A Strategy for Further Wellness for All: A Population Approach to Prevent Cardiovascular Diseases in Japan

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Summary
A population approach may be effective in reducing cardiovascular disease (CVD) in the entire population. In Japan, the first public population approach is Health Japan 21 from 2000 to 2012. In 2013, it was revised as Health Japan 21 (the second term), which was promoting the health of all citizens until 2022. In the final assessment, although a significant decrease in age-adjusted CVD mortality was observed, it is unclear why these findings occurred. An assessment system for a population approach for CVD needs to be developed in Japan.

Key Words
population approach; cardiovascular disease; Health Japan 21, mortality

Lifestyle modifications such as salt intake reduction and increased physical activity are very important to improve risk factors for cardiovascular disease (CVD). Intervventional approaches to improve risk factors consist of high-risk and population approaches. Most medical services are categorized as high-risk approaches. However, it may not affect the majority who fail to meet the criteria for screening of high-risk conditions, such as hypertension or hypercholesterolemia. To effectively reduce the prevalence of CVD in the broader population, it is necessary to lower the average risk associated with each risk factor in the population, even if the reduction is minimal. A population approach, which is milder but universally applied to all citizens without screening, may be effective in reducing CVD in the entire population. This presentation describes previous research and the current status of the public population approach in Japan.

MATERIALS AND METHODS
In Japan, a systematic population approach to prevent CVD has not been implemented in the public sector until the end of 20th century. The first public one was Health Japan 21 from 2000 to 2012 by the Ministry of Health, Labor and Welfare (MHLW). At around that time, a first intervention study to reduce CVD risk in worksites through a population approach, named for the high-risk and population strategy for occupational health promotion (HIPOP-OHP) study, was performed under funding by MHLW. In 2013, the MHLW established Health Japan 21 (the second term), an updated plan for promoting health for all citizens, of which the target year is 2022. As a preventive measure for CVDs, some target goals for prevention through the management of major traditional risk factors have been set. Usually, CVD is an object of emergency medical care, and it is not an object of screening. In addition, target goals for key lifestyle habits to prevent the acquisition and progress of risk factors for CVDs were set in the plan. In Health Japan 21, there is a three-layered structure for prevention, i.e., from the distortion of the lifestyle to acquiring a risk factor, from risk factor to CVD.

RESULTS
A committee of experts from several different academic fields was set up and targets for disease prevention were set based on scientific evidence mainly based on epidemiologic studies in Japan.
Concerning CVDs, high blood pressure, dyslipidemia, diabetes, and smoking were set as the main risk factors, for which targets were 1) a 4 mmHg decrease in mean systolic blood pressure (SBP), 2) a 25% reduction in prevalence of hypercholesterolemia, i.e., total cholesterol (TC) level being 240 mg/dL and greater, or LDL cholesterol (LDLC) being 160 mg/dL or greater, 3) prevention of increase in the prevalence of diabetes, 4) decrease in smoking rate (19.5% to 12%).

Regarding blood pressure in particular, the target value of nutrition and diet (salt intake, vegetable and fruit intake, i.e., potassium intake, and prevalence of over-weight), physical activity, alcohol drinking, and increase of antihypertensive medicine users among hypertensive patients were placed as the first step of the three-layer structure; and from there, a target value of a 4 mmHg decrease in SBP was set as a second-layer target goal. In addition, there were above-mentioned other second-layer items, such as hypercholesterolemia, diabetes, and smoking. Finally, decrease in age-adjusted mortality of stroke and ischemic heart disease was set as the third layer and final goals of the CVD field when the goals for these four risk factors were achieved.

Health Japan 21 (the second term) is currently undergoing final assessment. In the CVD field, age-adjusted mortality for stroke and ischemic heart disease decreased in both men and women, and the final target goals were already achieved before 2016, the year of the interim assessment. Therefore, the evaluation committee of the MHLW determined the rating “A” (target reached).

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The mean SBP has not reached the target goal for either men or women at present; however, it is considered to be on the way to improvement. In detailed trends, men showed a decrease from 2010 to 2015, but a slight increase from 2016 to 2018. On the other hand, the mean SBP of women consistently decreased between 2010 and 2018. For this reason, the evaluation for men was given a rating of ’B’ (improving trend, but achievement of the target goal is uncertain), while for women it was given a rating of ’B’ (improving trend).

