbeing Survey *Replaced by Health Survey Northern Ireland* (Data collected 2005/2006)	To capture information on a range of health issues including cardiovascular disease, mental health and ill-health, physical activity, smoking and drinking.	Representative sample of all adults aged 16+ living in NI. Survey based on systematic random sample of 5,000 addresses from the Land and Property Services Agency's property database. 4,245 respondents.	All the surveys begin with a household section that includes the following:- Household grid Relationship grid Tenure Car and telephone access. All adults aged 16 and over in each household are then asked individual sections relating to:- Health and ill-health; Mental health and wellbeing; Cigarette smoking and drinking; Physical activity; Physical measures: height and weight was measured to determine BMI. This was collected by trained interviewers following a strict protocol.	The Survey was previously conducted in 1997 and 2001, and 2006. This survey has now been replaced by Health Survey Northern Ireland.	Policy development.	Top line results available from http://www.csu.nisra.gov.uk/survey.asp51.htm
Health Survey Northern Ireland	Monitoring health of the NI population.	4,500 aged 16+- random sample of private addresses.	Physical measures (height and weight) are taken of those people resident aged	Annual.	Policy development.	First publication due October 2011.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
(Data collected 2010/11)			two and over.			
National Diet and Nutrition Survey (NDNS) (Data collected 2008-2012)	Provide detailed information on food consumption, nutrient intakes and nutritional status.	• Aimed to collect data from a UK representative sample of 1,000 people per year aged one and a half years+ (500 adults and 500 children). • In order to achieve equal numbers of adults and children in the sample, at some addresses only children were selected to take part. • In addition extra addresses were selected in Scotland and NI to boost the sample size in these countries.	NI specific data in 2012/13. There were two main stages to the survey; Stage 1: Interviewer visit: Dietary assessment; Four-day food diary; Interview with main food provider; detailed background interview. Anthropometric measurements: Height and weight, Physical activity monitor, Doubly labelled water sub-study (taken by a researcher). - Stage 2: Nurse visit: Clinical assessment: Blood sample, 24 hr urine sample, Physical measurements, Blood pressure.	Rolling 2008-2012.	Provide evidence base to Department of Health; Food consumption at individual level; Food chemical exposure assessments.	The headline results of the first two years (UK wide) of the NDNS rolling programme are available on UK Department of Health website. Data will be made available on the National UK Data Archive.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
REPUBLIC OF IRELAND						
SLÁN 1998	Produce baseline information for the ongoing surveillance of health and lifestyle related behaviours in the Irish adult population.	6,539 adults were sampled. The sample was generated randomly from the Irish electoral register. The North Eastern Health Board requested an augmented sample in that area in order to have precision estimates comparable with the average national sample. An extra sample of 1,076 was generated and sent postal questionnaires.	A self-administered questionnaire, an adapted version of the semi-quantitative food frequency questionnaire (SQFFQ) used in EPIC study was developed for use in SLÁN. There were eight sections in the questionnaire which covered general health (including self-reported height and weight), exercise, tobacco, illegal substances, accidents, household details and dietary habits.	Repeated in different sample in 2002.	Inform the Department of Health and Children's policy and programme planning; assist national and regional setting of priorities in health promotion activities.	Raw data available from ISSDA.
SLÁN 2002	Produce data of a nationally representative cross-section of the Irish population; Maintain a survey protocol which will enable lifestyle factors to be re-measured so that trends can	5,992 adults sampled. The sampling procedures followed those used in 1998.	There were eight sections in the questionnaire which covered general health (including self-reported height and weight), exercise, tobacco, illegal substances, accidents, household details and dietary habits.	Repeated in different sample in 2008.	Inform the Department of Health and Children's policy and programme planning; assist national and regional setting of priorities in	Raw data available from ISSDA.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
	be monitored.				health promotion activities.	
SLÁN 2008	The overall aim of SLÁN was to provide nationally representative data on the general health, health behaviours and health service use of adults living in Ireland.	10364 aged 18+. The sample was representative of the general population in Ireland when compared with Census 2006 figures and was further weighted to match the Census for analysis.	Dietary Assessment - FFQ. Anthropometric measurements: BMI; waist circumference; physical examination.	Once-off. Previous SLÁN surveys have taken place in 1998 and 2002.	Policy development.	2007 report available from http://www.SLÁN06.ie/SLÁN2007MainReport.pdf
DETAILED FOOD AND NUTRITION SURVEYS						
REPUBLIC OF IRELAND						
Diet Obesity and Health in Adults- Cork and Kerry heart disease and diabetes study (Phase 1 and 2) (Data collected 1998)	Causes and prevention of obesity, diabetes, CVD and related metabolic disorders.	• A group of 1,018 men and women aged 50 to 69 were recruited from 17 general practice lists in Cork and Kerry with a response rate of 70 per cent. • Follow up in 2006/07 of all 1,018 men and	Data on a wide range of risk factors were obtained from participants using standard internationally validated questionnaire instruments and measurement techniques. Data are available on measures of height, weight and central obesity, lifestyle and behavioural risk. Dietary assessment Willett FFQ adapted for use	Follow up in 2007, 2008.	Risk factor assessment.	Available from UCC.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
		women recruited to Phase 1 of the Study in 1998. • Re-screen surviving members of the cohort in late 2008 and in 2008-09 a further cross-sectional study involving a sample of 2,000 men and women in the same age group and drawn from the same population using the same primary care sampling strategy was carried out.	in Irish population (same as used in SLÁN). <u>Clinical assessment</u> Blood pressure, fasting blood lipids, glucose, insulin, homocysteine, urinary micro-albumin excretion and other established and potential risk factors for CVD and type 2 diabetes.			
National Adult Nutrition Survey (NANS)	What patterns exist in Irish food consumption, and how do they affect public	1,500 aged 18-90 years. A sample of adults was randomly selected from a database of names and addresses held by	Dietary assessment: Four-day semi-weighed food record.	Once-off	The database represents a valuable resource which will be	Summary results available at www.iuna.net. UCC/UCD hold

