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Brief Review on the National Nutrition Survey, Japan

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Outline of the survey

1. Historical background

The National Nutrition Survey, Japan has been annualy conducted for 50 years. It was started by the General Head Quarters(GHQ) in 1946, just after the World War Ⅱ, to assess nutritional conditions and income level of the Japanese people for acquiring urgent food supplies from other countries. At the beginning, the survey covered only Tokyo area, and the survey area was gradually expanded, being nationwide in 1948[1].

In 1952, the Nutrition Improvement Law was enacted, which states the aim and enforcement of the National Nutrition Survey. Under the law, nutritional conditions of the Japanese have been improved.

Especially in sync with the high economic growth from 1960*s, dietary habits of the Japanese have turned to be *modernized*, and malnutrition has become rare problems. On the other hand, over intake which may be related to obesity, heart diseases, diabetes mellitus and other chronic diseases, has become a more important matter in the nutrition policy in Japan. The aim of this survey also has shifted from the policy making for food supplies to monitoring the over intake for prevention of dietary-related chronic diseases and health promotion.

2. Purpose

Under the Nutrition Improvement Law, this survey aims to monitor food consumption and nutrient intake of the Japanese people, and to clarify the relationship between nutrition and health conditions, in order to obtain basic data for the nutrition and health promotion policy[2]

3. Source of data

In the 1993 survey, 15,782 subjects from 4,988 households in randomly selected districts were involved, in order to obtain a representative sample of districts in Japan.

4. Method

Preparation and data collection procedure is shown in Fig. 1. The Health Promotion and Nutrition Division, Health Service Bureau. in the Ministry of Health and Welfare, is responsible for budget, planning and implementation of the survey. Annual budget for the survey has been around 700,000 US dollars for the last five years. The actual data collection is done by the 300 regional health centers selected from approximately 850 ones under the supervision of the Health Promotion and Nutrition Division, and prefecture or major city(the designated cities) governments. The survey team consists of physicians, public health nurses, dietitians and clinical laboratory technicians. A chief at each regional health center becomes the head of the survey team. Before the survey, a meeting for explanation to households heads is held to obtain their consent to enroll in the survey, and then enumerators visit the households to distribute questionnaire sheets and request the subjects to fill them out.

The food intake survey in households has been done during the three consecutive days(excluding Saturday, Sunday and national holidays) in mid-November. The names of ingredient, weight, cooking name and the leftover amount were recorded by one member in each household. During the survey, dietitians trained for the survey visit each household at least once a day to check the recorded sheets. The members of the households are asked to undergo physical examinations by physitians and public health nurses at specified locations, to assess their physical conditions including nutritional status.