The prevalence of hypercholesterolemia can be an indicator of dyslipidemia. Two indices (for TC and LDLC) were used because there were doubts about the accuracy of the direct measurement method for LDLC when Health Japan 21 was started, but the problem of measurement accuracy has now been resolved (2). The cut-off point for LDLC is based on the Japan Atherosclerosis Society (JAS) Guidelines for Prevention of Atherosclerotic Cardiovascular Diseases 2017, which is set as 160 mg/dL of LDLC for the lipid management target for low-risk individuals (3) and is set by adding 80 mg/dL to the cut-off point for TC. However, both indicators remained almost unchanged, and some showed a worsening trend, such as TC in women. Therefore, the overall rating is “C” (no change). Prevalence of diabetes was also stable and a slight decrease in smoking rate was observed (19.5% to 16.7%).

**DISCUSSION**

Real world attempts to use a population approach to improve CVD risk factors are very rare in Japan. There are a few trials as a study basis. For example, from 1998 to 2004, an intervention study by population approach named the HIPPOP-OHP study (1) was carried out. Briefly, 12 worksites were recruited; each of which had 500–1,000 employees. The worksites were divided into 6 intervention or 6 control groups. In the intervention groups, the health-related environment was improved using a population approach. The baseline survey was conducted between 1999 and 2000, and the intervention program was implemented between 2000 and 2004. In the intervention group, information on CVD risk factors and lifestyle modification for all employees was provided. Posters and stand-type Point of Purchase advertising menus were placed on tables in the dining rooms at the workplaces. In addition, health-related events were organized through internal websites. To improve nutrition, the contents of meals served in the workplace dining rooms and box lunches delivered by caterers were evaluated, followed by recommendations for sodium and potassium intake, nutritional balance, and fat energy intake. Walking paths were constructed or walking maps were prepared. An Active Point Campaign using pedometers was arranged twice a year to promote individual and interdepartmental competition and increase physical activity among workers. To reduce smoking, designated smoking areas were established based on the advice of the specialist team. In addition, smoking cessation campaigns were conducted. In this study, the absolute (percent) changes in HDL-cholesterol were 2.7 mg/dL (4.8%) and −0.6 mg/dL (−1.0%) in the intervention and control groups, respectively (4). The smoking cessation rate, defined as abstinence from smoking for the preceding six months or longer, was assessed at 36 months after the baseline survey using a self-administered questionnaire: this rate was significantly higher in the intervention than control group (12.1%, vs. 9.4%, respectively) (5). However, intervention on dietary habit including salt intake did not work well (6). Furthermore, in the real-world community setting, recent budgetary constraints may prohibit generalization of these health-promoting activities across all citizens in Japan.

In the final assessment of Healthy Japan 21 (the second term), the age-adjusted mortality for CVD achieved the target goal with a significant decline. However, this decline is greater than would be expected from actual major risk factor trends such as blood pressure and hypercholesterolemia, as well as smoking and diabetes. One reason for this discrepancy is that the evaluation of primary prevention for CVD should essentially be checked by trend of incidence, not by mortality. Mortality is determined by the product of the incidence and the post-onset fatality, with the former usually improving with improvements in the social environment and lifestyle and the effectiveness of preventive measures, and the latter with advances in clinical medical technology. Unfortunately, there is no way of knowing the incidence of CVDs in Japan now. Although advances in treatment may have a great impact on reducing the number of deaths, the model used in Healthy Japan 21 (the second term) does not evaluate its effect and only looks at the final result, i.e., CVD mortality. In the case of cancer, the cancer registry system has already been legislated all over Japan; now, it is essential to urgently establish an incidence registry system for CVDs. Currently, the Basic Plan for Measures against Cardiovascular Diseases, based on the Cerebrovascular and Cardiovascular Disease Control Act enacted in 2018 (7), clearly states that a system for collecting medical information for CVDs should be established, with the aim of clarifying the actual situation of CVDs in Japan.

In terms of risk factors, multifaceted efforts are needed for blood pressure, including not only salt reduction, but also evaluation using sodium/potassium ratios, food ingredient labelling and development of foods with enhanced functions. In addition, blood pressure can be easily measured at home, and it is considered effective to strengthen self-monitoring by promoting home blood pressure measurement and linking it to personal health records. With regard to dyslipidemia, the method of health promotion differs between triglyceride and HDL cholesterol, which are lipids related to metabolic syndrome (closely related to obesity and diabetes), and LDLC, which is weakly related to metabolic syndrome and strongly related to quality of fatty acid. Therefore, it is necessary to promote awareness-raising projects.

Although each of these preventive measures has a
common philosophy and direction, at present, the horizontal linkage of each activity is weak. A system that enables information sharing and mutual collaboration to be established is needed. Considering that just under 900 people die every day from CVDs in Japan, it is necessary to develop a healthcare system that does not put a major strain on these treatments, especially emergency care.

Disclosure of state of COI
No conflicts of interest to be declared.

REFERENCES


