

P I N

LIBRARY
SECRETARIAT OF THE
PACIFIC COMMUNITY



SECRETARIAT OF THE PACIFIC COMMUNITY

PACIFIC ISLANDS NUTRITION

No 39, March 1999

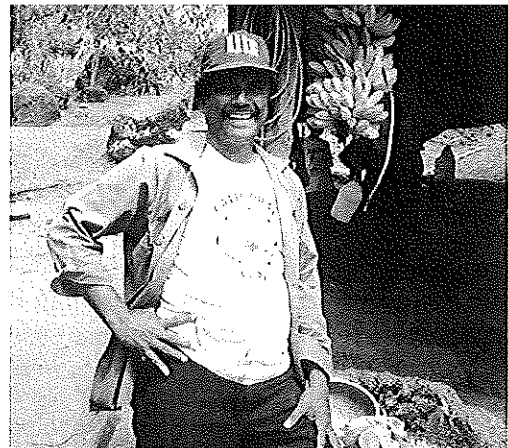
ISSN 1022-2782

A REGIONAL NEWSLETTER FOR
NUTRITIONISTS, DIETITIANS AND
NUTRITION EDUCATORS IN THE PACIFIC

*E*ditorial
MARCH

PIN Award – Health Promotion Person of the Year

It gives us great pleasure to inform readers that Mr Makato Siren, from Chuuk, Federated States of Micronesia, has been awarded the 1998 PIN Award as the Health Promotion Person of the Year. The award was presented by Dr Caleb Otto, Director of the Palau Bureau of Public Health, and the elder statesman of Health Promotion in the Pacific, at the recent SPC Regional Health Promotion meeting held in Noumea in December 1998. Mr Marcus Samo, the FSM representative at the meeting accepted the award on behalf of Mr Siren.



Mr Makat Siren, Health Promotion Person of the Year

This is the third year that the award has been presented and Mr Siren joins the illustrious company of previous winners, His Majesty King Taufa'ahau Tupou IV of Tonga and Mr Iroij Michael Kabua of the Marshall Islands. Although the award itself is just a piece of paper, we feel it symbolises the heart and spirit of those special Pacific Islanders who strive for better health of their people, communities and countries. Additionally, the award is a demonstration to others of how Pacific Island people can work together to make this part of the world a better place to live.

Mr Siren is a remarkable advocate of health and nutrition in the community in the state of Chuuk, Federated States of Micronesia. As a third-grade teacher, he first learned about the benefits of a healthy diet and home food production through the Family Food Production

IN THIS ISSUE

- Special feature: *Obesity*
- Nutrition during pregnancy: *current issues*
- Diabetes: *Indigenous diabetes awareness project for Hawaii and Pacific to begin*
- Cancer: *U.S. study finds chicken can cause cancer too*
- Meetings and events: *Nutrition Networks 1999 – Land & Sea Conference*

and Nutrition (FFPN) and Teacher Child Parent (TCP) programs, both supported by the United Nations Children's Fund, and through the introduction of new health and nutrition modules in the elementary schools. He attended FFPN and TCP workshops and he started the new classes in his room, along with the establishment of a school garden. After that, with his own family he put into action what he had learned, and worked with his community to enable them to gain the same understanding and health benefits.

In 1990, he organized the Kaeo Manau Club Association (KMCA), a club for family food production and consumption of healthy home-produced foods. Since the time of its initiation, the club has involved over 35 families and 300 people. This has all taken place on a group of remote

islands in the Faichuk area, an hour's boat ride from the main island of Weno of Chuuk. The combination of the TCP approach, using the school and the community, and the formation of the club, has helped motivate members to a greater home production and consumption of healthy foods which has led to health benefits for the whole community. A particular effort has been made with respect to eating the dark green leafy vegetable *bele*, rich in vitamin A, and the community reports that the once-serious problem of vitamin-A deficiency has now improved.

People of Chuuk know and respect Makato for his willingness to help others, his humour and fun way of going about motivating others. He has shown great initiative in using the CB radio system for communication among club members and has started a regular schedule of radio

broadcasting programs that has led to a greater understanding of health and nutrition principles and has motivated members to actually change their food habits. His design of a club for family food production in which all members are required to have some land, join in regular garden inspection visits, and share seedlings and planting material has been ingenious. His involvement in community awareness-raising events, such as the annual World Food Day has been important. Presently he is also looking at the possibilities of helping his club members sell their extra vegetable produce at the main island and he is planning to build a meeting place for club meetings, if funding can be found.

Finally, his commitment to continue with the work that has been started gives great hope for meaningful

Its time to make some changes

This edition of PIN is a little different to others, as it focuses on obesity and nutrition issues involving children. This is mainly because we have not received country reports and articles due to the Christmas break and the cyclones. All should be well for the next edition of PIN.

The nutrition priorities for SPC into the next millennium have now firmly shifted focus from nutrition deficiencies to non-communicable diseases (NCD). As a result, major initiatives have been proposed to monitor, control and prevent NCD. We all know that much NCD research has been carried out over the last 25 years in the Pacific but little has been translated into practice and action. For example, we have known for a long time that the rates of obesity have been climbing in most Pacific countries and that obesity is a real and

serious public health threat to people in the region. Many papers have been written on the subject. Experts have come from far and wide. Public awareness is at its highest. However, there have been very few country programmes (if any?) that have been successful and sustainable in reducing obesity in Pacific populations. It is no different elsewhere in the world as the Popkin-Doak article in this edition explains. Populations worldwide are gaining weight.

Similar to obesity, the rates of diabetes, hypertension, heart-disease and gout are also increasing. All these NCDs are, of course, associated, and are a product of the lives we lead. Changes in lifestyle are therefore called for. In order to make these changes and to reduce NCD rates, public education programmes about appropriate diet and exercise

are now carried out in all Pacific countries. However, while public education programmes are essential for the fight against NCD, they are not sufficient. Governments must stimulate appropriate lifestyle changes by making structural adjustments. This will require a whole range of actions in every sphere: from the establishment of community sports facilities and appropriate foods for children in school canteens to alcohol and tobacco controls and food import legislation.

It is probably our job and that of Pacific nutritionists and dietitians to provide Pacific governments with the necessary information and advice to enable them to make the necessary changes. This is the difficult part. What changes are to be made and where is the evidence that NCD rates will decline once

changes are made?

This year it is hoped that a few Pacific countries will participate in an SPC pilot project to enable communities to identify factors in their

environments that promote obesity. Once identified, the factors can be discussed at community level and collective decisions made about what to do about them. As governments reflect community needs, it is

hoped that structural changes will result from the process. It is a long-term project and really focuses on people making permanent lifestyle changes.

New SPC publication

This year will be a very busy one for the Nutrition & Lifestyle Disease Section of SPC. We will need our full complement of staff and are very pleased that Jimaima Schultz will be taking over the editorship of the PIN. Additionally, a major Pacific document will be produced.

Many readers will remember (and probably still refer to) a 1984 SPC publication entitled, *The effect of urbanisation and western diet on the health of Pacific Island populations*. Dr Terry Coyne, who compiled the publication between 1980 and 1982, has returned and is at present putting together the sequel in a

second volume, which will account for the years since then. As a pre-cursor, a series of articles about NCD and the 'Pacific nutrition transition' will be presented in further editions of the PIN starting in this edition with an update on obesity in the Pacific.

Special feature

THE OBESITY EPIDEMIC IS A WORLDWIDE PHENOMENON

Obesity has emerged as an epidemic in technologically developed countries during the past 25 years. More recently, the prevalence of obesity has begun to increase in developing and transitional societies. In fact, obesity levels in some lower-income countries are as high as or higher than those reported for the United States and other developed countries, and these levels are increasing rapidly.

Changes in the food supply and in activity patterns have been implicated as the major factors contributing to increased obesity in the West. With modern food supplies, high-fat foods have become readily available for both at-home and away-from-home consumption. Simultaneously, there have been marked shifts in physical activity patterns at work and during recreation.



Early results from the Vanuatu NCD survey show increasing obesity in urban areas. These men in rural Malekula do not have a problem.

Similar factors may also contribute to the emergence of obesity in less developed societies. The major shifts in diet that seem to be occurring on a worldwide basis in lower-income countries include a large increase in the consumption of vegetable oils, a shift away from coarser grains to more refined ones, and a shift toward a more diverse diet that includes more meats and eggs. In terms of physical activity, there have been large shifts toward much less physically demanding occupations, along with increases in the use of transportation to get to work or school, more technology in the home, and more passive use of leisure time. Rapid urbanization in developing countries, which is occurring even among low-income people, is one critical underlying cause of these

changes in diet and physical activity and the associated increases in obesity.

Trends in obesity are not limited to one region, country, racial or ethnic grouping. The highest levels of obesity in middle- and lower income countries occur in the Middle-East, Western Pacific, and Latin America. Obesity is less common in Asia, but there is evidence that its prevalence is rapidly increasing. The recent shifts in diet, physical activity, and the prevalence of overweight in China are among the most rapid ever documented.

The increase in obesity in lower-income countries has been associated with rapid increases in rates of non-insulin-dependent diabetes mellitus. Before, lower-income countries

focused exclusively on problems of undernutrition. However, since obesity is now becoming dominant, it now coexists with health problems related to undernutrition.

Policy makers must give the development of approaches to prevent obesity a higher priority. Few countries, aside from the higher-income ones, are developing resources to treat or even understand the nature of the problem. Before the world's medical systems are swamped by an epidemic of non-insulin-dependent diabetes and coronary heart disease, preventive action must be taken.

Barry M. Popkin and Colleen M. Doak. The Obesity Epidemic is a Worldwide Phenomenon [Review], Nutrition Reviews 56(4): 106-114

UPDATE ON OBESITY IN THE PACIFIC REGION

General picture of Pacific Island countries and territories and the role of the Secretariat of the Pacific Community (SPC)

The SPC is an inter-government development agency that provides technical assistance and support for its 22 Pacific Island member country and territories. SPC covers an area of over 30 million square kilometres, of which 98% is ocean. It stretches from the Northern Mariana Islands (130 degrees E) in the north to Pitcairn Island (130 degrees W) in the south; a distance of 14,000 kilometres or a third of the way around the globe.

