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Akira Babazono
Kyushu University

Toshihide Tsuda
Okayama University

Eiji Yamamoto
Okayama University of Science

Yoshio Mino
Osaka Prefecture University

Hiroshi Une
Fukuoka University

Alan L. Hillman
University of Pennsylvania, US

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EFFECTS OF AN INCREASE IN PATIENT COPAYMENTS ON MEDICAL SERVICE DEMANDS OF THE INSURED IN JAPAN

Akira Babazono
Kyushu University

Toshihide Tsuda
Okayama University Graduate School

Eiji Yamamoto
Okayama University of Science

Yoshio Mino
Osaka Prefecture University

Hiroshi Une
Fukuoka University

Alan L. Hillman
University of Pennsylvania

Abstract

Objectives: To examine quantitatively the effects of an increase in patient copayments from 10% to 20% on the demand for medical services in Japan.
Methods: The subjects of the study were the employees insured by the 1,797 health insurance societies, belonging to the National Federation of Health Insurance Societies, in 1996 and 1998. Indicators of medical service demands analyzed include the inpatient, outpatient, and dental case rates, the number of serviced days per case, the medical cost per day and the medical cost per insured.
Results: When the effects of an increase in patient copayments from 10% to 20% were evaluated, taking into account the average age, the average monthly salary, the total number, the gender (male-to-female) ratio and the dependent ratio of the insured, the estimated change in the case rate was −6.96% for inpatient, −4.79% for outpatient, and −5.77% for dental care. The estimated change in the number of serviced day per case was −4.66% for inpatient, −5.67% for outpatient, and −1.82% for dental care. The estimated change in the medical cost per day was −3.15% for inpatient, −13.00% for outpatient, and −11.48% for dental care. The estimated change in the medical cost per insured was −14.08% for inpatient, −21.54% for outpatient, and −18.11% for dental care.
Conclusions: The increase in patient copayments from 10% to 20% enabled insurers to substantially reduce medical costs by cost shifting from the insurer to the insured, with resultant changes in the case rate and the number of service days per case.

Keywords: Copayments, Health insurance, Health policy, Japan

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Employee health insurance was implemented in Japan in 1922 (11). Since then, the insured (but not family members) have received medical care free of charge, excluding some minor fixed-amount costs (11). (Family members also receive health insurance but at different rates of copayment.) After a modification of the Health Insurance Act in October of 1984, 10% copayments were introduced for the premium-paying person covered by employee health insurance (3). The initial 10% copayments substantially decreased the case rate (the total number of visits/the total number of insured of a given insurance society) and the number of service days per case (the total number of serviced days/the total number of visits) for inpatients, outpatients, and dental care (3). In addition, we later discovered an exacerbation of the poor financial balance of the employee health insurance system due to an aging-related increase in medical costs and a decrease in the amounts of premium collected because of the country's economic slump (4).

As a result, the system was revised again in September of 1997 to introduce 20% copayments (an additional 10%) for the premium-paying person covered by insurance (11). At the same time, the insured were required to bear approximately 150 Yen (1.25 dollars in 1997) for each drug prescription. Other reasons for the increase in copayments were an attempt to reduce unnecessary visits of the insured to medical facilities and to reduce excessive medical services provided by medical facilities. That is, the goals were to implement efficient allocation of medical resources (5) and an improvement in the financial status of insurers. However, whether the goal of reducing only unnecessary treatment has been met, rather than necessary treatment, as well, remains unstudied.

To date, few studies have examined comprehensively the impact of increased copayments on medical costs. Similarly, the types of medical services affected have not been evaluated. We undertook this study to examine quantitatively the effects of doubling patient copayments, from 10% to 20%, on the demand for medical services mainly from the perspective of insurers (the health insurance societies). These entities ultimately bear the burden of changes in the number and cost of medical service. However, such changes are both affected by, and the result of, the physician–patient interaction and ensuing behavior. This requires that we also consider, secondarily, their perspective as well. We compared data for 1996 with data for 1998 to infer the effects of the systemwide 1997 change.