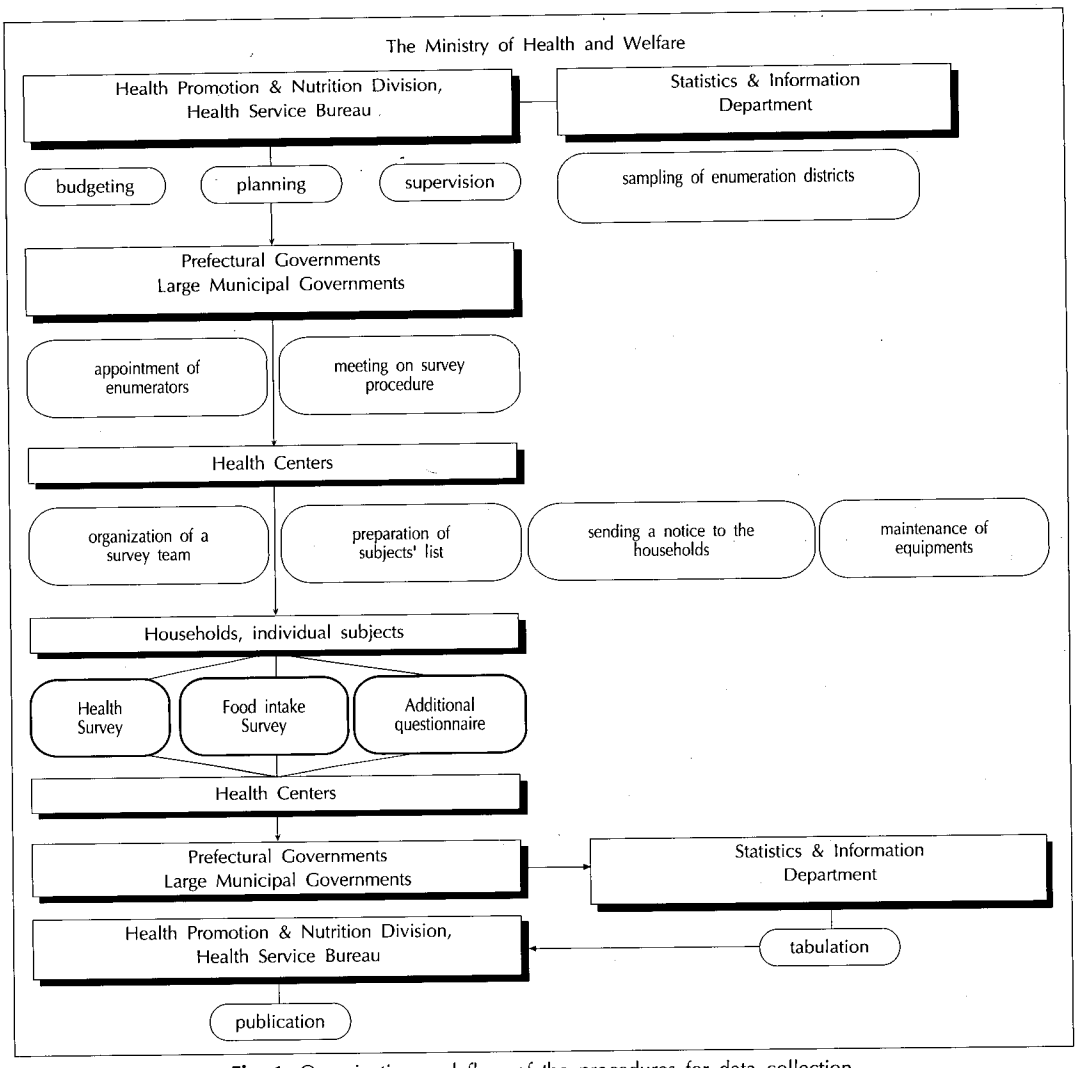

Fig. 1. Organization and flow of the procedures for data collection.

Main variables of the data collected in the 1993 survey are listed in Table 1. The optional questionnaire on dietary habits focuses on the different topics in each year, and some additional items have been measured in each survey year ; for example, serum iron, iron-binding capacity, HbAlc, fructsamine and uric acid were also measured in the 1990 survey.

The collected data gathered from regional health centers and checked at prefecture or major city governments. After the final error check at the Health Promotion and Nutrition Division, the data sets are input, merged, re-checked, stored and analyzed at the Statistics and Information Department, the Ministry of Health and Welfare.

5. Official publications

The annual survey reports in Japanese are published by the Ministry of Health and Welfare, and sold for general readers from a publisher company about 2 years after the data collection.

The average amounts of food groups, energy and nutrient intake per capita are mainly reported. Average percent rates of recommended daily allowance are calculated by household units. These data are tabulated by geographical areas, income levels, population scale of cities or towns, and size and type of the households. The results of anthropometry, blood pressure, and blood exams are also tabulated by age and sex groups, and some other related categories such as smoking or drinking habits, and physical activity levels.

Table 1. Variables of the data collected in 1993

A. Physical check for individual subjects
1) Anthropometry
*Height, Body weight [aged one or greater]
*Skinfolds thickness(triceps, subscaplar)[aged 15 or greater]
2) Blood pressure measurement(sitting position) [aged 15 or greater]
3) Blood drawing at least four hours after meal(RBC, hemoglobin, total cholesterol, HDL-cholesterol, triglyceride, total protein, blood sugar) [aged 30 or greater]
4) Physical activity(number f steps in a day measured by pedometer) [aged 30 or greater]
5) Interview on anti-hypertensive drug, smoking(present, ex-, or non-smoker ; number of tobacco in a day), alcohol drinking(present, ex-, or non-drinker ; amount of alcohol in a day), and exercise habit(at least 30 minutes at a time, twice in a week, and 1 year) [aged 20 or greater]

B. Dietary survey for households.
1) Members who compose the household(age, sex, birth day, job, pregnancy or lactation)
2) Questionnaire on the kind of meals in three days (meals cooked in a family, foods taken outside, or missing)
3) Food intake survey(weighed food record in three days)

C. Optional questionnaire on dietary habit
*Health status and dietary habit in children aged 3-15 years(only in 1993)

Main results of the survey

1. Food intake survey

1) Recent nutrient intake

Total energy, total protein, total fat, animal fat, calcium and salt intake per capita in 1993, were 2, 034kca, 79.5g, 58.1g, 28.3g, 537mg, and 12.8g, respectively. Although the intake of the most nutrients exceed the Japanese Recommended Dietary Allowance(R.D.A), average intake of calcium has been less than the R.D.A.(Fig. 2).

