Disclaimer: The submission below is derivative in nature and intended as a literature review only. My credentials are a B.A./B.Mus(Hons) so in this field I rely on the authority of others.

I declare I have no conflict of interest in this matter.

- Rosemary I Abetz-Rouse

Dietary Fat Recommendations

The past couple of years have seen significant activity on the issue of dietary fat. In the US, soft drink companies have agreed on a voluntary ban of fizzy drinks in US schools, to be replaced by low fat milk and unsweetened flavoured water. The New Zealand Health Ministry intends to follow suit in 2007. Dr Wilson and Dr Mansoor have found that current pricing favours consumption of higher saturated-fat content foods and are calling for the New Zealand government to take "substantive action" such as regulation and taxing food containing saturated fat (foodworks.co.nz 28 February 2005). At the same time, the New Zealand Food Pyramid has been described as outdated and lacking adequate amounts of four fat-soluble nutrients – omega 3, omega 6, vitamin D and vitamin E. (Bill Shrapnel, speaking at the New Zealand Dietetic Association, September 2005). This is to be rectified by recommending a new group of "healthy fats" including margarines, vegetable oils, nuts and seeds.

I have some concerns about the restriction of saturated fat content in children's diets, with particular regard to dairy fat. A 1996 study published in the Journal of Nutrition ("Considerations about dietary fat restrictions for children", 126:1031S) states that low-fat diets for children may lead to suboptimal growth and development. Numerous studies have shown that low fat diets lead to vitamin and mineral deficiencies either because they are not consumed in adequate amounts in restricted diets or their absorption is decreased when fat intake is inadequate (Lifshitz and Moses, "Growth Failure", Am. J. Dis. Child. 1989 143:537-542 and Nicklas et al, "Nutrient adequacy of low fat intakes for children: The Bogalusa Heart Study", Pediatrics 89:221-228). Since it is now recognised that the fat soluble vitamins (such as vitamins A, D, E and K) play important roles as antioxidants, a situation that encourages their loss would be undesirable.

While vitamin deficiencies may be prevented by promoting margarines, vegetable oils, nuts and seeds, a 1998 study shows that saturated fat in the diet is needed by the body to enable it to adequately convert the essential omega-3 fatty acid to the elongated omega-3 fatty acids EPA and DHA, necessary for prostaglandin formation and visual function respectively (Gerster 1998, "Can adults adequately convert alpha-linolenic acid (18:3n-3) to eicosapentaenoic acid (20:5n-3) and docosahexaenoic acid (22:6n-3)?" *Int J Vitam Nutr Res.* 68:159-73).

Vitamin A is obtainable from vegetable sources in the form of beta-carotene. However, the most optimistic estimates state that four units of beta-carotene are required to produce one unit of Vitamin A. Infants under the age of 2 cannot convert beta-carotene into Vitamin A, and children

make the conversion very poorly. They must therefore obtain most of their Vitamin A from animal fats. (Jennings I. W., “Vitamins in Endocrine Metabolism”. Charles C. Thomas Publisher, Springfield, Illinois, 1970.)

The rationale given for restricting saturated fat is that this decreases the risk of heart disease. However, in 1992 randomised trials of cholesterol lowering failed to demonstrate a reduction in total mortality (Frank et al, “Will lowering population levels of serum cholesterol affect total mortality?” Journal of Clinical Epidemiology 1992, 45:333-346). As at 1996, there were no data to show improved outcome in children on low fat, low cholesterol diets in terms of coronary artery disease in adulthood, and these diets had been largely ineffective in reducing serum cholesterol levels over prolonged periods of time (Ramsay et al, “Dietary reduction of serum cholesterol concentration: time to think again”, British Medical Journal 1991, 303: 953-957).

The precise magnitude of the problem of growth failure associated with ingesting low fat, low cholesterol diets is not known. Lifshitz and Tarim have documented more than 300 patients with nutritional growth retardation due to adherence to health beliefs currently in vogue and recommended by the scientific community (“Nutritional dwarfing,” Curr. Prob Pediatr. 23:322-336). Namely, these patients were ingesting diets low in fat and cholesterol without junk food and/or avoiding obesity. On the other hand, it is well known that mild fat restriction may allow normal growth. Even children on vegetarian diets may do well when intake of macro- and micronutrients is monitored and provided adequately. However, it is not known that low fat, low cholesterol diets in childhood will prevent adult onset disease (Tarim et al, “Cholesterol screening and dietary intervention in childhood for prevention of adult onset cardiovascular disease” in Childhood Nutrition 1995, p13-20). The drop in serum cholesterol levels is minimal, despite all the intervention, education and monitoring that can be achieved only with a highly financed practice.