SUBJECTS AND METHODS

Subject of Study

We examined all 1,797 health insurance societies belonging to the Federation of Health Insurance Societies (the central organization of socially managed health insurance in Japan) in 1996 and 1998. The Federation insured 15,903,160 persons in 1998. In Japan, the fiscal year runs from April through March of the following year; therefore, fiscal year 1996 reflects April of 1996 to March of 1997, and the fiscal year 1998 reflects April of 1998 to March of 1999. The additional 10% copayments were introduced in September of 1997 (at the middle of fiscal year 1997). Each health insurance society collects annual patient data and issues an "Annual Report of Health Insurance Societies," the source of data for this study.

Study Design

Although a randomized controlled trial would have been optimal, the copayments were introduced, de facto, as state policy within the framework of the universal health insurance system, this prohibiting the optimal approach. Other health care services did not change. Patients continue to visit doctors freely, and doctors generally continue to receive fee-for-service payment. Because the effects of introducing copayments may vary with time, it is also problematic to assess their effects over a short period of time–evaluating the effects of

the introduction of the copayments in 1997, by analyzing cross-sectional data, has limits. Therefore, we compare the data obtained in the half year after introduction of the higher copayment with data obtained in the half year before its introduction.

Indicators of Demands for Medical Services

We used inpatients, outpatients, and dental case rates per 1,000 people, the number of service days per case, the medical cost per day (in unit of 1,000 Yen, approximately $8.3), and the medical cost per insured (in unit of 1,000 Yen) as indicators of demands for medical services in this study. Case rates were calculated from the number of medical bills issued monthly by medical facilities to the Medical Fee Payment Fund for reimbursement. For each insured, any medical facility providing services issues one monthly medical bill reflecting all services provided by that facility. The medical cost per insured indicates the cost paid by the insurer and does not include copayments.

The relationship among the indicators is as follows: P, the number of insured; V, the total number of visits by all insured of a given insurance society; D, the total number of service days in a given society; and C, the total medical costs in a given society. Therefore, the case rate is expressed as V/P, the number of service days per case as D/V, the medical cost per day as C/D, and the medical cost per insured as C/P. Thus, C/P = V/P*D/V*C/D, indicating the medical cost per insured reflects all of these indicators and the change in C/P represents the extent by which medical costs are cut by the introduction of the total 20% copayments.

We set the exchange rate as 120 yen $1 from 1996 to 1998. Because this study did not compare costs between 1984 and 1997, discounting was unnecessary. Moreover, we did not discount medical costs in 1996 and 1998, because the federal lending rate was nearly zero at that time due to the economic recession in Japan.

Characteristics of Individual Health Insurance Societies

Based on the results of our previous studies, an individual health insurance society affects indicators of covered services through the average age of the insured, the total number of the insured, the gender ratio (the number of insured males to the number of insured females), the dependent ratio (the number of dependents divided by the number of insured), and the average monthly salary of the insured (3;4). These indicators, in turn, may affect the demand for medical services.

Statistical Analysis

First, we calculated the averages, standard deviations, and changes of characteristics of individual health insurance societies in 1996 and 1998. Then, we calculated the indicators of demand for medical services, for example, the case rate, the number of service days per case, the medical cost per day, and the medical cost per insured in 1996 and 1998, including the difference in each of these indicators between the two years. We used paired t-tests to evaluate the significance of those differences.

Next, data for 1996 were combined with data for 1998. We set a dummy variable for the copayments at 0 for 1996 data and at 1 for 1998 data. We used multiple regression analyses to estimate the change in indicators as a result of the additional 10% copayments, selecting the forced entry method. The explanatory variables were characteristics of the societies and the objective variable was the demand for each medical service. Because the total number of the insured showed a logarithmic normal distribution, logarithmic conversion was incorporated for this variable. Standardized partial regression coefficients served as indicators of the strength of correlation between objective and explanatory variables. Adjusted R^2 served as indicators of model fitness. We tested the significance of indicators using t-tests

and F-tests. We divided the nonstandardized regression coefficient of the copayments for each indicator (the estimated change in the indicator by the copayments) by the indicators of medical services for fiscal 1996 to examine the effects of the copayments, while taking the characteristics of each health insurance society into account.

