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A Behavioral Model of the Medical Offset Effect

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ABSTRACT

Persons who suffer from mental illness consume a disproportionate--and some maintain an inappropriate--amount of general (somatic) health services. Many mental health care providers assert that the timely treatment of mental illness will generate a subsequent reduction in the use of non-mental health care. Although this alleged phenomenon--termed the medical offset effect--has been intensively studied for two decades, these efforts have not produced anything approaching a consensus concerning the very existence of the effect. Different definitions and measures of the concept, different experimental designs, different research agendas, methodologies, and statistical techniques have contributed to researchers more often than not "talking past" one another. Furthermore, the findings of the overwhelming majority of offset studies have been vitiated by a variety of methodological shortcomings. Most of these shortcomings share a common etiology: the failure of researchers to explicitly either describe or analyze the behavioral foundations of the relationships they are trying to observe and measure. Research efforts have been largely devoted to identifying factors associated with the offset, rather than explaining the offset.

In this article we develop a behavioral model for explaining the medical offset and providing (a priori) justification for positing particular reltionships and, concomitantly, selecting and analyzing particular variables for study. This approach holds greater promise for enabling future research to incrementally advance our knowledge and understanding of the complex behavioral processes involved in the medical offset effect.

A BEHAVIORAL MODEL OF THE MEDICAL OFFSET EFFECT

INTRODUCTION

Mental health care providers have long asserted that the timely treatment of mental illness generates a subsequent reduction in the use of non-mental health care. This alleged phenomenon—termed the medical offset effect--has been intensively studied for almost two decades. Despite an overwhelming preponderance of evidence, uncertainties about the role of conditioning factors, the magnitude of the effect, and—more fundamentally--skepticism about the very existence of the effect continues to persist.

In part, the ambiguities shrouding offset research findings are a product of the different definitions and measurements of the concept which researchers have employed. Most (including the present authors) have defined the offset as a reduction in general health service utilization following a mental health intervention, independent of the level of mental health service utilization, and regardless of what happens to total—mental and physical—health service use.

Others—particularly those interested in cost-effectiveness, and public policy and private insurance company policy implications—have focused on (a) the latter—the total (physical and mental) health service utilization level; or (b) the changes in the pre-, as opposed to the post-mental health intervention, general health service utilization level.

Some researchers have measured the offset as changes in the number of visits to a health care provider; others have calibrated the effect in dollars—assessing changes in expenditures on, or in reimbursement for, medical care.

Beyond these elemental differences in definitions and means, the ambivalence surrounding offset research findings stems from a variety of factors: much of the research has been at cross purposes with researchers seeking to address different issues, using different experimental designs, and different statistical techniques. In part the problem has been that the at times odd, but rich conglomeration of social scientists who together comprise the offset research "community" come from widely varying disciplines with widely varying research methodologies and analytical techniques. This has contributed to offset researchers frequently "talking past one another."

The ambivalence has been compounded by the fact that in virtually all such studies the findings have been vitiated by a variety of methodological shortcomings. Most of these shortcomings share a common etiology: the failure of researchers to explicitly either describe or analyze the behavioral foundations of the relationships they are trying to observe and measure. Research efforts have been largely devoted to identifying factors associated with the offset, rather than explaining the offset, i.e., description has superseded explanation.[1]

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[1] This is not to belittle efforts of those who have already conducted research in this area. Jones and Vischi have so accurately captured our regard for the earlier work in this field that we echo their statement:

> The authors of the studies reviewed deserve much credit for their pioneering efforts. Many of the studies had to be done with minimal resources and limited data. Since many of the studies were only exploratory, the critiques of these studies may at times appear somewhat harsh. However, the primary purpose of this report is not to criticize past efforts, but rather to pave the way for additional research that can fill the gaps in our current understanding (1, p. 2).

Grappling with these issues is made more difficult when the participants lack a unifying behavioral model within which to synthesize and integrate the different components of health care behavior under investigation.

In this article we develop a behavioral model useful for explaining the medical offset and providing (a priori) justification for positing particular relationships and, concomitantly, selecting and analyzing particular variables for study. This approach will better enable future research to incrementally advance our knowledge and understanding of these complex behavioral processes.

BACKGROUND

Although a large share of the articles on the medical offset posit brief hypotheses about why the effect might be realized, rarely does the "methods" section reflect the hypotheses discussed in the introductory section. Instead, the focus of the analysis is simply to determine if an offset occurred, based on simple associations between two or three variables, or the cross-tabulation of a few variables with health services utilization.

The relationships so estimated are generally imprecise and often unreliable. They reflect not only the influence of the particular variables under study, but usually also the effects of excluded, but correlated, variables. For instance, suppose it is known that persons who have more social networks generally have a greater offset effect, and that those with more social networks are generally women. Now suppose further that a quasi-experiment to measure the offset effect is conducted, and gender is controlled for, but the number of social networks an individual has is not. Finally, suppose that it is found that being female is associated with a greater offset effect. What has been learned?

