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## Healthcare Services Accessibility of Children in the USA


### ABSTRACT

The increase in the number of children without insurance for health care services is an increasingly urgent issue in the United States. This and the recent trend toward managed care under public (Medicaid) and private insurances have contributed to widening the disparity in health conditions of children. Furthermore, problems with access to healthcare services affect actual utilization of those services that then influence health outcomes of children. We focus this study on the determinants that give rise and affect this widening healthcare services accessibility among children under 18 years in the USA: price of healthcare services, health insurance coverage, parent (or guardian's) education years, and pecuniary and non-pecuniary access costs to healthcare services.

The empirical study presented here uses data from *Community Tracking Study Household Survey 1996-1997* provided for public access use by the Center for Studying Health System Change: in particular, data on all children aged 0-17 was used for the analysis. This group was further subdivided into three cohorts: ages 0-5, ages 6-11, and ages 12-17. Our results suggest that the above-mentioned factors strongly determine the accessibility of healthcare services among children in the USA.

## I. Introduction

Better accessibility of healthcare services among households is a key in order to eliminate such health disparities among children in the United States (see *Healthy People 2010* by US Department of Health and Human Services, 2000). Regarding this accessibility, policy-makers often draw a distinction between access to and utilization of healthcare services. In particular, utilization of healthcare services is discussed in terms of the distribution of healthcare services according to the needs of individuals so as to shed light on the issues of horizontal and vertical equity (Culyer and Wagstaff, 1993; Gerdtham, 1997; Lie et al., 2002).

Disparity in the health of children is affected by at least two important aspects: the first is the individual's ability to produce or maintain the stock of (good) health (Grossman 1972[a]; Grossman 1972[b]) and the second is the degree of the accessibility of healthcare services. Especially with regard to the second aspect, which is the main issue in this study, accessibility to healthcare services depends on factors determined by individual choice as well as those that the individual can little influence. Access to healthcare services, such as the ability to seek better healthcare information, is an important factor that affects individual health disparities (Hsieh and Lin, 1996; Grossman, 2000; Tu and Hargraves, 2003). Also, access costs in terms of pecuniary and time costs are also factors that influence the amount of healthcare services utilization by the individual (Valdez, Banerjee, Ackerson and Fernandez, 2002). Similar to the ease of access, the choice of private insurance to cover costs of healthcare services is another controllable factor by the individual but the choice of the public health system is not. Both types of health insurances however, influence the degree of the health disparity among children.

The accessibility of healthcare services for an individual is defined to be the availability of private and public health insurances, the ability to procure and use information, and other socio-economic and demographic characteristics of the individual that influence the preceding two factors. The differences in these factors widen the disparity in health among children under the current mixed US healthcare system, while the continuing trend of high-cost healthcare services affects the affordability of healthcare services among households that consequently causes disparity in the health of children.

More specific questions posed in this study are: (1) does public policy, such as Medicaid, play an effective role in reducing health disparity among children under 18 years old in the USA? (2) Are the prices of healthcare services and access costs to healthcare services for children major determinants of this health disparity? Finally, (3) how important are the years of education of the primary guardian (parents/parent) in determining health disparities among children?

In the remainder of this study, we will strive to provide answers and insights regarding these enquiries. Section II presents a basic theoretical framework to evaluate effects of access costs to healthcare services. In section III, we present the empirical results, followed by the summary and conclusion of this study in section IV.

## II. Theoretical Framework

### 2—1 Accessibility of Healthcare Services

This section presents the theoretical framework of the analysis of the utilization of healthcare services $HSU$ by children, i.e., the household demand for healthcare services by children. The degree and intensity of utilization of healthcare services by children is largely affected by access costs to healthcare services.[1]

First, we assume a typical household has the following additively separable utility function:[2]

(1) $U = U(X_C) + U(\overline{H})$,

where $U(\cdot)$ is twice differentiable in the arguments in the parenthesis such that $U' > 0$ and $U'' < 0$; $X_C$ is a vector of market consumption goods excluding services of healthcare and health insurance; and $\overline{H}$ is the average health status of household members. In order to avoid any complication, we assume $\overline{H}$ is the average health status of children in the household and is a function of healthcare services utilized by children $HSU$.[3]

The inputs to produce $HSU$ can be written in the following form (Becker, 1965):

(2) $T_{HSU} \equiv t_{HSU}(E) \cdot HSU$, and

(3) $HS_{HSU} \equiv a_{HSU}(E) \cdot HSU$,

where $t_{HSU}(E) > 0$ and $a_{HSU}(E) > 0$ are the respective input-coefficients of time and market goods per unit of $HSU$, and both input-coefficients are inversely related to the

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[1] Although we may not always specify who makes use of healthcare services, in this paper, it is implicitly defined to be the children.