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
(Data collected 2008/09)	health.	Data Ireland (An Post). For groups that were not highly represented in the database, particularly 18-35 year olds, a second level of recruitment was introduced.	Socio-demographic and lifestyle information. Three self-administered questionnaires. Anthropometric measurements- measured: Weight, height, waist, hip circumference, body composition, blood pressure.		used by agencies concerned with public health policy and planning and by the food industry.	datasets.
LONGITUDINAL STUDIES						
REPUBLIC OF IRELAND						
Public Perception of Food Risk (Data collected 2006)	This project aims to understand the public's perception of food risks and to develop effective strategies to communicate risk.	Minimum of 1,500 adults aged 18+.	Self-reported. BMI. Diet. Physical activity questionnaire. The research team will monitor changes in public risk perception on a monthly basis using a web-based interactive survey. They will combine this with	Monthly waves of longitudinal data.	Policy development.	Peer reviewed journals and data available from UCD Geary Institute.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
			qualitative data from focus group work. The public's views will be compared with those of risk assessment experts.			
The Survey of Health, Ageing and Retirement in Europe (SHARE) (Data collected 2007-10)	Database on health, socio-economic status and social and family networks.	1,119 individuals in Ireland aged 50+ (part of a wider European study of 45,000 individuals).	Data collected included health variables, bio-markers (e.g. grip strength, body-mass index, peak flow), psychological variables, economic variables and social support variables.	Biennial.	SHARE is a cross-national panel database of micro data on health, socio-economic status and social and family networks of more than 30,000 individuals.	http://www.share-project.org/
TILDA (Data collected 2011)	To determine the health, social, economic status of people. As well as biological and environmental components of 'successful ageing and contributions that older people	8,178 individuals recruited aged 50 and over using a population sift. Stratified sampling was used to ensure a representative sample.	Questionnaires and Health assessments: Face-to-face interview on health, wellbeing, finance and family circumstances; Questionnaire to complete and return on quality of life, relationships, emotional well-being and health	Participants in the first wave of the TILDA study will have a follow-up interview every two years and health assessment every three to four years for a ten year period.	Comparable data with other international longitudinal studies.	http://www.tcd.ie/tilda/publications/

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
	are making to society and economy.		behaviours; A health assessment (measured height weight, blood samples for storage for future waves, hip and waist measurements, bone density, grip strength, cognitive tests, cardiovascular tests and vision tests).			
			OTHER			
ISLAND OF IRELAND						
The Trinity, Ulster and Department of Agriculture (TUDA) Cohort Study (Data collected 2008-13)	To create a database on diet, lifestyle and genetic make–up of adults with diagnosed high blood pressure (hypertension), low bone mineral density and early memory loss.	6,000 people aged 60+. Males and females >60y with either cognitive impairment (n=2000), osteoporosis/osteopenia (n=2000) or hypertension (n=2000).	Clinical Assessment: Blood sample; Blood pressure, DXA scan (bone mineral density). Anthropometric measurements: height, weight and waist/hip (measured). Number of cognitive function tests. Health and lifestyle questionnaire to obtain	Once-off.	Future research purposes.	Data still being collected- http://www.ucd.ie/jingo/researchprogrammes/