Scientists have also voiced concerns over the lack of any lower safety limit with regard to saturated fat intake. Prof. J. Bruce German at University of California in Davis, USA, states that “there is no indication that the optimal intake for overall health is easily extrapolated to mean zero saturated fat.” (“Saturated fats: what dietary intake?” American Journal of Clinical Nutrition 2004, 50:550-559). There is currently no argument that human breast milk provides the best nutrition for young infants; the breast milk of a well-fed mother supplies 53.5% of calories as fat, of which 25.8% of the calories are saturated fatty acids, 21.3% of calories are monounsaturated fatty acids, and 6.4% of calories are polyunsaturated fatty acids. If you think about it, it makes sense to expect that a two- or three-year-old should be consuming a diet that is not much different. (Dr. Mary Enig, “Know Your Fats”, p. 189). And yet the Ministry of Health is recommending that children consume reduced-fat milk from the age of 2.

It is commonly accepted that obesity is a risk factor for heart disease. McCargar et al has demonstrated that rats fed high carbohydrate diets gained more weight than those fed high fat diets. (“Influence of dietary carbohydrate to fat ratio on whole body nitrogen retention and body composition in adult rats”, Journal of Nutrition 1989, 119:1240-1245). This is consistent with the findings of Ronald Krauss of the Children's Hospital Oakland Research Institute (US), who notes

that “reduction of dietary carbohydrate appears to be of greater value for reducing cardiovascular disease risk than limiting intake of saturated fat.” (“Are Low-Fat Diets Good for Everyone? Effects of Dietary Intake on LDL Subclass Phenotype and Risk of Coronary Heart Disease”, from the proceedings of the 2004 Dairy Australia seminar).

Interestingly, the results of a nine-year Swedish study reported in The Age last month (http://www.ajcn.org/cgi/content/abstract/84/6/1481) showed that women consuming full-fat dairy products had less weight gain than those who did not (consumption of low-fat dairy products gave no such effect). On the other hand, a US study of 12,829 children showed that those who drank more than three 8-ounce servings of milk a day gained the most weight over a one-year period. Most of the children were drinking low-fat milk. The authors concluded that due to the evidence of weight gain, children should limit their intake of milk. (Rob Stein, Washington Post, June 7, 2005). . The authors did not consider the possibility that examining full-fat milk consumption might have given a different result, even though their conclusion stated that “Contrary to our hypotheses, dietary calcium and skim and 1% milk were associated with weight gain, but dairy fat was not.” (“Milk, Dairy Fat, Dietary Calcium, and Weight Gain”, The Archives of Pediatrics & Adolescent Medicine 2005, 159:543-550.)

Another recent study investigated whether consuming more dairy food might increase a person's total energy consumption, thereby countering any weight-maintaining advantage that might flow from the dairy. Two groups of eleven-year-old girls were examined: those who met their daily recommended three servings of dairy (39% of 172 subjects) and those who did not. The girls who met the dairy recommendation did indeed have a 20% higher energy intake than those who did not (2040 vs 1706 kcal/day, $p<0.001$) but had less body fat (mean BMI percentile 59 vs 67, $p<0.05$). The researchers raised the cautionary question of whether inaccurate reporting of energy intake amongst the overweight may be responsible for some of these associations. (“Girls' dairy intake, energy intake, and weight status”, J Am Diet Assoc 2006, Nov;106(11):1851-5).

Dr William P. Castelli, director of the famous Framingham study, stated that “... In Framingham... we found that the people who ate the most cholesterol, ate the most saturated fat, [and] ate the most calories, weighed the least, and were the most physically active.” (Castelli 1992, cited in Know Your Fats p78). It should be noted that this observation related to the unprocessed data; after interpreting the data to take exercise and total calorie intake into account, the study found some correlation between saturated fat intake and heart disease.