Fig. 3 shows 65.8% of the households took calcium at the level below the R.D.A. On the other hand, 23.8% and 37.1% households were considered to over-take energy and fat, respectively(Fig. 3). These results indicate very important notice for nutrition policy in Japan.

2) Trends of food and nutrient intake from 1946

The National Nutrition Survey has covered as long as 50 years changes in nutritional status of the Japanese, while economic state or health conditions shown by disease mortality or incidence rate in Japan have also remarkably changed. The time axis in the

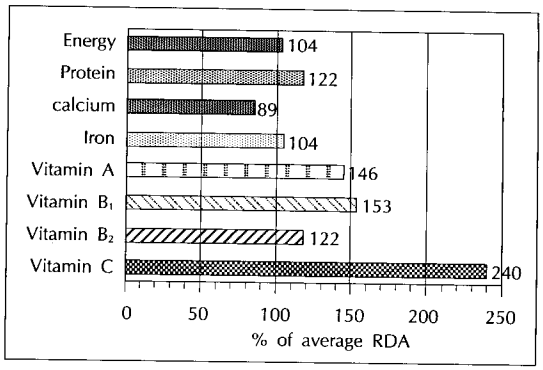

Fig. 2. Current nutrients intakes of Japanese.
– Average% of RDA in 1993 –

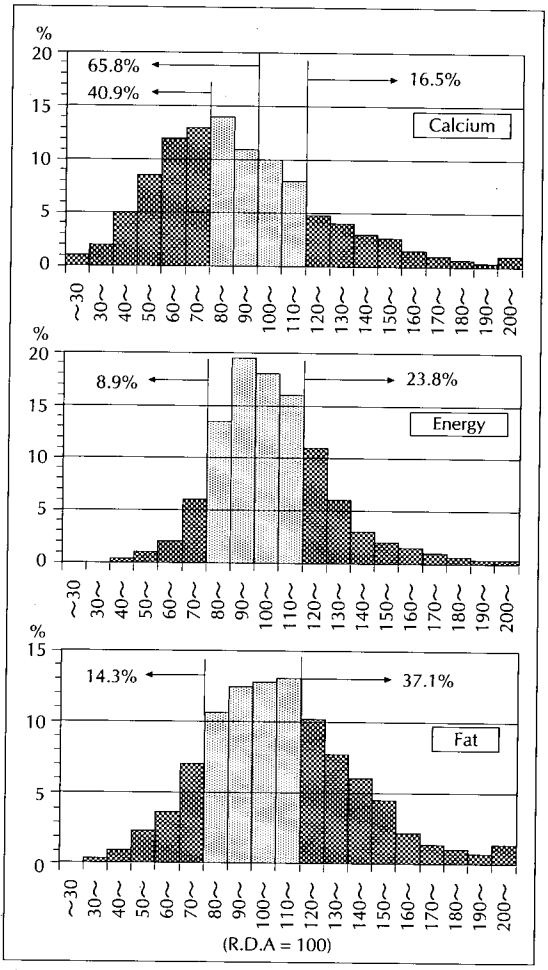

Fig. 3. Distribution of calcium, energy & fat intake of households expressed as a percentage of Japanese R.D.A.(1993).

previous 50 years of Japan can be divided into four periods : *Privation period* till 1950, *Reconstruction Period* till the end of 1950s, *High Economic Growth Period* from 1960, just before Tokyo Olympic, through 1975, and * Low Economic Growth Period* after 1975[3].