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
			information on diet (including data on nutritional factors e.g. B-vitamin status biomarkers), general health, drug and supplement use.			
NORTHERN IRELAND						
Sport and Physical Activity Participation survey (SAPAS) (Data collected 2009/10	To provide statistically robust data on participation, club membership, volunteering, and coaching attitudes to sport and spectating amongst a representative sample of NI adults.	• A stratified random sampling approach was applied for selection of households. • 4,653 aged 16+.	Face-to-face or in-home survey using the CAPI approach on: Participation; Club membership; Volunteering; Coaching attitudes to sport and spectating.	Once-off.	Surveillance tool for the Obesity Prevention Strategy.	Findings available from http://www.sportni.net/NR/rdonlyres/A24CB4FF-8233-4AD1-B050-02ADFD1C3DF7/0/SAPASPresentationtoParticipationSMIG.pdf
REPUBLIC OF IRELAND						
Lifeways Cross Generation Cohort Study (Data collected 2007/8)	To determine health status, diet and lifestyle of the mother, father, index child and grandparents and to establish patterns and links across	• Sampling began in 2001. • 1,124 pregnant women recruited at their first maternity hospital booking visit. • Women selected randomly and all	The database comprises of: baseline self-reported health data for all mothers, a third of fathers and at least one grandparent; clinical hospital data at recruitment; three year follow-up data from the families' General	The same participants were sampled again in 2007 when the child was four/five years. Papers on the data are still being published.	Knowledge about health status in a variety of situations; detailed information on GMS eligible	Reports available from http://www.ucd.ie/phpps/research/clinicalepidemiologygroup/lifewayscross-generationcohortstudy/

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
	generations.	women were Irish-born. • Comparison between the Lifeways sample and a nationally representative sample of women from the SLÁN 2002 national surveys shows the Lifeways sample is representative on socio-demographic characteristics including employment situation. • These pregnancies resulted in 1,055 index babies. • 355 fathers and 1,231 grandparents were then recruited.	Practitioners, and; linkage to hospital and vaccination databases. Dietary Assessment: FFQ completed by the parent on behalf of the child's food intake. Anthropometric measurements: Measured height and weight (taken by a researcher).		families; information about health care utilisation; help guide policy.	
HRB Centre for Diet and Health - cluster 4: weight management	To establish a national obesity cohort based on a database of severely obese adult and	Over 1,200 morbidly obese patients referred to weight management clinic who decide to attend. Approximately an extra 200	BMI- morbidly obese patients attending the weight management clinic.	Ongoing. A national database will be developed.	Policy development.	Available on direct application to clinics.

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
service clinical database (Data collected - continuous)	paediatric patients referred to all specialist referral centres for obesity in Ireland.	individuals added each year.				
A Cross-Sectional study of an Irish population estimating dietary salt intake, and its association with other lifestyle-related risk factors (Data collected 2008/09)	The overall aim of this study was to provide accurate and well validated estimates of dietary salt intake in the Irish population to support the on-going evaluation of policy initiatives over the past decade designed to reduce it.	**Phase 1:** Analyses of the existing SLÁN-07 data. **Phase 2:** 24-hour urine collections were obtained from a total of 599 adults aged 18 to 81 years based on three sub-samples 1. A general population sample drawn from participants on the SLÁN-07 survey who agreed to re-screening in 2008-09 (n=54) and participants of the 1998 Cork and Kerry Diabetes and Heart Disease Study (n=65) who were re-screened in 2007; 2. A group of student volunteers (n=169) from two large academic institutions in the Republic of Ireland; 3. An	Clinical assessment: 24 hour urine samples. Dietary data from the FFQ, physical measurements (height, weight, abdominal circumference and blood pressure).	Once-off.	Policy development to lower salt intakes.	Full report available from ***safe*food** website http://www.safefood.eu/getattachment/Publications/Research-reports/Salt--Hard-to-shake/Salt_Hard_to_Shake_Main_Report_Final.pdf.aspx

Name	Primary objective	Sample size/representativeness	Measures	Frequency/ future of study	Key uses	Accessibility of data
		occupational group, sampled from an occupational setting (n=311) from a total staff of approximately 1,600 workers.				

3.2.3 Uses of nutrition surveillance data

- **Public policy**

Government departments North and South are funding surveillance initiatives on an on-going basis to inform policy and public health initiatives. In NI, the Public Health Information and Research Branch of the Department of Health Social Service and Public Safety (DHSSPS) has led on the generation of accurate, relevant and timely information. Other organisations that have been major funders in NI include the FSA and *safe*food (in partnership with DHSSPS on NDNS) and Northern Ireland Centre for Diet and Health (NICHE). In ROI, the Department of Health's Health Promotion Policy Unit has funded surveillance initiatives in the past. Since the establishment of the HSE nutrition surveillance funding has been devolved to the HSE. These activities are carried out by the NNSC since its foundation in 1992. Other key funders in ROI have included Department of Agriculture, Food and Marine[1] (DAFM) and the HRB.

The purpose of the initiatives has been:-

(1) Monitoring weight status – in both jurisdictions good quality trend information exists on the weight status across most age groups. In NI, this exists for adults and children from two years from DHSSPS generated surveillance data. In ROI weight status data has been generated primarily from survey data funded from various sources including DH, DAFM and the HRB. Very strong trend data is available for the adult population. Across all age groups weight and height (length in the case of younger children) were required to calculate BMI and classify individuals into weight categories. Waist circumference was also a common measure used to assess distribution of excess fat in many studies.

