

Lifestyle and Cancer after the Second World War in Japan

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ABSTRACT

In this article, the changes in lifestyle and in the mortality rates of lifestyle-related cancers of Japanese people are discussed from the viewpoint of descriptive epidemiology. In Japan, stomach cancer was formerly one of the most frequent causes of cancer death. Colorectal, pancreas, breast and prostate cancers were not frequent. Thus, the kinds of cancer that Japanese people contracted were different from those in western countries. However, after the Second World War, the crude mortality rate of colorectal cancer increased, and in 1992 it became higher than that in the USA. The age-adjusted mortality rates of colorectal, pancreas, breast and prostate cancers increased, and that of stomach cancer gradually decreased. That is, the kinds of cancer of Japanese people have been westernized. In Japan, during the 70 years after the Second World War, the lifestyle, especially eating habits, greatly changed. Before the war the Japanese people ate much plant food, but after the war, the percentage of the intake of animal protein and animal fat greatly increased due to increased consumption of meat and poultry. The changes in the age-adjusted mortality rates of colorectal, pancreas and prostate cancers after the war can be at least partially accounted for by the change in eating habits. In Japan, the smoking rate was the highest for both males and females in 1966, and thereafter it has been decreasing. The age-adjusted mortality rate of lung cancer increased until 1995, but has been decreasing since that year. Since there is an interval of about 30 years between them, the "latent period" of smoking for lung cancer seems to be about 30 years. The mean age of women's first marriage and that of the first

delivery have both increased and may be factors contributing to the constant increase of the age-adjusted mortality of breast cancer.

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Key words: Cancer; Descriptive epidemiology; Japan; Lifestyle

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INTRODUCTION

The life expectancy of Japanese people has been increasing, and has been the longest in the world since the 1980s. Now cancer is the first cause of death of Japanese, with about 30% of all the causes of death accounted for by cancer.

Before the Second World War, the kinds of cancer that Japanese people contracted were different from those in western countries. After the war, the lifestyle, including the eating habits, of the Japanese was rapidly westernized and the kinds of diseases they contract changed, too. In this article, the changes in lifestyle and in the mortality rates of lifestyle-related cancers of Japanese people are discussed from the viewpoint of descriptive epidemiology.

Crude mortality rates of cancers in Japan

Figures 1-4 show the changes in the crude mortality rates of cancers in Japan and the USA (per 100,000 population). The number of deaths due to each of the cancers and the numbers of persons in each of the years were obtained from the web site of the OECD (http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT#).

In Japan, the crude mortality rate of colorectal cancer has been increasing rapidly, and in 1992 it became higher than that in the USA. The crude mortality rate of lung cancer has been increasing as well, and in the year of 2008 it became higher than in the USA.

The crude mortality rate of female breast cancer ("breast cancer" in this article) has also been increasing, and it will become higher than that of the USA in the near future. In contrast, the crude mortality rate of stomach cancer has gradually been decreasing.

