Non-sustained weight loss and metabolic improvement following a VLED regimen
Sarah E King, Janet M Bryson, Catherine M Burns, Louise A Baur, Soji Swaraj and Ian D Caterson
Dept of Endocrinology, Royal Prince Alfred Hospital, Camperdown, NSW 2050 Australia

Obesity, in particular central obesity, is a complex clinical disorder commonly associated with hypertension, hyperinsulinaemia, dyslipidaemia and increased risk of cardiovascular disease. The effects of a Very Low Energy Diet (VLED)-induced weight loss on these obesity-linked abnormalities was investigated.

Eleven non-diabetic clinically obese subjects (7M, 4F) followed a VLED for 12 weeks or until body weight was decreased by 10-15%. Basal metabolic rate (BMRR), sagittal depth (SD), blood pressure (BP), lipid profiles and fasting insulin were assessed before and immediately after the diet regime and where possible 9-12 months after completion of the VLED. There was no contact with the subjects during this period.

None of the significant improvements seen post VLED were significantly different to pre VLED levels at follow up. The degree of change in the metabolic parameters was related to the amount of weight regain. VLEDs are efficient at producing rapid weight loss and improvements in risk factors associated with obesity. However, subsequent weight gain, accompanied by loss of these benefits, suggests ongoing consultations could be important for weight maintenance.

<table>
<thead>
<tr>
<th>Pre</th>
<th>Post Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>11.0±1 11 5.7</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>118.0±4.3 103.5±4.3 113.5±6.3</td>
</tr>
<tr>
<td>BMRR (kcal/m²)</td>
<td>40.6±1.4 36.2±1.4 39.4±2.3</td>
</tr>
<tr>
<td>SD (cm)</td>
<td>27.5±2.4 23.1±2.5 26.6±0.9</td>
</tr>
<tr>
<td>BMR/24h (cal)</td>
<td>1967±38 1772±106 2133±221</td>
</tr>
<tr>
<td>Tchol (mmol/L)</td>
<td>3.00±0.26 2.52±0.32 3.06±0.41</td>
</tr>
<tr>
<td>LDL-C</td>
<td>1.02±0.07 1.06±0.06 1.10±0.06</td>
</tr>
<tr>
<td>HDL-C</td>
<td>1.00±0.11 1.10±0.08 1.78±0.18</td>
</tr>
<tr>
<td>Insulin (pmol/L)</td>
<td>117±14 76±14 98±22</td>
</tr>
</tbody>
</table>

p<0.05, **p<0.01, ***p<0.001 compared to pre VLED values

V. Food labelling
Labelling and the review of the food standards code
David R Briggs
Food Standards Review Group, National Food Authority, Barton, ACT 2600 Australia

Food sold in Australia must comply with standards that are contained in the Food Standards Code. The Code contains standards for the labelling and date marking of food, the use of additives, limits on contaminants and specifications for the identity composition and analysis of certain foods. The National Food Authority, an independent statutory body established in 1991, is responsible for developing food standards in Australia. Many of the standards in the Code were developed under earlier regulatory systems and are inconsistent with the Authority’s current objectives and policies. To promote consistency and reflect its objectives and policies in all standards, the Authority is currently undertaking a review of the Code, including the requirements for food labelling.

To make a prudent selection from the wide range of foods that is generally available, it is important that consumers are able to identify foods which, as part of an overall diet, provide the necessary balance between nutrient and energy intake essential to good health. Careful consideration needs to be given to what information should be required on food labels and how it is to be presented so that consumers can make this choice. A review of the current labelling provisions of nutritional significance and some possible new directions will be presented. Labelling requirements of nutritional significance to be discussed include the use and limitations of the nutrition information panel, the specific requirements for low joule and carbohydrate modified foods and the prohibition of certain claims. The use of the recently introduced code of practice on nutrient claims in food in providing consumers with consistent and meaningful information about claims using terms such as high, low, reduced, lite, diet, etc. will be described.

The ACNS Council for 1996-1997:
President: Dr David Sullivan; Vice President and Chairperson for New Zealand: Dr Boyd Swithun; Vice President and Chairperson for Australia: Prof Madeleine Ball; General Secretary: Prof Mark L Wahlqvist; Secretary (NZ): Ms Sarah Ley; Treasurer (Aust): Ms Gayle Savidge; Treasurer (NZ): Ms Judy MacAnulty; Councillor: Dr Robert Gibson.
Body composition and disease: is there anything new to be learned?

Noel W Solomon, MD and Manolo Mazariogos, MD
Center for Studies of Sensory Impairment, Aging and Metabolism, the research branch for the National Committee for the Blind and Deaf of Guatemala, Dr. Rodolfo Robles V." Eye and Ear Hospital, Diagonal 21 y 19 Calle, Zona 11, Guatemala City, 01011, Guatemala

The observes that disease has an effect on the tissues of the human body as an old as medicine, and to be dealt with by medicine and pre-technological societies. Primary changes in the amount, proportions or quality of total body mass, specific organs and specific tissues; conversely, changes in body composition secondary to and conditioned by diseases are myriad.

The classification of most of the associations has been roughly addressed. Nutritional and dietary therapies allows us to intervene to change proportions of fat and lean, while surgery provides some leverage to modify and reconstruct organs and appendages and also to remove any excess with respect to these secondary changes due to illness, however, one must determine whether they are generally detrimental or adaptive/accommodative before deciding to intervene. In the context of diet, body composition and ethnicity, ethnic groups differ with respect to their susceptibility to certain diseases and to the severity of their expression. Moreover, differences among different races in body composition are being documented systematically. The future holds in store the ability to analyze the molecular and chemical composition of the body. And we shall be able to focus not merely on the whole-body level, but at regional, segmental and even cellular loci. What must be kept in perspective is ensuring accessibility of the emerging technology to developing nations, as that is where the greatest diversity of both pathophysiology and ethnicity is to be found.

Body composition in the aged: its relevance to functional outcomes

Widjaja Lukito
Regional SEAMEO Center for Community Nutrition, University of Indonesia, Jakarta, Indonesia

Aging is accompanied by changes in body composition - a reduction in fat free mass (FFM), which includes total body water, protein and bone mass, and an increase in fat mass (FM), which is complicated by reduction of physiological reserves, which lead to unfavourable changes in functional status. Frailty is more prevalent among older adults than among their younger counterparts. Given that protein and bone mass constitute probably two of the most important nutritional reserves in the aged, it is therefore plausible that a reduction in these lean tissues partly contribute to frailty and its adverse health outcomes, which range from falls to institutionalisation and death. It is necessary to identify frailty which can be prevented or reversed before it becomes irreversible. Underlying body compositional changes which may result in falls and infections are linked to these changes. Maintenance of desirable body composition in the aged would help maximise functional status and health outcomes.

Nutrition deficiencies in the Asia Pacific region

Soemilah Sastroamidjojo
Department of Nutrition, Faculty of Medicine and SEAMEO-TROPED Regional Center for Community Nutrition, University of Indonesia, Jakarta, Indonesia

The twentieth century is marked for its impact on Nutrition not only because of its two world wars, but also by its rapid technological development and immense consumption.

The countries in the Asia Pacific region, which have fallen or still fall into the broad category of developing countries have had food shortage, famines, population pressures and poverty. In the development process, populations growth decreased and poverty slowly alleviated, invariable features have been the migration of populations from rural to urban areas and the influence of communication technology. These development challenges have been met in varying degrees and led to rising affluence, an aging population, food cultural shifts and environmental degradation. One of the consequences of this developmental transition is a changing profile of nutrition deficiencies, which continue to contribute to classical deficiency states and now as well as NCND (chronic non-communicable diseases).

Diet and cardiovascular disease in the Asia Pacific region

Geok Lin Khor
Department of Nutrition and Community Health, Faculty of Human Ecology, Universiti Pertanian Malaysia, Serdang, Malaysia

There are major changes in the dietary intake patterns of countries in the Asia Pacific region in relation to changes in the trends of mortality due to cardiovascular disease. Cardiovascular disease constitutes the single cause of mortality in many of the countries in the region. The mortality rate for coronary heart disease (CHD) has been on the decline since the mid 1960s in some countries such as Australia, New Zealand and Japan, while the decline in other countries including Singapore and Hong Kong appear to be occurring about two decades later. In countries, other countries like Malaysia and China show an upward trend for CHD mortality. Nonetheless, the mortality rates due to CHD in New Zealand, Australia, Singapore and Malaysia are clearly higher than the region. In China, Taiwan and Japan, cerebrovascular disease remains a major cause of death, although the latter two countries have undergone significant decline in stroke death rate since 1970.

The intake of fat from animal products, fish and vegetable oils need to be considered in the light of current knowledge of the different arteriogenic and thrombogenic effects of various fatty acids. Countries which have a higher mortality from CHD tend to have a higher intake of fat calories and proportion of fat from animal products. Related issues include the prevalence of hypercholesterolaemia and overweight in the various countries. Inakes of other items with CVD implications in the region such as soybeans, dietary and animal fat in FM. Aging is also considered to be a factor in the development of CVD.

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Anthropological of food and health

Zak I Sabry
School of Public Health, University of California, Berkeley, California, USA

Humans seek food not nutrients. Although foods stimulate the taste, visual, thermal and tactile senses, it is the mental representation of foods that makes us decide whether certain foods are edible or poisonous, liked or disliked. We often confuse preference with liking a food. Foods may be preferable for health or economic reasons. However, liking foods is more of a hedonic reaction. Furthermore, liking or preferring a food must be taken within an appropriate context, often specified by culture. Clearly, food choice influences nutrition and health status. This is why nutritionists become so pre-occupied with the determinants of food choice.

The determinants of food choice most often discussed are availability and economic factors. In addition, there are powerful biological and cultural determinants of food choice.

