

Australian Institute of Health and Welfare

# **AUSTRALIA'S Food & Nutrition**

**Ian H Lester**

in collaboration with the  
NHMRC Expert Panel on National Food and Nutrition  
Monitoring and Surveillance Strategy

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# Preface

As a nation, Australia is endowed with good health and one of the most diverse, nutritious and attractive food supplies in the world. Australia also has a commitment to social justice which seeks to eliminate differences in access and equity within the population, including inequalities in nutritional status and health. Nevertheless, there are Australians who cannot or do not buy and eat foods conducive to good nutrition and health.

The impetus for *Australia's Food & Nutrition* stems from the introduction by the Australian Government in September 1992 of the National Food and Nutrition Policy. One of four priority objectives of the National Food and Nutrition Policy was to establish an ongoing program of food and nutrition monitoring and surveillance in Australia. The Australian Institute of Health and Welfare was identified in the Policy as the central agency for the implementation of a strategy to meet this objective, with a responsibility for monitoring and reporting health and morbidity data in relation to food and nutrition at the whole community level as well as for subgroups in the population. *Australia's food & nutrition* is the first step towards meeting the Policy objective.

During the development of the Policy proposal, the Government also established within the National Health and Medical Research Council an Expert Panel on a National Food and Nutrition Monitoring and Surveillance Strategy. These actions express the Government's commitment to a social view of health and nutrition as well as its understanding that an ongoing monitoring and surveillance program is essential to policy and program development and the assessment of policy implementation strategies. At the start of the Policy implementation, the Expert Panel undertook to provide direction, advice and support during the compilation of *Australia's Food & Nutrition*.

The National Food and Nutrition Policy clearly recognises the importance of considering the food and nutrition system as a coherent entity. This important recognition is reflected in the compilation of this book which brings together for the first time, in one volume, information from all sectors of the food and nutrition system in Australia. As such it constitutes an important resource for all those concerned with food and nutrition in Australia and will improve the ability of policy and program decision makers to take into account sectoral and intersectoral effects. At the same time it also highlights those areas in which information is currently lacking and provides a baseline from which change can be monitored.

## Special note

The Commonwealth of Australia is a federation of six States and two self-governing Territories. Throughout this report the Australian Government is often referred to as the Commonwealth or Federal Government. In addition, the term 'States' is used to refer to the States and Territories of Australia.



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Agricultural and Resource Economics; Australian Bureau of Statistics; Australian Federation of Consumer Organisations, Australian Dairy Corporation; Australian Fish Marketing Authority; Australian Food Foundation; Australian Local Government Association; Australian Meat and Livestock Corporation; Australian Quarantine and Inspection Service; Bread Research Institute of Australia; Canned Food Information Service Inc.; Commonwealth Department of Education, Employment and Training; Commonwealth Department of Health, Housing, Local Government and Community Services; Council of Australian Food Technology Associations; CSIRO Divisions of Human Nutrition, Food Science and Dairy Research; Diabetes Australia NSW Branch; Dietitians Association of Australia; Flour Millers Council of Australia; Foodweek; Goodman Fielder Ltd; Health Development Foundation (SA); Lactation Resource Centre, Nursing Mothers Association of Australia; Meadow Lea Foods; Meat Research Corporation; NSW Department of Health; National Food Authority; National Heart Foundation of Australia; Roy Morgan Research; Victorian Food and Nutrition Program.

The Nutrition Section of DSHS carried the responsibility for the development phase of the National Food and Nutrition Policy proposal between 1990 and 1992. I worked in the Section over that period and I am well placed to know that Australia's Food and Nutrition (and the priority afforded to monitoring and surveillance in the Policy) owe a great deal to the groundwork done by the Section during that period. I acknowledge the important contribution of those involved ( in alphabetical order): Karen Cashel, Sue Jefferson, Mi Kyung Lee, Helen McFarlane, Cathy Meyer, Megan Shirlow and Vicki Taylor.

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Finally, while the contributions of so many people were instrumental in bringing together information from many disciplines, responsibility for errors, omissions and other indiscretions remains with me.

