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Abstract

In this paper, we employ two nationally representative individual-level datasets on medical claims from 2001 to 2007 to investigate whether recent medical fee reductions leads to medical suppliers to provide the patients with unnecessary inpatient treatment. We focus on the differences in provision between medical assistance patients who receive health care services without any contribution or copayment and insured patients in the public health insurance system who pay premiums and make copayments. In this situation, medical suppliers lacking appropriate professional ethnics may provide more unnecessary treatments to the beneficial patients who can be unaware of actual medical costs than to the insured patients. Given that medical assistance benefits are not randomly assigned but are determined by local government means testing, there may be a sample selection bias in the estimators obtained by conventional econometric analysis. To adjust for this endogeneity, we employ the bias-corrected matching estimator proposed by Abadie and Imbens (2011) and find that medical suppliers provide unnecessary inpatient treatment to both medical assistance beneficiaries and the insured in response to recent reductions in medical fees. Our estimates also suggest: that medical suppliers responded strongest to the larger fee reduction in 2006; that long-term hospitalized beneficiaries

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are provided with unnecessary treatment; and that unnecessary diagnostic imaging was provided to both beneficiaries and the insured over the entire period. We also find that the apparently larger health care expenditures of beneficiaries is in fact caused by sample selection bias in that medical assistance beneficiaries typically require more inpatient treatment, and not because they are provided with more unnecessary treatment than other patients.

Keywords: Social assistance system, Physician agency, Inpatient treatments, Financial incentive, Bias-corrected matching estimator, Japan

JEL Classification Number: C21, I13, I18, I38

1. Introduction

The purpose of welfare systems is to guarantee a minimum standard of living and to enhance independence by providing necessary assistance benefits to those persons who are destitute in accordance with their level of needs. In many countries, the level of welfare provided depends on means testing and whether an individual is eligible to receive benefits. Eligible beneficiaries are then typically provided with income security, employment support, and the provision of medical and long-term care financed by taxation. In many developed countries, several institutions independently provide these benefits. However, in Japan the public assistance system alone provides all possible assistance to beneficiaries within the confines of the law[1]. Figure 1 depicts the trend in government expenditure on public assistance in Japan and reveals that the public assistance share of medical assistance is about 64% higher on average than that for living assistance.

<Figure 1>

Obviously, health care services are important so that people can maintain and improve their health status, quality of life, and life expectancy. Indeed, Currie, Gruber, and Fischer (1995), Travis (1999), Baker and Royalty (2000) and Gross and Notowidigdo (2011) conclude that Medicaid in the US has contributed to improvements in the access to health care services and to health status and the quality of life of beneficiaries. As for Japan, Kumagai (2002) employs a prefecture-level aggregated dataset and finds that income transfers from the central government to local governments contributed to improving the health status of beneficiaries[2].

[1] See the National Institute of Population and Social Security Research (2011) for details.
[2] Hayashi (2011) also examines the medical assistance system in Japan and finds that the number of social assistance households and the factors related to mental illness of the beneficiaries have

Most recently, however, the Japanese government has discussed the most fundamental reforms of the Japanese medical assistance system proposed in nearly half a century (Cabinet Office, 2011). This policy interest directly relates to the large expenditure share of medical assistance in total public assistance in Japan, for which we identify several contributing factors. First, approximately 80% of households benefiting under the public assistance system in Japan are elderly (42.9% in 2012), injured or diseased (21.9%) or disabled (11.2%) with a commensurately greater need for medical care[3]. This is quite unlike the composition of the beneficiaries of Medicaid in the US, which generally provides coverage of most medical expenses for low-income women and children (35.6%), the elderly (19.0%), and the disabled (20.2%)[4]. Second, all health care expenditures for medical assistance beneficiaries in Japan are financed by taxation. This means that while the access of medical assistance beneficiaries to medical care is partially regulated, unlike public health insurance system patients, they are exempt from premium contributions to health insurance and copayments for medical services received, and typically receive the same treatment as public health insurance enrollees[5].

Importantly, the medical assistance system currently operating in Japan is associated with moral hazards that ultimately increase the expense of medical assistance in that some patients and some medical suppliers abuse the system to respectively receive and provide unnecessary treatment that little improves patient health (Suzuki, 2008; Kobayashi et al., 2010)[6]. In particular, because inpatient treatment is mostly determined by physicians, the problems associated with the relatively high health care expenditure (HCE) on inpatient treatment found in the medical

positive impacts that attenuate toward the top of the conditional quantile of the transfer deficit.

[3] The remaining 20% comprise single-mother (7.7%) and other (16.2%) families.

[4] Source from http://medicaid.gov/.

[5] The medical fees reimbursed for treatment for beneficiaries are identical to those for public health insurance patients.

[6] The most notorious affair involved the Yamamoto hospital in 2009, where the hospital director was arrested for the fraudulent billing of fictitious treatments and professional negligence and involuntary manslaughter arising from unnecessary and unprofessional surgical operations. See Kobayashi et al. (2010) for details.

assistance system could result from the provision of medical treatments by medical suppliers. In turn, this problem may have arisen because of recent health care reforms aimed at controlling the increase in HCE associated with rapid population aging in Japan and improvements in medical technology. These include, among others, an increase in the premium rates for employee health insurance, a reduction in medical fees (–1.30% in 2002, 0.00% in 2004, and –1.36% in 2006), the introduction and spread of the Diagnosis Procedure Combination/Per-Diem Payment System (DPC/PDPS) for acute care in the hospitals that met the requirements set in 2003, and the approximately 53% reduction in the number of hospital beds for recuperation. These policy reforms are expected to decrease the profits of medical facilities and the income of physicians[7] because HCE represents part of the compensation for their work[8]. In this situation, some of medical suppliers facing a reduction in health care-related income and thence profit may provide unnecessary medical services that do not contribute to improving patient health. They can do this because it is usually difficult for patients to judge the appropriateness of the medical services they receive. In health economics, these physician-related agency problems are widely discussed in the literature on supplier-induced demand. For example, Rice (1983), Hurley and Labbele (1995), Yip (1999), Dafny (2005), Melichar (2009), Carlsen et al. (2011), and Wang et al. (2011) find that physicians have a financial incentive to change their medical supply behavior in response to changes in fee schedules[9]. In Japan, Kawai and Maruyama (2000), Suzuki (2005), Nawata et al. (2006), Iizuka

[7] In Japan and many European countries, most physicians are employed in medical institutions and receive a fixed salary. In other words, they are not independent economic entities, but are merely one of several production inputs for the medical institution. In fact, the proceeds of health insurance are typically reimbursed to physicians and hospitals together, not to individual physicians (Hashimoto and Izumida, 2011, p. 13).

[8] For example, Suzuki (2002) finds that the unprecedented medical fee reduction in 2002 had a ruinous impact on the management of medical institutions.

[9] Many studies also find that physicians have a financial incentive to increase medical treatment and choose more profitable treatments when they experience a reduction in income, including an income shortage owing to fiercer competition in the area (Evans, 1974; Fuchs, 1978; Cromwell and Mitchell,

(2007, 2012), and Yuda (2013) also find that physicians have a financial incentive to provide unnecessary treatment in response to fee schedule changes.

The purpose of this article is to investigate whether recent negative income shocks to medical suppliers lead them to provide patients benefitting from the medical assistance system with more inpatient treatment than they provide to comparable public health insurance enrollees. In Japan in particular, unnecessary medical treatments are easily provided because most treatments are reimbursed under a fee-for-service scheme, because many medical facilities are involved in recuperative treatments, and because while medical bills are reviewed each month, they are not compared across time. Therefore, the examination of inpatient supply behavior has important policy implications in Japan for future medical fee schemes, the operation of the medical assistance system itself, and the public health care system as a whole. Moreover, this study is the first to employ a large nationally representative micro dataset to compare the medical supply behavior for medical assistance beneficiaries and public health insurance enrollees. The study also has important policy implications for Medicaid in the US because the medical reform bill enacted in March 2010 expands eligibility for Medicaid to all persons with income less than 133% of the federal poverty guideline after 2014[10].

The remainder of the paper is organized as follows. Section 2 provides a brief overview of the health care system in Japan. Section 3 presents the data to be used in the analysis and Section 4 presents the econometric methodology to be employed. Section 5 details the empirical results and Section 6 provides our conclusions.

1986) and a patient shortage arising from a decrease in the number of live births and policy reforms (Gruber and Owings, 1996; Iverson, 2004; Grytten and Sørensen, 2008).

[10] There are many extant economic studies on Medicaid in the US, most recently, Grabowski and Gruber (2007), Choi (2011), Garthwaite (2011), and Finkelstein et al. (2012).

2. The Japanese Health Care System[11]

This section briefly discusses the medical assistance and public health insurance systems and the medical fee schedule operating in Japan. Table 1 compares the medical assistance and the public health insurance systems in Japan.

<Table 1>

As shown, the purpose of the medical assistance system is to provide medical services for beneficiaries of the Japanese public assistance system. For the most part, medical assistance beneficiaries are exempt from premium contributions to health insurance and copayments for medical services received, and typically receive the same treatment as public health insurance enrollees. However, their access to medical assistance is regulated by the Public Assistance Act in that when seeking medical care they must attend a welfare office and obtain tickets for medication before proceeding to a designated medical facility.

As discussed, the HCEs of beneficiaries are fully financed at the public expense, and the medical fees reimbursed for these beneficiaries are identical to those for patients enrolled in the public health insurance system. As a result, the current system has caused many problems concerning the demand and supply of medical care for medical assistance beneficiaries. For example, beneficiaries can be unaware of actual medical costs and this is known to account for more frequent hospital visits or hospitalization (ex post moral hazard[12]). The existing system also leads some medical suppliers lacking appropriate professional ethics to rotate patients receiving medical assistance benefits across hospitals and to provide unnecessary treatment in

[11] Ikegami et al. (2011), Hashimoto et al. (2011), and Shibuya et al. (2011) summarize in detail the vicissitude, recent problems, and prospective views of the public health insurance systems in Japan. This section places reliance on these articles.
[12] See Zweifel and Manning (2000).

order to illegally receive medical fees (Kobayashi, 2010). To overcome these and other concerns, the Japanese government has recently deliberated upon the most fundamental reform of the medical assistance system in nearly half a century (Cabinet Office, 2011)[13].

In contrast, the public health insurance system in Japan, which has provided universal health care coverage since 1961, historically consists of the following three broad categories of health insurance: *Health Insurance* for employees and their dependents, the *Elderly Health Care System* for persons aged 70 years and over[14], and *Japanese National Health Insurance*, mostly provided by each municipality for the remainder of the Japanese population other than medical assistance beneficiaries. At present, there are about 3,500 insurers covering about 99.2% of the population as at the end of March 2012. Health insurance enrollees are free to choose the medical facility they wish to attend (the free access system) and receive health insurance treatment at low cost.

The HCEs of medical treatments for both beneficiaries and enrollees are reimbursed through a nationally uniform medical fee schedule[15]. That is, regardless of the age, experience, position, and skill of the physician or the individual attributes of the patient, the same medical fee is reimbursed to medical suppliers providing identical treatment. The fee schedule is reviewed biannually by the Central Social Insurance Medical Council consisting of representatives from insurers, physicians and intellectuals. The global revision rate of all services and drug prices k are determined with reference to both macro- and microeconomic indicators in the following

[13] Options discussed include strengthening the supervision of designated medical facilities, promoting or obligating the use of generic drugs in medical treatment, introducing patient copayment on the promise of a reimbursement in the following month, and revoking the designation of medical facilities that frequently provide inappropriate medical care services (Cabinet Office, 2011).

[14] This system changed to the *Long-life Health Care System* for persons aged 75 years and over in April 2008.

[15] See Endo (2005) and Hashimoto et al. (2011) for a more detailed explanation.

manner[16]:

$$k = \frac{\sum(\overline{p}_{it}q_{it-1} + \overline{p}_{jt}q_{jt-1})}{\sum(\overline{p}_{it-1}q_{it-1} + \overline{p}_{jt-1}q_{jt-1})} \quad (1)$$

where $\overline{p}$ is the official prices of goods *i* and *j* in period *t* and *q* is the total amount of health care services and drugs provided to the patient. The market prices for goods *i* items are obtained by survey at the time of the revision, and include drugs, specific medical devices, and commissioned examinations. These prices are determined by specific rules based on the market price, p_{it-1}[17]. Goods *j* are all medical services (except goods *i*) and are not surveyed. The prices for goods *j*, $\overline{p_{jt}}$, are determined to balance the global revision rate *k*. For the most part, the revision of the fee schedule system in Japan is based more on policy decisions and the economic situation, rather than on any objective evidence. Further, because the share of goods *i* is relatively minor, *k* is almost entirely determined by the revision rate of goods *j*.

3. Data

To examine the effects of a fee reduction in the fee schedule on medical supply behavior, we combine two nationally representative individual-level claim datasets for 2001–07 conducted by the Japanese Ministry of Health, Labor and Welfare, namely, the *Fact-finding Survey on Medical Assistance* (*FSMA*) and the *Survey of Medical Care Activities in Public Health*

[16] The macroeconomic indicators include the trends in economic growth, inflation, and wages, while the microeconomic indicators are based on the financial conditions of medical facilities reported in the latest *Survey on Economic Conditions in Health Care (Survey on Health Care Facilities)* conducted by the Ministry of Health, Labor, and Welfare.

[17] For example, pharmaceutical prices are determined by the National Health Insurance Drug Price Standard. See Iizuka (2007, 2012) for details.

Insurance (*MAHI*)[18].

The *FSMA* surveys the situation governing medical treatment, diseases and injuries, dispensing, and the use of drugs for recipients of the medical assistance system to obtain the basic data needed for administration of the system. The objects are randomly selected from the claim data reviewed every year in June and stored in welfare offices by separate extraction rates: 1 of every 10 claims for hospital inpatient treatment, 1 of every 20 claims for hospital outpatient treatment, 1 of every 5 claims for clinic inpatient treatment, 1 of every 20 claims for clinic outpatient treatment, and 1 of every 10 claims for dental treatment. In contrast, the *MAHI* surveys the situation governing medical treatment, diseases and injuries, dispensing, and the use of drugs for recipients of the public health insurance to obtain the basic data needed for the administration of medical insurance. The objects are selected from stratified random two-stage sampling, with insurance-covered medical care institutions and pharmacies as the primary sampling unit, and detailed statements as the secondary sampling unit. The health insurance organizations selected provide detailed statements in June every year from medical facilities and pharmacies using separate sample extraction rates, which differ across inpatients and outpatients, the type of insurance, and the attributes of the medical facility.

The dataset used in this study is composed of items common in both the claim data and several prefectural-level variables. We extract hospitalized individuals from the entire sample to accurately examine the responses of medical suppliers to negative income shocks because inpatient treatment is largely determined by physicians. In addition, we exclude the DPC/PDSS claims because medical facilities receive a fixed payment for these regardless of the volume of treatment provided to patients and because the DPC/PDSS system applies only to acute care in specific hospitals[19]. We also exclude individuals whose HCEs diverge from the sample mean by

[18] See http://www.mhlw.go.jp/english/database/db-hss/dl/smcaphi_2009.pdf.
[19] When health care expenditures are mainly reimbursed by an inclusive payment system, medical

more than ±2 standard deviations given that Lubits and Prihoda (1984), Scitovsky (1984), Werblow et al. (2007), and Felder et al. (2010) all find that the HCE of decedents (persons who have died) is generally much higher than that of survivors, depending on the date of death[20].

In this study, we divide the sample into short- and long-term hospitalizations because patient condition and the type of treatment can differ by the length of stay. Table 2A and 2B provides descriptive statistics of the main variables across beneficiaries and enrollees and the results of tests for the comparison of means[21].

<Table 2A>

<Table 2B>

Regardless of the length of stay, the mean HCE for medical assistance beneficiaries of 42.3 thousand yen (for short-term hospitalizations) and 36.2 thousand yen (for long-term hospitalization) is statistically significantly higher than for health insurance enrollees. However, the HCEs for each type of treatment do not exhibit a similar tendency. More specifically, for short- and long-term hospitalization, the expenditures on the administration of drugs for beneficiaries are significantly 3.4 and 5.0 thousand yen higher than those for enrollees, while the expenditures on procedures and operations for enrollees are 19.6 and 29.3 thousand yen statistically significantly higher than for beneficiaries, respectively. In addition, the expenditures on checkups and diagnostic imaging for beneficiaries are statistically significantly higher than for enrollees for short-term hospitalization, whereas those for long-term hospitalization are

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suppliers would tend not to provide unnecessary treatments to patients because they would gain more profit by underproviding treatment. However, the underprovision of treatment will also adversely affect patient health.

[20] In the end, this is a practical consideration in that we can identify decedents from the *MAHI* but not from the *FSMA*.

[21] HCEs adjusted to 2005 prices (¥1000 = USD9.10 = €7.31 in 2005).

statistically significantly lower. Of course, these differences may be reflected in the structure of disease prevailing among the patients. For example, with short-term hospitalization, the primary diseases of beneficiaries are diseases of the circulatory system (18.7%), mental and behavioral disorders (10.8%), diseases of the digestive system (10.0%), injury, poisoning and certain other consequences of external causes (10.0%), neoplasms (9.0%), and diseases of the respiratory system (9.0%), while those for enrollees are diseases of the circulatory system (11.9%), neoplasms (10.7%), diseases of the genitourinary system (9.5%), and diseases of the digestive system (9.1%). Similarly, with long-term hospitalization, the prevailing diseases for beneficiaries are mental and behavioral disorders (51.6%), diseases of the circulatory system (17.8%), injury, poisoning and certain other consequences of external causes (4.7%), neoplasms (3.8%), and diseases of the digestive system (3.7%), while those for enrollees are diseases of the circulatory system (21.2%), mental and behavioral disorders (13.8%), diseases of the genitourinary system (10.2%), neoplasms (10.2%), and injury, poisoning and certain other consequences of external causes (8.2%). In short, we can see that there are many more beneficiaries with mental and behavioral disorders irrespective of the length of stay. Because the treatments for mental disease tend to take a long time, it is considered that their treatment is quite different to that for other diseases. To address this, we use two samples in this study: the first includes all patients (referred to as the "full sample") and the second consists of all patients other than those with mental diseases (referred to as the "subsample").

Relative to the full sample, we can see the differences expand. Specifically, the mean HCEs of medical assistance beneficiaries are 44.6 (for short-term hospitalization) and 57.1 (for long-term hospitalization) thousand yen significantly higher than for enrollees. By types of treatments, expenditures of administrations for the beneficiaries and expenditures of procedure and operations of the enrollments are statistically significantly higher but the differences

diminish. On the other hand, expenditures of checkups and diagnostic imaging of the beneficiaries are statistically significantly higher and the differences expand for the short-term hospitalization but there are no significant differences for the long-term hospitalization.

4. The Empirical Model and Strategies

4.1 The Model

We specify the following HCE equation to examine the effect of the physician response to medical fee reductions on their medical supply behavior:

$$\ln(HCE_{it}) = \alpha_0 + \alpha_{MA} MA_{it} + \sum_{j=1}^{J} \alpha_j \cdot x_{jit} + \sum_{t=2002}^{2007} \alpha_t \cdot year_{it} + \sum_{k=1}^{K} \alpha_k \cdot local_{kit} + \sum_{j=1}^{J} \beta_j \cdot (MA_{it} \times x_{jit}) + \sum_{t=2002}^{2007} \beta_t \cdot (MA_{it} \times year_{it}) + u_{it} \quad (2)$$

where $\ln(HCE_{it})$ is the natural logarithm of an individual i's HCE in year t and MA is a dummy variable that equals 1 if the individual is a beneficiary and otherwise 0. Therefore, if a beneficiary *ceteris paribus* receives more inpatient treatment than a comparable enrollee, the estimate of α_{MA} should be significantly positive. The vector x_j includes individual attributes, institutional factors, and supply factors. Individual attributes include sex, age and age squared, and the designation of the primary disease is based on the International Classification of Diseases (ICD)-10 codes. The length of stay and its square are also included in x_j for the analyses of long-term hospitalization.