Evaluating fat consumption trends in Malaysia

Kalyana Sundram
Palm Oil Research Institute of Malaysia (PORIM), Kuala Lumpur, Malaysia

Fat consumption trends in Malaysia have gradually undergone major changes in recent years. While coconut oil consumption predominated about three decades ago, palm oil and its fractions have evolved as the dominant edible oil in this multi racial population today. Dietary fat energy averages 25% of the total energy intake with a polyunsaturated/saturated fatty acid ratio of 0.3. Fatty acid analysis of duplicate 24 hour recall food samples from segments of the population shows that the composition is largely palm oil related high polyunsaturated and low monounsaturated. Often, the intake of mystic fatty acids make up 7–10% of the composition suggesting the continued consumption of coconut oil largely as coconut milk and used to flavour traditional recipes. Dietary cholesterol intake is less than 300 mg/day. The availability of linoleic acid (about 3% energy) seems moderate whereas dietary omega-3 fatty acids are usually below optimum. The implications of this fat consumption pattern on blood lipid and lipoprotein levels and related coronary heart disease risk have not been properly evaluated. These pertinent public health questions are presently being assessed through an ongoing epidemiological study evaluating dietary habits, fat consumption trends and fatty acid composition for their impact on coronary heart disease risk factors in an urban Malaysian population.

Other items with CVD implications in the region such as soybeans, dietary and animal fat in FM, aging is also considered to be a factor in the development of CVD. The wide dietary scope covering populations from diverse socio-cultural backgrounds and at different economic and technological development points several challenges. Future research must be directed towards improving datasets for future decision making.
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The intake of fat from animal products, fish and vegetable oils need to be considered in the light of current knowledge of the different atherogenic and thrombogenic effects of various fatty acids. Countries which have a higher mortality from CHD tend to have a higher intake of fat calories and proportion of fat from animal products. Related issues include the prevalence of hypercholesterolaemia and overweight in the various countries. Intake of other items with CV disease implications in the region such as soybeans, dietary antioxidants and potassium, and beta-carotene and alcohol consumption are also of consequence.

The wide dietary scope covering populations from diverse socio-cultural backgrounds and at different economic and technological development pose several challenges. Future research must be directed towards improving datasets for future decision making.

Diet and cancer in the Asia Pacific region
Robert MacLennan
Queensland Institute of Medical Research, Royal Brisbane Hospital, QLD 4029, Australia

The relationships between ethnicity and nutrition are evident in the Asia Pacific Region, and there are extraordinary contrasts in the diets of its many diverse populations. Over the past twenty to fifteen years has seen a large increase in studies of diet and cancer, especially in China and Japan, and the attempt to relate diet to the large variation seen in cancers of many sites. Rapid cultural change has occurred in many countries and has been accompanied by new technologies, new industries and new food patterns. Cancers previously uncommon in Asia have increased with affluence and the adoption of more “Westemised” diets among sections of the population. Changes in diets have occurred with migration, and the evolution of cancer incidence following migration from China and Japan to North America has been comprehensively investigated. Studies of migrants, such as the Japanese in Hawaii and Europeans in Australia, suggest that many of the differences in cancer patterns among populations may be provisionally ascribed to dietary factors, but much remains to be discovered. More than anywhere else, the Asia Pacific region offers opportunities for studies to better understand dietary carcinogenesis. To do this more information is needed about its culturally diverse populations, and should include dietary studies, and also cancer registration and expertise in nutritional epidemiology and environmental carcinogenesis. There is an opportunity in this region to develop new culturally based approaches to cancer prevention.

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Unio-ethnicity and environmental plurality - studies in Chinese food and health

Bridget H-I Hsu-Hage
Monash University Department of Medicine, Monash Medical Centre, Clayton, Victoria, Australia

The study of Chinese living in China and abroad provides a unique opportunity to examine the relationships between food and health in a population which is relatively homogeneous genetically. This means that variation in CVD risk profile observed between the Chinese populations in the different countries, and centres within the one country, is likely to be due to environmental differences. Food intake is potentially one of the most important environmental factors related to variation in CVD risk disease profile. The Monash Nutrition Research Group (MNRG) is studying food consumption patterns of Chinese populations living in China and Australia, and is examining factors associated with changes in food consumption patterns at both individual and population levels.

Southern Chinese are a major donor population for overseas Chinese and are themselves ethnically diverse, as characterised by dialect spoken at home. Food consumption patterns of southern Chinese, unlike their northern counterparts, are traditionally high in rice accompanied by pork, fish, leafy greens, soups, and tea. Melbourne Chinese show a significantly lower intake of all these food items. The food consumption pattern of Melbourne Chinese is undergoing inevitable change and acculturation towards that of mainstream, but that is also changing, Australia. Traditional foods are replaced with wheat products, red meat, non-fatty type of vegetables, non-alcoholic beverages, and coffee. The nutrient intake and food sources of nutrition also are changing.

These observations illustrate the socio-environmentally dynamic nature of food habits, conventionally regarded as static. The motivation factors associated with changing eating practices in the two groups, drawn from different locations and socio-economic backgrounds, will merit further enquiry.

Short communication

Body mass index of young adults in China

Ge K, Zhai F, Liu H
Institute of Nutrition and Food Hygiene, Chinese Academy of Preventive Medicine, Beijing, China

Body mass index of young adults aged 20 to 45 years was observed in connection with household income, energy and macronutrient consumption. The sample consisted of 8477 urban and 2091 rural subjects, a part of the 1992 China national nutrition survey. The mean values of BMI were 21.5 and 21.9 for urban males and females, 21.1 and 21.5 for rural males and females. Inhabitants of three big cities presented a higher BMI value than the national averages. Underweight people (BMI < 18.5) accounted for 9.0% of the urban and 8.0% of the rural populations, and the overweight (BMI > 25) constituted 14.9% and 8.4% respectively.

Across communities, the proportion underweight is inversely related to the average energy intake, and the overweight proportion is positively related to the dietary fat intake in rural populations. Recent trends in BMI change in China are connected to food consumption patterns.

Body composition of different ethnic groups in South Africa

Benadé AIS, Oelofse A, Faber M
National Research Programme for Nutritional Intervention, Medical Research Council, Tygerberg 7505, South Africa

Anthropometric information from the three main ethnic groups in South Africa, namely Africans, Whites and Coloureds, collected during the past five years and covering the age groups 0 to 64 years of age, were compared.

Prevalence of underweight for age (<2 SD NCHS, WHO) was low for white children (3%) under two years of age, whereas Coloureds displayed rates double that observed for their contemporaries. Prevalence of overweight in this age group was similar namely 5%. No difference was observed between urban and rural children or between males and females.

With increasing age however, marked differences in body weight were observed between ethnic groups, males and females and between urban and rural areas. Although the prevalence of overweight increased in all three ethnic groups with age, more whites tended to become overweight than either Africans or Coloureds (45%, 38%, 24% respectively). Meanwhile, females were found to be overweight than urban females (58%, 39% respectively). Obesity on the other hand was found to be almost twice as prevalent in urban than rural females (38% and 30% respectively) with the highest prevalence recorded in the African females (Africans 60%, Coloureds 44%, Whites 22%). This is in contrast with the white South African males who has a higher prevalence of both overweight and obesity than his ethnic counterparts.

Body mass index as predictor for body fat: comparison between Chinese and Dutch Adult subjects

Deurenberg P', Ge K', Hautvast JGAJ', Wang J
1 Wageningen Agricultural University, The Netherlands; 2 Institute of Nutrition and Food Hygiene, Beijing, China

The relation between body mass index (kg/m²) and body fat body density (determined by the underwater weighing technique) was compared in Chinese and Dutch healthy subjects in relation to sex and age. The Dutch group was selected in relation to the Chinese group in that age, weight, height and body mass index did not exceed the normal observed values of the Chinese subjects. Mean weight, height and body mass index was higher in the Dutch group, but body fat from density did not differ between the groups. Body fat predicted from body mass index, age and sex did not differ from the value obtained by densitometry in both countries. The correlation between measured body fat and predicted body fat was 0.84 (p < 0.001) in the Chinese and 0.90 (p < 0.001) in the Dutch. The difference between measured and predicted body fat was related to the level of body fatness (r = 0.55, p < 0.001), but did not differ between the countries. In different age groups there were slight differences in the predicted values of the countries, but these differences lessened after correcting for differences in the level of body fatness in each age group. It is concluded that the relationship between body fatness and body mass index is not different between the two studied populations.

Body fatness in Chinese in Southern China and Melbourne

1 Department of Epidemiology, Guangdong Cardiovascular Institute, Guangzhou 510100, China; 2 Monash University Department of Medicine, Clayton, Melbourne, Victoria, 3168, Australia

Epidemiological studies have shown consistently that body fatness is positively related to the occurrence of CVD disease, CVD and total mortality, particularly in the affluent populations. Body fatness has emerged as important predictors for most of the CVD risk factors in a study of Melbourne Chinese. We present here the body fatness distribution and its socio-demographic determinants in four Chinese populations, of which the relative affluent Melbourne Chinese will be compared.

We examined 1474 adult Chinese (835 men and 638 women) representatively sampled from Melbourne, Australia (271 men and 269 women), and three counties in Guangdong Province of the People's Republic of China: Chaozhou-202 men and 202 women; Mexican-169 men and 140 women; Xinai-192 men and 118 women). A standard protocol was used to measure body weight and height, the waist circumference at the level of umbilicus and the maximal hip diameter. Body mass index (BMI) was calculated and the Bray's classification for overweight, acceptable weight, overweight or obese was used to describe total body fatness. Waist-to-hip ratio (WHR) was used to assess abdominal body fatness. The questionaire was adopted from the NIH national survey. Subjects also received a standard CVD risk factor assessment.

In all four populations, BMI is highly and positively associated with WHR. Melbourne Chinese men had a mean WHR higher than that of Chinese women. No significant differences were found among the three male populations in China. For women, Melbourne Chinese had a higher mean WHR than the Chaozhou Chinese; again no significant differences were found among the three female populations in China. These results were age, sex, education level and occupational status adjusted.