Ian H Lester

# Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
ACHPER	Australian Council for Health, Physical Education and Recreation Inc.
ADI	acceptable daily intake (of residues in food)
AFCO	Australian Federation of Consumer Organisations
AFF	Australian Food Foundation
AHMAC	Australian Health Ministers Advisory Council
AIHW	Australian Institute of Health and Welfare
AMLC	Australian Meat and Livestock Corporation
ANF	Australian Nutrition Foundation
AQIS	Australian Quarantine and Inspection Service
ASCO	Australian Standard Classification of Occupation
ASIC	Australian Standard Industrial Classification
AUS•MEAT	Authority for the Uniform Specification of Meat and Livestock
AWB	Australian Wheat Board
BMI	body mass index (Quetelet index).
CAFTA	Council of Australian Food Technology Associations
COFA	<i>Composition of foods Australia</i>
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAA	Dietitians Association of Australia
DASETT	Department of the Arts, Sport, the Environment, Tourism and Territories
DCSH	Department of Community Services and Health (now Department of Human Services and Health)
DEET	Department of Employment, Education and Training
DFAT	Department of Foreign Affairs and Trade
DHHCS	Department of Health, Housing and Community Services (now Department of Human Services and Health)
DHHLGCS	Department of Health, Housing, Local Government and Community Services (now Department of Human Services and Health)
DITAC	Department of Industry, Technology and Commerce (now Department of Industry, Technology and Regional Development)
DITARD	Department of Industry, Technology and Regional Development
DPIE	Department of Primary Industries and Energy
ELMY	estimated lean meat yield
FAO	Food and Agriculture Organisation

FICA	Food Industry Council of Australia
GATT	General Agreement on Tariffs and Trade
GLC	gas-liquid chromatography
HDL	high-density lipoprotein
HES	Household Expenditure Survey
HPLC	high-pressure liquid chromatography
HTST	high temperature short time (pasteurisation process)
IAC/IC	Industries Assistance Commission/Industry Commission
LDL	low-density lipoprotein
MPC	maximum permitted concentration (of contaminants in food)
MRL	maximum residue limit (in foods)
NFA	National Food Authority
NHF	National Heart Foundation of Australia
NHMRC	National Health and Medical Research Council
NHS	National Health Survey
NIDDM	non-insulin-dependent diabetes mellitus
NUTTAB	nutrient data table for use in Australia
PAF	population attributable fraction
PHA	Public Health Association of Australia
PTWI	provisional tolerable weekly intake (of contaminants in food)
RDI	Recommended Dietary Intake
TOBEC	total body electrical conductivity (meat carcass assessment method)
UHT	ultra-high temperature (pasteurisation process)
WHO	World Health Organization
WHR	waist-to-hip ratio

# Introduction

The conceptual framework depicted on page 2 developed from a number of existing models<sup>1-5</sup>, provided the basis for compiling and ordering the content of *Australia's food and nutrition*.

Chapter 1 provides an overview of the national context in which the food and nutrition system operates and in which current food and nutrition policy has developed. It describes the origins and diversity of the Australian people, the physical and geographical features of the Australian continent which influence its food supply. It describes the political systems and institutions which shape the country's policy environment, particularly the interaction of various levels of government in Australia, and the relationships between policy areas that can influence food, nutrition and health.