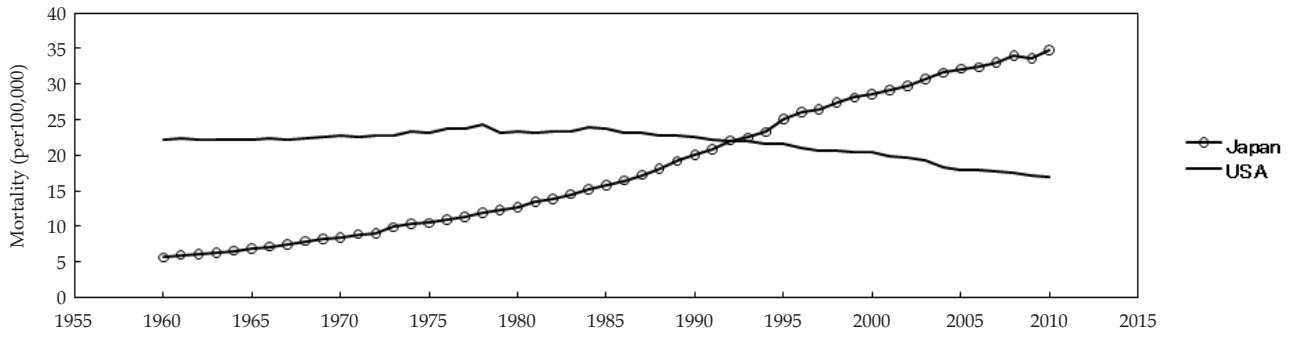


Figure 1 Crude mortality of colorectal cancer.

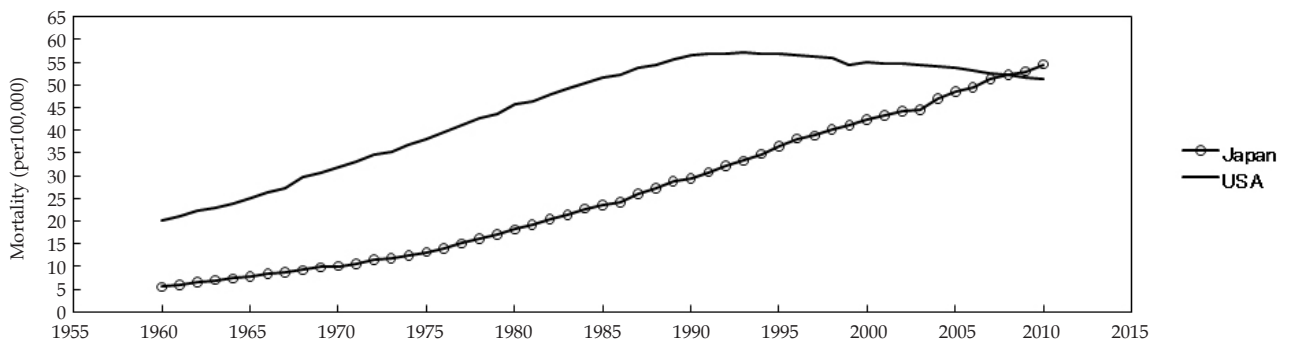


Figure 2 Crude mortality of lung cancer.

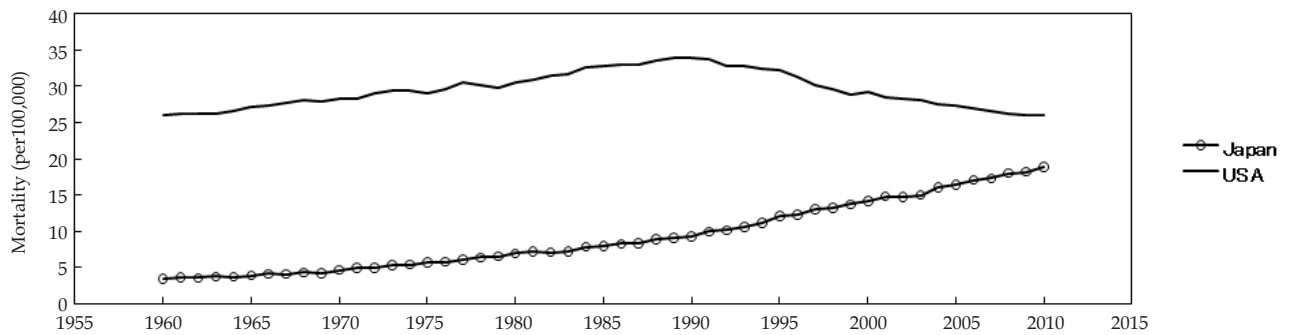


Figure 3 Crude mortality of breast cancer.