(2) Monitoring of compliance with food based dietary guidelines - The UK and ROI have a number of food related population guidelines e.g. five portions F&V per day and three portions of dairy foods. Dietary guidelines i.e. the Food Pyramid in ROI and the Eatwell Plate in UK have been developed to communicate these. Those studies that have used FFQ and food diaries as the method for investigating food intake have been used to assess compliance with food and dietary guidelines. Other methods have relied on self-reporting which will provide information on trends but won't provide accurate amounts.

(3) Monitoring of population nutrient goals – a small set of surveys have used methodologies that provide sufficient details on nutrient intakes i.e. NDNS (funded by FSA NI, DHSSPS and *safe*food in NI) and the IUNA studies. The purpose is to monitor existing intake concerns as well as to identify emerging nutrient intake issues among population groups. Specific studies have been carried out by the UK FSA and UCC to assess total salt intake through measuring 24h urinary salt content. The FSAI have regularly funded secondary

[1] Formerly known as Department of Agriculture, Food and Fisheries (2007-11), Department of Agriculture and Food (1997-9; 2002-7) and Department of Agriculture, Food and Rural Development (1999–2002).

analysis of IUNA studies to evaluate nutrients intakes and risk assessment analysis for nutrients to inform policy initiatives e.g. intake of salt from food and folate consumption.

(4) Informing fortification policies

A public health strategy that is commonly employed at a population level is food fortification. It is also used on a voluntary basis by food manufacturers. In NI, this is driven by national UK policy rather than at a local level. Both the UK and ROI have considered folic acid fortification of flour or breads in recent years. Data from detailed food and nutrients studies i.e. IUNA studies and NDNS are required to inform this process. Another emerging public health nutrition issue is the low vitamin D intakes among the NI and ROI population. Vitamin D supplementation is recommended for pregnant and lactating women in the UK and for infants from 0-1 yr in ROI. If supplementation or food fortification policy was being considered for other population groups then detailed food intake surveys would be required to assess the potential benefits and risk to the population.

(5) Assessing exposure to chemical contaminants – e.g. exposure to food additives, packaging materials, pesticides, shell-fish toxins. For example data from the NSIFCS was used to estimate the risk in the Dioxin Crisis 2008 (64, 65). The Nutrition Surveillance group highlighted the importance of detailed food and nutrient intake data to do this and the reliance that food toxicology has on such data.

- **Food, agriculture and health research**

The data generated is of key use to addressing specific research questions and in underpinning many of the nutritional developments of the food sector. In ROI, DAFM have funded major initiatives that contribute to nutrition surveillance on the IOI e.g. IUNA studies through their agri-food research programme FIRM. FIRM aims to develop public good technologies that will underpin a competitive, innovative and sustainable food manufacturing and marketing sector on a national and international trade level. The programme is creating a base of knowledge and expertise in generic technologies that will support a modern, consumer-focused industry and build Ireland's capacity for research and development.

Initiatives have also been funded by DAFM and the HRB, in collaboration with the DOHC. These initiatives include five research projects funded under the Food for Health Research Initiative (FHRI).

3.2.4 Data protection, storage and accessibility

The Nutrition Surveillance Group discussed and agreed that data protection, storage and accessibility were crucial to the acceptability and success of any future nutrition surveillance initiatives on the IOI. In both NI and ROI data protection laws exist to protect the confidentiality of any person participating in surveys/studies and rigorous ethical standards are put in place. From a public perspective it is important that this is communicated clearly for those who participate in nutrition surveillance initiatives.

This report has highlighted the wealth of data that has been generated on nutrition surveillance on the IOI. However, many of the initiatives have emerged independently resulting in data stored in many places with ranging levels of accessibility.

In the UK there are systems in place for the management of surveillance and health information. In NI, DHSSPS and Northern Ireland Statistics and Research Centre (NISRA) host the data generated locally. The data management for the NDNS is coordinated by the DH UK (formerly the FSA London) and the contractors. The IP rights of the information belong to the funding government department/agency which is set out in the initial contract phase. The data is then made accessible for secondary analysis through the National Archives.

In ROI, the data protection, storage and accessibility is driven by those that generated the data. In contrast to the UK, the IP rights generally belong to the institution that generated the data as opposed to the funding institution. There is no central location to access the data and data accessibility has been an issue in ROI. In the area of obesity, the Obesity Hub has collated relevant information from the island of Ireland (66).

In ROI future Health Information Systems may help with nutrition surveillance systems. The introduction of electronic/unique codes for citizens in the health system will allow for a more integrated approach across a range of surveillance needs. Such developments are likely to be relevant to the collection, management, storage and access of nutrition surveillance data. In 2012 the Health Information Bill will be published in ROI. Already the Health Information and Quality Authority has published draft standards for National Health Information Resources in order to achieve a more integrated approach for the use of data related to health (67).