RESULTS

Characteristics of Individual Health Insurance Societies

Table 1 shows the mean and standard deviation of the characteristics of individual health insurance societies. The mean difference (standard deviation) between 1996 and 1998 was 0.29 (2.99) years for average ages, −0.01 (0.06) for the total number of the insured (converted into common logarithms), 0.12 (0.77) for gender ratio, −0.01 (0.05) for dependent ratio, and −7.81 (10.00) thousand Yen for average monthly salary. The differences in average age, total number of the insured, gender ratio, and dependent ratio were all statistically significant.

Changes in the Indicators of Medical Services

As shown in Table 2, the inpatient, outpatient, and dental case rates decreased by 5.66%, 2.70%, and 4.22%, respectively. Those same indicators decreased by 4.33%, 5.44%, and

Table 1. Mean and Standard Deviation of Society Characteristics in 1996 and 1998 (n = 1,797)

Variables	1996	1998	Difference
Average age	39.45 (3.69)	39.74 (4.55)	0.29 (2.99)[c]
Total number of the insured[a]	3.60 (0.51)	3.58 (0.52)	−0.01 (0.06)[c]
Gender ratio (males to females)	4.65 (4.59)	4.53 (4.43)	0.12 (0.77)[c]
Dependent ratio (dependents to the insured)	1.12 (0.27)	1.11 (0.26)	−0.01 (0.05)[c]
Average monthly salary[b]	364.37 (66.25)	356.56 (64.44)	−7.81 (10.00)

[a] Log scale.
[b] Unit = 1,000 Yen or $8.3.
[c] $p < 0.001$.

Table 2. Changes in the Indicators of Medical Services in 1996 and 1998 (n = 1,797)

	1996	1998	Difference	Reduction (95% CI)
Case rate				
Inpatient	91.09 (24.76)	85.94 (22.37)	−5.16 (18.93)	−5.66% (−6.62% ∼ −4.70%)[a]
Outpatient	4947.89 (841.78)	4814.34 (785.88)	−133.55 (277.06)	−2.70% (−3.00% ∼ −2.44%)[a]
Dental	1381.82 (159.26)	1323.53 (155.93)	−58.29 (79.08)	−4.22% (−4.48% ∼ −3.95%)[a]
Number of service days per case				
Inpatient	12.67 (1.60)	12.12 (1.54)	−0.55 (1.57)	−4.33% (−4.90% ∼ −3.76%)[a]
Outpatient	1.91 (0.17)	1.81 (0.14)	−0.10 (0.11)	−5.44% (−5.70% ∼ −5.18%)[a]
Dental	2.59 (0.20)	2.55 (0.17)	−0.05 (0.11)	−1.75% (−1.97% ∼ −1.54%)[a]
Medical costs per service day				
Inpatient	25.06 (3.48)	24.44 (4.36)	−0.62 (5.21)	−2.47% (−3.43% ∼ −1.51%)[a]
Outpatient	5.76 (0.54)	5.03 (0.52)	−0.73 (0.36)	−12.76% (−13.05% ∼ −12.47%)[a]
Dental	5.57 (0.36)	4.92 (0.31)	−0.65 (0.24)	−11.68% (−11.88% ∼ −11.48%)[a]
Medical cost per insured person				
Inpatient	29.00 (9.63)	25.41 (8.07)	−3.59 (7.89)	−12.38% (−13.64% ∼ −11.12%)[a]
Outpatient	54.45 (11.36)	43.72 (8.69)	−10.73 (5.00)	−19.70% (−20.13% ∼ −19.28%)[a]
Dental	19.92 (2.73)	16.55 (2.21)	−3.37 (1.50)	−16.90% (−17.25% ∼ −16.55%)[a]

[a] $p < 0.001$.

1.75%, respectively, for number of service days per case. For cost per day, these indicators decreased by 2.47%, 12.76%, and 11.68%, respectively. For cost per insured, these indicators decreased by 12.38%, 19.70%, and 16.90%, respectively.