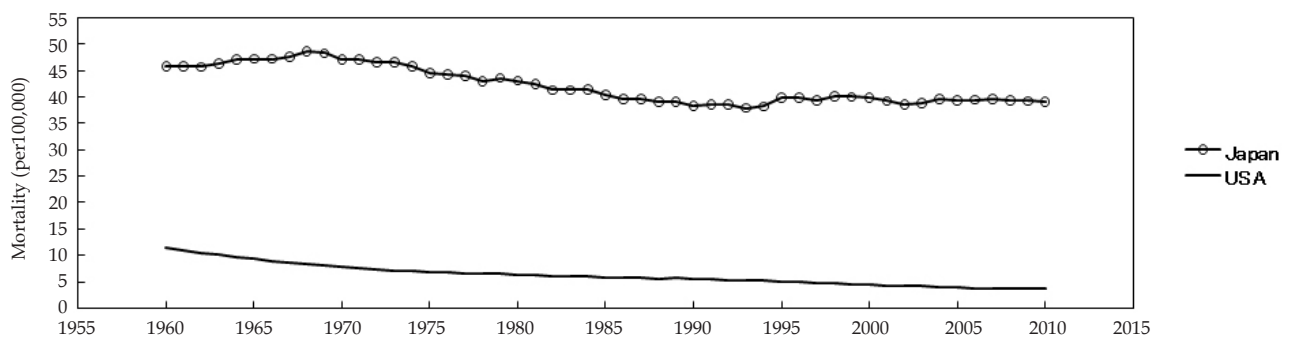


Figure 4 Crude mortality of stomach cancer.

Japanese society is aging. In 1970, the percentage of people aged 65 years or older was 7.1%, but in 1994 it was 14.1%, and in 2007 21.5%. Its increasing speed is the fastest in the world. It is natural that in such a society the number of deaths due to cancers increases. However, as shown in tables 1 and 2, the degree of increase differs among cancers (vital statistics of the Japanese Government; https://www.e-stat.go.jp/SG1/estat/GL08020103.do?_toGL08020103_&listID=000001108739&requestSender=dsearch). During the 60 years from 1950 to 2010, the crude mortality rates of lung, pancreas and prostate cancers increased by about 30-40-fold, and those of colorectal and breast cancers by about 6-7-fold. However, that of stomach cancer decreased after 1970.

Table 1 Crude mortality rates of cancers in Japanese men (per 100,000 population).

	1950	1960	1970	1980	1990	2000	2010
Lung	1.9	7.9	14.8	27.0	44.6	63.6	81.8
Stomach	46.6	57.3	58.6	53.9	49.6	53.5	53.5
Colorectal	4.4	5.2	8.5	13.5	22.1	32.4	38.9
Pancreas	0.8	2.5	5.0	7.8	12.1	16.9	23.7
Prostate	0.2	1.0	2.3	3.0	5.7	12.2	17.4

Table 2 Crude mortality rates of cancers in Japanese women (per 100,000 population).

	1950	1960	1970	1980	1990	2000	2010
Colorectal	4.5	5.6	8.0	11.9	18.2	25.1	31.3
Stomach	28.8	34.6	36.5	33.2	28.1	27.9	26.5
Lung	0.8	3.2	5.7	9.9	15.4	22.9	30.0
Pancreas	0.5	1.7	3.5	5.7	9.6	13.6	20.7
Breast	3.3	3.5	4.7	7.0	9.4	14.3	19.2

Age-adjusted mortality rates of cancers in Japan

In a society where the percentage of aged people is increasing, an age-adjusted mortality rate is necessary for comparison over a long period. Tables 3 and 4 show the age-adjusted mortality rates of these cancers (per 100,000 population based on the data of the Journal of Health and Welfare Statistics for each of the years; Health, Labour and Welfare Statistics Association, Japan). Its standard population is the model population in 1985 in Japan.

Table 3 Age-adjusted mortality rates of cancers in Japanese men (per 100,000 population).