One might say that Chinese women living in Melbourne had a relatively higher body fatness compared to their counterparts in China and that overweight, an indicator of increased total body fatness (BMI), is more prevalent in a population living in a relatively affluent society. In Chinese populations where the prevalence of obesity is almost zero, individual differences in abdominal fatness, attributable to age, education level or occupational status, appear to have a greater importance than differences in the population mean. Affluence, on the other hand, on the non-obese Chinese population is concerned, probably has an as much, if not more important on body fat distribution as on total body fatness.
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These observations illustrate the socio-environmentally dynamic nature of food habits, conventionally regarded as static. The motivation for changing Chinese population to make changes to their eating practices may differ from that of self-selected Chinese immigrants to Australia. The consequences of changing eating practices in the two groups, drawn from different locations and socio-economic backgrounds, will merit further exploration.

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Body fatness in Chinese in Southern China and Melbourne

1 Department of Epidemiology, Guangdong Cardiovascular Institute, Guangzhou, Guangdong, China; 2 Monash University Department of Medicine, Clayton, Melbourne, Victoria, Australia

Epidemiological studies have shown consistently that body fatness is positively related to the occurrence of CVD disease, CVD and total mortality, particularly in the affluent populations. Body fatness has emerged as an important predictors for most of the CVD risk factors in a study of Melbourne Chinese. We present here the body fatness distribution and its socio-demographic determinants in four Chinese populations, of which the relative affluent Melbourne Chinese will be compared. We examined 1474 adult Chinese (835 men and 638 women) representative sample collected from Melbourne, Australia (271 men and 269 women), and three counties in Guangdong Province of the People's Republic of China, Chaozhou-202 men and 202 women; Mexican-169 men and 140 women; Xinhui-192 men and 118 women). A standard protocol was used to measure body weight and height, the waist circumference at the level of umbilicus and the maximal hip diameter. Body mass index (BMI) was calculated and the Bray's classification for underweight, acceptable weight, overweight or obese was used to describe total body fatness. Waist-to-hip ratio (WHR) was used to assess abdominal body fatness. The questionnaire was adopted from the NHF national survey. Subjects also received a standard CVD risk factor assessment.

In all four populations, BMI is highly and positively associated with WHR. Melbourne Chinese men had a mean WHR higher than that of Chinese women. No significant differences were found among the three male populations in China. For women, Melbourne Chinese had a higher mean WHR than the Chaozhou in China; again no significant differences were found among the three female populations in China. There was no significant difference in BMI among the four male populations. Melbourne Chinese women, however, had a higher mean WHR than that of their Chaozhou and Mexican counterparts; no significant differences were found among the three female populations in China. These results were age, education level and occupational status adjusted. Our study showed that Chinese women living in Melbourne had a relatively higher body fatness compared to their counterparts in China and that overweight, an indicator of total body fatness (BMI), is more prevalent in a population living in a relatively affluent society. In Chinese populations where the prevalence of obesity is almost zero, individual differences in abdominal fatness, attributable to age, education level or occupational status, appear to have a greater importance than differences in the population mean. Affluence, insofar as the non-obese Chinese population is concerned, probably has no much, if not more impact on body fat distribution as on total body fatness.
A lesser known prediction of the theory is that the correlation between TBW and $H/R_0$ is better than the correlation between TBW and $H/R_{FG}$. This prediction can be explained as follows. The theory predicts that at $R_0$, the measured resistance, $R_0 = (R_0 - R_{FG})$. Since $R_0$ and $R_{FG}$ are proportional to ECV and TBW, the same combination of water volumes is measured for each subject. Biopsium data from human subjects has been analysed to estimate the standard deviation of $R_0$. This value implies that the SEE from correlations between TBW and $H/R_0$ will be up to 1% better than the SEE for TBW and $H/R_{FG}$, which is typically 3-5%. This is consistent with the improvement reported by Cornish et al who measured biopsium and D,O dilution data in rats.

Multi-frequency bioelectrical impedance for the prediction of total body water and extracellular water: validation in four different (ethnic) groups

1 Wageningen Agricultural University, The Netherlands; 2 University of Parma, Italy; 3 Institute of Nutrition and Food Hygiene, Beijing, China; 4 Ethiopian Nutrition Institute, Addis Ababa, Ethiopia

Multi-frequency bioelectrical impedance (MBFIA) can be used in the assessment of body water compartments. At low frequency body impedance is related mainly to extracellular water (ECW) and at high frequency body impedance is a measure of total body water (TBW). Body weight and body height were measured in the fasting state in different groups of healthy adult males and females from The Netherlands, Northern Italy, Ethiopia and China. MBFIA was measured at frequencies ranging from 1 kHz to 100 kHz. TBW and ECW were determined by dilution techniques with deuterium oxide and bromide respectively. The relation between TBW and ECW was measured by dilution technique and impedance index (height/impedance) at low and high frequency was not different between the four populations. When a prediction formula for TBW and ECW from impedance index, developed in another (Dutch) population was applied to the four groups, the differences in predicted and measured TBW and ECW were only small and not significant between the populations.

The residuals (measured minus predicted values) for TBW and ECW were correlated with TBW/height ($r = 0.29$, $p < 0.01$) and ECW/height ($r = 0.48$, $p < 0.01$) respectively, parameters that can be regarded as crude measures of body build.

It was concluded that MBFIA is an appropriate technique to predict body water compartments. Differences (between ethnic) groups can be partly attributed to differences in body build.

An improved water displacement method (IWDW) for body measurement and its application

Yang Q-H, Zhang H-Z
Department of Obesity Treatment, Third Hospital of Beijing Medical College, Beijing 100083, China

In order to solve the problem of estimating body fat content of obese people and increase the measurement accuracy for body fat, an improved water displacement method (IWDW) was established. A highly sensitive human body volumeter added to a breath oxygen analyzer (Caldwell style), are the main features of the IWDW. The standard deviation of a single observation of body fat by IWDW is 0.1 kg, which is lower than the 0.35 kg for the ordinary water displacement method. The body fat content of 20 children aged nine, 75 obese

outpatients and 51 controls were estimated by IWDW successfully. The body fat content of the male and female obese groups was 27.7 ± 5.0 (95% = 20.4-34.0) and 38.9 ± 5.7 (25.7-49.2%), respectively. The body fat content of a normal non-obese group, a mean-weight lifter group and a female swimming group were 16.4 ± 3.8% and 10.8 ± 4.7% and 17.2 ± 2.7%, respectively. IWDW should reduce the measurement error of body fat and expand the applicable range of the "Density Method".

References
The relation of middle-aged cadres' body fat content to lipidaemia, blood pressure and other disorders

Li Q, Gu J, Yang Z, Li H, Hao F, Zhao J, Wang Y
Military Medical Institute of Beijing Area, Shijiazhuang 050081, China

The body fat content (4BF) of middle-aged cadres, obesity prevalence and the relation of 4BF with blood lipids and some diseases has been assessed. The BIFA-100 body fat analyzer was used to measure 4BF; the principle of this instrument is bioelectrical impedance. Male 4BF > 25.0 and female 4BF > 30.0 were regarded as obese. Cadres (n = 320) aged 35-59 years were measured: males (n = 169) were aged 47.9 ± 7.1, females (n = 151) were aged 50.3 ± 7.7. The 4BF of males and females were 23.4 ± 8.7 and 35.9 ± 6.6 respectively, using BF criteria. The obesity prevalence for males and females were 43.8% and 75.5% respectively. Blood lipids and blood pressure (BP) were measured in males and the disorders of hypertension, hyperlipidaemia, hyperuricemia, coronary heart disease, hepatic adiposis (fatty liver), diabetes, cholecystitis and cerebral infarction documented. The results showed that the BF was positively correlated with Apo-A (the marker protein of low density lipoprotein and BP, and negatively correlated with Apo-B (the marker protein for high density lipoprotein). There were differences in triglycerides, Apo-A1, Apo-B and BP between obese and less fat people, but there was no difference in total cholesterol between the two groups, except with cholecystitis. The rate of all documented disorders was higher in obese people than in those with a lesser 4BF. Thus, in Beijing Chinese the measurement of BF has useful predictive value for disorders of increasing prevalence.

Multi-frequency measurements of bioimpedance are more effective than single-frequency measurements

Stroud DB, Borovnicar DJ, Xiong DW
Monash Medical Centre, Clayton Vic 3168, Australia & Department of Medicine, Monash University, Australia

Single frequency measurements of bioimpedance at 50 kHz, Hfo, are used extensively for estimating Total Body Water (TBW) in clinical subjects employed in own correlation between TBW and Hfo, where H is height. Equipment suitable for routine measurements of bioimpedance at multiple-frequencies has not been available until quite recently and it is now possible to identify Fe, the characteristic frequency, and Re, the resistance at Fe.

The Cole-Cole theory makes several predictions. One is that measurements at multiple frequencies will lie on a semi-circle when plotted as reactance versus resistance; this was demonstrated experimentally by Setti et al in 1980 and confirmed again in more recent work. The theory predicts two correlations, one between Extra-Cellular Water (ECW) and Hfo, the other between TBW and Hfo, and it is difficult to convincingly demonstrate these correlations in normal subjects, but there are several papers that have now found these correlations.

