

# **Demand for Mental Health Services: An Episode of Treatment Approach\***

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Our empirical knowledge about the demand for health care services, especially its price or insurance elasticity, has increased rapidly in the last decade [12]. In most of this empirical research, however, price is specified as a nonvarying coinsurance rate and demand is analyzed on an annual basis. When insurance policies include deductibles or maximum expenditure limits, the out-of-pocket price to the consumer is not constant. Rather, the theoretically correct price variable varies with the time remaining in the insurance policy's accounting period and the amount of expenditure required to change the coinsurance rate [8]. Newhouse suggests, "A more appropriate unit of observation when insurance is of this form is the illness episode rather than total demand per unit of time [18, 94]."

There are other reasons for analyzing demand for health services per episode, rather than per year. First, analysis based on annual data aggregates health care utilization across episodes and across periods of no utilization, and thus suppresses information on the decision to start an episode and information on the intensity of utilization within an episode. Second, health services are more reasonably modeled as being demanded by the episode, rather than by the visit. In the market for health care, physical and mental health services are not demanded for their own sake, but rather consumers demand "good health" or the bundle of services most likely to improve their health [6].

Accordingly, this paper analyzes the demand for mental health services using data aggregated to the level of the episode of treatment. An episode of mental health treatment is defined conceptually as the bundle of mental health services received during a period of continuous contact with the mental health system. By separating mental health care utilization into episodes and then categorizing episodes by type of mental health treatment, our approach analyzes both the de-

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cision to seek a certain type of mental health treatment (hospitalization, outpatient psychotherapy, outpatient psychotherapy with drug treatment) and the pattern of treatment once an episode has been initiated. Further, we provide new estimates of the elasticity of demand for mental health services by episode type and by provider type.

Earlier studies of the demand for mental health care estimated the price elasticity of demand using annual data [14; 23; 21; 7; 19] or using data grouped into shorter time periods, such as 30, 60, or 90 day periods [3]. Keeler et al. [9] use an episodic approach to analyze demand for mental health care; however, rather than using treatment episodes, they use a different conceptual approach to defining episodes. The focus of Keeler et al. was on the decision to start treatment and thus they “ignore the distinction between single and multiple episodes and reorganize the data, putting the total annual mental health costs into the first episode” [9, 48].

Results from these earlier studies are mixed. Wells et al. found that cost sharing has a negative and statistically significant effect on the probability of using outpatient mental health services, however an insignificant or negligible effect on utilization once treatment had begun [23]. Keeler’s et al. results suggest a price elasticity of demand for mental health services of  $-0.59$  to  $-0.79$  [9]. Ellis and McGuire’s results suggest a price elasticity of demand of  $-0.30$ ,  $-0.42$ , and  $-0.37$  for the first 30, 60, and 90 days of treatment, respectively [3]. Scheffler and Watts found that the price of outpatient mental health services had a statistically insignificant effect on the probability of using inpatient mental health services and a statistically insignificant effect on the level of inpatient mental health care use; however, preliminary results from their cohort analysis suggest that price has a negative and significant effect on outpatient mental health care utilization [19; 20].

In addition to being based on arbitrarily defined time periods, previous estimates of the price elasticity of demand for mental health services have not differentiated between different types of mental health treatments or between different types of mental health care providers. The price elasticity, however, may vary by type of treatment and by type of provider, and this variation has important policy implications for determining the optimal insurance policy.<sup>1</sup> Thus in our empirical analysis, episodes are classified into four categories, each corresponding to a clinically distinct treatment pattern. By controlling for type of episode, we can get more precise estimates of the price elasticity, since we are then analyzing more homogenous goods and services. Further, our empirical specification allows us to estimate the price elasticity by type of mental health care provider.

We adopt the two-part demand model employed in mental health by Wells et al. [23], Horgan [7] and Scheffler and Watts [19]. First, we estimate the probability of beginning a certain type of mental health treatment episode using a multinomial logit model; and second, we analyze the level of outpatient utilization within episodes.

