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Effects of reduced cost-sharing on children's health: Evidence from Japan



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ABSTRACT

Although childhood health status is widely recognized as an important determinant for future achievement and health, there are few studies on the impact of patient cost-sharing on children's health. This paper investigates whether reduced cost-sharing leads to an improvement of health status among preschool and school-age children in Japan, exploiting regional disparities in expansions of municipality-level subsidy programs for out-of-pocket expenditure. With the eligibility for this subsidy program, known as the Medical Subsidy for Children and Infants (MSCI), the coinsurance rate generally decreases from 30% or 20% to zero for outpatient health care services and drug prescriptions. In order to uncover the impact of this program, I conducted an original survey of all municipalities in Japan to understand the time-series evolution of the eligible age for the MSCI in October 2013 (weighted response rate = 75%), and the probability of being eligible for the MSCI was then calculated by the age, prefecture of residence, and year. These probabilities were matched to children's health data from the Comprehensive Survey of Living Conditions from 1995 to 2010. The results show that eligibility for the MSCI improves subjective measures of health status among preschool children ($n = 115,019$). However, I find no such improvement among school-age children ($n = 133,855$). In addition, MSCI eligibility does not reduce hospitalization among either preschool or school-age children. Taken together, this study finds no discernible effects on health among school-age children, suggesting recent rapid expansions of the MSCI for this age group have not been associated with the improvement of health status.

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1. Introduction

In the countries where universal health coverage has already been implemented, use of patient cost-sharing is a primary tool to contain health care expenditure. In fact, many high income countries increased their level of patient cost-sharing between 2000 and 2010 (Hossein and Gerard, 2013). However, our knowledge of the effect of such broad use of cost-sharing policy is not sufficient. In particular, several literature reviews consistently point out that the impact of patient cost-sharing on health is still uncertain (Baicker and Goldman, 2011; Goldman et al., 2007; Kiil and Houlberg, 2014). Thus far, most of what we know is from the RAND Health Insurance Experiment (Manning et al., 1987), which shows there was little difference in general health across various cost-sharing plans, but those experimental results from 30 years ago are not directly applicable to the situation today, especially to countries other than the United States. In addition, there are few studies on

the impact of patient cost-sharing on children's health. Since childhood health status is widely recognized as an important determinant for future achievement and health (Currie, 2009), making a new reliable evaluation is of particular importance.

With the fulfillment of these needs as a motivation, this paper presents new evidence on the impact of cost-sharing on children's health, exploiting recent local-level policy changes in Japan. In Japan, the national government sets the coinsurance rate for preschool children at 20% everywhere. However, local governments can reduce this amount at their own financial expense. This subsidy program, named Medical Subsidy for Children and Infants (MSCI, in Japanese: *Nyūyōji iriyōhi josei*), has been dramatically expanded in the last decade. Although the eligible age for the MSCI was under 2 years old in 97% of municipalities (sub-prefectural government) in 1998, roughly 50% of the municipalities expanded the eligibility to elementary-school-age children in 2010. With eligibility for the MSCI, the coinsurance rate decreases to zero or a very small amount in most municipalities. Regional diversity is also extensive. For example, municipalities in the Kanto region, which includes Tokyo

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prefecture, the capital of Japan, have rapidly extended the eligible age to over school-age since 2007, but many municipalities in the Kinki region, which is the second largest economic area in Japan, had restricted MSCI eligibility to preschool children by 2010.

The extensive regional diversity in the MSCI eligible ages provides plausible quasi-experiments that may uncover the causal effect of reduced cost-sharing on health. However, there have been few studies on the MSCI because no public organization had compiled comprehensive data on the MSCI until 2011. To overcome this difficulty, I conducted an original survey for all municipalities to gather data describing the precise system and time-series evolution of the MSCI from 1995 to 2012. The overall response rate is 55%, but the survey covers 75% of the population under 15 years old, as the response rate is higher in urban areas. Aggregating data at the prefecture level, the probabilities of being eligible for the MSCI were calculated for every child by age, year, and prefecture of residence. In the empirical analysis, these probabilities were matched to children's health data. The data used here are the Comprehensive Survey for Living Conditions (CSLC), which is a nationally representative sample of the Japanese population. Using these data, I investigate whether eligibility for the MSCI reduces the probability of having symptoms. I then examine the effects on hospitalization, as this may be prevented by reduced cost-sharing for outpatient care and drug prescription.

