

Food and Nutrition Monitoring in New Zealand

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Foreword

Food and nutrition are major determinants of the health status of New Zealanders. It has been estimated that about 40 percent of deaths in 1997 were attributable to the combined effect of nutrition-related risk factors (including 87 percent of all ischaemic heart disease and 83 percent of all diabetes deaths) (Ministry of Health and The University of Auckland 2003). About 30 percent of the projected two- to three-fold increase in the incidence of diabetes to 2011 will result from the obesity epidemic (the remainder represents demographic trends) (Ministry of Health 2002b).

The authors of this report have presented a comprehensive review of the current state of food and nutrition monitoring in New Zealand. Despite good use being made of the existing data sources, monitoring lacks co-ordination and has some important deficiencies. These are addressed in the report.

The Ministry of Health has a statutory responsibility to monitor and report on the state of New Zealanders' health. The monitoring of food and nutrition is a critical component of this process. This report provides a strategic direction both for Public Health Intelligence itself and for the wider sector to improve food and nutrition monitoring over the next two to three years.

Food and nutrition monitoring also plays an important role in tracking progress towards the New Zealand Health Strategy's objectives to improve nutrition and reduce obesity. Food and nutrition monitoring data will also contribute to the development and evaluation of *Healthy Eating – Healthy Action* implementation plans to achieve these objectives.

Comments about the report should be sent to Public Health Intelligence, Public Health Directorate, Ministry of Health, PO Box 5013, Wellington.



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Executive Summary

Food and nutrition monitoring involves the routine and ongoing collection, analysis, interpretation and reporting of data on all aspects of food and nutrition, from food supply and food consumption to nutrition-related health status. Relevant, reliable and timely food and nutrition monitoring data provide a basis for informed decision-making and are essential for the development and evaluation of effective food and nutrition-related policies, programmes and services.

To date, food and nutrition monitoring in New Zealand has been ad hoc. The objective of this report was to review current food and nutrition monitoring activities in New Zealand and outline future directions.

Key food and nutrition monitoring domains include food supply (national and household), food consumption patterns, nutrient composition of foods, nutrient intake, nutritional status and nutrition-related health status, together with variables that may influence these processes and outcomes such as food culture, food security and sociodemographic factors. Furthermore, to interpret food and nutrition monitoring data it is useful to have up-to-date and relevant reference data, including food and nutrition guidelines, targets or goals, and nutrient reference values.

This report shows that New Zealand has a number of important data sources useful for food and nutrition monitoring. Through a series of periodic national nutrition surveys, which are the cornerstone of food and nutrition monitoring, reliable and specific individual-level data have been collected on food consumption, nutrient intake, nutritional status, and factors affecting dietary intake. Through national health surveys, an increasing range of individual-level data on nutrition-related risk factors and health status are being collected. New Zealand also has a very good food composition database. However, food and nutrition monitoring in New Zealand currently lacks co-ordination, and has some important gaps, especially in regard to the monitoring of food supply.

This report is the first of several activities planned to improve food and nutrition monitoring in New Zealand. Other improvements include investigating secondary data sources that may be useful for monitoring food supply at a national and household level, strengthening networks and developing a reporting schedule to improve co-ordination of monitoring activities and dissemination of data, and exploring the feasibility of including additional nutrition questions in other surveys to enable key aspects of dietary behaviour to be monitored in the years between national nutrition surveys.

Introduction

Background

The importance of food and nutrition in health is becoming increasingly recognised. In addition to nutrient deficiencies, poor nutrition is a preventable risk factor for a number of major chronic conditions, including cardiovascular disease, diabetes, cancer, obesity, high blood cholesterol, and high blood pressure. Other factors contributing to the high profile of food and nutrition as determinants of health include rapid changes in our food supply and food consumption patterns, public interest in healthy eating, and public concern about food safety.

Food and nutrition monitoring involves the routine and ongoing collection, analysis, interpretation and reporting of data on all aspects of food and nutrition. Relevant, reliable and timely food and nutrition monitoring data provide a basis for informed decision-making and are essential for the development and evaluation of effective food and nutrition-related policies, programmes and services. The ultimate goal of food and nutrition monitoring is the prevention and control of nutrition-related health losses.

To date, food and nutrition monitoring in New Zealand has been ad hoc. This report is the first step towards improving the co-ordination and comprehensiveness of food and nutrition monitoring in New Zealand.

Objectives

The objectives of this report are to review current food and nutrition monitoring activities in New Zealand and outline future directions. This involves identifying:

- core food and nutrition monitoring domains
- users of food and nutrition monitoring data
- current and potential sources of food and nutrition monitoring data
- gaps and deficiencies in food and nutrition monitoring data
- activities required to improve food and nutrition monitoring.

Information was gathered by reviewing food and nutrition monitoring documents from New Zealand and overseas, and through discussions with Ministry of Health employees with expertise in food, nutrition and population health monitoring. This report is not intended to be comprehensive, and areas identified for improvement are restricted to improving the use and quality of existing data, and promoting co-ordination of current activities.

Food and Nutrition Monitoring

Roles and responsibilities

The Ministry of Health is responsible for nutrition and health policy development and monitoring (Appendix 1). The Public Health Intelligence group of the Public Health Directorate undertakes most nutrition and health monitoring activities within the Ministry of Health.

The New Zealand Food Safety Authority, which was previously split between the Ministry of Health and the Ministry of Agriculture and Forestry, is responsible for domestic food regulations and input into international food regulations (Appendix 1). This involves regulation and monitoring with respect to food safety, composition and labelling. Food Standards Australia New Zealand is responsible for the development of joint standards for food composition and labelling in Australia and New Zealand (Appendix 1). The New Zealand Food Safety Authority co-ordinates a ‘whole of government’ response to the work of Food Standards Australia New Zealand.

The focus of this report will be on aspects of food and nutrition monitoring for which the Ministry of Health has partial or complete responsibility. Therefore, food safety monitoring will not be covered, except where there is some overlap with nutrition monitoring activities (eg, New Zealand Total Diet Survey).