## **I. Episodes of Mental Health Care**

An episode of mental health treatment is defined as a period of continuous contact with the mental health system or as a series of mental health services associated with the same chronic disorder. Operationally, an episode of outpatient mental health treatment is defined, following

1. The second-best pricing literature suggests that the out-of-pocket price to the consumer should be lower or insurance coverage should be greater for less elastic services [2].

Kessler, Steinwachs, and Hankins, as a series of mental health services without an eight week hiatus between two services [10].<sup>2</sup>

As discussed in Goldman, Scheffler, and Cheadle, patients who receive outpatient care without needing hospitalization probably have very different mental health problems than those who are hospitalized [5]. Likewise, patients who receive outpatient care without needing medication may have different mental health problems than those requiring drugs. Accordingly, episodes are classified by clinically distinct treatment patterns.<sup>3</sup> The four exhaustive episode types are: outpatient visits only (no medication or hospitalization); outpatient visits with medication, but no hospitalization; outpatient visits with hospitalization; and hospitalization only.

Since our data are comprised of the insurance claims of subscribers in the high option Blue Cross and Blue Shield Plan of the Federal Employees Health Benefit Program, mental health services are defined as services in claims filed with a primary nervous and mental diagnosis. The mental health services include inpatient services, prescriptions for psychotropic medications, and outpatient visits to physicians, psychologists, and "mental health teams."

Our data base consists of subscribers who were independently sampled in 1979, 1980, or 1981 and who were enrolled in the Blue Cross and Blue Shield Plan for all three of the study years 1979, 1980, and 1981. In 1979 and 1980 the Blue Cross and Blue Shield's high option plan had a 20 percent copayment on outpatient mental health services and a \$100 deductible. In January 1981, in response to rising costs, the outpatient copayment was increased to 30 percent and the deductible was increased to \$150. There was no copayment or deductible for inpatient mental health services.

In order to insure that our analysis is based on complete episodes of treatment, our sample includes only those episodes contained entirely within one calendar year. Since the hiatus used in defining episodes is eight weeks, this means our sample includes only those episodes beginning eight weeks after the beginning of a year and ending eight weeks before the end of that same year. Thus our sample does not include censored episodes (i.e., episodes that may have started before January 1, 1979 or ended after December 31, 1981).

As a result of our sampling decision to include only those episodes contained entirely within one year, our analysis focuses on episodes of shorter duration (eight month maximum). Episodes which last for shorter time periods most likely reflect treatments of acute problems, crisis intervention, or brief psychotherapy, rather than extended psychotherapy and psychoanalysis [5]. To the extent demand for treatment of acute problems or crises is less price elastic than demand for extended psychotherapy, our results will underestimate the impact of price on mental health utilization.

Table I shows the frequency of mental health care episodes by episode and provider type. If we include one episode per individual in our sample, then 468 episodes of the total 646 episodes (72.4 percent) include outpatient visits. However, if we include multiple episodes per individual, as we do for our analysis of utilization within episodes, then there are 498 episodes with outpatient visits. Sixty-three percent of outpatient episodes are provided by general physicians and psychiatrists. There is clinical support for the finding that physicians are the dominant provider

2. Using a sensitivity analysis, we assessed the impact of using longer and shorter time intervals to define episodes. While the number of episodes in the sample was sensitive to the time period used, the impact on the empirical results was not significant.

3. Goldman, Scheffler, and Cheadle further subdivide episodes according to intensity of utilization and length of episode [5].

**Table I.** Mental Health Episodes by Episode Type and Provider Type

EPISODE TYPES	PROVIDER TYPE				
	Total	Physician	Psychologist	Mental Health Team	Multiple Provider Types
Outpatient Visits Only	401	247 62%	83 8%	37 21%	34 9%
Outpatient Visits with Medication	31	25 80%	3 10%	0	3 10%
Outpatient Visits with Hospitalization	36	24 67%	4 11%	2 6%	6 17%
Hospitalization Only	178	*	*	*	*

\*Provider type is not available for hospital-only episodes.

type in our sample of relatively short mental health episodes. Knesper, Pagnucco, and Wheeler found that primary care physicians treat clients in shorter time periods than psychologists [11].