Fig. 4 summarized the trends of nutrient intake from 1946. During the High Economic Period, fat in-

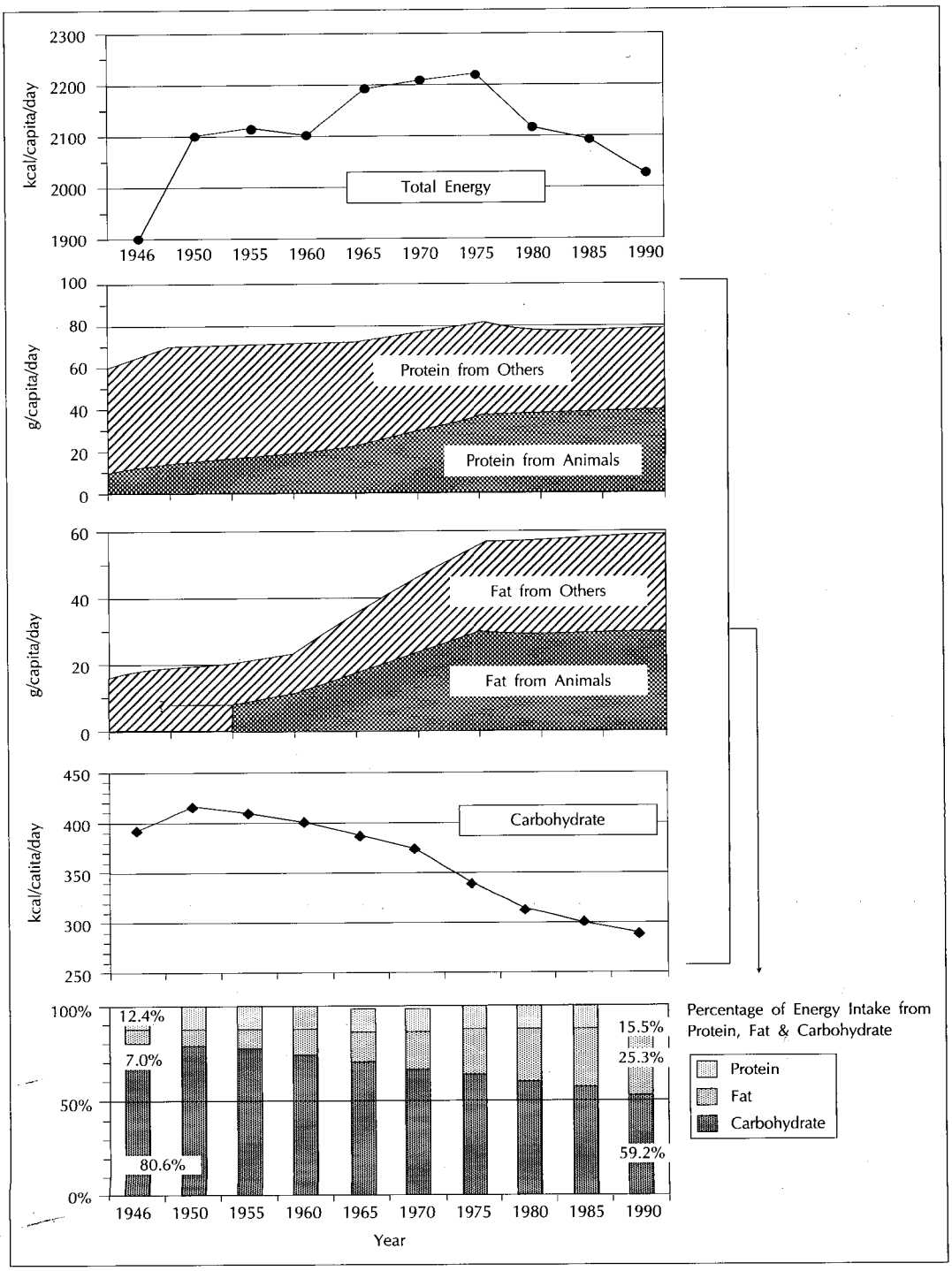

Fig. 4. Yearly changes in average intake of nutrients.

take, especially from animal food, had rapidly increased, making the proportion of fat intake in energy more than 25% from 1988, with gradually decreased total energy intake.

Sodium intake has been a major concern for prevention of hypertension, stroke and gastric cancer in Japan. Owing to nation-wide health campaigns or education, and the spread of refrigerators, sodium intake has remarkably decreased. The data of sodium intake (expressed by mount of salt intake) in the National Nutrition Survey are available from 1975, which were calculated from the food intake survey, not from urine samples. Salt intake has gradually decreased with a nadir in 1987 at the level less than 12g per capita, however, after that slowly increasing and then being stable(Fig. 5). This fact shows the nutrition policy to decrease average sodium intake of the Japanese is still very important.