2. Prior literature

Before introducing the study strategy and results, a brief literature review of the impact of cost-sharing on health is presented. On this issue, many studies focus on the impact of patient cost-sharing for outpatient care and prescription drugs on later hospitalization and ER visits. As is mentioned in the review by Goldman et al. (2007), previous studies find that increasing (decreasing) patient cost-sharing for prescription drug is associated with an increase (decrease) of later adverse events among patients with diabetes (Mahoney, 2005), schizophrenia (Zeber et al., 2007), asthma (Karaca-Mandic et al., 2012), or high cholesterol levels (Goldman et al., 2006), although some studies find no effect on hospitalization among patients with acute myocardial infarction (Pilote et al., 2002) or depression (Wang et al., 2010). Studies on the elderly population are likely to find a significant substitution effect of the changes in cost-sharing in prescription drugs and outpatient care (Chandra et al., 2010; Tamblyn et al., 2001; Trivedi et al., 2010) because of the high prevalence of chronic conditions among this population.

However, these observational studies may suffer from several biases. Hence, results from randomized controlled trials are of particular importance even if their relevancy to today's environmental background is limited. Again, the most notable and important contribution on this issue is from the RAND HIE (Newhouse, 1993), which shows no causal effect of higher patient cost-sharing on later increases in health care expenditures. The RAND HIE also suggests that cost-sharing has no significant impact on children's subjective and physiologic measures of health (Valdez et al., 1985), although it would increase health care costs. In addition, Taubman et al. (2014) examine the effect of Medicaid eligibility on emergency department utilization in the Oregon Health Insurance Experiment (Oregon HIE) and show that Medicaid eligibility increases ER utilization, rejecting the view that generous health insurance could reduce emergency-department use and perhaps even total health care costs through improved access to primary care.

Among studies of the Japanese population, two recent papers have examined the effect of patient cost-sharing on health in the elderly population (Nishi et al., 2012; Shigeoka, 2014). Nishi et al.

(2012) show that reduction of cost-sharing at the age of 70 improves psychological distress through reduced out-of-pocket costs. Using a similar research design, Shigeoka (2014) finds no improvement in subjective health and mortality, although health care utilization increases. Finally, Bessho (2012) investigates the effects of MSCI eligibility on children's health. However the strategy exploited in Bessho (2012) is based on a cross-sectional framework and certainly suffers from several biases.

3. Institutional background

3.1. Medical subsidy for children and infants

In Japan, the national-level coinsurance rate is 30% for school-age children and 20% for preschool children, although the rate for the latter was reduced from 30% to 20% in 2008 by an initiative of the national government. Of course, the amount of out-of-pocket costs implied by these coinsurance rates is not low, compared with other developed countries such as the United Kingdom and Nordic countries, but the access to physicians is generally easy without any stringent gatekeeping. Consequently, use of public health care services may not be constrained severely, regardless of comparably high out-of-pocket costs. However, there have been persistent proponents to reduce these coinsurance rates further. The background to this movement is the declining birth rate and increasing child poverty rate. In Japan, the total fertility rate has been in decline over the last three decades, and the child poverty rate has increased since the mid-1990s (OECD, 2012). As the importance of solving these structural problems has been widely acknowledged, it has been argued that costs for children, especially those in low-income households, should be removed. Since health care costs for childhood illness are sometimes high especially during the preschool years, a reduction of coinsurance rates through the appropriation of local tax revenue has been supported in the local assembly. This local subsidy program is the MSCI.

In general, the MSCI system differs across municipalities in four aspects. First, municipalities can freely set the eligible age for the MSCI within their jurisdiction. For children older than the upper age limit, municipalities provide no benefits. Second, municipalities can restrict eligibility for children from high-income households. Third, municipalities can also choose the reimbursement method (in-kind transfer or refund). Finally, the amount of subsidy varies across municipalities. Some municipalities charge very small out-of-pocket costs for health care utilization to promote the "appropriate" use of pediatric services, whereas the copayment is rendered completely free in 54% of all municipalities (MHLW, 2013).

It is useful to check the geographical distribution of the eligibility criteria for the MSCI, based on newly published official data from the Ministry of Health, Labour and Welfare (MHLW, 2013). In Fig. 1, a map of Japan is color-coded according to the eligible age for the MSCI for outpatient care in each municipality. Light pink areas, which are concentrated in the northeast and southwest regions, indicate municipalities where the MSCI has been expanded to include all preschool children. In contrast, most of the municipalities in the central main island of Honshu are shown in light green, indicating expansions of the MSCI to include children up to 15 years of age.

3.2. Historical evolution of the MSCI

Although the maximum age of eligibility for the MSCI has been dramatically raised in the last decade, no comprehensive data were collected on the precise MSCI system before 2011. The MHLW has published the eligibility criteria of all municipalities as of 2011

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