## II. Empirical Specification

Outpatient psychiatric visits or medications are not demanded for their own sake but because they affect an individual’s mental health. Accordingly, the theory of demand for health [6; 16] is appropriate for modeling the effects of price or changes in cost sharing on the utilization of mental health care services. The generalized Grossman model developed by Muurinen is employed in this paper because it allows for zero use of mental health care in some periods.

Consumers are assumed to be life-time utility maximizers and utility is a function of a composite consumption good,  $z(t)$ , and the services of the stock of mental health, or reduced sick time,  $s(t)$ . The utility function is:

$$\int_0^T \beta(t)U[z(t), s(t)]dt, \quad U_z > 0, U_s < 0, \tag{1}$$

where  $\beta(t)$  is a time discount factor and  $T$  is the time of death. Sick time is “produced” from the stock of mental health,  $H(t)$ , according to:

$$s(t) = \phi[H(t)], \quad \phi' < 0, \phi'' > 0. \tag{2}$$

The stock of mental health changes over time as an individual purchases mental health services  $\overline{M}(t) = M_1(t), M_2(t) \dots M_n(t)$  and the stock of mental health deteriorates:

$$\dot{H}(t) = f(t)\overline{M}(t) - \delta[t, x(t)]H(t), \tag{3}$$

where  $f(t)\overline{M}(t)$  is the new health produced by use of mental health services and  $\delta[\cdot]$  is the rate of depreciation of health. The rate of depreciation is a function of age<sup>4</sup> and other exogenous environmental factors,  $x(t)$ .

4. The prevalence rate of organic mental disorders, measured as the prevalence rate of mild or severe cognitive impairment, increases over the life span [4]. And in a study of older adults, Murrell, Himmelfarb, and Wright found that depression increases with age for men and the highest depression scores were found for women 75 years and older [15].

Individuals' wealth stocks change over time according to:

$$\begin{aligned} \dot{W}(t) = & rW(t) + Y[s(t), \bar{M}(t), R(t)] \\ & - [P^z(t)z(t) + \bar{P}^m(t)\bar{M}(t)], \end{aligned} \quad (4)$$

where  $r$  is the rate of interest,  $P^z(t)$  the exogenous price of  $Z(t)$ ,  $\bar{P}^m(t)$  the exogenous price vector of mental health services, and  $Y$  earned income, which is a function of sick time, the use of mental health services (if income is lost due to absence from work), and other relevant variables,  $R(t)$ . If for institutional reasons (i.e., sick leave) income is not lost due to absence from work, then  $Y$  will not depend on  $\bar{M}(t)$ .

Treating the health decision problem as a moving endpoint problem in dynamic optimization Muurinen shows that for users of health services the sum of the marginal consumption benefit of health and the marginal production benefit of health must equal the user cost of health capital<sup>5</sup>:

$$[U_s/\alpha + Y_s]\phi' = [\delta(t, x(t))]C(t), \quad (5)$$

where  $[U_s/\alpha]\phi'$  is the marginal consumption benefit of health,  $Y_s\phi'$  is the marginal production benefit of health, and  $C(t)$  is the marginal cost of new health investment.  $C(t)$  is equal to the sum of the money price of care and the opportunity cost of using mental health services, divided by the marginal productivity of mental health services in producing new health.

This generalized Grossman model suggests that for users of mental health care, the demand for outpatient mental health visits,  $VISITS$ , will be a function of the marginal utility of reduced sick time,  $U_s$ , the marginal utility of initial wealth,  $\alpha$ , the opportunity cost of care in the form of lost income,  $Y_s$ , the marginal effect of health stock on sick time,  $\phi'$ , the consumer's age,  $t$ , other environmental factors that effect the rate of depreciation of the health stock,  $x(t)$ , and the marginal cost of new health investment.

The marginal utility of reduced sick time will vary by individual and will depend on the characteristics of the individual.  $U_s$  is therefore a function of individual characteristics, such as sex (*FEM*) and race (*NONWHITE*). The marginal utility of wealth and the opportunity cost of care will depend on an individual's wealth or as a proxy for wealth their income (*SALARY*). The marginal effect of health stock on sick time will depend on the individual's current health status (*DISHOLD*).