The proxy variables for institutional factors include dummy variables for patients aged 15 years and under and for those aged 65 years and over. First, in recent years, every prefectural

government and many municipal governments have subsidized the copayment for patients aged 15 years and under as a countermeasure to the declining birth rate in Japan. The demand for inpatient care for this group of patients then differs from that of other age groups because these subsidies greatly reduce the price of medical care (see, for example, Bessho, 2012). Second, patients aged 65 years and over have also been insured under the system of public long-term care insurance (LTCI) since April 2000. Similarly, aged beneficiaries also receive long-term care assistance in that they are also eligible to receive nursing care without copayment. Thus, the elderly can consume both medical care and long-term care under their budget constraints if an individual is certified by the LTCI[22]. Thus, the demand and supply of inpatient care of the elderly may differ from that of the young (Tamiya et al., 2011). The remaining supply factors include a hospital dummy variable that captures the differences in practice styles across hospitals and clinics associated with the number of medical staff and the situation of the medical facility.

We also specify yearly dummy variables (*years*), with 2001 as the reference category. Given that medical fees were revised by –1.30% in 2002, by 0.00% in 2004, and by –1.36% in 2006, HCEs after 2002 are lower if we assume that medical suppliers provided the same treatments to patients during each period, on average. Therefore, all of the coefficients on the year dummy variables, α_t, are expected to be statistically significantly negative. Otherwise, the results would indicate that medical suppliers increased their supply of treatments in response to the fee reductions. Moreover, to further examine medical provision for beneficiaries, we specify interaction terms between *MA* and *x* and *year*. As with the interpretation of α_t, we hypothesize β_t is statistically significantly positive if medical suppliers provide unnecessary treatment to beneficiaries in response to the reduction in fees.

[22] However, owing to data limitations, we cannot identify individuals who are certified by the LTCI and who receive long-term care assistance.

The variables *local*s include lagged medical supply densities at the prefectural level, local-specific time trends, and prefectural fixed effects. We measure the medical supply density using the physician–population and hospital bed–population ratios to examine the inducement effect of fiercer competition, as also analyzed by Evans (1974), Fuchs (1978), and Cromwell and Mitchell (1986), among others. If the estimated coefficients of these variables are statistically significantly positive, medical suppliers provide the patients with unnecessary treatment in response to increased competition. Local-specific time trends are the prefectural total health care expenditures in year t. Time trends can capture the increase in HCEs at the macro level caused by the population aging and the advances in medical technology. By adding these trends, we can separate the effects of these trends from the annual negative income shocks. The prefectural dummy variables consider other unobserved heterogeneity in each area, such as the effects of population characteristics and the regional health and medical care plans defined by the prefectural government. Finally, u is the disturbance term. However, because ordinary standard errors are underestimated because intertemporal local effects are serially correlated when using long-term repeated cross-sectional data (Bertrand, Duflo, and Mullainathan, 2004), we estimate robust standard errors allowing for correlated residuals within each prefecture.

4.2 Controlling for Selectivity Bias

We can obtain consistent parameters by estimating equation (1) if the social (medical) assistance benefits are randomly assigned. Unlike the RAND health insurance experiment (Manning et al., 1987; Newhouse et al., 1992; Aron-Dine, Einav, and Finkelstein, 2013), however, the social assistance benefits are not randomly assigned, but are determined by the results of a means testing by the local government. This fact causes a sample selection bias in the parameters when estimating equation (1) using conventional econometric methods. In fact,

according to the *Report on Social Welfare Administration and Services* by the Ministry of Health, Labor, and Welfare, approximately 40% of welfare-eligible families receive social assistance benefits because of disease, injury or disability. Because these persons have a greater need for medical care services, their HCEs will be more than those for other people. In addition, medical assistance beneficiaries may be provided more inpatient treatment than health insurance enrollees because of the positive correlation between health and income. Therefore, it is improper that inpatient treatments to these people are included among the unnecessary treatments associated with the financial incentives of the physicians. In addition, Table 2A and 2B shows that the mean differences of most of the covariates are statistically significant. Therefore, we need to eliminate this selection bias to accurately estimate the difference in the HCE *ceteris paribus* between the beneficiaries and the enrollees.

To adjust for this bias, we employ the bias-corrected matching estimator (BCME) proposed by Abadie and Imbens (2011), which adjusts the difference within the matches for the differences in their covariate values. The BCME can then eliminate selectivity bias from imperfect matches based on an estimate of the two regression functions. In this case, $\mu_{MA}(x) = E\{Y(MA) \mid X = x\} \quad for\ MA = 0\ or\ 1$, where $Y \equiv \ln(HCE)$ and X includes all covariates. This method is appropriate for this analysis because the information available in the claim datasets is restrictive. The BCME also has the advantage of being $N^{1/2}$-consistent and asymptotically normal irrespective of the number of covariates, and this adds an additional layer of robustness. However, the BCME has some disadvantage in matching estimators without bias correction in terms of the efficiency of the estimates (Abadie and Imbens, 2006, 2011).

Given the estimated regression functions, we predict the missing potential outcomes as:

$$\widetilde{Y}_i(0) = \begin{cases} Y_i & if \quad MA_i = 0 \\ \dfrac{1}{\#J_M(i)} \displaystyle\sum_{l \in J_M(i)} \{Y_l + \hat{\mu}_0(X_i) - \hat{\mu}_0(X_l)\} & if \quad MA_i = 1 \end{cases}$$

and

$$\widetilde{Y}_i(1) = \begin{cases} \dfrac{1}{\#J_M(i)} \displaystyle\sum_{l \in J_M(i)} \{Y_l + \hat{\mu}_1(X_i) - \hat{\mu}_1(X_l)\} & if \quad MA_i = 0 \\ Y_i & if \quad MA_i = 1 \end{cases}.$$

Thus, the BCME for the average treatment effects for the treated (ATT) is:

$$ATT^{BCME} = \frac{1}{N_1} \sum_{i:MA_i=1} \left\{ Y_i - \widetilde{Y}_i(0) \right\}. \tag{3}$$

where N_1 is the number of treated, $\#J_M(i)$ is the number of elements of $J_M(i)$ which denotes the set of indices for the match for unit i that are at least as close as the Mth match: $J_M(i) = \{l = 1,2,...,N \mid MA_l = 1 - MA_i, \|X_l - X_i\|_V \leq d_M(i)\}$, where $d_M(i)$ is the distance from the covariates for unit i, X_i, to the Mth nearest match with the opposite treatment (Abadie and Imbens, 2011). In this study, we employ nearest-neighbor Mahalanobis metric matching (Rosenbaum and Rubin, 1983, 1985) using the variables for sex, age, primary disease, type of medical facility, place of residence, year, and individual's propensity score for the beneficiaries[23]. We let one observation of an enrollee be matched per beneficiary (one-to-one matching, $m = 1$). In addition, we also let four enrollees be matched per beneficiary (one-to-four

[23] Guo and Fraser (2010) and Wooldridge (2010) provide a more detailed explanation. The estimation results of the propensity scores are shown in Appendix A.

matching, m = 4), because Abadie and Imbens (2011) show that the one-to-four matching performs well in terms of the mean-square error in Monte Carlo simulations[24]. The estimator of the heteroskedasticity-constant variance of the population ATTs is as follows:

$$\hat{V}^{PATT} = \frac{1}{N_1^2}\sum_{i=1}^{N}\left[W_i \left\{ Y_i(1) - \hat{Y}_i(0) - \widehat{ATT^{BCME}}^{t} \right\}^2 + (1-W_i)\left\{ K_M^2(i) - K_M^{'}(i) \right\} \hat{\sigma}_{W_i}^2(X_i) \right], \quad (4)$$

where,

$$\hat{\sigma}_{W_i}^2(X_i) = \frac{1}{\#J_M^{'}(i)} \sum_{j \in \{J_M^{'}(i) \cup (i)\}} \left\{ Y_j - \overline{Y}_{J_M^{'}(i) \cup (i)} \right\}^2$$

and

$$\overline{Y}_{J_M^{'}(i) \cup (i)} = \frac{1}{\#J_M^{'}(i) + 1} \sum_{j \in \{J_M^{'}(i) \cup (i)\}} Y_j \, .$$

However, the ATT only shows the overall difference in the HCE between beneficiaries and enrollees. Accordingly, it does not allow us to investigate the different response of medical suppliers to each medical fee reduction. To address this, we use the matched samples to estimate the causal effects of each fee reduction on medical supply behavior.

5. Empirical Results

5.1 Response of Medical Suppliers to Medical Fee Reductions

[24] The results of the t-tests for the equality of means for the two groups are in Appendix B.

The left-hand side of Table 3 provides the estimation results for short-term hospitalization. The HCEs of the medical assistance beneficiaries in the raw samples of 30.9% (= exp(0.269)) and 32.0% (= exp(0.277)) are statistically significantly higher than those for health insurance enrollees for the full sample and the subsample, respectively. In contrast, the estimation results of the ATTs indicate that the HCEs of the beneficiaries are 5.4% to 6.5% (= exp(–0.056) and exp(–0.067)) for the full sample and 6.5% to 7.5% (= exp(–0.067) and exp(–0.077)) for the subsample, which is significantly lower than those of the enrollees.

In addition, the OLS estimation results using the matched samples for the short-term hospitalization show that the coefficients on *MA* are negative but statistically insignificant in the full sample, but are significantly negative in the subsample. Our estimates thus suggest that the HCE of inpatient beneficiaries without mental disease is then some 16.7% to 24.5% less than that of an enrollee, *ceteris paribus*. As for the estimated coefficients for the interaction terms between *MA* and the year dummy variables, only those for 2006 are statistically significantly negative for all samples. On the other hand, the estimated coefficients for the 2006 year dummy in all matched samples and those for 2007 in the matched full sample with $m = 4$ are significantly positive. These results suggest that the HCEs of the beneficiaries were between 30.2% and 33.4% higher in 2006 and 6.8% higher in 2007 than those of enrollees. These findings indicate that medical suppliers particularly provided enrollees with unnecessary inpatient treatment in response to the large fee reduction in 2006. As for the other individual attributes of medical assistance beneficiaries, age and the dummy variable for aged 15 years and under are significantly positive. In addition, the hospital dummy variable in the full sample with $m = 4$ is also statistically significantly positive. As for the enrollees, age and the hospital dummy exert significant effects on the increase in HCE for all samples. The medical supply densities and local-specific time trends are insignificant for all of the matched samples.

The right-hand side of Table 3 provides the estimation results for long-term hospitalization. The HCEs of the beneficiaries in the raw sample are 39.2% (= exp(0.331)) and 41.0% (= exp(0.344)), which is statistically significantly higher than those of the enrollees for the full sample and the subsample, respectively. Conversely, the estimation results for the ATTs indicate that the differences in HCE between beneficiaries and enrollees are not statistically significant for the full sample, whereas those for the beneficiaries in the subsample are only 3.2% (= exp(0.032)) to 4.0% (= exp(0.040)) higher than those of the enrollees. These results imply that the estimation results using the raw sample are affected by the sample selection bias. That is, we suggest that the higher HCEs of beneficiaries are not the result of being provided with more unnecessary treatment by medical suppliers, but rather by the fact that beneficiaries intrinsically require more treatment.

The OLS estimation results using the matched samples for long-term hospitalization show that the coefficients on *MA* are statistically significantly positive in the matched full sample with $m = 4$ and in the two matched subsamples. Our estimates thus suggest that the HCE of inpatient beneficiaries is 18.5% higher than those of enrollees, while the HCEs of those without mental disease are 44.7% to 50.7% higher. As for the interaction terms between *MA* and the year dummy variables, the coefficient of the interaction term for 2006 is significantly negative in all samples, as is that for 2005. Alternatively, several of the estimated coefficients for the yearly dummy variables are significantly positive. These results suggest that the HCEs of beneficiaries were 5.5% to 6.5% higher in 2005 and 43.0% to 45.7% higher in 2006 than those of enrollee in the matched full samples. In addition, those of the beneficiaries without mental diseases were 7.1% to 9.1% higher in 2005 and 22.4% to 23.7% higher in 2006 than those for enrollees in the matched subsamples. These results also indicate that medical suppliers provided health insurance enrollees in particular with unnecessary inpatient treatment in response to the large

fee reduction in 2006. As for the other individual attributes for beneficiaries, age and squared length of stay are significantly positive. For enrollees, however, the dummy variables for female, hospital and length of stay are significantly positive. Some of the estimated coefficients for physician density are also significantly positive. Moreover, the coefficient for the under 15 years dummy variable is also positive for the subsample with $m = 4$.

<Table 3>

5.2 Further Analysis of the Type of Medical Care Activity

This section employs the same approach as the previous subsection to examine whether medical suppliers change their behavior when providing the four different types of treatments, comprising the administration of drugs, procedures and operations, checkups, and diagnostic imaging. These treatments are considered to be largely affected by the discretion of medical suppliers. For example, more unnecessary provision of administration and procedures may badly affect a patient's health condition, while medical suppliers providing patients with more checkups and diagnostic imaging will be largely free of untoward effects on patients' health. Therefore, the analyses in this subsection have important policy implications for countries that mainly employ a fee-for-service reimbursement payment system. Table 4A–D summarizes the estimation results.

Table 4A shows the results for expenditure on the administration of drugs. Unlike the results for the mean comparison tests using the raw data, the HCEs of beneficiaries in the matched samples for short-term hospitalization are 25.3% to 27.0% statistically significantly higher in the full sample and 27.4% significantly higher in the subsample than are those for enrollees.

Those for long-term hospitalization are also 11.3% to 11.4% significantly higher in the matched full sample and 19.3% to 20.7% significantly higher in the matched subsample. For the OLS estimation results using the matched samples for short-term hospitalization, there are no significant coefficients for the *MA*, year dummies, and their interaction terms. As for long-term hospitalization, the *MA* dummy variable and its interaction with the 2006 year dummy variable are statistically significantly positive in both the matched samples, while the interaction between *MA* and the 2005 year dummy is also significantly positive in the matched full sample where $m = 4$. These estimates suggest that expenditures on the administration of beneficiaries with mental diseases are 6.1% to 11.5% higher in 2005 and 17.3% to 19.1% higher in 2006 than those for enrollees. In addition, the 2007 year dummy is statistically significantly positive in the matched full sample where $m = 1$, and this indicates that the HCE for the administration of health insurance enrollees is 14.3% higher than for medical assistance beneficiaries. Moreover, the hospital bed density exerts a statistically significantly positive impact on the increase in the HCE concerning administration.

Table 4B shows the results concerning the expenditure associated with checkups. Unlike the results of the mean comparison tests using the raw data, the HCEs of the beneficiaries in the matched samples for short-term hospitalization are 17.7% to 18.2% statistically significantly lower in the matched full samples and 20.4% to 21.2% significantly lower in the subsamples. On the other hand, those for long-term hospitalization are 7.5% to 9.9% significantly higher in the matched full samples and 6.6% higher in the matched subsamples. In the OLS estimation results using the matched samples for short-term hospitalization, only the coefficients for the interactions between *MA* and the 2003 and 2006 year dummies are statistically significantly positive. Our estimates then suggest that the HCEs for checkups for beneficiaries were 24.3% higher in 2003 and 13.7% to 15.4% higher in 2006 than those for enrollees. In addition, the

interactions between the dummy variables for compulsory education and hospital are also significantly positive. The results for long-term hospitalization show that the interaction terms between *MA* and the 2006 year dummy variable and the hospital dummy variable are statistically significantly positive in the matched samples. These estimates suggested that the 2006 expenditures on checkups for all beneficiaries were between 18.2% and 28.8% higher, while those for patients without mental diseases was 13.5% to 23.8% higher than those for enrollees. In addition, the 2005 and 2007 year dummy variables are also significantly positive in the matched subsample where $m = 4$. Moreover, the hospital bed density has a statistically significantly positive impact on the increase in the HCEs on administration for short-term hospitalization.

Table 4C provides the results concerning the expenditure on procedures and operations. Unlike the results of the mean comparison tests using the raw data, the HCEs of the beneficiaries for short-term hospitalization are between 5.5% and 6.9% statistically significantly lower than those of the enrollees in the matched full samples and 5.7% to 7.0% significantly lower in the matched subsamples. Those for long-term hospitalization are also 3.2% to 4.0% significantly lower in the matched full samples and 7.4% to 7.6% lower in the matched subsamples. The OLS estimation results using the matched samples show that the interactions between *MA* and the 2006 year dummy variable are statistically significantly positive for both samples, regardless of the length of stay. Our estimates then suggest that expenditures on procedures and operations for all beneficiaries are 11.1% to 11.4% higher in 2006 while those for patients without mental disease are 10.0% higher than those for enrollees for short-term hospitalization. As for long-term hospitalization, the expenditures on all beneficiaries are 11.1% to 15.0% higher, while those for patients without mental diseases are 20.3% to 24.5% higher than those for enrollees, respectively.

Table 4D provides the results concerning expenditures on diagnostic imaging. Unlike the results of the mean comparison tests using the raw data, the HCEs of beneficiaries for short-term hospitalization are 3.4% to 3.6% statistically significantly lower than those of the enrollments in the matched full samples and 3.3% to 3.4% significantly lower in the matched subsamples. As for the long-term hospitalization, these are also 10.6% to 10.8% significantly lower in the matched full samples and 10.8% to 11.8% lower in the matched subsamples. In the OLS estimation results using the matched samples for short-term hospitalization, the coefficients for the interactions between *MA* and the 2003, 2005, and 2006 year dummies in the full samples and those for 2003 and 2006 in the subsamples are statistically significantly positive. These results suggest that the expenditures of beneficiaries were 22.1% to 27.3% higher in 2006, 7.9% to 17.5% higher in 2003, and 7.4% to 9.3% higher for enrollees in the full samples and 18.1% to 22.3% higher in 2006 and 16.2% higher in 2003 than those of enrollees in the subsamples. As for long-term hospitalization, the results show that most of the interaction terms between *MA* and the year dummies are statistically significantly positive in both matched samples. This implies that unnecessary diagnostic imaging is provided not only to patients who are enrollees but also to those who are beneficiaries over the entire sample period. These results seemingly contradict the estimation results of the ATTs; however, the reason is that the estimated coefficients for the year dummies are much larger than those for the interaction terms.

<Table 4A>

<Table 4B>

<Table 4C>

<Table 4D>

6. Concluding Remarks

This article investigates whether medical suppliers provide more unnecessary inpatient treatments to medical assistance patients who receive health care services without any contribution or copayment than insured patients in the public health insurance system in response to recent policies regarding a reduction in medical fees. As medical assistance benefits are not randomly assigned but are determined by the results of means testing by local government, the estimators obtained by conventional econometric analysis are affected by sample selection bias. To adjust for this endogeneity, we employ the bias-corrected matching estimator proposed by Abadie and Imbens (2011). Using two nationally representative individual-level claim datasets for 2001–07, we find that medical suppliers provide unnecessary inpatient treatment to both medical assistance beneficiaries and health insurance enrollees in response to recent fee reductions. Our estimates also suggest that medical suppliers responded strongest to the largest fee reduction in 2006; that long-term hospitalized beneficiaries are provided with more unnecessary treatments; and that unnecessary diagnostic imaging is provided to both beneficiaries and the insured over the entire period. We also find that the general tendency of higher HCEs for beneficiaries is caused by sample selection bias, which implies that the higher HCEs of beneficiaries are not caused by being provided with more unnecessary treatment by medical suppliers, but derive from the fact that beneficiaries generally require more inpatient treatments.

Based on the results of this study, we consider that it would be effective for the medical fee schedule for beneficiaries to be changed from a fee-for-service to an inclusive payment system to prevent medical suppliers from providing patients with unnecessary treatment. Moreover, our results imply that it is crucial to introduce a copayment for inpatient care in the medical

assistance system. Conversely, there is the possibility that the large HCE ex post facto incurred by decreasing the number of hospital visits due to the introduction of the copayment.

Finally, we summarize the limitations of this study. First, as the data used in this study do not include the information on many individual patient attributes, such as complicating and past illnesses, lifestyle habits, family income and assets, family structure as well as the characteristics of medical institutions, such as management agency, hospital scales, and their diagnosis and treatment department. Second, while the data used in this study are nationally representative claim data, the surveys are only conducted at a certain time each year. This does not permit us to use information about long-term medical provision to patients. These limitations may not only cause omitted variable bias to make the parameters inconsistent in the empirical models, but may also affect the sensitivity of the matching to adjust for the selectivity bias. Further studies using more comprehensive datasets are important research challenges regarding medical care systems for the poor in the future.