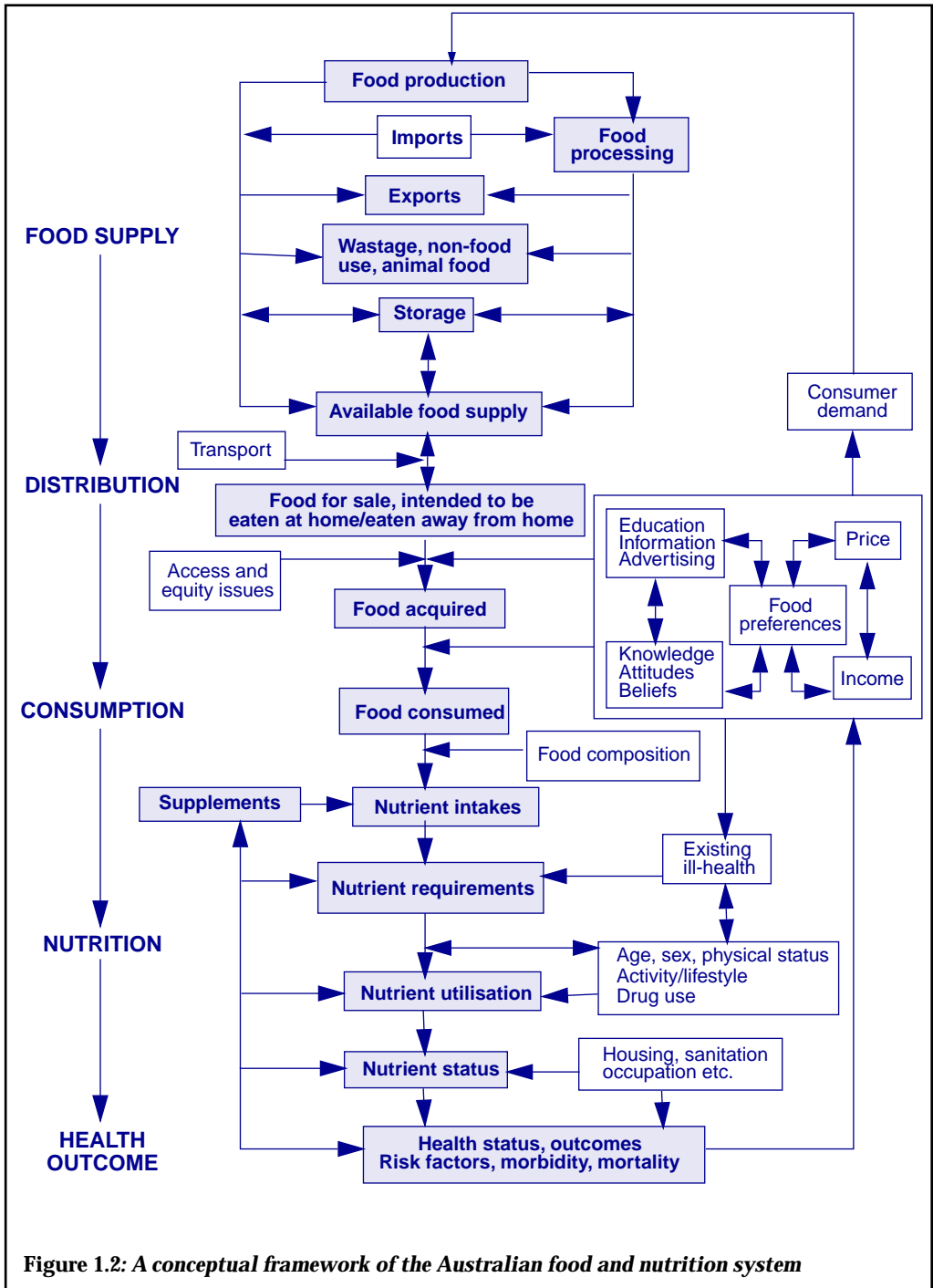
Chapter 2 then describes in some detail a number of different measures of the food supply. These range from data on primary production, food manufacture and processing, to the food and nutrient supply available for consumption by the population. What emerges from this chapter is that the food industry sector in Australia is not only a major source of export revenue but also a major employer; that the food supply is both abundant and diverse; and that there have been some important changes in the composition and the number of different foods available for consumption. While the diversity of the food supply has increased markedly the actual amounts of the nutrients available for consumption per head of population have changed relatively little.

Chapter 3 examines the meeting point of the food supply and the consumers—the retail sector. It also looks at availability and affordability of food relative to income and the knowledge, attitudes and concerns of Australian consumers regarding food and its relationship to health.

It will be seen that the retail sector of the food industry has undergone major change since 1950 when the first self-service supermarkets came into operation to a situation where four major chains now hold 95 percent of the retail market in packaged foods. While less information is available on the food prepared or eaten away from home there has also been considerable expansion in this sector and at the same time a shift away from small scale operators to large multi-national chains.

The cost of food has increased in absolute terms but, relative to income, the increase has been less than for housing and health services over the same period of time. Overall expenditure on food and non-alcoholic beverages has remained virtually constant at just under 20 percent of income since 1975-76.

Australians have a number of concerns that influence their relationship with the food supply. These concerns encompass far more than food safety and nutritional quality issues and 'relate to personal well-being, concern for others, the environment, and the activities of the food industry and government'.<sup>6</sup> Most, however, believe they eat a healthy diet and consequently make dietary changes only in the event of serious illness, advice from a doctor or a change in body weight.



