

17 Cancer and nutrition policy

Mark Wahlqvist

A number of matters need to be taken into account when we are developing public health nutritional advice.

Gaining public confidence

As scientists and health care workers, we have a responsibility to give the best advice on the available evidence. The limits of evidence need to be shared with the community. Not to do so creates a level of false confidence in the public mind, and also makes the public less sensitive to a changing base of evidence and to changes in preferred advice. We have seen instances of confusion about therapeutic nutrition where, for example, low carbohydrate diets were recommended for diabetes and now we recommend high carbohydrate, high fibre diets. In fact, there are intrinsically correct databases for both recommendations and, in a way, they have come together in contemporary advice, as have also dietary fibre restriction versus dietary fibre increase in the management of certain bowel conditions. If we can create a sense of 'developing evidence', we are, in the long term, in a much better position. Our task is to enable people to make better decisions for themselves in relation to diet and nutrition.

Unfortunately changes in the public's eating habits can interfere with the research process itself. In the multicentre Australian Colonic Polyps Prevention Study, we are testing diet-disease hypotheses. Specifically, I am chairman of a steering committee on food and nutrition policy in Victoria and am engaged in a research program. Our research task would be simpler if we could be sure that our results were not being muddied by changing dietary practices, generated by the very advice that we are giving to the public!

What are the educational possibilities, given the nutrient profile in the Australian diet? Fat intake at about 40 per cent of our energy intake (calories) is excessive, and carbohydrate at about 44 per cent, is low. There is excessive salt (commonly eight to 12g per day) and not enough fibre (usually 17 to 20g per day) (see Table 17.1).

Table 17.1 Estimated macronutrient composition of the average Australian diet based on food disappearance data for 1982/3 using 'old' food composition tables plus estimates of salt and fibre composition.

	Percentage of dietary energy
Protein	12
Fat	39
Carbohydrate	44
Alcohol	5
	100
Salt	8-12 grams/day
Fibre	17-20 grams/day

In response to this dietary situation, the Australian Nutrition Foundation has developed a pyramid concept to encourage preference for plant food, which is richer in dietary fibre, and moderation in fatty foods (Figure 17.1).

Also, the Foundation and the Victorian Fish Industry Council are distributing a poster through fish-and-chip shops in Victoria (Figure 17.2). Public health workers like to use an existing network but, to date, not much thought has been given to these networks in Australian communities. The poster conveys three simple concepts: eat fish grilled or steamed (rather than fried), with lemon or vinegar (rather than salt), and with bigger chips, since these contain less fat per serve than the more slender varieties. They are simple messages, but they are creating a sense of choice at point of purchase rather than an 'all-or-none' situation. We have to work within the existing environment: people can tolerate only so much change in their eating habits, and business must succeed.

Weighing the evidence

The various kinds of evidence on which advice is given include experimental animal evidence, epidemiological evidence and, increasingly, intervention studies. Different kinds of evidence are weighed and checked for inconsistencies. As scientists and health care professionals, we integrate this evidence and enable public health and clinical advice to be provided. The challenge is to do so in a way that reflects the confidence limits.

If one takes a recurrent issue, vitamin A and cancer, there are different kinds of evidence. There is experimental animal evidence: in some animal models vitamin A inhibits tumour induction. There is epidemiological evidence about protection against certain cancers by foods like green leafy and yellow vegetables which contain beta-carotene. However, there is discrepancy about retinol as opposed to beta-carotene. Here we are faced with a dilemma about evidence and we await various intervention studies.