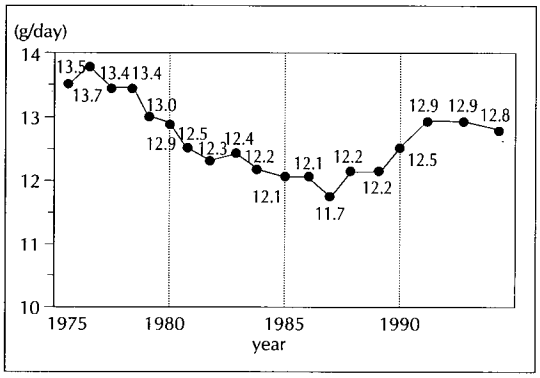

Fig. 5. Change in average salt intake.

3) Geographical differences in food and nutrient intake

The forty seven prefectrues are divided into eleven geograhical blocks, and food and nutrient intake data are tabulated by the eleven blocks. Because population size of each prefecture varies very much from Tokyo Metropolitan to the smallest prefecture, sample size is not enough to describe the characteristics of food and nutrient intake in each prefecture. Yamaguchi et al. combined the raw data sets of the National Nutrition Survey from 1980 to 1984 and re-analyzed them to dipict the relationship of nutrient intake to cancer mortality rate in the 47 prefectures[4].

Fig. 6 shows regional differences in the average in-

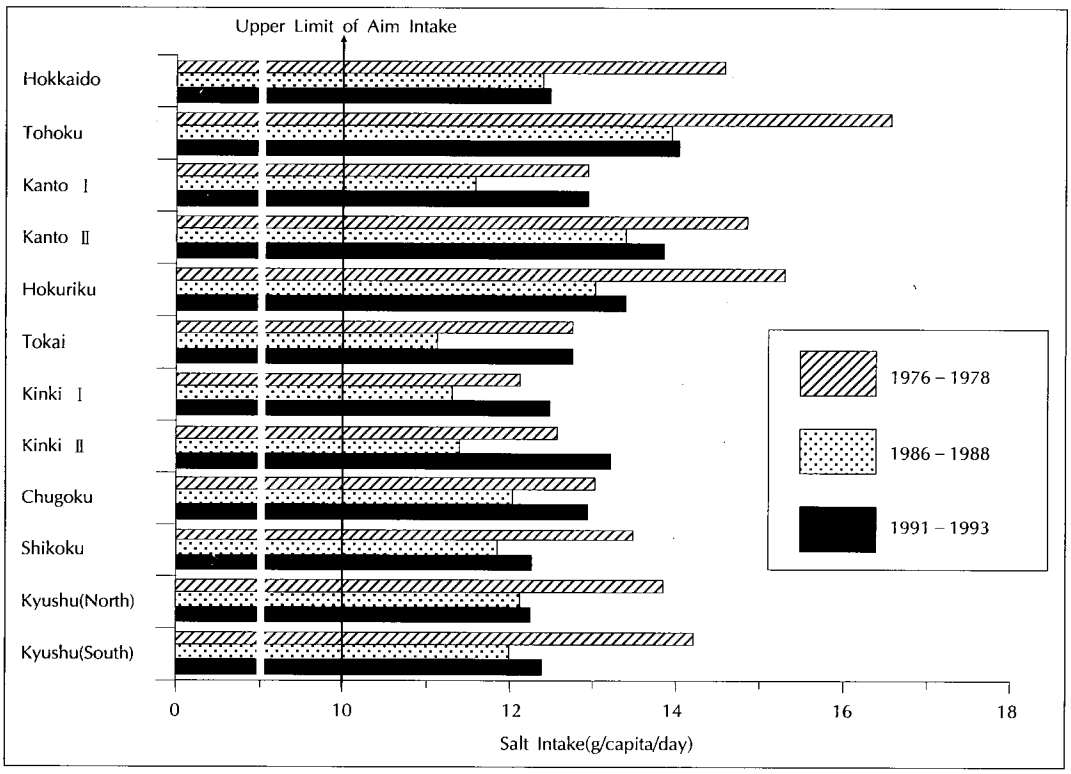

Fig. 6. Regional differences in the average intake of salt.

take of salt and its changes. Tohoku and Hokuriku areas are well known for high incidence rate of stroke and high salt intake. Regional differences in salt intake have become less remarkable, but still present.