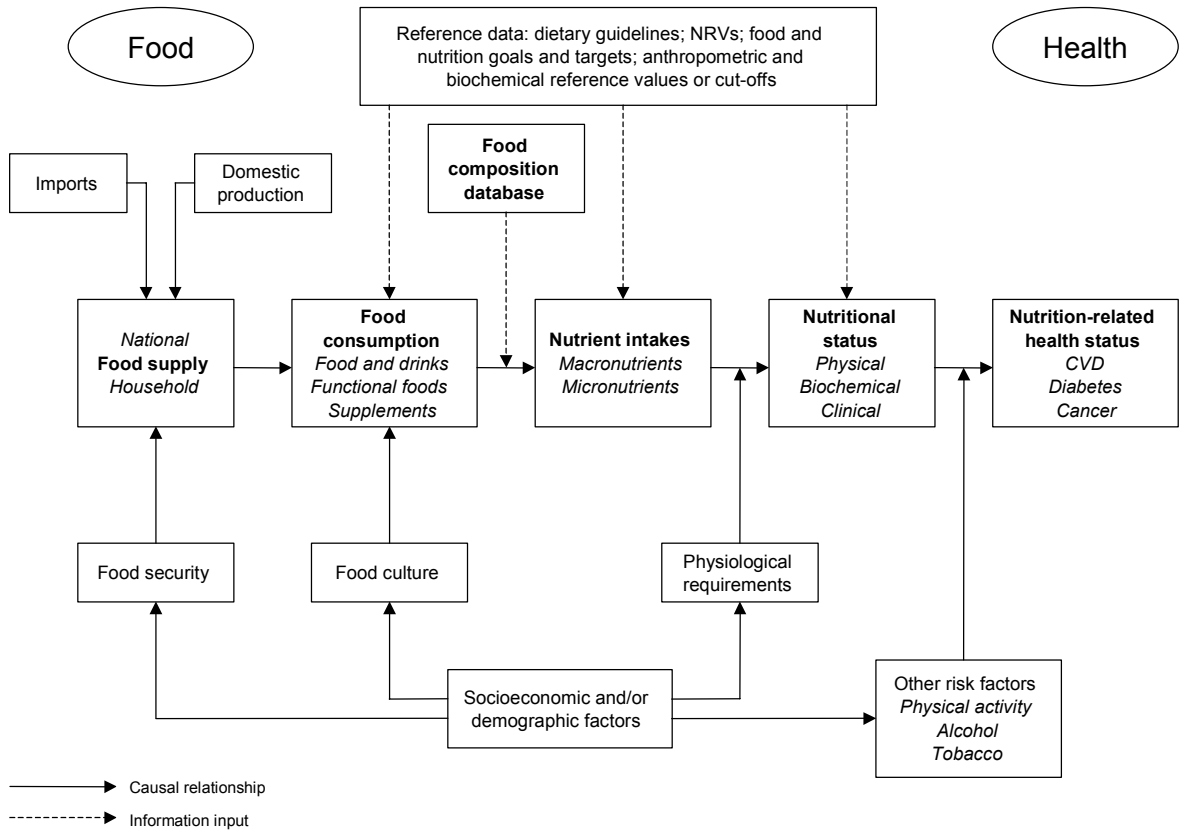
Domains

Food and nutrition monitoring involves the routine and ongoing collection, analysis, interpretation and reporting of data on all aspects of food and nutrition, including:

- food supply (national and household)
- food consumption patterns
- nutrient composition of foods
- nutrient intake
- nutritional status and nutrition-related health status
- factors influencing food consumption patterns and nutritional or health status.

To help interpret food and nutrition monitoring data it is useful to have up-to-date and relevant reference data, including food and nutrition guidelines, food and nutrition targets or goals, nutrient reference values (formerly referred to as recommended dietary intakes or RDIs), and anthropometric and biochemical reference values or cut-off points. Figure 1 summarises key food and nutrition monitoring domains, as well as the many factors influencing them. Food and nutrition monitoring domains are described in more detail in the section on sources of data.

Figure 1: Food and nutrition monitoring domains



Notes: NRVs = nutrient reference values; CVD = cardiovascular disease.

Purpose

The most important use of food and nutrition monitoring data is to provide an evidence base for informed decision-making. Relevant, reliable and timely food and nutrition monitoring data are essential for the development and evaluation of effective policies, programmes and services. Table 1 summarises the end users of food and nutrition monitoring data and how the data are used.

Table 1: Users and uses of food and nutrition monitoring data

Stakeholder	Purpose
Government	<p>Nutrition: national food and nutrition guidelines, NRVs, nutrition goals and targets, nutrition strategies (eg, Healthy Eating – Healthy Action), purchasing services, health promotion, advice for Minister of Health.</p> <p>Health: health strategies (eg, chronic disease, inequalities, population subgroups), purchasing services, health promotion.</p> <p>Food: development, monitoring and enforcement of food regulations and standards (food safety, composition and labelling), international food standards (Codex), advice for Minister of Food Safety.</p>
Health sector (DHB, PHO, PHU)	Programmes (eg, nutrition education, health promotion, food safety programmes) and services, patient advice and education
Non-government organisations	Policies and programmes, health promotion
Academic institutions	Teaching, research direction, data for research
Food industry	Food labelling, food marketing
General public	Information, advice, education

Notes: NRVs = nutrient reference values, DHB = District Health Board; PHO = primary health organisation; PHU = public health unit.

Sources of Data

Sources of food and nutrition monitoring data can be primary or secondary (Ferro-Luzzi and Martino 1997). Primary data are collected through surveys specifically designed to monitor food and nutrition. National nutrition surveys are the major source of primary data, and provide detailed and specific information on food and nutrient intakes, nutritional status and nutrition-related health status. Ideally, food and nutrition monitoring data should be collected continuously. However, this is not a practical option for most countries as nutrition surveys are expensive to undertake. Most countries undertake national nutrition surveys on a periodic basis, approximately every 10 years, which is considered sufficient to keep up with changes in dietary patterns and new food technologies.

Secondary data are derived from data collected for purposes other than food and nutrition monitoring. Potential sources of secondary data include routinely collected health statistics, household budget surveys, market research surveys, industry surveys and research studies. Issues to be considered when evaluating the value of secondary data sources include the:

- periodicity of data collection (ad hoc, periodic, continuous)
- frequency of data collection (weekly, monthly, yearly)
- level of aggregation (individual, household, national)
- sample size and sampling strategy
- format in which the data are stored (computer, paper)
- availability and cost of data.

Current and potential sources of data for each food and nutrition monitoring domain are discussed below (not in order of priority).