While high serum cholesterol levels are widely accepted as a risk factor for coronary artery disease, it should be kept in mind that researchers have singled out some saturated fats as less harmful. It has been demonstrated that saturated fatty acids, defined as lauric, myristic, palmitic and stearic acids, are not a uniform group in terms of hypercholesterolemic effect (Vanderveen, “Regulatory history for stearic acid”, Am. F. Clin. Nutr. 1994, 60: 983S-985S). Stearic acid, making up the largest proportion of animal fats, was found to have many benefits. Professor J. Bruce German states that “if you had a zero myristic acid and palmitic acid intake, but consumed some stearic acids, you could have a diet with a reasonable amount of saturated fat that would look metabolically like a

saturated fat-free diet." ("Saturated fats: Finding a middle ground", International News on Fats, Oils and Related Materials: INFORM, 2006, 17:631-632).
Another study noted that there is conflicting evidence regarding the hypercholesterolemic effects of lauric and palmitic acid. The results of the various studies may be confounded due to some studies using synthesised versions of the fat, rather than a naturally occurring version of the fat like in butter ("Fat high in stearic acid favorably affects blood lipids and factor VII coagulant activity in comparison with fats high in palmitic acid or high in myristic and lauric acids", The American Journal of Clinical Nutrition, 1994, 59:371).

Dairy fats are mainly made up of palmitic, myristic, stearic acids (saturated fats) and oleic acid (a monounsaturated fat). Given that stearic and oleic acids are acknowledged as beneficial, it comes as no surprise that Smedman et al noted an inverse association between consumption of milk fat and a large number of cardiovascular risk factors in 70 year old males (American Journal of Clinical Nutrition 1999, 69:22-29). More recently, the 2005 study "Milk consumption, stroke, and heart attack risk: evidence from the Caerphilly cohort of older men" (J. Epidemiol. Community Health 2005, 59:502-505) noted that the men who had consumed the most milk had a reduced risk for a vascular disease event. Low-fat milk was virtually unavailable in South Wales during the 20-year period of the study. The study does not deny that drinking milk raises blood cholesterol levels, but observes that in the study of 200,000 subjects, with 8500 vascular events, there was no corollary effect of increasing the risk of heart disease but rather, that milk had a slightly protective effect against heart disease. This effect may be due to milk's significant ability to lower blood pressure, as high blood pressure is a major contributor to heart disease.

Milk fat may also have anticarcinogenic properties. In 1994, Dr. Peter Parodi, a research scientist at the Dairy Research and Development Corporation of Australia, wrote a review of the anticarcinogenic nature of conjugated linoleic acid (CLA) in milk fat (*Austral.J.Dairy Tech.* 49:93-97,1994). Milk also contains rumenic acid, vaccenic acid, branched chain fatty acids, butyric acid, cysteine-rich whey proteins, calcium and vitamin D; all components which have the potential to help prevent breast cancer; at the very least, there is no evidence of milk consumption increasing the risk of breast cancer. ("Dairy Product Consumption and the Risk of Breast Cancer", Journal of the American College of Nutrition, 2005, Vol. 24:556S-568S).

Guideline-makers such as the Ministry of Health may seem to face the problem that dietary recommendations would become too complex if the public were aware that a base limit of saturated fat is required for good health. It has been noted that guideline-makers may believe that the recommendation mantra of "the lower the saturated fat, the better" is an important point to get across, even if the blanket recommendation might have some flaws. ("Saturated fats: Finding a middle ground", International News on Fats, Oils and Related Materials: INFORM, 2006, 17:631-632). However, allowing children an unrestricted fat intake while their bodies are growing does not complicate the message unduly. Children do not die of heart disease, but unsupervised low fat, low cholesterol diets could harm their growth. On the other hand, milk fat has anticarcinogenic properties, protects against the occurrence and symptoms of asthma and allergies, and may assist in protecting against heart disease.

Therefore, it has been recommended that no preventative action be taken unless clear evidence showing lowered risk of future heart disease is provided. At the very least, schools and doctors should be warned that low fat, low cholesterol diets must always be supervised, and appropriate counselling should be provided to ensure that the dietary intake is adequate. ("Considerations about dietary fat restrictions for children", Journal of Nutrition 1996 126:1031S).