Results of Multiple Regression Analyses

Table 3 shows the results of the multiple regression analysis to estimate the case rate. The inpatient case rate showed a significant correlation with average age, total number of the insured, gender ratio, average monthly salary, and copayments ($\beta = 0.601$, 0.061, 0.089, -0.081, and -0.140, respectively). The outpatient case rate showed a significant correlation with average age, gender ratio, dependent ratio, average monthly salary, and copayments ($\beta = 0.701$, 0.083, -0.357, 0.341, and -0.144, respectively). The dental case rate showed a significant correlation with average age, gender ratio, dependent ratio, average monthly salary, and copayments ($\beta = 0.475$, -0.094, -0.408, 0.428, and -0.240, respectively). The adjusted R^2 of the models for inpatient, outpatient, and dental case rate were significant (0.332, 0.472, and 0.388, respectively).

Table 4 shows the results of the multiple regression analysis to estimate the number of service days per case. For inpatient service days, we found a significant correlation with average age, total number of the insured, gender ratio, dependent ratio, average monthly salary, and copayments ($\beta = 0.355$, 0.137, -0.134, 0.182, -0.221, and -0.178, respectively). For the outpatient service days, we found a significant correlation with average age, gender ratio, dependent ratio, average monthly salary, and copayments ($\beta = 0.489$,

Table 3. Results of Multiple Regression Analysis to Estimate the Case Rate ($n = 1{,}797$)

Variables	Inpatient (β)	Outpatient (β)	Dental (β)
Average age	0.601[b]	0.701[b]	0.475[b]
Total number of the insured	0.061[b]	−0.004	0.016
Gender ratio (males to females)	0.089[b]	0.083[b]	−0.094[b]
Dependent (dependents to the insured)	0.009	−0.357[b]	−0.408[b]
Average monthly salary[a]	−0.081[b]	0.341[b]	0.428[b]
Copayments	−0.140[b]	−0.144[b]	−0.240[b]
Adjusted R^2	0.332[b]	0.472[b]	0.388[b]

[a] Unit = 1,000 Yen or $8.3.
[b] $p < 0.001$.

Table 4. Results of Multiple Regression Analysis to Estimate the Number of Service Days per Case ($n = 1{,}797$)

Variables	Inpatient (β)	Outpatient (β)	Dental (β)
Average age	0.355[b]	0.489[b]	0.278[b]
Total number of the insured	0.137[b]	−0.005	0.005
Gender ratio (males to females)	−0.134[b]	−0.133[b]	−0.174[b]
Dependent ratio (dependents to the insured)	0.182	0.072[b]	0.119[b]
Average monthly salary[a]	−0.221[b]	−0.306[b]	−0.359[b]
Copayments	−0.178[b]	−0.354[b]	−0.133[b]
Adjusted R^2	0.222[b]	0.411[b]	0.187[b]

[a] Unit = 1,000 Yen or $8.3.
[b] $p < 0.001$.

−0.133, 0.072, −0.306, and −0.354, respectively). For the dental service days, we found a significant correlation with average age, gender ratio, dependent ratio, average monthly salary, and copayments ($\beta = 0.278, -0.174, 0.119, -0.359$, and -0.133, respectively). The adjusted R^2 of the models for inpatient, outpatient, and dental service days were significant (0.222, 0.411, and 0.187, respectively).

Table 5 shows the results of the multiple regression analysis to estimate the medical cost per day. For the inpatient cost per day, we found a significant correlation with gender ratio, average monthly salary, and copayments ($\beta = -0.126$, 0.249, and -0.122, respectively). For the outpatient cost per day, we found a significant correlation with gender ratio, dependent ratio, and copayments ($\beta = -0.036$, 0.175, and -0.415, respectively). For the dental cost per day, we found a significant correlation with average age, total number of the insured, gender ratio, dependent ratio, average monthly salary of the insured, and copayments ($\beta = -0.040$, 0.064, -0.147, 0.112, -0.178, and -0.679, respectively). The adjusted R^2 of the models for the inpatient, outpatient, and dental cost per day were significant (0.090, 0.199, and 0.500, respectively).