Food supply

Monitoring trends in the food supply is important because food availability influences food consumption patterns and therefore nutritional and health status. Food supply monitoring can occur at a national or household level.

At a national level, food supply monitoring is undertaken to determine the total available food supply, the per capita food and nutrient availability, and the nutritional adequacy of the available food supply. National food supply data are the most useful way to monitor long-term trends in food availability.

At a household level, food supply monitoring is undertaken to detect changes in household food use and expenditure patterns, including the use of foods or meals prepared outside the home. Patterns and trends in consumption of foods prepared away from home, including the setting (eg, restaurant, take-away, pre-prepared) and portion size, are important dimensions of nutrition monitoring.

Food balance sheets

Food balance sheets (FBS) are the most common means of collating comprehensive data on the food supply at the national level. The United Nations Food and Agricultural Organization (FAO) sets out specific guidelines for FBS, which ensures that data are collected consistently over time and between countries. This allows long-term trends to be assessed within countries, and comparisons to be made between countries.

Total food available for consumption is calculated by totalling all food produced, adding the amount of food imported and the change in stocks held over a specified period, and subtracting the amount of food exported, wasted, used for non-food purposes (eg, seed and stock feed) or used in the manufacture of a different type of food. Per capita supply is then calculated by dividing the total food available for consumption by the population size. For selected nutrients (energy, protein and fat), per capita nutrient availability is also calculated using food composition data. However, it is important to note that FBS data only provide an estimate of per capita food and nutrient *availability* (ie, apparent consumption), rather than a measure of actual food and nutrient *consumption*. Furthermore, FBS cannot account for the fact that foods are not available equally to, or consumed equally by, all members of the population.

FBS collection in New Zealand began in 1972 using data from the then Ministry of Agriculture and Fisheries. From 1977 to 1996 Statistics New Zealand collected FBS data through a number of surveys, particularly the annual Agricultural Production Survey. In 1997 this and several other surveys relevant to FBS were discontinued or scheduled less frequently. As a result, the compilation of FBS was discontinued. The Ministry of Health and health sector expressed concern over the discontinuation of FBS.

In 1999, the Ministry of Health contracted the New Zealand Institute for Crop and Food Research Ltd to determine the feasibility of re-establishing data collection for FBS. The authors of the report concluded that it was 'feasible and desirable to continue data collections and preparation of FBS' (Burlingame and Hicks 1999). Several options were suggested, and details of these can be found in the 1999 report.

However, despite continued concerns about the lack of food supply data in New Zealand, the collation of FBS data has not resumed. The Ministry of Agriculture and Forestry (MAF) has recently received funding to develop an ongoing programme to collect agricultural statistics in partnership with Statistics New Zealand. The feasibility of reinstating FBS, using data from MAF surveys and/or other sources identified in the 1999 report, will be revisited in the future. In the interim, alternative sources of national and household food supply data will be identified and evaluated. Potential sources of food supply data include industry surveys, market research data, and Statistics New Zealand's Household Economic Survey.

Industry surveys

Various agricultural and horticultural organisations collect data that could be used to monitor the food supply at a national level. The Restaurant Association of New Zealand (RANZ) represents 1400 businesses in the food and hospitality industry. The RANZ, in conjunction with Statistics New Zealand, collects data on the number of food-service outlets and annual revenue and sales by type of outlet (ie, coffee houses, and unlicensed restaurants and cafes; licensed and BYO restaurants and cafes; fish and chip, Chinese, hamburger, pizza and chicken takeaway outlets; caterers; sandwich and lunch bars; and ice-cream parlours). These data could be useful for monitoring national trends in the consumption of meals prepared away from home.

Market research surveys

AC Nielsen is an international market research company with a number of retail measurement services. SCANTRACK data, which measure sales (\$) and the physical volume of all bar-coded items purchased at supermarkets, have been collected in New Zealand since 1954. Data are collected weekly, aggregated and distributed four-weekly. SCANTRACK data are collected from the majority of supermarkets and some Four Square stores. Because SCANTRACK relies on barcodes, data on random-weight items such as fresh meat, poultry, fish, fruit and vegetables are not collected.

AC Nielsen publishes SCANTRACK data annually by product category in *Market Information Digest*. However, the product categories are based on market research needs and are generally not useful for food and nutrition monitoring. For example, some foods are grouped too grossly to be of use (eg, milk and cream), while others are split across many product categories. AC Nielsen can provide a more detailed breakdown tailored to meet individual clients' needs, but at an additional cost.

Several overseas studies have investigated the usefulness of supermarket sales data for monitoring food and nutrient intake. One study concluded that supermarket sales data provide a possible indirect indicator of national salt and fat intake and a tool for measuring the effectiveness of nutrition interventions (Narhinen et al 1998). Another study found that supermarket sales data were a useful means of assessing regional differences in dietary behaviour, especially fat consumption (Narhinen et al 1999). Monitoring dietary fat intake in the population would involve tracking sales in dairy products, margarines, and cooking or salad oils. These foods would need to be subdivided according to the amount and type of fat they contained, and the feasibility and cost of obtaining sales data by these groups would need to be determined. AC Nielsen data are also useful for identifying new foods that should be added to the New Zealand Food Composition Database.

A potentially more useful AC Nielsen retail measurement service is HOMESCAN, which electronically captures actual consumer purchase information from 1500 demographically representative households across New Zealand. After each shopping trip, households scan the barcodes of every product purchased, and enter information relating to quantity and price paid. Unlike SCANTRACK, HOMESCAN includes information on random weight items such as fresh fruit, vegetables and meat, and grocery purchases at retail outlets other than supermarkets. A major advantage of HOMESCAN data is that purchase data are analysed in conjunction with demographic information.

Household Economic Survey

The Household Economic Survey (HES) is a Statistics New Zealand survey that collects data on the income and expenditure patterns of private households throughout New Zealand. The HES was an annual survey until 1998, but is now carried out at three-yearly intervals. The survey involves approximately 3000 households, with data collection spread over a 12-month period to enable seasonal variation to be ascertained. Each household member aged 15 years and over keeps an expenditure diary for 14 consecutive days, recalls major purchases made in the previous 12 months, and provides income and employment information. Expenditure on food is classified into over 600 reference categories, although these are aggregated into broad food categories for the purposes of publication. Food items are reviewed annually and new food items added as appropriate. Data can be linked to socioeconomic factors, as well as age, sex and ethnicity. Some regional breakdowns are also available.

