A RAND NOTE

THE IMPACT OF COST SHARING ON EMERGENCY DEPARTMENT USE

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PREFACE AND SUMMARY

The authors of this Note studied the effect of insurance coverage on the use of emergency department services, using data from a national trial of cost sharing in health insurance. A total of 3973 persons below the age of 62 years were randomly assigned to fee-for-service health insurance plans with coinsurance rates of 0, 25, 50, or 95 percent, subject to an income-related upper limit on out-of-pocket expenses.

Persons with no cost sharing had emergency department expenses that were 42 percent higher than those for persons on the 95 percent plan ($P < 0.01$) and about 16 percent higher than those for persons with smaller amounts of cost sharing. Without cost sharing, emergency department visits for less serious diagnoses (e.g., abrasions) increased three times as much as did visits for more serious diagnoses (e.g., lacerations). Controlling for insurance, persons in the lower third of the income distribution had emergency department expenses that were 64 percent higher than those in the upper third ($P < 0.001$) and received a greater proportion of their ambulatory care in the emergency department.

It was concluded that the absence of cost sharing results in significantly greater emergency department use than does insurance with cost sharing. A disproportionate amount of the increased use involves less serious conditions.

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CONTENTS

Rates of visits to the hospital emergency department have increased dramatically in the past 25 years. Between 1955 and 1980, per capita emergency department visit rates, as measured by the American Hospital Association annual survey, rose by 550 per cent, while per capita rates for hospital admission grew 30 per cent and rates of visits to physicians' offices remained about the same (1-3). This increase has been accompanied by growing concerns about the cost and appropriateness of emergency department use. Emergency service charges are higher than those for office care of similar medical problems, and it has been shown in many settings that a considerable portion of emergency department use is for self-limited or nonurgent conditions (4-8).

The growth in emergency department use occurred during a period of expanding insurance coverage, but efforts to explain the use of this service have focused almost exclusively on the demographic characteristics of the users and on the accessibility of other sources of care, such as the patient's regular physician (4-6,9). Although it has been noted that insurance coverage for the emergency department has been considerably more generous than coverage for other ambulatory care, the role of insurance in the use of the emergency department has received little attention.

Health insurance coverage is currently changing. Cost-containment strategies employing increased cost-sharing by patients may lead to less generous coverage for emergency services. Prior studies do not allow clear predictions about the effects of this change. Emergency department use has commonly been viewed as relatively unaffected by cost to the patient, at least compared with other ambulatory care. If emergency department use is sensitive to the extent of insurance coverage, however, it may decrease with expanded cost sharing. Use by persons with low income may be differentially affected, raising questions about equity of access. The distribution of medical problems seen in the emergency department may also change, with uncertain effects on the appropriateness of use.

To address these questions, we studied the impact of insurance coverage on the use of emergency department services, using data from a randomized trial of cost sharing in health insurance, the Rand Health Insurance Experiment (HIE).

METHODS

The design of the HIE has been detailed elsewhere (10,11). We will summarize here the features that are most relevant to the present study.

Selection of Sites and Families

The HIE was conducted in six geographic sites: Dayton, Ohio; Seattle, Washington; Fitchburg and Leominster, Massachusetts; Franklin County, Massachusetts; Charleston, South Carolina, and Georgetown County, South Carolina. The present study uses data from only the first three years of the study and from the first four sites. It excludes the South Carolina sites and the fourth and fifth years of the other sites because of delays in processing data. Sites were selected to provide a variety of regional and urban and rural characteristics. They were also chosen to reflect variation in the degree of pressure on the ambulatory care system, as measured by the waiting time for an appointment and the proportion of primary care physicians accepting new patients.

Within sites, families were randomly selected, with the following exclusions: persons eligible for Medicare at any time before the end of the study, those with high incomes (eliminating about 3 per cent of families contacted), those with service-connected disabilities, institutionalized persons, and those in the military and their dependents.

