Excellus Health Plan, Inc.

Income and the Use of Outpatient Medical Care by the Insured
Author(s): Joel W. Kovner, L. Brian Browne and Arnold I. Kisch
Source: *Inquiry*, Vol. 6, No. 2 (June, 1969), pp. 27-34
Published by: Excellus Health Plan, Inc.
Stable URL: http://www.jstor.org/stable/29770536
Accessed: 30/04/2013 13:58

Joel W. Kovner
L. Brian Browne
Arnold I. Kisch, M.D.

Income and the Use of Outpatient Medical Care by the Insured

For present and future health planning, both governmental and voluntary, the determination of whether a relationship exists between income and the use of outpatient medical services for the insured is most important. If use is related to income, the organization and administration of delivery systems for outpatient care should reflect awareness of such a fact. Many studies have thoroughly examined the relationship between income and the use of ambulatory care for populations consisting of both insured and uninsured persons. None, however, has precisely or extensively investigated the relationship between income and use for insured populations only; it is the purpose of this paper to present such an analysis.

Previous Studies

The studies that have analyzed the relationship between income and the use of outpatient medical services for populations consisting of both the insured and uninsured have reached essentially similar conclusions. On a nationwide basis, the National Health Survey[1] indicates a positive relationship between income and use. For the state of Michigan, McNerney, et al.,[2] present similar findings. In a more precise manner, Stigler[3] has pointed out that the income elasticity of demand (the percentage change in the quantity of medical services taken by buyers associated with a 1 percent change in income) is less than one for physician services, but nevertheless positively dependent. He further concludes that the income elasticity appears to increase as income levels increase. Paradiso[4] presents essentially similar results, but implies that the elasticity is greater than one. Paul Feldstein[5] also opts for positive dependence but sets the elasticity at 0.6. For insured populations only, there are several studies[6, 7] that have considered the relationships between use and various demographic parameters; however the relationship between use and incomes has, with one exception, not been investigated. The empirical study by Darsky, et al.,[8] on Windsor Health Services does present data on income versus per capita use for the insured only. However, income is not considered in its most sensitive form, per capita income; and use is in terms of the number of physician office and home visits, an aggregation that could hide many substantial relationships (e.g., the use of preventive services versus income). Additionally, and unfortunately, although the Darsky data would allow one to conclude that there seems to be a trend between increasing income and decreasing per capita use of physician home and office visits, the relationship is neither extensively considered nor quantified.

Joel W. Kovner, Dr. P.H. is Health Plan Economist, Kaiser Foundation Health Plan, Southern California Region, and Lecturer, School of Public Health, University of California at Los Angeles. L. Brian Browne, M.A. is Public Administrative Analyst, School of Public Health, and Arnold I. Kisch, M.D. is Assistant Professor of Preventive Medicine, School of Medicine, UCLA.

27

Methodology of the Present Study

The Study Populations

Two populations served as the data bases for this study: 1) longshoremen and their dependents in Stockton, California, and 2) employees of the Los Angeles Department of Water and Power and their dependents. Within these populations, the segments selected for study were the longshoremen covered under the health plan offered by the San Joaquin Foundation for Medical Care, and the employees of the Department of Water and Power enrolled with the Ross-Loos Medical Group. Among the longshoremen in Stockton there were approximately 500 subscribers to the health plan. All of these, together with insured dependents, were included in the study. In Los Angeles, a study group was selected by random sampling within a much larger population.

The two health insurance plans represented in this study, the Ross-Loos Medical Group and the San Joaquin Foundation for Medical Care, have both been extensively described in the literature.[9, 10] Both offer comprehensive coverage with the quality of insured care monitored through a continuing audit program. Ross-Loos provides services through a multispecialty group practice of physicians located in a large home office and in 13 branch offices throughout the Los Angeles area. The plan serves a population of about 140,000 subscribers and dependents.

The San Joaquin Foundation, sponsored by the San Joaquin County Medical Society, provides services through physicians primarily in a solo or single specialty practice setting. There are approximately 300 affiliated physicians (representing over 95 percent of the members of the County Medical Society). A population of approximately 100,000 persons, covered by a variety of health insurance contracts, receives care through the Foundation.