Food and nutrient intake

The core component of food and nutrition monitoring is the collection of primary data on food and nutrient intake at an individual level. Food and nutrient intake encompasses all foods and beverages including functional or fortified foods,¹ dietary supplements,² and breast milk.

Food consumption data are essential for assessing the quality of the diet in comparison to food-based dietary guidelines. For example, food consumption data are used to determine the proportion of people consuming the recommended number of servings of vegetables and fruit. Food consumption data can also be used to examine relationships between diet and nutritional status or nutrition-related health status. Analysis of food consumption data as dietary patterns provides an additional dimension to examining relationships between diet and health, with the focus on the entire diet rather than on single foods or nutrients.

¹ Functional foods are foods that have been formulated to provide health benefits beyond normal nutrition. They resemble conventional foods and are intended to be eaten as part of a usual diet. Examples of functional foods include margarines with modified fat content, and breakfast cereals with added vitamins and minerals. Foods fortified with essential nutrients to prevent a demonstrated nutrient deficiency are a type of functional food.

² Dietary supplements are products containing vitamins, minerals, herbs or botanicals, amino acids, and various other dietary substances. Dietary supplements are intended for ingestion as a pill, capsule, tablet or liquid. They do not usually resemble conventional foods and are intended to supplement rather than represent an entire meal or diet.

Nutrient intake is calculated by combining data on the amounts and types of foods consumed by individuals with data on the nutrient composition of these foods (see section on food composition). Reliable estimates of nutrient intake are essential for assessing the nutritional adequacy of the diet in comparison to nutrient reference values (NRVs) and dietary targets. Nutrient intake data can also be used to examine relationships between particular nutrients and nutritional status or nutrition-related health status (eg, saturated fat intake and prevalence of high blood cholesterol). Another aspect of nutrient intake that is becoming increasingly important is the contribution of dietary supplements, fortified foods and functional foods to overall nutrient intake.

National nutrition surveys

National nutrition surveys are the cornerstone of food and nutrition monitoring and the only means of collecting reliable and specific data on food and nutrient intake at an individual level. Food and nutrient intake data are collected via one or more of the following: 24-hour dietary recall, food frequency questionnaire, or food diary.

National nutrition surveys are difficult and expensive to undertake and impose a considerable burden on the respondent. Therefore, most countries undertake national nutrition surveys approximately every 10 years, which is considered sufficient to keep up with changes in dietary patterns and new food technologies.

Three national nutrition surveys have been undertaken among adult New Zealanders: the 1977 National Diet Survey, 1989 Life in New Zealand (LINZ) Survey, and 1997 National Nutrition Survey (NNS). The first national Children's Nutrition Survey (CNS) was undertaken in 2002 and key results are expected in late 2003. Details of national nutrition surveys can be found in Appendix 2.

The 1997 NNS provides reliable and specific data on current food and nutrient intake. This was the first national nutrition survey to include a repeat 24-hour dietary recall in a sub-sample of participants to adjust for day-to-day variation in an individual's food intake, and so provide estimates of 'usual' nutrient intake. Data from the 24-hour diet recall were also used to determine food sources of key nutrients and dietary supplement use. A qualitative food frequency questionnaire was used to determine the usual frequency of consumption of a range of foods and beverages.

Breastfeeding data

For infants, food consumption includes breast milk. Breastfeeding data purchased by the Ministry of Health from the Plunket Society are used to monitor breastfeeding rates in New Zealand and identify population subgroups or regions with low breastfeeding rates. Plunket data provide information on the proportion of babies fully breastfed at five to six weeks, at three months, and at four to six months, and fully or partially breastfed at four to six months. Breastfeeding rates are available by ethnic group and District Health Board. The Clinical Services Directorate of the Ministry of Health currently purchases these data.

Research studies

Nutritional data collected by academic institutions and non-government organisations provide a potential source of secondary data on food and nutrient intake. The main limitation of such data is that they are generally not representative of the national population. However, the advantage of these studies is that they often focus on particular populations subgroups (eg, pregnant and breastfeeding women, infants and young children) not adequately covered in national nutrition surveys. These studies may also use measures of food and nutrient intake that are not practical for national surveys (eg, 24-hour urinary sodium excretion, which is the most reliable indicator of total salt intake).

The major academic institutions in New Zealand involved in research on human nutrition are Otago University and, more recently, Massey University and Auckland University. The Centre for Social and Health Outcomes Research and Evaluation (SHORE) at Massey University undertakes a range of descriptive research (quantitative and qualitative) related to alcohol consumption.

Total diet survey

The New Zealand Total Diet Survey is undertaken to determine the safety of commonly eaten foods with respect to contaminants and selected nutrient elements. Contaminants include a range of pesticides and heavy metals. The survey is based on a series of simulated fortnightly diets for different population subgroups including adult males, adult females, young men and children. The simulated diets are based on a food list of over 100 commonly eaten foods, as well as some foods with potentially high levels of contaminants or nutrients of interest. The food list is constructed using food consumption data from national nutrition surveys and supermarket scan data. Foods from the food list are collected over a 12-month period to account for seasonal variation. Foods are then analysed for contaminants and selected nutrient elements. Where appropriate, nutrient data are included in the New Zealand Food Composition Database.

Total diet surveys are conducted every five to six years. Five total diet surveys have been undertaken in New Zealand since 1974, the most recent of which was the 1997/98 survey. The Ministry of Health funded previous surveys. The next total diet survey, scheduled for 2003/04, is the responsibility of the New Zealand Food Safety Authority.

Nutritional and health status

Measurement of nutritional status is another core component of food and nutrition monitoring. Nutritional status can be assessed by anthropometric, biochemical or clinical measures. In large population surveys, height and weight are the most common anthropometric measures of nutritional status because they are easy to measure reliably, and can be used to calculate body mass index (BMI), the most widely accepted indicator of overweight and obesity. Other simple anthropometric measures, such as waist and hip circumference, can be used to estimate body fat distribution. Biochemical indicators of nutritional status can be used as biomarkers of dietary intake, to determine the prevalence of nutrient deficiencies (eg, iron deficiency anaemia) and nutrition-related health problems (eg, high blood cholesterol). Information on nutritional status or nutrition-related health status, such as the prevalence of hypertension, diabetes and cardiovascular disease, can be

determined clinically or obtained by questionnaire (self-report). Ideally, information on health status should be obtained from the same people that provide dietary and anthropometric data so that links between diet, nutritional status and health status can be assessed.

