

# Country report of Japan – September 2020



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## ***THIS REPORT HAS BEEN PREPARED BY THE JAPANESE ASSOCIATION OF CARDIAC REHABILITATION (JACR):***

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Country report Japan – September 2020, Prof. Makita and Prof Koba

I. Health care

# Baseline Information about Japan

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Located in eastern Asia, Japan is a democratic country consisting of Japanese islands, southwest islands, Izu Islands, Ogasawara Islands, etc. Its capital is Tokyo. Japan has 47 prefectures in it as administrative districts. Its population totals 126,160,000 (as of October 2019), which has been decreasing by about 250,000 annually in the past several years. The percentage of the population of elderly people aged 65 or older has reached 29%, making its share of elderly people the highest one in the world and far exceeding the second highest share (23.0%) for Italy. The shift in Japan's population is characterized by the fact that its declining birth rate and growing proportion of elderly people has been progressing ahead of the rest of the world. Average life expectancy in 2019 is 81 years old in males and 87 years old in females, the world-leading longevity since 1980s.

## I. Structure of health care

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In Japan, a universal health insurance system was created in 1961. This system includes the following:

- 1) All people are obligated to sign up for one of the public healthcare insurance schemes
- 2) Which public healthcare insurance scheme is expected to have depends on his/her occupation, age and resident area
- 3) People are allowed to freely choose their medical institutions and the frequency of visitation at their own discretion regardless of the type of their insurance scheme (free access system).

If getting sick, injured, etc., only with an insurance card, the people of Japan can receive necessary medical services wherever they are in Japan by paying a certain percentage of the cost. In principle, there is no difference in terms of benefits among all types of public healthcare insurances. The coverage of benefits includes the costs for hospitalization, outpatient medical examinations, the treatment of outpatients with a mental disorder, prescribed drugs, home-visit nursing, and dental therapies. Patients basically pay by themselves 30% of their total medical costs, which percentage varies by their age and income. For those patients whose medical costs get expensive enough to exceed their monthly self-pay limit, the high-cost medical expense benefit is available as a scheme to compensate the excess amount so that their medical expenses will not become too much of a burden to their family budget.

### **Cardiac rehabilitation**

If patients are judged by their physicians that they need to receive cardiac rehabilitation (CR) after developing a cardiac disease or undergoing cardiovascular surgery, such CR is authorized as a medical treatment to be insured. Under instructions from doctors, physical therapists, nurses, and other specialists provide the patients with rehabilitation programs including exercise therapies and lifestyle guidance. As a representative example, 2,050 JPY (17.7 Euro) is paid to a medical institution for its 20-

minute rehabilitation program. Those diseases against which CR is considered to be effective have been listed: acute myocardial infarction (AMI), angina pectoris, heart failures (HF), conditions after an open-heart surgery, peripheral arterial diseases and great vessel diseases. These diseases have been designated for which treatments are covered by public healthcare insurances. The rehabilitation period is limited to 150 days in principle.

## II. Risk factors

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### Ranked cause of death in Japan

Looking at the number of causes of death, the leading cause was malignant neoplasms with 373,547 deaths (the death rate per 100,000 of the population was 300.7); the second one cardiac diseases (excluding hypertensive ones) with 208,210 (167.6); the third one senile deterioration with 109,606 (88.2); and the fourth one cerebrovascular diseases with 108,165 (87.1).