Multi-frequency bioelectrical impedance for the prediction of total body water and extracellular water: validation in four different (ethnic) groups

1 Wageningen Agricultural University, The Netherlands, 2 University of Pavia, Italy, 3 Institute of Nutrition and Food Hygiene, Beijing, China, 4 Ethiopian Nutrition Institute, Addis Ababa, Ethiopia

Multi-frequency bioelectrical impedance (MBFIA) can be used in the assessment of body water compartments. At low frequency bioimpedance is related mainly to extracellular water (ECW) and at high frequency bioimpedance is a measure of total body water (TBW). Body weight and body height were measured in the fasting state in different groups of healthy adult men and females from The Netherlands, Northern Italy, Ethiopia and China. MBFIA was measured at frequencies ranging from 1 kHz to 100 kHz. TBW and ECW were determined by dilution techniques with deuterium oxide and bromide respectively. The relations between TBW and ECW as measured by dilution technique and impedance index (height/impedance) at low and high frequency was not different between the four populations. When a prediction formula for TBW and ECW from impulse index, developed in another (Dutch) population was applied to the four groups, the differences in predicted and measured TBW and ECW were only small and not significant between the populations. The residuals (measured minus predicted values) for TBW and ECW were correlated with TBW/height (r = 0.29, p < 0.01) and ECW/height (r = 0.48, p < 0.01) respectively, parameters that can be regarded as crude measures of body build.

It is concluded that MBFIA is an appropriate technique to predict body water compartments. Differences between (ethnic) groups can be partly attributed to differences in body build.
The body composition and physical activity of elderly individuals were studied. Forty elderly subjects were divided into two groups according to their body mass indices (BMI). One group (n = 20) had BMI <17 kg/m² (low BMI) and regarded as in a chronic energy deficiency (CED). The other group (n = 20) had BMI >17 kg/m² (normal BMI), which was the lowest 17 in Grade I, and the other group (n = 20) had BMI values between 22 to 25 kg/m². Body composition was measured using skinfold thickness and bioelectrical impedance analysis (BIA). The Durnin and Womersley table was used to estimate fat mass (FM) from the sum of four skinfold thicknesses, namely biceps, triceps, subscapular and supraclavicular. For BIA, two formulas were adopted to calculate fat-free mass (FFM): the Durnin and Lewis and Deurenberg equations. Results obtained from these three formulas were compared. Physical activity level (PAL) was estimated on the basis of recorded physical activity patterns, and cumulative energy expenditure was based on values reported by FAO/WHO/UNU.

The agreement of three different methods in the estimation of percent total body fat
Wattanapenpaiboon N, Lukito W, Straus BJG, Ha Hage BH-H, Wahlgvist ML
SEAMOEP-TRPMEU Regional Center for Community Nutrition, University of Indonesia, Jakarta 14030, Indonesia

Percent total body fat (%BF) assessed by three different methods was compared in a representative population of apparently healthy Anglo-Celtic Australians. Four-skinfold thickness measurement (SKF) and single-frequency bioelectrical impedance analysis (BIA) were performed on a total of 477 subjects (21 men and 266 women), aged 26-84 years. %BF estimated by SKF was derived from Durnin and Womersley's table, and Lukito's formula was used to calculate %BF estimated by BIA. Total energy expenditure (DEXX) using Lunar DXA densitometer was performed in a subsample of 68 men and 137 women.

Significant differences between %BF estimated by BIA and SKF or DEXA. Mean differences between %BF estimated by DEXA and BIA (DEXA-BIA) were 3.7 ± 6.2% in men and 7.8 ± 6.4% in women, whereas those between SKF and BIA (SKF-BIA) were 3.9 ± 5.5% in men and 4.3 ± 5.2% in women. A significant difference between %BF estimated by DEXA and SKF (DEXA-SKF, 3.1 ± 5.0%) was also found in women, but not in men. In addition, there was a reduction in the agreement between %BF estimated by DEXA and SKF with increasing %BF averaged of the two methods. Similar observations were also made between BIA and DEXA, and between BIA and SKF only in women, not in men. In contrast, the agreement between BIA and SKF in %BF estimation in men was improved with increasing %BF.

In conclusion, significant differences in %BF estimated by BIA, DEXA and SKF were observed in the present study. These differences, in most cases, were not independent of body fatness. Gender differences observed in the agreement between methods may be due to the differences in body fat distribution between men and women. This may result from the different fat distribution of methods to estimate body fat at different sites such as subcutaneous and visceral fat. Results of this study indicate the need to identify a reference method for %BF estimation, which would be required for comparisons between populations.

Comparison of D,0 with various methods for measuring total body water in growth hormone deficient adults
Xiong DW, Borovnicar DJ, Bainbridge R, Stroud DB, Wahlgvist ML, Strauss BJG
Department of Medicine, Monash Medical Centre, Monash University, Clayton, Victoria 3168, Australia

Objective. The study aim was to compare different methods of assessing TBW in growth hormone deficient (GHD) adults with the reference method of deuterium oxide (D,0) dilution.

Design. TBW in GHD adults was estimated by three different methods and compared with the reference method of D,0 dilution.

Measurement. TBW has been determined from:
- Deuterium oxide dilution was measured using a Fourier Transform Infrared (FTIR) spectrometer.

Body composition and physical activity of institutionalised elderly Indonesians with chronic energy deficiency
Iswarawanit DW, Schultink JW, Rumawas JSP, Lukito W
SEAMOEP-TRPMEU Regional Center for Community Nutrition, University of Indonesia, Jakarta 14030, Indonesia

The body mass and body composition of elderly individuals were studied. Forty elderly subjects were divided into two groups according to their body mass indices (BMI). One group (n = 20) had BMI <17 kg/m² (low BMI) and regarded as in a chronic energy deficiency (CED). The other group (n = 20) had BMI >17 kg/m² (normal BMI), which was the lowest 17 in Grade I, and the other group (n = 20) had BMI values between 22 to 25 kg/m². Body composition was measured using skinfold thickness and bioelectrical impedance analysis (BIA). The Durnin and Womersley table was used to estimate fat mass (FM) from the sum of four skinfold thicknesses, namely biceps, triceps, subscapular and suprailiac. For BIA, two formulas were adopted to calculate fat-free mass (FFM): the Durnin and Lewis and Deurenberg equations. Results obtained from these three formulas were compared. Physical activity level (PAL) was estimated on the basis of recorded physical activity patterns, and cumulative energy expenditure was based on values reported by FAO/WHO/UNU.

• Resistance (R) was obtained using a BEI-108A body composition analyser (RII-Systems Inc, Detroit, MI, USA). TBW was calculated using the manufacturers software (Bodycomp II, version 1.1, RII Systems Inc) and the regression equations of Kushner and Lukasiak relating TBW estimated by D,0 dilution and [height(cm)/R] as estimated by single frequency bioelectrical impedance analysis (BIA) in normal healthy adults.
• The sum of extracellular water (ECW) determined from in vivo neutron activation analysis (IVNAA) and intracellular water (ICW) determined from total body potassium (TBK) as measured by potassium 40 counting.
• Fat free mass (FFM) was calculated as body weight less fat mass (FM) as estimated from skinfold thickness (SF) measurements.

A simple water displacement method of measuring the change of body fat and water during bed rest
Yang Q-H, Duan B-Z
Department of Osteopathy Treatment, Third Hospital of Beijing Medical University, Beijing 100083, China

The simple water displacement method (SWD) of measuring the change of body fat means the ΔF = (Vf - V0) - (Vf - V0)/BF, where ΔF is the change of body fat, Vf the total body volume after bed rest and V0 the total body volume before bed rest. Five male adults were studied in 3 periods of continuous bed rest for 16 days. During bed rest the energy intake of the subjects was 2913 ± 3014 kcal (10.77 ± 12.49 kcal/kg), the increase of body fat mass by the ordinary water displacement method (OWDM) and SWD was 1.26 ± 0.75 (0.02-1.42) kg and 1.28 ± 0.81 (0.38-1.93) kg respectively. With the “Energy Requirement = Total Metabolic Energy × 1.2875 × Increase of Body Fat × 0.565 × Decrease of Body Protein” formula, the range of energy requirement calculated using the data estimated by OWDM and SWD was 771-2788 kcal (10.77-17.3 kmol/kg10.8 kg). The results of these bed rest were divided into 4 periods equally. With the “The Alcohol = Body Water – Body Fat = Body Fat” formula, the body water loss of the successive I, II, III and IV periods calculated by SWD was 0.62 ± 0.54, 0.22 ± 0.18, 0.23 ± 0.15 and 0.66 ± 0.01 respectively.

The adequacy of predicted body fat percent in Chinese children with Caucasian prediction formulas
Wang J, Deurenberg P
1. Chinese Academy of Preventive Medicine, Beijing, China; 2. Wageningen Agricultural University, The Netherlands

Body composition was measured by underwater weighing and by anthropometry and bio-electrical impedance in 165 Chinese boys and 156 Chinese girls aged 10 to 17 years and living in Beijing. Until age 12 years there were no differences in body weight, body height and body mass index (kg/m²) between boys and girls, but body fat density was slightly higher in girls. After age 12, boys had higher body weights, body heights and body mass index, but lower body fat as calculated from body density. Predicted body fat from body mass index, body impedance and skinfold thickness was generally slightly lower compared to body fat from body density, except for body fat from impedance, which was both in boys and girls slightly higher compared to body fat from body density. However, the mean differences were small and maximally reached 2.7% body fat in boys (impedance) and 1.7% in girls (skinfold). The standard deviations of the differences were within the mean estimated error of the used methodology and comparable with values obtained in other studies. The differences between measured and predicted values were slightly higher in the youngest and the oldest children, probably indicating invalid assumptions in the used methodologies at these ages. At the lower level of body fatness all prediction formulas systematically overestimated body fat, and at higher fat levels body fat was systematically underestimated. It is concluded that prediction formulas developed in Caucasian subjects are generally valid in Chinese children. However, in countries with a high prevalence of low weight (low body fat) children, there may be a need for specific prediction formulas for body composition for the low body weight group.