National nutrition surveys

National nutrition surveys are the main source of data on nutritional status. All three adult nutrition surveys and the 2002 CNS include anthropometric measures of nutritional status. The 1989 and 1997 adult nutrition surveys and 2002 CNS included biochemical and clinical measures of nutritional status. Details of the measures of nutritional status included in each national nutrition survey are summarised in Table 3 (Appendix 2).

National health surveys

National health surveys are the main source of data on nutrition-related health status. Information on health status is collected by questionnaire (self-report). There have been two national health surveys in New Zealand: the 1992/93 Household Health Survey and the 1996/97 New Zealand Health Survey (NZHS) (Ministry of Health 1999). The 1996/97 NZHS collected data from adults on some nutrition-related risk factors and health outcomes (eg, high blood pressure and prevalence of doctor-diagnosed diabetes). The NZHS also collected data on other risk factors relevant to nutrition-related health status, including physical activity levels, alcohol consumption and cigarette smoking.

The third national health survey of New Zealand adults began in September 2002 and will be in the field approximately 12 months; results will be available in late 2003 or early 2004. This latest survey is similar to the 1996/97 NZHS, although some changes and improvements have been made. For example, the 2002/03 survey has been expanded to include actual measurements of height and weight. This is a significant development as it allows BMI and the prevalence of overweight and obesity to be monitored more regularly. Although many countries now include height and weight in national health surveys, many rely on self-reported height and weight. Self-reported height and weight are highly correlated with measured height and weight in adults (with the exception of older adults), but systematically underestimate actual BMI and the prevalence of overweight and obesity as people over-report their height and under-report their weight. The 2002/03 NZHS also includes new questions on nutrition (vegetable and fruit consumption), and expanded sections on nutrition-related risk factors (high blood pressure and high blood cholesterol), and nutrition-related health status (heart disease, stroke, diabetes, osteoporosis and cancer).

Research studies

Nutritional data collected by research institutes provide a source of secondary data on nutritional and health status. The main limitation of such data is that they are often based on small, one-off surveys that are limited to particular regions or demographic subgroups and, as a result, are generally not representative of the national population. However, these data are potentially very useful for food and nutrition monitoring because in addition to detailed data on food and nutrient intake, they often include biochemical indicators of nutritional status not included in national nutrition surveys (eg, red blood cell folate). Furthermore, such data are sometimes available for population subgroups of particular

interest that may not be adequately covered in national nutrition surveys (eg, pregnant women). Their other main advantage is that the data tend to be very reliable and accurate. The best use of these data is as a supplement to primary data collected through national nutrition or health surveys.

Health statistics

The New Zealand Health Information Service collates national data on all hospitalisations, deaths and cancer registrations. These data are useful for monitoring trends in nutrition-related diseases, such as ischaemic heart disease, stroke, diabetes and some cancers. Trends in disease incidence and mortality can be related to trends in dietary intake. For example, the decline in ischaemic heart disease mortality has coincided with a decrease in total and saturated fat intake. Hospitalisation data are also used to monitor the prevalence of low birthweight (under 2500 grams), an indicator of intra-uterine nutrition.

Birth defects monitoring

An inadequate intake of folate by women periconceptionally is an established risk factor for neural tube defects (NTDs). It is recommended that women in New Zealand take 800 µg folic acid four weeks prior to conception and for 12 weeks after conceiving to reduce the risk of NTDs. In New Zealand, NTDs are monitored as part of the Birth Defects Monitoring Programme operated by the Public Health Intelligence group. At a national level, folate intake is measured during national nutrition surveys. However, the contribution of dietary supplements and fortified foods (voluntary fortification of selected foods with folic acid began in 1996) to overall folate intake is more difficult to determine. Biochemical assessment of red blood cell folate is the most reliable indicator of folate status and was considered for the 1997 NNS but was not included for practical reasons (it involved a separate tube for blood and the immediate addition of vitamin C). However, this analyte could be included in future national nutrition surveys.

Food composition

Up-to-date information on the nutrient composition of foods available in New Zealand is essential for calculating reliable estimates of nutrient intakes from food consumption data. Food composition data are also essential for calculating per capita nutrient availability (apparent consumption) from food supply data. To keep the database up to date, new foods should be identified and analysed for their nutrient composition (in the form in which they are eaten) on an ongoing basis. To complement this database, data on food fortification practices and the nutrient content of dietary supplements are also required. Sources of food composition data are discussed below.

New Zealand Food Composition Database

A comprehensive food composition database should include all major foods available for consumption in a country. Improvements to food composition data should be ongoing, and should include adding new foods, and updating nutrient data for foods already included on the database where existing data are out of date, were derived from overseas databases, or are incomplete for some nutrients of interest. Ongoing improvements to analytical methods used to determine nutrient content are also important.

The Ministry of Health contracts the Institute of Crop and Food Research Ltd to maintain and develop the New Zealand Food Composition Database (NZFCD). The NZFCD was established in 1980 and currently includes approximately 2600 foods, analysed for 48 core nutrients. Almost 50 percent of the foods in the NZFCD are New Zealand sourced. Priorities for analysing foods, set by a multidisciplinary steering committee, are based on how widely the food is consumed, whether similar foods are already on the database, whether data are already available in New Zealand or overseas, particular nutrients requiring analysis, and specific needs at the time of national nutrition surveys. The Institute of Crop and Food Research Ltd carries out food composition analyses for both the Ministry of Health and the food industry. Although foods analysed for industry are not automatically included on the database, the Institute may request permission to include such data. In the past, Ministry of Health science projects (eg, iodine in dairy products and the NZTDS) have also contributed data to the NZFCD. An audit of the NZFCD is being undertaken in 2003 to ensure that the Institute of Crop and Food Research Ltd provides a quality NZFCD service, and to ensure stakeholder satisfaction with the service.

The NZFCD also includes some data on dietary supplements, which were collected for the purpose of analysing the 1997 NNS and 2002 CNS. However, data on dietary supplements are currently based on the nutrient breakdown printed on the label rather than on actual analytical values.