THE HEALTHY DIET PYRAMID

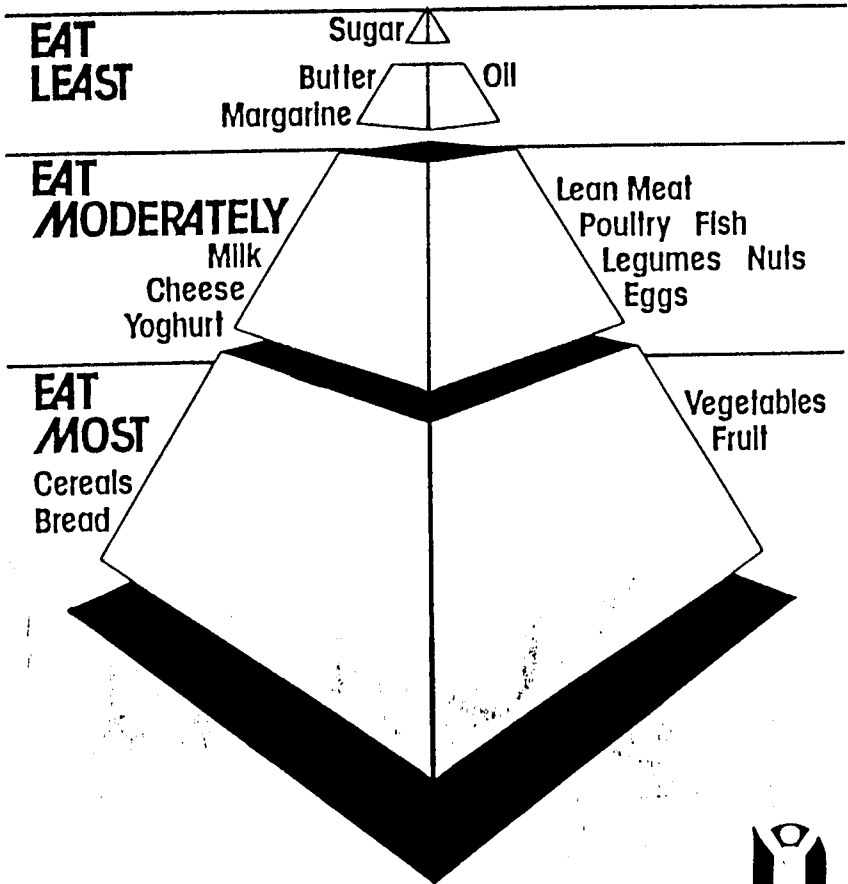
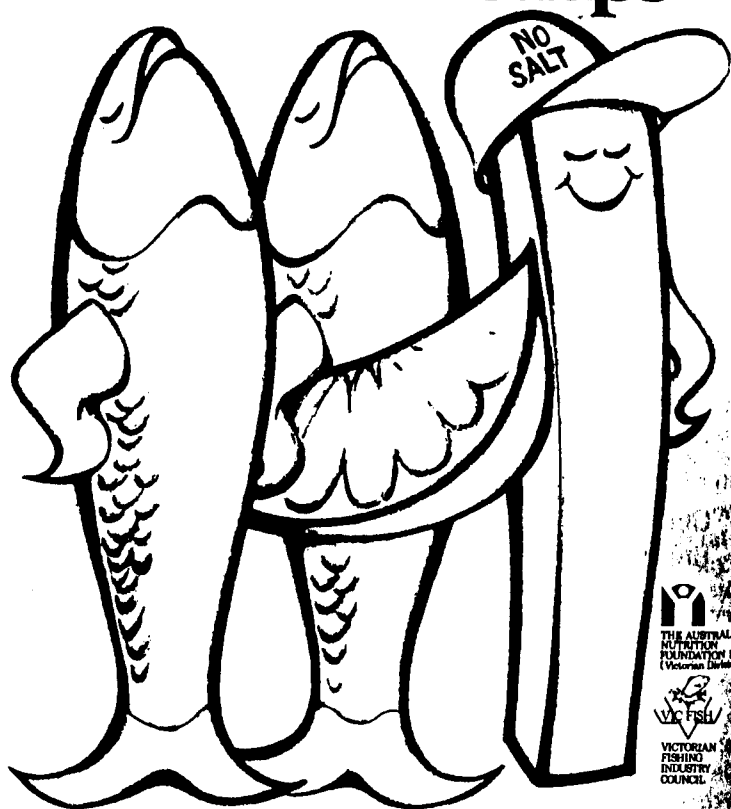


Figure 17.1 The healthy diet pyramid

Healthier ways with Fish'n Chips



Have fish
grilled or
steamed.

Have it with
lemon or vinegar
rather than salt.

Bigger chips
have less fat
per serve.



Figure 17.2 Healthier ways with fish 'n chips

We do not depend on one particular study to make up our minds. On the contrary, we have to weigh the evidence on the basis of the quality of the studies, preferring some to others. An example of this process at work for dietary factors and disease is given in Table 17.2. The task force for the American Society of Clinical Nutrition took into account different kinds of evidence and gave each a score out of a hundred. Thus various quality-of-evidence scores were ascribed to links between dietary cholesterol and atherosclerotic vascular disease, salt and high blood pressure, alcohol and liver disease and so on.

Table 17.2 Quality-of-evidence scores for dietary factors and disease

	Median	Middle 5
Dietary cholesterol - arteriosclerotic disease	62	44-77
Fat - arteriosclerotic disease	58	44-62
Cholesterol and fat - arteriosclerotic disease	73	53-77
Carbohydrate (sugar) - dental disease	82	77-90
Alcohol - liver disease	87	77-93
Salt - high blood pressure	74	62-77
Excess energy - high blood pressure, diabetes, arteriosclerotic disease	68	62-72

Source: American Society for Clinical Nutrition (Ahrens, E.H. & Connor, W.E., Chairmen) (1982), 'Report of the task force on the evidence relating six dietary factors to the nation's health', *American J. of Clinical Nutrition* 32, 2621-748 (whole issue). The figures shown above have been interpolated from the figure on p. 2631.