Has it been learned that (1) females are more likely to experience an offset, or that (2) females have more values manifested in their behavioral patterns that encourage them to seek help/care, or that (3) gender has no direct role in explaining the effect, but rather is simply serving (inadvertently) as a proxy measure for the number of social networks? Generally the conclusion that would be reached would be the first one, that females are more likely to experience an offset (although the question of "Why?" remains unanswered). That purely descriptive analysis and "finding" would not be very useful in understanding the observed behavior.[2]

Methodological shortcomings such as these cannot be dismissed out of hand. They account for why, despite the voluminous upsurge in the quantity of studies of the offset effect, our understanding of the phenomenon remains at a low level; so low, in fact, that after two decades of study, we are still uncertain of its existence. In essence, investigation of the offset effect has become stuck on a kind of research treadmill. Even after uncovering a variable that is statistically significantly related to the offset effect, without adequate <u>a priori</u> hypothesizing about the behavior being modeled (and consequently not having controlled for other variables known or plausibly hypothesized to impact the offset effect), additional research findings for the most part are unable to discount a host of competing hypothetical explanations. Given that, as Cook and Campbell have so succinctly

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[2] Moreover, in the event that the analytical technique employed is multiple regression--as is increasingly the case--this failure results in what in statistical parlance is known as a "specification error." The omission of relevant variables results in estimated coefficients that will be either smaller or larger than their true values, and consequently either understate or overestimate the offset effect. The omission of relevant variables also results in overestimating the residual variance. Hence inferences about the confidence interval around the coefficients will be inaccurate (the probability of Type I errors will be increased).

put it (2, p. 23), ". . . the only process available for establishing a scientific theory is one of eliminating plausible rival hypotheses . . ." this is no minor flaw.

Ten years ago, when the study of general health services utilization passed through a similar juncture, Hershey, Luft, and Gianaris wrote:

> Many studies of health services utilization have been made in the past few years . . . Occasionally, a specific model has been outlined and tested, but frequently little consideration has been given to exactly what behavior is being measured by the data . . . A basic hypothesis of this paper is that using only a few independent variables can lead to an incorrect interpretation of the data in comparison with using an expanded set of variables . . . Unfortunately, many investigations continue to be insensitive to the problems of omitting crucial variables (3, pp. 838-839).

In the next two sections we construct a causal behavioral model for investigating the medical offset effect. The model developed is something of an idealized one; it abstracts from considerations of data availability, accessibility, and cost, but nonetheless should prove useful in providing a benchmark for future empirical model-building efforts. The development of the model will proceed in two stages.

First, with a dropback of relevant findings from offset research, the hypothetical relationships between mental and general health status and their interactions with mental and general health service utilization will be examined. This is the essence of this research note: it provides the wherewithal to synthesize and integrate the offset literature. But it is not the entire task set forth here.

Second, the offset model will be viewed within the more general theoretical framework of a behavioral model of health care service use. The modeling of medical care behavior, being a longer standing, more sophisticated, and refined endeavor, will not be dealt with in detail. The discussion in this segment of the paper will seek merely to root the offset-specific considerations identified in the first portion of the discussion into a more general, better understood and wholistic behavioral model framework.

I. BEHAVIORAL FOUNDATIONS OF THE OFFSET: HYPOTHETICAL LINKAGES BETWEEN MENTAL HEALTH STATUS AND GENERAL HEALTH CARE UTILIZATION

If it does exist, how can a medical offset be explained? To address this issue, it is necessary first to understand how mental health status might be related to health service utilization. There are various possible explanations.

A. The Link Between Mental Health Status And General Health Status

Numerous studies have found that persons with mental disorders have higher rates of physical disorders (4-11) and even higher rates of mortality (12-14). In which direction, however, does causality run?

On the one hand, psychological and behavioral problems, in and of themselves, can cause poor health. The mentally disturbed are more likely to somatize their psychological problems (7, p. 32) and seek treatment for secondary physical symptoms. This is the causal relationship most commonly assumed by offset researchers, and portrayed by the Paths labeled "4" and "7" in Exhibit I.

INSERT EXHIBIT I ABOUT HERE

On the other hand, physical problems may cause psychological distress, leading to a rise in general health service utilization in three ways: (a) directly (Path 7),

whereby an individual seeks general health services in an effort to improve his low general health status; (b) indirectly (Paths 5-4-7), whereby the secondary emotional reaction to the physical ailment reduces mental health status, which prompts individuals to seek care for derivative, mental health-associated physical symptoms; and (c) indirectly, (Paths 5-6) whereby an individual seeks general health services for mental health problems because he seeks to avoid the stigma of using mental health services, and/or because general health services are relatively more accessible.