An attempt was made to interview each health plan subscriber in the study populations: 426 interviews were completed in Los Angeles; 282 in Stockton. For the 395 subscribers in Los Angeles and the 264 subscribers in Stockton who gave permission, both their own and their dependents' medical records at the respective health plan were reviewed to ascertain the total quantity of insured services received by each individual in the period July 1, 1966 to June 30, 1967. In all, 1,025 records were examined in Los Angeles; 858 in Stockton.

In interviewing the subscribers, questions relating to the total dollar expenditures for insured services were asked, as well as questions on family size and income.

Because of the wide differences in the demographic characteristics of the two populations and in the respective medical care delivery systems, the Ross-Loos and Stockton populations will be considered separately.

Quantification of the Variables

Although many previous studies have considered income in terms of family income, the most sensitive measure of disposable income streams is per capita income; hence, income will be in terms of per capita income. For the San Joaquin population, per capita income ranged from $0 to $17,000; for the Ross-Loos group, the range was $72 to $45,000.

Where the data permitted, outpatient medical care was measured by a system developed by one of the authors (JWK).[11] It was felt that such an analysis was preferable to other indices presently applied because of its specificity.

Kovner disaggregates ambulatory health services into five broad subsets: 1) office visit services, 2) laboratory services, 3) minor surgical services, 4) radiological services, and 5) all other services. The first three subsets are further divided into distinctive elements. For office visit services these elements are: a) initial office visit for acute or chronic illness, b) follow-up office visit for acute or chronic illness, c) office visit for severe accidental

injury, d) initial office visit for mild accidental injury, e) follow-up office visit for mild accidental injury, f) physical examination, child (age less than 12) with no presenting illness, g) physical examination, child (age less than 12) *with* presenting illness, h) physical examination, adult (age more than 12) with no presenting illness, i) physical examination, adult *with* presenting illness, j) telephone consultation, k) visit with only nurse seen, and l) visit for injection or immunization. For laboratory services, the elements are: a) routine blood count, b) blood chemistry, c) serology, d) other blood examinations, and e) urinalysis. For minor surgical services the elements are: a) initial visit for minor surgery, and b) follow-up visit for minor surgery. All of these subsets and elements are easily identifiable and therefore quantifiable. Further, they represent distinct types of patient services.

For purposes of this paper, utilization was measured by cumulating incidence in each of the above categories of ambulatory services. Volume indices (e.g., dollar value per category of services delivered) would of course have been a more accurate measure of utilization. However, incidence does reveal trends in utilization and constraints on time and data collection further recommend it in this case. Categories with fewer than 10 incidences of use were not included in the analysis. Thus the "blood serology" and "all other service" categories were eliminated, leaving 19 categories. The disaggregation outlined above could only be applied to insured services in the present study. Only for such services could data be retrieved from patient medical records.

For uninsured outpatient services (those services which the plans did not cover or for which they did not reimburse any dollar amounts to the individual) utilization was considered in terms of dollars spent, and data were obtained from subscriber recall. Such care was disaggregated into four categories of dollar expenditures: 1) all laboratory, X-ray, and diagnostic

services, 2) physician visits, 3) ancillary care (nurses, chiropractors, etc.), and 4) appliances, glasses and artificial limbs.

Essentially the same type of outpatient services are insured under both plans. One important exception is initial office visits for dependents, which are covered by Ross-Loos, but not by the San Joaquin Foundation. Relative to Ross-Loos, this constraint results in some shifting of utilization by dependents in the San Joaquin plan toward follow-up office visits (which are insured). Nonetheless, the percentage of uninsured services received per person (the dollar value of uninsured services/the estimated dollar value for all outpatient services) is similar for both plans.

Statistical Analysis

Two methods of analysis were utilized. First, the correlation coefficient, r, between per capita income and the utilization of each of the 23 categories of outpatient services (19 insured and 4 uninsured) was computed. The correlation coefficient indicates the standardized relationship between the covariance of the two variables being considered. Values for r lie between and include -1 and $+1$, with $+1$ indicating perfect dependence (or correlation), -1 perfect negative dependence, and 0 independence.

Unfortunately, r does not allow for the detailed analysis which the income elasticity of demand provides. Hence, using least squares estimation, utilization of each of the categories of services was regressed against per capita income. From the $b_{y_i x_i}$ (where y equals the category of service and x per capita income), income elasticities of demand are usually computed as the product of $b_{y_i x} (\bar{x}/\bar{y}_i)$.