In the demand for health model developed by Muurinen, the rate of depreciation of health is a function of both the age of the health stock (*AGE*) and the intensity of its use. Thus the variables included in  $x(t)$  are factors that might alter the use-related depreciation of an individual's mental health stock, such as location—city v. country (*RURAL*) and education (*ELEM*, *SOMECOLL*, and *BA*). Education may affect an individual's life-style decisions and health habits (i.e., diet and exercise), and thus their use-related deterioration of mental health. Keeler et al. found that health habits, such as smoking, drinking, and exercising have a significant association with the probability of using mental health services. For example, their results suggest that individuals who do not get much exercise have a higher likelihood of using mental health services than moderate or heavy exercisers [9].

The marginal cost of new health investment is a function of the money price or the out-of-pocket price of mental health services to an individual (*NETPR*), the time cost of mental health

5. It is also assumed that the proportionate change of health investment costs over time is equal to the rate of interest.

**Table II.** Variable Descriptions (*N* = 497)

Variable	Description	Mean	Standard Deviation
<i>ELEM</i>	= 1 if individual does not have high school degree	0.05	0.21
<i>SOMECOLL</i>	= 1 if individual has some college experience	0.24	0.43
<i>BA</i>	= 1 if individual has college or higher degrees	0.43	0.50
<i>FEM</i>	= 1 if female, 0 if male	0.43	0.50
<i>NONWHITE</i>	= 0 if white, 1 all other groups	0.13	0.34
<i>AGE</i>	Age as of 1/1/80	42.11	10.13
<i>SALARY</i>	Annual deflated federal salary, 1980, in thousands of dollars	26.68	
<i>DISHOLD</i>	= 1 if physical disability reported on employment record	0.35	0.48
<i>PSYCHMD</i>	Ratio of psychiatrists to total physicians in the individual's county, 1978	0.07	0.04
<i>NETPR</i>	Consumer's out-of-pocket price for an outpatient mental health visit	10.36	5.52
<i>PSYCHPR</i>	Average price (deflated) of a physician/psychiatrist visit, by HCFA region	10.52	2.56
<i>RURAL</i>	= 1 if individual lived in rural county	0.04	0.20
<i>FAC-INPAT</i>	= 1 if there is a long-term hospital located in the individual's county	0.51	0.50
<i>HOSP</i>	= 1 if episode includes inpatient services	0.08	0.28
<i>DRUG</i>	= 1 if episode includes medication	0.06	0.25
<i>MD</i>	= 1 if 90% of visits (over whole episode) provided by physician/psychiatrist	0.62	0.48
<i>TEAM</i>	= 1 if 90% of visits (over whole episode) provided by mental health team	0.09	0.29
<i>MIXED</i>	= 1 if 90% of visits (over whole episode) not provided by one provider type	0.08	0.28

services or as a proxy the availability of mental health providers (*PSYCHMD*), and the marginal productivity of mental health services which may vary by type of mental health care episode (*HOSP*, *DRUG*) and by type of mental care provider (*MD*, *TEAM*, *MIXED*). The variables are defined in Table II.

Accordingly, the following equation is estimated for users of mental health services:

$$\begin{aligned}
 \text{VISITS} = f(\text{FEM}, \text{AGE}, \text{NONWHITE}, \text{SALARY}, \text{ELEM}, \text{SOMECOLL}, \text{BA}, \\
 \text{DISHOLD}, \text{RURAL}, \text{NETPR}, \text{PSYCHMD}, \text{HOSP}, \text{DRUG}, \text{MD}, \\
 \text{TEAM}, \text{MIXED}).
 \end{aligned}
 \tag{6}$$

Ideally, the price variable included in the demand equation would be the “effective price” or the true shadow price of care. Keeler, Newhouse, and Phelps show that the effective price depends on the coinsurance rate and the number of days left in the accounting period of the insurance plan [8]. Newhouse, Phelps, and Marquis show, however, that when individuals always exceed their deductible, marginal price is the theoretically correct price [17].