With food and nutrition, we are not dealing with only one factor or one outcome. Cigarette smoking is a much more unifactorial consideration than is diet. The chemical and metabolic complexities of food are great. From leading causes of 'lost life-years' up to age 75 in Victoria, we can give public health programs relative weights for various nutritionally related diseases (Table 17.3). Most important, potentially, is ischaemic heart disease, with 15 per cent of the lost years in that category. Contrast that with, for example, lung cancer four per cent, breast two per cent, colon two per cent, and so on. This helps us to work out a nutritional strategy.

We also need to take into account the variety of mechanisms, some initiatory, some promotional, that link diet with cancer, and the variety of pathways involved. It is important always to think in a multi-factorial fashion (Table 17.4). The pathways may start with carcinogens in the food or beverage, or they may form in the body. In the bowel, carcinogen transport or metabolism might be altered by cruciferous vegetables or alcohol or dietary fibre. Pre-malignant states might be altered and there might be interaction with energy balance. I have chosen to express it in this way because energy balance is predicated not only on what we eat, but also, importantly, on levels of physical activity.

Obesity is not necessarily related to an absolute excess energy intake although the intake is obviously in excess of need. In fact slimmer people often eat more than obese people because they exercise more. There is some evidence that eating more, which is possible if one exercises more, is associated with increased longevity. So we should not necessarily conclude that restricted diets are a good thing.

Table 17.3 Leading causes of 'lost life-years' to age 75, Victoria 1983

	Percent of total lost life-years to age 75
Congenital anomalies	6
Accidents, poisoning and violence	24
motor vehicle accidents	10.6
suicide	5.9
homicide	1.1
Cancer:	24
lung	4.4
breast	2.4
colon	2.2
leukaemias, lymphomas etc.	2.7
Diseases of the circulatory system:	24
ischaemic heart disease	15.4
stroke	4.3
Chronic lung disease	3
Chronic liver disease and cirrhosis	2
Other causes ¹⁷	
	<hr/> 100

Table 17.5 shows that food is an extraordinarily complicated set of chemicals. Amongst the various non-nutrient chemicals in food are ones which may have anticarcinogenic properties, for example, the flavonoids in fruits and vegetables, the indoles in cruciferous vegetables, the phenolic acids in beverages like coffee and tea, and so on. Therefore, when thinking in food terms, it is very important not to single out a particular factor.

We need to think about how the dietary pattern is related to cancer and to the wider disease pattern. For example, we are a lot more confident now about the relationship between diet and cardiovascular disease. Since cardiovascular disease is a very important factor in lost life-years, and since recommendations for reducing cardiovascular disease coincide with those for decreasing various kinds of cancer, we can have more confidence in making public health recommendations in the cancer area. Moreover, there is a relationship between a high fat/low plant food/alcohol abuse dietary pattern and both obesity and type-2 diabetes. This knowledge further strengthens our case for recommending dietary changes (Table 17.6).

Table 17.4 Diet and cancer: possible pathways

	Food factors
Carcinogens in food or beverage	Mycotoxins Produces of cooking
Carcinogens form in body	Nitrites Fat & bile salts
Carcinogen transport or metabolism altered	Cruciferous vegetables Alcohol Dietary fibre Vitamin A
Premalignant 'states' altered	
Interaction with energy balance	

Source: R. MacLennan (1983), 'Dietary factors in human carcinogenesis', in *Cancer Management*, 13th International Cancer Congress, Part E, Alan R. Liss Inc., New York, pp. 347-55.

Individual versus public

Public health professionals are regularly confronted with the issue of whether to 'go public', to engage in individual counselling, or to address particular high risk groups. This dilemma is particularly acute when dealing with industry. The food industry often resists the public approach, insisting that recommendations be kept on an individual basis. But each case must be assessed independently.

In the Food and Nutrition Program in Victoria there will be an evolving policy document. One of the arguments is to favour addressing the population at large. In the cardiovascular disease area there is a case for working with the population at large since the impact on coronary mortality rates is likely to be greater than if the program is confined to high risk groups. With cancer there are perhaps better defined high risk groups; it may be possible to target them. And since, in this area, the perceived health gains are greater, we may have more success in influencing dietary behaviour.

Recommendations

Despite the complexities, recommendations such as appear in the Victorian Anti-Cancer Council documents are possible and necessary. These include:

- Avoid obesity
- Cut down on total fat intake
- Eat more fibre foods such as fruits, vegetables, and wholegrain cereals
- Include foods rich in vitamins A and C in the daily diet
- Include cruciferous vegetables such as cabbage, broccoli, brussel sprouts, kohlrabi and cauliflower in the diet
- Be moderate in drinking alcoholic beverages
- Be moderate in eating salt-cured, smoked, and nitrite-cured foods.