A slight methodological problem is presented in testing for the significance of $r_{y_i x}$ and $b_{y_i x}$. Twenty-three variables or categories are being tested and the level of significance should take this into consideration. This problem is obviated by use of the multiple contrast method in

Table 1. Correlation coefficients between the use of outpatient medical services and income

Insured services

Category	San Joaquin Foundation	Ross-Loos
Initial office visit for acute or chronic illness	+ .051	+ .013
Follow-up office visit for acute or chronic illness	+ .071	+ .040
Office visit for severe accidental injury	− .009	− .037
Initial office visit for mild accidental injury	− .042	− .028
Follow-up office visit for mild accidental injury	− .009	− .028
Physical examination, child (age less than 12) with no presenting illness	− .008	− .026
Physical examination, child (age less than 12) *with* presenting illness	− .013	− .024
Physical examination, adult (age more than 12) with no presenting illness	− .010	+ .056
Physical examination, adult (age more than 12) *with* presenting illness	+ .111	− .003
Initial visit for minor surgery	+ .012	+ .038
Follow-up visit for minor surgery	− .006	− .006
Telephone consultation	− .013	− .020
Visit with only nurse seen	+ .005	− .015
Visit for injection or immunization	+ .015	− .004
Routine blood count	+ .003	+ .014
Blood chemistry	+ .076	+ .032
Other blood examinations	+ .020	+ .025
Urinalysis	+ .046	+ .031
X-ray	− .001	+ .045

Uninsured services

Category	San Joaquin Foundation	Ross-Loos
All laboratory, X-ray, and diagnostic services	+ .048	− .002
Physician visits	+ .001	+ .094
Ancillary care (nurses, chiropractors, etc.)	− .003	+ .072
Appliances, glasses and artificial limbs	− .039	+ .109

Table 2. Income elasticities for outpatient medical services

Insured services

San Joaquin Foundation	Ross-Loos
All categories approach zero except physical examination, adult *with* presenting illness = .816	All categories approach zero

Uninsured services

Category	San Joaquin Foundation	Ross-Loos
All laboratory, X-ray, and diagnostic services	Approaches zero	Approaches zero
Physician visits	Approaches zero	.7401
Ancillary care (nurses, chiropractors, etc.)	Approaches zero	1.2336
Appliances, glasses, and artificial limbs	Approaches zero	1.7590

which the $\alpha = .1 - \dfrac{\alpha_1}{2m}$, where α = the level of significance used, α_1 = the predetermined level of significance, and m = the number of categories tested.

Results

The correlation coefficients $r_{y_1 x}$ between the use of each of the 23 categories of outpatient services and per capita income are found in Table 1; the income elasticities in Table 2.

Considering insured services first, the $r_{y_1 x}$ for all outpatient services provided to members at the Ross-Loos plan appear independent of income (tabled $r_{.05, 1025} = .104$). For members of the San Joaquin Medical Foundation Plan, all services appear independent (tabled $r_{.05, 858} = .123$), with the exception of physical examination for adult with presenting illness

which ($r = .111$) approaches dependence.

Similarly, the income elasticities will approach zero (as r approaches zero, b approaches zero; hence, the income elasticity approaches zero) for all insured services in the Ross-Loos population. In the San Joaquin Foundation population, the income elasticities all approach zero, with the exception of physical examination, adult *with* presenting illness, which at .816 approaches significance ($b_{y_1x}/(b_{y_1x})$ = 3.29; tabled $t_{.05,858} = 3.291$).

When uninsured services are examined, the r_{y_1x} for three of the categories of service appear dependent or approach dependence in the Ross-Loos population: physician visits ($r = .094$) and ancillary care ($r = .072$) approach significance, while appliances ($r = .109$) is significant. For the San Joaquin Foundation population, the r_{y_1x} for all uninsured services appear independent.

Similarly, the income elasticities for the three above-mentioned services in the Ross-Loos population do not approach zero: for physician visits, the income elasticity is equal to .7401 and approaches significance ($b_{y_1x}/(b_{y_1x})$ = 3.02); for ancillary care, the income elasticity is 1.234 and also approaches significance ($b_{y_1x}/(b_{y_1x})$ = 2.35). For appliances, the income elasticity is 1.759 and is significant ($b_{y_1x}/(b_{y_1x})$ = 3.56).