In this area there are 7,500 islands but only 500 are inhabited (see map). The total population is 6.9 million people who between them speak a quarter of the world's languages. Often considered by Europeans as a

paradise, some Pacific Islands are hosts to some of the highest rates of non-communicable diseases (NCD) in the world. However, in other parts of the Pacific NCDs are relatively unknown. The key to understanding the NCD problem, especially the obesity epidemic, might lie here in one of the Pacific Islands.

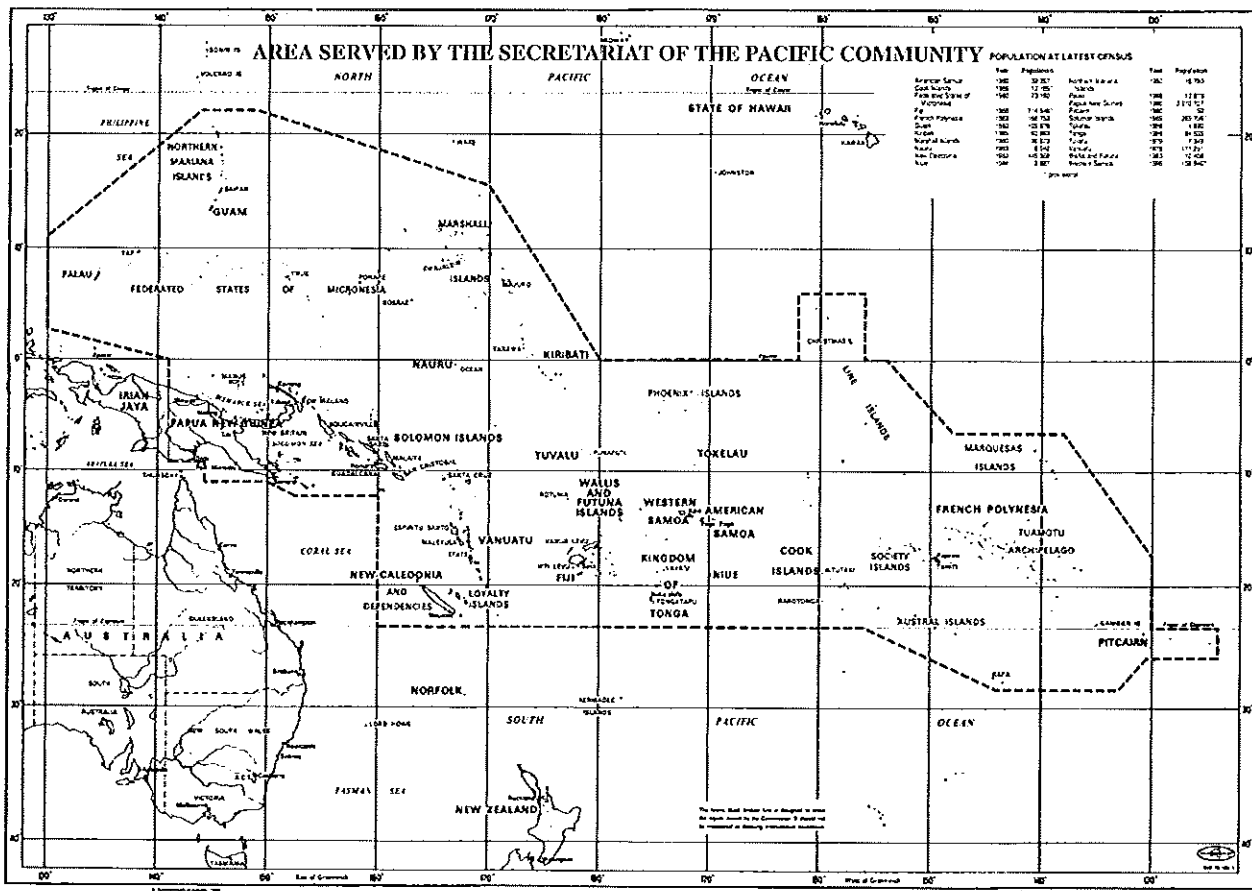
As you can imagine, it is not an easy task for SPC to cover such a large area and provide effective service for all the Pacific Islands. Fortunately, close liaisons have been formed between SPC and the UN agencies, especially WHO and UNICEF. The collaboration enjoyed by SPC and WHO has rewarded both organisations both in

terms of efficiency and effective service delivery.

Presented below is a very brief summary of the general trends in obesity across the Pacific, using data collected from various projects and programmes undertaken in Pacific Island countries.

The transition in the Pacific: general trends

What has been described as the epidemiological or nutrition transition has been occurring in the Pacific since the first contacts with western culture. The transition is associated with a shift from traditional, self-sufficient economies to the "global society" which in turn has changed



disease patterns in the Pacific from infectious diseases to non-communicable diseases, including obesity.

Countries are at different stages of the transition as can be seen in Figures 1–3, which show the supply of foods available for consumption over a 30-year time period. Food-supply figures show comprehensively the food preferences of populations and their changes over time. The influencing factors include increased technology and affluence as well as western marketing and trade.

You will notice that a significant shift has occurred during this time in the types of foods supplied – from traditional high-fibre, high-carbohydrate foods to imported high-energy, processed and refined foods. PNG displays a traditional food supply that might be recommended by nutritionists. It is also a “non-dependent” or self-sufficient food supply.

Kiribati is in transition; where once the main staple food was root crops, like in PNG, now highly refined/processed imported cereals, mainly flour and rice, are more freely available and consumed. Kiribati displays a food supply which is a mixture of traditional and imported foods; it is “in transition”.

The food-supply in French Polynesia shows all the characteristics of a developed economy. The three most commonly available foods (cereals, meat and milk) are high in energy and mostly imported. Alcoholic beverages are included in Figure 3 to illustrate that, by weight, they are the sixth most commonly available food in the country.

If there is one commonality amongst Pacific countries it would be that they are all different. In the past this biological, dietary and ethnic diversity has been their strength.

However, now it could be argued that this diversity is threatened as the food supply tends towards a state of globalisation.

Trends in Obesity

Figures 4 and 5 show the latest rates of obesity for the region. The data have been taken from surveys and studies of national statistics that took place in different years and used different methodologies. They have been collected by SPC and will be shown and referenced in the final document. These are just some of the preliminary findings. Similar to the pictures of the food supply shown in Figures 1, 2 and 3, we see that there is a wide variation between and within countries in the rates of obesity. In general we see:

- Nauru has the highest rates
- Polynesian countries (with the exception of Nauru) show the highest rates. Economically, they

Figure 1: Weight of food available PNG: 1963-94

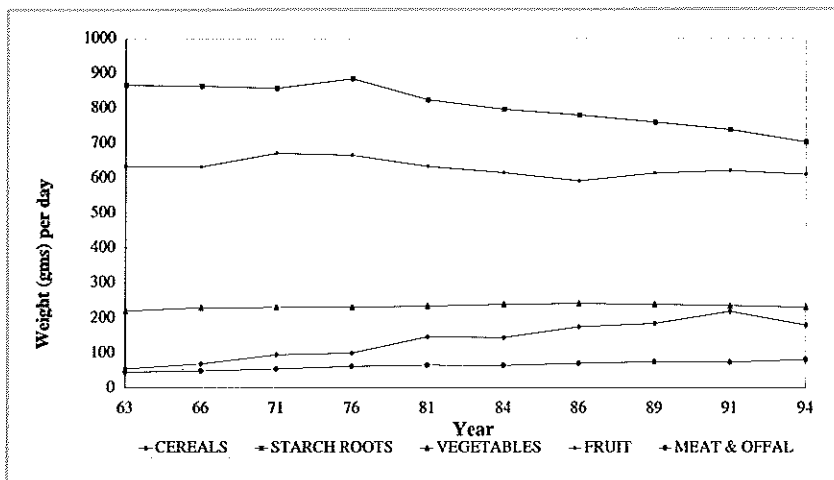


Figure 2: Weight of food available: Kiribati 1963-94

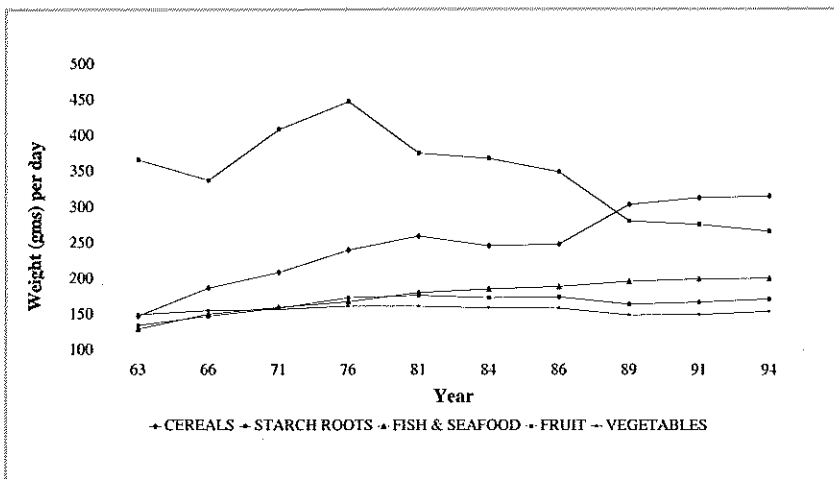
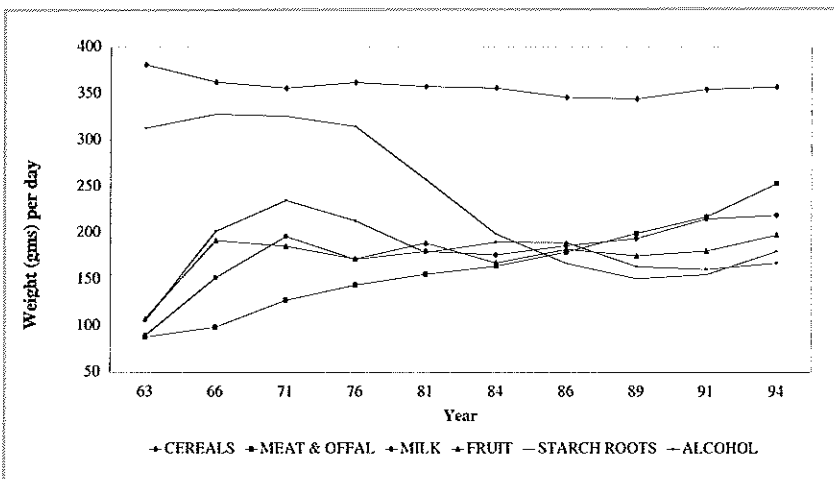


Figure 3: Weight of food available: French Polynesia 1963-94



are well developed

- The more traditional less developed economies in Melanesia and Micronesia show the lowest rates but only in rural areas. The influence of western culture is more pronounced in the cities.
- Countries with variable rates are the ones in transition or of mixed ethnicity such as Fiji.