Table 6 shows the results of the multiple regression analysis to estimate the medical cost per insured. For the inpatient cost per insured, we found a significant correlation with average age, total number of the insured, gender ratio, dependent ratio, average monthly salary, and

Table 5. Results of Multiple Regression Analysis to Estimate the Medical Costs per Day ($n = 1{,}797$)

Variables	Inpatient (β)	Outpatient (β)	Dental (β)
Average age	0.000	−0.011	−0.040[b]
Total number of the insured	−0.011	0.017	0.064[c]
Gender ratio (males to females)	−0.126[c]	−0.036[d]	−0.147[c]
Dependent ratio (dependents to the insured)	−0.042	0.175[c]	0.112[c]
Average monthly salary[a]	0.249[c]	−0.034	−0.178[c]
Copayments	−0.122[c]	−0.415[c]	−0.679[c]
Adjusted R^2	0.090***	0.199***	0.500***

[a] Unit = 1,000 Yen or $8.3.
[b] $p < 0.01$.
[c] $p < 0.001$.
[d] $p < 0.05$.

Table 6. Results of Multiple Regression Analysis to Estimate the Medical Costs per insured ($n = 1{,}797$)

Variables	Inpatient (β)	Outpatient (β)	Dental (β)
Average age	0.605[b]	0.669[b]	0.442[b]
Total number of the insured	0.097[b]	0.025[c]	0.044[d]
Gender ratio (males to females)	−0.039[d]	−0.017	−0.218[b]
Dependent ratio (dependents to the insured)	0.062[b]	−0.096[b]	−0.192[b]
Average monthly salary[a]	−0.045[d]	0.105[b]	0.073[b]
Copayments	−0.227[b]	−0.513[b]	−0.593[b]
Adjusted R^2	0.423***	0.654***	0.569***

[a] Unit = 1,000 Yen or $8.3.
[b] $p < 0.001$.
[c] $p < 0.05$.
[d] $p < 0.01$.

Table 7. Estimate of Changes (95% Confidence Interval) in the Copayments on the Indicators of Demands for Medical Services ($n = 1{,}797$)

Variables	Inpatient	Outpatient	Dental
Case rate	−6.96%[a] (−8.23% ∼ −5.66%)	−4.79%[a] (−5.56% ∼ −4.01%)	−5.77%[a] (−6.37% ∼ −5.17%)
Number of service days per case	−4.66%[a] (−5.40% ∼ −3.92%)	−5.67%[a] (−6.07% ∼ −5.28%)	−1.82%[a] (−2.22% ∼ −1.42%)
Medical cost per day	−3.15%[a] (−4.01% ∼ −2.28%)	−13.00%[a] (−13.86% ∼ −12.14%)	−11.48%[a] (−11.85% ∼ −11.11%)
Medical cost per insured	−14.08%[a] (−15.51% ∼ −12.64%)	−21.54%[a] (−22.26% ∼ −20.82%)	−18.11%[a] (−18.70% ∼ −17.51%)

[a] $p < 0.001$.

copayments ($\beta = 0.605$, 0.097, −0.039, 0.062, −0.045, and −0.227, respectively). For the outpatient cost per insured, we found a significant correlation with average age, total number of the insured, dependent ratio, average monthly salary, and copayments ($\beta = 0.669$, 0.025, −0.096, 0.105, and −0.513, respectively). For the dental cost per insured, we found a significant correlation with average age, total number of the insured, gender ratio, dependent ratio, average monthly salary, and copayments ($\beta = 0.442$, 0.044, −0.218, −0.192, 0.073, and −0.593, respectively). The adjusted R^2 of the models for the inpatient, outpatient, and dental cost per insured were significant (0.423, 0.654, and 0.569, respectively).

We estimated the effects of changes in the copayments on the indicators of demands for medical services from the regression coefficient of the copayments (Table 7). The estimated changes (95% CI) in the case rates were −6.96% (−8.23% to −5.66%) for inpatients, −4.79% (−5.56% to −4.01%) for outpatients, and −5.77% (−6.37% to −5.17%) for dental services. The estimated changes (95% CI) in the number of service days per case were −4.66% (−5.40% to −3.92%) for inpatients, −5.67% (−6.07% to −5.28%) for outpatients, and −1.82% (−2.22% to −1.42%) for dental services. The estimated change in the medical cost per day (95% CI) was −3.15% (−4.01% to −2.28%) for inpatients, −13.00% (−13.86% to −12.14%) for outpatients, and −11.48% (−11.85% to −11.11%) for dental services. The estimated changes (95% CI) in the medical cost per insured were −14.08% (−15.51% to −12.64%) for inpatients, −21.54% (−22.26% to −20.82%) for outpatients, and −18.11% (−18.70% to −17.51%) for dental services.