[2] For brevity, we omit the subscript $i$ to represent a particular household.

[3] In this formulation, healthcare service utilization is exogenous to average health status. However, if an individual health stock declines due to illness, the individual will increase health investment, for instance, purchasing more healthcare services to maintain or restore the health stock (Grossman, 1972[a] and 1972[b]). The simultaneity problem is not fully incorporated in our theoretical model.

years of education of the primary guardian $E$: $\frac{\partial t_{HSU}}{\partial E} < 0$ and $\frac{\partial a_{HSU}}{\partial E} < 0$.[4]

In equation (2), $T_{HSU}$ is total time spent on healthcare service utilization by children, which includes time spent collecting information on healthcare services, time spent on waiting for one's turn at hospitals and clinics, and time consumed with actual healthcare service utilization.[5] Let $\Omega$ be defined as the household's total hours per period such as $\Omega = T_{HSU} + T_H + T_W$, where $T_H$ is the husband's total hours of work in the labor market per period and $T_W$ is the wife's total hours of work per period.[6] $HS_{HSU}$ in equation (3) is a subset of market goods $X$ and includes preventive and treatment healthcare services as well as health insurance $HIN$: $HS_{HSU} \in X$ and $HIN \in HS_{HSU}$.

Let us define the household full-income constraint as

(4) $X_C + [w \cdot t_{HSU} + (1-\theta) \cdot p_{HS} \cdot a_{HSU}]HSU = NY + w\Omega$,

where $X_C \in X$; $HS_{HSU} \notin X_C$; a unit price of $X_C$ is set as the numeraire; $w$ is wage rate per unit of time;[7] $p_{HS}$ is a unit price of healthcare service $HS_{HSU}$; $\theta$ is a proportion of healthcare service costs covered by health insurance and if $\theta = 0$, parents have no insurance coverage for healthcare service costs; and $NY$ is non-labor income. In equation (4), $w \cdot t_{HSU} + (1-\theta) \cdot p_{HS} \cdot a_{HSU} \equiv P_{HSU}$ is the shadow price of healthcare service utilization.

Since the household utility function is additively separable, we give emphasis on the second term of the household utility function specified in equation (1), which we simplify into a household utility function containing only healthcare service utilization,

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[4] According to Tu and Hargraves (2003), education is the key to explaining differences in health information gathering among people. Also, education is related to health knowledge (Grossman, 2000).

[5] Children can collect healthcare information on their own time through friends at school. We however assume that their parents are more efficient (and hence, specialize) in collecting information on healthcare services than children since the latter specializes on study at school. Therefore, a parent's time is considered in the time constraint in order to make the operation in our model simple.

[6] The time constraint in the household is narrowly defined by excluding other household production activities to avoid unnecessary complications, and in order to focus on the household behavior of collecting healthcare service information.

[7] $w$ is a weighted average of parents' wage rates per unit time.

(5) $V = V(HSU)$,

where $V_{HSU} = \dfrac{\partial V}{\partial HSU} > 0$ and $\dfrac{\partial V_{HSU}}{\partial HSU} = \dfrac{\partial^2 V}{\partial HSU^2} < 0$;

and

(6) $[w \cdot t_{HSU} + (1-\theta) \cdot p_{HS} \cdot a_{HSU}]HSU = P_{HSU} \cdot HSU = \gamma[NY + w \cdot \Omega]$

We assume the household expenditures on $HSU$ to be a proportion of the household full-income, $\gamma[NY + w\Omega]$, where $0 < \gamma < 1$.

The household maximizes the new utility function $V$ subject to the new household full-income constraint given in equation (6). From the maximization problem, we arrive at the following equilibrium condition:

(7) $MRS \equiv \dfrac{V_1}{V_2} = \dfrac{w}{(1-\theta)p_{HS}} = \dfrac{a_{HSU}(E)}{t_{HSU}(E)} \equiv MRTS$,

where $V_1 \equiv \dfrac{\partial V}{\partial HSU}\dfrac{\partial HSU}{\partial T_{HSU}}$ and $V_2 \equiv \dfrac{\partial V}{\partial HSU}\dfrac{\partial HSU}{\partial HS_{HSU}}$.