Males have similar rates of overweight. However, females experience a higher prevalence of obesity, especially in those transition/mixed-race countries. The variations within countries with homogeneous populations correlate well with age, sex and geographic location (urban versus rural). In countries with heterogeneous (mixed race) populations we can add ethnicity as a major influence. Fiji is a good example of this.

Figure 6 shows the trend in obesity in Fiji by age group and sex. Melanesian females display the same trend as Indian females except the level of obesity is 20-30% higher in Melanesian females. Some of this difference may be explained by ethnic differences in body composition and anthropometry but not all. Men show the same trends. The general level for men is lower than females with Melanesian men experiencing higher rates than Indian men.

The variation in rates of obesity between countries shows the stage of the transition that any particular country has reached. For example PNG, Solomon Islands and Vanuatu show signs of just entering the transition, while Nauru seems to be the furthest advanced.

Figure 7 shows the levels of obesity and overweight in Vanuatu by sex in rural and urban areas. We see there is a general progression in levels of overweight and obesity from rural to urban. This is more pronounced in females. When standardised for age we see that there is still the progres-

sion from rural to urban. However, the levels are greater in females, except in urban areas, and the rate of increase of obesity is far greater than that of overweight, again, with the exception of urban areas. Factors that promote obesity are more prevalent in cities and urban areas, such as labour-saving technology, TV, public and private transport, fast food and imported high-energy foods.

If we look at the levels of obesity related to age, we see a peak around 50 years (as for Fiji) except in urban areas. The heterogeneous nature of urban areas (cities) tends to mask population differences.

To understand this we might look at Nauru, (Figure 8) which to all intents and purposes, can be described as urban. Figure 8 shows the mean BMI by age group. We see that mean BMI peaks very early, in the 20–29 age group. There is less differentiation between males and females (females still have higher BMI) and there is little change with age and throughout the years. There is little or no diversity.

The population of Nauru might have reached the limit of the transition, with 93% of the population overweight or obese and reaching their maximum weight between 20–30 years of age. Latest reports have estimated life expectancy in Nauru to be 43 years. This is yet to be confirmed, but if correct, would be a dire warning for other Pacific nations to quickly install preventive programmes.

Robert Hughes, Nutritionist/NCD Epidemiologist, Nutrition & Lifestyle Disease Section, Community Health Programme, SPC