Assignment of Families to Insurance Plans

Of the families initially contacted, 24 percent refused a series of two or three preliminary interviews. Noncooperation at any stage resulted in a family's exclusion. Families selected for enrollment were assigned to an experimental insurance plan by a method that made the distribution of health, demographic, and economic covariates across insurance plans as similar as possible while retaining an element of randomization (12). All eligible family members were assigned to the same plan. There was no choice of plans; the family could either accept the assigned plan or choose not to participate. Of those offered

enrollment, 85 per cent accepted. Although older, less educated persons were more likely to refuse the offer, there were no significant differences across plans (F(with 24,9392df) = 0.9, Table 1). Moreover, among those who accepted the offer there were no significant differences among plans in terms of the enrollees' health status, family income, education, or age (13).

Description of Insurance Plans

The experimental insurance plans differed along two dimensions: the coinsurance rate (the fraction of the bill paid by the family) and the maximal dollar expenditure (an upper limit on the family's annual out-of-pocket expenditure). The coinsurance rate was either 0 (free), 25, 50, or 95 per cent. The maximal dollar expenditure was set at either 5, 10, or 15 per cent of the family's income, up to a maximum of $1,000. The 95 per cent plan with this upper limit on expenditure approximates an income-related family deductible.

To illustrate, a family assigned to a 25 per cent coinsurance rate with $1,000 maximal expenditure would pay 25 per cent of all expenses in each year until total expenses reached $4,000. At that point, it would have spent $1,000 out-of-pocket. All subsequent expenses in that year would be paid by the insurance plan. At the start of the next year, the family would revert to paying 25 per cent until it had again reached the $1,000 limit.

One plan had a 95 per cent coinsurance rate but differed from the others in that the insurance paid all expenses exceeding either $150 per person or $450 per family. This plan is referred to as the "individual deductible plan." On this plan alone, coinsurance applied only to outpatient expenses. Expenses for inpatient care and for emergency department visits for accidental injury within five days of the accident were free. Except for these provisions and some dental and mental health provisions not pertinent to the present study, all plans covered the same broad range of services, including visits to physicians and other health professionals, medical supplies, and drugs, with free care or coinsurance applying equally to all services.

The data reported below are based on claims filed with the Health Insurance Experiment. Although the incentive to file a claim rose with the fraction of the bill reimbursed, we have determined by an independent check of physician billing records that adjustment for differential underfiling would have a negligible affect on the estimated differences among plans in the use of physician services (14). For this reason, and because the estimate of underfiling was not specific to emergency department services, we have not adjusted the numbers below for possible differential underfiling.

Emergency Department Use Definitions

Data on emergency department visits were obtained from insurance claim forms completed by providers. Visits were identified by the place of service or by California Relative Value Studies codes (15). We excluded visits covered by insurance other than the experimental plan (e.g., worker's compensation or medical benefits provided by automobile insurance), which accounted for about 5 per cent of emergency department visits. Use of the emergency department for laboratory tests or medication without evaluation of the patient by a physician in the emergency department was also excluded. Minimal follow-up care obtained in the emergency department within three days after an initial visit--e.g., a cast or wound check, was not counted as a separate visit, but charges for these visits were included in those for the initial visit.

Emergency department expenses included all charges associated with the visit, including those for ambulance transport, tests ordered and procedures performed at the time of the visit, and any brief follow-up visits as described above. Excluded were charges for any subsequent inpatient services or for operating room or obstetrical procedures.

Visits resulting in admission to the hospital were identified by comparison of dates, providers, and diagnoses on emergency department and inpatient claims. For as many as a third of these visits, radiology and laboratory charges associated with use of the emergency department were billed with inpatient services, and there was no identifiable linkage to the emergency department. In such instances these charges could not be included in the emergency department expense.

Up to four diagnoses were recorded on the claim forms and coded using the *Hospital Adaptation of the International Classification of Diseases*, second edition (16). We used weighted frequencies in the analysis of visits by diagnosis. For example, if there were three diagnoses recorded on the claim form, each was assigned one third of a visit.

