
3-9

The Nutrition Transition and Obesity in China

By:
Fuzhi Cheng

**CASE STUDY #3-9 OF THE PROGRAM:
“FOOD POLICY FOR DEVELOPING COUNTRIES: THE ROLE OF
GOVERNMENT IN THE GLOBAL FOOD SYSTEM”
2007**

Edited by:

Per Pinstруп-Andersen (globalfoodsystem@cornell.edu) and Fuzhi Cheng
Cornell University

In collaboration with:

Søren E. Frandsen, FOI, University of Copenhagen

Arie Kuyvenhoven, Wageningen University

Joachim von Braun, International Food Policy Research Institute

Executive Summary

Before China's economic reforms of the late 1970s, the typical Chinese diet consisted primarily of grain products and starchy roots, with few animal source foods, caloric sweeteners, or fruits and vegetables. Since the 1980s, Chinese people have experienced drastic changes in their food consumption behavior and nutritional status as a result of rapid economic development, expansion of agricultural production, globalization, urbanization, and technological improvement. These social and economic changes have helped shift the Chinese dietary structure toward increased consumption of energy-dense foods that are high in fat, particularly saturated fat, and low in carbohydrates. Dietary changes have been accompanied by a decline in energy expenditure associated with sedentary lifestyles, motorized transportation, labor-saving devices at home and at work, and physically undemanding leisure activities.

Along with the nutritional transition in China has come a rising epidemic of overweight and obesity among adults and adolescents, as well as widespread diet-related, noncommunicable diseases (DR-NCDs) including cardiovascular diseases, diabetes, and certain forms of cancer. The DR-NCDs are currently the leading causes of death, and mortality rates are projected to increase in the future. Obesity and related chronic diseases create large adverse impacts on individuals, families, communities, and the country as a whole and are China's primary public health concerns.

Recognizing that obesity and associated diseases are both individual and social problems, China has pursued a set of integrated, multisectoral, and population-based policies. The National Plan of Action for Nutrition in China serves as an overarching framework for setting food-based policies related to the country's nutrition and health issues. Specific policies range from promoting healthy diets and lifestyles to providing incentives to healthy food growers. In addition to food-based policies, China is implementing intensive disease prevention and control programs to address clinical aspects of obesity-related diseases.

Despite these efforts, the country still faces complex food and nutrition issues that are at the core of its economic and social development. Broad-based nutrition programs are still missing owing to the lack of funding for nutritional activities and a

lack of institutions to coordinate and manage nutrition interventions. Food policies, including those designed to affect the relative prices of unhealthy foods, remain questionable because it is often difficult to identify certain foods as "unhealthy". The coexistence of underweight, micronutrient-deficient, and overweight populations further complicates the situation. Given that large pockets of poverty exist, special care must be taken to avoid increasing the likelihood of underweight and micronutrient deficiency among the population as a result of policy changes to cope with overweight and obesity. It is increasingly important that policies focusing on healthy diets and physical activities will lead to optimal health outcomes.

Your assignment is to design what you would consider the most appropriate policy measures to address the problems identified in this case. Justify the policy measures you select, and assess the likely consequences of these policy measures for public health, nutrition, and economic development in China.

Background

The Nutrition Transition¹

Before the economic reforms of the late 1970s, the typical Chinese diet consisted primarily of grain products and starchy roots, with few animal source foods, caloric sweeteners, or fruits and vegetables. According to estimates from the Food and Agriculture Organization of the United Nations (FAO), based on the food balance sheet, cereals (such as rice and wheat), starchy roots (such as potatoes), and pulses (such as beans and peas) provided 1,015 kilocalories (kcal) (62 percent), 295 kcal (18 percent), and 101 kcal (6 percent), respectively, to the average daily per capita calorie supply in 1961, while meat products contributed only 30 kcal (1.8 percent). Sweet foods were rarely consumed, contributing merely 22 kcal per day (1.3 percent). An average Chinese person had a supply of only 78.8 kilograms (kg) of vegetables and 4.3 kg of fruits in 1961, equivalent to a daily calorie supply of 60 kcal from vegetables and 6 kcal from fruits—or just 3.7

¹ In this analysis, "nutrition transition" refers to shifts in dietary and physical activity patterns that are accompanied by demographic and epidemiologic changes.

percent and 0.4 percent of the total calorie supply per capita per day, respectively. Stimulants (such as tea and coffee), spices, and alcoholic beverages combined contributed 9 kcal, or 0.6 percent, to the average diet, and eggs and fish products contributed 16 kcal, or 1.0 percent. This dietary pattern, though severely lacking in necessary nutrients, had persisted in China throughout the 1960s and 1970s.