Body fat measurement and obesity analysis of old people with different rest style in two places
Military Medical Institute of Beijing Area, Shijiazhuang 05008, China

The author observed and compared body fat content, body fat distribution, energy intake and the prevalence of high energy intake and obesity of 83 retired cadres in rest agronomy (45 males, aged 64 ± 4.2 y; 38 females, aged 64 ± 3.8 y), and 47 old people in the old
Body composition and physical activity of institutionalised elderly Indonesians with chronic energy deficiency

Iswarawanti DW, Schultink JW, Rumawas JSP, Lukito W
SEAMEO-TROPMED Regional Center for Community Nutrition, University of Indonesia, Jakarta 10430, Indonesia

The body composition and physical activity of elderly individuals were studied. Forty elderly subjects were divided into two groups according to their body mass indices (BMI). One group (n = 20) had BMI < 17 kg/m² (low BMI) and regarded as in a chronic energy deficiency (CED) condition, while the other group (n = 20) had BMI values between 22 to 25 kg/m². Body composition was measured using skinfold thickness and bioelectrical impedance analysis (BIA). The Durnin and Womersley table was used to estimate fat mass (FM) from the sum of four skinfold thicknesses, namely biceps, triceps, subscapular, and suprailliac. For BIA, two formulas were adopted to calculate fat free mass (FFM): they were the Durnin and Le督促en equation and the Le督促en and Womersley equation. The discrepancy between the Durnin and Le督促en equations was less with an increase in FM. Both groups had a similar PAL (1.3 x basal metabolic rate (BMR)), Elderly subjects with CED had the same level of activity of daily living (ADL). As those with normal BMI, the Durnin formula was used to calculate FM in elderly Indonesians are not available, these findings suggest that the Le督促en equation is a suitable formula to do. The cut-off point to define CED identified by James and colleagues is not sensitive enough to detect perturbations in ADL of elderly Indonesians.

The agreement of three different methods in the estimation of percent total body fat

Department of Medicine, Monash Medical Centre, Melbourne, Australia; 2. SEAMEO-TROPMED Regional Center for Community Nutrition, University of Indonesia, Jakarta; 3. Clinical Nutrition and Metabolism Unit, Monash Medical Centre, Melbourne, Australia

Percent total body fat (%BF) assessed by three different methods was compared in a representative population of apparently healthy Anglo-Celtic Australians. Four-skinfold thickness measurement (SKF) and single-frequency bioelectrical impedance analysis (BIA) were performed on a total of 477 subjects (211 men and 266 women), aged 26-84 years. %BF estimated by SKF was derived from Durnin and Womersley's table, and Le督促en's formula was used to calculate %BF estimated by BIA. %BF estimated by SKF was performed in a subsample of 68 men and 137 women.

There were significant differences between %BF estimated by BIA and SKF or BIA. Differences in %BF estimated by Durnin and Womersley's table and Le督促en's formula were 3.7 ± 3.6% in men and 7.8 ± 6.6% in women; those between SKF and BIA (SKF-BIA) were 3.9 ± 5.5% in men and 4.3 ± 5.2% in women. A significant difference between %BF estimated by Durnin and Womersley's table and Le督促en's formula was also found in women, but not in men. In addition, there was a reduction in the agreement between %BF estimated by SKF and with increasing %BF averaged of the two methods. Similar observations were also made between BIA and SKF, and between BIA and BIA only in women, not in men. In contrast, the agreement between BIA and SKF in %BF estimation in men was improved with increasing %BF.

In conclusion, significant differences in %BF estimated by BIA, SKF and Durnin and Womersley's table were observed in the present study. These differences, in most cases, were not independent of body fatness. Gender differences observed in the agreement between methods may be due to differences in fat distribution between men and women. This may result from the difference in the fat distribution at different sites such as subcutaneous and non-subcutaneous fat. Results of this study indicate the need to identify a reference method for %BF estimation, which would be required for comparisons between populations.

Comparison of D,O with various methods for measuring total body water in growth hormone deficient adults

Xiong DW, Borovnicar DJ, Bainbridge R, Stroud DB, Wahlgqvist ML, Straus BJ
Department of Medicine, Monash Medical Centre, Monash University, Clayton, Victoria 3168, Australia

Objective. The study aim was to compare different methods of assessing TBW in growth hormone deficient (GHD) adults with the reference method of deuterium oxide (D,O) dilution.

Design. TBW in GHD adults was estimated by three different methods and compared with the reference method of D,O dilution.

Patients. GHD adults, men (n = 34) and females (n = 23) with either isolated or partial hypopituitarism, aged 18-64 years, were included in the study.

Measurements. TBW has been determined from:

- D2O dilution technique. The D2O concentration was measured using a Fourier Transform Infrared (FTIR) spectrometer.

- Resistance (R) was obtained using a BEI-10A body composition analyser (RJL-Systems Inc, Detroit, MI, USA). TBW was calculated using the manufacturers software (Bodycomp II, version 1.1; RJL Systems Inc) and the regression equations of Kushner and Lukasik relating TBW estimated by D,O dilution and [height(cm)]/R as estimated by single frequency bioelectrical impedance analysis (BIA) in normal healthy adults.

- The sum of extracellular water (ECW) determined from in vivo neutron activation analysis (IVANA) and intracellular water (ICW) determined from total body potassium (T/K) as measured by potassium 40 counting.

- Fat free mass (FFM) multiplied by 0.67 where FFM was determined as body weight less fat mass (FM) as estimated from skinfold thickness (SF) measurements.

Results. BIA (RJL, Kushner and Lukasik) estimates of TBW were strongly correlated and in agreement with the dilution reference method [RUL: r = 0.91 (P < 0.001); bias = 0.1 L with 95% CI of +0.2 to -1.1 L, limit of agreement ± 6.1 L. Kushner: r = 0.89 (P < 0.001) bias = -0.2 L, with 95% CI of -0.9 to -1.4 L, limit of agreement ± 7.1 L. Lukasik: r = 0.89 (P < 0.001) bias = +1.2 L with 95% CI of +1.3 to -0.2 L, limit of agreement ± 7.5 L].

A simple water displacement method of measuring the change of body fat and water during bed rest

Yang Q-H, Duan B-Z
Department of Obesity Treatment, Third Hospital of Beijing Medical University, Beijing 100083, China

The simple water displacement method (SWDM) calculated the change of body fat means the ΔF = (VF1 - VF2) - (VH1 - VH2) = (VF2-VH2) - (VF1-VH1) formula, where ΔF is the change of body fat, VF1 and VH1 represent total human body volume and body weight before and after the experiment respectively. Normal BMI adults were studied in five male adults, aged 26-84 years, were divided into 4 periods equally. With the “Body Water Volume - Body Weight - Body Fat” formula, the body water loss of the two periods was calculated using displacement method (SWDM) and SWDM2 was 1.0 ± 0.2 (0.02-0.42) kg and 1.28 ± 0.18 (1.01-1.93) kg respectively. With the “Energy Requirement = Total Metabolic Energy × 12875 × Increase of Body Fat × 5650 × Decrease of Body Protein” formula, the range of energy requirement calculated using the data estimated by SWDM and SWDM2 was 771 ± 2780 kcal (17.0-47.9 kcal/kg/24h) and 1165-1992 kcal (22.7-34.2 kcal/kg/24h) respectively. Six days of bed rest were divided into 4 periods equally. With the “Body Water Volume - Body Weight - Body Protein - Body Fat” formula, the body water loss of the successive I, II, III and IV periods calculated by SWDM was 0.62 ± 0.52L, 0.22 ± 0.18L, 0.23 ± 0.16L and 0.66 ± 0.06L respectively.

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1. Chinese Academy of Preventive Medicine, Beijing, China; 2. Wageningen Agricultural University, The Netherlands

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Predicted body fat from body mass index, body impedance and skinfold thickness was generally slightly lower compared to body fat from body density, except for body fat from impedance, which was both in boys and in girls slightly higher compared to body fat from body density. However, the mean differences were small and maximally reached 2.7% body fat in boys (impedance) and 1.7% in girls (skinfold). The standard deviations of the differences were within the estimation error of the used methodology and comparable with values obtained in other studies. The differences between measured and predicted values were slightly higher in the youngest and the oldest children, probably indicating invalid assumptions in the used methodologies at these ages. At the lower level of body fatness all prediction formulas systematically overestimated body fat, and at higher fat levels body fat was systematically underestimated.

It is concluded that prediction formulas developed in Caucasian subjects are generally valid in Chinese children. However, in countries with a high prevalence of low weight (low body fat) children, there may be a need for specific prediction formulas for body composition for the low body weight group.

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II. Nutrition, Ethnicity and Health

Plenary Lectures

Short Communication

Serum carotenoid status in Caucasian Australians (with and without Pritikin diet), and Japanese

Lo CS1, Wahlqvist ML1, Horie Y1, Horie K1, Bainbridge R1
1. Monash University Department of Medicine, Monash Medical Centre, Clayton, Victoria 3168, Australia; 2. Nagoya Municipal Women’s Junior College, Nagoya, Japan; 3. Aichi Gaku Ken University, Otsuaki, Aichi, Japan

Knowledge about carotenoid status in health and disease has improved dramatically during the last few years. But little is known about how such status varies with food culture or ethnicity. In the present study we sought to assess the status of carotenoids in those with disparate food cultures, Caucasian Australians (on a usual or low fat Pritikin diet) and Japanese in Nagoya. The study included 20 healthy Caucasian women and 10 Caucasian women on a Pritikin diet from Melbourne and 20 healthy Japanese women from Nagoya, Japan. Fasting blood was obtained for carotenoid analysis using HPLC. Serum carotenoids are shown in Table 1. Japanese women had significantly higher serum lutein (p<0.001), β-carotene (p<0.001) than did the Caucasian women (on a usual or Pritikin diet). There was no significant difference in serum lycopene or α-carotene between Japanese and Caucasians (with and without Pritikin diet). Serum vitamin A concentrations were lower in Japanese women. In Japanese women the serum concentrations of α-carotene and β-carotene were associated with serum lycopene (r=0.48 and 0.52 respectively). There was no significant relationship between serum lycopene and serum vitamin A (r=0.15). In Caucasian women the serum concentrations of lutein, α-carotene and β-carotene were associated with serum vitamin A (r=0.48, 0.46 and 0.42 respectively).