Method of Analysis

Because of the random assignment to insurance plans, analysis of differences in sample means (analysis-of-variance methods) would have yielded unbiased estimates of plan effects. However, the skewed distribution of emergency department expenditures (i.e., a small number of persons accounting for a large proportion of use) would have made analysis of variance methods statistically inefficient (17). To increase the precision of the analysis, we estimated expenses using a two-equation model described elsewhere (17). We used three years of data to estimate coefficients of the two regression equations, and then predicted expenditure for a standardized population (the population enrolled in all plans in Year 1) using the estimated equations. To estimate the number of emergency department visits by persons on each plan, we used a negative binomial regression model. Except where noted, standard errors have been adjusted for intrafamily and intertemporal correlation. All tests are two-tailed.

Our analysis combined plans with differing maximal dollar expenditures but with the same coinsurance rate, because prior work suggests those plans have similar effects on use of services (11).

In the analysis of visits by the urgency of the diagnosis, the free-care plan is compared with the 25, 50, and 95 per cent coinsurance plans. The individual-deductible plan is excluded, because cost sharing depended on whether the visit was related to an accident and was within the required period.

Sample Analyzed

The expenditure analysis used 11,456 person-years of data on 3988 persons. Because the statistical methods used in this analysis require equal periods for each observation (17), years for which a person was not a full-year participant were excluded from the expenditure analysis. A person who, for example, died or left the study for any reason in year 2 was included for year 1 if he or she participated throughout year 1. Although participants who died probably had above-average emergency department expenditure, their use of such facilities may well have been lower than average, because their above-average expenditure increased the likelihood that they would exceed the maximal dollar expenditure and receive all subsequent services free. In any event, they accounted for only 1 per cent of enrollees (13), so their exclusion should not materially affect our estimates.

Our model for visits (negative binomial regression) allowed us to use the entire time the person was enrolled in the study, including partial years of participation. Infants born during the study were excluded, however. In the analysis of visits we used an average of 2.9 years of data on 3973 different persons.

Using estimates for visits, we calculated the effect of cumulative sample loss, which ranged over three years from 5 per cent on the free plan to 15 per cent on the 95 per cent plan. We found that the effect of the insurance plan on the rate of emergency department visits did not differ significantly between those who left the study before three years and those who completed it (chi-square [4] = 3.32). Thus, the plan predictions from our expenditure model, which are made for a standardized population, do not appear to be appreciably biased by the differential sample loss among plans. As a result, no adjustment has been made for sample loss. We also found that persons who left the experiment early for reasons other than death made emergency department visits at the same rate as persons with similar health and demographic characteristics who completed the study ($t < 0.29$), whereas those who died had a higher visit rate, as would be expected.

RESULTS

Differences in Use Among Plans

Expenditure for emergency department services increased as cost sharing decreased (Table 2, column 1). Expenditure on the 95 per cent plan was 70 per cent of that on the free-care plan.

The effect of cost sharing on annual expenses can be subdivided into the effect on the decision to use any emergency department services and the effect on the amount of services used, given any use. Almost all the effect of cost sharing that we observed can be accounted for by the effect on the decision to use any emergency department services during the year. The probability of any use ranged from 22 per cent with free care to 15 per cent with the 95 per cent plan (Table 2, column 2). In other words, as compared with persons receiving free care, those on the 95 per cent plan were 70 per cent as likely to use the emergency department.

Differences among plans in the number of emergency department visits show a similar pattern (Table 2, column 3). With respect to the likelihood of a visit and the number of visits, the reversal of order involving the 50 per cent plan was not statistically significant. (Note that fewer persons were assigned to the 50 per cent plan, making that result less precise; Table 2, column 4).