Chapter 4 summarises the information on the food and nutrient intakes of Australians available from the major dietary intake surveys conducted since 1983. These surveys have been of two types: those based on a 24-hour recall or record of intake and those based on semi-quantitative food frequency questionnaires which set out to determine the usual intake of individuals. Because all these surveys were population based they have not provided adequate data on minority groups in the population and in general analysis has focussed primarily on sex and age related differences in intake. Future surveys need to consider the influence of other aspects of the individual's socio-demographic environment. Because of the small number of surveys which have been conducted and the different dietary methodologies used little information is currently available on trends in the food and nutrient intake of individuals over time.

Chapter 5 begins with a consideration of the data on breastfeeding and the growth of infants and children in Australia. In both areas, routinely collected and collated national data do not currently exist, and the information presented was compiled from numerous sources. With the specific exception of iron deficiency there is little evidence for the widespread occurrence, in Australia, of conditions associated with dietary inadequacy and the primary focus of this chapter is on the chronic conditions considered to have a nutritional component in their aetiology. Among those which are major causes of death, illness or disability in Australia are coronary heart disease, stroke, hypertension, atherosclerosis, some forms of cancer, non-insulin dependent diabetes, osteoporosis and dental caries. All these conditions are multifactorial in their origin and it is not easy to assign a figure to the proportion which is specifically preventable by diet. Some estimates of the overall cost to the community of diet related diseases have, however, been made and these indicate that, in Australia, alcohol related disease, dental caries and coronary heart disease together account for almost 75% of the direct and indirect health care costs attributable to diet related conditions.

Chapter 6 examines factors—financial, social and physical—that are associated with differences in food behaviours and nutritional status between groups within the Australian population. It outlines the influence of these 'social determinants of health' on nutrition and health outcomes, with an emphasis on socio-economic status. This chapter also summarises information on food and nutrition intakes of selected groups within the population with excess risk of poor nutrition. This information, although limited, demonstrates that as a group in each case, those living in remote areas, or of non-English-speaking background, Aboriginal and Torres Strait Islander people, and those with higher physiological requirements are often at a nutritional disadvantage.

The final chapter in *Australia's food and nutrition*, Chapter 7, considers the question of nutrition monitoring and surveillance, that is the ongoing, regular collection, analysis and dissemination of information on key measures and indicators of the food and nutrition system, for the purpose of informing community discussion and supporting public policy-making on nutrition and related health issues. This chapter identifies specific data needs for nutrition monitoring and surveillance and discusses some of the ways in which these might be met. It thus provides a starting point for the development of a national food and nutrition monitoring and surveillance strategy. An essential component of such a strategy is the conduct of regular nutrition surveys. One possibility is to conduct such surveys in conjunction with the 5-yearly National Health Surveys conducted by the Australian Bureau of Statistics. This approach has the

advantage not only of providing an established mechanism for selection of a nationally representative sample but also of maximising the value of the dietary and nutrition related data collected by being able to link it with the information collected as part of the National Health Survey. An initial survey of this kind—the National Nutrition Survey - is currently scheduled to commence in early 1995 and will provide a major opportunity to update existing information about the food intake and nutritional status of the Australian population.

## References

1. Heywood P, Lund-Adams M. The Australian food and nutrition system: a basis for policy formulation and analysis. *Aust J Public Health* 1991;15(4):258–270.
2. Life Sciences Research Office FASEB. Nutrition monitoring in the United States. An update report on nutrition monitoring. DHHS Publ. no. (PHS) 89–1255. Washington, DC: US Government Printing Office, 1989;8–10.
3. Kelly A. Nutritional surveillance in Ireland. Report for 1985. Dublin: Medico-social Research Board, 1986;1–8.
4. Mason JB, Habicht J-P, Tabatabai H, Valverde V. Nutritional surveillance. Geneva: WHO, 1984;1–194.
5. Department of Health and Human Services, Department of Agriculture. Ten-year Comprehensive Plan for the National Nutrition Monitoring and Related Research Program: notice. *Federal Register Part II* 1993;(111):32 752–767.
6. Worsley A. Shoppers' concerns about food and health, Sydney, Adelaide, Melbourne, 1991. Report provided to the Nutrition Section, Department of Health, Housing and Community Services, 1991.