DISCUSSION

Insurers Saved Costs by Increasing Co-Payments

We compared the data for fiscal years 1996 and 1998 to examine the impact of the additional 10% copayments. The copayments were introduced in 1984 (an initial 10%) and 1997 (an additional 10%, for total of 20%). We found that the additional 10% copayments enabled insurers to reduce medical costs, 14.08% for inpatients, 21.54% for outpatients, and 18.11% for dental services, beyond the savings realized in 1984 (3). These savings were generated from the additional 10% cost shifting from the insurer to the insured and the resultant changes in the case rate and the number of service days per case. Because we did not evaluate insurer costs in 1984, we cannot directly compare them. The copayments affected both patient and physician behavior. The changes in case rate and the number of service days per case reflect both a reduction in patients' care-seeking behavior and a reduction in physicians' service-ordering behavior. Furthermore, patients' behavior may induce changes in physician's behavior. Reductions in patients' financial means likely reduced the amount of care they seek from physicians.

The change in medical cost per day for inpatient services was much smaller than for outpatient or dental services, probably due to the high-medical cost refunding system in Japan. Under this system, the maximum out of pocket payment by the insured is 63,600 Yen ($530) per month (11). In Japan, the high-medical cost refund system subsidizes those patients receiving high-cost inpatient services, reducing the percentage of the medical cost shifted from insurer to insured for inpatient services more than the shift for outpatient and dental services, under the 20% copayments.

Comparison of change in case rates and the number of service days per case in 1984 and 1997

When the initial 10% copayments were introduced in 1984, the case rate decreased 4.21% for inpatients, 5.31% for outpatients, and 5.02% for dental services (3). The number of service days per case decreased 3.24% for inpatients, 9.15% for outpatients, and 2.21% for dental services (3). In comparison, the additional 10% copayments (total 20%) decreased the case rate, 6.96% for inpatients, 4.79% for outpatients, and 5.77% for dental services, whereas the number of service days per case decreased 4.66% for inpatients, 5.67% for outpatients, and 1.82% for dental services. Of interest, the changes in the case rate and in the number of service days per case resulting from each 10% increase in copayments had a similar percentage impact, except for outpatient service days per case. Economists call this "elasticity", or the relationship between price and demand. Do medical patients actually behave as economists would predict, even when they are sick? This question bears further scrutiny, as ill patients have been thought to be exempt from "marketplace" dynamics such as this.

Income Effect Caused by Copayments

After the system changes in 1984, the outpatient or dental case rate did not correlate with the average monthly salary of the insured. Now, however, we find a strong correlation between them. The increased copayments may have exerted an income effect, perhaps making it difficult for low-income insured to receive medical services.

In 1984, the number of service days per case for inpatient, outpatient, and dental services showed a negative correlation with the average monthly salary of the insured, a correlation that was more markedly negative in the present analysis. This finding suggests that the number of service days per case increases as the average monthly salary of the insured becomes smaller. It seems unlikely that physicians intentionally prolong or make more frequent the treatment for low-income patients. Rather, it seems more reasonable that patients required longer periods of treatment as their income becomes smaller and their care-seeking behavior is delayed.

The additional 10% copayments impact low-income patients by producing economic barriers to timely medical care. As a result, they need longer treatment when they finally do seek care. Thus, the additional 10% copayments may reduce necessary care, at least for low-income insured.

Effects of Copayments on Chronic Diseases and Minor Sickness

Studies of copayments generally show that they decrease case rates for patients with minor sickness (1;8;9;13–17), but some do report that the case rates decreased irrespective of the severity of illness (18;19) or that the case rate did not markedly change (7).