When emergency department visits resulting in hospitalization are examined separately, the response to cost sharing persists. Persons on the 25, 50, and 95 per cent plans made only two thirds as many emergency department visits resulting in hospitalization as did those with free care (Table 3). We could not reject the hypothesis that persons making visits that resulted in hospitalization had the same response to cost sharing as those making other emergency visits (chi-square (4) = 1.80). For emergency visits resulting in hospitalization, the response was similar to that for all hospital admissions (11).

The response of persons on the individual-deductible plan was more like the response of those on the coinsurance plans in this respect. Although the individual-deductible plan provided free care for emergency

department visits resulting in admission, this was not stated in benefit information given to participants, and many enrollees may have assumed otherwise. This factor, as well as the small sample, makes it difficult to infer from the response to the individual-deductible plan whether cost sharing deters hospital admission following an emergency department visit by influencing the patient's decision to come to the emergency department or by influencing the physician's decision to hospitalize the patient.

Comparison of Emergency Department and Total Ambulatory Expenses

Cost sharing had a similar effect on emergency department and total ambulatory expenses. The emergency department accounted for about 14 per cent of total ambulatory expenses on each of the plans. The variation across plans was not significant at the 0.10 level [$F(4,3688) < 1.36$].

Differences in Emergency Department Diagnoses Among Plans

We examined whether the kinds of medical problems for which patients use the emergency department varied by the plan. Ninety-one per cent of visits involved one or more diagnoses recorded by the physician on the claim form. We grouped the more frequent diagnoses into categories, 26 of which each accounted for 1 per cent or more of all emergency department visits. A panel of four emergency department physicians were asked to rate these diagnostic categories as either "more urgent" or "less urgent" on the basis of the seriousness of the diagnosis and the need for immediate care. Fifteen categories were rated more urgent and eleven were rated less urgent, with complete agreement for all categories except sprain, otitis media, and "abdominal pain--no other diagnosis" (Table 4).

Emergency department use involving any of the 15 more urgent diagnoses was 23 per cent lower on the plans with any cost sharing than on the free plan ($p < 0.01$). Use involving only less urgent diagnoses was 47 per cent lower on the cost sharing plans than on the free plan ($p < 0.01$). Stated differently, as compared with the cost sharing plans, free care was associated with 90 per cent higher use for the less urgent diagnoses but only 30 per cent higher use for the more urgent diagnoses.

Thus, cost sharing had a threefold greater effect on the number of visits involving only less urgent diagnoses than it did on the number of visits involving any of the more urgent diagnoses (chi-square(4) = 17.10, P <0.01). This result was not sensitive to recategorization of the diagnoses for which opinions about the level of severity differed.

For less urgent visits, nearly all the observed response to cost sharing occurred between free care and the 25 per cent coinsurance plan. There was very little difference among the 25, 50, and 95 per cent plans. In contrast, visits involving urgent diagnoses decreased with increasing amounts of cost sharing. For these visits, use on the 25 per cent plan was 85 per cent of the free-plan rate whereas use on the 95 per cent plan was only 65 per cent of the free-plan rate.

To test further the hypothesis that a disproportionate amount of the additional use associated with free care involved less serious medical problems, we classified visits for lacerations, the single most frequent diagnosis, by whether or not they were sutured. The rate of visits for sutured lacerations did not differ for persons on the free plan and persons with any cost sharing (Table 5). The difference between the free and cost-sharing plans for visits involving any laceration was due entirely to unsutured lacerations, which were 63 per cent higher with free care than with any cost sharing (P < 0.01).

Insurers sometimes provide more generous coverage for emergency department visits related to accidents than for those related to illness. We compared the response to cost sharing for visits with accident-related diagnoses and for visits with other diagnoses. Accident-related visits were 69 per cent as frequent on the coinsurance plans as on the free plan, and visits unrelated to accidents were 66 per cent as frequent as on the free plan. This difference was not significant at the 0.10 level (chi-square(3)=0.83). Thus, accident-related visits increase with free care about as much as do illness-related visits.