In the San Joaquin Foundation population the income elasticities for all uninsured services approach zero.

Discussion

When insured populations utilize insured outpatient services (regardless of the comprehensiveness of coverage), it appears that: 1) an independent relationship exists between use and income, and 2) the income elasticities for outpatient health services approach zero (i.e., changes in income have no effect on consumption). This finding applies equally in two different health insurance plans.

For uninsured outpatient services, the results of the two sample populations are dissimilar. The population at the San Joaquin Foundation exhibits an independent relationship between use and income, with income elasticities approaching zero. The Ross-Loos population results, by contrast, suggest that for three out of the four categories of uninsured services, income and use are dependent, with income elasticities of over .7 for each.

Insured Services

The income elasticities approach zero and income and use are independent, with one exception, for all insured services. The one exception, physical examination for an adult *with* a presenting illness, would seem to be atypical in the light of results on all other insured care. The finding is explicable perhaps by the fact that only 44 such services occurred for the full year's period. More importantly, when correlation coefficients and income elasticities are computed for only those individuals that used insured services, physical examination, adult *with* presenting illness, becomes independent of income, and the income elasticities approach zero.

The possible reasons for the above findings are numerous. The most plausible, however, is that since the apparent market price of an outpatient service approaches zero when that service is insured, price no longer acts as a rationing device and income will not, of itself, have any effect on the demand for medical services. Although it can be correctly argued that coverage for the insured service is not complete and that considerable opportunity costs are involved in obtaining the care, it is clear from a reading of the insurance contracts for both plans that the price of the insured service is being reduced to a considerable extent.

Another possible explanation might be that involvement in a prepaid plan convinces many individuals that they are "losing money" if they do not use the services for which they have paid. Since

31

the insurance premium does not discriminate against income groups, this would also result in independence between income and use.

The similarity of results for insured services in the two plans is especially noteworthy because the two medical care delivery systems involved are fundamentally different. One might suspect that the above conclusions can be generalized to still other populations covered by health insurance.

Uninsured Services

Unlike insured services, the relationship between use and income are different for the San Joaquin Foundation and Ross-Loos populations.

Considering the Ross-Loos population first, use and income were dependent for physician visits, ancillary care, and appliances; with income elasticities of .74, 1.23, and 1.76, respectively. The income elasticities for the three services demonstrate that changes in income do affect changes in demand for these uninsured services. For appliances, the consumer will increase his demand at a greater percentage rate than his increase in income; for ancillary care, at a percentage only slightly higher than the increase in income; for physician visits, at a percentage somewhat less than the increase in income.

The reasons for the differing levels of these income elasticities are the same reasons applicable to any study of this measure: the different prices of the three services, the price of competing goods, and personal preference patterns.

The Ross-Loos results are especially relevant and intuitively appealing because they approximate what other investigators, such as Paradiso and P. Feldstein have found to be the relationships between income and use for the general population (where the majority of outpatient care is uninsured). Most noteworthy, perhaps, is the finding that the income elasticity for physician visits is .74, which is close to the income elasticity computed by Feld-

stein (.6) from 1958 household interview data.

Parenthetically, a regression of each of the three services against per capita income in its linear and squared form suggests that the income elasticity for each of the services starts at high levels and declines as income increases. This is in contradiction to Stigler's work, and suggests that further study of income elasticities for medical care products in the national marketplace is called for.

Considering the San Joaquin Foundation population, it would be consistent to assume that data for uninsured services would be similar to both the Ross-Loos results on uninsured services and estimates provided for the general population. However, as can be seen, such is not the case. As with insured services, income and use are independent and the income elasticities approach zero in this population.

The primary reason for this finding are the financial constraints applicable to obtaining insured services in Stockton and the already demonstrated independent relationship between use and income for insured services. The most important of the financial constraints involves a dependent's coverage for physician office visits. From an analysis of the San Joaquin Foundation insurance contract for the study population, it appears that in order for a dependent to be covered for physician office visits (excluding visits resulting from accidental injury) an initial visit must first be fully paid for by the patient. As a result the Foundation provides, under insurance, a heavy preponderance of follow-up office visits. Approximately 52 percent of the total output provided per person in the San Joaquin plan is composed of follow-up visits as opposed to 16 percent of the output per person at Ross-Loos.