Yet another (the third) possible explanation of the coexistence of physical and psychological distress, and one that is rarely noted in the offset-specific literature, is what Hankin and Oktay term the "joint vulnerability theory": some individuals are more vulnerable to, and hence generally suffer, more physical as well as psychiatric ailments (15-18).

Joint vulnerability coupled with the observation that both psychological and physical conditions can serve as hidden causes or as complications of one another (6,19) results in high and co-occurring levels of both physical and psychological distress, and suggest that the psychiatrically ill may have even more physical problems than the general population. In 11 of the 12 studies reviewed by Hankin and Oktay (7, p. 32) this was in fact found to be the case; the psychiatrically ill had more physical ailments. Moreover, at least one of these studies (4) found that this

relationship persisted even after controlling for age, sex, marital status, and social class.[3]

This theory suggests that the time-dependent causal ordering of the general health status-mental health status relationship is equivocal: the mental health-general health status interaction is at once simultaneous and transactional. In addition to being affected by, and affecting, one another, common sense and casual observation tell us that mental health status and general health status are both also subject to change by other outside factors--variables as yet not discussed. This possibility is portrayed in Exhibit I, by jointly considering Paths "4" and "5."

The influence of other extraneous (not to imply unimportant) variables that jointly impact on mental and general health status and/or the possibility that particular individuals with particular types of characteristics are jointly vulnerable, however, suggests that the model of mental health status and health care utilization thus far developed is incomplete. The role of additional influences (exogenous variables) acting as conditioning and/or intervening factors will be investigated later in section II.[4]

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[3] The various linkages between physical and mental health, in general, have enjoyed much greater recognition, and has been the focus of much research in recent years (20, 21). Increasingly, they are construed by the general public as scientific fact. Nevertheless, the exact linkage mechanisms are still not well understood. Some, for example, maintain that emotional difficulties increase susceptibility to germs and/or enhance accident-proneness (22-24). Yet the exact nature of the cause of this relationship has not, as yet, been definitively established. It may be that a complex constellation of causative factors--some or all of which may be necessary, but none of which in and of itself may be sufficient—account for it. In that event, unequivocally isolating and identifying the relationship may be a long time (if ever) in coming.

[4] An exogenous variable is one whose variation is assumed to be determined by causes external to the system or model. Such variables may be contrasted with an endogenous variable whose variability is assumed to be determined by variables that are exogenous to, or other endogenous variables of, the model.

Potential Offset Effects

Within this context of the relationship between mental health status and general health status, what is it that mental health services can do to reduce general health service utilization? By reducing the severity of the level of distress in the mentally disordered, mental health treatment may reduce the somaticization of their psychological problems and/or sever the linkages by which psychological and behavioral problems can lead to physical health problems (Path "4"). Psychotherapy thus produces two positive health enhancing effects. First, it results in the desirable (primary) effect of reduced mental distress; second, it produces the indirect, or secondary, effect of reducing physical discomfort--thereby reducing or eliminating the basis for seeking medical care via Path 7. In addition, successful psychotherapy's positive impact on general health status (Path 4) may feed back into mental health status (Path 5): raising mental health status from abnormally low level can, in effect, snowball, further enhancing mental health status.

Viewed in this manner, the medical offset--to the extent that it exists--may be regarded as an outcome measure of psychotherapy. Other things being equal, the more effective the psychotherapy, the greater the offset.

This in fact is the perspective of most offset research. Note, however, that this model of behavior is consistent with only a portion of the behavioral model just developed. It is consistent with only two of the three (just-discussed) explanations of why individuals with mental disorders generally have physical distress as well. It is most compatible with the notion that psychological problems give rise to somatic ailments. To a lesser extent, it is also consistent with the joint

vulnerability theory. In this instance, the (again, usually implicit) offset model posits that it is the use of mental health services that impacts upon general health service usage: the relationship is assumed to be unidirectional ("recursive" in the nomenclature of statistical modeling). This is portrayed by two different paths in Exhibit I; one consisting of arrows 1 and 6, the other, of arrows 1, 4, and 7.

What, however, has happended to the third possible explanation of the coexistence of physical and psychological distress? The possibility that physical problems may cause psychological distress and mental illness has been ignored. Incorporating it necessarily complicates matters. This alternative explanation (which need not exist independently from either one or both of the first two possible explanations) turns the assumed causal relationship between general health service utilization and mental health service utilization around. It is general health service use that now impacts on mental health service usage.[5]

Obviously, either one of these causal orderings, or both of them, might be occurring at any particular moment in time. The appropriate model to investigate the medical offset, therefore, should not preclude the possibility of this simultaneous (non-recursive) relationship by assumption.