The equilibrium condition shows that the marginal rate of substitution in consumption $MRS$ must equal the input price ratio of healthcare service utilization, which, in turn, must equal the marginal rate of technical substitution $MRTS$. Furthermore, we have the Jacobian $|J| > 0$ from the second order condition as,[8]

(8) $$|J| = \begin{vmatrix} 0 & -w & -(1-\theta)p_{HS} \\ -w & V_{11} & V_{12} \\ -(1-\theta)p_{HS} & V_{12} & V_{22} \end{vmatrix} > 0 \ ,$$

where $V_{11} = \dfrac{\partial V_{HSU}}{\partial HSU}\left(\dfrac{1}{t_{HSU}}\right)^2 < 0$, $V_{12} = V_{21} = \dfrac{\partial V_{HSU}}{\partial HSU}\left(\dfrac{1}{a_{HSU}t_{HSU}}\right) > 0$, and

$V_{22} = \dfrac{\partial V_{HSU}}{\partial HSU}\left(\dfrac{1}{a_{HSU}}\right)^2 < 0$.

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[8] The Jacobian $|J|$ has the same value of the bordered Hessian $|\overline{H}|$, but the latter has $w$ and $(1-\theta)p_{HS}$.

**2-2 Comparative Static Analysis**

In this section, we analyze the effects of changes in parameter on the demand for healthcare service utilization $HSU$ by children in a household with special emphasis on the costs of accessibility to healthcare services: insurance coverage, price of healthcare services, and costs of information.

First, we examine the effect of a change in non-labor income $NY$ on the demand for $HSU$:

$$(9)\quad \frac{\partial HSU}{\partial NY} = \frac{-\gamma}{a_{HSU}|J|}[-wV_{21} + (1-\theta)p_{HS}V_{11}] > 0,^{9}$$

where $a_{HSU} \equiv a_{HSU}(E)$. Hence, disparities in health status among children in a society widen due to increases in the non-labor income differentials of households in the society. Valdez, Banerjee, Ackerson and Fernandez (2002) present a different formulation: they find that if a low-income person has a greater marginal utility of income than a high-income person, access costs to healthcare services of the former is greater than the latter. Therefore, accessibility of healthcare services by the low-income person will be more restricted than the high-income one. However, an increase in the wage rate of parents $w$, which is the opportunity cost of time, will not exacerbate the health status disparity if the income effect dominates the substitution effect.[10]

Second, we evaluate how accessibility to healthcare services affects healthcare service utilization by children. In the preceding formulation of equation (4), there are two parameters reflecting the degree of ease of access: the first is an insurance coverage $\theta$ for healthcare costs and the other is the time involved in accessing healthcare service, such as traveling time and waiting time at hospitals and clinics. The pecuniary-cost effect of an increase in health insurance coverage will increase the demand for healthcare service utilization:

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[9] In this case, we are holding the marginal rate of substitution between $T_{HSU}$ and $HS_{HSU}$, which implies the relative price of inputs $\frac{w}{(1-\theta)p_{HS}}$ being constant.

[10] The income effect is $\{T_{HSU}[-wV_{21} + (1-\theta)p_{HS}V_{11}]/D\} < 0$ and the substitution effect is $[\lambda w(1-\theta)p_{HS}/D] > 0$, where $D = a_{HSU}|J| > 0$.

$$(10)\quad \frac{\partial HSU}{\partial \theta} = \frac{p_{HS}}{a_{HSU}|J|}[\lambda w^2 - HS_{HSU}(-wV_{12} + (1-\theta)p_{HS}V_{11})] > 0.$$

Therefore, a household with a more generous health insurance will provide better healthcare services to children in the household; this will thus contribute to widening the inequality of accessibility to healthcare services by children between households with health insurance and those without. This also implies that a provision of subsidized healthcare service at schools for children in relatively poor households will improve accessibility. In this sense, Medicaid is one of the effective public policies to reduce health disparity among children. On the other hand, an increase in the unit price of healthcare service $p_{HS}$ lowers the quantity demanded for healthcare service utilization for all children, i.e., $\frac{\partial HSU}{\partial p_{HS}} < 0$. But, it is more severe for children with no health insurance than those with, since $\theta = 0$ for the former. Hence, the degree of accessibility of healthcare services, and also, health disparity among children with and without health insurance will widen.[11]