Figure 4: Obesity in the Pacific 1998: Females

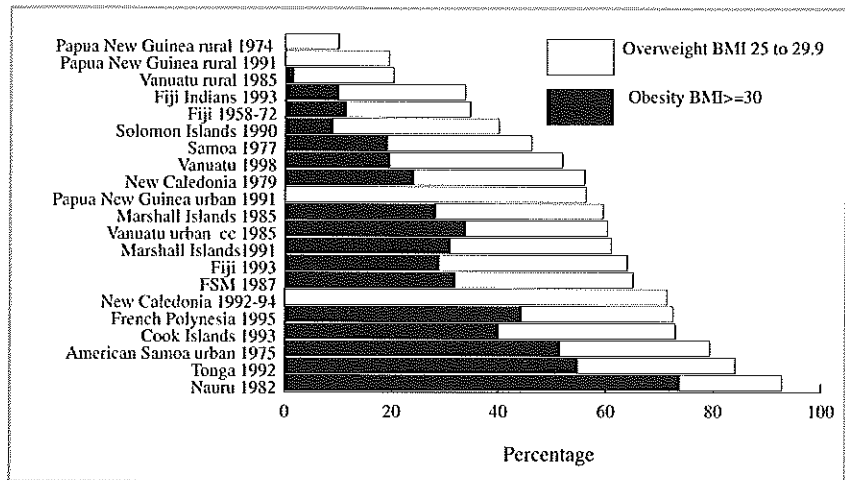


Figure 5: Obesity in the Pacific 1998: Males

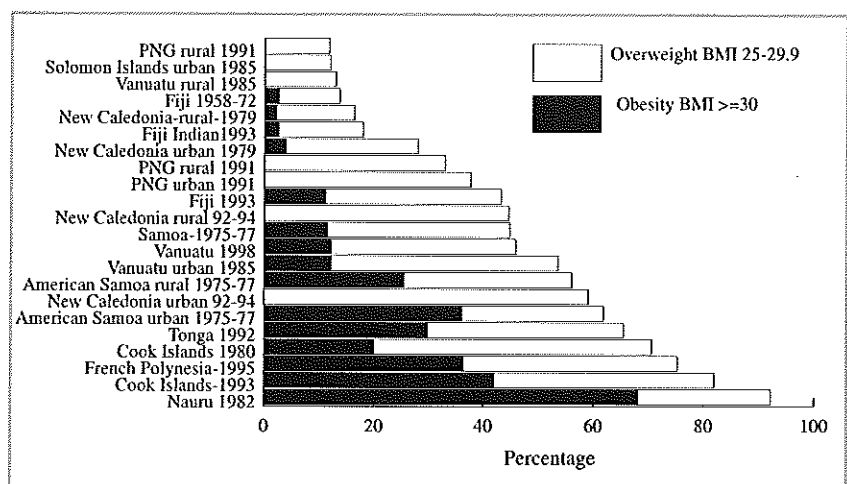


Figure 6: Obesity in Fiji by age groups: 1993

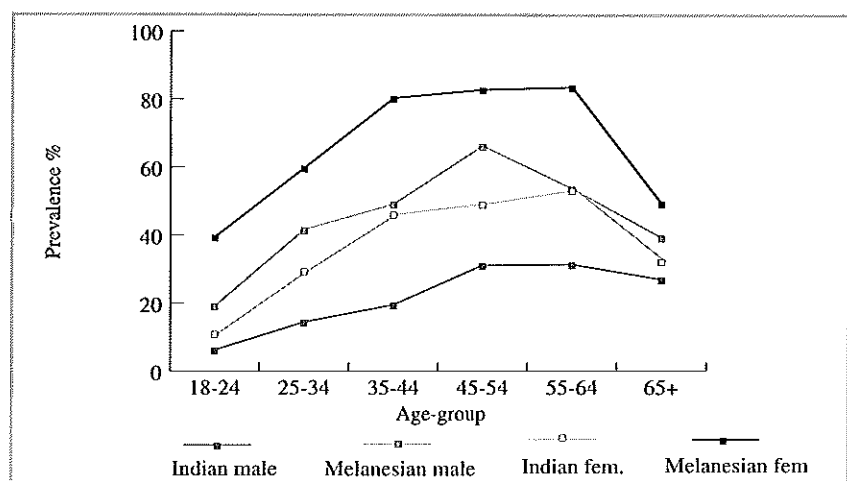


Figure 7: Obesity & overweight: Vanuatu 1998

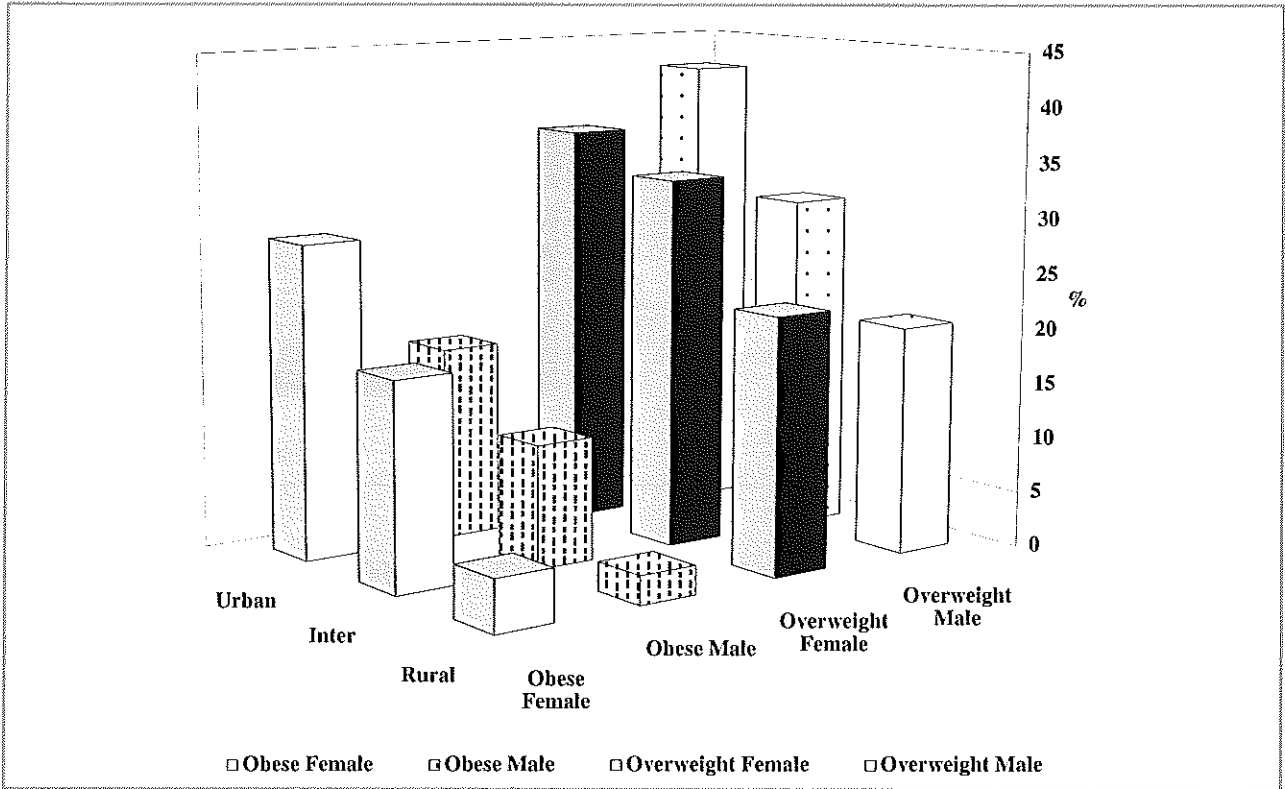
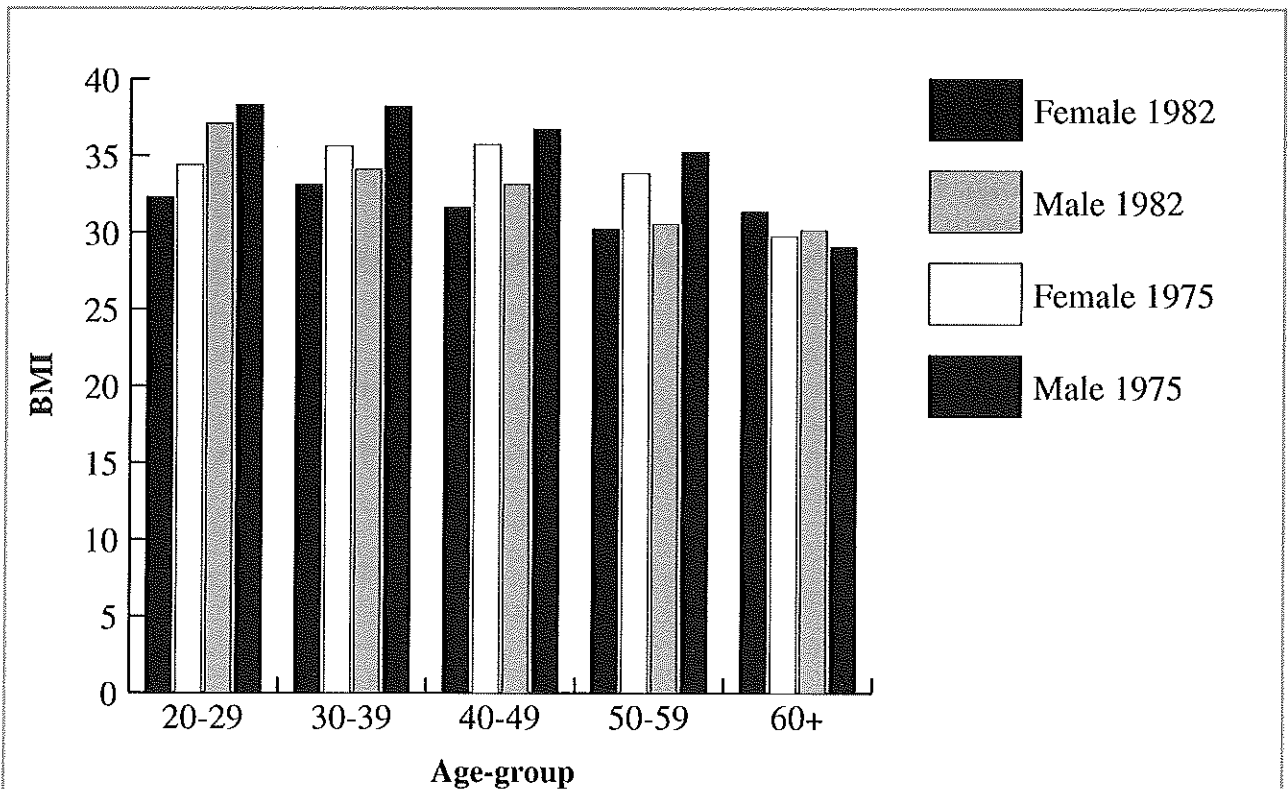


Figure 8: Mean BMI by age and sex: Nauru 1975 & 1982



How do I look?

Body size perception and preferences in some Pacific Island countries

A number of studies have reported that women in western cultures have a distorted perception of their body size and that their preference for body size is for an ultra-thin look.^{1,2,3} In studies of both men and women, females tend to overestimate body size more than males.^{4,5} This distortion of perception of body of size is thought to be associated with eating and exercise disorders and low self-esteem also more commonly found among women in western cultures.⁶

In contrast to western societies' obsession with thinness, some traditional Pacific Island cultures, regarded a large body size as being high status – representing power, wealth and attractiveness. In Tahiti and Nauru, selected individuals, usually young men and women, underwent a *fattening* process. The young adults were taken to a special place where they were fed by relatives and expended little physical activity. The main purpose of this fattening ritual was *to enhance their sexual attractiveness; to grow fat, lusty and high spirited.*⁷

Today, in many Pacific Island groups, rates of non-communicable diseases such as diabetes and cardiovascular disease are reaching epidemic proportions. Overweight, obesity and physical inactivity are all major risk factors for these western diseases. Imported energy-dense foods and labour saving devices appear to be main contributors to this cycle of obesity and lower energy expenditure. But has this western influence also brought with it a distorted perception of body size and a preference for a slim body?

Several recent studies in the Pacific have shed light on this question.

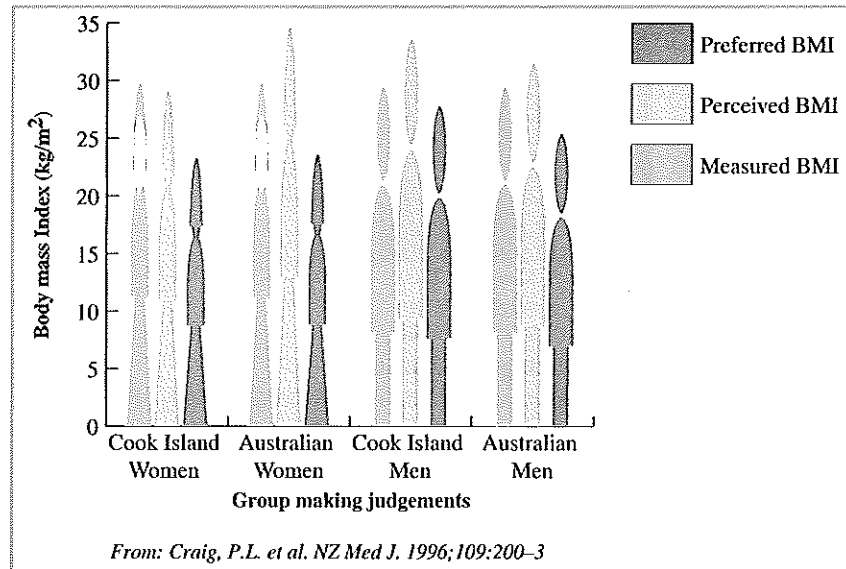


Figure 1: Measured, perceived and preferred body sizes for Cook Islanders and Australians

Cook Island adults (83 women and 49 men) in the village of Tutakimoa on the main island of Rarotonga were interviewed regarding preference and perception of body size.⁸ A sample of Australians was also interviewed – selected and matched for gender, age and Body Mass Index with the Cook Island group. A set of 10 photographs depicting varying body sizes was shown to the study participants. The photographs were produced using a distorted photographic technique that produced an alteration of the width of the image without changing the height. This technique produced photographs with images that ranged in BMI from 18.8 to 52.5 kg/m² for the male series and BMI of 17.5 to 51.3 kg/m² in the female series. A similar series with Caucasian male and female models was produced and used with Australian subjects. The study participants were asked to choose from the series of photographs which image represented their own body size (perceived) and which body size they would prefer to be (preferred).

They were also asked to identify which size they considered the most healthy and most attractive for their own sex and for the opposite sex. These were averaged to give an 'ideal' body size for each sex. Body Mass Index (BMI) was calculated for each participant based on actual weight and height measurements.

The results showed that the Cook Island women were the most accurate in identifying their current body size as seen in Figure 1. Australian women, on the other hand, significantly overestimated their body size compared with their measured BMI. Men in both ethnic groups with BMIs below 25 were also accurate in their assessment of their body size (data not shown).