Then, focusing on the annual trend of major causes of death, malignant neoplasms have been consistently increasing, consecutively ranked first among all causes of death since 1981. Deaths from malignant neoplasms accounted for 27.4% of overall deaths in 2018. In other words, about 1 out of 3.4 people of the total population of Japan passed away due to them. In malignant neoplasms, so-called Western-type cancers such as colon, lung, pancreas, prostate, ovary, and breast tended to increase, while gastric cancer consistently decreased (3). As for cardiac diseases (excluding hypertensive ones), after taking the 2nd place by replacing cerebrovascular diseases in 1985, they have continued to increase both in the number of deaths and the rate of deaths, constituting 15.3% of total deaths in 2018. In-hospital mortality of AMI and HF may have reached a plateau to 8.5% and 8%, respectively (4). Meanwhile, stroke, especially cerebral hemorrhage was the leading cause of death in the 1960s and was the highest all over the world (5). This high mortality rate from cerebral hemorrhage was due to hypertension, high rate of smoking and lower intake of saturated fat (6). The mean salt intake in 1976 was 13.7 g/day, gradually decreasing to 10.8 g/day in 2017. The decreases in cerebrovascular diseases can be largely explained by the decrease in that due to cerebral haemorrhage and blood pressure lowering. Cerebrovascular diseases started declining after hitting their peak in 1970 and ranked 3rd in 1985 by exchanging positions with cardiac diseases (excluding hypertensive ones). Afterwards, they have maintained a declining trend while repeating ups and downs both in the number of deaths and the rate of deaths, making up 7.9% of overall deaths in 2018.

## CVD Deaths (2018)

**Table 1.** Total deaths and CVD death rates of men/women in 2018 in Japan (per 100,000 of the population) (7)

	Men	Women	Total
Total deaths	1156.5	1040.3	1096.8
Cardiac diseases (excluding hypertensive ones)	162.1	172.8	167.6
Cerebrovascular diseases	86.7	87.5	87.1

Source: The Japanese Ministry of Health LaW. 2018:

<https://www.mhlw.go.jp/toukei/saikin/hw/jinkou/geppo/nengai18/dl/h6.pdf>. (in Japanese)

### Trends in deaths from cardiac diseases

The mortality per 100,000 of the population from coronary artery diseases in 2016 was 66.4 for men and 46.8 for women. Since the second half of 1990's, it has tended to slightly increase or remain at the same level for men while slightly decreasing for women. In the meantime, the mortality per 100,000 of the population from HF death in 2016 was 46.4 for men and 70.6 for women, the latter being higher than the former. Since the latter half of 1990's, it has been increasing for both men and women. It is worth noting that just as described, while the mortality (and the absolute number of deaths) from cardiac diseases overall has been increasing as the population ages, that from coronary artery diseases including AMI has not been necessarily increasing. This can be explained by the fact that acute-phase deaths from AMI and equivalents have been contained but deaths from chronic heart failure death and equivalents have increased.

### CVD risk factors

The mean systolic blood pressure has been substantially decreasing for both men and women in Japan. Additionally, the smoking rate for men exceeding 70% in 1960's has been decreasing gradually. In contrast, the prevalence ratio of hypercholesterolemia in our country has tended to increase in recent years, particularly noticeable among middle-aged and older men. In the meantime, the prevalence ratio of diabetes has tended to increase in these years for both men and women and the ratio of obesity has been increasing among men.

The Hisayama Study is a population-based prospective cohort study designed to evaluate the risk factors for cardiovascular diseases in a general Japanese population. The prospective follow-up surveys have been conducted in subjects aged 40 or older since 1961. Notable characteristics of this study include its high participation rate (70-80% of all residents aged 40 or older), high follow-up rate (99%

or over), and high autopsy rate (approximately 75% of deceased cases). This study shows that the prevalence of glucose intolerance (prediabetes and diabetes), hypercholesterolemia, and obesity increased steeply. (5) (8)

The Japanese dietary style has markedly changed with Westernization and diversification from the 1960s. According to the National Health and Nutrition Surveys Japan, from 1960 to 2005, the amounts of animal products, total fats and oils increased markedly by more than 3-fold, while rice consumption decreased by half (9) (10). The major changes in animal products sources are increases in meat intake and decreases in fish intake in younger generations. The percentage of energy from fat has clearly increased from 7.0% in 1946 to 30% in the present younger generation. The average number of walking steps increased up till 2000 when the Japanese government launched “Health Japan 21”. However, step-determined physical activity was clearly decreasing to 2015, while the time-trend decreases in physical activities were not clear in elder population (11). Thus, changes of dietary style and physical inactivity were associated with increased cardiometabolic risk such as dyslipidemia and diabetes, especially younger and middle-aged population. The meta-analysis of 16 Japanese cohorts followed from 1985 to 2005 showed that excess weight was associated with increased risk of cerebral infarction and MI (9). The incidence of AMI has been increasing in younger populations and decreasing in the elderly, and that improvement in the in-hospital mortality of AMI may have reached a plateau in all age groups (12).