Given then an independent relationship between income and use for insured services and also given the fact that in many cases uninsured services are utilized to obtain eligibility for insured care, it seems logical that in Stockton the pattern of

utilization for uninsured services should closely mirror that for insured care. If, on the other hand, the use of uninsured services had no effect on the ability to receive insured care, such a relationship would not be expected.

An example of the latter situation is found at Ross-Loos. Here, in our sample population, the consumption of uninsured services has no bearing on an individual's ability to obtain insured care. Hence it is reasonable to expect that income elasticities for uninsured services will approach national levels—and such is indeed the case.

Speculations from Results

The results of this study suggest the following generalizations. First, income elasticities of demand for outpatient uninsured care will approach zero in any insurance scheme in which the use of uninsured care is undertaken to enable the individual to obtain insured care. Such behavior by the patient (or system) implies, however, that the dollar imputed benefits received from the insured care considerably offset the cost of the uninsured services necessary to qualify for insured care. In the San Joaquin Foundation population such apparently is the case. Under other insurance plans this might not necessarily follow, however.

Second, and conversely, where use of uninsured services bears no relationship to insured services, it is reasonable to expect that the income elasticities for outpatient uninsured service will approach the general market conditions (where presently the majority of outpatient care is not compensated for by health insurance).

Summary

The relationship between income and the use of outpatient medical care services in two insured populations has been analyzed. Income is considered in terms of per capita income, services in terms of 23 discrete categories of outpatient care. Using correlation coefficients and income elasticities, it has been found that for insured services, there is an independent relationship between income and use. Given the large differences in the delivery systems of the two insurance plans under study, it has been hypothesized that such a relationship could extend to all insured populations.

For uninsured services, it has been found that a dependent relationship exists between income and use in one plan, but not another. In the plan where the dependent relationship exists, the income elasticities approach levels found for the general population. In the plan where an independent relationship exists between income and use of uninsured services, it has been suggested that this is because the use of such services is necessary in order to obtain valuable insured services and because the income elasticities of insured services approach zero.

References

1 U.S. National Center for Health Statistics. *Vital and Health Statistics*, Series 10, No. 18, June, 1965, "Volume of Physician Visits, United States, July 1963-June 1964" (Washington, D.C.: U.S. Public Health Service, 1965).

2 McNerney, Walter J., *et al. Hospital and Medical Economics*, 2 Vols. (Chicago: Hospital Research and Educational Trust, 1962).

3 Stigler, George J. *The Theory of Price* (New York: Macmillan, 1952).

4 Dewhurst, Frederic J., *et al. America's Needs and Resources* (New York: The Twentieth Century Fund, 1947).

5 Feldstein, Paul I., and Severson, Ruth M. "The Demand for Medical Care," in *Report of the Commission on the Cost of Medical Care*, Vol. 1 (Chicago: American Medical Association, 1964).

6 Columbia University School of Public Health and Administrative Medicine. *Family Medical Care*

Under Three Types of Health Insurance (New York: 1962).

7 Anderson, Odin W., and Sheatsley, Paul B. *Comprehensive Medical Insurance—A Study of Costs, Use, and Attitudes Under Two Plans.* Research Series 9 (New York: Health Insurance Foundation, 1959).

8 Darsky, Benjamin J., *et al. Comprehensive Medical Services Under Voluntary Health Insurance. A Study of Windsor Medical Services* (Cambridge, Massachusetts: Howard University Press, 1958).

9 Sasuly, Richard, and Hopkins, Carl E. "A Medical Society-Sponsored Comprehensive Medical Care Plan. The Foundation for Medical Care of San Joaquin County, California," *Medical Care,* Vol. 5, No. 4 (July-August, 1967).

10 Kisch, Arnold I., and Viseltear, Arthur J. *The Ross-Loos Medical Group,* Medical Care Administration—Case Study No. 3 (Washington, D.C.: U.S. Public Health Service, 1967).

11 Kovner, Joel W. *A Production Function for Outpatient Medical Facilities* (unpublished Ph.D. dissertation, University of Michigan, 1968, available University Microfilms).

34