Appendix 1. Estimating the Propensity Scores

To adjust for the sample selection bias of receipt of the social assistance benefits, we employ the bias-corrected matching estimator proposed by Abadie and Imbens (2011). As for the sample matching, we employ the nearest-neighbor Mahalanobis metric matching (Rosenbaum and Rubin, 1983, 1985) using the variables of sex, age, primary disease, the type of medical facility, place of residence, year, and the individual propensity score of the beneficiaries. To obtain the propensity score, we estimate the following equation (A1) by sample:

$$MA_{it}^{*} = \gamma_0 + \sum_{j=1}^{J} \gamma_j \cdot x_{jit} + \sum_{t=2002}^{2007} \gamma_t \cdot year_{it} + \sum_{k=1}^{K} \gamma_k \cdot local_{kit} + \sum_{l=1}^{L} \delta_l \cdot z_{lit} + v_{it} \quad \text{(A1)}$$

where z contains excluded variables to identify the parameters in equation (2). However, given that the information available from the claim datasets is restrictive, we conveniently let an observation for a health insurance enrollee be matched to a beneficiary who appears to be in a similar health condition. In practice, z includes interaction terms between age and the dummy variables for primary diseases. In addition, the interaction terms between length of stay and the primary diseases dummy variables are also added to z for the long-term hospitalization sample. Although this approach is practical and convenient, Abadie and Imbens (2011) show that a regression-based bias correction can eliminate asymptotic bias from imperfect matches associated with less information. Table A1 provides the estimation results for equation (A1).

<Table A1>

Appendix 2. Results of t-Tests for the Equality of Means for the Two Groups

Table A2 provides the results of the t-tests for the equality of means in the two groups for the matched samples. However, the mean differences are still statistically significant in the matched samples. Generally, while these results imply that the selectivity bias has not been completely removed, we do find that most of the mean differences in the matched samples are close to zero. The reason why these differences are statistically significant is that the standard errors are extremely small because the numbers of observations in each sample are quite large.

Table B also shows that the pseudo R-squared values range from 0.003 to 0.005, which implies the independent variables in equation (A1) do not have sufficient explanatory power for the assignment of social assistance benefits. Consequently, we remove the selectivity biases using sample matching.

<Table A2>

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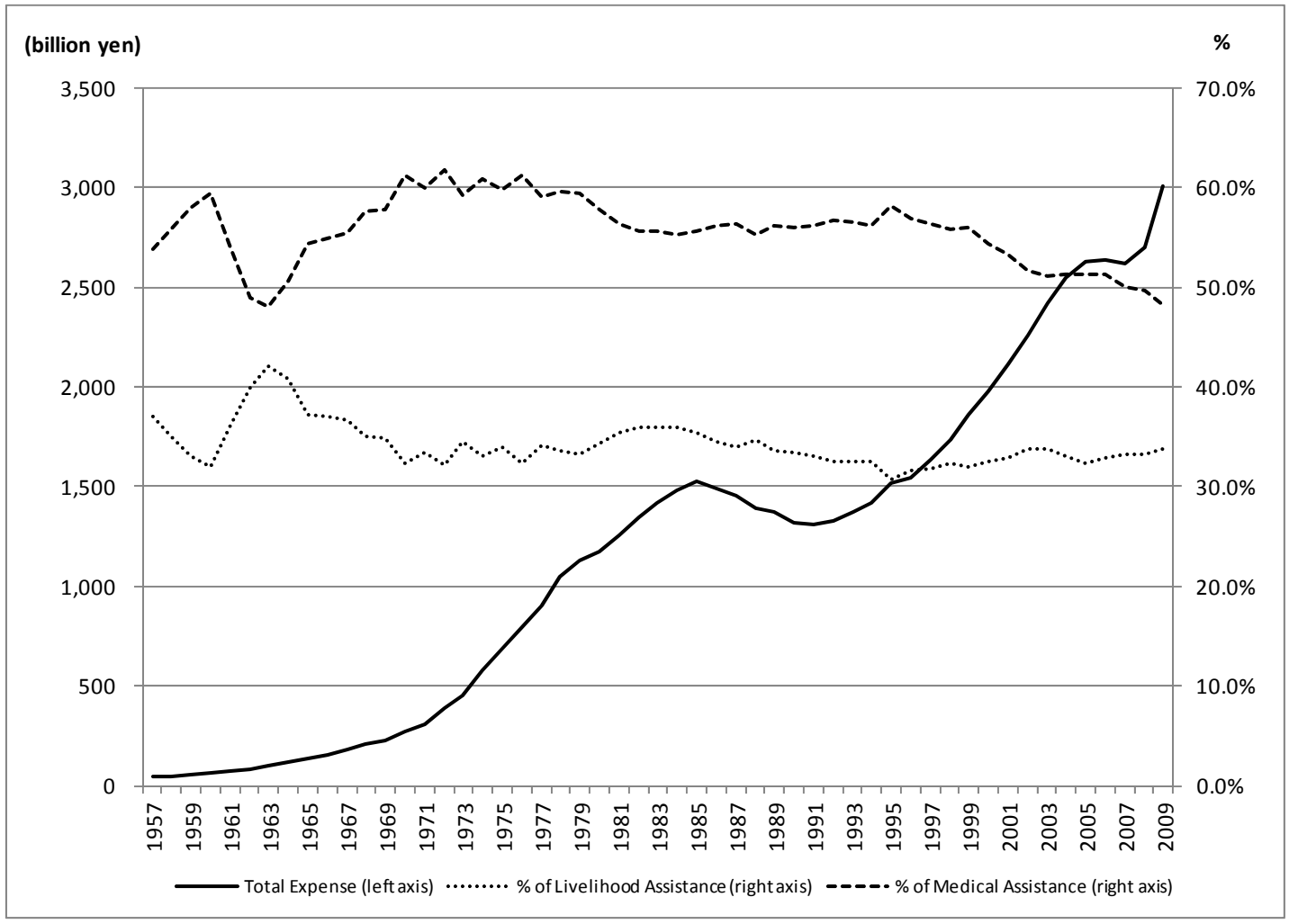
Figure 1 Trends in the government expenditure of the Social assistance system in Japan



Note: Source from National Institute of Population and Social Security Research (2013).

Table 1 Comparison of the medical assistance and public health insurance systems in Japan

	Medical assistance system	Public health insurance
Financial source	Public funds (100%)	Premiums, copayments, and public funds
Copayment rate	0%	10% for those aged 75 and over, 20% for preschool children, and 30% for all other enrollees
Patient access control	Patient must obtain authorization for medical care and drug tickets	None (free access system)
Coverage	As for public health insurance	In-kind (90%) and cash benefit (10%)
Medical supply	Designated medical facilities under the *Public Assistance Act*	Designated medical facilities under the *Health Insurance Act* and the *National Health Insurance Act*.
Medical fee schedule	As for public health insurance	Nationally uniform medical fee schedule
Review of claims	Municipalities or local welfare offices	The Social Insurance Medical Fee Payment Foundation and the Federation of National Health Insurance Organizations.

Note: Adapted from Suzuki (2008).

Table 2 Descriptive statistics

A: Short-term hospitalization

Sample	Beneficiaries			The insured			Mean Difference tests	
	N	Mean	SD	N	Mean	SD	Difference	SE
Health Care Expenditure (thousand yen in 2005 price)								
Total Health Care Expenditure	17888	247.449	175.044	182404	205.115	170.460	42.334***	1.368
Medications	14082	8.401	12.003	148398	5.036	8.402	3.365***	0.103
Procedures and Operations	9199	60.421	98.673	113769	80.003	98.675	-19.582***	1.070
Checkups	15153	26.489	29.065	161278	21.648	27.572	4.841***	0.246
Diagnostic imaging	12921	19.277	22.845	98229	17.096	23.506	2.180***	0.215
(Subsample)								
Total Health Care Expenditure	15948	250.182	177.578	178181	205.595	170.893	44.587***	1.463
Medications	12797	8.271	12.012	145520	4.991	8.403	3.280***	0.108
Procedures and Operations	8802	62.011	99.581	112952	80.516	98.829	-18.505***	1.101
Checkups	13888	27.142	29.810	158331	21.737	27.749	5.404***	0.262
Diagnostic imaging	11925	19.754	23.205	96223	17.226	23.644	2.528***	0.226
Individual attributes								
Female	17888	0.470	0.499	182404	0.528	0.499	-0.059***	0.004
Age	17888	61.890	18.939	182404	52.207	26.312	9.683***	0.154
Primary diseases								
Certain infectious and parasitic diseases	17888	0.038	0.192	182404	0.038	0.192	0.000	0.002
Neoplasms	17888	0.090	0.286	182404	0.107	0.309	-0.017***	0.002
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	17888	0.004	0.065	182404	0.004	0.065	0.000	0.001
Endocrine, nutritional and metabolic diseases	17888	0.089	0.284	182404	0.036	0.185	0.053***	0.002
Mental and behavioral disorders	17888	0.108	0.311	182404	0.023	0.150	0.085***	0.002
Diseases of the nervous system	17888	0.033	0.178	182404	0.027	0.162	0.006***	0.001
Diseases of the eye and adnexa	17888	0.035	0.185	182404	0.083	0.276	-0.048***	0.002

Diseases of the ear and mastoid process	17888	0.003	0.059	182404	0.008	0.091	-0.005***	0.000
Diseases of the circulatory system	17888	0.187	0.390	182404	0.127	0.333	0.060***	0.003
Diseases of the respiratory system	17888	0.090	0.286	182404	0.119	0.324	-0.029***	0.002
Diseases of the digestive system	17888	0.100	0.300	182404	0.091	0.287	0.009***	0.002
Diseases of the skin and subcutaneous tissue	17888	0.008	0.087	182404	0.008	0.087	0.000	0.001
Diseases of the musculoskeletal system and connective tissue	17888	0.060	0.237	182404	0.040	0.197	0.019***	0.002
Diseases of the genitourinary system	17888	0.045	0.207	182404	0.095	0.294	-0.051***	0.002
Pregnancy, childbirth and the puerperium	17888	0.002	0.041	182404	0.014	0.117	-0.012***	0.000
Certain conditions originating in the perinatal period	17888	0.005	0.070	182404	0.084	0.277	-0.079***	0.001
Congenital malformations, deformations and chromosomal abnormalities	17888	0.002	0.044	182404	0.014	0.117	-0.012***	0.000
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	17888	0.002	0.045	182404	0.003	0.055	-0.001***	0.000
Injury, poisoning and certain other consequences of external causes	17888	0.100	0.299	182404	0.079	0.269	0.021***	0.002
Institutional factors								
Compulsory education	17888	0.040	0.196	182404	0.120	0.325	-0.080***	0.002
Insured by the Long-term care insurance	17888	0.507	0.500	182404	0.413	0.492	0.094***	0.004
Medical Supply characteristics								
Hospital	17888	0.855	0.352	182404	0.449	0.497	0.406***	0.003
Local characteristics								
Physician density	17888	210.681	36.117	182404	201.841	37.260	8.840***	0.284
Hospital bed density	17888	1176.561	310.062	182404	1170.721	299.841	5.839**	2.422
Local specific time trends (billion yen)	17888	554.286	338.061	182404	412.879	292.358	141.408***	2.619
Yearly dummy variables								
2001 (Reference group)	17888	0.123	0.328	182404	0.149	0.356	-0.027***	0.003
2002	17888	0.132	0.339	182404	0.156	0.363	-0.024***	0.003
2003	17888	0.150	0.357	182404	0.152	0.359	-0.003***	0.003

2004	17888	0.148	0.355	182404	0.159	0.366	-0.011***	0.003
2005	17888	0.153	0.360	182404	0.130	0.336	0.023***	0.003
2006	17888	0.152	0.359	182404	0.129	0.335	0.023***	0.003
2007	17888	0.142	0.349	182404	0.125	0.330	0.018***	0.003

Note: (1) *** and ** represent statistical significance at the 1 and 5 percent levels, respectively.

B: Long-term hospitalization

Sample	Beneficiaries			The insured			Mean Difference tests	
	N	Mean	SD	N	Mean	SD	Difference	SE
Health Care Expenditure (thousand yen in 2005 price)								
Total Health Care Expenditure	82555	329.119	137.741	184633	292.905	199.893	36.214***	0.668
Medications	47836	18.593	18.519	133898	13.558	18.242	5.035***	0.098
Procedures and Operations	19705	37.100	78.709	87948	66.426	110.903	-29.326***	0.674
Checkups	39730	12.659	15.348	113594	17.407	21.134	-4.749***	0.099
Diagnostic imaging	18997	12.305	15.806	69198	13.585	19.780	-1.280***	0.137
(Subsample)								
Total Health Care Expenditure	39953	343.916	178.522	159134	286.773	206.700	57.143***	1.033
Medications	21939	15.840	20.633	118122	12.947	18.508	2.893***	0.149
Procedures and Operations	13536	47.927	90.081	83324	69.335	113.021	-21.408***	0.868
Checkups	17987	18.618	20.120	101261	18.497	21.958	0.120	0.165
Diagnostic imaging	14388	14.073	17.085	66194	13.824	20.016	0.249	0.162
Individual attributes								
Female	82555	0.441	0.497	184633	0.569	0.495	-0.128***	0.002
Age	82555	64.549	14.642	184633	65.053	23.005	-0.504***	0.074
Length of stay (month)	82555	7.057	10.956	184633	2.194	6.285	4.863***	0.041
Primary diseases								
Certain infectious and parasitic diseases	82555	0.014	0.118	184633	0.019	0.137	-0.005***	0.001
Neoplasms	82555	0.038	0.191	184633	0.102	0.303	-0.064***	0.001
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	82555	0.002	0.040	184633	0.004	0.062	-0.002***	0.000
Endocrine, nutritional and metabolic diseases	82555	0.044	0.205	184633	0.043	0.204	0.001	0.001
Mental and behavioral disorders	82555	0.516	0.500	184633	0.138	0.345	0.378***	0.002
Diseases of the nervous system	82555	0.037	0.188	184633	0.039	0.195	-0.003***	0.001

Diseases of the eye and adnexa	82555	0.002	0.049	184633	0.012	0.110	-0.010***	0.000
Diseases of the ear and mastoid process	82555	0.001	0.025	184633	0.004	0.062	-0.003***	0.000
Diseases of the circulatory system	82555	0.178	0.383	184633	0.212	0.409	-0.034***	0.002
Diseases of the respiratory system	82555	0.025	0.156	184633	0.058	0.233	-0.033***	0.001
Diseases of the digestive system	82555	0.037	0.189	184633	0.059	0.235	-0.022***	0.001
Diseases of the skin and subcutaneous tissue	82555	0.003	0.050	184633	0.006	0.074	-0.003***	0.000
Diseases of the musculoskeletal system and connective tissue	82555	0.035	0.184	184633	0.070	0.255	-0.035***	0.001
Diseases of the genitourinary system	82555	0.020	0.140	184633	0.102	0.303	-0.082***	0.001
Pregnancy, childbirth and the puerperium	82555	0.000	0.009	184633	0.002	0.049	-0.002***	0.000
Certain conditions originating in the perinatal period	82555	0.000	0.019	184633	0.030	0.171	-0.030***	0.000
Congenital malformations, deformations and chromosomal abnormalities	82555	0.000	0.017	184633	0.014	0.118	-0.014***	0.000
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	82555	0.001	0.027	184633	0.003	0.052	-0.002***	0.000
Injury, poisoning and certain other consequences of external causes	82555	0.047	0.213	184633	0.082	0.275	-0.035***	0.001
Institutional factors								
Compulsory education	82555	0.004	0.065	184633	0.048	0.214	-0.044***	0.001
Insured by the Long-term care insurance	82555	0.501	0.500	184633	0.614	0.487	-0.112***	0.002
Medical Supply characteristics								
Hospital	82555	0.926	0.262	184633	0.557	0.497	0.369***	0.001
Local characteristics								
Physician density	82555	211.538	37.615	184633	204.631	36.466	6.906***	0.156
Hospital bed density	82555	1171.255	303.306	184633	1201.314	297.613	-30.058***	1.263
Local specific time trends (billion yen)	82555	548.034	340.906	184633	403.931	294.228	144.102***	1.370
Yearly dummy variables								
2001 (Reference group)	82555	0.147	0.354	184633	0.173	0.378	-0.026***	0.002
2002	82555	0.148	0.355	184633	0.162	0.369	-0.015***	0.002

2003	82555	0.145	0.353	184633	0.155	0.361	-0.009***	0.001
2004	82555	0.143	0.350	184633	0.165	0.372	-0.022***	0.001
2005	82555	0.145	0.353	184633	0.125	0.330	0.021***	0.001
2006	82555	0.140	0.347	184633	0.111	0.314	0.029***	0.001
2007	82555	0.131	0.338	184633	0.110	0.313	0.022***	0.001

Note (1) See Table 1A.

Table 3 Empirical Results

Length of Stay	Short-term hospitalization						Long-term hospitalization					
Sample	Full sample			Subsample			Full sample			Subsample		
Data	Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample	
		m=1	m=4		m=1	m=4		m=1	m=4		m=1	m=4
Mean difference/ ATT												
	0.269***	-0.056***	-0.067***	0.277***	-0.067***	-0.078***	0.331***	-0.007	-0.005	0.344***	0.032***	0.040***
	[0.007]	[0.010]	[0.008]	[0.007]	[0.010]	[0.008]	[0.003]	[0.005]	[0.004]	[0.005]	[0.008]	[0.006]
Regression Estimates												
Medical Assistance	-0.315*	-0.092	-0.060	-0.373**	-0.245*	-0.167*	0.581***	0.189	0.185**	0.471***	0.447**	0.507***
	(0.173)	(0.121)	(0.084)	(0.157)	(0.131)	(0.092)	(0.142)	(0.116)	(0.092)	(0.158)	(0.176)	(0.106)
Interaction terms												
2002	0.040	0.056	0.038	0.025	0.051	0.039	0.043**	-0.003	-0.001	0.021	-0.018	-0.016
	(0.053)	(0.040)	(0.023)	(0.050)	(0.040)	(0.029)	(0.017)	(0.020)	(0.015)	(0.023)	(0.017)	(0.015)
2003	-0.011	-0.018	-0.033	-0.021	-0.025	-0.029	0.047***	0.009	0.007	0.025	-0.010	-0.006
	(0.037)	(0.050)	(0.036)	(0.037)	(0.053)	(0.037)	(0.013)	(0.016)	(0.011)	(0.016)	(0.025)	(0.022)
2004	-0.043	-0.025	-0.032	-0.047	-0.015	-0.015	0.064***	-0.005	0.008	0.056**	-0.006	0.005
	(0.031)	(0.035)	(0.025)	(0.030)	(0.033)	(0.027)	(0.017)	(0.019)	(0.014)	(0.022)	(0.023)	(0.018)
2005	-0.007	0.001	-0.019	-0.009	0.006	-0.009	0.057***	-0.005	-0.020	0.058***	-0.045*	-0.058*
	(0.041)	(0.037)	(0.025)	(0.041)	(0.042)	(0.032)	(0.014)	(0.018)	(0.017)	(0.021)	(0.024)	(0.031)
2006	-0.319***	-0.297***	-0.300***	-0.325***	-0.283***	-0.278***	-0.296***	-0.418***	-0.394***	-0.295***	-0.265***	-0.242***
	(0.039)	(0.047)	(0.026)	(0.038)	(0.044)	(0.029)	(0.023)	(0.022)	(0.019)	(0.029)	(0.027)	(0.026)
2007	-0.003	0.024	-0.020	-0.016	0.024	-0.001	0.110***	0.006	-0.018	0.063***	-0.011	-0.035
	(0.035)	(0.058)	(0.032)	(0.034)	(0.049)	(0.035)	(0.017)	(0.020)	(0.015)	(0.023)	(0.029)	(0.029)
Female	0.036*	-0.020	-0.010	0.045**	0.000	0.003	-0.041***	-0.036***	-0.038***	-0.062***	-0.054***	-0.062***
	(0.020)	(0.016)	(0.011)	(0.020)	(0.016)	(0.012)	(0.008)	(0.009)	(0.004)	(0.012)	(0.014)	(0.011)