Cook Island and Australian women both had similar body size preferences (BMI 23–24 kg/m²). Australian women of all sizes preferred a body size smaller than their perceived body size. Of the Cook Island women, only those with BMIs

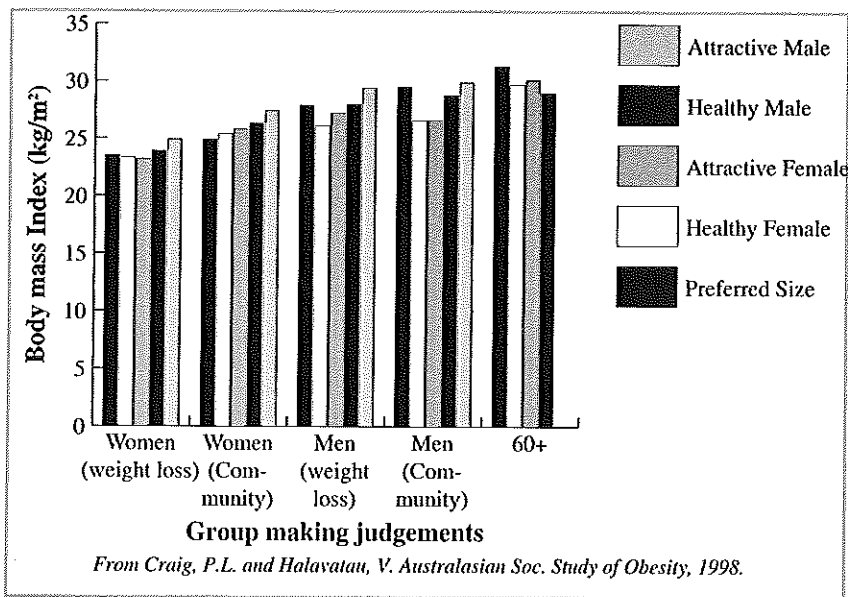


Figure 2: Ideal Body Size (BMI) for males and females for Tongans in weight loss programme and community

less than 25 were satisfied with their size. Cook Island men preferred a larger body size than Australian men (BMI 27.9 vs 25.5 kg/m²). Both male and female Cook Islanders chose larger sizes as the 'ideal' male and female bodies.

A similar survey was conducted in Tonga by the same investigators.⁹ A small group of men (n= 25) and women (n=64) involved in a weight loss programme and other men (n=217) and other women (n=233) from the Tongan community, not involved in the weight loss programme, participated in the study of perceived and preferred body size.

The women in the weight loss programme and the community women, slightly underestimated their perceived weight compared with their measured weight. The degree of underestimation was similar for both groups, indicating that the weight loss programme did not influence perception of body size to any significant degree. The men in the weight loss group, however, did significantly overestimate their perceived weight, whereas the other men did not.

When asked about healthy and attractive body sizes, the men consistently chose larger body sizes for both males and females as seen in Figure 2. The men selected an 'attractive' male body size of approximately BMI of 30 kg/m². The community women chose the 'healthy' female as having a body size close to their own preferred body size i.e. a BMI of 25. The women in the weight loss programme chose the smallest sizes for 'attractive' and 'healthy' males and females (BMIs of 23 for women and BMI 24–25 for males).

Another recent study included 160 adults from rural and urban communities in Samoa and 65 Samoans living in Auckland.¹⁰ The body size perception tool consisted of 10 ascending sized body images rated on a scale of 0 to 100 from very thin to very obese. Study participants were asked to provide a rating of their perceived current size, ideal size, most attractive size, most healthy size and the upper and lower limits of normal weight.

Perceived body size was higher among both men and women in Auckland compared with Samoa.

Actually BMIs were also higher among the Auckland group but the study did not compare perceived body size with measured body size. Samoan women in Auckland rated smaller ideal body size, smaller attractive body size, and a lower upper limit for normal weight compared with the women in Samoa. Auckland men, however, expressed a larger size for ideal body size, attractive, healthy and lower limit of normal weight compared with their Samoan counterparts.

When asked about satisfaction with health and weight most Samoans in Auckland and Samoa were generally satisfied with their health, but dissatisfied with their weight. Approximately half of both groups were moderately or strongly negative about their weight. Over half of the women in Samoa (56%) and in Auckland (66%) had attempted to lose weight within the preceding year. Approximately 58% of the men in Auckland and 43% of the men in Samoa had also attempted to lose weight.

These studies relating to body perception and body composition may highlight several important points. The preference of smaller body size as ideal and/or attractive is being adopted by several Polynesian groups, and this body size may be smaller than traditional values. This trend appears to be related to the level of westernisation and is more pronounced among females. Women may have adapted to this aspect of acculturation faster than men.

The higher ratings given to the upper limits of normal weight range by Samoans may also indicate the absence of a strongly negative view of obesity. Even though Samoans regarded their weight negatively, their views regarding their health were positive.

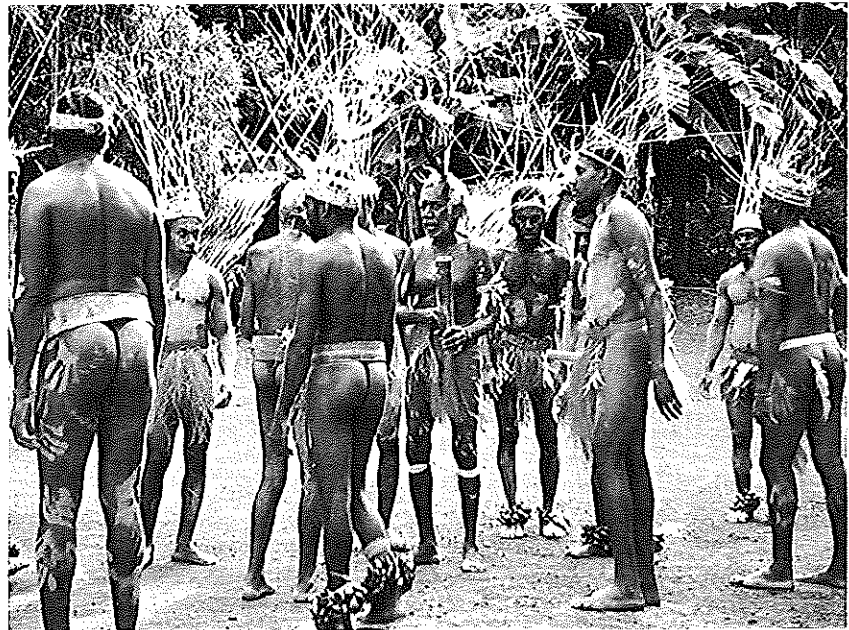
The accuracy of perception of body size, especially among Cook Island

women may reflect a positive self-body image. The trend toward a preference for the thinner ideal body size does not yet seem to be accompanied by the distorted body image so often reported among western women. This may be cause for caution, however. Lowering of preference for body size and expectations of unrealistically small body size may set in motion the development of eating- or exercise-related disorders.

The appropriateness of using western ideals for body size for Polynesians has also been questioned. Several studies have shown that for the same BMI Polynesians have lower body fat when compared with Caucasian counterparts.¹¹ For instance a Samoan man with a BMI of 30kg/m² may carry 22 kg of body fat compared with a Caucasian man of the same size who carries 28 kg of body fat. At this time, it is not clear what health risks are associated with the level of BMI among the various ethnic groups of the Pacific.

These studies may indicate that people of the Pacific may need to exercise caution in adopting values of thinness that may be unrealistic or that may diminish feelings of self-worth and self esteem—factors which may be critical in maintaining healthy lifestyle choices throughout life.

“The appropriateness of using western ideals for body size for Polynesians has also been questioned.”



What is the desirable body shape in the Pacific?

REFERENCES

1. Garner DM, Garfinkel PE, Stancer HC, Moldovsky H. Body image disturbances in anorexia nervosa and obesity. *Psychosom Med* 1976; 38: 327-35.
 2. Crisp AJ, Kalucy RS. Aspects of the perceptual disorder in anorex-

ia nervosa. *Br J Med Psychiatry* 1974; 47: 349-61.
 3. Thompson JK, Thompson C. Body size distortion and self-esteem in asymptomatic normal weight males and females. In *J Eating Disord* 1986; 5: 1061-8.
 4. Brodie DA, Slade PD, Rilely VJ. Sex differences in body image perceptions. *Perc Mot Skills* 1991; 72: 73-4.
 5. Fallon AE, Rozin P. Sex differences in perceptions of desirable body shape. *J Abnormal Psychol* 1985; 94: 102-5.
 6. Freeman RJ, Thomas CD, Solyom L, Koopman RF. Clinical and personality correlates of body size overestimation in anorexia nervosa and bulimia nervosa. In *J Eating Disord* 1985; 4: 439-56.
 7. Pollock NJ. Cultural elaborations of obesity – fattening practices in Pacific Societies. *Asia Pacific J Clin Nutr* 1995; 4: 357-60.

8. Craig PL, Swinburn BA, Matenga-Smith T, Matangi H, Vaughan G. Do Polynesians still believe that big is beautiful? Comparison of body size perceptions and preferences of Cook Islands, Maori and Australians. *N Z Med J* 1996; 109: 200-3.
 9. Craig PL, Halavatau V. Different body perceptions between weight loss participants and the community in Tonga. *Australian Society for the Study of Obesity*. (abstr) 1998.
 10. Brewis AA, McGarvey ST, Jones J, Swinburn BA. Perceptions of body size in Pacific Islanders. *Int J Obes Relat Metab Disord* 1998; 22:185-9.
 11. Swinburn BA. Using the body mass index: weigh then weigh up. *NZ Med J* 1998; 111: 377-8.

Terry Coyne, NCD Project Officer, Nutrition & Lifestyle Disease Section, Community Health Programme, SPC

OPTIMUM BODY-MASS INDEX AND MAXIMUM SEXUAL ATTRACTIVENESS



Evolutionary psychology suggests that a woman's sexual attractiveness is based on cues of reproductive potential. Researchers compared two potential cues of body shape and weight.

The conventional measure of female body shape is the waist/hip ratio, which has become a major determinant of physical attractiveness. A ratio of 0.7 (a curvaceous body) is said to be the optimum of attractiveness. The waist/hip ratio is thought to represent a fat distribution that leads to maximum fertility. However, anorexic women (who are amenorrhoeic and, therefore, infertile) can have the same waist/hip ratio as normal women, which suggests that this ratio is not a reliable measure of reproductive potential.

The researchers suggested that body-mass index is more closely related to fertility and health than waist/hip

ratio, and, therefore, should be more important in determination of sexual attractiveness. They studied the relative importance of waist/hip ratio compared with body-mass index in the determination of attractiveness among 40 male undergraduates who rated colour images of 50 women in front view. Ten women were drawn from each of the body-mass index categories: emaciated ($< 15\text{kg/m}^2$), underweight ($15\text{--}19\text{ kg/m}^2$), normal ($20\text{--}24\text{ kg/m}^2$), overweight ($25\text{--}30\text{ kg/m}^2$), and obese ($> 30\text{kg/m}^2$). Within each body-mass index category the women had various waist/hip ratios, typically ranging from 0.68–0.90. The women's heads were not visible. They presented the images randomly and the men saw the full set of images before they rated them.