New Zealand Manufactured Food Database

The Ministry of Health contracts Nutrition Services at Auckland Hospital to maintain and develop the New Zealand Manufactured Food Database (NZMFD). The NZMFD contains information on the presence or absence of allergens in foods, as well as foods fortified with nutrients. Information is collected from food manufacturers via postal questionnaires. Knowledge of which foods are fortified is important when nutrient intakes are calculated from food consumption data collected in nutrition surveys.

Factors influencing dietary intake

Sociodemographic status

Collection of data on sociodemographic variables such as age, sex, ethnicity, income, occupation, education, deprivation index, and geographic location (rural/urban) is vital, as these factors influence dietary intake. Sociodemographic data are also necessary for identifying subgroups of the population who are particularly at risk of inadequate nutrient intakes or nutrition-related health problems. It is standard practice to collect detailed sociodemographic data as part of all population surveys and most research studies.

Food security

Food security is concerned with the ready availability and affordability of nutritionally adequate, safe, and culturally appropriate foods. Food security affects dietary intake by influencing household food supply. The first national data on food security in New Zealand were collected as part of the 1997 NNS. Food security was assessed by a series of questions especially developed and pre-tested for the survey. The 2002 CNS also includes questions on household access to healthy food, an indicator of food security.

Other sources of food security data include the annual Estimated Food Costs survey conducted by the University of Otago in the five main centres: Auckland, Hamilton, Wellington, Christchurch and Dunedin. The survey monitors the cost of foods that would meet the nutritional needs of most healthy people (based on the food and nutrition guidelines). For each food, prices are recorded at five different shops in each city (three supermarkets and two specialty shops or dairies). Food costs are prepared for three cost categories: basic, moderate and liberal. The basic cost category assumes that all foods will be prepared at home and includes the lowest-priced items within each food category. The moderate price category allows for an increase in the variety of meats, fish, fruit and vegetables, and the inclusion of some convenience foods. The liberal food category allows for the use of more convenience and imported foods, some out-of-season fruit and vegetables, more expensive cuts of meat and some specialty foods. Estimates of weekly food costs are calculated for adult males and females, adolescent boys and girls, school-age children of five and ten years, and preschool children of one and four years.

Other potential sources of data on food security are national or regional studies of food bank use and benefit statistics.

Food culture

Food culture includes food preferences, food preparation habits, eating settings, and other aspects of consumer behaviour, including people's knowledge, attitudes and beliefs about food and nutrition. The 1997 NNS collected data on food preparation habits. Future national nutrition surveys could be expanded to include additional questions on other aspects of food culture. Research studies and market research surveys may provide additional sources of data on food culture. Data from the Restaurant Association of New Zealand may provide useful information on the proportion of meals eaten away from home. It may also be useful to monitor marketing practices, such as the content of advertising on children's television and supermarket shelf space allocations.

Stage of change

'Stage of change' refers to people's intentions and/or attempts to change dietary intake, as well as perceived barriers or facilitators of dietary change. The 1997 NNS collected data on dietary changes currently attempted, intended dietary changes, and perceived barriers to dietary changes in line with the food and nutrition guidelines. Research studies may also provide more detailed information on stage of change. Such data are valuable for formulating and targeting health promotion strategies.

Food and nutrition guidelines, targets and standards

To help interpret food and nutrition monitoring data, it is useful to have up-to-date and relevant reference data, including food and nutrition guidelines (often referred to as dietary guidelines), nutrient reference values (NRVs), and food and nutrition goals or targets. In turn, food and nutrition monitoring data inform the development and review of food and nutrition guidelines, goals and targets, and NRVs. National or international reference data for anthropometric, biochemical and clinical measures are also required to determine the

prevalence of nutritional problems (eg, iron deficiency anaemia, high blood cholesterol, overweight and obesity).

Food and nutrition guidelines

The Ministry of Health produces food and nutrition guidelines for population subgroups across the life cycle (ie, infants and toddlers, children aged 2–12 years, adolescents, adults, older people, pregnant women, and breastfeeding women).

The food and nutrition guidelines consist of a background paper for health professionals and a pamphlet for the public (available free of charge). For each population subgroup, the recommended number of servings for each of the four major food groups is detailed. Food consumption data from nutrition surveys are compared to these recommendations to assess how healthy the diet is (eg, what proportion of the population is consuming adequate amounts of vegetables and fruit).

Nutrient reference values

New Zealand issued its first and only recommended dietary intakes (RDIs) in 1983 (Nutrition Advisory Committee 1983). On the recommendation of the Nutrition Taskforce, New Zealand adopted the 1990 Australian RDIs (Truswell et al 1990) for all nutrients (except iodine and selenium) in 1991. The revision of the 1990 Australian RDIs and development of joint nutrient reference values (NRVs, formerly referred to as RDIs) for New Zealand and Australia was agreed in 1998 but did not commence until late 2002. The review is being undertaken by the National Health and Medical Research Council of Australia and is expected to be completed in 2005. As part of this process New Zealand has developed the technical reports regarding NRVs for selenium and iodine. Data from the 1997 NNS will be used to inform the review of joint NRVs for New Zealand and Australia.

Food and nutrition targets or goals

The Nutrition Taskforce was appointed in 1988 to provide recommendations for national food and nutrition policy. The 1991 report of the Nutrition Taskforce, *Food for Health* (Department of Health 1991), includes goals and targets for foods, nutrients and health, and outlines strategies to meet these goals and targets. For most nutrients, the targets proposed measurable improvements in dietary intake for the year 1995 and/or 2000. For example, for total dietary fat, the target was for total fat to provide 30–35 percent of energy by 1995 and 30–33 percent of energy by the year 2000.

In 1995 the Public Health Commission produced the *National Plan of Action for Nutrition* (Public Health Commission 1995), a 10-year strategic plan for food and nutrition policy, programmes and research. NPAN included targets for key foods and nutrients to be achieved by the year 2000 or 2005. Many of the NPAN targets were adopted from *Food for Health*, but had the time period extended. For example, the target for total fat was to decrease intake to 30–33 percent of energy by 2005. These targets were monitored and reported annually by the Public Health Commission and subsequently the Ministry of Health in *Progress on Health Outcome Targets* from 1995 to 2000. The NPAN has been

superseded by the Ministry of Health's *Healthy Eating – Healthy Action* strategy (Ministry of Health 2003), which does not include quantitative targets.