Age	0.006**	0.003	0.005*	0.008***	0.008**	0.009***	-0.009***	0.006**	0.005**	-0.005**	-0.003	-0.005**
	(0.002)	(0.004)	(0.002)	(0.002)	(0.004)	(0.003)	(0.001)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)
Squared Age	-0.005**	-0.002	-0.004**	-0.006***	-0.007**	-0.008***	0.003**	-0.007***	-0.006***	0.000	0.001	0.002
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Under15	0.305***	0.084	0.166**	0.370***	0.193*	0.248***	-0.633***	0.002	-0.078	-0.573***	-0.261	-0.359***
	(0.106)	(0.099)	(0.068)	(0.110)	(0.114)	(0.073)	(0.080)	(0.079)	(0.065)	(0.108)	(0.157)	(0.085)
Aged	-0.029	0.005	0.005	-0.032	0.004	0.007	-0.034**	-0.020*	-0.018**	-0.067**	-0.074***	-0.069***
	(0.020)	(0.036)	(0.024)	(0.021)	(0.039)	(0.026)	(0.016)	(0.012)	(0.008)	(0.025)	(0.022)	(0.011)
Hospital	-0.062	0.052	0.041*	-0.070*	0.046	0.024	-0.059***	0.005	-0.005	-0.050**	-0.005	0.006
	(0.041)	(0.031)	(0.024)	(0.040)	(0.031)	(0.023)	(0.019)	(0.016)	(0.011)	(0.021)	(0.021)	(0.013)
Length of stay							-0.032***	-0.010***	-0.010***	-0.041***	-0.022***	-0.026***
							(0.002)	(0.001)	(0.001)	(0.005)	(0.005)	(0.005)
Squared length of stay							0.059***	0.019***	0.019***	0.059**	0.043*	0.052**
							(0.005)	(0.002)	(0.002)	(0.023)	(0.024)	(0.021)
Year dummies												
2002	-0.044	-0.077***	-0.060***	-0.043	-0.073***	-0.061***	-0.043***	0.001	-0.005	-0.043***	-0.010	-0.016
	(0.030)	(0.022)	(0.015)	(0.030)	(0.021)	(0.015)	(0.012)	(0.016)	(0.015)	(0.014)	(0.013)	(0.014)
2003	-0.004	-0.017	0.001	-0.002	-0.001	0.000	-0.043***	-0.004	-0.007	-0.045***	-0.015	-0.024*
	(0.012)	(0.025)	(0.014)	(0.013)	(0.027)	(0.015)	(0.014)	(0.015)	(0.010)	(0.015)	(0.020)	(0.012)
2004	-0.016	-0.056**	-0.042***	-0.014	-0.064**	-0.049***	-0.039**	0.029*	0.010	-0.047***	0.000	-0.008
	(0.016)	(0.023)	(0.013)	(0.017)	(0.028)	(0.017)	(0.015)	(0.015)	(0.009)	(0.017)	(0.018)	(0.013)
2005	0.017	0.004	0.017	0.021	-0.002	0.023	-0.014	0.055***	0.065***	-0.019	0.071***	0.091***
	(0.020)	(0.032)	(0.025)	(0.020)	(0.042)	(0.025)	(0.014)	(0.016)	(0.016)	(0.018)	(0.023)	(0.030)
2006	0.377***	0.332***	0.334***	0.377***	0.302***	0.319***	0.337***	0.457***	0.430***	0.291***	0.237***	0.224***
	(0.017)	(0.039)	(0.021)	(0.018)	(0.044)	(0.026)	(0.020)	(0.019)	(0.016)	(0.024)	(0.022)	(0.018)
2007	0.075***	0.035	0.068**	0.079***	-0.025	0.050	-0.082***	0.016	0.041**	-0.109***	-0.063**	-0.006
	(0.023)	(0.057)	(0.032)	(0.024)	(0.064)	(0.046)	(0.020)	(0.023)	(0.019)	(0.025)	(0.030)	(0.027)
Individual attributes												

Female	-0.054***	0.013	-0.005	-0.057***	0.000	-0.010	0.022***	0.016*	0.020***	0.016***	0.014	0.021***
	(0.009)	(0.021)	(0.013)	(0.009)	(0.014)	(0.010)	(0.006)	(0.009)	(0.006)	(0.006)	(0.014)	(0.007)
Age	0.015***	0.019***	0.016***	0.014***	0.015***	0.014***	0.015***	0.000	0.001	0.023***	0.019***	0.022***
	(0.001)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
Squared Age	-0.009***	-0.013***	-0.011***	-0.009***	-0.010***	-0.008***	-0.005***	0.004**	0.003***	-0.011***	-0.009***	-0.011***
	(0.001)	(0.003)	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Under15	-0.067	0.163*	0.095	-0.083	0.104	0.060	0.182***	-0.457***	-0.377***	0.401***	0.036	0.160**
	(0.100)	(0.088)	(0.060)	(0.100)	(0.081)	(0.060)	(0.039)	(0.056)	(0.045)	(0.039)	(0.107)	(0.065)
Aged	0.005	-0.023	-0.026	0.005	-0.023	-0.029	0.013	-0.004	-0.005	0.021	0.028	0.021
	(0.009)	(0.030)	(0.019)	(0.010)	(0.033)	(0.020)	(0.012)	(0.011)	(0.009)	(0.014)	(0.024)	(0.013)
Hospital	0.703***	0.605***	0.614***	0.708***	0.610***	0.627***	0.615***	0.551***	0.558***	0.626***	0.575***	0.560***
	(0.050)	(0.039)	(0.032)	(0.051)	(0.037)	(0.032)	(0.016)	(0.021)	(0.016)	(0.017)	(0.020)	(0.019)
Length of stay							0.042***	0.018***	0.017***	0.078***	0.054***	0.055***
							(0.002)	(0.001)	(0.001)	(0.004)	(0.005)	(0.004)
Squared length of stay							-0.080***	-0.037***	-0.036***	-0.146***	-0.115***	-0.121***
							(0.005)	(0.002)	(0.002)	(0.012)	(0.022)	(0.019)
Local effects												
Physician density	-0.766**	0.217	-0.146	-0.825**	0.109	-0.260	0.176	0.162	0.260***	0.229	0.394*	0.263
	(0.310)	(0.301)	(0.202)	(0.331)	(0.444)	(0.251)	(0.190)	(0.121)	(0.091)	(0.225)	(0.204)	(0.225)
Hospital bed density	0.345	0.208	-0.079	0.360	0.209	0.031	-0.119	-0.166	-0.333**	-0.159	-0.571**	-0.710**
	(0.400)	(0.348)	(0.214)	(0.420)	(0.317)	(0.167)	(0.255)	(0.145)	(0.132)	(0.312)	(0.281)	(0.288)
Trend	0.514	-1.401	-0.152	0.503	1.758	-0.057	0.303**	1.560	0.779	0.371**	2.055	0.582
	(0.307)	(2.161)	(1.449)	(0.326)	(2.663)	(1.666)	(0.125)	(0.977)	(0.822)	(0.150)	(1.668)	(1.238)
Constant	-6.941	21.157	11.373	-6.422	-12.857	10.188	-3.465	-7.668	1.590	-5.512	-12.030	5.726
	(6.561)	(23.279)	(16.017)	(7.050)	(28.901)	(18.430)	(3.277)	(10.545)	(8.838)	(3.853)	(18.189)	(13.771)
N	200292	38612	146030	194129	34620	130388	267188	166858	662396	199087	81446	321446

R-squared	0.254	0.120	0.113	0.259	0.125	0.120	0.233	0.132	0.128	0.225	0.128	0.123

Note (1) ***, **, * represent statistical significance at the 1, 5, and 10 percent levels, respectively.

(2) Robust standard errors allowing for correlated residuals within prefectures are shown in parentheses.

(3) All equations include the dummy variables of primary diseases, prefectural dummy variables, and the interactions between a dummy variable of the beneficiary (*MA*) and primary dummy variables.

Table 4 Empirical results by types of medical care activities

(A) Administration of drugs

Length of Stay	Short-term hospitalization						Long-term hospitalization					
Sample	Full sample			Subsample			Full sample			Subsample		
Data	Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample	
		m=1	m=4		m=1	m=4		m=1			m=1	m=4
Mean difference/ ATT												
	0.494***	0.239***	0.226***	0.476***	0.242***	0.242***	0.559***	0.107***	0.108***	0.301***	0.188***	0.177***
	[0.011]	[0.017]	[0.014]	[0.012]	[0.018]	[0.015]	[0.006]	[0.010]	[0.009]	[0.010]	[0.015]	[0.013]
Regression Estimates												
Medical Assistance	-0.135	-0.093	-0.097	-0.194	0.021	-0.115	1.200***	0.107	0.156	0.985***	1.085***	1.034***
	(0.211)	(0.250)	(0.175)	(0.235)	(0.248)	(0.186)	(0.347)	(0.185)	(0.093)	(0.357)	(0.284)	(0.149)
Interaction terms												
2002	0.027	-0.020	-0.039	0.015	-0.077	-0.068	0.048**	-0.014	-0.011	-0.062	-0.069	-0.041
	(0.070)	(0.082)	(0.061)	(0.068)	(0.091)	(0.069)	(0.023)	(0.032)	(0.026)	(0.042)	(0.057)	(0.036)
2003	-0.077	-0.111*	-0.135***	-0.079	-0.147*	-0.145***	0.073***	0.015	0.024	-0.006	0.015	0.012
	(0.046)	(0.066)	(0.044)	(0.049)	(0.075)	(0.050)	(0.027)	(0.029)	(0.027)	(0.045)	(0.077)	(0.044)
2004	0.012	0.009	-0.041	0.008	-0.008	-0.046	0.107***	-0.014	0.004	0.021	0.065	0.068
	(0.044)	(0.058)	(0.051)	(0.047)	(0.071)	(0.060)	(0.030)	(0.030)	(0.017)	(0.042)	(0.067)	(0.048)
2005	0.046	0.011	-0.015	0.039	-0.018	-0.031	0.092***	0.023	-0.001	0.042	0.115*	0.061*
	(0.042)	(0.089)	(0.039)	(0.043)	(0.091)	(0.044)	(0.031)	(0.034)	(0.028)	(0.045)	(0.062)	(0.033)
2006	0.036	0.050	0.034	0.028	0.039	0.012	0.149***	0.052	0.057**	0.078	0.191***	0.173***
	(0.046)	(0.059)	(0.046)	(0.047)	(0.068)	(0.049)	(0.035)	(0.037)	(0.025)	(0.047)	(0.050)	(0.037)
2007	-0.017	0.007	-0.065	-0.029	-0.004	-0.063	0.112***	-0.006	0.004	0.024	0.077	0.043
	(0.043)	(0.063)	(0.042)	(0.045)	(0.067)	(0.046)	(0.032)	(0.042)	(0.034)	(0.044)	(0.056)	(0.041)

Female	0.054**	0.039	0.026	0.057**	0.039	0.036	0.027	0.002	-0.024*	0.023	0.036	0.020
	(0.024)	(0.028)	(0.021)	(0.026)	(0.033)	(0.023)	(0.019)	(0.019)	(0.012)	(0.024)	(0.022)	(0.022)
Age	0.015***	0.011*	0.015***	0.018***	0.011*	0.017***	-0.010***	0.014***	0.015***	-0.003	-0.011	-0.008**
	(0.004)	(0.006)	(0.004)	(0.004)	(0.006)	(0.005)	(0.003)	(0.003)	(0.003)	(0.005)	(0.007)	(0.004)
Squared Age	-0.014***	-0.012**	-0.015***	-0.016***	-0.012**	-0.017***	-0.003	-0.016***	-0.017***	-0.007*	0.001	-0.002
	(0.003)	(0.005)	(0.003)	(0.003)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.003)
Under15	0.131	-0.163	0.015	0.214	-0.195	0.050	-0.941***	0.087	0.065	-0.710***	-0.725***	-0.707***
	(0.122)	(0.218)	(0.117)	(0.141)	(0.199)	(0.137)	(0.111)	(0.119)	(0.088)	(0.185)	(0.227)	(0.133)
Aged	-0.130***	-0.144*	-0.116**	-0.140***	-0.175**	-0.126**	-0.098***	-0.045**	-0.031*	-0.112***	-0.166***	-0.128***
	(0.044)	(0.081)	(0.048)	(0.046)	(0.075)	(0.049)	(0.023)	(0.021)	(0.017)	(0.038)	(0.041)	(0.034)
Hospital	0.091*	0.140***	0.096***	0.076	0.110**	0.078***	-0.166***	-0.073**	-0.100***	-0.174***	-0.079**	-0.117***
	(0.052)	(0.048)	(0.031)	(0.050)	(0.047)	(0.027)	(0.043)	(0.029)	(0.033)	(0.042)	(0.038)	(0.036)
Length of stay							-0.026***	-0.005**	-0.006***	-0.022**	-0.011	-0.012**
							(0.004)	(0.002)	(0.001)	(0.010)	(0.007)	(0.005)
Squared length of stay							0.047***	0.008	0.010***	0.020	0.025	0.028*
							(0.009)	(0.005)	(0.003)	(0.032)	(0.021)	(0.014)
Year dummies												
2002	-0.088**	-0.031	-0.045	-0.090**	0.013	-0.020	-0.047**	0.011	0.006	-0.059***	-0.054	-0.069***
	(0.033)	(0.054)	(0.034)	(0.034)	(0.058)	(0.037)	(0.018)	(0.030)	(0.025)	(0.019)	(0.040)	(0.025)
2003	-0.055**	-0.015	-0.015	-0.056**	0.035	-0.004	-0.042***	0.020	0.003	-0.049**	-0.068	-0.065**
	(0.025)	(0.049)	(0.026)	(0.026)	(0.049)	(0.022)	(0.016)	(0.028)	(0.026)	(0.018)	(0.047)	(0.027)
2004	-0.128***	-0.168***	-0.114***	-0.130***	-0.144**	-0.108***	-0.110***	0.031	0.003	-0.128***	-0.132**	-0.155***
	(0.033)	(0.056)	(0.039)	(0.034)	(0.061)	(0.039)	(0.019)	(0.022)	(0.014)	(0.022)	(0.056)	(0.041)
2005	-0.128***	-0.114	-0.108***	-0.128***	-0.069	-0.085**	-0.070***	0.036	0.035	-0.087***	-0.110*	-0.085***
	(0.045)	(0.073)	(0.038)	(0.046)	(0.074)	(0.037)	(0.022)	(0.031)	(0.024)	(0.029)	(0.059)	(0.031)
2006	-0.178***	-0.241***	-0.209***	-0.181***	-0.222***	-0.200***	-0.142***	-0.006	-0.036	-0.179***	-0.233***	-0.257***

	(0.055)	(0.061)	(0.051)	(0.057)	(0.071)	(0.041)	(0.025)	(0.040)	(0.027)	(0.031)	(0.048)	(0.043)
2007	-0.128**	-0.199**	-0.127*	-0.134**	-0.191*	-0.140**	-0.044	0.143***	0.091	-0.081**	0.018	-0.040
	(0.063)	(0.091)	(0.072)	(0.065)	(0.105)	(0.058)	(0.030)	(0.067)	(0.060)	(0.040)	(0.077)	(0.080)
Individual attributes												
Female	-0.077***	-0.050**	-0.044***	-0.078***	-0.048*	-0.051***	-0.001	0.027**	0.052***	-0.010	-0.018	0.000
	(0.008)	(0.022)	(0.015)	(0.009)	(0.028)	(0.018)	(0.010)	(0.013)	(0.009)	(0.010)	(0.016)	(0.012)
Age	0.020***	0.024***	0.020***	0.020***	0.027***	0.020***	0.036***	0.013***	0.012***	0.047***	0.053***	0.052***
	(0.001)	(0.004)	(0.003)	(0.001)	(0.005)	(0.003)	(0.001)	(0.003)	(0.004)	(0.001)	(0.006)	(0.003)
Squared Age	-0.011***	-0.013***	-0.010***	-0.011***	-0.015***	-0.010***	-0.024***	-0.011***	-0.010***	-0.030***	-0.036***	-0.034***
	(0.001)	(0.004)	(0.002)	(0.001)	(0.004)	(0.003)	(0.001)	(0.003)	(0.003)	(0.001)	(0.005)	(0.003)
Under15	-0.093*	0.211*	0.033	-0.080	0.341***	0.089	0.043	-0.970***	-0.941***	0.397***	0.380**	0.395***
	(0.055)	(0.125)	(0.059)	(0.056)	(0.113)	(0.068)	(0.042)	(0.097)	(0.071)	(0.047)	(0.175)	(0.113)
Aged	0.047***	0.053	0.038	0.043**	0.071*	0.036	0.085***	0.030	0.015	0.091***	0.147***	0.104***
	(0.017)	(0.049)	(0.025)	(0.017)	(0.041)	(0.022)	(0.015)	(0.022)	(0.021)	(0.019)	(0.034)	(0.023)
Hospital	0.192***	0.138***	0.180***	0.193***	0.153***	0.181***	0.010	-0.101***	-0.075***	0.028	-0.080**	-0.046*
	(0.032)	(0.036)	(0.023)	(0.033)	(0.037)	(0.022)	(0.023)	(0.030)	(0.026)	(0.024)	(0.030)	(0.025)
Length of stay							0.057***	0.032***	0.033***	0.088***	0.066***	0.065***
							(0.003)	(0.002)	(0.001)	(0.005)	(0.007)	(0.004)
Squared length of stay							-0.108***	-0.062***	-0.061***	-0.171***	-0.148***	-0.143***
							(0.007)	(0.006)	(0.004)	(0.016)	(0.020)	(0.011)
Local effects												
Physician density	-0.409	0.339	-0.032	-0.403	-0.168	-0.353	-0.398	-0.894**	-0.431	-0.336	-0.251	-0.366
	(0.860)	(0.532)	(0.451)	(0.886)	(0.657)	(0.391)	(0.413)	(0.359)	(0.283)	(0.476)	(0.705)	(0.410)
Hospital bed density	0.176	-0.961	-0.969***	0.225	-0.985	-0.929***	0.259	0.334	0.517**	0.339	1.220*	0.428

	(0.415)	(0.655)	(0.324)	(0.435)	(0.817)	(0.315)	(0.294)	(0.305)	(0.239)	(0.345)	(0.690)	(0.468)
Trend	0.095	-0.009	-1.177	0.079	1.308	0.290	0.306	-0.717	-0.299	0.192	-6.860*	-2.084
	(0.416)	(4.204)	(2.154)	(0.433)	(4.942)	(2.133)	(0.307)	(3.643)	(2.711)	(0.394)	(3.881)	(3.020)
Constant	-1.433	9.498	24.385	-1.407	-2.335	9.645	-7.146	16.129	7.748	-5.424	72.090*	26.045
	(10.546)	(44.002)	(23.766)	(10.948)	(51.042)	(23.491)	(7.058)	(39.856)	(29.414)	(8.853)	(42.768)	(33.283)
N	162480	30040	114670	158317	27392	104344	181734	96724	383988	140061	44804	176596
R-squared	0.110	0.070	0.064	0.108	0.067	0.061	0.181	0.133	0.130	0.143	0.058	0.057

Note: See Table 3.