They used multiple polynomial regression to model the contributions of body-mass index and

waist/hip ratio to the prediction of attractiveness ratings, with adjustment for the women's ages. Body-mass index accounted for 73.5% of variance, whereas waist/hip ratio accounted for only 1.8%. Waist/hip ratio correlated poorly with attractiveness, whereas even small changes in body-mass index radically altered the attractiveness rating. Further analyses included other body-shape dimensions, including waist/bust ratio (upper-body shape), bust/hip ratio (degree to which the body has "hourglass" shape), and the leg length/torso length ratio. None of these contributed significantly to attractiveness ratings more than body-mass index and waist/hip ratio alone.

Previous studies have asked participants to rate line drawings of female figures with various waist/hip ratios. Such studies have, however, failed to control for the alteration in apparent body-mass index with narrower or wide waists. With images of real women, body-mass index and waist/hip ratio are known and their effects can be estimated separately. In these conditions, body-mass index emerges as the major factor in determining sexual attractiveness, since it is a good predictor of health and reproductive potential.

*Adapted from:
Tovee MJ, Reinhardt S, Emery JL,
Cornelissen PL,
Optimum body-mass index and maximum sexual attractiveness, Lancet
1998; 352: 548.*

Screening for type-2 diabetes in children: should it be carried out in the Pacific?

The numbers of cases of type-2 diabetes among aboriginal children in Canada is increasing. There is strong evidence that this increase is due to increased case finding and decreasing age of onset in high-risk populations. The longer duration of the disease increases the likelihood of complications occurring earlier. Prevalence and age-of-onset data must be collected to develop rational population-based screening programme for the earlier detection and intervention.

Researchers carried out a cross-sectional survey of schoolchildren aged 4–19 years of anthropometry and fasting serum concentrations of glucose and insulin during 1996–97 in a remote Ojibwa-Cree Community in Northern Canada at the request of the community for a diabetes screening programme. Of the 873 children registered at the school, 717 (82%) had standing height, weight, fasting serum glucose and insulin measured following the American Diabetes Association diagnostic criteria (fasting blood glucose > 7.0 mmol/L for diabetes, and 6.0–6.9 mmol/L for impaired fasting glucose).

Six new cases of diabetes were females, all were symptom-free, unrelated, and aged 8–17 years. Fasting serum glucose concentrations ranged from 7.1 mmol/L to 11 mmol/L, and fasting insulin concentrations from 60–670 pmol/L (mean 237.5 pmol/L). All these children were obese with a body-mass index higher than the 75th percentile for age. Together with the two girls aged 11 years and 14 years who had been previously diagnosed and confirmed with diabetes, the total prevalence of diabetes among children aged 4–19 years was 1.1%, with a female/male ratio of 8.0. Only one

child was younger than 10 years and, thus, for girls aged 10–19 years, the prevalence of diabetes was 3.6%. This finding is similar to the prevalence of 4% reported for adolescent girls aged 10–19 years in another northern Ojibwa-Cree population in Canada. The six girls with new-onset diabetes did not require insulin or develop ketosis during 12–24 months of the follow-up. 19 (2.7%) of the 717 children had impaired fasting glucose with fasting serum glucose of 6.1–6.9 mmol/L. The male/female ratio was 1.4:1.0. The mean fasting insulin concentration was also higher than that for the normoglycaemic children (212.6 vs 81.3 pmol/L).

The distribution of fasting serum glucose and insulin concentrations was unimodal but skewed with a long tail consisting of a small number of children with high values. Among normoglycaemic children, girls had higher fasting insulin concentrations than boys.

The prevalence of obesity among children in the community studied was 48% for girls and 51% for boys, which exceeds the 90th percentile of the NHANES 1 age-sex reference values for body mass index. Of particular concern is that 33% of girls and 35% of boys in this population exceeded the 95th percentile.

Rapid social change occurred in the past three decades in this and many



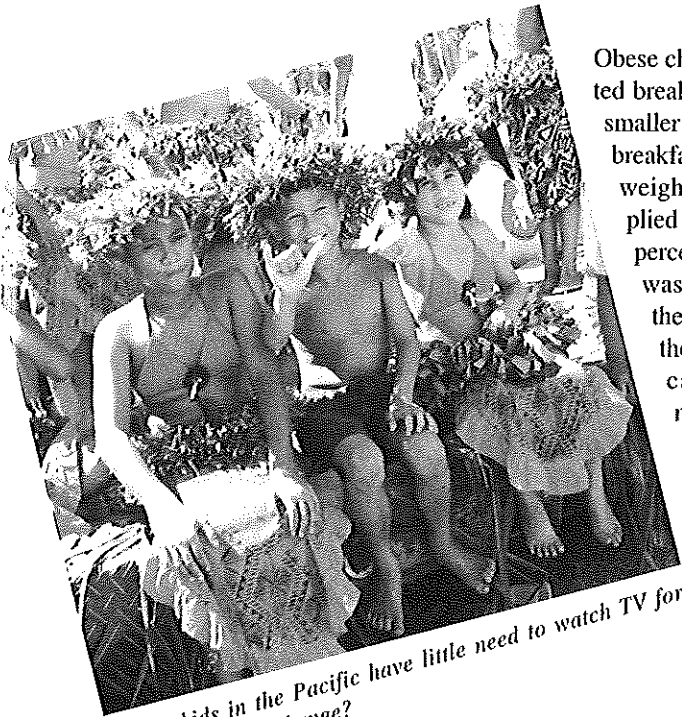
Diabetes screening for Pacific children. How feasible is it?

other northern Canadian communities, with increased reliance on store-bought food and decreased physical activity. Consequently, the prevalence of obesity and diabetes in adults has increased. Our results show that children should be included in diabetes-screening programmes in high-risk populations.

An optimum lower age for type-2 screening needs to be defined. 15% of children with new-onset diabetes have been shown to be younger than 10 years at diagnosis. We recommend that screening endorsed by aboriginal communities should include all people aged 7 years and older.

*Adapted from:
Dean HJ, Kue Young T, Flett B,
Wood-Steimen P. Screening for type-2
diabetes in aboriginal children in
northern Canada.
Lancet 1998;352: 1523*

BREAKFAST HABITS OF OVERWEIGHT CHILDREN



Active kids in the Pacific have little need to watch TV for hours, but will it change?

Obese children, especially girls, omitted breakfast more frequently and ate smaller amounts of grain products at breakfast, in comparison to normal-weight children. The energy supplied by breakfast, measured as a percentage of energy expenditure, was lower in the obese than in the normal-weight children, and their breakfasts were lower in carbohydrates, thiamin, niacin, vitamin B6, vitamin D, and iron.

The results of this study indicate that obese children have less satisfactory breakfast habits than normal-weight children do. To some extent, this may reflect the

poorer overall quality of the diets of the overweight subjects. It is also possible, however, that an inadequate breakfast may contribute to the making of poorer food choices throughout the rest of the day, thereby promoting obesity. Since better breakfast habits have been associated with better overall diets, it is desirable to promote and facilitate the eating of adequate breakfasts by schoolchildren, especially those who are overweight.

Previous studies have shown that the diets of obese people are less nutritionally sound than those of normal-weight people, and that they omit breakfast more frequently, as well as eating less nutritious breakfasts. The study summarized here, which was conducted in Madrid, investigated the breakfast habits of overweight or obese Spanish school children compared with those of normal weight. Since both early eating habits and early obesity may persist into adulthood, the relationships between dietary habits and body weight during the school years may be of life-long significance.

The researchers studied 200 children, aged 9–13 years, who completed seven-day food records. The subjects were classified as obese/overweight (body-mass index above the 75th percentile) or normal weight (body-mass index equal to or below the 75th percentile).

Rosa Maria Ortega, Ana Maria Requejo, Ana Maria Lopez-Sobaler et al., Differences in the Breakfast Habits of Overweight/Obese and Normal Weight Schoolchildren, International J Vitamin and Nutrition Research 68(2): 125–132 (1998)

Additional reading

The causes and health consequences of obesity in children and adolescents,

Pediatrics 101 (3, Supplement) : 497–574 (Mar. 1998)

James O. Hill and Frederick L.

Trowbridge, coeditors.

Review sponsored by the International Life Sciences Institute.



Breakfast, Cognition, and School Learning,

American J Clinical Nutrition 67

(4, Supplement): 743S–813S (Apr. 1998)

Ernesto Pollitt, guest scientific editor.

Proceedings

of a symposium

held in Napa, California,

August 28–30, 1995.

CHILDHOOD AND ADOLESCENT OBESITY, ACTIVITY AND TELEVISION

The prevalence of obesity has increased substantially in recent years, both in Western societies and in some developing and newly industrialized countries. This trend is evident in children as well as adults. Although obesity has underlying genetic causes, which may explain about 50% of the variation in body weight, the dramatic recent increase must be due to behavioral factors rather than genetics.

Long-term studies of obese children have shown that the degree of obesity in the family and the degree of overweight at puberty are the two most important predictors of body weight in adulthood. The risk for adult overweight is about twice as great for individuals who were overweight as children compared with those who were of normal weight. The persistence of overweight seems to be greatest for extreme overweight and for overweight which continues through late adolescence.

A long-term follow-up study of Harvard University alumni has indicated that individuals who were overweight in adolescence have excess mortality from all causes and specifically from coronary heart disease. Other studies have also demonstrated associations between overweight in childhood and adult morbidity and mortality.

Common complications of obesity in childhood include psychosocial problems, hyperlipidemia, hepatic steatosis, abnormal carbohydrate metabolism, and the persistence of obesity into adulthood. Rare complications include orthopedic problems, sleep apnea, pseudotumor cerebri, polycystic ovaries, cholelithiasis, and hypertension.