Since the 1980s China has made remarkable progress in boosting national economic development and agricultural production. Meanwhile, the country has witnessed dramatic changes in its dietary structure. Cereals continued to be the main source of dietary energy, providing 1,382 kcal/capita/day in 2003, up from 1,015 kcal/capita/day in 1961. Starchy roots became a less important food commodity, falling from an average per capita calorie supply of 295 kcal per day in 1961 to only 175 kcal per day in 2003. In contrast, the per capita calorie supply of meat products increased more than 15 times from 1961 to 2003, growing from 30 kcal/capita/day to 451 kcal/capita/day. Other foods such as vegetable oils also became important sources of dietary energy intake.

The Chinese population now has a much richer, more diverse diet. Vegetables and fruits, for instance, contributed some 8 percent to the average calorie supply in 2003. Each person in China, on average, had a supply of 271 kg of vegetables and 50 kg of fruit per year. The supply of alcoholic beverages increased almost 23-fold—from 1.2 to 27.1 kg/capita/year, although it is still much lower than in many developed Asian countries (IIASA 2005). The supply of sweeteners, such as sugar, nearly quadrupled to 8.2 kg/capita/year. In 2003, people in China ate about nine times as many eggs as in 1961 and the supply of fish and other aquatic products had increased from 5.2 to 32.1 kg/capita/year.

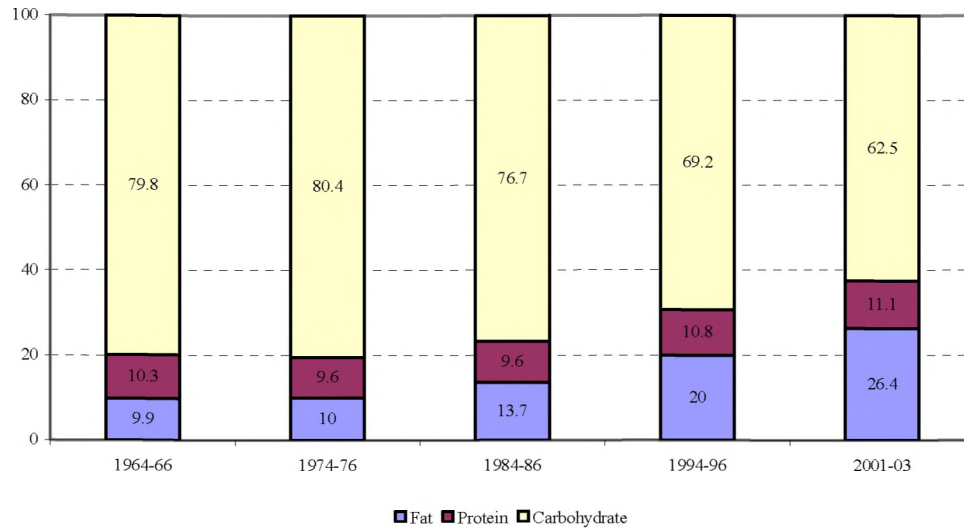
There is also a trend toward increasing reliance on animal products relative to vegetal products for dietary energy. For example, although the Chinese population had a higher per capita calorie supply of cereals in 2003 than in 1961 (1,382 kcal compared with 1,015 kcal), the share of cereals in the overall calorie supply declined from 62.1 percent to 47.5 percent. Meanwhile, animal products (including meat products) rose from 51 kcal/capita/day (or 3.1

percent of calorie intake) in 1961 to 613 kcal/capita/day (or 21.1 percent) in 2003. This trend corresponds to a change in the share of energy from fat, protein, and carbohydrates (Figure 1). During the period 1964–66 to 2001–03, energy from carbohydrates fell from 80 percent to 63 percent, while that from fat increased from 10 percent to 26 percent. Notably, however, edible oil contributes a significant share of total fat intake in China (Popkin and Du 2003).

Since China is a large and diverse country, the changes in dietary patterns have not been uniform across the population. They are influenced by a number of factors including regional, ethnic, cultural, income, and agricultural production differences. This information is not readily available from the food balance sheet, but household food consumption and nutrition surveys can provide additional insight into this matter. Results from two China Health and Nutrition Surveys conducted in 1989 and 1997 are shown in Table 1 to illustrate differences in consumption patterns of major food items for people living in urban and rural areas and for people belonging to different income groups.

A number of interesting features are worth noting. First, there was a decrease in grain consumption between 1989 and 1997 in both urban and rural areas and among all income groups (this is also true for a longer period 1980–2003, not shown in the table). Average grain consumption per capita per day dropped almost 20 percent from 684 grams (g) in 1989 to 557g in 1997, with rural and low-income people experiencing the most significant decreases. In addition, there appears to be a negative relationship between income and grain intake—that is, higher income is associated with less grain consumption. Third, the per capita consumption of animal products has increased substantially, especially for high-income and urban people. For instance, meat consumption grew by 23.1g in urban areas, but just 14g in rural areas. In contrast to grain consumption, this result indicates a positive relationship between income and animal food intake. Finally, on average, there was a decrease in fresh vegetable intake but an increase in fresh fruit intake. People in urban areas and with higher incomes consume more fruits than those in rural areas and with lower incomes. The reverse occurs for vegetable consumption.