On the other hand, the effects of changes in the coverage $\theta$ and the wage rate $w$ on $T_{HSU}$, such as collecting healthcare service information, traveling to hospitals, and waiting for one's turn in the hospital, depend on the net strength between the positive income and negative substitution effects. If accessibility of healthcare services for children in the households without health insurance is limited by $\theta = 0$, lowering time costs of access to healthcare services is an option for public policies. For example, public policies on disseminating information on healthcare services and publicizing the location of healthcare service providers within the neighborhood will narrow the inequality of accessibility to healthcare services and consequently health disparities among children if the costs of information are not negligible.

Finally, we examine the effect of the parent's education $E$ on healthcare service utilization. The effect of this on healthcare service utilization $HSU$ depends on how much a parent's education affects the input-coefficients of time $t_{HSU}(E)$ and

[11] For children with health insurances, the income effect is $\{HS_{HS}[-wV_{12} + (1-\theta)p_{HS}V_{11}]/a_{HSU}D\} < 0$ and the substitution effect is $-\lambda(1-\theta)w^2 < 0$.

market goods $a_{HSU}(E)$ per unit of $HSU$:

$$(11)\quad \frac{\partial HSU}{\partial E} = \frac{w\cdot(1-\theta)p_{HS}\cdot V_{HSU}\cdot\Psi}{a_{HSU}t_{HSU}\cdot E\cdot|J|}(-\varepsilon_a+\varepsilon_t) = \Pi(-\varepsilon_a+\varepsilon_t),$$

where $\Psi = \frac{HUS}{E}\left(\frac{\partial \ln V_{HSU}}{\partial \ln E}\right)+1>0$ since $\frac{\partial V_{HSU}}{\partial E}>0$ is assumed;

$$\Pi = \frac{w\cdot(1-\theta)p_{HS}\cdot V_{HSU}\cdot\Psi}{a_{HSU}t_{HSU}\cdot E\cdot|J|}>0;\quad \varepsilon_a \equiv \frac{\partial \ln a_{HSU}}{\partial \ln E}<0;\text{ and }\quad \varepsilon_t \equiv \frac{\partial \ln t_{HSU}}{\partial \ln E}<0.$$

Therefore, the sign of equation (11) depends on the education elasticity of market-goods inputs $\varepsilon_a$ and that of time inputs $\varepsilon_t$. If $\varepsilon_a$ is greater than $\varepsilon_t$ in absolute value, the demand for healthcare service utilization increases. The expression in equation (11) is also expressed as,

$$(12)\frac{\partial HS_{HSU}}{\partial E} = \frac{w\cdot(1-\theta)p_{HS}\cdot V_{HSU}\cdot\Psi}{t_{HSU}\cdot E\cdot|J|}(-\varepsilon_a+\varepsilon_t) = a_{HSU}\Pi(-\varepsilon_a+\varepsilon_t);\text{ and}$$

$$(13)\frac{\partial T_{HSU}}{\partial E} = -\frac{w\cdot(1-\theta)p_{HS}\cdot V_{HSU}\cdot\Psi}{a_{HSU}\cdot E\cdot|J|}(-\varepsilon_a+\varepsilon_t) = -t_{HSU}\Pi(-\varepsilon_a+\varepsilon_t).$$

The results from equations (12) and (13) indicate that if parents are more efficient in using market goods and services relative to time inputs for healthcare service utilization, the demand for market goods such as healthcare services and health insurance will rise, while reducing time inputs. These results imply that a government policy aimed at reducing the inequality of accessibility, i.e., health disparities, among children may be attained by the provision of education to parents, and also to their children, if policy makers correctly understand the effects of education on the access, use and outcome of healthcare service utilization.

In the above comparative static analyses, we have shown how accessibility of healthcare services affects the utilization among children. In the following section, we examine if reality supports those theoretical predictions. By using data from *Community Tracking Study Household Survey, 1996-1997: [United States]*, we analyzed the behavior of healthcare service utilization among children of ages 0 to 17 years old (with a total observation of 10640). The dependent variable DRVISNX is the number of times within

the last 12 months the person had seen the doctor on an outpatient basis and the Tobit model is used to analyze the healthcare service utilization.[12]

[12] Variable descriptions and statistics are reported in Table 1.