4 Summary and recommendations

4.1 Conclusion

There is now a solid bank of surveys and research studies cataloguing food intake, body weight status, lifestyle behaviours and clinical measurements on most groups of the population on IOI. This work has intensified over the past 15 years. It provides a useful foundation, both in terms of data and expert personnel, on which to build a modern nutrition surveillance system that will serve us into the future.

The surveys and research projects undertaken to date have developed relatively independently over time. They have had a range of funding sources (from Government Departments to Health Agencies), a variety of methodologies (from FFQs to seven-day food diaries) and a selection of drivers (from food science to the agricultural industry to public health). There has been a practice of once-off surveys as distinct from a harmonised approach. This has left some gaps with incomplete coverage and occasional duplication. It has resulted in snapshots in time that are not necessarily always comparable. Some of the information is contained in silos which are not readily accessed, sometimes for practical reasons and sometimes for IP reasons. This does not facilitate the easy transfer of information.

In the past, particularly in ROI, there has not been a clear distinction drawn between surveys and on-going nutrition surveillance. However, in NI there are stronger mechanisms for capturing some nutrition surveillance. For population-based surveys to be useful they should use a common methodology and standardised protocol approach. They should be conducted at sufficient frequency to provide useful information for the assessment of both food safety and nutritional risk, and for planning, implementation and evaluation of public health practice. The research and one-off surveys have provided rich information although they are not surveillance per se.

There are a number of challenges to developing and implementing a nutrition surveillance system that is fit for purpose for IOI into the future. These include the following issues:

- Cost – in an era of limited financial resources a major challenge will be build a cost effective system to meet public health needs.
- Prioritising measures to be monitored - there are many stakeholders and users of nutrition surveillance data with different priorities. It is critical that the core measures chosen are driven by public health priorities. Cost will also be a factor in the decision making particularly where more sensitive clinical/biomarker measures are more expensive compared to more subjective measures.

- Developing an integrated approach – many studies/surveys feed into nutrition surveillance currently and duplication exists in some areas while there are gaps in many others.
- Privacy/confidentiality - Survey data must be collected and stored in line with the highest standards of data protection.
- Maximising technology - the use of modern technology to collect, collate and analyse data has major potential but will require piloting and validating.
- Changing society - issues such as the replacement of the house phone by mobile phones and the internet, the proportion of food prepared outside the home and the growth in population surveys all offer challenges but also significant opportunities to traditional nutrition surveillance methods e.g. collection of information on hand-held devices.
- Flexibility - the system needs to be sufficiently flexible to allow response to new needs and emerging issues.

The imperatives to maximise the use of resources (both financial and expertise) for nutrition surveillance have never been stronger than they are today. Greater co-ordination between agencies and jurisdictions can produce much efficiency. There is much evidence of similarities in food–related lifestyles in the two jurisdictions on the IOI. These considerations pose the possibility of a virtual nutrition surveillance conglomerate for the IOI.

4.2 A vision for surveillance for the island of Ireland

The following vision for a future nutrition surveillance system was identified:

- A nutrition surveillance system that is integrated into existing regional and national health information systems.
- An all-island approach that is co-ordinated by the relevant partners from NI and ROI would be beneficial from a logistics perspective and to maximise resources (financial and expertise) on the island.
- A nutrition surveillance system should be driven by public health policy requirements while also serving constituents in agriculture, food science and industry.
- It should include the following core set of measures:
    - Anthropometry - Weight and height
    - Food Intake – Two options were identified:
        - As a very basic marker of diet quality a measure of fruit and vegetable intake is necessary. Use of the Food Frequency Questionnaire (FFQ) method would provide trend analysis but FFQ have limitations and it should be noted that this method

overestimates fruit and vegetable intake. This approach would also not provide any measure of nutrient intake and would not meet the needs to risk exposure/chemical contamination of the diet.

        - The alternative approach for assessing food intake identified is a four-day diet diary. This approach is robust and also meets chemical risk assessment needs. However, it is costly and burdensome on the respondent.
    - Collection of data on socio-demographic and lifestyle information.
      Note: - Biomarkers and clinical assessment – these measures when included in surveillance systems result in a lower response rate to participation. The advisory group recommend that these could be 'add ons' to a basic nutrition surveillance system for research or investigative purposes.
    - It should be publically funded as an on-going function with a multi-annual budget while retaining some flexibility to react to emerging issues.
    - It should have a credible public profile with credibility akin to the population census.