Cardiovascular risk factors in three communities of southern Chinese Liu XQ1, Cheng PF2, Yuan YH1, Deng ML1, Dai ZR1, Kuang TH1, Zhang DL1, Hsu-Hage BH3, Wahlqvist ML1
1. Department of Epidemiology, Guangdong Cardiovascular Institute, Guangzhou 510100 China; 2. Monash University Department of Medicine, Monash Medical Centre, Clayton, Victoria 3168, Australia

Obesity and anomalous serum lipids are known as the major risk factors for cardiovascular disease. The main factors for cardiovascular disease were measured on base surveys of three sub-ethnic communities in China. The results were presented at the conference. Men and women (95%) aged 25 years and over, were randomly sampled from three areas of Guangzhou, Meixian and Xinhui. A standard protocol was used to measure blood pressure, body weight, height, waist and hip circumferences. The laboratory was standardised for analysis of serum lipids by Centers of Disease Control (CDC), USA. Serum total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), and triglycerides (TG) were measured after a 12-hour fast. After adjusting for age, men and women in Guangzhou had the highest TG, TC, low density lipoprotein cholesterol (LDL-C) and systolic and diastolic blood pressure levels. LDL-C in women and BMI both in men and women between communities. This study indicates that there are differences in blood pressure and serum lipids in these three sub-ethnic communities. The results may be due to the differences in socio-economic factors, dietary habit, heredity and education, which should be further investigated. The emphasis in policies for the prevention of cardiovascular disease in Chinese people is needed.

Cardiovascular disease risk profile in adult Chinese living in North Jakarta, Indonesia

Kapanton NH1, Rumawas JS2, Schlultink JW1, Hsu-Hage BH3, Wahlqvist ML3
1. SEAMEO-TROPED Regional Center for Community Nutr, Jakarta, Indonesia; 2. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Germany; 3. Dept of Medicine, Monash Medical Centre, Monash University, Australia

A cross sectional study of cardiovascular disease risk profile was carried out in North Jakarta, Indonesia. One hundred and six Chinese (Indonesian and family history of cardiovascular disease) aged 25 years and over, were recruited to collect baseline information. There was a high prevalence of overweight/diabetes and hypertension,升高(52.4% and 48.5% respectively). Among men, the prevalence of "current smoker" was 12.2% for men and 3.9% for women. The prevalence of hyperlipidaemia (cholesterol > 5.7 mmol/L and triglycerides > 2.5 mmol/L) was 14.6% of men and 9.6% of women. Mean values of BMI, WHR, and blood pressure were significantly higher in men than in women. Body mass index and blood pressure in women were significantly increased with age. In men, total cholesterol and LDL cholesterol were positively associated with BMI, while triglycerides were associated with WHR. These findings suggest Chinese Indonesian women have more favourable cardiovascular risk profiles than men and, that age is likely to be an important determinant for women.

Cardiovascular disease risk factors among Indian subjects living in Kuala Lumpur, Malaysia

Manian T1, Rumawas JS2, Schlultink WJ1, Khor GL1
1. Department of Nutrition and Community Health, Universiti Pertanian Malaysia, Serdang, Malaysia; 2. SEAMEO-TROPED Regional Center for Community Nutrition, Universiti of Indonesia, Jakarta; 3. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, Germany

Several reports have shown that migrants from the Indian subcontinent have an increased risk of cardiovascular disease when settling in industrialised countries. A cross-sectional study was carried out on coronary heart disease risk factors in a randomly selected group of 75 Indian men and 75 Indian non-pregnant non-lactating women with ages ranging from 25 to 55 years old and living in Kuala Lumpur, Malaysia. Risk factors surveyed included hypertension, hypercholesterolaemia, low HDL-cholesterol, high LDL-cholesterol, smoking, diabetes, increased body mass index, increased waist-to-hip ratio and elevated blood pressure levels. Findings from the study will be used as a baseline to monitor the intakes of Indians towards the achievement of the national dietary targets set in 1991. Appropriate intervention programmes for the general population and specific high risk groups have commenced using a multi-pronged approach.
II. Nutrition, Ethnicity and Health

Plenary Lectures

Short communication

Serum carotenoid status in Caucasian Australians (with and without Pritikin diet), and Japanese
Lo CS1, Wahlqvist ML1, Horie Y1, Horie K1, Bainbridge R1
1. Monash University Department of Medicine, Monash Medical Centre, Clayton, Victoria 3168, Australia; 2. Nagoya Municipal Women's Junior college, Nagoya, Japan; 3. Aichi Gaku Ken University, Otsuaki, Aichi, Japan

Knowledge about carotenoid status in health and disease has improved dramatically during the last few years. Little is known about how such status varies with food culture or ethnicity. In the present study we sought to assess the status of carotenoids in those with disparate food cultures, Caucasian Australians (on a usual or low fat Pritikin diet) and Japanese in Nagoya. The study included 20 healthy Caucasian women and 10 Caucasian women on a Pritikin diet from Melbourne and 20 healthy Japanese women from Nagoya, Japan. Fasting blood was obtained for carotenoids analysis using HPLC. Serum carotenoids are shown in Table 1. Japanese women had significantly higher serum lutein (p<0.001), β-carotene (p<0.001), and lycopene (p<0.001) than did the Caucasian women (on a usual or Pritikin diet). There was no significant difference in serum lutein or α-carotene between Japanese and Caucasians (with and without Pritikin diet). Serum carotenoid concentrations in HDL-C in Caucasians on a usual diet was significantly higher than in Caucasians on a Pritikin diet (p<0.001); fat intake may be critical for the bioavailability of these carotenoids. These findings indicate that Japanese women may have a lower risk of cardiovascular disease than Caucasian women irrespective as carotenoid status is concerned. The reasons for these differences are not clear. The most likely possibility is that Japanese and Caucasian women have different intakes of carotenoids. Three times the average offers, perhaps because of different fat intakes. Thirdly, the catabolism or excretion of carotenoids may also be different between Caucasian and Japanese women.

Table 1. The serum carotenoids of Caucasian and Japanese women (mean ± SEM in mg/L)

<table>
<thead>
<tr>
<th>Carotenoids</th>
<th>Caucasian Australian (n=20)</th>
<th>Caucasian Australian on Pritikin diet (n=10)</th>
<th>Japanese (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lutein</td>
<td>291±25</td>
<td>317±45</td>
<td>877±84**</td>
</tr>
<tr>
<td>β-carotene</td>
<td>150±23</td>
<td>109±49</td>
<td>331±28**</td>
</tr>
<tr>
<td>Lycopene</td>
<td>123±15</td>
<td>67±32</td>
<td>93±1</td>
</tr>
<tr>
<td>α-carotene</td>
<td>41±6</td>
<td>31±4</td>
<td>48±6</td>
</tr>
<tr>
<td>Total carotenoids</td>
<td>1006</td>
<td>881</td>
<td>2704</td>
</tr>
</tbody>
</table>

Cardiovascular disease risk factors in adult Chinese living in North Jakarta, Indonesia
Kapanton NH1, Rumawas JS2, Schultz JW3, Hsu-Hage BH-H3, Wahlqvist ML3
1. SEAMEO-TROPMED Regional Center for Community Nutrition, Jakarta, Indonesia; 2. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Germany; 3. Dept of Medicine, Monash Medical Centre, Monash University, Australia

A cross sectional study of cardiovascular disease risk profile was carried out in North Jakarta, Indonesia. One hundred and six Chinese individuals from the community were enrolled in the study. The study population was recruited to collect baseline information. There was a high prevalence of overweight and hypertension, clogging WHO criteria, especially in men (32.6% and 48.8%, respectively). The prevalence of "current smoker" was 12.2% for men and 3.9% for women. The prevalence of hyperlipidemia (cholesterol at 5.5, and/or triglycerides ≥ 2.3) was 14.6% of men and 9.6% of women. Mean values of BMI, WHR, and blood pressure were significantly higher in men than in women. Body fatness and blood pressure in women were significantly increased with age. In women, total cholesterol and LDL cholesterol were positively associated with BMI, while triglycerides were associated with WHR. These findings suggest Chinese Indonesian women have more favourable cardiovascular risk profiles than men and that, age is likely to be an important determinant for women.

Cardiovascular disease risk factors among Indian subjects living in Kuala Lumpur, Malaysia
Manian T1, Rumawas JS2, Schultink WJ3, Khor GL1
1. Department of Nutrition and Community Health, Universiti Pertanian Malaysia, Serdang, Malaysia; 2. SEAMEO-TROPMED Regional Center for Community Nutrition, Universiti of Indonesia, Jakarta; 3. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eschborn, Germany

Several reports have shown that migrants from the Indian subcontinent have an increased risk of cardiovascular disease when settled in Western countries. The present cross-sectional study was carried out on coronary heart disease risk factors in a randomly selected group of 75 Indian men and 75 Indian non-pregnant/non-lactating women with ages ranging from 25 to 55 years old and living in Kuala Lumpur, Malaysia. Risk factors surveyed included hypertension, hypercholesterolaemia, low HDL-cholesterol, high LDL-cholesterol, smoking, diabetes, increased body mass index, increased waist-to-hip ratio, and history of cardiovascular and cerebrovascular disease. The prevalence of coronary heart disease risk factors was higher in men than women. More than three risk factors were present in 48% of men compared to the corresponding variables. Mean levels of body mass index (BMI), waist to hip circumference ratio (WHR), TG, HDL, LDL, systolic and diastolic blood pressure of the three communities which were 25.21 kg/m², 0.827, 6.05 mmHg, 1.28 mmHg, 1.33 mmHg, 4.15 mmHg, 118.6 mmHg and 77.9 mmHg respectively. There were no significant differences in WHR among men and women BMI both in men and women between communities. This study indicates that there are differences in blood pressure and serum lipids in these three sub-ethnic communities. The results may be due to the differences in socio-economic factors, dietary habits, heredity and education, which should be further investigated. The emphasis in policies for the prevention of cardiovascular disease in Chinese people is needed.
Cardiovascular disease risk factor prevalence in South Asian Melburnians
Ibiebele T, Hsu-Hage BH-H, Wahqvist ML
Monash University Department of Medicine, Monash Medical Centre, Clayton, Victoria 3168, Australia

Objective To assess cardiovascular disease (CVD) risk factor prevalence South Asians residing in Melbourne.