**Table 2.** Trends in age-adjusted frequencies or mean values of risk factors, with 5 Hisayama cohorts, aged  $\geq 40$  years (8).

	Year of examination					p for trend
	1961	1974	1983	1993	2002	
<b>Men</b>						
No. of subjects	705	855	1,048	747	1,305	
Hypertension, %	38.4	43.1	47.7	43.7	41.3	0.71
Antihypertensive agents, %	2.0	8.4	10.9	14.7	17.5	<0.001
SBP in hypertensives, mmHg	161	157	152	152	148	<0.001
DBP in hypertensives, mmHg	91	90	92	88	89	0.01
Glucose intolerance, %	11.6	14.1	14.3	29.9	54.0	<0.001
Hypercholesterolemia, %	2.8	12.2	23.0	25.2	22.2	<0.001
Obesity, %	7.0	11.6	20.2	26.7	29.2	<0.001
Current smoking, %	75.0	73.3	57.2	47.0	47.4	<0.001
Current drinking, %	69.6	63.8	65.2	64.6	71.8	0.004
<b>Women</b>						
No. of subjects	913	1,183	1,411	1,236	1,803	
Hypertension, %	35.9	40.1	41.2	34.6	30.8	<0.001
Antihypertensive agents, %	2.1	7.4	11.5	15.2	16.2	<0.001
SBP in hypertensives, mmHg	163	161	155	155	149	<0.001
DBP in hypertensives, mmHg	88	87	87	84	86	<0.001
Glucose intolerance, %	4.8	7.9	7.0	21.0	35.1	<0.001
Hypercholesterolemia, %	6.6	19.9	33.5	35.7	35.3	<0.001
Obesity, %	12.9	21.5	23.5	26.2	23.8	<0.001
Current smoking, %	16.6	10.2	7.4	4.6	8.5	<0.001
Current drinking, %	8.3	5.7	7.8	12.9	29.3	<0.001

SBP: systolic blood pressure, DBP: diastolic blood pressure

Hypertension: blood pressure  $\geq 140/90$  mmHg and/or intake of antihypertensive agents

Glucose intolerance: diabetes or prediabetes

Hypercholesterolemia: total cholesterol  $\geq 220$  mg/dL

Obesity: body mass index  $\geq 25$  kg/m<sup>2</sup>

Source: Kiyohara Y. Alteration of Lifestyle-Related Diseases in Japanese: Current Status and Challenges—the Hisayama Study. Reproduced with permission from Japanese Society of Laboratory Medicine. *Rinsho Byori*. 2015;63(5):623-30.

### III. Main actors in prevention care in Japan

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The number of doctors and dentists had been increasing year after year, reaching 277,927 for doctors and 97,198 for dentists respectively in 2006. There are 1,333,000 nurses in Japan. The number of cardiologists is 14,529 (2018) while that of cardiovascular surgeons is 2,279 (2020). Japan has 1,019 cardiology training hospitals authorized by the Japanese Circulation Society (JCS), and 322 training-related ones. Besides these training facilities, cardiologists and cardiovascular surgeons work at a general hospital or practice their own clinic. Annually, patients experience 70,000 emergency percutaneous coronary interventions (PCI) and 200,000 elective ones (4).