Emergency Department Use by Low-Income Persons

In an analysis that controlled for the insurance plan, persons in the lower third of the income distribution had emergency department expenses that were 66 per cent higher than those of persons in the upper third of the income distribution (Table 6). As income fell, emergency department services also constituted an increasingly large proportion of all ambulatory care expenses (Table 6, column 2).

Despite their greater use of the emergency department, the poor were not measurably more sensitive to cost sharing. We compared the responses to cost sharing of persons in the lower third and persons in the upper two thirds of the income distribution, with respect to the probability of any emergency department use. We cannot reject the hypothesis of an equal response at a 0.10 significance level. Thus, in response to income-related cost sharing, low-income persons appear to reduce their use of emergency department services to about the same extent as persons at other income levels.

Emergency Department Use by Geographic Site

Emergency department use varied markedly by geographic site. Franklin County and Fitchburg had emergency department expenses that were about 25 and 70 per cent higher, respectively, than Seattle's (Table 7). Sites were selected to reflect variation in the degree of pressure on the ambulatory care system. One measure of this pressure, the number of days that a new patient must wait for an appointment by with a primary care physician, as measured in 1973-1974, is shown in Table 7. Fitchburg had much longer waiting times than Dayton or Seattle. Although other unmeasured differences among sites could have influenced emergency department use, the observed differences were clearly associated with this measure of the relative availability of other primary care. We infer that with longer waiting periods for primary care physicians, people rely more heavily on the emergency department.

DISCUSSION

Our results show that emergency department use responds to cost sharing. Persons with free care use emergency department services about 40 per cent more frequently than persons with income-related catastrophic coverage (the 95 per cent plan) and about 20 per cent more frequently than persons with lower levels of cost sharing. The 40 per cent increase in use is small relative to the 550 per cent overall increase in emergency department use in the past three decades. Expanded insurance coverage may, nonetheless, account for a substantial portion of the 550 per cent increase. In our study cost sharing was capped. Without such a cap (which has been unusual in the past) the differentials we observed between free and cost sharing plans would have increased. (This is especially true in the 95 per cent coinsurance plan, since 30 per cent of the families in this plan exceeded the cap and received all subsequent visits free of charge.) Perhaps more important, in our study cost sharing and free care applied equally to emergency and other ambulatory care. Under most insurance policies, emergency department care is free, or at least much better insured than other ambulatory care, thereby creating an incentive to substitute emergency for office care. If we had compared an insurance plan of this type with our experimental cost sharing plans, the differences in emergency department use that we observed would have been even larger.

Differences in use between the free and cost-sharing plans were seen across most diagnoses, but were greater for less urgent conditions. Virtually all of the observed response to cost sharing for visits involving less urgent diagnosis occurred between the free and 25 per cent plans. Hence, a 25 per cent coinsurance rate may almost maximally deter emergency department use for less serious conditions. With a fixed upper limit on out-of-pocket expenditures, further increases in the coinsurance rate do not affect use for less urgent care, but do reduce use for more serious conditions.

Some appropriate and important uses of the emergency department may be discouraged by cost sharing. But the response to cost sharing among persons with diagnoses rated as more urgent probably overestimates such an effect, because these diagnoses subsume cases of varying severity. For example, with lacerations, we found no evidence that the subset of patients who required at least one suture were deterred from using the emergency department. It may be more difficult, however, for the patient with other problems--e.g., chest pain--to decide whether care is necessary. Thus, these results may not apply to all medical problems.

What happened to patients who were deterred by cost sharing from using the emergency department? Some unknown fraction of these patients used other sources of ambulatory care, and the remainder relied on self-care. Any calculation of cost savings associated with cost sharing for emergency department services should take into account the costs of such care, even though they may be lower than costs for emergency department care would have been. It has been argued that cost sharing leads to delayed care and higher eventual costs as problems become more serious. Neither our results, particularly those regarding admission to the hospital from the emergency department, nor other data from the Health Insurance Experiment (11) support this argument, even after three years of observation. Any increased costs of coinsurance due to delayed care are outweighed by the increased use of services associated with the free plan.

