Medical Cost Reduction in Rural Residents Through a Health Promotion Programme in Japan

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Objectives

In the previous study, we found that the implementation of the Centre of Healthy Aging Programme (CHAP) since 2008 to increase awareness of healthy lifestyles reduced cardiovascular disease risks among residents of Hirosaki city, a rural area in Aomori with the lowest life expectancy in Japan (Figure 1). In this study, we aim to assess the overall medical costs covered by the Japanese public health insurance system and compare them between CHAP participants and non-participants to understand the effect of CHAP in reducing the economic burden of a rural government.

Methods

We compared the total medical costs in the follow-up period from 1 July 2015 to 31 March 2020 using the claims data of residents in Hirosaki city, who were divided into 3 groups based on the participation of checkups during 1 year before the start of the follow-up period (baseline period): CHAP participants (CHAP group), residents who received an annual regular health checkup provided by the local government (checkup group), and everyone else (no-checkup group) (Figure 2). We used a zero-inflated model to compare medical costs used in the 5-year follow-up period, adjusted by age, sex, coronary heart disease (CHD) risk score, and Charlson comorbidity index (CCI) in the baseline period. As we partly employed the result of checkups to estimate the CHD risk score, we applied a multiple imputation method for missing values in the no-checkup group.

Results

The checkup group had the highest age and CCI (Table 1).

After adjusting background factors, the estimate of medical costs in the CHAP and checkup groups were 0.869 and 0.967 times as much as those in the no checkup group, respectively. The increase in CCI by 1.0 point was associated with 1.195 times higher costs (Figure 3).

Using these estimated parameters, we evaluated the medical costs per person per 5 years as follows.

A man aged 60 years without any checkup	**1,251,855JPY**
+annual regular checkup	**−41,311JPY**
+CHAP*	**−163,993JPY**

The CHAP and checkup groups showed a lower probability of incurring no costs (odds ratios of 0.371 and 0.107, respectively). Higher CCI and age were also associated with a lower probability of incurring no costs (Figure 4).

Using these estimated parameters, we evaluated the probability of incurring medical costs per person per 5 years as follows.

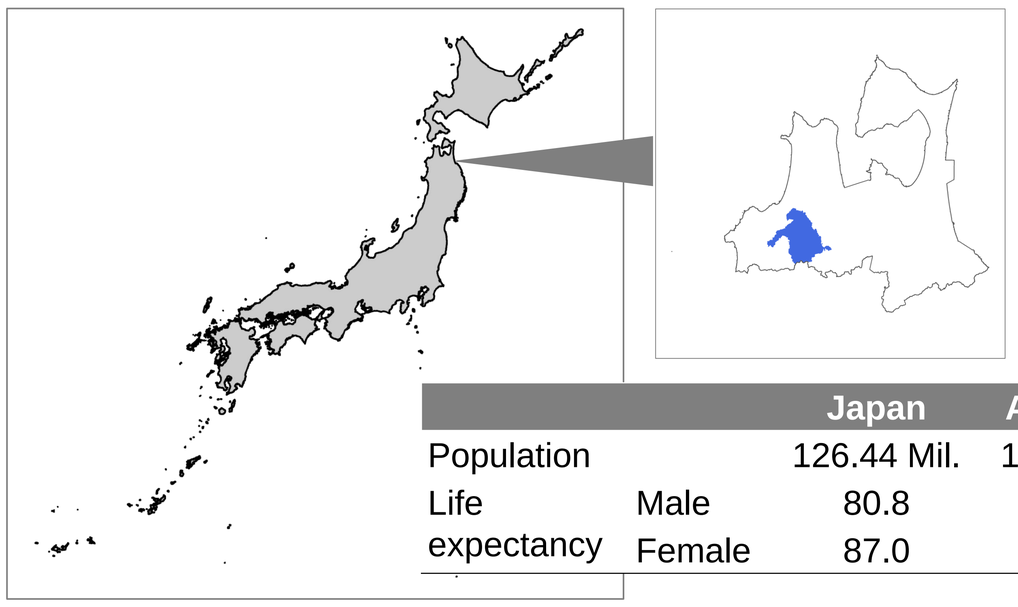
A man aged 60 years without any checkup	**3.0%**
+annual regular checkup	**+86.9%**
+CHAP*	**+61.2%**

*The CHAP group included residents who didn't receive annual regular checkups.