The number of facilities in which patients underwent CR reached 1,102 as of 2017. However, as one of Japan's characteristics, there are inpatient facilities for the recovery phase rehabilitation from cerebrovascular diseases and bone joint diseases, but there are no inpatient facilities specialized for the recovery phase rehabilitation from cardiac diseases. Accordingly, compared to 7,546 rehabilitation facilities for cerebrovascular diseases and 11,184 ones for bone joint diseases, there are much fewer facilities where patients receive CR. Presently, except for those in the acute stage, CR services for those in the recovery stage or the maintenance stage can be provided only to outpatients (13). The Japanese Association of Cardiac Rehabilitation (JACR) has prepared guidelines jointly with JCS (14) and published several standard programs (15) (16). This guideline is currently being revised and scheduled to be published next year. Facilities intending to provide CR services should meet prescribed criteria to be covered by public insurance schemes. As one of those criteria, staff members who provide rehabilitation services are required to be certified as a registered instructor of CR. These registered instructors of CR have been certified by the JACR (the JACR established the instructor certification system in 2000). This system aims to improve the quality of CR not only for physicians but also for other medical professions. They learn required skills and knowledge of CR through lectures who are provided by councillors and directors of the JACR. The JACR published the textbook for these applicants. The registered instructors must pass the examination conducted by the JACR. The instructors include physicians, nurses, physical therapists, occupational therapists, medical technologists, pharmacists, registered dietitians, clinical engineering technologists, certified clinical psychologists, certified public psychologists, or health fitness programmers.

## IV. Prevention activities

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### Health Japan 21

The government of Japan launched a health promotion plan named “Health Japan 21” in 2000, and its secondary version in 2013. This initiative aims to raise the rates of medical check-ups and health guidance for the purpose of preventing the incidence and aggravation of cancers, cardiac diseases, cerebrovascular diseases and lifestyle-related diseases including diabetes attributable to the changes in its people’s lifestyle habits and the rapidly advancing aging of its population. This initiative sets detailed objectives for each of 9 areas (17):

- 1) Nutrition/Eating Habit
- 2) Physical Activity/Exercise
- 3) Rest/Promotion of Mental Health
- 4) Tobacco
- 5) Alcohol
- 6) Oral Health
- 7) Diabetes
- 8) Cardiovascular Disease
- 9) Cancer

The detailed objectives for diabetes include the reduction of adult obesity and the increasing number of steps in everyday life while those for cardiovascular diseases do the decrease in salt intakes and the increase of those taking exercise regularly. To achieve these objectives, efforts are being made at the level of respective prefectures and municipalities.

### Specific health check-ups/Specific health guidance

Associated with “Health Japan 21”, in order to prevent lifestyle-related diseases accounting for about 60% of the causes of deaths for Japanese, health check-ups (specific ones) focusing on metabolic syndromes (visceral fat syndromes) are carried out for those people aged 40 – 74 (18). Based on their outcomes, specialized staff members (health nurses, managerial dieticians, etc.) provide supports to review their lifestyle habits. The check-up rate was 53%, and the specific health guidance was performed in 20% of subjects with high-risk for lifestyle-related diseases in 2017.

### Basic Act on Stroke and Cardiovascular Diseases

In December 2018, “Basic Act on Stroke and Cardiovascular Diseases” was enacted. The purpose of this act is to extend the healthy life expectancy of people and consequently alleviate the burdens of medical/nursing care costs by promoting the prevention of circulatory diseases such as strokes and MI and by preparing agile and appropriate medical treatment systems for such diseases. In association with the establishment of “Basic Act on Stroke and Cardiovascular Diseases”, also for circulatory

diseases, it is expected that the 5-year plan designed pursuant to 5 strategies advocated by JCS will be further developed. Basic policies of “Basic Act on Stroke and Cardiovascular Diseases” will be announced this summer.