Figure 1: Shares of Fat, Protein, and Carbohydrates in Dietary Energy Supply, 1964–66 to 2001–03 (percentage)



Source: FAO 2005.

Table 1: Consumption of Major Food Items, 1989 and 1997 (mean intake in grams/capita/day, age 20-45)

Food	Urban		Rural		Low-income		Middle-income		High-income		Total	
	89	97	89	97	89	97	89	97	89	97	89	97
Grains	556	489	742	581	811	615	642	556	595	510	684	557
Coarse	46	25	175	54	226	68	98	43	78	30	135	46
Refined	510	465	567	527	585	546	544	513	517	479	549	511
Vegetables	309	311	409	357	436	356	360	357	335	325	377	345
Fruits	14.5	36	14	17	5.5	8	13	18	26	38	15	21.7
Meat	73.9	97	44	58	36	40	58	64	67	96	53	67.8
Poultry	10.6	16	4.1	12	4.1	7	6.6	10	7.7	20	6.1	12.7
Eggs	15.8	32	8.5	20	6	14	11	22	16	32	11	22.7
Fish	27.5	31	23	27	12	16	29	26	33	40	25	27.9
Milk	3.7	4	0.2	0.9	0.8	0.1	0.2	1.4	3.5	3.6	1.3	1.7
Plant oil	17.2	40	14	36	13	32	16	37	16	42	15	37.1

Source: Popkin and Du 2003.

Despite spatial and income differences, one trend is clear for the Chinese population: as more energy-dense foods have become available, total energy intake in China has increased substantially. In 2003 the overall average dietary energy consumption of 2,910 kcal/capita/day was about 80 percent higher

than that in 1961 (1,635 kcal/capita/day).² This change has occurred just as energy expenditure for

² Total energy intake in recent years has decreased slightly from its peak level of about 2,980 kcal/capita/day in 1998 (FAO 2005).

the Chinese has been on a steady decline, especially in the past two decades. With rapid urbanization, more people have shifted away from high-energy-consuming work activities such as farming, mining, and forestry in rural areas toward the service sector in urban areas. The acceleration of this occupational shift is analyzed in detail in Du et al. (2002). Other changes are also important. For example, Chinese households have a marked increase in ownership of motorized vehicles, televisions, and computers.³ Thus the use of labor-saving transportation devices and the rise in physically undemanding leisure time also contribute to decreased energy expenditure in the Chinese population.

Driving Forces

Rapid changes in diets and lifestyle patterns are having a significant impact on China's nutritional status. A number of forces are driving this nutrition transition in China.

Income growth. As a result of rapid overall economic growth, per capita disposable income in China has increased substantially during the past two decades. As income grows, people are diversifying out of their traditional diet dominated by cereals and other starchy staples. Studies have found that income elasticity for animal-source foods in China has remained positive for all income groups since the 1980s, which means an average Chinese person will always demand more of this food given additional income (Popkin and Du 2003; Du et al. 2004). This is in contrast to the demand for other foods such as coarse grains for which negative income elasticities might be the case.⁴ The tendency to purchase more energy-dense and animal-source foods when income rises may be related to people's apparently innate preferences for dietary sugars and fats or to habits possibly adopted in infancy or childhood (Drewnowski 1989). In addition to its dietary impact, income growth can have adverse effects on labor supply, leading to a decrease in energy expenditure. A "backward-bending" labor supply curve means that individuals with higher incomes may desire less burdensome

work and more leisure time. With the popularization of televisions, personal computers, and other indoor entertainment systems (which become more affordable as income rises), expanded leisure time is usually characterized by physically undemanding activities.

Livestock production increase and relative price decrease. China's dramatic increase in animal-source food consumption would not have been possible without a rapid expansion of its domestic livestock industry.⁵ Since 1985 China's pork output has increased markedly, reaching almost 50 million tons in 2004. China's beef sector has grown from an inconsequential output level in the 1980s to the third largest in the world (after the United States and Brazil). China has moved into second place behind the United States in total output of poultry meat. Meanwhile, the relative price of livestock products has followed a downward trend. Projections point to a further decline in future livestock prices relative to cereals (Delgado et al. 1999). The combined substitution and income effect that results from the relative price decrease for animal-source food raises its consumption.