(B) Checkups

Length of Stay	Short-term hospitalization						Long-term hospitalization					
Sample	Full sample			Subsample			Full sample			Subsample		
Data	Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample	
		m=1	m=4		m=1	m=4		m=1			m=1	m=4
Mean difference/ ATT												
	-0.640***	-0.195***	-0.201***	-0.603***	-0.238***	-0.228***	-0.514***	0.072***	0.095***	-0.272***	0.064**	0.064**
	[0.025]	[0.036]	[0.030]	[0.026]	[0.036]	[0.030]	[0.016]	[0.026]	[0.023]	[0.019]	[0.030]	[0.025]
Regression Estimates												
Medical Assistance	-0.802	-0.536	-0.718***	-0.674	-0.138	-0.524**	-0.207	-0.647*	-0.211	-0.011	0.098	0.504
	(0.644)	(0.413)	(0.209)	(0.690)	(0.378)	(0.211)	(0.521)	(0.359)	(0.187)	(0.624)	(0.427)	(0.317)
Interaction terms												
2002	-0.010	0.080	-0.038	-0.030	0.070	-0.011	-0.053	0.001	-0.092**	-0.056	0.002	-0.114**
	(0.113)	(0.133)	(0.086)	(0.107)	(0.146)	(0.097)	(0.053)	(0.080)	(0.044)	(0.059)	(0.101)	(0.056)
2003	0.114	0.243**	0.116	0.082	0.168	0.104	-0.046	-0.092	-0.109**	-0.010	-0.015	-0.132**
	(0.122)	(0.106)	(0.074)	(0.116)	(0.122)	(0.091)	(0.057)	(0.088)	(0.049)	(0.061)	(0.082)	(0.062)
2004	0.086	0.037	-0.037	0.083	-0.035	-0.014	-0.063	-0.082	-0.092	-0.041	-0.155	-0.161***
	(0.094)	(0.102)	(0.080)	(0.089)	(0.109)	(0.084)	(0.064)	(0.108)	(0.056)	(0.082)	(0.153)	(0.059)
2005	0.057	0.163	0.062	0.061	0.084	0.039	-0.004	0.006	-0.024	0.066	-0.001	-0.114*
	(0.126)	(0.146)	(0.093)	(0.117)	(0.138)	(0.105)	(0.058)	(0.086)	(0.057)	(0.057)	(0.112)	(0.059)
2006	0.153	0.146	0.154**	0.112	0.049	0.137*	0.109*	0.288***	0.182***	0.145***	0.238**	0.135***
	(0.097)	(0.118)	(0.067)	(0.097)	(0.130)	(0.072)	(0.056)	(0.062)	(0.031)	(0.068)	(0.094)	(0.050)
2007	0.008	0.186	0.025	-0.008	0.101	-0.016	-0.084	-0.087	-0.173***	-0.080	-0.117	-0.191***
	(0.105)	(0.124)	(0.070)	(0.093)	(0.143)	(0.088)	(0.062)	(0.106)	(0.047)	(0.060)	(0.144)	(0.061)
Female	0.056	-0.063	-0.047	0.069	-0.065	-0.030	-0.068**	0.026	0.028	-0.008	0.026	0.057

	(0.061)	(0.066)	(0.046)	(0.066)	(0.070)	(0.048)	(0.032)	(0.041)	(0.026)	(0.043)	(0.056)	(0.038)
Age	-0.007	-0.004	0.000	-0.011	-0.013	-0.004	-0.001	0.024**	0.016***	-0.007	0.003	-0.005
	(0.010)	(0.013)	(0.009)	(0.011)	(0.014)	(0.010)	(0.007)	(0.009)	(0.005)	(0.010)	(0.013)	(0.009)
Squared Age	0.012	0.005	0.002	0.015	0.012	0.005	0.002	-0.018**	-0.014***	0.003	-0.005	0.001
	(0.008)	(0.011)	(0.008)	(0.009)	(0.012)	(0.009)	(0.006)	(0.007)	(0.004)	(0.007)	(0.009)	(0.006)
Under15	0.945**	0.463	0.658***	0.835*	0.243	0.550**	-0.483	0.402	0.102	-0.781*	-0.367	-0.476*
	(0.452)	(0.376)	(0.208)	(0.483)	(0.360)	(0.221)	(0.332)	(0.369)	(0.258)	(0.449)	(0.496)	(0.278)
Aged	0.050	0.114	0.107	0.039	0.132	0.118*	-0.138**	-0.174***	-0.130***	-0.167**	-0.167*	-0.184**
	(0.071)	(0.118)	(0.071)	(0.074)	(0.122)	(0.070)	(0.064)	(0.064)	(0.061)	(0.074)	(0.084)	(0.086)
Hospital	0.119	0.183*	0.209***	0.139*	0.188**	0.226***	0.001	0.147**	0.151	0.070	0.216***	0.156***
	(0.073)	(0.092)	(0.053)	(0.072)	(0.091)	(0.046)	(0.062)	(0.068)	(0.040)	(0.065)	(0.066)	(0.041)
Length of stay							-0.089***	-0.029***	-0.029	-0.033**	-0.070***	-0.069***
							(0.009)	(0.007)	(0.004)	(0.014)	(0.013)	(0.010)
Squared length of stay							0.181***	0.071***	0.065	-0.020	0.158**	0.161***
							(0.024)	(0.019)	(0.011)	(0.051)	(0.063)	(0.052)
Year dummies												
2002	-0.049	-0.166**	-0.056	-0.047	-0.194**	-0.082	-0.120***	-0.141***	-0.062	-0.111***	-0.158**	-0.031
	(0.040)	(0.079)	(0.062)	(0.041)	(0.086)	(0.066)	(0.029)	(0.043)	(0.028)	(0.031)	(0.077)	(0.038)
2003	-0.051	-0.201**	-0.077	-0.047	-0.163	-0.076	-0.119***	-0.064	-0.032	-0.115***	-0.112*	0.028
	(0.038)	(0.098)	(0.062)	(0.038)	(0.104)	(0.068)	(0.029)	(0.055)	(0.045)	(0.030)	(0.059)	(0.057)
2004	0.004	0.068	0.069	0.006	0.129	0.063	-0.126***	-0.115	-0.074	-0.108***	0.011	0.060
	(0.049)	(0.073)	(0.069)	(0.048)	(0.082)	(0.071)	(0.035)	(0.084)	(0.037)	(0.036)	(0.105)	(0.042)
2005	0.082	-0.019	0.066	0.087	0.044	0.071	-0.109***	-0.153*	-0.086	-0.096**	-0.055	0.096*
	(0.058)	(0.131)	(0.091)	(0.059)	(0.127)	(0.094)	(0.040)	(0.084)	(0.039)	(0.040)	(0.101)	(0.051)
2006	0.025	0.012	-0.029	0.031	0.089	-0.028	-0.151***	-0.393***	-0.237	-0.136**	-0.249**	-0.103
	(0.056)	(0.112)	(0.082)	(0.057)	(0.104)	(0.082)	(0.054)	(0.087)	(0.049)	(0.052)	(0.096)	(0.070)

2007	0.165**	0.077	0.123	0.176**	0.142	0.145	-0.031	-0.142	0.063	-0.015	0.070	0.171*
	(0.069)	(0.146)	(0.118)	(0.070)	(0.175)	(0.127)	(0.057)	(0.151)	(0.066)	(0.059)	(0.154)	(0.091)
Individual attributes												
Female	-0.086***	0.008	-0.008	-0.085***	0.026	-0.010	-0.141***	-0.234***	-0.241	-0.138***	-0.167***	-0.215***
	(0.018)	(0.049)	(0.030)	(0.017)	(0.046)	(0.030)	(0.015)	(0.029)	(0.021)	(0.016)	(0.041)	(0.025)
Age	0.032***	0.035***	0.030***	0.033***	0.041***	0.032***	0.028***	0.004	0.013	0.032***	0.022*	0.030***
	(0.003)	(0.009)	(0.007)	(0.003)	(0.011)	(0.007)	(0.004)	(0.007)	(0.004)	(0.004)	(0.011)	(0.006)
Squared Age	-0.037***	-0.034***	-0.031***	-0.038***	-0.040***	-0.032***	-0.014***	0.006	0.000	-0.019***	-0.010	-0.017***
	(0.003)	(0.008)	(0.006)	(0.003)	(0.009)	(0.006)	(0.003)	(0.006)	(0.003)	(0.003)	(0.008)	(0.004)
Under15	-1.186***	-0.586**	-0.747***	-1.185***	-0.455	-0.730***	0.153	-0.774***	-0.423	0.204	-0.261	-0.131
	(0.186)	(0.266)	(0.191)	(0.188)	(0.375)	(0.217)	(0.137)	(0.252)	(0.167)	(0.136)	(0.398)	(0.178)
Aged	-0.075***	-0.122	-0.124**	-0.068**	-0.146	-0.145***	0.075**	0.115*	0.068	0.097***	0.105	0.117*
	(0.028)	(0.089)	(0.059)	(0.028)	(0.094)	(0.051)	(0.031)	(0.067)	(0.050)	(0.030)	(0.082)	(0.058)
Hospital	-0.258***	-0.280***	-0.301***	-0.255***	-0.267***	-0.295***	-0.266***	-0.411***	-0.412	-0.255***	-0.397***	-0.338***
	(0.073)	(0.064)	(0.056)	(0.074)	(0.065)	(0.053)	(0.055)	(0.066)	(0.062)	(0.056)	(0.074)	(0.060)
Length of stay							0.112***	0.042***	0.039	0.152***	0.170***	0.161***
							(0.008)	(0.005)	(0.005)	(0.011)	(0.011)	(0.010)
Squared length of stay							-0.236***	-0.105***	-0.089	-0.333***	-0.468***	-0.438***
							(0.025)	(0.015)	(0.012)	(0.044)	(0.046)	(0.050)
Local effects												
Physician density	-1.551	1.260	0.073	-1.665	1.171	-0.182	0.070	-0.012	-0.380	-0.189	-0.358	-1.611**
	(0.994)	(1.661)	(1.220)	(1.010)	(1.625)	(1.156)	(0.585)	(0.674)	(0.503)	(0.589)	(0.801)	(0.773)
Hospital bed density	0.067	1.942**	1.132	0.102	2.004*	0.552	-0.836	-0.449	0.201	-0.915	-2.135*	-0.857
	(1.263)	(0.808)	(0.933)	(1.282)	(0.996)	(1.008)	(0.794)	(0.897)	(0.485)	(0.923)	(1.159)	(0.611)

Trend	-0.183	-14.44***	-6.603	-0.160	-15.055**	-5.106	-0.510	5.074	1.318	-0.409	-3.512	0.519
	(0.812)	(6.656)	(4.431)	(0.817)	(7.120)	(4.430)	(0.491)	(4.715)	(2.774)	(0.507)	(4.931)	(3.383)
Constant	16.954	143.611	69.904	16.702	150.074*	58.808	20.927*	-45.877	-7.884	20.086	61.404	14.318
	(18.119)	(72.918)	(47.738)	(18.204)	(79.331)	(48.200)	(11.905)	(51.549)	(30.763)	(12.041)	(54.351)	(37.214)
N	122968	19546	74834	121754	18750	71646	107653	39794	158034	96860	27404	108694
R-squared	0.274	0.209	0.199	0.270	0.199	0.188	0.280	0.158	0.156	0.283	0.162	0.156

Note: See Table 3.

(C) Procedures and operations

Length of Stay	Short-term hospitalization						Long-term hospitalization					
Sample	Full sample			Subsample			Full sample			Subsample		
Data	Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample	
		m=1	m=4		m=1	m=4		m=1			m=1	m=4
Mean difference/ ATT												
	0.302***	-0.057***	-0.071***	0.321***	-0.059***	-0.073***	-0.286***	-0.033***	-0.040***	0.058***	-0.077***	-0.079***
	[0.008]	[0.012]	[0.010]	[0.009]	[0.013]	[0.010]	[0.006]	[0.010]	[0.009]	[0.008]	[0.012]	[0.010]
Regression Estimates												
Medical Assistance	-0.424*	-0.050	-0.056	-0.474*	-0.052	-0.047	0.001	0.108	-0.035	0.315	0.328	0.320**
	(0.253)	(0.163)	(0.098)	(0.246)	(0.173)	(0.103)	(0.402)	(0.171)	(0.103)	(0.431)	(0.210)	(0.158)
Interaction terms												
2002	0.069	0.071	0.064	0.049	0.058	0.057	0.011	0.025	0.033	0.043	0.051	0.061
	(0.044)	(0.050)	(0.041)	(0.042)	(0.051)	(0.041)	(0.024)	(0.035)	(0.032)	(0.031)	(0.042)	(0.038)
2003	0.006	0.012	0.008	-0.006	-0.011	-0.017	-0.016	-0.039	-0.026	0.012	0.029	0.014
	(0.028)	(0.043)	(0.029)	(0.029)	(0.044)	(0.030)	(0.026)	(0.039)	(0.039)	(0.036)	(0.066)	(0.050)
2004	-0.012	0.021	0.017	-0.023	0.007	0.014	0.024	-0.022	-0.013	0.035	0.048	0.059
	(0.026)	(0.038)	(0.034)	(0.028)	(0.038)	(0.037)	(0.026)	(0.028)	(0.024)	(0.036)	(0.059)	(0.037)
2005	0.015	0.049	0.045	0.004	0.031	0.025	0.015	0.000	0.019	0.044	0.031	0.052
	(0.037)	(0.056)	(0.037)	(0.037)	(0.052)	(0.037)	(0.024)	(0.038)	(0.036)	(0.037)	(0.059)	(0.044)
2006	0.007	0.111**	0.114***	-0.006	0.073	0.100**	0.143***	0.111**	0.150***	0.130***	0.203***	0.245***
	(0.036)	(0.047)	(0.036)	(0.034)	(0.049)	(0.039)	(0.034)	(0.051)	(0.037)	(0.038)	(0.054)	(0.031)
2007	-0.031	0.001	-0.001	-0.052*	-0.028	-0.017	0.040	-0.028	0.008	0.012	0.037	0.038
	(0.027)	(0.045)	(0.032)	(0.030)	(0.043)	(0.032)	(0.030)	(0.049)	(0.039)	(0.032)	(0.061)	(0.048)
Female	0.049*	-0.001	0.006	0.054**	0.009	0.013	0.027***	0.013	0.003	0.023	0.031	0.020

	(0.022)	(0.021)	(0.014)	(0.021)	(0.024)	(0.015)	(0.009)	(0.018)	(0.010)	(0.014)	(0.020)	(0.015)
Age	0.001	-0.002	0.000	0.003	-0.001	0.000	-0.005	0.000	0.000	-0.012***	-0.010*	-0.010**
	(0.003)	(0.004)	(0.003)	(0.003)	(0.005)	(0.003)	(0.003)	(0.004)	(0.002)	(0.004)	(0.006)	(0.004)
Squared Age	-0.002	0.003	0.001	-0.003	0.002	0.000	0.003	0.000	0.000	0.006***	0.006	0.005*
	(0.002)	(0.003)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)
Under15	-0.052	-0.004	0.024	-0.006	-0.001	0.013	-0.254**	0.070	0.041	-0.494***	-0.326	-0.305***
	(0.088)	(0.127)	(0.061)	(0.097)	(0.134)	(0.075)	(0.108)	(0.157)	(0.078)	(0.115)	(0.201)	(0.099)
Aged	-0.047*	-0.040	-0.028	-0.065**	-0.064	-0.038	-0.038***	-0.058**	-0.052**	-0.030	-0.033	-0.021
	(0.026)	(0.041)	(0.028)	(0.026)	(0.045)	(0.035)	(0.014)	(0.023)	(0.020)	(0.019)	(0.031)	(0.020)
Hospital	-0.085***	-0.052	-0.046***	-0.083**	-0.058	-0.050**	-0.160***	-0.074**	-0.077***	-0.188***	-0.057	-0.075***
	(0.030)	(0.038)	(0.023)	(0.031)	(0.036)	(0.022)	(0.037)	(0.033)	(0.027)	(0.034)	(0.037)	(0.026)
Length of stay							0.002	0.003	0.004*	-0.035***	0.001	-0.001
							(0.003)	(0.002)	(0.002)	(0.005)	(0.005)	(0.003)
Squared length of stay							0.004	-0.004	-0.008*	0.082***	0.011	0.015*
							(0.005)	(0.004)	(0.004)	(0.014)	(0.014)	(0.008)
Year dummies												
2002	0.001	-0.032	-0.029	0.003	-0.025	-0.016	-0.049**	-0.039	-0.053**	-0.047**	-0.015	-0.048**
	(0.022)	(0.036)	(0.030)	(0.021)	(0.038)	(0.032)	(0.018)	(0.031)	(0.023)	(0.021)	(0.035)	(0.020)
2003	0.012	-0.013	-0.009	0.014	0.004	0.018	-0.023	0.018	-0.005	-0.027	-0.022	-0.032
	(0.024)	(0.033)	(0.023)	(0.023)	(0.038)	(0.026)	(0.021)	(0.030)	(0.031)	(0.022)	(0.049)	(0.036)
2004	-0.017	-0.044	-0.063**	-0.014	-0.038	-0.057	-0.093***	-0.030	-0.047**	-0.104***	-0.089	-0.115***
	(0.026)	(0.034)	(0.028)	(0.025)	(0.035)	(0.035)	(0.024)	(0.028)	(0.018)	(0.029)	(0.061)	(0.037)
2005	-0.016	-0.028	-0.053	-0.013	-0.022	-0.033	-0.069**	-0.039	-0.076**	-0.079***	-0.037	-0.093**
	(0.032)	(0.046)	(0.037)	(0.032)	(0.045)	(0.037)	(0.026)	(0.044)	(0.036)	(0.028)	(0.057)	(0.041)
2006	-0.047	-0.129**	-0.170***	-0.043	-0.107*	-0.156***	-0.203***	-0.147***	-0.209***	-0.211***	-0.251***	-0.318***
	(0.038)	(0.061)	(0.036)	(0.038)	(0.063)	(0.042)	(0.034)	(0.054)	(0.037)	(0.038)	(0.074)	(0.050)

2007	-0.033	0.032	-0.065	-0.029	0.027	-0.068	-0.114***	-0.036	-0.103**	-0.124***	-0.088	-0.130*
	(0.043)	(0.070)	(0.039)	(0.044)	(0.074)	(0.047)	(0.037)	(0.067)	(0.051)	(0.040)	(0.101)	(0.076)
Individual attributes												
Female	-0.090***	-0.022	-0.036***	-0.092***	-0.032	-0.042***	-0.052***	-0.035**	-0.024***	-0.059***	-0.062***	-0.047***
	(0.011)	(0.022)	(0.011)	(0.012)	(0.023)	(0.011)	(0.006)	(0.016)	(0.008)	(0.007)	(0.016)	(0.009)
Age	0.015***	0.016***	0.014***	0.015***	0.018***	0.016***	0.011***	0.005**	0.004***	0.014***	0.011***	0.011***
	(0.001)	(0.003)	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.004)	(0.002)
Squared Age	-0.008***	-0.012***	-0.010***	-0.008***	-0.013***	-0.010***	-0.005***	-0.001	-0.001	-0.008***	-0.007**	-0.006***
	(0.001)	(0.003)	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
Under15	0.023	-0.028	-0.068	0.024	0.016	-0.010	0.208***	-0.079	-0.091	0.260***	0.143	0.089
	(0.048)	(0.090)	(0.045)	(0.048)	(0.092)	(0.047)	(0.039)	(0.120)	(0.064)	(0.043)	(0.134)	(0.065)
Aged	0.041***	0.048	0.030	0.039***	0.050	0.021	0.035***	0.057**	0.051***	0.038***	0.045**	0.033**
	(0.014)	(0.035)	(0.019)	(0.014)	(0.035)	(0.023)	(0.012)	(0.024)	(0.017)	(0.012)	(0.022)	(0.016)
Hospital	0.584***	0.534***	0.528***	0.591***	0.552***	0.541***	0.387***	0.290***	0.297***	0.430***	0.293***	0.312***
	(0.036)	(0.045)	(0.033)	(0.035)	(0.042)	(0.030)	(0.026)	(0.030)	(0.029)	(0.024)	(0.027)	(0.023)
Length of stay							-0.018***	-0.018***	-0.017***	-0.007	-0.039***	-0.038***
							(0.003)	(0.002)	(0.002)	(0.004)	(0.006)	(0.004)
Squared length of stay							0.020***	0.025***	0.027***	-0.007	0.059***	0.057***
							(0.005)	(0.005)	(0.005)	(0.009)	(0.015)	(0.010)
Local effects												
Physician density	-0.924*	-0.353	-0.193	-1.000**	-0.306	-0.409	0.377	-0.271	0.108	0.273	-0.516	0.033
	(0.466)	(0.441)	(0.315)	(0.464)	(0.540)	(0.387)	(0.405)	(0.258)	(0.188)	(0.524)	(0.773)	(0.474)
Hospital bed density	0.011	0.214	-0.210	-0.005	0.144	-0.146	0.253	0.080	0.265	0.174	-0.344	-0.119

	(0.382)	(0.820)	(0.600)	(0.384)	(0.719)	(0.494)	(0.295)	(0.311)	(0.282)	(0.384)	(0.514)	(0.313)
Trend	0.694	-4.597	-0.708	0.752	-3.800	0.981	-0.550	0.185	0.612	-0.432	-1.565	-2.063
	(0.502)	(3.329)	(1.849)	(0.517)	(3.597)	(1.852)	(0.462)	(2.494)	(2.327)	(0.580)	(3.373)	(2.431)
Constant	-11.262	57.316	16.860	-12.246	48.780	-0.990	12.377	5.175	-2.627	10.336	28.691	29.700
	(13.048)	(36.503)	(20.674)	(13.456)	(38.837)	(20.517)	(10.796)	(27.363)	(25.583)	(12.674)	(37.454)	(27.260)
N	176431	32500	123632	172219	29924	113448	153324	80196	318710	119248	36642	144686
R-squared	0.214	0.144	0.139	0.217	0.148	0.142	0.181	0.216	0.213	0.119	0.076	0.075

Note: See Table 3.