	1950	1960	1970	1980	1990	1995	2000	2010
Lung	3.6	13.6	22.5	35.5	45.0	47.5	46.3	42.4
Stomach	87.3	98.5	88.9	69.9	49.5	45.4	39.1	28.2
Colorectal	8.5	9.5	12.9	17.6	21.9	24.4	23.7	21.0
Pancreas	1.4	4.2	7.4	10.0	12.1	12.7	12.4	13.0
Prostate	0.5	2.2	3.2	4.4	6.0	7.7	8.6	8.0

Table 4 Age-adjusted mortality rates of cancers in Japanese women (per 100,000 population).

	1950	1960	1970	1980	1990	1995	2000	2010
Lung	1.3	4.8	7.3	10.2	11.6	12.5	12.3	11.5
Stomach	48.0	51.8	46.5	34.1	21.6	18.5	15.3	10.2
Colorectal	7.5	8.4	10.3	12.2	13.8	14.1	13.6	12.1
Pancreas	0.8	2.5	4.5	5.8	7.1	7.0	7.2	8.2
Breast	5.4	5.1	5.8	7.2	8.2	9.9	10.7	11.9

During the 60 years from 1950 to 2010, the age-adjusted mortality rate of stomach cancer was reduced from 87.3 to 28.2 in males, and from 48.0 to 10.2 in females. That is, the reduction rates were about 67.7% and 78.8%, respectively. Both in men and women, the age-adjusted mortality rates of cancers, excluding stomach cancer, in

2010 were higher than those in 1950. Those of pancreas and breast cancers have been almost continuously increasing. Those of lung and colorectal cancers increased until 1995, but have been decreasing since that year. That of prostate cancer increased until 2000, but began to decrease in that year.

Changes in eating habits

Figure 5 shows the change in the rates of animal protein (%) and animal fat (%), and intake of meat/poultry (g). In Japan, after the Second World War, intake of animal protein and animal fat greatly increased. Most of the increase was accounted for by the increase in the consumption of meat/poultry.

Change in intake of salt

Table 5 shows the intake of salt (g/person/day) in Japan. It has been gradually decreasing.

Change in smoking rate

Smoking is a risk factor for many cancers such as lung, colorectal and pancreas cancers^[1]. Figure 6 shows the changes in the smoking rates in Japan. In 1966, the smoking rates were the highest for both males (83.7%) and females (18.0%). Since that year, the rates have been decreasing.

Table 5 Intake of salt (g/person/day) in Japan.

	1975	1980	1985	1990	1995	2000	2005	2010
Intake of salt	13.5	12.9	12.1	12.5	13.2	12.3	11.0	10.2

Changes in women's mean ages at the first marriage and at the first delivery

It is reported that delivery at an older age is one of the risk factors for breast cancer^[2]. Table 6 shows the changes in women's mean age at the first marriage and at the first delivery in Japan. Both of them have been gradually increasing.

Table 6 Women's mean ages at the first marriage and at the FIRST DELIVERY in Japan.

	1950	1960	1970	1980	1990	2000	2010
First marriage	23.0	24.4	24.2	25.2	25.9	27.0	28.8
First delivery	24.4	25.4	25.6	26.4	27.0	28.0	29.9

DISCUSSION

There are virtually no other countries where such a drastic change in nutritional intake occurred during about a half century. People in Japan mainly consumed plant foods for thousands of years before the Second World War. However, after the war, eating habits of western countries rapidly entered the country, and Japanese people began to consume much more food of animal origin.

Formerly, stomach cancer was one of the most frequent malignancies among Japanese people. Colorectal, prostate, breast, and pancreas cancers were originally frequent in western countries, and after the war they became frequent in Japan as well.

Several cancers are etiologically related to eating habits. In Hokkaido, Japan, several case-control studies of these were conducted^[3-5]. "To eat meat daily" and "to eat animal viscera once a week or more" were risk factors for pancreas cancer (odds ratios: 2.00 and 1.75, respectively). "To eat ham/sausage three times a week or more" and "to eat animal viscera once a week or more" were risk factors for colorectal cancer (odds ratios: 1.72 and 1.68, respectively).