2. Health survey

In recent several years, the health survey for individual subjects has been thought to be more important to monitor risk factors for chronic degenerative diseases such as high blood pressure, obesity or hyperlipidemia, and also to monitor lifestyles such as smoking, alcohol drinking or exercise habit in adulthood.

1) prevalence of hypertension, obesity, hypercholesterolemia and anemia

The survey can also describe prevalence of hypertension, obesity, hypercholesterolemia, anemia and so on, by a large scale, representative sample. Fig. 7 depicts distribution of total cholesterol, HDL-cholesterol and total protein in 1993. Around 30% male and 40% female subjects aged 30 or greater, and total cholesterol level above 220mg/dl.

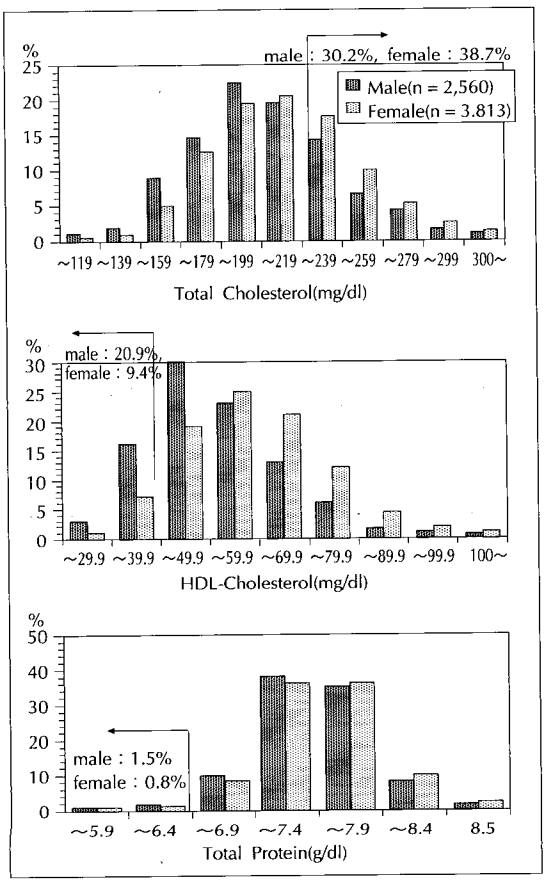

Fig. 7. Distribution of total cholesterol, HDL-cholesterol and total protein levels(1993).

2) Changes in lifestyles

From 1989's survey, same questions on lifestyles have been used, which can illustrate yearly changes in prevalence rate of habitual alcohol drinking and smoking, and rate of subjects with exercise habit(Fig. 8). They offer very important information for policy making for health promotion mainly focused on physical activity, and for anti-tobacco action in the government.

Future design of the survey

Some features of the National Nutrition Survey are summarized in Table 2. The authors and the Health Promotion and Nutrition Division, the Ministry of Health and Welfare have just started the projects to review the problems in methodology of the survey and to propose a modified design for the survey. In those activities, some idea on the survey design have been discussed(Table 3). Among those, a new method to collect additional information of the individual subjects in the diet intake survey was started in 1995, and development of a new food composition data base and error check systems are being started in 1996.

Epilogue

The National Nutrition Survey has illustrated not only nutritional and health conditions of the Japanese, but also socioeconomic conditions in the country for the last 50 years. During these years, we have experienced the most drastic changes in socioeconomic conditions that have never been in other countries. The diet of the Japanese has shifted from *traditional* to *modernized* one, which in now thought to be semi-Westernized and well-balanced for health. However, some proportion of the Japanese population may take too *Westernized* diet or take excess amount of energy and animal fat, which might cause obesity, hyperlipidemia, diabetes mellitus and some types of cancers. The National Nutrition Survey has become to play a more and more important role for monitoring nutrition and health conditions of the