(D) Diagnosis imaging

Length of Stay	Short-term hospitalization						Long-term hospitalization					
Sample	Full sample			Subsample			Full sample			Subsample		
Data	Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample		Raw data	Matched sample	
		m=1	m=4		m=1	m=4		m=1			m=1	m=4
Mean difference/ ATT												
	0.286***	-0.036**	-0.034***	0.309***	-0.035**	-0.033**	-0.003	-0.114***	-0.112***	0.151***	-0.114***	-0.125***
	[0.010]	[0.016]	[0.013]	[0.011]	[0.016]	[0.013]	[0.009]	[0.015]	[0.013]	[0.010]	[0.016]	[0.013]
Regression Estimates												
Medical Assistance	-0.282	0.056	-0.047	-0.348	-0.130	-0.136	-0.175	0.639***	0.283	-0.072	0.292	0.121
	(0.253)	(0.208)	(0.110)	(0.242)	(0.224)	(0.105)	(0.351)	(0.164)	(0.207)	(0.346)	(0.299)	(0.275)
Interaction terms												
2002	0.013	0.091	0.031	-0.016	0.064	0.009	0.067*	0.023	0.009	0.115***	0.052*	0.032
	(0.067)	(0.055)	(0.052)	(0.068)	(0.062)	(0.059)	(0.034)	(0.026)	(0.020)	(0.039)	(0.030)	(0.025)
2003	0.002	0.175***	0.079*	-0.007	0.162***	0.055	0.101***	0.044	0.054**	0.170***	0.122***	0.109***
	(0.050)	(0.047)	(0.040)	(0.050)	(0.053)	(0.043)	(0.029)	(0.032)	(0.024)	(0.034)	(0.036)	(0.031)
2004	-0.024	0.038	0.013	-0.030	0.016	-0.007	0.104***	0.053	0.066***	0.150***	0.076*	0.093***
	(0.045)	(0.051)	(0.030)	(0.050)	(0.045)	(0.039)	(0.034)	(0.032)	(0.023)	(0.040)	(0.039)	(0.029)
2005	0.019	0.093**	0.074**	-0.002	0.063	0.026	0.128***	0.097***	0.115***	0.169***	0.065	0.082**
	(0.053)	(0.043)	(0.036)	(0.055)	(0.050)	(0.043)	(0.028)	(0.035)	(0.030)	(0.037)	(0.049)	(0.040)
2006	0.148***	0.273***	0.221***	0.121**	0.223***	0.181***	0.236***	0.233***	0.228***	0.253***	0.293***	0.252***
	(0.045)	(0.070)	(0.055)	(0.045)	(0.074)	(0.061)	(0.036)	(0.043)	(0.036)	(0.043)	(0.056)	(0.048)
2007	0.009	0.078	0.057	-0.017	0.058	0.022	0.124***	0.166***	0.205***	0.145***	0.174***	0.179***
	(0.048)	(0.048)	(0.044)	(0.049)	(0.058)	(0.052)	(0.032)	(0.041)	(0.034)	(0.041)	(0.039)	(0.027)
Female	-0.029	-0.058**	-0.057***	-0.027	-0.080***	-0.066***	0.101***	0.096***	0.081***	0.096***	0.092*	0.097***

	(0.019)	(0.026)	(0.020)	(0.020)	(0.028)	(0.021)	(0.018)	(0.030)	(0.023)	(0.021)	(0.048)	(0.035)
Age	0.007	-0.004	0.002	0.010**	0.003	0.006	-0.010**	-0.026***	-0.016***	-0.013***	-0.021***	-0.012*
	(0.004)	(0.006)	(0.005)	(0.004)	(0.006)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.006)	(0.007)
Squared Age	-0.005	0.003	-0.002	-0.007*	-0.002	-0.005	0.009***	0.021***	0.015***	0.011***	0.017***	0.010**
	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)	(0.005)	(0.005)
Under15	0.063	-0.117	0.034	0.118	0.085	0.130	-0.345***	-0.508**	-0.217	-0.510***	-0.402	-0.157
	(0.116)	(0.152)	(0.109)	(0.109)	(0.164)	(0.096)	(0.124)	(0.224)	(0.155)	(0.170)	(0.240)	(0.173)
Aged	-0.060*	-0.009	-0.026	-0.073**	-0.027	-0.040	0.012	-0.045*	-0.043	0.006	0.003	0.001
	(0.034)	(0.075)	(0.035)	(0.032)	(0.087)	(0.039)	(0.027)	(0.024)	(0.031)	(0.033)	(0.044)	(0.041)
Hospital	-0.125**	-0.062*	-0.102**	-0.106*	-0.063*	-0.084**	-0.038	0.009	-0.009	-0.033	0.016	0.015
	(0.056)	(0.036)	(0.039)	(0.058)	(0.035)	(0.042)	(0.057)	(0.038)	(0.032)	(0.054)	(0.035)	(0.032)
Length of stay							0.029***	0.017***	0.014***	0.021**	0.031***	0.037***
							(0.005)	(0.005)	(0.003)	(0.008)	(0.008)	(0.004)
Squared length of stay							-0.037***	-0.021*	-0.022***	-0.013	-0.113***	-0.126***
							(0.013)	(0.013)	(0.007)	(0.028)	(0.033)	(0.023)
Year dummies												
2002	0.017	-0.059*	0.006	0.019	-0.049	0.012	0.175***	0.208***	0.215***	0.169***	0.226***	0.225***
	(0.040)	(0.034)	(0.034)	(0.040)	(0.046)	(0.038)	(0.022)	(0.036)	(0.024)	(0.022)	(0.039)	(0.027)
2003	0.058	-0.089*	0.011	0.059	-0.076	0.021	0.204***	0.281***	0.263***	0.200***	0.258***	0.269***
	(0.043)	(0.050)	(0.041)	(0.044)	(0.055)	(0.047)	(0.027)	(0.040)	(0.039)	(0.028)	(0.038)	(0.045)
2004	0.036	-0.007	0.022	0.035	-0.001	0.020	0.160***	0.219***	0.218***	0.152***	0.231***	0.231***
	(0.053)	(0.049)	(0.037)	(0.053)	(0.046)	(0.043)	(0.022)	(0.041)	(0.025)	(0.022)	(0.037)	(0.028)
2005	0.030	-0.033	0.003	0.032	-0.036	0.004	0.177***	0.225***	0.223***	0.174***	0.268***	0.277***
	(0.063)	(0.056)	(0.043)	(0.064)	(0.058)	(0.049)	(0.035)	(0.055)	(0.037)	(0.036)	(0.053)	(0.049)
2006	-0.069	-0.198***	-0.133***	-0.066	-0.217***	-0.158***	0.077**	0.096	0.117**	0.073*	0.026	0.116
	(0.052)	(0.064)	(0.046)	(0.053)	(0.074)	(0.052)	(0.037)	(0.077)	(0.054)	(0.039)	(0.073)	(0.069)

2007	0.062	-0.068	-0.010	0.065	-0.159	-0.063	0.196***	0.147	0.146**	0.195***	0.117	0.209***
	(0.073)	(0.090)	(0.064)	(0.075)	(0.096)	(0.076)	(0.052)	(0.097)	(0.057)	(0.054)	(0.083)	(0.068)
Individual attributes												
Female	-0.073***	-0.029	-0.036**	-0.072***	-0.008	-0.025	-0.095***	-0.085***	-0.067***	-0.097***	-0.090**	-0.090***
	(0.018)	(0.020)	(0.014)	(0.019)	(0.023)	(0.017)	(0.013)	(0.026)	(0.018)	(0.014)	(0.037)	(0.027)
Age	0.016***	0.026***	0.020***	0.016***	0.021***	0.019***	0.018***	0.032***	0.024***	0.017***	0.024***	0.016***
	(0.001)	(0.004)	(0.003)	(0.001)	(0.004)	(0.002)	(0.002)	(0.004)	(0.003)	(0.002)	(0.004)	(0.004)
Squared Age	-0.010***	-0.018***	-0.012***	-0.010***	-0.015***	-0.011***	-0.017***	-0.028***	-0.022***	-0.017***	-0.022***	-0.016***
	(0.001)	(0.003)	(0.003)	(0.001)	(0.004)	(0.002)	(0.001)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)
Under15	-0.165***	-0.015	-0.167***	-0.168***	-0.174	-0.221***	-0.060	0.112	-0.189	-0.085	-0.166	-0.436***
	(0.032)	(0.116)	(0.049)	(0.034)	(0.129)	(0.048)	(0.066)	(0.184)	(0.113)	(0.069)	(0.235)	(0.158)
Aged	0.098***	0.070	0.077***	0.098***	0.072	0.076**	0.044***	0.109***	0.106***	0.042***	0.052	0.055*
	(0.020)	(0.055)	(0.027)	(0.020)	(0.067)	(0.033)	(0.014)	(0.021)	(0.018)	(0.014)	(0.031)	(0.028)
Hospital	0.788***	0.720***	0.753***	0.792***	0.745***	0.763***	0.535***	0.497***	0.518***	0.539***	0.502***	0.504***
	(0.041)	(0.043)	(0.042)	(0.039)	(0.045)	(0.040)	(0.035)	(0.040)	(0.033)	(0.035)	(0.039)	(0.035)
Length of stay							-0.079***	-0.064***	-0.058***	-0.086***	-0.091***	-0.094***
							(0.005)	(0.006)	(0.003)	(0.006)	(0.006)	(0.004)
Squared length of stay							0.131***	0.112***	0.106***	0.141***	0.221***	0.224***
							(0.011)	(0.013)	(0.007)	(0.013)	(0.028)	(0.018)
Local effects												
Physician density	0.768	0.650	0.021	0.695	0.690	0.367	0.021	0.115	-0.296	-0.093	-0.206	-0.751
	(0.543)	(0.741)	(0.506)	(0.558)	(0.621)	(0.520)	(0.516)	(0.680)	(0.496)	(0.540)	(0.651)	(0.630)
Hospital bed density	-0.505	0.883*	0.117	-0.556	0.773	-0.090	-0.103	0.065	0.036	-0.252	-0.630*	-0.720***
	(0.477)	(0.485)	(0.484)	(0.491)	(0.589)	(0.521)	(0.395)	(0.376)	(0.233)	(0.418)	(0.335)	(0.233)

Trend	-0.431	4.200	3.656	-0.395	8.933**	5.717**	0.247	1.108	0.157	0.380	4.080	0.181
	(0.513)	(4.094)	(2.476)	(0.532)	(3.751)	(2.596)	(0.422)	(3.908)	(2.539)	(0.479)	(3.615)	(3.177)
Constant	11.756	-49.980	-35.244	11.578	-100.0***	-58.09***	-4.467	-7.933	5.183	-6.213	-33.269	12.988
	(12.793)	(44.698)	(26.908)	(13.180)	(40.184)	(28.259)	(10.414)	(42.866)	(28.125)	(11.489)	(39.109)	(34.739)
N	111150	27134	104716	108148	25090	96710	88195	38348	152416	80582	29118	115508
R-squared	0.179	0.094	0.095	0.179	0.092	0.092	0.198	0.178	0.175	0.194	0.123	0.120

Note: See Table 3.

Table A1 Estimating propensity scores

Length of Stay	Short-term hospitalization		Long-term hospitalization	
	Full sample	Subsample	Full sample	Subsample
Female	-0.010	0.002	-0.169***	-0.143***
	(0.010)	(0.010)	(0.006)	(0.008)
Age	0.069***	0.066***	0.099***	0.092***
	(0.004)	(0.004)	(0.003)	(0.003)
Squared Age	-0.048***	-0.045***	-0.075***	-0.068***
	(0.002)	(0.002)	(0.001)	(0.001)
Under15	1.084***	1.025***	1.355***	1.291***
	(0.044)	(0.046)	(0.047)	(0.055)
Aged	-0.030*	-0.017	-0.159***	-0.098***
	(0.017)	(0.017)	(0.011)	(0.013)
Hospital	0.971***	0.953***	0.965***	0.945***
	(0.011)	(0.012)	(0.009)	(0.009)
Length of stay			-0.001	0.001
			(0.002)	(0.002)
Squared length of stay			0.000***	0.000***
			(0.000)	(0.000)
Primary diseases				
Certain infectious and parasitic diseases	-0.023	-0.014	0.006	0.135
	(0.141)	(0.140)	(0.158)	(0.155)
Neoplasms	-0.654***	-0.601***	-1.474***	-1.177***
	(0.152)	(0.152)	(0.155)	(0.154)
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	-0.235	-0.218	-0.443*	-0.287
	(0.218)	(0.216)	(0.237)	(0.231)
Endocrine, nutritional and metabolic diseases	0.565***	0.601***	0.597***	0.866***
	(0.150)	(0.149)	(0.154)	(0.153)

Mental and behavioral disorders	1.098***		1.550***	
	(0.144)		(0.144)	
Diseases of the nervous system	-0.202	-0.175	-0.166	-0.052
	(0.154)	(0.154)	(0.150)	(0.149)
Diseases of the eye and adnexa	-0.547***	-0.484***	-1.053***	-0.802***
	(0.184)	(0.183)	(0.262)	(0.257)
Diseases of the ear and mastoid process	-0.528**	-0.508**	-1.829***	-1.597***
	(0.234)	(0.233)	(0.377)	(0.369)
Diseases of the circulatory system	-0.207	-0.131	-0.038	0.309**
	(0.147)	(0.147)	(0.148)	(0.147)
Diseases of the respiratory system	-0.023	-0.016	-0.056	0.028
	(0.135)	(0.135)	(0.145)	(0.143)
Diseases of the digestive system	-0.214	-0.182	-0.448***	-0.197
	(0.142)	(0.141)	(0.152)	(0.150)
Diseases of the skin and subcutaneous tissue	0.128	0.139	-0.194	-0.027
	(0.176)	(0.175)	(0.205)	(0.201)
Diseases of the musculoskeletal system and connective tissue	-0.035	0.009	-0.585***	-0.311**
	(0.152)	(0.152)	(0.154)	(0.152)
Diseases of the genitourinary system	-0.082	-0.054	-0.313**	-0.061
	(0.150)	(0.149)	(0.159)	(0.157)
Pregnancy, childbirth and the puerperium	0.447	0.394	1.583	1.571
	(0.470)	(0.469)	(0.963)	(0.960)
Certain conditions originating in the perinatal period	0.457***	0.435**	0.223	0.154
	(0.176)	(0.175)	(0.222)	(0.220)
Congenital malformations, deformations and chromosomal abnormalities	0.006	-0.008	-0.193	-0.243
	(0.154)	(0.154)	(0.179)	(0.177)
Injury, poisoning and certain other consequences of external causes	-0.038	-0.015	-0.492***	-0.280*

	(0.138)	(0.138)	(0.149)	(0.147)
Physician density	-0.403	-0.371	-0.139	0.040
	(0.455)	(0.470)	(0.295)	(0.360)
Hospital bed density	-1.114***	-0.925***	-1.354***	-0.917***
	(0.370)	(0.382)	(0.243)	(0.296)
2002	0.022	0.021	0.100***	0.123***
	(0.019)	(0.019)	(0.012)	(0.014)
2003	0.100***	0.104***	0.118***	0.169***
	(0.020)	(0.021)	(0.013)	(0.015)
2004	0.087***	0.103***	0.056***	0.140***
	(0.025)	(0.025)	(0.016)	(0.019)
2005	0.252***	0.255***	0.223***	0.315***
	(0.030)	(0.031)	(0.019)	(0.024)
2006	0.306***	0.311***	0.298***	0.416***
	(0.034)	(0.035)	(0.022)	(0.027)
2007	0.230***	0.239***	0.165***	0.258***
	(0.042)	(0.043)	(0.027)	(0.033)
Trend	1.283***	1.125***	1.986***	1.816***
	(0.381)	(0.394)	(0.245)	(0.303)
Constant	-26.788***	-24.162**	-45.218***	-44.770***
	(9.115)	(9.421)	(5.906)	(7.259)
N	200292	194129	267188	199087
Log likelihood	-46886.006	-43835.193	-115938.830	-78254.443
Pseudo R-squared	0.222	0.205	0.298	0.216
LR test (coefs=0)	$\chi^2(97)$ = 26778.77***	χ^2 (95) = 22592.18***	$\chi^2(117)$ = 98516.26***	$\chi^2(114)$ = 43113.74***
Wald test (excluded var.)	$\chi^2(18)$ = 255.91***	$\chi^2(17)$ = 164.97***	$\chi^2(36)$ = 2977.16***	$\chi^2(34)$ = 801.47***
Propensity Score				
Mean	0.089	0.082	0.310	0.201

SD	0.112	0.100	0.267	0.184

Note: (1) ***, **, and * represent statistical significance at the 1, 5, and 10 percent levels, respectively.
(2) Standard errors are shown in parentheses.
(3) All equations include the prefectural dummy variables.

Table A2 Results of t-Tests for the Equality of Means for the Two Groups

(A) Short-term hospitalization (m=1)

Sample	Full sample						Subsample					
	The beneficiaries		The insured				The beneficiaries		The insured			
	Mean	SE	Mean	Se	Difference	SD	Mean	SE	Mean	Se	Difference	SD
Individual attributes												
Female	0.468	0.499	0.468	0.499	0.000	0.000	0.465	0.499	0.465	0.499	0.000	0.000
Age	61.329	19.622	61.359	19.452	-0.030	0.021	62.222	19.708	62.260	19.551	-0.038	0.022
Length of stay												
Primary diseases	0.037	0.189	0.035	0.183	0.002***	0.001	0.041	0.199	0.039	0.193	0.002***	0.001
Certain infectious and parasitic diseases	0.093	0.290	0.095	0.294	-0.002***	0.001	0.103	0.305	0.106	0.308	-0.002***	0.001
Neoplasms	0.004	0.066	0.002	0.048	0.002***	0.001	0.005	0.070	0.003	0.055	0.002***	0.001
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	0.089	0.285	0.095	0.294	-0.006***	0.001	0.100	0.300	0.104	0.305	-0.004***	0.001
Endocrine, nutritional and metabolic diseases	0.103	0.304	0.101	0.301	0.002	0.001						
Mental and behavioral disorders	0.031	0.174	0.028	0.165	0.003***	0.001	0.035	0.183	0.031	0.174	0.004***	0.001
Diseases of the nervous system	0.040	0.195	0.040	0.196	0.000	0.001	0.044	0.206	0.045	0.206	0.000	0.001
Diseases of the eye and adnexa	0.003	0.058	0.003	0.054	0.000	0.000	0.004	0.061	0.003	0.057	0.000	0.000
Diseases of the ear and mastoid process	0.187	0.390	0.193	0.394	-0.005***	0.001	0.209	0.406	0.215	0.411	-0.007***	0.001
Diseases of the circulatory system	0.090	0.287	0.088	0.284	0.002*	0.001	0.100	0.301	0.099	0.298	0.002	0.001

Diseases of the respiratory system	0.100	0.301	0.104	0.305	-0.003***	0.001	0.112	0.315	0.115	0.319	-0.003***	0.001
Diseases of the digestive system	0.007	0.085	0.005	0.072	0.002***	0.001	0.008	0.090	0.006	0.077	0.002***	0.001
Diseases of the skin and subcutaneous tissue	0.056	0.231	0.054	0.225	0.003***	0.001	0.063	0.243	0.060	0.237	0.003***	0.001
Diseases of the musculoskeletal system and connective tissue	0.044	0.206	0.043	0.203	0.001**	0.001	0.049	0.217	0.049	0.215	0.001	0.001
Diseases of the genitourinary system	0.009	0.094	0.009	0.096	0.000**	0.000	0.010	0.099	0.010	0.101	0.000*	0.000
Pregnancy, childbirth and the puerperium	0.006	0.077	0.005	0.072	0.001***	0.000	0.007	0.081	0.006	0.077	0.001***	0.000
Certain conditions originating in the perinatal period	0.002	0.047	0.002	0.039	0.001*	0.000	0.003	0.050	0.001	0.037	0.001***	0.000
Congenital malformations, deformations and chromosomal abnormalities	0.026	0.160	0.023	0.149	0.004***	0.001	0.029	0.169	0.025	0.157	0.004***	0.001
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	0.070	0.255	0.075	0.263	-0.005***	0.001	0.078	0.268	0.084	0.277	-0.006***	0.001
Injury, poisoning and certain other consequences of external causes												
Medical Supply characteristics	0.847	0.360	0.847	0.360	0.000	0.000	0.835	0.371	0.835	0.371	0.000	0.000
Hospital												
Year	0.124	0.330	0.124	0.329	0.000	0.000	0.125	0.331	0.125	0.331	0.000	0.000
2001	0.136	0.343	0.136	0.342	0.000	0.000	0.138	0.345	0.137	0.344	0.001**	0.000