Several studies have linked television viewing with obesity in children. It has been proposed that television viewing may both reduce spontaneous activity levels and promote food intake. Physical activity is reduced because television viewing replaces more active pursuits. Food intake tends to increase because television viewing stimulates snacking and because most of the foods advertised on television are high in calories.

***“The risk for adult
overweight is about
twice as great for
individuals who
were overweight as
children compared
with those who were
of normal weight.”***

Treatment of obese young children can cause growth and health problems. Weight maintenance during growth, rather than weight loss, is generally the most appropriate treatment strategy for prepubertal children.

The treatment principles for obese children are basically the same as those for adults – energy restriction or increased physical activity. However, children, unlike adults,

require energy not only for weight maintenance but also for growth. Therefore, it is often felt that increased physical activity is a better strategy than reduced energy intake, which might have a negative effect on normal growth. Some of the best long-term treatment results have been observed in programs that include behaviour modification and family involvement, along with exercise. There has been little experience with drug or surgical treatment of obese children. Clearly, if drug treatment is considered, it will need extreme caution and specialist supervision. Surgical treatment is generally regarded as a last resort for use only in extreme cases, and even then it has not met with much success.

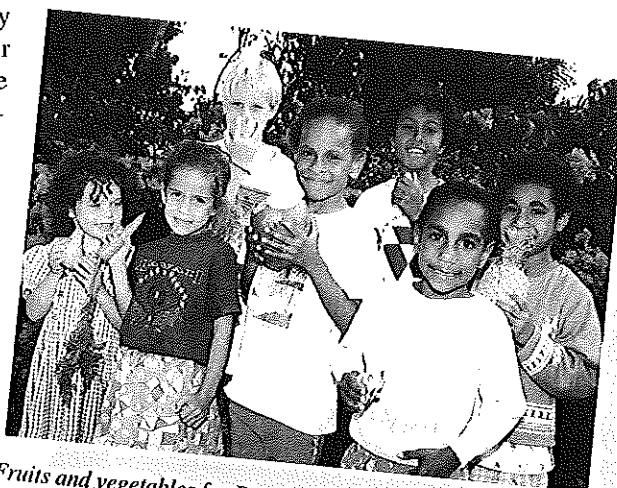
Few systematic studies of treatment strategies for childhood obesity have been conducted. There is a need for additional research in this area. In addition, according to the reviewer, it is essential to promote a respectful view of the obese child in society and among the health professions. “Obesity is such a multifactorial disease that it is obvious that psychosocial aspects are important trigger mechanisms in many cases. Numerous studies convincingly demonstrate that obese children and adolescents are stigmatized from early age onwards into adulthood. Nobody in the Western world – whether child or adult – actively strives to become obese and those who develop this unfortunate condition deserve the support and not the scorn of the medical profession”.

S.Rössner, Childhood Obesity and Adulthood Consequences, Acta Paediatrica 87(1):1–5 (Jan. 1998)

PREDICTORS OF OVERWEIGHT IN SCHOOL CHILDREN

Obesity is a critically important risk factor for chronic diseases in the United States. Its prevalence is increasing in both children and adults. Obesity in childhood may be especially important because it tends to persist into adulthood. The report summarized here, which was derived from a study conducted at 96 elementary schools in four parts of the United States (California, Louisiana, Minnesota, and Texas), attempted to identify factors that predict the risk of overweight in an ethnically diverse group of children and to determine whether overweight in childhood is associated with an adverse cardiovascular risk profile.

Height, weight, and triceps skinfold thickness of 5106 students were measured at age 9 and again at age 11. The strongest predictor of overweight (or overfatness as measured by skinfold thickness) at age 11 was



Fruits and vegetables for Pacific kids – a challenge for parents

overweight or overfatness at age 9. African-American race and male sex also showed significant independent associations with overweight. Children in the overweight group (above the 85th percentile for body mass index) had significantly higher means for total blood cholesterol and apolipoprotein B, lower mean high-density lipoprotein (HDL) cholesterol, and lower performance on a nine-minute run than those in lower weight groups.

The results of this study indicate that overweight in childhood is an important predictor of continued overweight as the child grows older and is associated with poorer results on several indicators of cardiovascular risk. "It is possible, even in primary school, to identify a group of children at high risk with respect to both later overweight and overfatness and who are likely to have other cardiovascular risk factors".

Johanna T. Dywer, Elaine J. Stone, Minhua Yang et al. for the Child and Adolescent Trial for Cardiovascular Health Collaborative Research Group, Predictors of Overweight and Overfatness, in a Multiethnic Pediatric Population, American J Clinical Nutrition 67 (4): 602-610 (Apr 1998)

FOOD CONSUMPTION PATTERNS OF NEW YORK SCHOOLCHILDREN

Current official dietary recommendations, such as the Dietary Guidelines for Americans, the Food Guide Pyramid (FGP), and the recommendations of the 5 A Day for Better Health Program (5 A Day), are intended for children aged two years and older, as well as adults. Previous studies have indicated that elementary school-age children do not meet these recommendations.

Typically, they tend to consume fewer fruits and vegetables and more fat and energy than recommended for good health and weight maintenance.

This study compared the actual dietary intakes (as determined by a household questionnaire and 24-hour dietary recall) of 693 second and fifth-grade children with the FGP

and 5 A day recommendations. The children were students at public and private schools in New York City; 38% were black; 34% Hispanic; 19% white, and 8% Asian. Data were collected during the 1989-90 school year, as part of a larger dental health study.

Children consumed fewer than the recommended number of daily FGP

servings, on average, for grains, vegetables, and fruit, but met the recommendations for meat and dairy products. Compared with a maximum of 50, the mean FGP index score was 29.2 for second graders and 30.4 for fifth graders. The mean 5 A Day consumption score was 3.4 and 3.6 servings of fruits and vegetables for second and fifth graders, respectively.

Second graders from low socioeconomic status households consumed significantly fewer foods from the FGP fats, oils, and sweets group, compared with children from higher socioeconomic status households. Fifth graders from low socioeconomic

status households had significantly higher mean FGP and 5 A Day index scores. Black non-Hispanic fifth graders scored significantly better on both the FGP and 5 A Day indexes compared to others. All of these differences appeared to be at least partially mediated by participation in the school lunch program. Gender did not significantly affect food consumption. Meal skipping and consumption of meals prepared by the child itself or by another child were associated with poorer scores on the dietary indexes.

These findings indicate that New York City school children are not meeting the USDA and National

Cancer Institute dietary recommendations. "Knowledge and skills training are needed to improve food consumption patterns as children consume foods away from home and as they take on greater responsibility for meal preparation and food selection".

Thomas A. Melnik, Sandra J. Rhoades, Kathleen R. Wales, Catherine Cowell, and Wendy S. Wolfe, *Food Consumption Patterns of Elementary Schoolchildren in New York City, J American Dietetic Assoc 98 (2):159-164 (Feb 1998).*

Pregnancy

NUTRITION DURING PREGNANCY: CURRENT ISSUES

Several current topics concerning nutrition during pregnancy are discussed in a brief review in the *European Journal of Obstetrics and Gynecology*.

Disagreements on Recommended Intakes.

Most countries have issued recommended dietary intakes for pregnant women. Surprisingly, there are large differences in the recommendations for different countries. The reviewer regards these differences as "unacceptable" because metabolic studies do not support them. There is an urgent need to resolve the differences and provide more consistent guidance for pregnant women.

Energy Intakes.

Recent research has shown that energy intakes of women during pregnancy increase very little. Apparently, women in western soci-

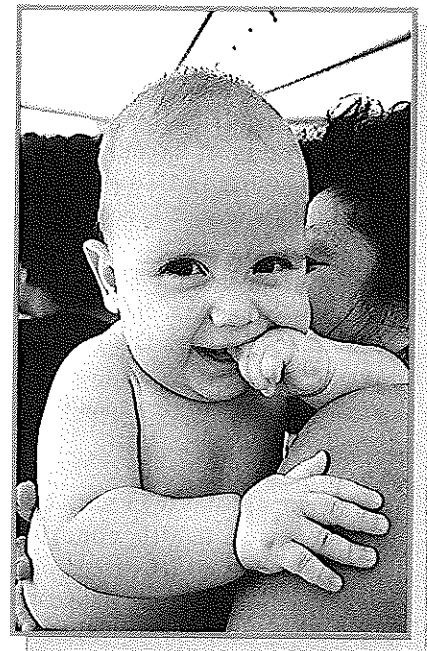
eties do not eat more during pregnancy because they significantly reduce their physical activity levels. This decrease in activity evidently secures the necessary energy. It is unclear, however, whether such "relative" reduced energy intake also secures adequate supplies of nutrients during pregnancy.

Essential Fatty Acids.

The need of infants for essential fatty acids is a focus of much current research. Additional research is needed on the essential fatty acid needs of the fetus and the effects of fatty acids on growth retardation and visual function.

Vitamin A.

Excessive intakes of vitamin A in early pregnancy may increase the risk of congenital anomalies. Recent scientific findings tend to support the 1994 recommendations of the



Every mother's wish— a happy, healthy baby

Netherlands Nutrition Council and Health Council that daily intakes of vitamin A in the first months of pregnancy should not exceed 3000µg/day and that teratogenic harm cannot be excluded at intakes above 7500µg/day.

Folic Acid.

It is well established that increasing women's intake of folic acid, through supplementation or food fortification, reduces their risk of bearing a child with a neural tube defect. Several research programs are now attempting to determine whether adequate folic acid levels in the blood can also be achieved by specific dietary and food recommenda-

tions instead of supplementation or fortification.

Iron.

Iron deficiency anemia in pregnancy is still prevalent and should be treated. This general policy is meant to protect the health of both the mother and the fetus. There is growing evidence that weekly iron supplementation may be as effective as daily dosing and that it may benefit pregnant women by reducing side effects such as constipation.