Table 17.5 Naturally occurring anticarcinogenic compounds in foods

Inhibitor	Typical dietary source	References
Aromatic isothiocyanates (benzyl isothiocyanate, phenyl isothiocyanate)	Brussel sprouts, cabbage cauliflower	130
Ascorbic acid	Citrus fruits, leafy vegetables	26
β -carotene	Carrots, yams	26
Coumarins, lactones (α -angelica lactone, limettin, coumaranone, etc.)	Citrus fruits, vegetables	137
Fibres ^a	Cereal (bran) products, fruits, vegetables	26
Flavonoids (quercetin, myricetin, kaempferol, chrysin, etc.)	Most fruits, vegetables, grains	7,33
Indoles (indole-3-acetonitrile, indole-3-carbinol, 3,3'-diindolymethane)	Brussel sprouts, cabbage, cauliflower	63
Phenolic acids (caffeic acid, ferulic acid, chlorogenic acid, ellagic acid, etc.)	Coffee, tea, soybeans, oats, apples, potatoes	112
Protease inhibitors	Soybeans, seeds, nuts, legumes	101
Selenium compounds	Grains (from Se-rich soil), brazil nuts, clams, mushrooms	15, 26
α -tocopherol	Oils, nuts, asparagus	25

^a It is important to distinguish distinct types of fibres based on mechanisms. Cereal bran fibre increases stool bulk and lowers concentration of intestinal carcinogens and promoters. Lignin and pectin fibres have multiple effects, including those on the metabolism of carcinogens and on the enterohepatic cycling of metabolites.

Source: Fiala, E.S. Reddy, B.S. Weisburger Y.H. (1985) Annual Review of Nutrition 5, 295-321.

Table 17.6 Dietary pattern related to a cancer and wider disease pattern

Diet	Disease
High fat, low plant food, and alcohol abuse	Cancer: Large bowel Breast Respiratory tract Cardiovascular disease Obesity Type-2 diabetes

These recommendations are similar to those advanced by the National Research Council of the Academy of Science in the United States. There is a different level of evidence for each recommendation. For example, the evidence for moderation in eating salt-cured, smoked and nitrite-cured foods is suggestive but not great. The documents of the Anti-Cancer Council in Victoria attempt to give an idea of the limits of evidence. They set out to enable people to think more clearly about diet and cancer and to make distinctions, such as between prevention and therapy (people often think that concepts of prevention can be transferred to therapeutics).

It is important for the public to understand that several factors may be operative and that latency periods vary. I suggest that some of the differences in the interaction between diet and coronary disease, and diet and cancer, reflect different latency periods. And, as I have stressed, we must consider other health outcomes.

Two valuable documents are available from the Anti-Cancer Council in Victoria: 'How to make good decisions about diet and cancer', and 'How health professionals and family and friends might address diet problems in cancer patients: a guide'. Similar documents are available in New South Wales.

Conclusion

These are some of the issues that have to be considered in formulating a food and nutrition policy. A lot more work is required. We need to know more about what the community eats, to define more clearly the at-risk groups, and to engage in an educational process because that is the only way to enable the public to make better decisions for themselves. Also the environment of food needs to change so that choices can more easily be made. That is the approach taken in our policy in Victoria. We need to initiate community action, so that the program is self-sustaining and, very importantly, we need to monitor outcomes.

Preventing cancer

Edited by

Martin Tattersall

**Australian Professional Publications
Sydney, 1988**

First published in 1988 by
Australian Professional Publications
3 Wolger Road, Mosman, N.S.W. 2088.

Copyright © M. Tattersall, R. Doll, N. Gray, S.R. Leeder, D.M. Lloyd, G.R. Harde, G. Berry, A. Rogers, G. Major, V. Beral, G.W. Milton, C.H. Gallagher, J.I. Pitt, A. Bagshawe, D.B. Thomas, A.S. Truswell, A.B. Miller, A.A. Evers, A.J. McMichael, M. Wahlqvist, P.H. Baird, S. Abraham, K. Brock.

Printed in Australia by Printing Headquarters Pty Ltd.

This book is copyright. Apart from fair dealings for the purpose of private study, research, criticism or review, as permitted under the Copyright Act no part may be reproduced by any process without permission. Inquiries should be made to the publisher.

Cataloguing - in - Publication data

Preventing cancer.

Bibliography.
Includes index.
ISBN 0 949416 12 6.

1. Cancer - Prevention. 2. Cancer. I. Tattersall,
Martin H.N. (Martin Henry Norman) 1941- .

616.99'4'052