## III. Empirical Results

The results show that a substantial number of variables are statistically significant and robust, although a few variables show signs that contradicted the hypotheses. Table 2 presents the complete regression results. We find that the major factor inducing healthcare service utilization is the price of healthcare services (MEDCOST), whose result (-0.0028) is statistically robust and applies to the entire sample. The estimated price elasticity is -0.07 and is inelastic.[13]

Parent education (HIGRADX_P), which is a proxy for efficiency in collecting healthcare information, implying time allocation to access healthcare services for their children, is positive (0.0523) and highly significant for the entire sample. This variable is highly significant for children aged 0~5 years while insignificant for older children. Parent education plays an important role in the decision regarding healthcare utilization for young children (Hsieh and Lin, 1996; Tu and Hargraves, 2003); but the more the children are independent of their parents, the less important the parent's efficiency is.

Annual family income (CESINCX) positively influences healthcare service utilization (0.0060): the estimated income elasticity is 0.09 for the entire sample, while it is 0.07 for children of both 0~5 and 6~11 age groups and 0.13 for the 12~17 group. It follows that healthcare service utilization is a necessary good among children.

Another robust factor positively influencing the amount of healthcare service utilization is whether the individual has a usual place to visit when sick or in need of healthcare services (USCARE): this variable is highly significant for all age groups. This means that a family doctor system is highly effective in promoting health utilization. In other words, if the individual has no family doctor, health disparity due to the lack of accessibility relative to a counterpart with a family doctor widens. Publicizing and promoting accessibility to doctors within neighborhoods may be one of the policy strategies to narrow the health disparity among children.

In contrast, the results show that health insurance-related factors are relatively weak in determining healthcare service utilization among children. Of the results shown

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[13] $-0.07 \cong -0.0028\left(\frac{83.276}{3.3030}\right)$. For other age groups, the price elasticity is -0.08 for the 0~5 and 6~11 age groups, and it is -0.05 for the 12~17 age group.

in Table 2 for the entire sample, among the statistically significant insurance variables are private insurance coverage that requires referrals (PVREF1P) and Medicaid requiring referrals (MCDREFP): both have positive effects on healthcare service utilization. Medicaid has a strong influence on the utilization. On the other hand, insurance plans that require sign-up with particular doctors have little effect in determining healthcare service utilization, regardless of coverage type (PVSIG1P and MCDSIGP). This implies that such types of insurance which limit individual discretionary choice of doctors seems less preferable than those do not; hence, the individual tends to avoid seeing doctors, i.e., not utilize healthcare services.[14]

In order to evaluate ease of access to healthcare services, variables that reflect this aspect were included, for instance the variable PUTOFR2 (accept health insurance) through PUTOFR16 (availability of transportation). All of these variables turn out to have significant results for children between 6 and 11 years old. Some appear to be significant in other age groups. For example, PUTOFR3 (health plan cover costs), PUTOFR4 (doctor appointments are obtained) and PUTOFR6 (short traveling time) are highly significant for the entire sample and for children between 0 and 5 years old. These results impart important information: accessibility to healthcare service is the major determinant for promoting health among children.

In addition to the above factors representing the accessibility to healthcare services, we examined how attitudes by doctors to patients influence healthcare utilization among children and found these also strongly affect the amount of healthcare service utilization by children, such as LSTLISN (doctor listens well) and LSTEXPL (doctor explains well). DRNOREF_P (doctor does not give referrals) and DRINFLU_P (doctor is influenced by insurance policy) are also positively significant for results for all children of ages 0 to 17, while some of these variables are not significant for other

[14] Since we suspect that the relative weak effects of the insurance variables might be due to other variables describing types of private and public insurances, we estimated a regression without those health-insurance related variables, i.e., deleting the variables of PUTOFR2 through DRUNNEC_P in Table 2, the variables on MCDSIGP (Medicaid requires sign-up for particular doctor) and MCDHMOP (HMO) became statistically highly significant at the 5 percent significance level in addition to the significant variables of PVREF1P and MCDREFP. Thus, we can't reject that Medicaid is an important determinant in healthcare service utilization among children.

age groups. The positive result on DRNOREF_P is a little puzzling unless we suspect some induced demand. The supply side of healthcare services also seems to influence healthcare service utilization among children. That DRUNNEC_P (doctor performs unnecessary tests or procedures) have insignificant results for all age groups is easy to understand since children (and their parents) will not choose such doctors.