Urbanization. In 2004 about 39 percent of the total population lived in China's urban areas, compared with 17 percent in 1975 (World Bank 2006). Urbanization has led to fundamental changes in food preferences and needs. For example, as the opportunity cost of time spent on cooking increases, people tend to demand more foods outside the home, and these foods usually contain high concentrations of salt and fat. Huang and Bouis (1996) found that in China, urbanization alone accounted for an extra 5.7–9.3 kilograms in per capita consumption of meat and fish products annually and a decrease of 58.3–70.1 kilograms in per capita consumption of rice, once income and price effects had been controlled for. Since the share of rural population is still high (about 60 percent), the potential for further urbanization and rapid increases in per capita consumption of animal-source food remains high. In addition to food consumption changes, urbanization also brings about more physically undemanding jobs in the service sector and increased use of automated transportation.

³ According to the National Bureau of Statistics of China, for every 100 households there were 25 motorized vehicles, 133 televisions, and 33 personal computers in 2004 (NBS 2005).

⁴ In economics, goods with negative income elasticities are called "inferior goods".

⁵ The expansion of China's livestock industry would not, in turn, have been possible without the dramatic increase in production of feed grains, such as soybeans and maize.

Globalization. Since China initiated broad economic reforms in the late 1970s, trade in food and food products has increased substantially. The momentum for further liberalization quickened after China's entry into the World Trade Organization (WTO) at the end of 2001. In most recent years, annual imports of agricultural products have exceeded US\$5 billion. Freer trade has driven down the prices of several major food items including edible oils and related products, which are important sources of fat intake for the Chinese population. Globalization has also led to the penetration of Western-style fast food outlets into China, and their popularity is stimulated by mass media promotions and a generation of one-child families. The success of Kentucky Fried Chicken and McDonald's in China is a good example of the effects of globalization.

Technological Advances. Technological factors can lead people to expend less energy as they adopt a sedentary lifestyle, motorized transport, labor-saving devices at home and at work, and physically undemanding activities during their leisure time.

Obesity and Chronic Diseases

China's recent nutrition and dietary changes have both positive and negative health consequences. Many believe that the increased consumption of animal-source products such as meat has helped alleviate protein-energy malnutrition and micronutrient deficiency, which used to be prevalent in some parts of the country. More important, however, the shift toward more energy-dense, nutrient-poor foods with high levels of sugar and saturated fats, combined with reduced physical activity, has led to an epidemic of overweight and obesity in China. Although human genes could play an important role in determining a person's susceptibility to weight gain, the causal linkage between increased fat intake and obesity has been shown in numerous longitudinal studies (see, for example, Bray and Popkin 1998).

Overweight and obesity among adults is commonly assessed using the body mass index (BMI), defined as the weight in kilograms divided by the square of the height in meters (kg/m^2).⁶ A healthy BMI is

considered to be in the range of 18.5 to 25. A BMI greater than 25 is defined as overweight, and a BMI greater than 30 as obese. In China, the prevalence of overweight and obesity has been on the rise (Table 2). The combined prevalence of overweight and obesity was positively associated with income; it was about twice as high in the high-income group (19.6 percent) as in the low-income group in 1997 (10.9 percent). The average prevalence increased by 50 percent in the eight-year period, but in the high-income group it increased more than 80 percent.

According to a nutrition and health survey conducted in China in 2002, more than 200 million adults are estimated to be overweight, among which more than 60 million are obese (*China Daily* 2004). Compared with levels in 1992, the prevalence of overweight and obesity has increased 39 percent and 97 percent, respectively. The overall adult overweight and obesity rates average 22.8 percent and 7.1 percent, but in urban areas the rates rise to 30 percent and 12.3 percent. A conservative prediction by Popkin et al. (2001) shows that about 40 percent of the Chinese population will be overweight by 2025. The child obesity rate has been estimated to be around 10 percent in recent years, but it is projected to grow by 8 percent a year. Studies show that in China up to 27 percent of urban children aged 10 to 12 are overweight (UNICEF 2005).

The rising prevalence of overweight and obesity in China poses a high risk for serious diet-related, noncommunicable diseases (DR-NCDs), including type 2 diabetes, gallbladder disease, cardiovascular disease (hypertension, stroke, and coronary heart disease), and certain forms of cancer. These diet-related diseases, along with other chronic diseases, were projected to account for 79 percent of all deaths in China in 2005 (Figure 2). Cardiovascular disease is the leading cause of mortality and alone accounts for 33 percent of all deaths. According to the World Health Organization (WHO), deaths from chronic diseases will increase by 19 percent by 2015. Most markedly, deaths from diabetes will increase by 50 percent (WHO 2005).