Design A population-based cross-sectional study of a representative sample of 350 people of South Asian origin (Indian, Pakistani, Bangladeshis, Sri Lankan) ancestry, aged 25 years and over. Subjects were systematically selected from a sampling framework generated by the Melbourne Telephone directory using a list of presumptive South Asian families furnished by South Asian community organisations in Melbourne.

Measurements Measurements taken included: blood pressure, fasting serum glucose, insulin, triglycerides, and total and low-density lipoprotein cholesterol. Anthropometric measurements, namely height, weight, waist and hip circumferences, were also taken. Body mass index (BMI) and waist-to-hip ratios were calculated. Data on some CVD risk factors such as smoking were collected using questionnaires.

Results In the population surveyed, men and women differed significantly in their presentation of established CVD risk factors. Comparisons of prevalence (%) of selected risk factors between men and women are shown in the table. A higher level of HDL cholesterol was observed in women, while higher levels of total and LDL cholesterol, triglycerides and serum glucose were observed in men. No significant difference was observed in BMI (24.9±2.9 for men and 24.8±3.9 for women).

Distribution of risk factors by age groups in both males and females showed that those aged 34-45 years appeared to have the highest prevalence of most of the risk factors except for a slight decrease in NIDDM, which was more prevalent in those over 55 years in both males and females. The prevalence of NIDDM in this population is comparable to that observed in other studies of South Asians. Conclusion The South Asian males in Melbourne show a higher prevalence of the CVD risk factors hypertension, cigarette smoking and diabetes, while the females show a higher prevalence of abdominal obesity.

Kadihah (3.6 mmol/L) and triglyceride (2.6 mmol/L) Hyper tension 22.1 15.6 Non-insulin-dependent diabetes (NIDDM) 10.3 12.2 General obesity 5.1 9.4 Abdominal obesity 45.4 65.9** St a t i s t i c s 40.3 4.3***

*P < 0.05; **P < 0.01; ***P < 0.001.

Plasma lipids and dietary habits of Malaysian Indian subjects living in Kuala Lumpur, Malaysia
Maniam T, Runawas JSP, Schultink WJ, Khor GL
1. Department of Nutrition and Community Health, Universiti Pertanian Malaysia, Serdang, Malaysia;
2. SEANUT-CROPMED Regional Center for Community Nutrition, University of Indonesia, Jakarta;
3. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), GmbH, Eschborn, Germany

This study aimed to determine whether the high rates of coronary heart disease in Indians living in Malaysia could be persuasively linked to effects of food composition on blood lipids. We studied the diet and consumption of clarified butter (ghee) in relation to the lipid profile of those Indians living in Kuala Lumpur, Malaysia. Plasma lipids, glucose and anthropometric measurements were determined in 75 men and 75 non-pregnant/non-lactating women aged 25 to 55 years. A food frequency questionnaire was used to assess food intake over one year. Rice was the staple and consumed daily. The main sources of protein were fish, chicken and eggs, with meat eaten rarely. Both males and females were unlikely to eat fruits. The frequent consumption of peanuts among women could be protective against coronary heart disease. Total blood cholesterol and LDL-cholesterol concentrations were higher in subjects from households using ghee in cooking. The consumption of the traditional Indian diet showed to be significantly associated with total cholesterol and LDL-cholesterol levels in men. The chanoys which are eaten with achaar and contains plenty of grated coconut may contribute to the high cholesterol level in the subjects who eat chanoys frequently.

The use of bitter buckwheat and konjac in weight reduction in obese patients with diabetes
Yang P
Tangshan Workers’ Hospital, Tangshan, China

Bitter buckwheat is produced in the hill region of Szechuan Province, China, and has been used in traditional medicine for those with diabetes. Konjac is a wild plant, a tuber, and has been used as food, in the form of vermicelli or as a jelly sheet. These foods are rich in dietary fiber which can help in weight reduction.

Ten diabetic patients with hyperlipidemia, age 39-45, were studied. Their body weights were 160-20 above the desirable range and the average blood levels of the five patients were given a bitter buckwheat diet, in the form of vermicelli, about 20-30 g/d. All drug therapy was suspended.

Mean serum cholesterol levels in four cases fed bitter buckwheat flour, decreased from 7.2 to 6.6 mmol/L; serum triglyceride decreased in one case only from 1.9 to 1.8 mmol/L. In the group fed konjac, mean serum cholesterol decreased from 6.8 to 6.6 mmol/L, and mean serum triglyceride decreased from 1.9 to 1.8 mmol/L. In two patients only. The blood glucose decreased to near normal. The average weight reduction in the ten cases was 1.5 kg. The patients felt full after eating either diet and had no side effects such as nausea, vomiting, abdominal pain, bloating or increased bowel movement were observed.

The effect of yogurt supplementation on the nutritional status of undernourished pre-operative colorectal cancer patients
Siagian CM, Rumawas JSP, Rahayuningsih S, Puspegoro AD
1. Nutrition Dept, Medical Faculty, Christian University, Jakarta;
2. Nutrition Department, Medical Faculty, University of Indonesia;
3. Surgery Department, Cipto Mangunkusumo Hospital Medical Faculty, University of Indonesia, Jakarta, Indonesia

Colorectal cancer patients often have anorexia, nausea and vomiting due to diagnostic procedures and therapeutic side effects leading to insufficient food intake and undernutrition as well as increased energy requirements and metabolic disorders. Improvement in nutritional status prior to an operation leads to a better post and post operative prognosis. Yogurt, a fermented milk, is easily digested and easily absorbed. Furthermore yoghurt is highly nutritious and well tolerated. Transferrin is a sensitive parameter for assessing changes in protein nutritional status. To improve the nutritional status of colorectal cancer patients an intervention study was carried out on hospitalized pre-operative and undernourished colorectal cancer patients with whom 3x10g yogurt plus 3x2g sugar was provided as a food supplement daily for 7 days. Anthropometric and laboratory assessments were performed at the commencement and the end of the study. There was a high prevalence of undernutrition among hospitalised colorectal cancer patients (74%). Significant increases in body weight and serum transferrin (P < 0.05) were observed after 7 days intervention. This finding suggests that yogurt can improve the nutritional status of colorectal cancer patients.

Nutritional risk for coronary heart disease (CHD) in 186 elderly patients in hospital
Liu D-L
Department of Nutrition, General Hospital Air Force, Beijing 100036, China

Coronary arteriosclerosis is an important cause of death in the elderly in China. For this reason, a nutrition survey was conducted in 186 elderly patients admitted during December 1992 - February 1994 to provide data for nutritional assessment. Body composition: height was 167.1 ± 7.1 cm, body weight was 68.5 ± 10.9 kg. Fifty-two subjects had weights 10-19% higher than standard weights and their mean body fat content was 21.6 ± 5.1%. Forty-seven subjects had weights 20-29% higher than the standard and their mean body fat content was 25.7 ± 4.7%. Eleven subjects had a weight 30% or higher than the standard weights and their mean body fat content was 28.6 ± 3.8%.

Laboratory examination: haemoglobin, total cholesterol (TC) and triglycerides (TG) were 157.8 ± 20.9 g/L, 5.2 ± 1.3 mmol/L and 1.7 ± 0.8 mmol/L, respectively.

Food intake: A high fat diet is thought to contribute to obesity which is an important cause of coronary arteriosclerosis. In this population, for those with CHD, saturated and unsaturated fatty acid intake were high while polyunsaturated fatty acids were low. An α-3 fatty acid rich diet can decrease the TC/HDL (high density lipoprotein cholesterol) ratio in plasma. Polyunsaturated fatty acids, especially α-3, may prevent heart rhythm disorders caused by ischaemia through a change in components of the cardiac membrane and raise the threshold for ventricular fibrillation.

Dietary fibre intakes were also relatively low in CHD patients. Dietary fibre is hydrophilic in the intestine, and combines with ions and bile acids. It decreases the absorption of fat. Fibre also decreases the ratio of Zn/Cu which may help prevent cardiovascular disease. In diets to prevent cardiovascular disease, it is appropriate to supply at least 10-15g dietary fibre in diet and many would say 20-30g from a variety of sources. Not only can blood lipids be optimised by diet, but tissue morphology and metabolic events favourably influenced.

Dietary intake and body composition in an urban elderly population in Beijing, China
Wang Y, Roe DA
Division of Nutritional Sciences, Cornell University, Ithaca, NY 14853 USA

A cross-sectional study was conducted to investigate the relationship between dietary intake and nutritional status, anthropometric characteristics and socioeconomic factors in an urban Chinese elderly population in Beijing, China. A total of 305 elderly individuals participated in the study with a mean age of 67.5 years. The mean body mass index (BMI) was 25.1 ± 3.7 and 24.8 ± 4.7 kg/m² for males and females, respectively. About 49% of males and 38% of females had a BMI above 24 and below 27.9 kg/m² whereas 17% of both males and females had a BMI over 28 kg/m². BMI was negatively correlated with age, so that 80% of overweight individuals were younger than 75 years of age. However, body weight and triceps skinfold thickness were strongly correlated with age. Anthropometric characteristics and socioeconomic factors (e.g. income, education level, healthcare access) were also strongly correlated with BMI. Individuals with the highest BMI quartile (BMI > 27.3) had a significantly higher intake of meat compared with subjects in the lower BMI quartile groups (P < 0.05). BMI was positively correlated with dietary intake of energy and protein (P < 0.05), and inversely associated with age and physical activity (P < 0.05) in multiple regression analysis. Moreover, BMI was positively associated with an individual’s education level and household income (P < 0.05) in the study population.