Other variables included pertain to socio-demographic characteristics of the individual and household. Among these, two noteworthy results are the negative effects on the healthcare service utilization among children of MARRIEDHOUSE (married couples with children) and NKID_P (the number of children in the household). The effect of the former may be considered as a sign of higher productivity in health promotion for children by the parents in the household. Using the same line of reasoning, it can be argued that households with more children may face lower costs in health production due to positive externalities. On the other hand, one can also argue that the effect is actually the opposite such that the more children the household has the less chance for all of the household's children to access healthcare services.

## IV. Summary and Conclusion

The widening disparity of health outcomes among children in the United States, in part worsened by the increase in the number of health uninsured children, is an urgent problem. This situation affects healthcare services utilization of children, which in turn strongly determines detrimentally the gaps in the health status among children. This study has theorized that utilization of healthcare services is the process that impacts the accessibility among children; accessibility of healthcare services is defined to be the availability of private and public health insurances, out-of-pocket costs for healthcare services, the ability to procure and use information, and other socio-economic and demographic characteristics of the individual that influence the preceding two factors. In order to empirically test how accessibility of healthcare services affects the utilization among children, we analyzed the behavior of healthcare service utilization among children of ages 0 to 17, using data from *Community Tracking Study Household Survey, 1996-1997: [United States]* and applied a Tobit model for the analysis.

Among a number of statistically significant and robust explanatory variables, the major factors found to induce healthcare service utilization are the price of healthcare services, aspects of the health insurance coverage type, education years of the parent or guardian, and costs incurred while trying and actually accessing healthcare services. Medicaid is found to be also important in promoting health access among children. Equally noteworthy are the price and income elasticities. The price elasticity of healthcare services is found to be inelastic, which ranges from -0.05 to -0.08, for all the age groups. In addition, income elasticity is also found to be inelastic for all the age groups as well: the estimated income elasticity ranges from 0.07 to 0.13, indicating that healthcare services is a necessary good for children.

Variables reflecting accessibility, like short traveling time, health plan coverage, accessibility of a doctor, transportation, health plan recognition at various healthcare places, also strongly determine healthcare services utilization. Furthermore, qualitative evaluation of the attending doctor is shown to be an important determinant of healthcare use: for instance, if an individual's doctor listens well or explains well, the individual is more inclined to have more healthcare services.

Although accessibility has many facets, ease of access to healthcare services is the core determinant that gives rise to the disparity of health outcomes among children in US. The different factors that affect and influence this accessibility, however, also imply the means by which we can close that gap. If policy-makers focus on promoting easier access to healthcare services, it will be an effective step in addressing and resolving health disparity among children.

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Table 1 continued.

| Variable | Variable Description | Age 0-17 (Obs=10640) Mean | S.D. | Age 0-5 (Obs=3531) Mean | S.D. | Age 6-11 (Obs=3327) Mean | S.D. | Age 12-17 (Obs=3782) Mean | S.D. |
|---|---|---|---|---|---|---|---|---|---|
| drnoref_p | Agree with statement that one's doctor may not be giving referrals to other doctors: dummy | 0.132 | 0.339 | 0.132 | 0.339 | 0.131 | 0.338 | 0.132 | 0.339 |
| drinflu_p | Agree with statement that one's doctor may be highly influenced by the insurance policy rules: dummy | 0.394 | 0.489 | 0.404 | 0.491 | 0.396 | 0.489 | 0.382 | 0.486 |
| drunnec_p | Agree with the statement that one's doctor may be performing unnecessary tests: dummy | 0.105 | 0.307 | 0.113 | 0.316 | 0.099 | 0.299 | 0.103 | 0.304 |
| genhlh | Personal evaluation that one's own health is good: dummy | 0.883 | 0.321 | 0.883 | 0.322 | 0.885 | 0.32 | 0.882 | 0.323 |
| sex | Dummy variable for gender: male=1 | 0.51 | 0.5 | 0.513 | 0.5 | 0.504 | 0.5 | 0.512 | 0.5 |
| hispanic | Dummy variable for Hispanic ethnicity | 0.113 | 0.316 | 0.13 | 0.336 | 0.111 | 0.314 | 0.098 | 0.298 |
| angloam | Dummy variable for Anglo-Saxon ethnicity | 0.733 | 0.442 | 0.703 | 0.457 | 0.737 | 0.44 | 0.759 | 0.428 |
| afroam | Dummy variable for African-American ethnicity | 0.144 | 0.351 | 0.15 | 0.357 | 0.146 | 0.353 | 0.137 | 0.344 |
| marriedhouse | Dummy variable for households with married couples and children | 0.689 | 0.463 | 0.696 | 0.46 | 0.667 | 0.471 | 0.701 | 0.458 |
| agex_p | Age of the guardian/parent of the child | 36.993 | 8.567 | 31.633 | 7.591 | 36.864 | 7.257 | 42.112 | 7.302 |
| nkid_p | The number of children the guardian/parent has | 1.856 | 0.932 | 1.773 | 0.872 | 2.039 | 0.977 | 1.772 | 0.922 |
| citydummy | Person lives in a metropolitan area with more than a 200,000-population: dummy | 0.85 | 0.357 | 0.857 | 0.35 | 0.86 | 0.347 | 0.835 | 0.371 |