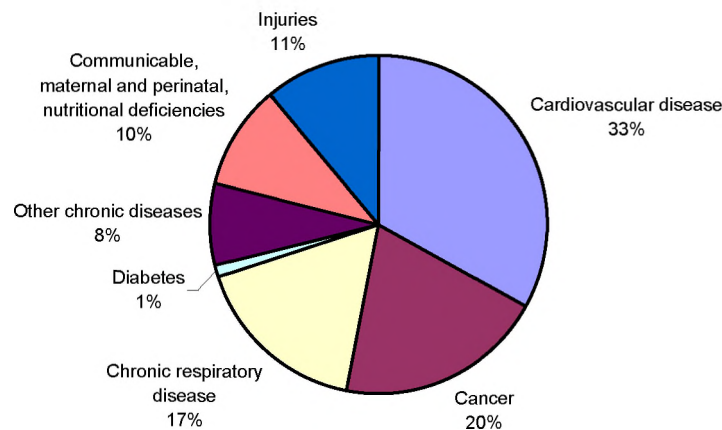
⁶ For infants and young children, the BMI is compared with a "reference population" of the same age that is known to have grown well.

Table 2: Combined Prevalence of Overweight and Obesity (BMI ≥ 25), 1989–1997 (percentage)

Income	1989	1991	1993	1997
Low	6.3	6.6	9.5	10.9
Middle	9.1	11.7	10.0	14.7
High	10.7	13.6	13.5	19.6
Average	10.3	10.6	10.9	15.4

Note: Data are for adults aged 20–45 years and are from China Health and Nutrition Surveys in 1989, 1991, 1993, and 1997.
Source: Du et al. 2004.

Figure 2: Projected Causes of Death for All Ages, China (2005)



Source: WHO 2005.

Policy Issues

Lack of Nutrition Intervention

From the 1950s to the late 1970s, the Chinese government's responses to malnutrition were limited, and concerns about nutrition were largely confined to issues of food security and food availability,

such as inadequate agricultural output and poor food distribution. The strategies for national development during this period were separated from efforts to improve the population's nutritional

status. Given the tremendous need to meet food demand for both domestic stability and national defense purposes, grain production was over-emphasized in some areas of the country, and diversified agriculture was neglected. The results were disproportionate amounts of some agricultural products, shortage of others and an unbalanced dietary structure.

After economic reforms were initiated in the late 1970s, China began to emphasize the importance of coordinated development of agriculture, and the nutritional status of the Chinese population improved substantially. A comprehensive national strategy for nutrition intervention, however, was missing for most of the 1980s and 1990s. This lack had to a certain extent offset the initial nutritional gains from economic growth and agricultural adjustment. There is also a lack of funding allocated for nutritional activities and a lack of institutions to coordinate and manage nutrition interventions. Consequently, government participation in nutrition interventions is limited, and larger roles are often played by research institutes and civil societies.

The Difficulty of Implementing Food Policy

A number of food policies are considered controversial because of their unintended nutritional impacts. One example is price policy. By changing relative prices of different goods, price policy is often used to shift food consumption patterns to achieve certain nutritional and health objectives. An increase in the price of an “unhealthy” food (such as through a consumption tax) will presumably help reduce its consumption. Standard economic theory says that an increase in the price of a good tends to drive consumption away from that good (and its complements) and toward its substitutes. So an increase in the price of an unhealthy food should shift consumer demand toward a healthier food.

Though simple in theory, price policy is hard to implement in practice. It is often difficult to identify foods as “unhealthy,” and an increase in the price of so-called “unhealthy” foods could reduce access to their healthy components. For example, there is great controversy about the role of animal-source foods and caloric sweeteners. Guo et al. (1999) show that price increases for animal-source foods in China would have a large negative impact on their consumption and on people’s cor-

responding fat intake. This reduction in consumption, however, could also decrease people’s intake of a wide range of other crucial dietary components such as protein, calcium, and iron. Even for fat intake itself, arguments arise about whether to reduce total fat intake or just the intake of selected types of fats like trans fatty acids, erucic acid, and saturated fats. Setting appropriate price policy at highly disaggregate levels remains a challenge to policy makers, and other food policies pose similar challenges.

The Triple Burden

The coexistence of energy deficiencies, nutrient deficiencies, and excessive energy intake (the triple burden) in one population further complicates the issue. A policy directed at reducing overweight and obesity must take into account those who are underweight and/or micronutrient deficient. Recent studies have shown that underweight and overweight (or undernutrition and overnutrition) can and do occur in close proximity at the national, community, and even household levels in China (Doak et al. 2000). For example, in a 1982 survey, 9.7 percent of adults aged 20–45 were underweight, whereas 6 percent were overweight. By 1989, the prevalence of overweight (8.9 percent) had surpassed that of underweight (8.5 percent). By 2002 the proportion of overweight adults reached nearly 22 percent, yet more than 6 percent of adults were still suffering from underweight (Zhai and Wang 2006).⁷ At the household level 28 percent of families have a least one underweight member, 26 percent have at least one overweight member, and 8 percent have at least one underweight member coexisting with one overweight member (Doak et al. 2000). Concurrent with overweight and underweight is widespread micronutrient deficiency (primarily iron, vitamin A, iodine, and zinc), mainly among poor women and children. For example, recent statistics show that the prevalence of iron-deficiency anemia in children under five years of age is 12.3 percent in urban areas and 26.7 percent in rural areas. This rate is highest among infants under six months of age, with a prevalence rate of 50 percent in rural areas (WHO 2005).