*NETPR* is the marginal price of an additional outpatient visit. Thus for most users of mental health service, price has been specified correctly. However, for low users (i.e., in the range of one to four visits), price has been misspecified if the deductible has not otherwise been met. The bias resulting from this omission, however, is most likely very small because the \$100 or \$150 deductible in the High Option Blue Cross-Blue Shield Plan is a family deductible and applies to both medical and mental health care services.

*NETPR* is calculated for each individual by dividing the individual’s expenditures for outpatient mental health visits by his/her number of visits; and then multiplying this average visit price by the coinsurance rate (0.2 before January 1981 and 0.3 after January 1981). A potential problem with estimating price by dividing expenditures by visits is that visits do not measure intensity of service (for example, time during the visit) or quality of service. If there is measurement error in the visits variable, the estimated price variable will contain errors that are negatively associated with the true price variable and this will result in a bias away from zero in the price elasticity estimate [17]. In our empirical work, however, we control for provider type and this may eliminate the quality or service intensity variation.

Episode type may also be endogenous. For example, Keeler et al. found that users of mental health services are more likely to purchase psychotropic drugs when there is no out-of-pocket cost to the user [9]. And if inpatient and outpatient mental health services are substitutes, then the probability of beginning an inpatient mental health care episode may be higher in markets where the price of outpatient mental health visits is higher.

Accordingly, we use a multinomial logit model to estimate the impact of economic factors, such as the average areawide price of a psychiatrist visit, *PSYCHPR*, the availability of mental health providers, *PSYCHMD*, and the availability of inpatient health facilities, *FAC-INPAT* on the choice of episode type. In addition to economic factors, provider type and characteristics of the mental health user, such as age, sex, race, disability status, and income are included. However, data on provider type is not available for inpatient-only episodes. Thus, equation (7) is estimated twice. First, it is estimated using the sample of all episode types, but excluding provider type. Second, it is estimated using the sample of outpatient episodes and including provider type.

$$EPTYPE = g(AGE, FEM, NONWHITE, SALARY, DISHOLD, PSYCHPR, PSYCHMD, FAC - INPAT, MD, MIXED, TEAM). \quad (7)$$

Support for treating provider type as an exogenous variable is found in the literature. With respect to the market for mental health care services, the results of Wells et al. suggest that the choice of provider type—mental health care specialist, such as a psychiatrist, psychologist, or psychiatric social worker versus a general medical physician is not sensitive to the generosity of insurance coverage [24]. And in the market for physical health services, Marquis found that the level of cost-sharing is not significantly related to consumers’ choices of provider type—general practitioner in private practice versus specialist in private practice versus hospital emergency room or clinic [13].

Ideally, the price variable for the multiple logit equation would be the expected cost of a

**Table IIIA.** Logit Estimates of Episode Type<sup>a</sup> (*N* = 646)

Variables	EPISODE TYPE		
	Outpatient with drugs	Outpatient with hospitalization	Inpatient only
<i>CONSTANT</i>	-3.36** (1.26)	-0.84 (1.18)	0.47 (0.67)
<i>AGE</i>	0.01 (0.02)	0.00 (0.02)	0.04** 0.01
<i>FEM</i>	0.15 (0.43)	-0.06 (0.39)	-0.84** (0.23)
<i>NONWHITE</i>	-0.59 (0.77)	0.74 (0.44)	1.64** (0.26)
<i>SALARY</i>	-0.01 (0.02)	-0.06* (0.02)	-0.08** 0.01
<i>DISHOLD</i>	-1.16* (0.51)	-0.49 (0.39)	0.17 (0.21)
<i>PSYCHPR</i>	0.09 (0.07)	0.01 (0.07)	-0.07 (0.04)
<i>PSYCHMD</i>	1.20 (5.52)	-5.67 (5.38)	-12.41** (3.23)
<i>FAC-INPAT</i>	-0.39 (0.40)	0.07 (0.37)	-0.20 (0.22)

*F* statistic for all parameters (except intercept) equal to zero = 4.92\*\*

a. Estimated using PC CARP (Iowa State University, 1986). Standard errors are shown in parentheses.

\*Statistically significant at the 5% level.