2002	0.152	0.359	0.152	0.359	0.000	0.000	0.155	0.362	0.156	0.363	-0.001**	0.000
2003	0.149	0.356	0.149	0.356	0.000	0.000	0.151	0.358	0.152	0.359	0.000	0.001
2004	0.151	0.358	0.150	0.357	0.000	0.001	0.148	0.355	0.147	0.354	0.001**	0.001
2005	0.149	0.356	0.149	0.357	-0.001	0.001	0.146	0.353	0.147	0.354	-0.001	0.001
2006	0.140	0.347	0.139	0.346	0.001	0.001	0.136	0.343	0.136	0.343	0.000	0.001
2007												
Prefectures	0.116	0.320	0.114	0.318	0.002***	0.001	0.116	0.321	0.115	0.319	0.002**	0.001
Hokkaido	0.016	0.127	0.017	0.128	0.000	0.001	0.017	0.128	0.017	0.128	0.000	0.001
Aomori	0.005	0.071	0.005	0.071	0.000	0.001	0.005	0.068	0.005	0.072	-0.001	0.001
Iwate	0.010	0.099	0.012	0.107	-0.002***	0.001	0.011	0.102	0.012	0.108	-0.001**	0.001
Miyagi	0.009	0.094	0.007	0.082	0.002***	0.001	0.009	0.093	0.006	0.076	0.003***	0.001
Akita	0.004	0.066	0.005	0.069	0.000	0.001	0.004	0.064	0.004	0.064	0.000	0.001
Yamagata	0.007	0.082	0.008	0.090	-0.001**	0.001	0.007	0.083	0.009	0.092	-0.002***	0.001
Fukushima	0.010	0.098	0.010	0.100	-0.001	0.001	0.010	0.099	0.010	0.099	0.000	0.001
Ibaraki	0.010	0.100	0.009	0.097	0.001	0.001	0.010	0.099	0.010	0.098	0.000	0.001
Tochigi	0.006	0.079	0.005	0.073	0.001**	0.000	0.007	0.082	0.005	0.074	0.001	0.000
Gunma	0.026	0.159	0.026	0.160	0.000	0.001	0.026	0.160	0.027	0.161	0.000	0.001
Saitama	0.030	0.171	0.029	0.169	0.001	0.001	0.031	0.172	0.030	0.170	0.001	0.001
Chiba	0.112	0.315	0.112	0.315	0.000	0.001	0.108	0.311	0.110	0.313	-0.002*	0.001
Tokyo	0.060	0.237	0.063	0.243	-0.004***	0.001	0.060	0.237	0.062	0.241	-0.002**	0.001
Kanagawa	0.007	0.084	0.007	0.082	0.000	0.001	0.006	0.080	0.006	0.077	0.000	0.001
Niigata	0.003	0.051	0.002	0.049	0.000	0.000	0.003	0.052	0.003	0.052	0.000	0.000
Toyama	0.004	0.065	0.004	0.063	0.000	0.001	0.004	0.066	0.004	0.063	0.000	0.001
Ishikawa	0.002	0.049	0.002	0.047	0.000	0.000	0.002	0.049	0.002	0.045	0.000	0.000
Fukui	0.002	0.049	0.001	0.030	0.002***	0.000	0.003	0.050	0.001	0.029	0.002***	0.000
Yamanashi	0.005	0.073	0.006	0.075	0.000	0.000	0.005	0.070	0.005	0.071	0.000	0.000
Nagano	0.006	0.078	0.005	0.069	0.001**	0.001	0.006	0.079	0.004	0.066	0.002***	0.001
Gifu	0.009	0.096	0.010	0.099	-0.001	0.001	0.010	0.098	0.010	0.100	0.000	0.001
Shizuoka	0.034	0.181	0.034	0.181	0.000	0.001	0.034	0.182	0.036	0.186	-0.001**	0.001
Aichi	0.008	0.089	0.009	0.096	-0.001**	0.001	0.008	0.087	0.009	0.096	-0.002**	0.001

Mie	0.006	0.074	0.005	0.069	0.001	0.001	0.006	0.075	0.005	0.069	0.001	0.001
Shiga	0.027	0.161	0.025	0.157	0.001	0.001	0.026	0.158	0.023	0.150	0.003**	0.001
Kyoto	0.127	0.333	0.126	0.332	0.001	0.001	0.127	0.333	0.127	0.333	0.000	0.001
Osaka	0.054	0.227	0.061	0.240	-0.007***	0.001	0.056	0.230	0.064	0.245	-0.008***	0.001
Hyogo	0.012	0.110	0.009	0.095	0.003***	0.001	0.012	0.110	0.009	0.094	0.003***	0.001
Nara	0.008	0.090	0.006	0.076	0.002***	0.001	0.008	0.091	0.006	0.078	0.002***	0.001
Wakayama	0.005	0.067	0.005	0.073	-0.001	0.001	0.005	0.068	0.005	0.072	-0.001	0.001
Tottori	0.002	0.049	0.002	0.048	0.000	0.000	0.002	0.047	0.002	0.044	0.000	0.000
Shimane	0.016	0.124	0.016	0.126	0.000	0.001	0.016	0.125	0.016	0.126	0.000	0.001
Okayama	0.018	0.135	0.019	0.135	0.000	0.001	0.019	0.135	0.019	0.136	0.000	0.001
Hiroshima	0.013	0.114	0.014	0.117	-0.001	0.001	0.013	0.114	0.014	0.118	-0.001	0.001
Yamaguchi	0.008	0.091	0.009	0.093	0.000	0.001	0.009	0.093	0.009	0.094	0.000	0.001
Tokushima	0.010	0.102	0.009	0.093	0.002**	0.001	0.010	0.101	0.009	0.094	0.002**	0.001
Kagawa	0.013	0.115	0.014	0.116	0.000	0.001	0.014	0.116	0.015	0.120	-0.001	0.001
Ehime	0.014	0.119	0.012	0.107	0.003***	0.001	0.014	0.118	0.011	0.106	0.003***	0.001
Kochi	0.058	0.235	0.063	0.244	-0.005***	0.001	0.060	0.237	0.063	0.243	-0.003***	0.001
Fukuoka	0.006	0.074	0.007	0.081	-0.001*	0.001	0.006	0.076	0.007	0.081	-0.001	0.001
Saga	0.015	0.122	0.016	0.124	-0.001	0.001	0.015	0.120	0.014	0.118	0.000	0.001
Nagasaki	0.012	0.108	0.011	0.103	0.001*	0.001	0.011	0.105	0.010	0.102	0.001	0.000
Kumamoto	0.020	0.141	0.022	0.145	-0.001	0.001	0.021	0.144	0.023	0.149	-0.002*	0.001
Iota	0.011	0.103	0.010	0.099	0.001	0.001	0.010	0.101	0.010	0.097	0.001	0.001
Miyazaki	0.024	0.152	0.023	0.150	0.001	0.001	0.024	0.154	0.024	0.153	0.000	0.001
Kagoshima	0.017	0.129	0.015	0.122	0.002**	0.001	0.017	0.128	0.015	0.120	0.002***	0.001
Pseudo R-squared for estimating equation (A1)			0.003						0.004			

Note: (1) ***, **, and * represent statistical significance at the 1, 5, and 10 percent levels, respectively.

(B) Short-term hospitalization (m=4)

Sample	Full sample						Subsample					
	The beneficiaries		The insured				The beneficiaries		The insured			
	Mean	SE	Mean	Se	Difference	SD	Mean	SE	Mean	Se	Difference	SD
Individual attributes												
Female	0.469	0.499	0.469	0.499	0.000	0.000	0.466	0.499	0.466	0.499	0.000	0.000
Age	61.766	19.102	61.776	18.838	-0.010	0.015	62.726	19.134	62.768	18.864	-0.042***	0.016
Length of stay												
Primary diseases	0.038	0.191	0.032	0.177	0.006***	0.000	0.043	0.202	0.036	0.187	0.006***	0.000
Certain infectious and parasitic diseases	0.091	0.287	0.096	0.294	-0.005***	0.000	0.101	0.302	0.108	0.310	-0.006***	0.000
Neoplasms	0.004	0.066	0.003	0.054	0.001***	0.000	0.005	0.070	0.003	0.059	0.001***	0.000
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	0.089	0.285	0.100	0.299	-0.010***	0.001	0.100	0.300	0.104	0.305	-0.004***	0.001
Endocrine, nutritional and metabolic diseases	0.107	0.309	0.102	0.303	0.005***	0.001						
Mental and behavioral disorders	0.033	0.177	0.026	0.160	0.006***	0.001	0.036	0.187	0.029	0.167	0.008***	0.001
Diseases of the nervous system	0.036	0.187	0.038	0.191	-0.002***	0.000	0.041	0.197	0.043	0.202	-0.002***	0.000
Diseases of the eye and adnexa	0.003	0.059	0.003	0.052	0.001***	0.000	0.004	0.062	0.003	0.055	0.001***	0.000
Diseases of the ear and mastoid process	0.187	0.390	0.198	0.398	-0.011***	0.001	0.209	0.407	0.225	0.417	-0.015***	0.001
Diseases of the circulatory system	0.090	0.287	0.086	0.280	0.005***	0.001	0.101	0.302	0.096	0.294	0.005***	0.001

Diseases of the respiratory system	0.100	0.299	0.102	0.303	-0.003***	0.001	0.111	0.314	0.114	0.318	-0.003***	0.001
Diseases of the digestive system	0.008	0.086	0.006	0.078	0.001***	0.000	0.008	0.091	0.007	0.082	0.002***	0.000
Diseases of the skin and subcutaneous tissue	0.059	0.236	0.054	0.227	0.005***	0.001	0.066	0.248	0.061	0.240	0.005***	0.001
Diseases of the musculoskeletal system and connective tissue	0.045	0.207	0.043	0.202	0.002***	0.000	0.050	0.218	0.048	0.213	0.002***	0.000
Diseases of the genitourinary system	0.006	0.080	0.007	0.084	-0.001***	0.000	0.007	0.085	0.008	0.088	-0.001***	0.000
Pregnancy, childbirth and the puerperium	0.003	0.056	0.003	0.052	0.000***	0.000	0.004	0.059	0.003	0.055	0.001***	0.000
Certain conditions originating in the perinatal period	0.002	0.048	0.001	0.038	0.001***	0.000	0.003	0.051	0.002	0.040	0.001***	0.000
Congenital malformations, deformations and chromosomal abnormalities	0.027	0.162	0.022	0.147	0.005***	0.001	0.030	0.171	0.025	0.156	0.005***	0.001
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	0.072	0.258	0.078	0.268	-0.006***	0.001	0.080	0.272	0.087	0.282	-0.007***	0.001
Injury, poisoning and certain other consequences of external causes												
Medical Supply characteristics	0.853	0.354	0.853	0.354	0.000	0.000	0.841	0.366	0.841	0.366	0.000	0.000
Hospital												
Year	0.123	0.328	0.122	0.328	0.001***	0.000	0.124	0.330	0.124	0.329	0.000	0.000
2001	0.133	0.340	0.133	0.340	0.000	0.000	0.135	0.341	0.134	0.341	0.001*	0.000
2002	0.150	0.357	0.151	0.358	0.000	0.000	0.153	0.360	0.155	0.362	-0.002***	0.000

2003	0.149	0.356	0.149	0.356	-0.001*	0.000	0.151	0.358	0.152	0.359	0.000	0.000
2004	0.153	0.360	0.151	0.358	0.001***	0.000	0.150	0.357	0.148	0.355	0.002***	0.001
2005	0.150	0.358	0.154	0.361	-0.004***	0.001	0.148	0.355	0.151	0.358	-0.003***	0.001
2006	0.142	0.349	0.139	0.346	0.003***	0.000	0.139	0.346	0.137	0.344	0.002***	0.000
2007												
Prefectures	0.113	0.317	0.109	0.311	0.004	0.000	0.113	0.317	0.110	0.313	0.003***	0.000
Hokkaido	0.017	0.129	0.017	0.129	0.000***	0.000	0.017	0.130	0.017	0.129	0.000	0.000
Aomori	0.005	0.073	0.006	0.075	0.000	0.000	0.005	0.071	0.006	0.075	-0.001*	0.000
Iwate	0.010	0.099	0.011	0.104	-0.001***	0.000	0.011	0.102	0.011	0.106	-0.001**	0.000
Miyagi	0.009	0.096	0.007	0.085	0.002***	0.000	0.009	0.096	0.007	0.081	0.003***	0.000
Akita	0.004	0.066	0.005	0.072	-0.001**	0.000	0.004	0.065	0.005	0.068	0.000	0.000
Yamagata	0.007	0.081	0.008	0.090	-0.002***	0.000	0.007	0.082	0.008	0.091	-0.002***	0.000
Fukushima	0.010	0.099	0.010	0.100	0.000	0.000	0.010	0.100	0.010	0.099	0.000	0.000
Ibaraki	0.010	0.100	0.010	0.098	0.000	0.000	0.010	0.099	0.010	0.099	0.000	0.000
Tochigi	0.006	0.080	0.006	0.077	0.000	0.000	0.007	0.082	0.006	0.078	0.001**	0.000
Gunma	0.026	0.158	0.026	0.160	-0.001	0.001	0.026	0.160	0.027	0.162	-0.001	0.001
Saitama	0.029	0.169	0.030	0.172	-0.001	0.001	0.030	0.170	0.030	0.171	-0.001	0.001
Chiba	0.110	0.313	0.108	0.311	0.002**	0.001	0.106	0.308	0.106	0.307	0.001	0.001
Tokyo	0.058	0.234	0.064	0.244	-0.005***	0.001	0.058	0.234	0.063	0.242	-0.005***	0.001
Kanagawa	0.008	0.087	0.006	0.080	0.001***	0.000	0.007	0.083	0.006	0.076	0.001***	0.000
Niigata	0.003	0.051	0.003	0.052	0.000	0.000	0.003	0.053	0.003	0.053	0.000	0.000
Toyama	0.005	0.067	0.004	0.064	0.000	0.000	0.005	0.067	0.004	0.066	0.000	0.000
Ishikawa	0.003	0.050	0.002	0.049	0.000	0.000	0.003	0.051	0.002	0.048	0.000	0.000
Fukui	0.003	0.051	0.001	0.031	0.002***	0.000	0.003	0.051	0.001	0.030	0.002***	0.000
Yamanashi	0.005	0.073	0.005	0.074	0.000	0.000	0.005	0.071	0.005	0.072	0.000	0.000
Nagano	0.006	0.080	0.005	0.069	0.002***	0.000	0.007	0.082	0.005	0.069	0.002***	0.000
Gifu	0.009	0.097	0.010	0.102	-0.001***	0.000	0.010	0.098	0.010	0.101	-0.001	0.000
Shizuoka	0.033	0.179	0.034	0.181	-0.001	0.000	0.034	0.181	0.035	0.184	-0.001**	0.000
Aichi	0.008	0.090	0.009	0.094	-0.001**	0.000	0.008	0.089	0.009	0.094	-0.001**	0.000
Mie	0.006	0.076	0.005	0.074	0.000	0.000	0.006	0.076	0.006	0.074	0.000	0.000

Shiga	0.027	0.162	0.026	0.160	0.001	0.001	0.026	0.159	0.024	0.154	0.002**	0.001
Kyoto	0.125	0.331	0.125	0.330	0.001	0.001	0.125	0.330	0.124	0.330	0.000	0.001
Osaka	0.055	0.228	0.060	0.238	-0.006***	0.001	0.056	0.231	0.063	0.243	-0.007***	0.001
Hyogo	0.013	0.112	0.011	0.105	0.002***	0.001	0.013	0.112	0.011	0.106	0.001**	0.001
Nara	0.008	0.091	0.006	0.078	0.002***	0.000	0.008	0.091	0.007	0.082	0.002***	0.000
Wakayama	0.005	0.068	0.005	0.070	0.000	0.000	0.005	0.069	0.005	0.069	0.000	0.000
Tottori	0.003	0.050	0.002	0.048	0.000	0.000	0.002	0.049	0.002	0.047	0.000	0.000
Shimane	0.016	0.126	0.017	0.127	0.000	0.001	0.016	0.126	0.016	0.127	0.000	0.001
Okayama	0.018	0.135	0.019	0.137	-0.001	0.000	0.019	0.135	0.020	0.139	-0.001***	0.000
Hiroshima	0.014	0.117	0.013	0.115	0.000	0.000	0.014	0.116	0.014	0.116	0.000	0.001
Yamaguchi	0.009	0.094	0.009	0.094	0.000	0.000	0.009	0.096	0.009	0.097	0.000	0.000
Tokushima	0.011	0.104	0.009	0.094	0.002***	0.000	0.011	0.104	0.009	0.095	0.002***	0.000
Kagawa	0.014	0.118	0.014	0.117	0.000	0.000	0.014	0.119	0.014	0.118	0.000	0.001
Ehime	0.015	0.121	0.012	0.108	0.003***	0.000	0.015	0.121	0.011	0.102	0.004***	0.000
Kochi	0.057	0.232	0.064	0.246	-0.007***	0.001	0.058	0.234	0.063	0.244	-0.005***	0.001
Fukuoka	0.006	0.075	0.006	0.079	-0.001	0.000	0.006	0.077	0.006	0.078	0.000	0.000
Saga	0.016	0.125	0.017	0.128	-0.001*	0.001	0.015	0.122	0.016	0.127	-0.001*	0.001
Nagasaki	0.012	0.109	0.012	0.108	0.000	0.000	0.012	0.107	0.011	0.106	0.000	0.000
Kumamoto	0.021	0.142	0.023	0.149	-0.002***	0.001	0.022	0.146	0.023	0.151	-0.002***	0.001
Iota	0.011	0.105	0.010	0.101	0.001*	0.000	0.011	0.103	0.010	0.100	0.001	0.000
Miyazaki	0.024	0.153	0.023	0.151	0.001	0.001	0.025	0.155	0.025	0.156	0.001	0.000
Kagoshima	0.018	0.133	0.013	0.115	0.005***	0.000	0.018	0.131	0.014	0.117	0.004***	0.000
Pseudo R-squared for estimating equation (A1)			0.004						0.005			

Note: See Table A2(A).