Use by Low-Income Persons

It has long been recognized that low-income persons use emergency department services more than other persons. But because low-income persons tend to have less insurance coverage, prior studies have not been able to determine how much of the difference in use is attributable to income, and how much to unequal insurance coverage. Our findings indicate that given equal insurance, low-income persons still use considerably more emergency department services and that the emergency department provides a substantially greater proportion of their ambulatory care. A possible explanation is that emergency services are more available to this population than other ambulatory services.

Low-income neighborhoods may be less likely to have private physicians' offices but relatively more likely to have hospitals with emergency departments than many middle-income neighborhoods. Alternatively, the difference in emergency use among low-income persons in our study may reflect patterns of care that developed when low-income people were poorly insured and that persisted even after three years of improved insurance.

As in our previous analysis of the use of all health services (11), we did not detect a differential response to cost sharing by low-income persons. It is important to recognize that cost sharing in this experiment was related to income. Lower-income persons had a lower maximal dollar expenditure. Because they were more likely to exceed this limit on out-of-pocket payment, they were more likely to be exempt from cost sharing for part of the year (11). Thus, lower-income persons faced a lower effective or average cost-sharing rate. Without this income-related feature, low-income persons would have had a disproportionate reduction in emergency department use with cost sharing.

Even though low-income persons do not differ in their response to income-related cost sharing, however, changes in insurance coverage specific to emergency department care would have a greater impact on them, because they depend on emergency department care for a greater share of their health care.

Implications for Insurance Design and Manpower Planning

What do our results suggest about insurance coverage for emergency department services? Different levels of coverage for different kinds of care can be justified on several different grounds. One argument from economic theory supports more generous coverage of those services whose demand is less affected by insurance (18). Historically, this has probably been an important rationale for the more generous coverage of emergency department care compared with other ambulatory care. Our results indicate that the use of emergency department and ambulatory care is similar to that under cost sharing plans. Hence, more generous insurance coverage of emergency department care cannot be justified on this basis. The same may be said for the practice of providing

differential coverage of accident-related and illness-related emergency department visits.

Differential insurance of emergency department care must be based on other considerations. These might include concern for the poor, given their greater reliance on the emergency department or the relative cost or effectiveness of such care. For reasons of relative cost, some would argue that emergency department care should be less generously insured. In California, the Medicaid program imposed a $1.00 copayment for office or clinic visits and a $5.00 copayment for emergency department visits. We have not attempted to assess the relative costs (as opposed to charges) of emergency department care, nor can we comment on the relative effectiveness of such care.

Our results have implications for manpower and facility planning in emergency medicine. While the growing supply of physicians is increasing the availability of care outside the emergency department, cost-containment concerns are expanding the use of cost sharing. On the basis of our results, these two trends may lead to difficulties for some emergency facilities, especially those in areas with a large supply of physicians. Free-standing or "urgent care" centers, which treat the minor problems we found to be most influenced by cost sharing, may be particularly affected. To the degree that those who project manpower needs in emergency medicine have neglected the above trends, their estimates may overstate requirements for emergency physicians (19). Emergency department physicians may find that these trends, although reducing the total demand for their services, will shift the content of their practice toward clinical problems that are more appropriate to their special training and thus more to their liking.