4.3 Recommendations

- At a cross-border departmental level establish close co-operation on nutrition surveillance to maximise the use of resources on the IOI and ensure the collection of timely and robust data that is comparable north, south, east and west.
- A core set of measures of a) anthropometry b) food intake and c) nutrition biomarkers should be shared and agreed where possible.
- A continuous/rolling methodology should be employed replacing the current interval approach to data collection.
- An IOI methodology hub for nutrition surveillance should be developed for standardised protocols.
- Where relevant, nutrition information is collected on foot of research that is wholly funded by the State, the IP should be managed in accordance with the IP Policy in both jurisdictions (The National Statistics Office co-ordinate IP in the UK and The National IP Policy in ROI is to be launched in 2012).
- A dissemination strategy which optimises timely use of surveillance data should be employed.

A data storage and management system with formalised governance arrangements should be in operation.

5 Appendices

Appendix 1: Members of nutrition surveillance sub-group and terms of reference

Nutrition surveillance group members

Name	Organisation	Email
Aileen McGloin	*safe*food	amcgloin@safefood.eu
Barbara Livingstone*	University of Ulster	MBE.Livingstone@ulster.ac.uk
Catherine Hayes	Health Service Executive	hayesc9@tcd.ie
Cecily Kelleher	University College Dublin	Cecily.kelleher@ucd.ie
Cliodhna Foley Nolan	*safe*food	cfoleynolan@safefood.eu
Ivan Perry	University College Cork	i.perry@ucc.ie
Kieron Moore	DHSSPS NI	Kieron.Moore@dhsspsni.gov.uk
Maria Jennings*	Food Standards Agency	Maria.Jennings@foodstadards.gsi.gov.uk
Marian Faughnan	*safe*food	mfaughnan@safefood.eu
Pamela Byrne	Dept. of Agriculture	Pamela.byrne@agriculture.gov.ie
Patricia Heavey	University College Dublin	Patricia.heavey@ucd.ie
Theresa Maguire	Health Research Board	TMaguire@hrb.ie
Ursula O'Dwyer	Dept. of Health and Children	Ursula_O'Dwyer@health.irlgov.ie

*Members of *safe*food Scientific Advisory Committee

Terms of reference of the group:

1. Purpose of the all-island Nutrition Surveillance Working Group:

To review current nutrition surveillance on the island of Ireland and make recommendations for maximising the use of resources (inputs and outputs).

2. Aims and Objectives:

- Collate information on current nutrition surveillance activities.
- Perform a gap analysis.
- Review the use of current nutrition surveillance data.
- Develop recommendations and advise on prioritisation of the recommendations including a focus on those with an all-island dimension.
- Generate a vision for surveillance for the island of Ireland.

Appendix 2: Overview of international nutrition surveillance systems (a) UK, (b) US and (c) Denmark

(a) UK

National Diet and Nutrition Survey

Objective	To provide annual data about the nation's dietary intake and nutritional status; to estimate the proportion of individuals with compromised nutritional status, and to estimate the proportions attaining recommended intakes.
Start Year	1992
Frequency	1992 – 2001 – every three years a different age group surveyed. 2008 – 2011 – every year a sample of those aged 18+ months sampled.
Age Range	1.5 years+
Sample Size (per round)	1,000 people per round (500 adults aged 19+). Additional recruitment was undertaken in Scotland, Northern Ireland and Wales in order to achieve large enough samples in these countries to enable cross-country comparisons to be made. Data for NI will be available in 2012. Broadly representative of UK population – age, gender, educational attainment, housing tenure and social class. Response rate – 55 per cent.
Data Collected (currently)	Anthropometric: Height and weight: all where possible; infant length measurement:18-23 months; waist and hip circumference: 11 yrs+; demi-span (65+ and those aged 16-64 whose height could not be measured); mid upper arm circumference: 2-15 yrs. Food and Nutrient: Food diary based on four consecutive days – 2 weekdays and 2 weekends. Biomarkers: 24hr urine collection (4 yrs+ fully out of nappies): salt. Non-fasting blood sample (1.5-3 yrs and diabetics not willing to fast), fasting blood sample (4 yrs+): haematology- iron status, water-soluble vitamins and total homocysteine, fat-soluble vitamins and carotenoids, blood lipids, zinc and selenium. Physical Activity and/or Health and Lifestyle Information: Recent Physical Activity Questionnaire (RPAQ) given to all. Children aged 4-15 years were asked if they were willing to wear a physical activity monitor for four consecutive days. Through a CAPI and self-completion questionnaire, a socio-economic classification was assigned to each participant's household. Information on smoking and drinking habits was also collected.
Main Uses	Nutrition surveillance; exposure assessment (additives, contaminants, pesticides, etc.); dietary advice; teaching; product development; policy; marketing.

Accessibility of Data	Data archives available at www.esds.ac.uk/ Reports available at http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsStatistics/DH_128166
Funding	Jointly funded by the Department of Health in England and the UK Food Standards Agency (FSA). Available from FSA or Department of Health UK.