Conclusion

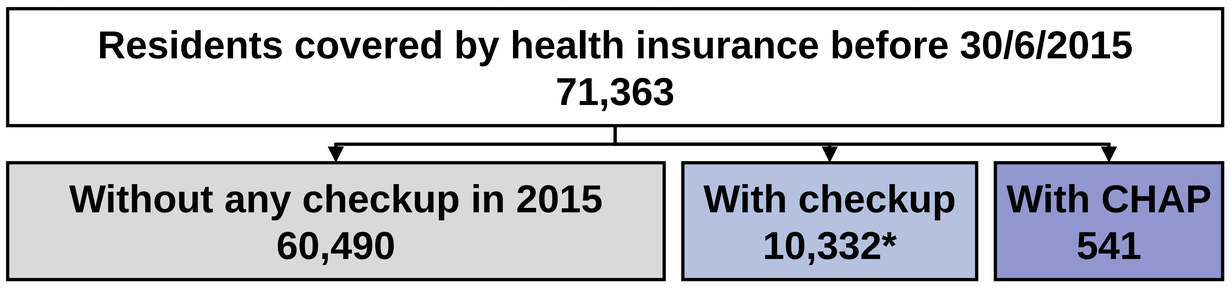
The health programmes including the CHAP and regular health checkups were associated with a higher probability of the occurrence of health service but with lower expenses. Moreover, they can contribute to reducing overall medical costs.

Figure 1. Location of Hirosaki city



		Japan	Aomori
Population		126.44 Mil.	1.26 Mil.
Life expectancy	Male	80.8	78.7
	Female	87.0	85.9

Figure 2. Flow of identifying subjects of analyses



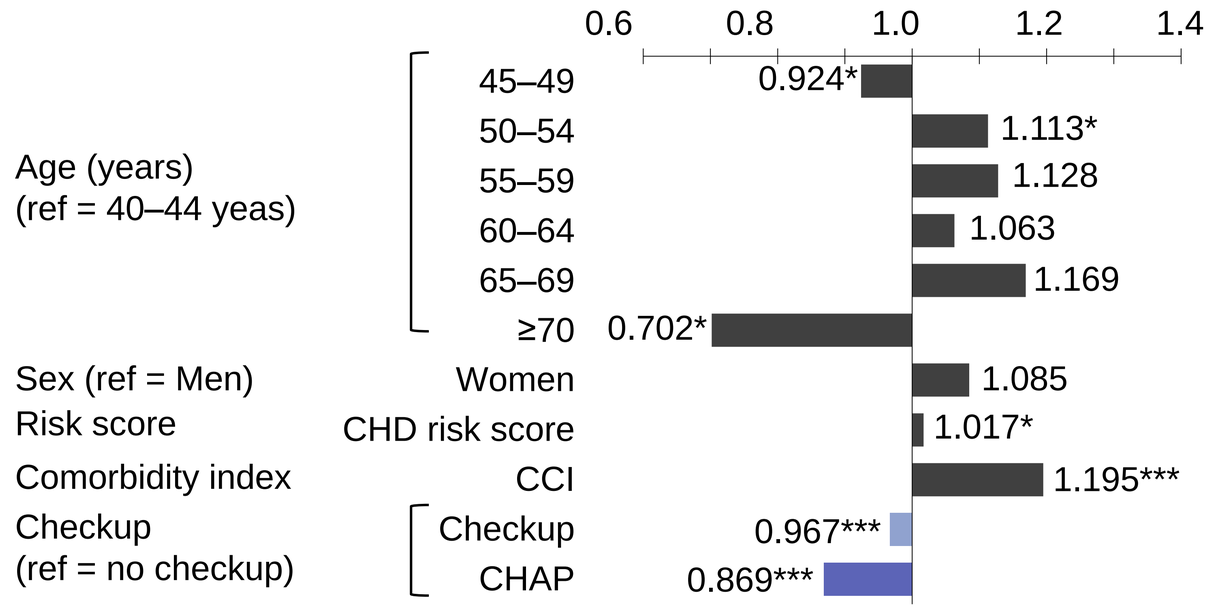
* Limited in individuals aged 40–74 years