Table 1

CHARACTERISTICS OF FAMILIES THAT ACCEPTED AND REFUSED ENROLLMENT OFFER, BY PLAN

	Free Plan		25 and 50 Per Cent		95 Per Cent		Individual Deductible		
Characteristic	Accept	Refuse	Accept	Refuse	Accept	Refuse	Accept	Refuse	F Value[a]
Education (yr)	12.6	12.1	12.6	11.7*	12.8	12.0*	12.7	11.7*	0.2
Physician visits in past year	4.3	4.6	3.6	3.9	3.7	4.5	4.5	3.8	0.9
Income (in thousand 1973 dollars)	10.2	12.7	10.0	9.0	10.0	11.3	10.3	10.1	2.2
% hospitalized in past year	10.6	9.2	9.2	13.2	10.0	13.2	12.3	13.7	0.5
% male	49.3	42.6	48.8	40.5	46.0	43.0	49.7	44.2	0.2
Age (yr)	29.1	39.8*	28.8	29.9	28.0	34.1*	28.6	30.6	2.4
% black	0.9	0.0	2.1	0.5	2.6	0.4	2.2	0.0	0.1
Health index[a]	9.9	9.8	9.9	9.8	10.0	9.9	9.9	9.6	0.9
No. of families	332	20	234	66	194	65	264	62	
% of families	94	6	78	22	75	25	81	19	

NOTE: Sample consists of families in Seattle and Massachusetts. (Dayton and South Carolina data for refusals are not available . Variables are averaged within families; averages presented are averages across families.

[a] F-tests are for differences between plans. They have 3 and n degrees of freedom, where n ranges between 1186 and 1229, because of missing data.

[b] The health index is the sum of responses to one question about the amount of pain (from 1=a great deal to 4=none), one question about the amount of worry (from 1=a great deal to 4=none), and five self-rated health questions (1=excellent, 2=good, 3=fair, 4=poor).

*$P < 0.05$.

Table 2

ADJUSTED ANNUAL EMERGENCY DEPARTMENT USE PER PERSON

(Cost-sharing plans use shown as per cent of free plan use)

Plan	Expense	Probability of Any Use	Visits Per 1000 Persons	Person-Years of Data
Free	100% = $32	100% =0 .22	100% = 304	3797
25%	86%	85%[a]	79%[b]	2296
50%	90%	92%	82%	877
95%	70%[b]	70%[b]	65%[b]	2219
Individual deductible	82%[c]	81%[a]	80[a]	2252

NOTE: Results shown are for a standardized population with the same age, sex, race, geographic site, income, education, and health status characteristics as the population actually enrolled throughout year 1 of the experiment. Expenses are expressed in June 1984 dollars. Use of cost sharing plans is shown as a percentage of free-plan use.

[a] The contrast with the free plan is significant at the 0.05 level.

[b] The contrast with the free plan is significant at the 0.01 level. The t-statistics for the contrasts of expenses on the 25 per cent, 50 per cent, and individual deductible plans and expenses on the free plan exceed 1.

[c] The contrast with the free plan is significant at the 0.10 level.

Table 3

ACTUAL ANNUAL RATE OF EMERGENCY DEPARTMENT VISITS RESULTING IN HOSPITALIZATION

Plan	Visits/1,000 Persons (S.E.M.)[a]	Percentage of Free Plan
Free	32 (3.5)	100%
25%, 50%, and 95%	21 (2.1)[b]	67%
Individual deductible[c]	22 (3.5)	68%

[a] The standard errors of the mean shown are uncorrected for intrafamily or intertemporal correlation. The true S.E.M.s are slightly larger.

[b] $p < 0.05$ for the contrast with the free plan.

[c] See discussion of individual deductible plan in methods section.