\*\*Statistically significant at the 1% level.

complete episode of each of the four treatment patterns. Since the three episode types with outpatient visits are approximately the same average length, the expected cost will be proportionate to the out-of-pocket visit price. Thus the average areawide price of a psychiatrist visit is used as an approximation to the expected outpatient episode cost.

### III. The Empirical Results

#### *Choice of Episode Type*

The results of the multinomial logit analyses of the choice of episode type are reported in Tables IIIA and IIIB. In both tables the omitted episode type is outpatient-only episodes (outpatient episodes with no drugs and no hospitalization).

The average area-wide price of a psychiatrist visit does not have a statistically significant impact on the choice of episode type;<sup>6</sup> however, the time price of care, measured as the availability

6. Since the availability of psychiatrists (*PSYCHMD*) and price (*PSYCHPR*) are positively correlated, an additional specification excluding *PSYCHMD* was estimated. Deleting *PSYCHMD* from equation (8) does not change the result that *PSYCHPR* has a statistically insignificant effect on episode type.



**Table IIIB.** Logit Estimates of Outpatient Episode Type<sup>a</sup> (*N* = 474)

Variables	EPISODE TYPE	
	Outpatient with drugs	Outpatient with hospitalization
<i>CONSTANT</i>	-4.01** (1.40)	-1.69 (1.28)
<i>AGE</i>	0.01 (0.02)	0.00 (0.01)
<i>FEM</i>	0.23 (0.44)	0.03 (0.38)
<i>NONWHITE</i>	-0.64 (0.77)	0.81** (0.43)
<i>SALARY</i>	-0.01 (0.02)	-0.06** (0.03)
<i>DISHOLD</i>	-1.28* (0.52)	-0.53 (0.39)
<i>PSYCHPR</i>	0.09 (0.08)	0.02 (0.07)
<i>PSYCHMD</i>	0.66 (5.65)	-6.25 (5.45)
<i>FAC-INPAT</i>	-0.37 (0.40)	0.07 (0.37)
<i>MD</i>	1.15 (0.64)	0.77 (0.57)
<i>TEAM</i>	-7.97 (34.35)	0.11 (0.90)
<i>MIXED</i>	1.08 (0.86)	1.63* (0.68)

*F* statistic for all parameters (except intercept) equal to zero = 1.52

a. Estimated using PC CARP (Iowa State University, 1986). Standard Errors are shown in parentheses.

\*Statistically significant at 5% level.

\*\*Statistically significant at 1% level.

of psychiatrists, does have a significant impact. The availability of psychiatrists has a negative and statistically significant impact on the probability of beginning an inpatient-only episode, relative to an outpatient-only episode. An increase in the availability of psychiatrists relative to other types of physicians may decrease the time costs (travel and waiting time costs) of outpatient mental health services, and thus decrease demand for inpatient care, a potential substitute for outpatient care. This is consistent with Acton's results that suggest travel time functions as a price in determining demand for medical services [1]. Further, re-estimating equation (7) with the psychiatrist to population ratio, rather than the psychiatrist to physician ratio, yields very similar results.

The characteristics of the individual also appear to affect the choice of type of mental health episode. Individuals with higher incomes are less likely to have mental health episodes that include

hospitalization. This is consistent with the hypothesis that individuals with higher incomes, and therefore higher time costs of care, are more likely to substitute outpatient treatment for inpatient treatment in order to minimize the time costs of care. The results also suggest that women are less likely to have inpatient only episodes, while older individuals and nonwhites are more likely to have episodes of mental health which consist of only inpatient care. Further, individuals with physical disabilities appear to be less likely to have outpatient episodes with drugs. Physical disabilities may increase the probability of initiating a mental health episode since the problems of coping with the disability may lead to mental health problems. However, this type of mental health problem is probably less likely to require treatment with drugs.

With respect to the impact of provider type on outpatient episode type, the results suggest that when the provider is a physician, episodes are more likely to include medication than when the provider is a psychologist. However, this result is not statistically significant at conventional significance levels. And as one would expect, episodes that include both inpatient and outpatient treatment are more likely to include multiple provider types.