(C) Long-term hospitalization (m=1)

Sample	Full sample						Subsample					
	The beneficiaries		The insured				The beneficiaries		The insured			
	Mean	SE	Mean	Se	Difference	SD	Mean	SE	Mean	Se	Difference	SD
Individual attributes												
Female	0.441	0.496	0.441	0.496	0.000	0.000	0.449	0.497	0.449	0.497	0.000	0.000
Age	64.536	14.703	64.456	14.543	0.080***	0.010	69.043	14.587	69.140	14.332	-0.097***	0.017
Length of stay	69.950	109.265	68.126	109.478	1.823***	0.038	16.831	38.247	15.695	38.102	1.136***	0.026
Primary diseases												
Certain infectious and parasitic diseases	0.014	0.118	0.012	0.110	0.002***	0.000	0.029	0.167	0.024	0.154	0.004***	0.000
Neoplasms	0.039	0.193	0.040	0.196	-0.001***	0.000	0.079	0.270	0.081	0.273	-0.002***	0.001
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	0.002	0.040	0.001	0.034	0.000***	0.000	0.003	0.057	0.003	0.053	0.000	0.000
Endocrine, nutritional and metabolic diseases	0.045	0.207	0.038	0.192	0.006***	0.000	0.092	0.289	0.093	0.290	-0.001	0.001
Mental and behavioral disorders	0.512	0.500	0.528	0.499	-0.016***	0.001						
Diseases of the nervous system	0.036	0.187	0.028	0.165	0.008***	0.000	0.075	0.263	0.074	0.261	0.001	0.001
Diseases of the eye and adnexa	0.002	0.049	0.002	0.047	0.000	0.000	0.005	0.070	0.005	0.067	0.000	0.000
Diseases of the ear and mastoid process	0.001	0.025	0.000	0.018	0.000***	0.000	0.001	0.037	0.001	0.024	0.001***	0.000
Diseases of the circulatory system	0.179	0.383	0.183	0.387	-0.004***	0.000	0.367	0.482	0.382	0.486	-0.016***	0.001

Diseases of the respiratory system	0.025	0.157	0.023	0.151	0.002***	0.000	0.052	0.221	0.048	0.215	0.003***	0.001
Diseases of the digestive system	0.038	0.190	0.037	0.189	0.001**	0.000	0.077	0.267	0.073	0.260	0.004***	0.001
Diseases of the skin and subcutaneous tissue	0.003	0.050	0.001	0.037	0.001***	0.000	0.005	0.072	0.003	0.052	0.003***	0.000
Diseases of the musculoskeletal system and connective tissue	0.035	0.184	0.036	0.186	-0.001***	0.000	0.072	0.258	0.073	0.260	-0.001	0.001
Diseases of the genitourinary system	0.020	0.140	0.019	0.137	0.001***	0.000	0.041	0.199	0.038	0.192	0.003***	0.001
Pregnancy, childbirth and the puerperium	0.000	0.019	0.000	0.020	0.000	0.000	0.001	0.027	0.001	0.029	0.000	0.000
Certain conditions originating in the perinatal period	0.001	0.023	0.001	0.024	0.000	0.000	0.001	0.033	0.001	0.034	0.000	0.000
Congenital malformations, deformations and chromosomal abnormalities	0.001	0.032	0.001	0.024	0.000***	0.000	0.002	0.047	0.001	0.031	0.001***	0.000
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	0.006	0.080	0.004	0.061	0.003***	0.000	0.013	0.114	0.008	0.087	0.006***	0.001
Injury, poisoning and certain other consequences of external causes	0.042	0.200	0.045	0.206	-0.003***	0.000	0.085	0.279	0.092	0.288	-0.006***	0.001
Medical Supply characteristics												
Hospital	0.924	0.264	0.924	0.264	0.000**	0.000	0.857	0.350	0.857	0.350	0.000	0.000
Year												
2001	0.147	0.354	0.147	0.354	0.000*	0.000	0.147	0.354	0.147	0.354	0.000	0.000

2002	0.148	0.355	0.149	0.357	-0.001***	0.000	0.154	0.361	0.156	0.363	-0.002***	0.001
2003	0.146	0.353	0.145	0.352	0.000*	0.000	0.154	0.361	0.152	0.359	0.002***	0.001
2004	0.144	0.351	0.144	0.351	0.000	0.000	0.150	0.357	0.150	0.358	-0.001	0.001
2005	0.145	0.352	0.146	0.353	0.000**	0.000	0.139	0.346	0.141	0.348	-0.002***	0.001
2006	0.139	0.346	0.139	0.346	0.001***	0.000	0.135	0.342	0.130	0.336	0.005***	0.001
2007	0.131	0.337	0.131	0.337	0.000	0.000	0.122	0.327	0.123	0.329	-0.001**	0.001
Prefectures												
Hokkaido	0.078	0.268	0.076	0.264	0.002***	0.000	0.084	0.277	0.081	0.273	0.003***	0.001
Aomori	0.013	0.111	0.013	0.113	0.000	0.000	0.014	0.116	0.014	0.117	0.000	0.001
Iwate	0.008	0.088	0.008	0.087	0.000	0.000	0.007	0.084	0.007	0.081	0.000	0.000
Miyagi	0.010	0.099	0.011	0.104	-0.001**	0.000	0.009	0.097	0.011	0.102	-0.001**	0.001
Akita	0.009	0.093	0.006	0.080	0.002***	0.000	0.007	0.081	0.006	0.078	0.001	0.000
Yamagata	0.003	0.056	0.003	0.055	0.000	0.000	0.003	0.053	0.003	0.059	-0.001*	0.000
Fukushima	0.011	0.103	0.011	0.102	0.000	0.000	0.008	0.091	0.009	0.093	0.000	0.000
Ibaraki	0.016	0.125	0.019	0.136	-0.003***	0.001	0.011	0.106	0.011	0.106	0.000	0.001
Tochigi	0.012	0.107	0.012	0.111	-0.001*	0.000	0.008	0.091	0.009	0.097	-0.001**	0.001
Gunma	0.007	0.082	0.007	0.083	0.000	0.000	0.006	0.075	0.005	0.073	0.000	0.000
Saitama	0.028	0.166	0.029	0.169	-0.001*	0.001	0.027	0.163	0.028	0.165	-0.001	0.001
Chiba	0.031	0.173	0.034	0.181	-0.003***	0.001	0.029	0.168	0.031	0.172	-0.002**	0.001
Tokyo	0.118	0.323	0.112	0.315	0.007***	0.001	0.119	0.324	0.119	0.323	0.000	0.001
Kanagawa	0.054	0.226	0.056	0.230	-0.002***	0.001	0.054	0.225	0.053	0.225	0.000	0.001
Niigata	0.009	0.093	0.010	0.102	-0.002***	0.000	0.007	0.083	0.006	0.080	0.001	0.000
Toyama	0.004	0.061	0.003	0.058	0.000	0.000	0.002	0.050	0.002	0.047	0.000	0.000
Ishikawa	0.006	0.077	0.005	0.068	0.001***	0.000	0.006	0.074	0.005	0.071	0.000	0.000
Fukui	0.003	0.056	0.002	0.049	0.001***	0.000	0.002	0.049	0.003	0.050	0.000	0.000
Yamanashi	0.004	0.060	0.002	0.041	0.002***	0.000	0.003	0.055	0.001	0.037	0.002***	0.000
Nagano	0.005	0.073	0.006	0.075	0.000	0.000	0.004	0.066	0.004	0.067	0.000	0.000
Gifu	0.007	0.081	0.007	0.081	0.000	0.000	0.006	0.079	0.007	0.081	0.000	0.000
Shizuoka	0.011	0.105	0.011	0.106	0.000	0.000	0.012	0.107	0.012	0.108	0.000	0.001
Aichi	0.032	0.177	0.037	0.190	-0.005***	0.001	0.030	0.170	0.029	0.169	0.000	0.001

Mie	0.011	0.105	0.010	0.100	0.001**	0.000	0.009	0.096	0.010	0.099	-0.001	0.001
Shiga	0.005	0.072	0.004	0.064	0.001***	0.000	0.005	0.073	0.006	0.075	0.000	0.000
Kyoto	0.024	0.153	0.021	0.142	0.004***	0.001	0.021	0.145	0.020	0.142	0.001	0.001
Osaka	0.126	0.332	0.129	0.335	-0.002***	0.001	0.157	0.364	0.156	0.363	0.001	0.001
Hyogo	0.041	0.199	0.044	0.205	-0.003***	0.001	0.043	0.202	0.044	0.206	-0.002*	0.001
Nara	0.009	0.092	0.007	0.082	0.002***	0.000	0.007	0.085	0.007	0.085	0.000	0.000
Wakayama	0.008	0.087	0.006	0.077	0.002***	0.000	0.010	0.098	0.007	0.084	0.003***	0.001
Tottori	0.003	0.052	0.003	0.054	0.000	0.000	0.002	0.050	0.003	0.050	0.000	0.000
Shimane	0.003	0.057	0.003	0.051	0.001***	0.000	0.003	0.053	0.002	0.048	0.000	0.000
Okayama	0.013	0.113	0.012	0.110	0.001	0.000	0.012	0.111	0.013	0.113	-0.001	0.001
Hiroshima	0.018	0.134	0.018	0.134	0.000	0.001	0.018	0.131	0.019	0.137	-0.002**	0.001
Yamaguchi	0.014	0.119	0.015	0.123	-0.001*	0.000	0.013	0.114	0.016	0.124	-0.002***	0.001
Tokushima	0.013	0.115	0.012	0.108	0.002***	0.000	0.012	0.110	0.010	0.101	0.002***	0.001
Kagawa	0.008	0.089	0.008	0.088	0.000	0.000	0.008	0.089	0.009	0.092	-0.001	0.001
Ehime	0.014	0.116	0.013	0.114	0.000	0.000	0.015	0.123	0.015	0.121	0.001	0.001
Kochi	0.013	0.113	0.014	0.115	0.000	0.001	0.014	0.117	0.014	0.116	0.000	0.001
Fukuoka	0.082	0.274	0.086	0.280	-0.004***	0.001	0.081	0.274	0.082	0.274	0.000	0.001
Saga	0.007	0.084	0.007	0.082	0.000	0.000	0.006	0.078	0.007	0.084	-0.001*	0.000
Nagasaki	0.020	0.140	0.020	0.140	0.000	0.001	0.017	0.128	0.017	0.131	-0.001	0.001
Kumamoto	0.016	0.127	0.018	0.134	-0.002***	0.000	0.017	0.131	0.020	0.140	-0.003***	0.001
Iota	0.018	0.133	0.018	0.134	0.000	0.001	0.020	0.139	0.019	0.135	0.001*	0.001
Miyazaki	0.013	0.115	0.015	0.120	-0.001**	0.000	0.012	0.107	0.012	0.108	0.000	0.001
Kagoshima	0.028	0.165	0.028	0.165	0.000	0.001	0.024	0.153	0.025	0.157	-0.001*	0.001
Okinawa	0.014	0.119	0.011	0.103	0.004***	0.000	0.014	0.117	0.010	0.098	0.004***	0.001
Pseudo R-squared for estimating equation (A1)			0.004						0.004			

Note: See Table A2(A).

(D) Long-term hospitalization (m=4)

Sample	Full sample						Subsample					
	The beneficiaries		The insured				The beneficiaries		The insured			
	Mean	SE	Mean	Se	Difference	SD	Mean	SE	Mean	Se	Difference	SD
Individual attributes												
Female	0.441	0.497	0.441	0.497	0.000	0.000	0.451	0.498	0.450	0.498	0.000**	0.000
Age	64.545	14.661	64.454	14.467	0.090***	0.006	69.130	14.478	69.266	14.153	-0.135***	0.010
Length of stay	70.400	109.474	67.906	109.776	2.493***	0.024	17.008	38.445	15.416	37.960	1.591***	0.016
Primary diseases												
Certain infectious and parasitic diseases	0.014	0.118	0.010	0.101	0.004***	0.000	0.029	0.167	0.021	0.144	0.008***	0.000
Neoplasms	0.038	0.192	0.041	0.197	-0.002***	0.000	0.079	0.269	0.083	0.276	-0.004***	0.000
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	0.002	0.040	0.001	0.035	0.000***	0.000	0.003	0.057	0.003	0.057	0.000	0.000
Endocrine, nutritional and metabolic diseases	0.044	0.206	0.039	0.194	0.005***	0.000	0.091	0.288	0.093	0.290	-0.002***	0.000
Mental and behavioral disorders	0.515	0.500	0.532	0.499	-0.017***	0.000						
Diseases of the nervous system	0.037	0.188	0.027	0.162	0.010***	0.000	0.075	0.264	0.072	0.258	-0.002***	0.000
Diseases of the eye and adnexa	0.002	0.049	0.002	0.046	0.000***	0.000	0.005	0.070	0.005	0.067	0.000**	0.000
Diseases of the ear and mastoid process	0.001	0.025	0.000	0.019	0.000***	0.000	0.001	0.036	0.001	0.028	0.001***	0.000
Diseases of the circulatory system	0.178	0.383	0.184	0.387	-0.005***	0.000	0.368	0.482	0.390	0.488	-0.022***	0.001

Diseases of the respiratory system	0.025	0.156	0.023	0.150	0.002***	0.000	0.052	0.221	0.047	0.212	0.004***	0.001
Diseases of the digestive system	0.037	0.189	0.036	0.185	0.002***	0.000	0.077	0.266	0.072	0.259	0.004***	0.000
Diseases of the skin and subcutaneous tissue	0.003	0.050	0.002	0.039	0.001***	0.000	0.005	0.072	0.003	0.057	0.002***	0.000
Diseases of the musculoskeletal system and connective tissue	0.035	0.184	0.036	0.186	-0.001***	0.000	0.072	0.259	0.071	0.257	0.001***	0.000
Diseases of the genitourinary system	0.020	0.140	0.018	0.134	0.002***	0.000	0.041	0.199	0.038	0.191	0.004***	0.000
Pregnancy, childbirth and the puerperium	0.000	0.019	0.000	0.022	0.000***	0.000	0.001	0.027	0.001	0.031	0.000***	0.000
Certain conditions originating in the perinatal period	0.000	0.017	0.000	0.019	0.000***	0.000	0.001	0.024	0.001	0.027	0.000***	0.000
Congenital malformations, deformations and chromosomal abnormalities	0.001	0.031	0.001	0.022	0.000***	0.000	0.002	0.045	0.001	0.031	0.001***	0.000
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	0.006	0.080	0.004	0.063	0.003***	0.000	0.013	0.115	0.009	0.092	0.005***	0.000
Injury, poisoning and certain other consequences of external causes	0.041	0.199	0.044	0.205	-0.003***	0.000	0.085	0.279	0.090	0.286	-0.005***	0.000
Medical Supply characteristics												
Hospital	0.925	0.263	0.925	0.263	0.000***	0.000	0.858	0.349	0.858	0.349	-0.135***	0.010
Year												
2001	0.147	0.354	0.146	0.353	0.001***	0.000	0.147	0.354	0.149	0.356	-0.001***	0.000

2002	0.148	0.355	0.150	0.357	-0.002***	0.000	0.153	0.360	0.153	0.360	-0.001	0.000
2003	0.145	0.353	0.145	0.352	0.001***	0.000	0.153	0.360	0.153	0.360	0.001	0.000
2004	0.143	0.351	0.144	0.351	0.000	0.000	0.150	0.357	0.151	0.358	-0.001***	0.000
2005	0.145	0.352	0.147	0.354	-0.001***	0.000	0.139	0.346	0.142	0.349	-0.002***	0.000
2006	0.140	0.347	0.139	0.346	0.000	0.000	0.135	0.342	0.131	0.337	0.005***	0.000
2007	0.131	0.338	0.130	0.336	0.001***	0.000	0.122	0.327	0.122	0.327	0.000	0.000
Prefectures												
Hokkaido	0.077	0.267	0.071	0.258	0.006***	0.000	0.083	0.276	0.080	0.271	0.004***	0.000
Aomori	0.013	0.112	0.014	0.118	-0.001***	0.000	0.014	0.117	0.014	0.119	-0.001*	0.000
Iwate	0.008	0.088	0.008	0.089	0.000	0.000	0.007	0.084	0.007	0.082	0.000	0.000
Miyagi	0.010	0.099	0.011	0.104	-0.001***	0.000	0.009	0.097	0.010	0.100	-0.001**	0.000
Akita	0.009	0.093	0.007	0.086	0.001***	0.000	0.007	0.081	0.006	0.079	0.000	0.000
Yamagata	0.003	0.056	0.003	0.058	0.000*	0.000	0.003	0.053	0.004	0.059	-0.001***	0.000
Fukushima	0.011	0.103	0.011	0.105	-0.001**	0.000	0.008	0.092	0.009	0.093	0.000	0.000
Ibaraki	0.016	0.125	0.019	0.138	-0.003***	0.000	0.011	0.106	0.011	0.106	0.000	0.000
Tochigi	0.012	0.107	0.013	0.111	-0.001***	0.000	0.009	0.092	0.010	0.098	-0.001	0.000
Gunma	0.007	0.083	0.007	0.085	0.000**	0.000	0.006	0.075	0.005	0.073	0.000	0.000
Saitama	0.029	0.167	0.031	0.174	-0.003***	0.000	0.027	0.163	0.029	0.168	-0.002***	0.000
Chiba	0.031	0.173	0.036	0.187	-0.005***	0.000	0.029	0.168	0.030	0.171	-0.001**	0.000
Tokyo	0.118	0.322	0.108	0.310	0.010***	0.000	0.118	0.323	0.116	0.321	0.002**	0.001
Kanagawa	0.054	0.225	0.056	0.229	-0.002***	0.000	0.054	0.225	0.054	0.227	-0.001	0.001
Niigata	0.009	0.093	0.010	0.097	-0.001***	0.000	0.007	0.083	0.006	0.075	0.001***	0.000
Toyama	0.004	0.061	0.003	0.058	0.000**	0.000	0.002	0.050	0.003	0.050	0.000	0.000
Ishikawa	0.006	0.077	0.005	0.069	0.001***	0.000	0.006	0.074	0.005	0.072	0.000	0.000
Fukui	0.003	0.056	0.003	0.050	0.001***	0.000	0.002	0.049	0.003	0.051	0.000	0.000
Yamanashi	0.004	0.060	0.002	0.044	0.002***	0.000	0.003	0.055	0.002	0.039	0.002***	0.000
Nagano	0.005	0.073	0.006	0.074	0.000	0.000	0.004	0.066	0.004	0.064	0.000*	0.000
Gifu	0.007	0.082	0.007	0.086	-0.001***	0.000	0.006	0.080	0.007	0.081	0.000	0.000
Shizuoka	0.011	0.105	0.012	0.109	-0.001***	0.000	0.012	0.107	0.012	0.110	-0.001***	0.000
Aichi	0.033	0.177	0.037	0.188	-0.004***	0.000	0.030	0.171	0.029	0.169	0.001*	0.000

Mie	0.011	0.105	0.011	0.103	0.001***	0.000	0.009	0.096	0.010	0.098	-0.001*	0.000
Shiga	0.005	0.072	0.005	0.070	0.000**	0.000	0.005	0.074	0.006	0.077	0.000**	0.000
Kyoto	0.024	0.154	0.023	0.148	0.002***	0.000	0.022	0.145	0.022	0.147	0.000	0.000
Osaka	0.126	0.332	0.124	0.330	0.002***	0.000	0.157	0.364	0.155	0.362	0.002***	0.000
Hyogo	0.041	0.199	0.044	0.206	-0.003***	0.000	0.043	0.202	0.045	0.207	-0.002***	0.001
Nara	0.009	0.092	0.007	0.082	0.002***	0.000	0.007	0.085	0.007	0.084	0.000	0.000
Wakayama	0.008	0.087	0.006	0.078	0.001***	0.000	0.010	0.098	0.007	0.084	0.003***	0.000
Tottori	0.003	0.052	0.003	0.052	0.000	0.000	0.002	0.050	0.003	0.051	0.000	0.000
Shimane	0.003	0.057	0.003	0.051	0.001***	0.000	0.003	0.053	0.002	0.047	0.001***	0.000
Okayama	0.013	0.113	0.012	0.109	0.001***	0.000	0.013	0.111	0.013	0.111	0.000	0.000
Hiroshima	0.018	0.134	0.018	0.134	0.000	0.000	0.018	0.131	0.020	0.139	-0.002***	0.000
Yamaguchi	0.014	0.119	0.015	0.122	-0.001**	0.000	0.013	0.115	0.016	0.124	-0.002***	0.000
Tokushima	0.013	0.115	0.011	0.106	0.002***	0.000	0.012	0.110	0.011	0.105	0.001***	0.000
Kagawa	0.008	0.089	0.008	0.091	0.000	0.000	0.008	0.089	0.009	0.092	-0.001*	0.000
Ehime	0.014	0.116	0.015	0.121	-0.001***	0.000	0.015	0.123	0.016	0.125	0.000	0.000
Kochi	0.013	0.113	0.014	0.117	-0.001***	0.000	0.014	0.117	0.014	0.119	0.000	0.000
Fukuoka	0.081	0.273	0.083	0.277	-0.002***	0.000	0.081	0.273	0.079	0.270	0.002***	0.001
Saga	0.007	0.084	0.008	0.090	-0.001***	0.000	0.006	0.078	0.007	0.086	-0.001***	0.000
Nagasaki	0.020	0.141	0.022	0.147	-0.002***	0.000	0.017	0.128	0.019	0.136	-0.002***	0.000
Kumamoto	0.016	0.127	0.019	0.137	-0.003***	0.000	0.017	0.131	0.020	0.141	-0.003***	0.000
Iota	0.018	0.133	0.018	0.131	0.000	0.000	0.020	0.140	0.019	0.137	0.001**	0.000
Miyazaki	0.013	0.115	0.015	0.122	-0.002***	0.000	0.012	0.107	0.012	0.110	-0.001*	0.000
Kagoshima	0.028	0.165	0.025	0.157	0.003***	0.000	0.024	0.153	0.024	0.152	0.000	0.000
Okinawa	0.014	0.119	0.010	0.101	0.004***	0.000	0.014	0.116	0.009	0.092	0.005***	0.000
Pseudo R-squared for estimating equation (A1)			0.005						0.005			

Note: See Table A2(A).