*Deceased
Cardiovascular disease risk factor prevalence in South Asian Melburnians
Ibiebele T, Hsu-Hage BH-H, Wahlqvist ML
Monash University Department of Medicine, Monash Medical Centre, Clayton, Victoria 3168, Australia

Objective To assess cardiovascular disease (CVD) risk factor prevalence South Asians residing in Melbourne.

Design A population-based cross-sectional study of a representative sample of 530 people of South Asian origin (Indian, Pakistani, Bangladesh, Sri Lankan) ancestry, aged 25 years and over. Subjects were systematically selected from a sampling frame generated by the Melbourne Telephone directory using a list of presumptive South Asian families furnished by South Asian community organisations in Melbourne.

Measurements. Measurements taken included: blood pressure, fasting glucose, serum insulin and blood lipid. Anthropometric measurements, namely height, weight, waist and hip circumferences, were also taken. Body mass index (BMI) and waist-to-hip ratios were calculated. Data on some CVD risk factors such as smoking were collected using questionnaires.

Results. In the population surveyed, men and women differed significantly in their presentation of established CVD risk factors. Comparisons of prevalence (%) of selected risk factors between men and women are shown in the table. A higher level of HDL cholesterol was observed in women, while higher levels of total and LDL cholesterol, triglycerides and serum glucose were observed in men. No significant difference was observed in BMI (24.9±2.9 for men and 24.8±3.9 for women).

Distribution of risk factors by age groups in both males and females showed that those aged 34–45 years appeared to have the highest prevalence of most of the risk factors except for diabetically NIDDM, which was more prevalent in those over 55 years in both males and females. The prevalence of NIDDM in this population is comparable to that observed in other studies of South Asians. Conclusion. The South Asian males in Melbourne show a higher prevalence of the CVD risk factors hypertension, cigarette smoking and diabetes, while the females show a higher prevalence of abdominal obesity.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined high cholesterol (6.5 mmol/L) and triglyceride (2.6 mmol/L)</td>
<td>6.0</td>
<td>6.1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>22.1</td>
<td>15.6</td>
</tr>
<tr>
<td>Non-insulin dependent diabetes (NIDDM)</td>
<td>10.3</td>
<td>12.8</td>
</tr>
<tr>
<td>Obesity</td>
<td>9.1</td>
<td>9.4</td>
</tr>
<tr>
<td>Abdominal obesity</td>
<td>5.1</td>
<td>4.5</td>
</tr>
<tr>
<td>**P &lt; 0.05; **P &lt; 0.001; **<strong>P &lt; 0.0001</strong></td>
<td></td>
<td></td>
</tr>
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</table>

Plasma lipids and dietary habits of Malaysian Indian subjects living in Kuala Lumpur, Malaysia
Manim T, Runawas JSP, Schulkin WJ, Khor GL
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NUTRITION, ETHNICITY, AND BODY COMPOSITION (ABSTRACTS)

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Siagian CM, Runawas JSP, Rahayuningisih S, Pusponegoro AD
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*Died
The dietary survey of urban and rural inhabitants of Tianjin, China
Tian HG
Tianjin Municipal Bureau of Public Health

A dietary survey was carried out to assess food patterns and nutrition profiles among the 15-54 year old Chinese population of Tianjin. Design: A random-stratified multi-cluster sampling technique was used in the survey. Of the 2333 eligible subjects, 207 dropped out, giving a response rate of 96%. Setting: Tianjin, one of the three largest cities in China, includes urban and rural districts. Subjects: A random stratified multi-level cluster sampling technique was used in the survey. Of the 2333 eligible subjects, 207 dropped out, giving a response rate of 96%. Results: Distinct differences in dietary patterns and nutrient intakes were found between subjects living in urban and rural areas. The diet of urban people was richer in fat and high quality protein compared with that of rural people. The percentage of energy intake from fat was about 31% in the urban diet and about 21% in the rural diet. Low intakes of vitamin A, riboflavin, calcium and zinc were found in both areas, with the situation being worse in the rural areas. Sodium intake was found to be high in both areas. Cholesterol intake was much higher among the urban people. Conclusion: The present survey revealed that the intake of some nutrients was lower than those recommended and that total sodium intake was very high. The study suggests that an integrated nutrition intervention is needed taking account food habits and urban-rural differences in food supply, education and economy.

A longitudinal dietary questionnaire study of urban and rural area residents in Tianjin
Wang D-S
Department of Nutrition and Food Hygiene, Tianjin Medical University, Tianjin 30070, CHINA

A longitudinal observation of three years duration on the nutritional status of urban and rural area residents in Tianjin (from 1986 to 1988) demonstrated substantial dietary changes; animal foodstuff intake increased notably. Energy and protein intakes reached recommended allowances for essential nutrients, and some nutrients exceeded the Asian and world mean intakes. Grain was still the main part of the diet with animal foodstuff a secondary part. Dietary intakes of both calcium and vitamin B1 reached 50% of the recommended intakes.

A simple and quick method to evaluate the influence of food price policy on population nutrition and nutrition intervention
Yang XL, Tian HG
Food Safety Control and Inspection Institute, Tianjin 300011, The People’s Republic of China

Food Price Policy has a strong influence on a population’s food choice and nutrition status, especially for low income families. Therefore, it is valuable to have a simple and quick method to evaluate its influence. Embracing the principles of nutritional rationality and economical feasibility, a mathematical model was established by means of Linear Programming to appraise the influence on and the rationality of the valorisation of particular foodstuffs, eggs and pork, in Tianjin. The 1990 data on food variety and price were used. It was found that a subsidy policy would not achieve improvement in the nutritional status of low income families. However, the concept of a “food choice space” has prospects for nutrition intervention. The conclusion is that this method can be used to judge the nutritional effect of food price policies and provide base line data for nutrition intervention.

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Upcoming conferences:

July 13-17, 1996, Florence, Italy
66th CONGRESS OF THE EUROPEAN Atherosclerosis Society
Contact: ES ’96, Fondazione Giovanni Lorenzini Medical Foundation, Via Appiani, 7, 20121 Milan, Italy.
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July 26, 1996, Sydney, Australia
KELLOGG’S NUTRATION SYMPOSIUM - THE ROLE OF DIET IN CANCER PREVENTION
Contact: Margaret Reid,
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August 11-16, 1996, Sydney, Australia
3rd INTERNATIONAL HYDROCOLLOIDS CONFERENCE
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August 18-22, 1996, Beijing, China
6th INTERNATIONAL SYMPOSIUM ON SELENIUM IN BIOLOGY AND MEDICINE
Contact: Prof Yiming Xia, Secretary General, ISSHM’96, Institute of Nutrition and Food Hygiene, Chinese Academy of Preventive Medicine, 29 Nan Wei Road, Beijing 100000, China.
Tel: +86-10-304-6034; Fax: +86-10-301-1875

August 29-31, 1996, Melbourne, Australia
AusPEN (AUSTRALIAN SOCIETY OF PARENTERAL AND ENTERAL NUTRITION) 22nd ANNUAL SCIENTIFIC MEETING
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Tel: +61-3-960-6744; Fax: +61-3-960-7155

September 18-20, 1996, Malmö, Sweden
SYMPOSIUM ON IN VIVO BODY COMPOSITION STUDIES
Prof Magne Alpsten, Dept of Radiation Physics, University of Göteborg, Sahlgrenska Sjukhuset, S-41345 Göteborg, Sweden.
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September 23-24, 1996, Canberra, Australia
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September 25-28, 1996, Hong Kong
WESTERN PACIFIC IDF MEETING

September 28-29, 1996, Sydney Hilton, Sydney, Australia
AUSTRALIAN ASSOCIATION OF THE STUDY OF OBESITY + THE NUTRITION SOCIETY OF AUSTRALIA
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September 29 - October 1, 1996, Sydney, Australia
20th ANNUAL SCIENTIFIC MEETING OF THE NUTRITION SOCIETY OF AUSTRALIA
Contact: A/Prof Jennie Brand Miller, Human Nutrition Unit, Dept of Biochem, University of Sydney, NSW 2006
Email: jbrandmiller@biochem.sydney.edu.au

September 30 - Oct 10, 1996, Wageningen, the Netherlands
THIRD INTERNATIONAL GRADUATE COURSE ON PRODUCTION AND USE OF FOOD COMPOSITION DATA IN NUTRITION
Contact: Mrs L Duyff, Secretariat FoodComp ‘96, Dept of Human Nutrition, Wageningen, the Netherlands
Tel: +31-37-483354; Fax: +31-37-483342
Email: lous.duyff@secretariat.voed.wau.nl

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20TH ANNUAL SCIENTIFIC MEETING, NUTRITION SOCIETY OF AUSTRALIA

September 30-October 2, 1996, Sydney, Australia
ENDOCRINE SOCIETY OF AUSTRALIA, ANNUAL SCIENTIFIC MEETING
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Tel: (06) 257-3299; Fax: (06) 257-3256

October 1, 1996, Sydney, Australia
NATIONAL HEART FOUNDATION OF AUSTRALIA - OVERWEIGHT AND CARDIOVASCULAR DISEASE
Contact: Susana Senses-Ferrari, NHF, PO Box 2, Woden, ACT 2606 Australia.
Tel: (08) 282-2144; Fax: +61-6-282-5147

October 2-4, 1996, Sydney Hilton, Sydney, Australia
AUSTRALIAN DIABETES SOCIETY, ANNUAL SCIENTIFIC MEETING
Contact: Ruth Lilian, ICMS, GPO Box 2609, Sydney, NSW, 2000
Tel: +61-2-241-1478; Fax: +61-2-251-3552