⁷ The prevalence of underweight and overweight preschool children is 7.8 percent and 8.2 percent (Zhai and Wang 2006).

Given that large pockets of poverty exist where many still suffer from undernutrition and vitamin and mineral deficiencies, particularly in China's poor, rural western regions, programs targeting the reduction of overweight must also be capable of addressing underweight and micronutrient deficiency.⁸ Public health policies that aim to reverse overnutrition and overweight by cutting the supply or raising the price of energy-dense foods may have undesired consequences on underweight and micronutrient-deficient people. Similarly, programs designed to address underweight and micronutrient deficiency may alter the diet to the detriment of groups vulnerable to overweight. Therefore, it is increasingly important for policies to focus on healthy diets and physical activities that will lead to optimal health outcomes in all three dimensions.

Stakeholders

Obesity and related chronic diseases have large adverse impacts on individuals, families, communities, and the country as a whole. At the individual level, the health consequences of obesity range from nonfatal, quality-of-life complaints such as respiratory difficulties, musculoskeletal problems, skin problems, and infertility to diseases that lead to an increased risk of premature death, including non-insulin-dependent diabetes, gallbladder disease, cardiovascular problems (hypertension, stroke, and coronary heart disease), and cancers that are hormone related and associated with the large bowel. Hypertension, diabetes, and raised serum cholesterol are between two and six times more prevalent among heavier women. Severe obesity is associated with a 12-fold increase in mortality in 25- to 35-year-olds when compared with lean individuals. Negative attitudes toward the obese can lead to discrimination in many areas of life, including health care and employment. Moreover, the psychological consequences of obesity can range from lowered self-esteem to clinical depression. Rates of anxiety and depression are three to four times higher among obese individuals. Individuals suffering from obesity and related chronic diseases face

lowered or complete loss of productivity and income-earning and learning capacity. Families with obese members suffer from lower household income and higher medical expenditures.

At the country level, the effect of obesity is equally large. Recent estimates suggest that about 2–8 percent of the total health care costs in developed countries are attributable to obesity. This figure was estimated to be 9.1 percent, or US\$78.5 billion, in the United States in 1998 (Finkelstein et al. 2003). These costs are direct costs of diagnosis, treatment, and management of obesity, not including indirect costs arising from loss of productivity. Of course, the true costs could be even greater if all obesity-related conditions are included in these calculations. The exact numbers for China are not clear, but studies have shown that these costs could be very high. For example, Popkin et al. (2001) estimated that total hospital spending in 1998 on diet-related chronic diseases was US\$11.74 billion, representing 1.6 percent of gross domestic product (GDP) and 22.6 percent of all hospital expenditures. The study also found that diet-related chronic diseases could have large economic costs in terms of lost productivity due to premature deaths. Specifically, the costs associated with this type of mortality were estimated to be US\$3.41 billion, or 0.5 percent of GDP, even when a very conservative method of extrapolation was used.

A more recent WHO study reported that China could lose US\$18 billion dollars in national income from premature deaths due to heart disease, stroke, and diabetes in 2005 alone. These costs are projected to rise dramatically in the next two decades as the prevalence of diet-related chronic diseases continues to increase. WHO estimates that cumulatively China could lose US\$558 billion over the next 10 years from premature deaths due to the chronic diseases (WHO 2005). It is important to note that these costs do not include loss of work output for patients who survive or for lowered work rates due to diet-related chronic diseases, including lost productivity from persons who are debilitated and being treated as outpatients or not being treated at all. It can, however, be argued that the costs would be much higher if the losses of productivity due to morbidity and mortality were combined.

⁸ In addition to the 26.1 million rural people living below the official poverty line, undernutrition and micronutrient deficiency pose at least a moderate threat to the roughly twice as large low-income rural population living on the brink of poverty, the urban poor (about 14.7 million), and a large portion of the 100 million people who “float” between rural and urban areas.