(b)US

National Health and Nutrition Examination Survey (NHANES)

Objective	Designed to assess the health and nutritional status of adults and children in the United States.
Start Year	1960
Frequency	Annual representative sample.
Age Range	All ages.
Sample Size (per round)	A nationally representative sample of about 5,000 persons each year. Response rate: 73 per cent.
Data Collected (currently)	Anthropometric: Weight: all ages; Height (length for those 47 months or less); Upper leg length: 8+ years; Upper arm length: 2+ months; Head circumference: birth-6 months; MUAC: 2+ months, Waist circumference: 2+ years, Triceps skinfold: 2+ months; Subscapular skinfold: 2+ months. Food and Nutrient: 24 hr dietary recall followed by short questionnaire to ascertain whether the person's intake on the previous day was usual or unusual. Biomarkers: Blood and urine sample to test for a large range of things including vitamin D status, oral glucose tolerance test, and infectious diseases. Full list available from http://www.cdc.gov/nchs/data/nhanes/nhanes_09_10/labcomp_f.pdf Physical Activity and/or Health and Lifestyle Information: Computer-assisted questionnaire which looked at participants' physical activity levels (PAL), alcohol and drug use and current health status.

Main Uses	Assess prevalence of diseases and their risk factors; nutrition surveillance; national standards for measurements such as height, weight, and blood pressure; epidemiological studies and research; policy.
Accessibility of Data	Report and data files accessible at http://www.cdc.gov/nchs/nhanes/about_nhanes.htm
Funding	Funding for NHANES comes from two primary sources: direct funding through the National Centre for Health Statistics base budget and reimbursable funding from collaborating agencies totalling 29 million for 2010 wave.

(c) Denmark

The Danish National Survey of Diet and Physical Activity

Objective	Monitor intake of foods and nutrients to identify public health nutrition problems; Evaluate intake of foods and nutrients according to sex and age groups; Quantify intake of selected non-nutrients and contaminants.
Start Year	1985
Frequency	1985 (15-80 yrs);1995 (1-80 yrs); 2000-2002 (4-75 yrs); 2003-2008 (4-75 yrs); 2006-2007 (1.5-3 yrs); 2011-2013 (4-75 yrs).
Age Range	Current study: 4-75 yrs.
Sample Size (per round)	3,700 individuals. Response rate for dietary recall: children (4-14 yrs): 71.4 per cent ; adults (15-75 yrs): 50.2 per cent.
Data Collected (currently)	Anthropometric: Weight, height and waist circumference - both measured and self-reported. Food and Nutrient: Seven-day food diary. Biomarkers: N/A. Physical Activity and/or Health and Lifestyle Information: Pedometer used to calculate steps.
Main Uses	Nutrition surveillance, monitoring of public health, description of population dietary habits, epidemiological research.
Accessibility of Data	Publications available from http://www.food.dtu.dk/Default.aspx?ID=20797
Funding	Danish National Institute of Social Research Finn Lund, SFI-Survey. No costs available.

Appendix 3: Current food and nutrient intake

Current mean food and nutrient intakes of populations surveyed on the IOI compared to the population target

						Actual mean intake of food/nutrient in the different surveys			
Survey title		NCFS	NTFS	NSIFCS	NANS	National Diet and Nutrition Survey			
Region		ROI	ROI	NI & ROI	ROI	UK			
Year of survey		2003/4	2005-6	1997/8	2008/10	2008/09 – 2009/10			
Sample size (n)		594	441	1,379	1,500	1,000			
Age group (y)		5-12	13-17	18-64	18-90	1.5-3	4-10	11-18	19-64	65+
Food/Nutrient	Target**									
Fruits and vegetables (g/d)	>400	208	200	251	192			M 3.1 F 2.7	M 4.2 F 4.1	M 4.7 F 4.2
CHO (% energy)	≥50	52	49	44.3	45.5	50.6	M 51.8 F 51.3	M 50.9 F 51.0	M 47.1 F 18.3	M 45.8 F 46.6
Total Fat (%	≤ 35	34	35.6	35.2	36.9	34.1	M 33.7	M 34.1	M 35.2	M 37.1

Survey title		NCFS	NTFS	NSIFCS	NANS	Actual mean intake of food/nutrient in the different surveys National Diet and Nutrition Survey				
energy)							F 34.4	F 34.6	F 34.4	F 35.9
SFA (% energy)	≤ 11%	14.7	14.4	14		14.8	M 13.5	M 12.7	M 12.9	M 14.5
							F 13.4	F 12.6	F 12.6	F 14.3
PUFA (% energy)	~6.5%	4.9	5.8	7		4.7	M 5.2	M 5.6	M 6.1	M 6.1
							F 5.5	F 5.9	F 6.2	F 6.0
MUFA (% energy)	12%	11.6	12.7	12		11.3	M 11.9	M 12.6	M 12.7	M 12.6
							F 12.2	F 12.9	F 12.1	F 11.9
Added Sugar (NMES)(g/d)	<11%	14.6	12.4	9.3		N/A	N/A	N/A	N/A	N/A
Fibre or NSP* (g/d)	Adults:18g NSP or 25g fibre Children: Age + 5g	9.4	11.6	14.8	19.2 (fibre)	8.1	M 11.4	M 12.7	M 14.9	M 14.8
							F 10.7	F 10.9	F 12.8	F 12.3
Salt (g/d)	<6	4.6 (5-6y)	6.3	10	7.4	N/A	N/A	N/A	N/A	N/A