#### **5-Year plan to overcome strokes and circulatory diseases**

1. To fulfill treatment systems in recovery/chronic phases in addition to acute phase
2. To practice team medicine through the development of a wide range of medical staff members including specialized doctors
3. To precisely evaluate the quality of medical services and prognoses by building a nation-wide data registration system
4. To further conduct educational activities emphasizing the significance of circulatory diseases and the effectiveness of their prevention
5. To enhance research leading to the treatments based on causes

## V. Cardiac Rehabilitation (CR)

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In Japan, CR is covered by the public health insurance system for AMI, angina pectoris, HF, peripheral artery disease, great vessel disease and cardiovascular surgery. The JACR has negotiated with the Ministry Health, Labor and Welfare and has been involved in medical fee reversion related to CR. In clinical fields, the members of JACR engaged in daily CR work.

### **Current State of Cardiac Rehabilitation in Japan (1)**

A second nation-wide survey of the status of CR was conducted in 2009, collecting questionnaire replies from 597 hospitals (64%) of a total of 934 JCS-authorized cardiology training hospitals (19). The results revealed that the implementation rate of PCI remained very high, and that the implementation rate of outpatient CR more than doubled from 9% in 2004 (20) to 21% in 2009 (19). It should be noted that, although the length of hospital stay of AMI patients has shortened significantly from  $19 \pm 9$  days in 2004 to  $15 \pm 6$  days in 2009 ( $p < 0.001$ ), it remains much longer than that in the US. The length of hospital stay for AMI without any complications is as long as 30 days covered by health insurance. According to data from the Japanese Ministry of Health, Labor and Welfare, the number of registered medical institutions for CR has been steadily increasing; from 186 institutions in the year of 2005, to 330 in 2007, 495 in 2010, and 608 in 2011 (21).

### **Cardiac Rehabilitation Program in Recovery Phase**

Typical outpatient CR program starts approximately 2–3 weeks after AMI or cardiovascular surgery such as CABG and continues for 3–5 months. The program includes hospital-based supervised exercise sessions (1–3 times weekly, consisting of walking, bicycling with an ergometer, and calisthenics), educational classes and individual counselling, combined with home exercise program. The exercise intensity is determined individually at 50–60% of the heart rate reserve, or the heart rate at the anaerobic threshold (AT) level obtained by cardiopulmonary exercise testing (CPX) using cycle ergometer, or with a perceived exercise rating (original Borg's score) of 12–13 on a scale of 6–20. Home exercise program consists mainly of brisk walking at a prescribed heart rate for 30–60 min 2–4 times each week. Patients are encouraged to attend educational classes with lectures on secondary prevention, diet, smoking cessation, medications, and physical activities suggested by physicians, nurses, dieticians, pharmacists, and exercise instructors. A multicentre retrospective study showed that participation of outpatient CR was greater improvement of major cardiovascular events in patients underwent CABG (22). The current CR program does not involve patients' spouse, partner or family.

## **Participation Rate in Cardiac Rehabilitation in Japan**

Because CR in Japan has been delivered almost exclusively by cardiology hospitals, hospitalized AMI patients start in-hospital CR and are automatically transferred to the outpatient CR program of the same hospital if the hospital is providing outpatient CR services. From the data of the 2004 nationwide survey, the CR participation rate was estimated to be between 3.8 and 7.6%, because only 7% of JCS-authorized cardiology training hospitals could provide outpatient CR services at that time (1).

## VI. The Future

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Previous cardiovascular medicine has been focusing most of its attention on the building of acute-phase treatment systems. Therefore, the goal of its services is for patients to leave the hospital for home and return to community and the treatments are completed when they are discharged from the hospital. On the other hand, the present and future medical service provision system mainly deals with chronic HF and accordingly its treatments are not completed inside an acute care hospital. Japanese people need to do exercises through CR, receive nutrition interventions and manage their cardiac disease from the acute phase to the chronic phase (maintenance phase) in order to prevent its rehospitalization and re-aggravation. Regrettably, however, any sufficient system has not been prepared yet in terms of their medical treatments covered by public insurance schemes, etc. “Basic Act on Stroke and Cardiovascular Diseases” enacted in December 2018 is expected to be enforced in specific ways. JACR wants to build up the number of CR facilities which focus on recovery phase CR and also incorporate CR into community comprehensive care system.

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