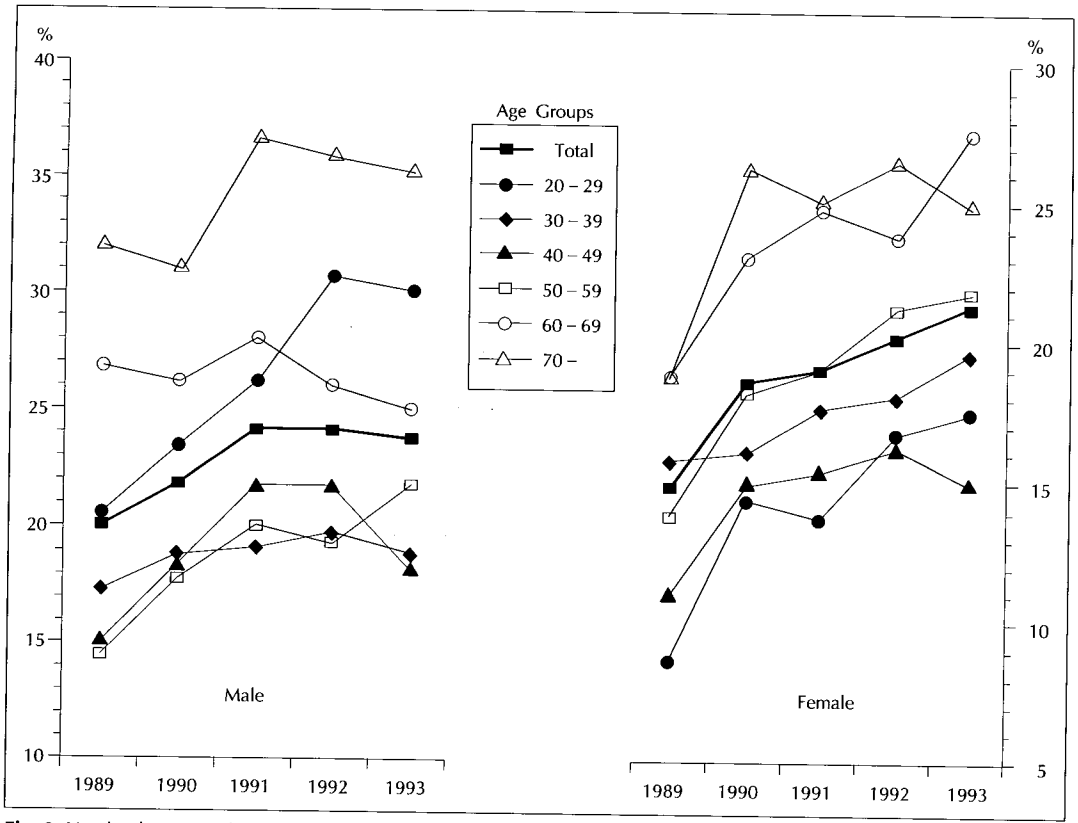

Fig. 8. Yearly change in the ratio of subjects with exercise habit (habitual exercise at least 30 mins at a time, twice in a week, and 1 year).

Table 2. Characteristics of the national nutrition survey, Japan

[Strengths]

1. Nation-wide, population-based, representative sample
2. The Survey was started in 1946 and has maintained the same methods.
3. Annual survey
4. Three days weighed and recording method

[Limitation and problems]

1. Food intake data for individual subjects are not available.
2. Difference in the methodology from dietary surveys other countires(24-hours recall vs. weighed and recording method)
3. The food composition data base for the meals taken outside is not enough(Now 969 regular foods, 94 processed foods and only 96 meals taken outside are listed in the food composition data base used for the survey).
4. Data processing procedure including error check, takes too long time after data collection.

Table 3. Future design for the national nutrition survey, Japan

1. Modification fo the method for food intake survey
   While maintaining the comparability of the data collected from household units(weighed and recording), additional information on the intake of individual subjects will be obtained by estimating the share rate of each dish in household(Fig. 9).
2. Development of a new food composition data base for the meals supplies by the food service industry.
3. Development of efficient data entry and error check system using PCs. Utilization of the Health Network System for data transferring and editing procedure between the local health centers and the Ministry of the Health and Welfare.
4. Opening some tabulated or graphed data to the Internet for researchers, policy makers and other people in the world.