Table 2: Tobit Estimation Results for All Age Groups and Sub-groups (Dependent Variable: drvisnx)

| | 0~17 years old (n=10,640) | | | 0~5 years old (n=3,782) | | | 6~11 years old (n=3,327) | | | 12~17 years old (n=3,531) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ind. Variables | Coefficient | t-statistics | P>\|t\| | Coefficient | t-statistics | P>\|t\| | Coefficient | t-statistics | P>\|t\| | Coefficient | t-statistics | P>\|t\| |
| medcost | -0.0028 | -12.260 | 0.000 | -0.0050 | -10.160 | 0.000 | -0.0027 | -6.960 | 0.000 | -0.0014 | -4.500 | 0.000 |
| higradx_p | 0.0523 | 3.030 | 0.002 | 0.0649 | 2.040 | 0.042 | -0.0043 | -0.140 | 0.885 | 0.0131 | 0.490 | 0.624 |
| cesincx | 0.0060 | 4.610 | 0.000 | 0.0075 | 3.220 | 0.001 | 0.0038 | 1.750 | 0.081 | 0.0066 | 3.210 | 0.001 |
| pvsig1p | 0.0368 | 0.310 | 0.759 | 0.1486 | 0.660 | 0.506 | -0.0541 | -0.270 | 0.787 | 0.0339 | 0.180 | 0.855 |
| pvref1p | 0.1872 | 1.660 | 0.098 | 0.1216 | 0.580 | 0.565 | 0.1584 | 0.840 | 0.400 | 0.3068 | 1.750 | 0.081 |
| pvhmo1p | 0.0237 | 0.210 | 0.831 | 0.1851 | 0.910 | 0.362 | 0.1375 | 0.730 | 0.467 | -0.2018 | -1.170 | 0.242 |
| medsigp | 0.3308 | 1.490 | 0.136 | 0.1949 | 0.630 | 0.532 | 0.4734 | 1.160 | 0.245 | -0.2159 | -0.410 | 0.681 |
| medrefp | 0.8500 | 3.810 | 0.000 | 1.0788 | 3.350 | 0.001 | 0.5823 | 1.480 | 0.140 | 0.6428 | 1.250 | 0.210 |
| medhmop | 0.3856 | 1.580 | 0.115 | -0.0050 | -0.010 | 0.989 | 0.4604 | 1.090 | 0.278 | 0.7908 | 1.490 | 0.137 |
| uscare | 2.2413 | 10.840 | 0.000 | 3.2950 | 7.740 | 0.000 | 2.0628 | 5.570 | 0.000 | 1.5235 | 5.330 | 0.000 |
| putofr2 | -0.1192 | -0.260 | 0.798 | 0.1831 | 0.210 | 0.833 | -1.8757 | -2.160 | 0.031 | 0.3697 | 0.550 | 0.583 |
| putofr3 | 1.1484 | 3.080 | 0.002 | 1.5088 | 1.840 | 0.066 | 2.3251 | 3.720 | 0.000 | 0.6973 | 1.330 | 0.183 |
| putofr4 | 1.5324 | 4.690 | 0.000 | 2.3390 | 3.880 | 0.000 | 1.2956 | 2.530 | 0.012 | 1.1102 | 2.020 | 0.043 |
| putofr6 | 1.5792 | 3.080 | 0.002 | 2.5965 | 2.620 | 0.009 | 1.4883 | 1.900 | 0.058 | 0.9750 | 1.150 | 0.249 |
| putofr16 | 1.7993 | 1.550 | 0.120 | -1.3308 | -0.640 | 0.522 | 3.9609 | 1.890 | 0.059 | 3.0661 | 1.740 | 0.082 |