#### *Level of Use within Episodes of Treatment*

Equation (6) is estimated in double-log form using three specifications.<sup>7</sup> Regression A assumes the elasticity of demand is constant. Regression B allows the elasticity of demand to vary across episode types. Regression C allows the elasticity of demand to vary across provider types. The results of these cluster regressions (ordinary least squares regressions with adjustments for the lack of independence in the data—multiple episodes by the same individual over time) on the logarithm of the number of outpatient mental health visits are reported in Table IV.<sup>8</sup> The coefficients on the dummy variables can be interpreted as percentage changes and the coefficient on *SALARY* and *NETPR* as elasticities.

When the elasticity of demand for outpatient mental health visits is allowed to vary across episode type, the results suggest that the elasticity of demand for outpatient visits in outpatient-only episodes is  $-0.34$ . The estimated elasticity within episodes associated with drugs is  $0.75$ . However, we could not reject the null hypothesis that the elasticity (the sum of the coefficients on *LN<sub>NETPR</sub>* and *LN<sub>NETPR</sub> \* DRUG*) is equal to zero at the ten percent level of significance. Further, the results suggest that compared to outpatient-only episodes, individuals purchase 36 to 39 percent more outpatient visits in episodes including hospitalization.

When the price elasticity of demand for outpatient mental health visits is allowed to vary by provider type, the results suggest that demand for visits to psychiatrists and other physicians is less elastic than demand for visits to psychologists. The elasticity is  $-0.74$  in episodes where psychologists are the providers. In episodes where psychiatrists and other physicians are the providers, the estimated elasticity is  $-0.15$ . Again in both cases demand is inelastic; however, demand for outpatient visits provided by MDs is less responsive to changes in the out-of-pocket price of visits than demand for outpatient visits provided by psychologists. This result is supported

7. An additional specification including four dummy variables representing the occupation of the consumer was estimated. These results are very similar to the ones reported in the paper. In addition, these results suggest that, holding salary constant, individuals employed in professional and administrative occupations use more mental health visits than blue collar workers.

8. Regressions using ordinary least squares and regressions using an instrumental variable for *NETPR* yield similar results. However, the price elasticity of demand for outpatient mental health visits is  $-1.39$  using the instrumental variables method.

**Table IV.** Regressions on Outpatient Utilization within Episodes<sup>a</sup>

Variables	(A)	(B)	(C)
<i>CONSTANT</i>	0.99 (0.55)	1.15* (0.55)	2.02** (0.71)
<i>FEM</i>	0.13 (0.11)	0.12 (0.11)	0.13 (0.11)
<i>AGE</i>	-0.01 (0.00)	-0.01 (0.00)	-0.01 (0.00)
<i>NONWHITE</i>	0.15 (0.14)	0.14 (0.14)	0.15 (0.14)
<i>LSALARY</i>	0.50** (0.16)	0.45** (0.16)	0.46** (0.16)
<i>ELEM</i>	-0.07 (0.23)	-0.09 (0.23)	-0.05 (0.23)
<i>SOMECOLL</i>	-0.06 (0.12)	-0.06 (0.12)	-0.05 (0.12)
<i>BA</i>	-0.22 (0.14)	-0.23 (0.14)	-0.19 (0.14)
<i>DISHOLD</i>	0.01 (0.10)	0.00 (0.10)	0.01 (0.09)
<i>RURAL</i>	0.14 (0.23)	0.16 (0.23)	0.16 (0.23)
<i>LNTPR</i>	-0.33** (0.10)	-0.34** (0.11)	-0.74** (0.21)
<i>PSYCHMD</i>	2.81* (1.21)	2.81* (1.21)	2.81* (1.21)
<i>HOSP</i>	0.36* (0.16)	1.13 (0.71)	0.39* (0.16)
<i>DRUG</i>	-0.11 (0.18)	-2.41* (1.05)	-0.06 (0.18)
<i>MD</i>	-0.50** (0.11)	-0.49** (0.11)	-1.85** (0.57)
<i>TEAM</i>	-0.13 (0.18)	-0.13 (0.17)	-1.41 (1.06)
<i>MIXED</i>	0.46** (0.18)	0.44* (0.18)	0.11 (0.91)
<i>LNTPR*HOSP</i>		-0.34 (0.30)	
<i>LNTPR*DRUG</i>		1.09* (0.49)	
<i>LNTPR*MD</i>			0.59* (0.25)