Table 4

RESPONSE TO PLANS BY DIAGNOSIS

Diagnoses	Annual Visits per 10,000 Persons: Coinsurance Plans (25%, 50%, 95%)	Annual Visits per 10,000 Persons: Free Plan	Visits on Coinsurance Plans as a Proportion of Visits on Free Plan
More urgent diagnoses			
Laceration	337 (26)	438 (37)	0.77
Fracture/dislocation	134 (17)	168 (23)	0.80
Miscellaneous serious trauma[a]	57 (12)	67 (14)	0.85
Asthma	30 (18)	83 (28)	0.36
Otitis media	40 (10)	78 (15)	0.51
Chest pain/acute heart disease	59 (15)	57 (13)	1.04
Cellulitis/abscess/wound infection	36 (09)	39 (10)	0.92
Surgical abdominal disease[b]	42 (10)	38 (09)	1.11
Head injury	36 (08)	33 (09)	1.09
Urinary tract infection	22 (06)	43 (13)	0.51
Acute eye injury/infection	34 (08)	34 (09)	1.01
Obstetrical	29 (09)	31 (09)	0.94
Allergic reaction	26 (07)	26 (08)	1.00
Acute alcohol/drug related	27 (09)	20 (07)	1.35
Burn, second degree/complicated	19 (06)	22 (08)	0.86
Visits with any of the above diagnoses	991 (52)	1280 (70)	0.77[c]
Less urgent diagnoses			
Abrasion/contusion	228 (22)	403 (37)	0.54
Sprain	164 (18)	249 (27)	0.63
Upper respiratory infection	92 (13)	190 (23)	0.51
Influenza/viral syndrome	40 (08)	61 (12)	0.65
Gastroenteritis/diarrhea	36 (08)	67 (14)	0.62
Abdominal pain (no other diagnosis)	34 (09)	65 (30)	0.53
Back/neck pain	32 (07)	67 (21)	0.45
Arthritis/bursitis	30 (07)	63 (14)	0.45
Headache	8 (05)	59 (26)	0.11
Acute bronchitis	14 (05)	36 (09)	0.42
Burn, first degree	7 (03)	28 (08)	0.28
Visits involving only the above diagnoses	663 (40)	1185 (75)	0.53[c]

NOTE: Equal partial weights were used to count visits involving multiple diagnoses. For example, if a visit resulted in three diagnoses, each was counted as one third of the visit.

[a] Includes foreign bodies, ingestions, ligamentous ruptures, and internal, neurovascular, and crush injuries.

[b] Includes cholecystitis, gastrointestinal bleeding, appendicitis, intestinal obstruction, and peptic ulcer disease.

[c] $P < 0.01$ for the difference between coinsurance and the free plan, and for the difference between visits involving more urgent diagnoses and visits involving only less urgent diagnoses.

Table 5

VISIT RATES FOR SUTURED AND UNSUTURED LACERATIONS UNDER FREE-CARE AND COST-SHARING PLANS

Plan	Annual Visit Rate Per 10,000 Persons (S.E.M.)	
	Sutured Lacerations	Unsutured Lacerations
Free	205 (1.9)	248 (2.3)
25%, 50%, and 95%	207 (2.0)	152 (1.7)[a]

NOTE: The individual deductible plan is included with free care, because the deductible on this plan did not apply to accidents.

[a] $P < 0.01$ for the difference between visits involving unsutured lacerations under free care and such visits under coinsurance.

Table 6

ANNUAL EMERGENCY DEPARTMENT EXPENSE PER PERSON, BY INCOME TERTILE

Income Tertile	Expense ($)	Percentage of Total Ambulatory Expense
Upper third	25	8
Middle third	31	11[a]
Lower third	41[a]	16[a]

NOTE: Results shown are controlled for the plan but are not adjusted for differences among income tertiles in terms of age, sex, race, geographic site, education, or health status. However, income had a significant ($P < 0.10$) effect on emergency department expense independent of its association with these other demographic variables. Expenses are expressed in June 1984 dollars.

[a] The contrast with the highest income tertile is significant at the 0.01 level.

Table 7

ANNUAL EMERGENCY DEPARTMENT EXPENSE
PER PERSON, BY SITE

Site	Free Plan ($)	Wait for New Patient Appointment, 1973-1974 (Number of Days)
Seattle	28	4
Dayton	26	7
Franklin County	35[a]	9
Fitchburg	48[a]	25

NOTE: Results shown are for the population actually enrolled in each site in Year 1 of the experiment, but are standardized to the free plan. Expenses are expressed in June 1984 dollars and are adjusted for regional differences in cost of living.

[a] The contrast with Seattle is significant at the 0.01 level.

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