The Ministry of Health has recently published targets for breastfeeding in *Breastfeeding: A guide to action* (Ministry of Health 2002a).

Summary of data sources

Table 2 summarises food and nutrition monitoring domains and data sources.

Table 2: Food and nutrition monitoring domains and data sources

Domain	Data sources	Comments
Food supply	HOMESCAN and HES (household) SCANTRACK, FBS (national)	Includes national and household food supply
Food consumption	Adult and child nutrition surveys; limited data on selected food groups (eg, vegetables and fruit) from health surveys	All foods and beverages, including fortified or functional foods, dietary supplements and breast milk
Dietary patterns	Algorithm applied to nutrition survey data	Factor analysis or diet quality score (eg, Healthy Eating Index)
Nutrient intake	Derived from nutrition surveys using the New Zealand Food Composition Database	Requires maintenance of up-to-date food composition database
Nutritional status	Adult and child nutrition and health surveys	Includes anthropometric and biochemical measurements
Nutrition-related health status	Health and nutrition surveys	Includes incidence and prevalence of ischaemic heart disease, ischaemic stroke, diabetes, obesity, blood pressure, blood lipid profile
Food security	Nutrition surveys; healthy food basket pricing; food bank surveys; benefit statistics	Includes various dimensions of household food security
Food culture	Nutrition surveys; RANZ survey of foods consumed away from home; surveys of advertising and marketing	Includes food preferences, food preparation practices, social settings for eating, portion sizes, consumer knowledge, attitudes and behaviours, and marketing and advertising practices
Stage of change	Nutrition surveys	Includes intention to and attempts to change diet; perceived barriers or facilitators of dietary change
Links to other risk and protective factors	Health and health behaviour surveys	Includes drug use (especially alcohol and tobacco), physical activity, infant care practices (ie, breastfeeding)

Notes: HES = Household Economic Survey; FBS = food balance sheets; RANZ = Restaurant Association of New Zealand.

Conclusions

Assessment of current situation

New Zealand has a number of important data sources useful for food and nutrition monitoring. Through a series of periodic national nutrition surveys, reliable and specific individual-level data have been regularly collected on food consumption, nutrient intake, nutritional status, and factors affecting dietary intake. Through periodic national health surveys, an increasing range of individual-level data on nutrition-related risk factors and health status are being collected. The NZFCD is a very good reference database on the nutrient content of New Zealand foods.

Excellent use is currently being made of existing food and nutrition monitoring data. Data from all three national nutrition surveys in adults (1977 NDS, 1989 LINZ and 1997 NNS) are currently being used to examine changes in the BMI distribution and the prevalence of overweight and obesity in New Zealand from 1977 to 1997, to project future changes in BMI, and to identify subgroups of the population most at risk of developing obesity. Data from the 1997 NNS are being used to inform the review of the joint NRVs for Australia and New Zealand, and to develop the food list for the 2003/04 NZTDS. As part of the development of *Healthy Eating – Healthy Action*, data from the 1997 NNS were recently used to estimate the burden of disease attributable to nutrition-related risk factors (BMI, blood pressure, blood cholesterol, vegetable and fruit intake). Information from the 1997 NNS and 1996/97 NZHS are frequently provided to the various Ministry of Health directorates, the health sector (especially DHBs) and public. Data from the 1997 NNS and 1996/97 NZHS are currently being used as a data input for research studies at academic institutions, including universities and Crown Research Institutes. Other regular users of food and nutrition monitoring data include dietitians, nutritionists, the food industry, and non-government organisations.

However, food and nutrition monitoring in New Zealand currently lacks co-ordination, and has some important deficiencies, especially in the area of food supply monitoring. The Public Health Intelligence group has a commitment to improving food and nutrition monitoring, and has already identified and acted on areas where improvements can be made (eg, including measurements of height and weight in the 2002/03 NZHS).

The New Zealand Health Monitor (Ministry of Health 2002c), a 10-year strategic plan for population health surveys, will further improve food and nutrition monitoring in New Zealand. The *Monitor* proposes that separate adult and child national nutrition surveys be undertaken every 8–10 years. Although continuous collection of food and nutrition monitoring data through national nutrition surveys is the ideal, this is not a practical option for most countries as nutrition surveys are expensive to undertake. With the exception of the United States, which has recently moved to continuous data collection, countries that undertake regular national nutrition surveys (eg, Australia and the United Kingdom) do so on a periodic basis, approximately every 10 years. The *Monitor* also proposes that the NZHS be undertaken every two to three years, and a new Health Behaviours Survey be undertaken continuously. Although it is intended that the core component of the NZHS remain stable so that trends can be monitored, there is flexibility to expand the nutrition

module in future health surveys. Core nutrition questions could also be included in the Health Behaviours Survey.

Future improvements

This report has identified that the major gaps in current food and nutrition monitoring relate to co-ordination and food supply monitoring. Public Health Intelligence plans to address these gaps by:

- investigating secondary data sources that may be useful for monitoring food supply at a national and household level (assuming the appropriate data are available, this could lead to the establishment of some form of food supply monitoring)
- developing a reporting schedule and strengthening networks to improve dissemination of food and nutrition monitoring data. Together with this overview report, such reporting and networking could also provide a mechanism to improve co-ordination of monitoring activities.