The Barker Hypothesis.

Barker and colleagues at the University of Southampton have hypothesized that coronary heart dis-

ease and other chronic adult diseases have their origin in fetal and infant life. Their studies show an association between low birth weight and higher coronary heart disease risk. Further research is needed to confirm this hypothesis and learn about possible metabolic pathways for such an effect.

Nutrition Research Newsletter.

Vol. XVII, No. 4, Apr. 1998.

on an original article by:

Joseph G.A.J. Hautvast, Adequate Nutrition in Pregnancy Does Matter, European J Obstetrics and Gynecology 75 (1): 33-35 (Dec 1997)

Diabetes

Indigenous diabetes awareness project for Hawaii and Pacific to begin

The US Centre for Disease Control is funding a five-year, 2.1 million US dollar diabetes-awareness project targeting the at-risk populations in Hawaii and the US-associated Pacific Island nations.

The project, named The Pacific Diabetes Resource Centre, will be administered by Papa Ola Lokahi, a Honolulu-based advocacy group that oversees the Native Hawaiian Health Care System.

The Centre's goal is to create a community-based health education model for the prevention and management of diabetes for indigenous populations in the Pacific region.

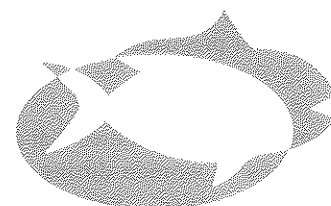
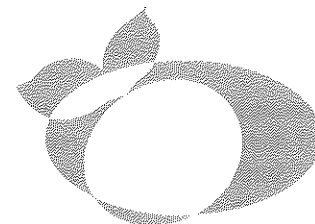
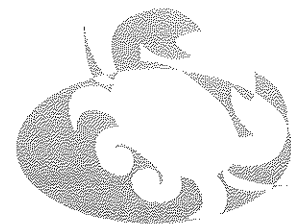
To accomplish this, an advisory committee will be established to encourage people with diabetes, health-care workers, and community

leaders to report on their experiences with the disease. The committee then will review that information and map out the best possible solutions to curb the epidemic in the Pacific.

The final phase of the project will be to bring this plan to the communities, to get new diabetes preventative and management programs off the ground.

The project's training centres and offices will be based in Honolulu and Kolonia, Pohnpei, in the Federated States of Micronesia. The project program manager is James Rarick, who says native populations have a four-to-five times greater chance of developing diabetes than non-indigenous peoples in the Pacific.

HONOLULU (Pacnews)



U.S. study finds chicken can cause cancer too

People who have quit eating steaks for health reasons but still eat chicken and fish may still have a higher risk of colon cancer, researchers say. They said so-called "white" meat is no less likely to cause cancer than "red" meat.¹ But the more peas and beans a person eats, the lower the risk of colon cancer, they found. "There is evidence of an excess risk of colon cancer for higher intakes of both red meat and white meat," Dr Pramil Singh and Dr Gary Fraser of the Center for Health Research at Loma Linda University in California wrote in the latest issue of the *American Journal of Epidemiology*. "The strongest (food-related) risk factor... was found for total meat intake," they added. Genetic makeup can also affect a person's risk of colon cancer.

Singh and Fraser used information from the Adventist Health Study, which examines the health of 34,000 Seventh Day Adventists. They are supposed to follow a largely vegetarian diet, but many sometimes eat meat.

Between 1977 and 1982 they found 157 cases of colon cancer in this group. Colon cancer is the second most common cause of cancer death in the United States, after lung cancer. People who said they ate red meat once a week had a 38 percent higher risk of colon cancer than those who ate no meat. People who

reported sometimes eating white meat had a 55 percent higher risk of colon cancer compared with vegetarians. The more meat the Adventists ate, the higher their risk. People who ate red or white meat four times a week or more had up to twice the risk of colon cancer.

Singh and Fraser said they did not know why meat had this effect, but diets high in fat and meat, and low in fruits, vegetables and fiber, have been linked to several forms of cancer, including colon cancer. Several teams of researchers have found that cooking red meat produces chemicals known as heterocyclic aromatic amines, which have been found to cause tumors in rats and mice. Last year the

American Institute for Cancer Research and the World Cancer Research Fund estimated that as many as 4 million cases of cancer worldwide could be prevented every year if people ate less meat and more vegetables.

The World Health Organization agrees people should cut back on meat and eat more fruits and vegetables to avoid cancer. A 1996 study found that heavy consumption of animal fat, saturated and mono-unsaturated fat and red meat was associated with the development of non-Hodgkin lymphoma in women.

*Reuters WASHINGTON - Monday
19 October 1998*

The World Health Organization agrees people should cut back on meat and eat more fruits and vegetables to avoid cancer.

High Vitamin A Intake Increases Hip Fracture Risk

Excess vitamin A is known to cause bone fragility and spontaneous fractures in laboratory animals. This study assessed whether dietary intake of vitamin A accounts for high hip fracture rates in Scandinavia.

Investigators identified 247 women with hip fractures and 973 age-matched controls from a Swedish cohort enrolled in a mammography study and assessed vitamin A intake by dietary questionnaire; the primary dietary sources were cod liver oil and fortified milk products. The analysis controlled for other osteoporosis risk factors, including physical activity, body mass index, smoking, hormone therapy, previous fractures, and menopausal status.

Hip fracture risk increased with high vitamin A intake. For intake >1.5 mg/d, compared with <0.5 mg/d, the odds ratio for hip fracture was 1.95 (95% CI 1.11 to 3.43) in univariate analysis, and 2.05 (CI 1.05 to 3.98) in multivariate analysis. A cross-sectional study confirmed an inverse relation between bone density and vitamin A intake in these women.

Comment: This study indicates that excessive vitamin A intake can contribute to hip fracture risk and is a reminder that policies related to vitamin use and food fortification must take into account potential harms as well as benefits. Clinicians should query their patients about supplement use and warn them about possible harm resulting from overuse.

Journal Watch: Women's Health, December 1998, Vol. 3, No. 12. Massachusetts Medical Society, 1998

Eating Well While I'm Pregnant

- ✓ eat the right foods to stay healthy while you're pregnant and afterwards
- ✓ look after yourself so that you grow a healthy baby
- ✓ keep fit while you're pregnant

Breastmilk is Best

- ✓ eat the right foods to stay healthy

- ✓ while you're breastfeeding
- ✓ how to breastfeed correctly
- ✓ the benefits of breastfeeding and expressing
- ✓ how to keep fit

Starting My Baby On Solids

- ✓ how to tell when your baby is ready for solids
- ✓ which solids to give your baby at

4 – 6 months, at 7 months and at 8 – 9 months

- ✓ how to prepare and cook your baby's food
- ✓ teething

The cost is NZ\$25 from Pacific Islands Heartbeat, The Heart Foundation, P.O. Box 17 – 160 Greenlane, Auckland 1130, New Zealand

Nutrition Networks 1999 – Land & Sea Conference Cairns, Tropical North Queensland 4–6 August 1999

The Nutrition Networks' 99 Conference Management Committee would like to invite people working in Food and Nutrition to come to Cairns from 4–6 August 1999 for the 6th Nutrition Networks conference. Food and Nutrition workers will come together to share knowledge and skills and to look at new ways to deliver Food and Nutrition health services.

The conference is hosted by the Edward Koch Foundation and promises to be a fun and informative event that takes a new approach to the ways Food and Nutrition affects the lives of indigenous people in rural and urban places. The theme for Nutrition Networks '99 will be 'Land and Sea'.

The program for the conference is being decided by an Indigenous Management Committee, which is calling for contributions from people at all levels of Food and Nutrition Health Services. You may have success stories to share of programs that are working well in your area or stories that highlight barriers to delivering messages to your community.

Nutrition Networks '99 Aim

To enable indigenous people working in Food and Nutrition to support, share and listen to each other and develop new approaches to Food and Nutrition, in a fun and holistic way.

Objectives:

- ✓ To develop and encourage self-confidence and self-reliance in Food and Nutrition workers so they can initiate and sustain programs/projects.
- ✓ To foster partnerships between government and non-government, and community and individuals in addressing Food and Nutrition issues.
- ✓ To raise awareness of Food and Nutrition issues so they become a priority for community, government and non-government at all levels.
- ✓ To foster better communications networks for indigenous people working in Food and Nutrition across Australia and internationally.
- ✓ To assess existing strategies and devise new strategies to deal with Food and Nutrition issues.

Expected Outcomes:

- ✓ Indigenous people taking control of Food and Nutrition issues.
- ✓ Improved communication networks for stakeholders.
- ✓ Conference report for distribution to delegates, funding bodies and relevant government departments.
- ✓ The development of a newsletter and Website (which may be administered by successive Nutrition Networks Management Committees).
- ✓ New and improved Food and Nutrition strategies.
- ✓ Increased participation by indigenous people in Food and Nutrition at a community level.

For more information please contact MaryBeth Gundrum, Conference Coordinator on 0740 310 206;

Fax: 0740 310 744.

Address:

P.O. Box 2964,
Cairns 4870 or
e-mail: nutritionnet@northnet.au

© Copyright Secretariat of the Pacific Community 1999

The SPC authorises reproduction of this material, whole or in any part, in any form, provided that appropriate acknowledgement is given. The opinions expressed in this newsletter are not necessarily those of the SPC.

Original text: English. Please note that articles from Micronesia and the US retain American spelling.

Design: Patricia Martin; Illustrations: Jipé Lebars; Layout: Muriel Borderie; Editing: Sarah Langi, SPC Publications section.

Produced by Robert Hughes, Community Health Programme. Funded by the United Nations Development Programme through the Household Food Security Project.

SPC, B.P. D5, 98848 Noumea Cedex, New Caledonia

Telephone: +687 26.20.00, Facsimile: +687 26.38.18, E-mail: roberth@spc.org.nc, Web site: <http://www.spc.org.nc>