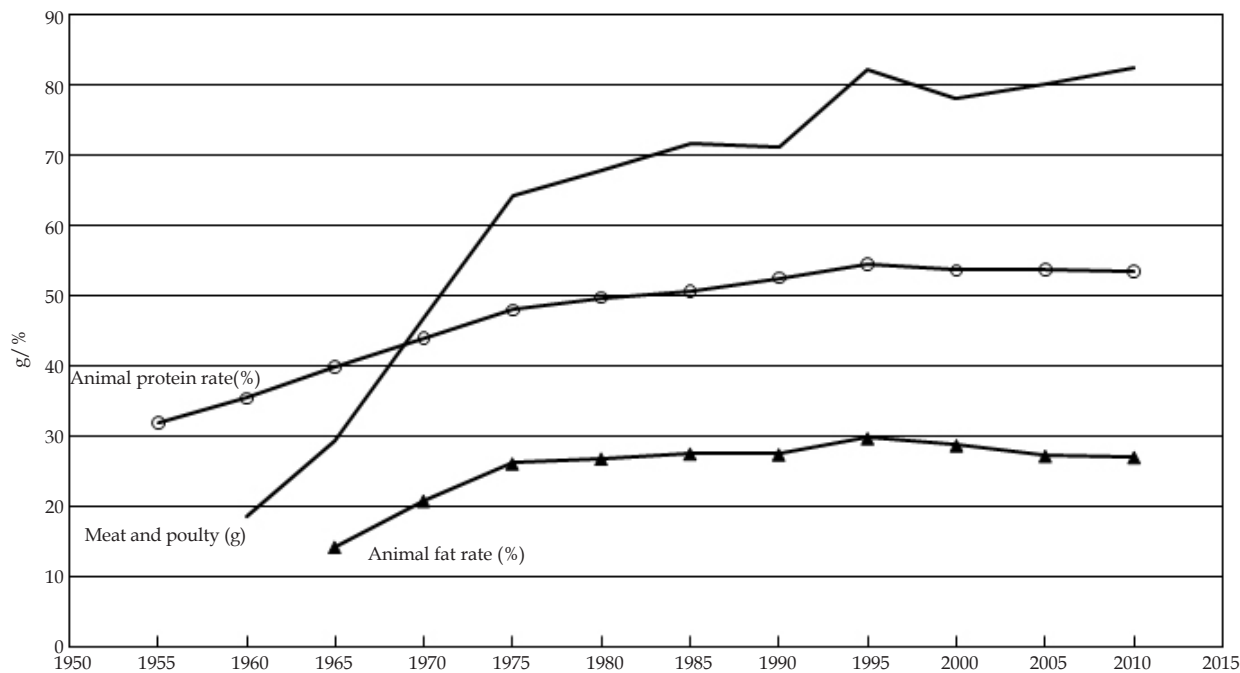


Figure 5 Rates of animal protein (%) and animal fat (%), and intake of meat/poultry (g) in Japan.