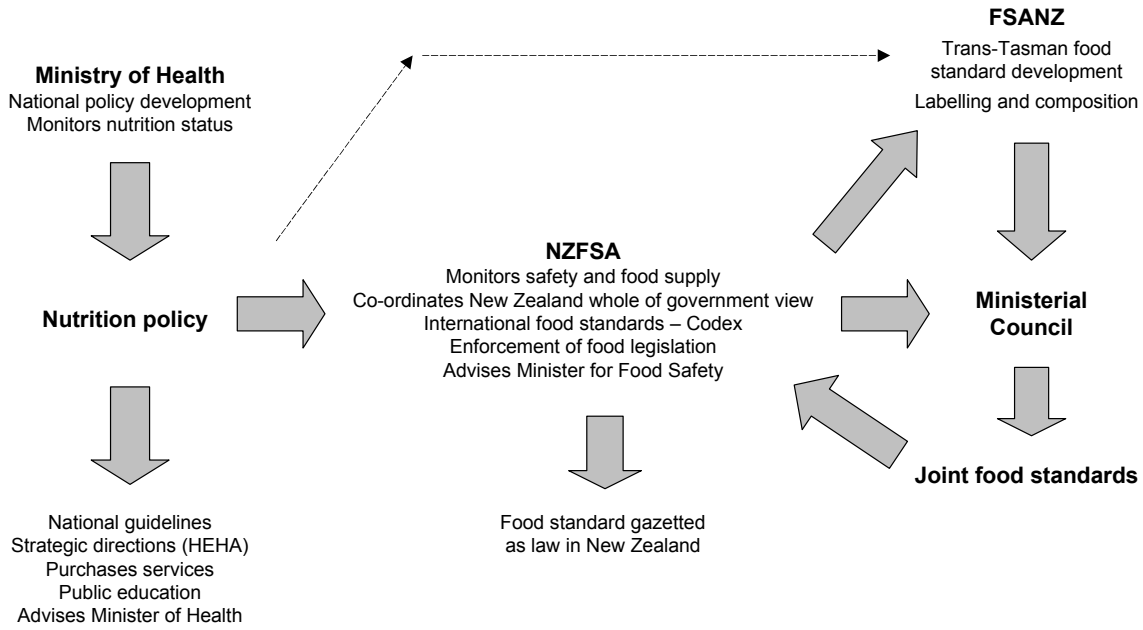
Other planned improvements to food and nutrition monitoring include expanding the module on nutrition in the next NZHS and/or including food and nutrition questions in other appropriate surveys (eg, the Health Behaviours Survey). If reliable and suitably brief nutrition questions can be identified and included in other surveys, this will enable key aspects of dietary behaviour to be monitored in the years between national nutrition surveys. Any food and nutrition questions included in health surveys should also be included in periodic national nutrition surveys, which are the core component of any food and nutrition monitoring programme.

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Appendix 1: Government Roles



Notes: NZFSA = New Zealand Food Safety Authority; FSANZ = Food Standards Australia New Zealand; HEHA = Healthy Eating – Healthy Action.

Source: Reid 2002

Appendix 2: Nutrition Surveys

1977 National Diet Survey

The first national nutrition survey was the 1977 National Diet Survey (NDS) of adults, which was funded by the National Heart Foundation of New Zealand. The survey involved a 24-hour dietary recall and anthropometric measurements of nutritional status (see Table 3 for details). The results of the 1977 National Diet Survey were published in 1979 (Birkbeck 1979).

1989 Life in New Zealand Survey

The second national nutrition survey of adults was undertaken in a subgroup of the 1989 Life in New Zealand (LINZ) survey participants. The LINZ survey was a Hillary Commission for Recreation and Sport initiative, and funded by the Hillary Commission for Recreation and Sport, Department of Health, Medical Research Council of New Zealand, National Heart Foundation of New Zealand and New Zealand Cancer Society. In phase one of the LINZ survey, participants who completed the mailed Life in New Zealand questionnaire were sent two of four questionnaires: Your Health, Changes in Your Life, Your Eating Habits and Leisure. Phase two of the LINZ survey involved a 24-hour dietary recall, and anthropometric, biochemical and clinical measurements of nutritional status. Details of the survey are summarised in Table 3. The results of the 1989 LINZ survey were published in a series of reports, including one on nutrition (Horwath et al 1991) and one on health (Mann et al 1991).

1997 National Nutrition Survey

The third and most recent national nutrition survey was the 1997 National Nutrition Survey (NNS). The 1997 NNS involved 4636 adults, and included an over-sample of Māori (n = 704) and Pacific people (n = 307). The 1997 NNS involved a 24-hour dietary recall, a qualitative food frequency questionnaire, and questions about food preparation habits, dietary supplement use, current and intended dietary changes, barriers to dietary change and food security. The 1997 NNS also involved anthropometric, biochemical and clinical measures of nutritional status and nutrition-related health status. Details of the survey are summarised in Table 3. As the 1997 NNS was carried out in a subset of 1996/97 NZHS participants, data on other risk factors and health status are available for 1997 NNS participants. The results of the 1997 NNS were published in *NZ Food: NZ People* (Russell et al 1999). A series of journal articles based on the 1997 NNS findings were published in the *New Zealand Medical Journal* (Ferguson et al 2001; Horwath et al 2001; Mann 2001; Parnell, Reid et al 2001; Parnell, Wilson et al 2001; Skeaff et al 2001; Wilson et al 2001).

2002 Children's Nutrition Survey

The first national Children's Nutrition Survey (CNS) was undertaken in 2002. The CNS involved children aged 5–14 years and includes an oversample of Māori and Pacific children. Details of the survey are summarised in Table 3. Results from the CNS are expected in late 2003.

Table 3: Summary of national nutrition surveys in New Zealand

	1977	1989	1997	2002
<i>Sample</i>				
Total	1938	1702*	4636	~3200
Age range (years)	20–74	15+	15+	5–14
<i>Food and nutrient intake</i>				
Nutrient intake (24-hour recall)	✓	✓	✓	✓
Food frequency questionnaire		✓	✓	✓
Dietary supplement use	✓	✓	✓	✓
<i>Factors influencing dietary intake</i>				
Food preparation practices		✓	✓	✓
Current and intended dietary changes		✓	✓	
Barriers/facilitators of dietary change		✓	✓	
Knowledge of food and health		✓		
Food security			✓	✓
<i>Nutritional and health status</i>				
Height, weight, BMI (measured)	✓	✓	✓	✓
Waist, hip (measured)	✓	✓	✓	✓
Skinfolds (measured)	✓	✓	✓	✓
Bio-impedance (measured)				✓**
Lipids (blood)		✓	✓***	✓***
Iron status (blood)		✓	✓	✓
Iodine (urine)				✓
Blood pressure (measured)		✓	✓	
Hypertension (self-report)			✓	
Heart disease (self-report)		✓		
Diabetes (self-report)		✓	✓	
<i>Other risk factors</i>				
Physical activity (self-report)		✓	✓	✓
Smoking (self-report)		✓	✓	
Alcohol (self-report)		✓	✓	✓

* Sample size for 24-hour dietary recall: 4683 for FFQ, 4615 changes in your life (including diet), 4706 physical measurements, 4373 leisure, 2597 blood lipids.

** Sub-sample only.

*** Total and LDL cholesterol only.

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