Because obesity and associated conditions are both individual and social problems and have deep roots in people's nutritional status, dietary habits, and lifestyle patterns, solving these problems requires a multisectoral, multidisciplinary, and population-based approach. The relevant sectors include health, agriculture, commerce, education, sport, and transportation ministries, as well as local governments. Various stakeholders must be involved and coordinated, including individuals, households, the public and private sectors, and nongovernmental organizations (NGOs). NGOs like the China Nutrition Society have taken a very proactive approach to promoting healthy diets, and international organizations like WHO and the United Nations Children's Fund (UNICEF) are also playing an important role.

Policy Options

Policy options to help reduce overweight and obesity directly involve a wide range of long-term strategies, including prevention, weight maintenance, management of co-morbidities, and weight loss. These strategies should be part of an integrated, multisectoral, population-based approach that includes environmental support for healthy diets and regular physical activity (WHO 2005). In a broader context, an appropriate and comprehensive food and nutrition policy is essential, and the formulation of this policy should be a joint effort of many concerned agencies under the leadership of the government. The policy should address food production, food processing, marketing, food distribution, exports and imports, poverty alleviation, and nutrition education. All government sectors involved should integrate better nutrition into the goals of their sectoral plans and programs of development. Together with supply-side measures, policies for fostering healthy food consumption and lifestyle patterns should be regarded as essential in the government's efforts to meet the challenge of increasing overweight and obesity.

At present, the National Plan of Action for Nutrition in China serves as an overarching framework for setting food-based policies related to the country's nutrition and health issues. The plan was first approved by the State Council in 1997. In 1998, responsibility for carrying out the plan was transferred to the Department of Disease Control of the Chinese Ministry of Health. The plan sets out a broad range of long-term goals including alleviation

of hunger and food shortage, improvement of nutritional status, and prevention and control of chronic diseases. Emanating from the plan, a number of demand-side and supply-side policies have been implemented specifically to prevent obesity and related diseases.

On the demand side, some initiatives have been undertaken to raise public awareness about the importance of healthy diets and lifestyles. The most important of these are the Dietary Guidelines for Chinese Residents and the Balanced Diet Pagoda proposed by the Chinese Nutrition Society (CNS). Similar to the food pyramid guidance system in the United States, the Chinese dietary guidelines establish eight principles for developing a good diet. These principles include increasing the intake levels of fruits and vegetables and higher-fiber products and reducing the intake of caloric sweeteners and fat. Correspondingly, the Chinese Pagoda, consisting of five levels of food intakes, recommends average values for daily consumption of different foods based on estimated energy needs for an average healthy Chinese adult.

Parallel to the dietary guidelines are different forms of nutrition education campaigns throughout the country. For example, face-to-face nutrition education sessions have been held in a number of provinces in China (Zhai et al. 2002). These educational activities are usually held at limited locations, however, and are designed for a specific group of people, like public health workers at anti-epidemic stations. Publications related to nutrition education, such as the dietary guidelines, are also available. But information dissemination concerning nutrition is limited in scale and usually unorganized. To date, there have been no mass media campaigns related to nutrition in China (Zhai et al. 2002).

Policies on the supply side consist primarily of creating incentives for farmers to grow more healthy foods. Cereals and legumes are known to contain important nutrients required for good nutrition, including carbohydrates, protein, and even fat, as well as vitamins and minerals, including calcium, folic acid, and iron. The Ministry of Agriculture and the Ministry of Commerce have collaborated to promote the production of certain cereals and soybeans. In 2004, the Chinese government started to give subsidies for the purchase of grain and soybean seeds that are considered "high quality." These products include soybeans

with a high oil content, corn for industrial use, and wheat with high protein. In addition to seed subsidies, more general forms of agricultural support to crops are also available, for example, through direct payments, infrastructure, and agricultural research. There have also been efforts to enhance the production of fruits and vegetables. In 2003, China reported that 145 million tons of fruits and 540 million tons of vegetables were produced—a 100 percent and 250 percent increase over the amount produced in 1995, respectively—and the majority of the fruits and vegetables are consumed domestically (World Bank 2005).

Beyond food-based policies, intensive disease prevention and control programs administered by the Ministry of Health are underway. These programs seek to provide clinical assistance to address the existing burden of obesity-related diseases. The National Plan for Prevention and Control of Diet-Related Noncommunicable Diseases was issued in 1996 and involved integrated intervention activities carried out in 24 demonstration sites in 17 provinces (Zhai et al. 2002). The National Guideline for the Prevention and Control of Hypertension was in place in 1998, the same year that National Hypertension Day (October 8 of each year) was established.

Attempts have been made to promote physical activity among the Chinese people. The government urges all residents to exercise regularly to improve their health status, because appropriate regular daily physical activity is considered a major component in preventing chronic diseases. In major cities, local governments have increased the density of opportunities for physical activity, including recreation facilities such as parks, large squares, recreation centers, and green spaces. Recognizing that patterns of physical activity acquired during childhood and adolescence are more likely to be maintained throughout the life span, China's Ministry of Education has initiated a campaign to lighten school children's academic burden and increase their time for physical activities.