Table 1. Characteristics of subjects of analyses

	No-checkup		Checkup		CHAP	
	n, mean	%, SD	n, mean	%, SD	n, mean	%, SD
N (40–74 years)	34,648		9,960		414	
Age (years)	60.4	9.7	64.7	8.0	61.3	8.7
Male	16,995	49.1	4,179	42.0	164	39.6
CCI	0.7	1.6	0.9	1.4	0.6	1.0
CHD Risk score	–	–	39.1	9.0	37.0 (42.2)*	8.8 (10.5)*

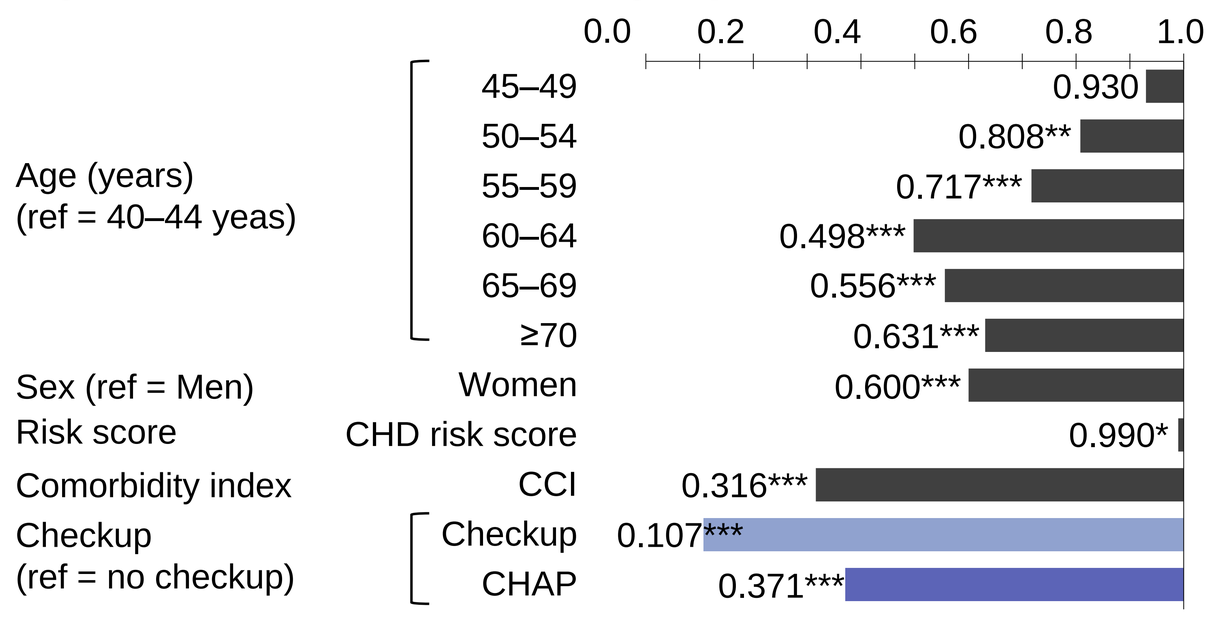
CCI: Charlson comorbidity index; CHD: coronary heart disease
*Calculated using both results of checkup and CHAP and the latter is noted in parentheses.

Figure 3. Risk ratio of the increase in 5-year medical costs



*<0.01, **<0.001, ***0.0001

Figure 4. Odds ratio of avoiding 5-year medical costs



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