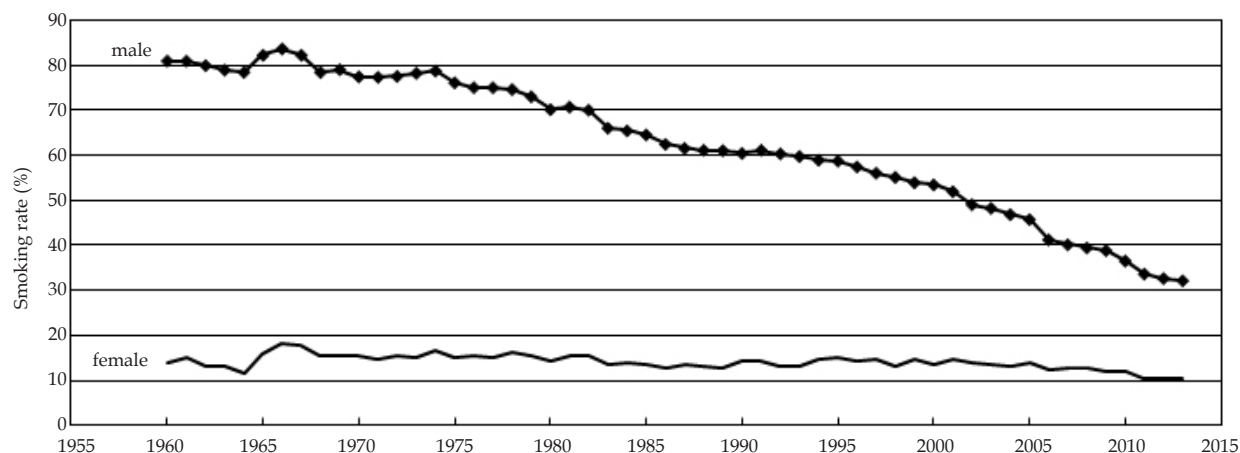


Figure 6 Smoking rates in Japan.

"To eat rice 3 times a day", which is one of the traditional Japanese eating habits, promoted stomach cancer (odds ratio, 1.40), but suppressed pancreas cancer (0.89) and colorectal cancer (0.75).

According to the WCRF/AICR report^[6], red meat, ham and sausage are risk factors for colorectal cancer. Intakes of meat and fat promote the occurrence of prostate cancer^[7,8].

Intake of salted food is one of the risk factors for stomach cancer^[9]. Traditional Japanese foods such as miso soup, soy-sauce and Japanese preserved vegetables pickled in salt, contain much salt. However, due to the westernization of eating habits, Japanese people consume less traditional Japanese food. The decrease of salt intake may be one of the results of the westernization of eating habits, and might be one of the reasons for the decrease in the mortality of stomach cancer.

Thus, in Japan, the increases of the age-adjusted mortality rates of colorectal, pancreas and prostate cancers, and the decrease of that of stomach cancer can be at least partially accounted for by the westernization of dietary intake.

Smoking is one of the largest risk factors for lung cancer. The

highest age-adjusted mortality rates of this cancer were recorded for both males and females in 1995. On the other hand, the highest smoking rate was recorded in 1966. Since there was an interval of about 30 years between them, the "latent period" of smoking for this cancer seems to be about 30 years.

It is probable that the rapid increase of colorectal cancer is mainly due to the westernization of eating habits, but smoking is also a risk factor for colorectal cancer^[10-12]. Since the age-adjusted mortality rate of colorectal cancer also began to decrease in 1995, it is possible that smoking has some effects on the age-adjusted mortality rate of this cancer. If so, the "latent period" of smoking for this cancer might also be about 30 years.

The age-adjusted mortality rate of pancreas cancer has not decreased. In western countries, it is reported that smoking is one of the risk factors for this cancer^[13-15], but a report from Japan indicated that smoking was not a significant risk factor in males^[16]. The pancreatic cancer of Japanese people might be etiologically different from that in western countries. To see the effects of smoking on its age-adjusted mortality rate, observation until around the years 2020-

25 is necessary.

The age-adjusted mortality rate of prostate cancer began to decrease in 2000. Smoking is one of the risk factors for this cancer^[17], and it is necessary to observe its age-adjusted mortality rate until around the year 2020 to see the influence of smoking on its mortality rate.

The age-adjusted mortality rate of breast cancer continues to increase. Formerly it was suggested that westernization of dietary habits promoted this cancer^[18], but according to recent reports, fat intake is not a risk factor for it^[19,20]. Many factors are related to the occurrence of breast cancer, but smoking is not considered to be a strong risk factor^[21]. On the other hand, the change in women's age at their first marriage and their first delivery cannot be ignored as both have been increasing. They are likely to be factors related to the constant increase of the age-adjusted mortality of breast cancer.

CONFLICT OF INTERESTS

There are no conflicts of interest with regard to the present study.

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