Assignment

Design what you would consider the most appropriate policy measures to address the problems identified in this case. Justify the policy measures you select, and assess the likely consequences of

these policy measures for public health, nutrition, and economic development in China.

Additional Readings

- Doak, C., L. Adair, M. Bentley, C. Monteiro, and B. Popkin. 2005. The dual burden household and the nutrition transition paradox. *International Journal of Obesity* 29: 129–36.
- Popkin, B., and P. Gordon-Larsen. 2004. The nutrition transition: Worldwide obesity dynamics and their determinants. *International Journal of Obesity* 28: 52–59.
- Zhai, F., D. Fu, S. Du, K. Ge, C. Chen, and B. Popkin. 2002. What is China doing in policy-making to push back the negative aspects of the nutrition transition? *Public Health Nutrition* 5: 269–73.

References

- Bray, G., and B. Popkin. 1998. Dietary fat intake does affect obesity. *American Journal of Clinical Nutrition* 68: 1157–73.
- China Daily. 2004. Nearly 200 million Chinese are overweight. October 13, 2004.
http://www.chinadaily.com.cn/english/doc/2004-10/13/content_382110.htm.
- Delgado, C., M. Rosegrant, H. Steinfeld, S. Ehui, and C. Courbois. 1999. *Livestock to 2020: The next food revolution*. Food, Agriculture, and the Environment Discussion Paper 28. Washington, DC: International Food Policy Research Institute.
- Doak, C., L. Adair, C. Monteiro, and B. Popkin. 2000. Overweight and underweight coexist within households in Brazil, China, and Russia. *Journal of Nutrition* 130: 2965–71.
- Drewnowski, A. 1989. Sensory preferences for fat and sugar in adolescence and in adult life. In C. Murphy, W. Cain, and D. Hegsted, eds., *Nutrition and the chemical senses in aging*. *Annals of the New York Academy of Sciences* 561: 243–50.
- Du, S., B. Lu, F. Zhai, and B. Popkin. 2002. A new stage of the nutrition transition in China. *Public Health Nutrition* 5 (1): 169–74.

- Du, S., T. Mroz, F. Zhai, and B. Popkin. 2004. Rapid income growth adversely affects diet quality in China—Particularly for the poor!" *Social Science and Medicine* 59: 1505–15.
- FAO (Food and Agriculture Organization of the United Nations). 2005. FAOSTAT. <http://faostat.fao.org/> [accessed November 20, 2005].
- Finkelstein, E., I. Fiebelkorn, and G. Wang. 2003. National medical spending attributable to overweight and obesity: How much, and who's paying? *Health Affairs* W3: 219–26.
- Guo, X., B. Popkin, T. Mroz, and F. Zhai. 1999. Food price policy can favorably alter macronutrient intake in China. *Journal of Nutrition* 129: 994–1001.
- Huang, J., and H. Bouis. 1996. *Structural changes in the demand for food in Asia*. Food, Agriculture, and the Environment Discussion Paper 11. Washington, DC: International Food Policy Research Institute.
- IIASA (International Institute for Applied Systems Analysis). 2005. Can China feed itself? <http://www.iiasa.ac.at/> [accessed November 20].
- NBS (National Bureau of Statistics of China). 2005. *China statistical yearbook*. <http://www.stats.gov.cn/> [accessed November 20, 2005].
- Popkin, B., S. Horton, and S. Kim. 2001. *The nutrition transition and prevention of diet-related chronic diseases in Asia and the Pacific*. ADB Nutrition and Development Series No. 6. Manila, Philippines: Asian Development Bank.
- Popkin, B., and S. Du. 2003. Dynamics of the nutrition transition toward the animal foods sector in China and its implications: A worried perspective. *Journal of Nutrition* 133: 3898S–3906S.
- UNICEF (United Nations Children's Fund). 2005. At a glance: China. <http://www.unicef.org/> [accessed November 20, 2005].
- WHO (World Health Organization). 2005. *The world health report 2005*. Geneva.
- World Bank. 2005. Compliance with food safety requirements for fruits and vegetables. Washington, DC. Unpublished manuscript.
- . 2006. *World development indicators*. Washington, DC.
- Zhai, F., D. Fu, S. Du, K. Ge, C. Chen, and B. Popkin. 2002. What is China doing in policy-making to push back the negative aspects of the nutrition transition? *Public Health Nutrition* 5: 269–73.
- Zhai, F., and H. Wang. 2006. The double burden of malnutrition in China, 1989 to 2000. In *The double burden of malnutrition: Case studies from six developing countries*. FAO Food and Nutrition Paper 84. Rome: FAO.