Japanese to prevent such chronic diseases. Nutrient intake data of the individual subjects are available from the 1995's survey, which can be linked to data from the individual health check survey. It is expected that the relationship of nutrition to health status of the Japanese will be more clarified by the new method. In the rapidly changing era of information and globalization, the National Nutrition Survey should be more opened to the other countries. Many people in

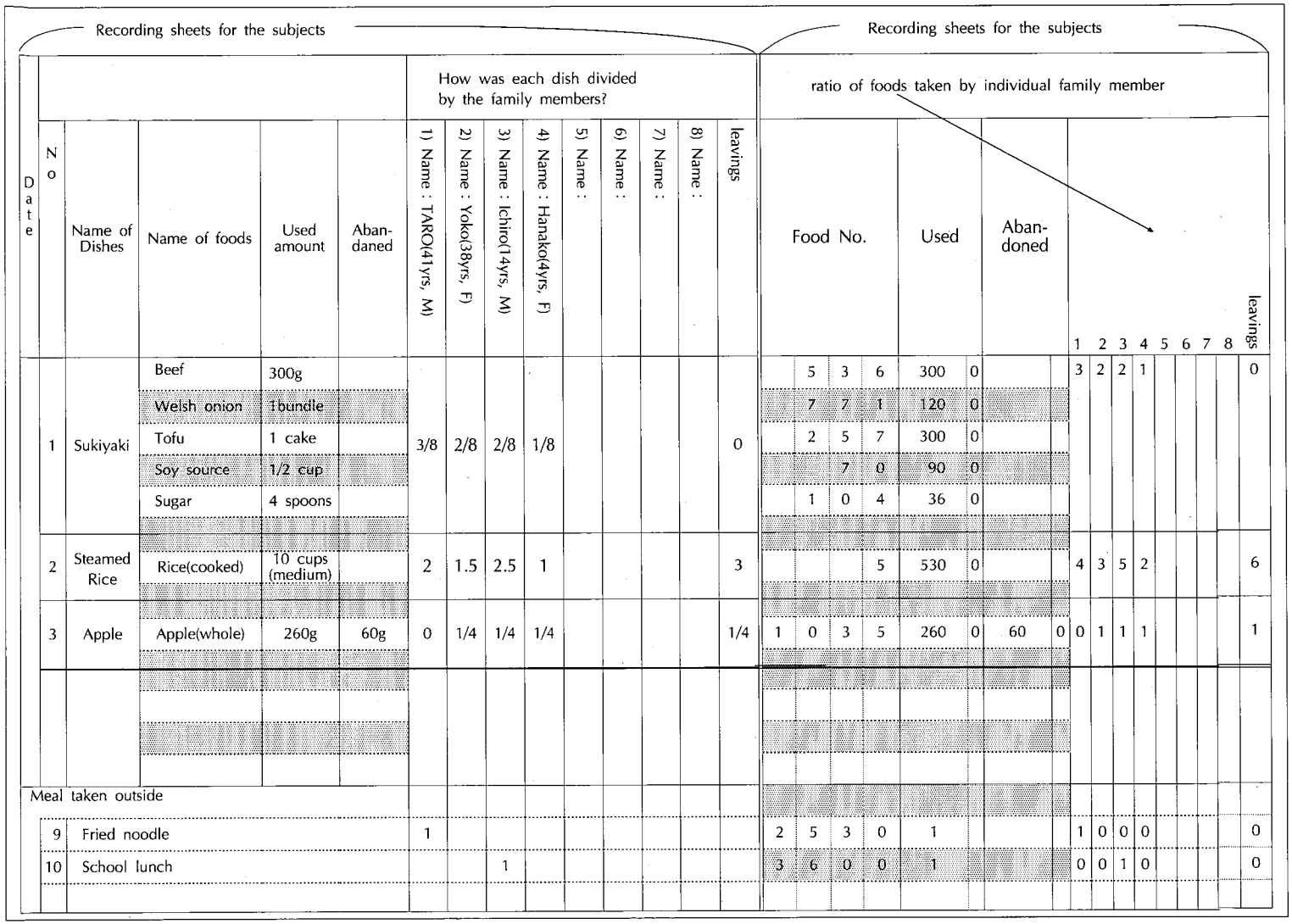

Fig. 9. A sample of the new recording sheet for the estimation of individual food intake.

other countries might hope to easily refer to the Japanese experience in the field of nutrition during the last 50 years.

The authors believes in the historically important role of the National Nutrition Survey, and also feel the necessity to change it being more fitted to the needs in the soon coming 21st century.

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