Table IV. Continued

Variables	(A)	(B)	(C)
<i>LNTPR*TEAM</i>			0.58 (0.49)
<i>LNTPR*MIXED</i>			0.13 0.41
	<i>N</i> = 498 <i>R</i> <sup>2</sup> = .1651	<i>N</i> = 498 <i>R</i> <sup>2</sup> = .1769	<i>N</i> = 498 <i>R</i> <sup>2</sup> = .1771

a. Estimated using SUPERCARP (Iowa State University) which adjusts for within contract variation. Standard errors are shown in parentheses.

\*Statistically significant at the 5% level.

\*\*Statistically significant at the 1% level.

by clinical evidence. Knesper, Pagnucco, and Wheeler found that psychiatrists cared for a more seriously ill patient population than psychologists or social workers [11].

Further, the results suggest that compared to episodes where psychologists are the providers, individuals purchase 49 to 53 percent fewer visits in episodes where MDs are the providers, and individuals purchase 40 to 46 percent more visits in episodes with multiple providers. Again this is supported by clinical evidence. Knesper, Pagnucco, and Wheeler found that primary care physicians provide an average of 4 visits per client, while psychologists provide an average of 12 visits per client [11].

The coefficient on *PSYCHMD* is positive and statistically significant in all three specifications.<sup>9</sup> This result is consistent with the hypothesis that an increase in the availability of psychiatrists reduces the time costs of outpatient mental health care, and therefore increases utilization of outpatient mental health care visits. This result is also consistent with the bandwagon effect. A higher ratio of psychiatrists to all physicians may reflect a greater acceptance of mental health treatment among consumers, and therefore increase utilization of outpatient mental health care visits.

With respect to the three variables that appear to be most relevant in Grossman's demand for health model, age and education have statistically insignificant effects on utilization of outpatient mental health visits, while income has a positive and statistically significant effect on utilization. The income elasticity of demand for outpatient mental health visits is estimated to be 0.45 to 0.50. Grossman also found that an individual's wage rate had a positive and statistically significant effect on medical care utilization [6].

The coefficient on education is expected to be negative if individuals with more education are more efficient producers of health [6] or if individuals with more education choose lifestyles that reduce the use-related rate of depreciation on health [16]. Grossman and Wagstagg, however, found that education has a statistically insignificant effect on utilization of medical services [6; 22]. This result is similar to our finding that education has a statistically insignificant effect on utilization of mental health services.

9. Equation (6) was also estimated using the psychiatrist to population ratio. The results suggest that a one percent increase in the psychiatrist to population ratio results in a 9 percent increase in utilization of outpatient mental health visits. The results using the psychiatrists to physician ratio suggest that a one percent increase in this ratio results in a 19 percent increase in utilization.

## IV. Conclusion

While Manning, Newhouse, Duan, Keeler, Leibowitz, and Marquis have analyzed demand for physical health services by type of treatment (hospital, dental, acute-care, well-care, and chronic-care) [12], this is the first empirical analysis of demand for mental health services by type of treatment episode. Our empirical investigation of the elasticity of demand for mental health services is based on insurance claims data grouped into four clinically distinct types of mental health episodes (outpatient psychotherapy only, outpatient psychotherapy with drug treatment, outpatient psychotherapy with hospitalization, and hospitalization only), and therefore gives elasticity estimates for relatively homogenous units of care. Further, our analysis controls for type of mental health provider.

Our results suggest that price has a statistically insignificant effect on the choice of episode type and a negative and significant effect on utilization within episodes. Further, the elasticity of demand for outpatient mental health visits appears to vary by type of mental health care episode and type of mental health care provider. For example, demand for outpatient visits is less elastic in episodes associated with the use of drugs. And the demand for outpatient visits in episodes where a psychiatrist or other physician is the provider is less elastic than the demand for visits in episodes where a psychologist is the provider. The degree of responsiveness to price or insurance coverage is important because, other things equal, services that are more elastic should be less well insured.

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