In our previous study of the 1984 system change, we used time-sequential analysis to evaluate the impact of the initial copayments on the case rate of insured persons with hypertension (2). Our goal was to clarify whether the initial copayments influenced necessary care, as well as unnecessary care. We found an increase in the case rate during the six-month period before the introduction of the copayments and a substantial decrease

in case rate during the following six months. Perhaps patients anticipated the cost-shifts by seeking care before it became more expensive to them, then sought less care after the copayments were introduced, might seek less care after the copayments were introduced!

After the introduction of the total 20% copayments, in comparison to the initial 10% copayments in 1984 when no effect on the case rate of hypertension care was found, the case rate for patients with hypertension, gastric ulcers, asthma, and colds decreased (20). However, more precise studies are necessary to evaluate the effect in detail. The opportunity to receive care for chronic diseases such as hypertension and diabetes mellitus should be guaranteed, even when they are of mild severity, or especially when they are mild. Interrupting the progression of disease is easiest when disease is treated early.

Limitations

Although randomized trials (RCTs) offer the best way to study the impact of change in the health care setting, RCTs are costly, and with the vicissitudes of public policy making, they are not always feasible because of cost. Subjective data may have been useful, but we chose to defer such a study for the future. Instead, we tried to understand the validity of our work, by considering the effect of biases and controlled for covariates as best we could (see Subjects and Methods section).

First, we made no adjustments for the time value of money (i.e., discounting—the adjustment made for alternative uses of money), because the federal lending rate was almost zero in the time period of the study. However, because we compared costs between 1996 and 1998, we did consider the effect of medical price increases. The Japanese government strictly regulates the medical price schedule and revising it every other year. Neither insurers nor providers have the freedom to negotiate individually a different fee schedule (6). During the study period, the average medical price increase was 1.3%. According to the Japanese Government, the inpatient cost, the outpatient cost, and dental cost per case changed by an average of 4.9%, −4.8%, −0.3% from 1996 to 1998, respectively (10;12). Adjustments for inflation did not change our results.

Second, we controlled for average age, total number of the insured, gender ratio, dependent ratio, and average monthly salary by multiple regression analysis (see Subjects and Methods section). The number of health insurance associations was 1,816 in 1996 and 1,803 in 1998, the decrease due mainly to financial problems caused by increasing cost share for the elderly and the long-standing economic recession (4). Although the unemployed people may be even less likely to visit physicians because of higher copayments, our study population was composed of the employed.

Third, the economic recession in Japan might have affected the impact of the increase in patient copayments. The average monthly salary dropped 2.1% from 1996 to 1998 among the employed, which were the subjects of our study. Companies did reduce employees' salaries to some degree, and we accounted for this in our analyses (see Subjects and Methods section). The Japanese government increased patient copayments, but they did not increase medical prices significantly because of the economic recession. The important message is that medical costs per case did not change significantly. We found no evidence that the physician-patient interaction resulted in changed test, procedure, and/or number of service behavior. Finally, it might be possible that medical technology could have changed quite rapidly and, therefore, have important cost consequences. However, we found only small differences in the medical costs per case between 1996 and 1998.

CONCLUSION

The additional 10% copayments enabled insurers to substantially reduce medical costs by cost shifting from the insurer to the insured, with resultant changes in the case rate and

the number of service days per case. The magnitude of the impact on case rates and number of service days from the additional copayments in 1997 was approximately the same as the initial copayments in 1984 (i.e., each 10% increment had the same results). Although the effects of each 10% increment were additive, we also observed an income effect from the introduction of the additional 10% copayments, when we had not in the earlier study of the initial 10% copayments. The additional copayments may have reached a level when they do reduce necessary care, at least for low-income insured, another avenue ripe for study. Finally, the impact on quality of care of the introduction of both the initial and the additional 10% copayments remains unknown, but perhaps the most important avenue for future study of all!

POLICY IMPLICATIONS

The control of increasing medical costs caused by advances in medical technology and the aging of society has become a problem world-wide. Increasing patient copayments is one of the most powerful ways to do so. However, the use of such a powerful intervention may inhibit visits for milder diseases, possibly resulting in aggravation of the disease. Policy makers should consider quality of care as well as possible savings when they change patient copayments.

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