Survey title		Actual mean intake of food/nutrient in the different surveys NCFS	NTFS	NSIFCS	NANS	National Diet and Nutrition Survey
	Less for children <10y	4.3 (7-10y) 6 (11-12y)				

*NCFS – National Children's Food Survey (28), NTFS – National Teens' Food Survey (29), NISFCS – North South Ireland Food Consumption Survey (20); NANS – National Adult Nutrition Survey (35), NDNS- National Diet and Nutrition Survey (13).

CHO- Carbohydrate; SFA – Saturated Fats, PUFA – Polyunsaturated fats; MUFA – Monounsaturated fats; NMES – Non-milk extrinsic sugars; NSP – Non-starch polysaccharides; M – males; F- females.

** Targets (24) except for Fibre –NSP values given for LINDNS, American Heart Association guidelines for fibre applied in NCFS (68).

Appendix 4: All studies included for consideration

1	A qualitative exploration of food choice influences across the life course in older Irish adults.
2	A qualitative investigation of food choice influences and health motives in Irish adults aged 50 plus.
3	All-Ireland traveller health study.
4	An econometric analysis of the impact of economic change on food expenditure in Ireland.
5	Cardiac rehabilitation dietary intervention study.
6	Child Health System (CHS).
7	Childhood obesity: the extent of the problem among six- year old Irish national school children.
8	Consumer cognitive responses to food.
9	Continuous household survey (CHS).
10	Cystic fibrosis registry.
11	Diet and lifestyle: pattern and cluster analysis in cross sectional and longitudinal cohorts.
12	Diet obesity and health in adults - Cork and Kerry heart disease and diabetes study (phase 1).
13	Diet obesity and health in adults - Cork and Kerry heart disease and diabetes study (phase 2).
14	Eldemet.
15	Evaluation of the Preparing for Life early childhood intervention programme.
16	Expenditure and food survey.
17	Experience of sport and physical activity in Northern Ireland (findings from the continuous household survey).
18	Food institutional research measures (FIRM) – Perceived risks of food.
19	Food4me.
20	Health and Social Wellbeing Survey (HSWS).
21	Health needs of early school leavers.
22	Health Survey Northern Ireland.
23	Health-related quality of life (HRQOL) and nutritional status of patients with HIV infection.
24	Heartwatch evaluation.
25	HRB centre for diet and health research, cluster 2: diet, obesity and health in pregnancy and childhood: RCT of low glycemic index dietary intervention vs. no intervention in preventing the recurrence of fetal macrosomia (ROLO study).
26	HRB centre for diet and health, cluster 4: weight management service clinical database.
27	Infant feeding survey (IFS).
28	Irish survey of health behaviour of school-aged children.
29	JINGO.
30	Lifeways cross generation cohort study.
31	Lipgene.

32	Millennium cohort study.
33	National adult nutrition survey (NANS).
34	National children's food survey (NCFS).
35	National diet and nutrition survey (NDNS).
36	National pre-school nutrition survey (NPNS).
37	National survey of children's dental health.
38	National teens' food survey (NTFS).
39	Northern Ireland longitudinal study (NILS).
40	North South Ireland food consumption survey of adults.
41	Randomised control trial of low glycemic index dietary intervention vs no intervention in preventing the recurrence of fetal macrosomia (ROLO study).
42	Obesity and wellbeing in India.
43	*safe*food/UCC dietary salt intake study.
44	Study of childhood overweight and obesity in primary schools of Co. Leitrim, ROI.
45-47	SLÁN 1998, 2002, 2007.
48	Serotonin and obesity.
49	Sport and physical activity participation survey (SAPAS).
50	The emergence and portrayal of obesity in the media.
51	The Irish Longitudinal Study of Ageing.
52	The survey of health, ageing and retirement in Europe (SHARE).
53	The Trinity, Ulster and Department of Agriculture (TUDA) cohort study.
54	WHO childhood obesity surveillance initiative.
55	WHO childhood obesity surveillance initiative second round.
56	Young person's behaviour and attitude survey (YPBAS).

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***safe*food**:
7 Eastgate Avenue, Eastgate, Little Island, Co. Cork
7 Ascaill an Gheata Thoir, An tOiléan Beag, Co. Chorcaí
7 Aistyett Avenue, Aistyett, Wee Isle, Co. Cork
Tel: +353 (0)21 230 4100 ***Fax:*** +353 (0)21 230 4111
Email: info@safefood.eu ***Web:*** www.safefood.eu