| lstlisn | 1.2473 | 6.450 | 0.000 | 0.8338 | 2.530 | 0.011 | 0.9331 | 2.670 | 0.008 | 1.7959 | 5.810 | 0.000 |
| lstexpl | 2.9264 | 14.850 | 0.000 | 2.3374 | 6.800 | 0.000 | 3.4300 | 9.680 | 0.000 | 2.2831 | 7.350 | 0.000 |
| drnoref_p | 0.2210 | 1.880 | 0.060 | 0.0943 | 0.450 | 0.653 | 0.3518 | 1.770 | 0.077 | 0.1864 | 0.990 | 0.321 |
| drinflu_p | 0.1410 | 1.730 | 0.084 | 0.1898 | 1.300 | 0.194 | 0.1862 | 1.350 | 0.177 | 0.1374 | 1.050 | 0.294 |
| drunnec_p | 0.0405 | 0.310 | 0.753 | 0.1401 | 0.620 | 0.533 | -0.3258 | -1.460 | 0.144 | 0.0078 | 0.040 | 0.970 |
| genhlh | -0.1455 | -1.250 | 0.213 | -0.1525 | -0.730 | 0.467 | -0.0922 | -0.470 | 0.638 | -0.1611 | -0.870 | 0.387 |
| sex | -0.0822 | -1.090 | 0.274 | -0.0621 | -0.460 | 0.645 | 0.0829 | 0.660 | 0.512 | -0.2738 | -2.290 | 0.022 |
| hispanic | -0.1461 | -0.970 | 0.330 | 0.0736 | 0.280 | 0.782 | -0.3985 | -1.590 | 0.112 | -0.2894 | -1.170 | 0.241 |
| angloam | -0.0482 | -0.340 | 0.734 | 0.0972 | 0.400 | 0.692 | -0.0746 | -0.310 | 0.755 | 0.0712 | 0.300 | 0.767 |
| afroam | -0.7005 | -4.080 | 0.000 | -0.4847 | -1.630 | 0.103 | -0.5513 | -1.900 | 0.057 | -0.9136 | -3.200 | 0.001 |
| marriedhouse | -0.5476 | -5.850 | 0.000 | -0.4493 | -2.570 | 0.010 | -0.5770 | -3.720 | 0.000 | -0.8468 | -5.700 | 0.000 |
| agex_p | -0.0555 | -12.080 | 0.000 | -0.0348 | -3.630 | 0.000 | -0.0099 | -1.090 | 0.277 | -0.0118 | -1.360 | 0.175 |
| nkid_p | -0.3239 | -7.860 | 0.000 | -0.2685 | -3.350 | 0.001 | -0.2200 | -3.280 | 0.001 | -0.2096 | -3.090 | 0.002 |
| citydummy | 0.2300 | 2.100 | 0.035 | 0.0425 | 0.210 | 0.831 | 0.3165 | 1.670 | 0.095 | 0.2677 | 1.590 | 0.111 |
| _cons | -0.2647 | -0.680 | 0.496 | -0.7322 | -1.030 | 0.303 | -1.9197 | -2.780 | 0.005 | -1.0860 | -1.690 | 0.091 |
| LR chi2(29) | 3,092.76 | Prob>chi2 | [0.000] | 622.21 | Prob>chi2 | [0.000] | 1,063.66 | Prob>chi2 | [0.000] | 1,156.86 | Prob>chi2 | [0.000] |
| Pseudo R2 | 0.0575 | | | 0.0323 | | | 0.0662 | | | 0.0651 | | |
| Log likelihood | -25,358.47 | | | -9,305.99 | | | -7,496.53 | | | -8,309.75 | | |
| Left-censored n at drvisnx<=0 | | | 1791 | | | 281 | | | 651 | | | 859 |