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[5] This is the behavioral model that is both implicit and most evident in the psychoeducational-psychotherapy offset studies (see, for example, 25). Uniformly in these studies, the study population first experiences a physical health problem (most commonly undergoing a surgical procedure, or the onset of a particular chronic disease). Subsequently, the individual receives psychotherapy in the form of information and emotional support.

Finally, mental health intervention may produce better general health status (and thus create an offset) in two other ways. Psychotherapy may encourage more rational behavior leading to a healthier lifestyle (Path 3) or it may contribute to better general health service efficiency through greater compliance with medical advice (27). Thus the offset would appear via Paths 2-12.

The behavioral explanations of the offset effect thus far discussed share a common focus; the relationship between mental health status and physical health status. It has already been suggested that there are other, exogenous variables, as yet not discussed, which also affect general health status and mental health status. So, too, there are other exogenous variables, as yet not discussed, that affect general health care utilization, mental health care utilization, and very plausibly, by extension, the medical offset effect, as well.

B. Patient Characteristics And Medical Care Delivery Systems

In very broad, conceptual terms, these other factors are patient characteristics, characteristics of the medical care delivery system, and interactions between these two sets of variables. More specifically, they may be referred to as the patient's predisposition to seek help and of which kind; patient compliance with medical advice; and the provider's training and incentive structure. These possibilities warrant more detailed discussion than they have received in the literature to date.

Numerous studies have found that individuals with a mental disorder have a much higher rate of general health services utilization than other patients (19, 26-35). Frequently the rate has been found to be more than double that of other patients

(as in nine of the studies reviewed by Hankin and Oktay (7), as well as in the studies reported in 26, 35-37).

Some analysts have tested specific hypotheses intended to sort out the extent to which this greater level of utilization might be at least partially attributable to the differences in physical health status--most notably Mechanic and associates (29, 36, 37), but also Budman and his colleagues (e.g., 39). That is, these researchers hypothesized that the mentally disordered have an enhanced predisposition to seeking care, and tested whether or not that factor alone (as opposed to their potentially greater physical health disorders) accounted for their relatively greater medical services utilization.

All of the studies investigating help- or care-seeking behavior have found it to be a significant explanatory factor in the use of general health services. It may be that for the mentally distressed medical care utilization fulfills a variety of important, emotionally-stabilizing functions (reassurance, social support, etc.), and that the actual source of care may be of secondary importance: they seek help "wherever" they can get it (30, 38, 40). Because there are factors encouraging individuals to enter the general health services sector (as opposed to the mental health specialty sector--most importantly differential insurance coverage and stigmatizing), this finding--a more specific behavioral/causal explanation--is suggestive of another line of inquiry. It implies that such individuals may be turning to a general physician--most likely their primary health care provider--for treatment of a mental disorder (Path "6"). It may also be that persons suffering psychological problems feel uncomfortable presenting psychiatric symptoms, and complain of one or more of a variety of minor acute ailments (36, 41, 42). In these instances, depending upon a host of factors

(including the individual patient's diagnosis, the severity of his disorder, his goals and expectations, his relationship with his provider, his provider's training, attitude, and caseload), this raises the specter of inappropriate utilization.[6]

Potential Offset Effects

Mental health intervention, as opposed to general health service use, more directly addresses the cause of the mental problem, rather than merely ameliorating the symptoms. Mental health service utilization, therefore, may be substituted for general heath service utilization creating an offset: an increase in mental health service usage, decreases the need for and use of general health service (Path 6 is replaced by Path 8). This substitution of mental health services for medical care service was the finding of Follette and Cummings (43) in their landmark study.[7]

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6 Other characteristics of the individual (e.g., the number and quality of his social networks) may, however, be the triggering device resulting in his turning to a general health, rather than a mental health, practitioner. This is the type of issue that can be raised and effectively addressed only with a behavioral model.

It is important to distinguish between these two different--though not mutually exclusive--explanations of the cause of the offset because they represent two very different factors (perhaps characteristic of different people) and they both cause and affect other, different behavioral factors. They are each subject to change, but by manipulation of different factors: which is to say, they have different policy implications.

7 They found, however, that when they added mental health service use to the post-mental health intervention level of general medical service utilization the offset effect vanished: the mental health services had, in effect, been substituted on nearly a one-for-one basis for the general health services.

Some offset researchers have argued that this is not likely to always be the case, and that Follette and Cummings' finding was an aberration. Their argument goes something like this: mental health service, being the more appropriate type of care is more effective and, hence, if provided, results in a net reduction in the number of services needed to achieve a particular level of comfort, other things being equal. That is, the provision of more appropriate and effective mental health services results in an offset.

Several additional relationships need to be identified. Path 9 (like Path 2) constitutes an efficiency-feedback loop, certainly a controversial one, in which non-mental health specialist providers might have an impact on mental health service utilization.

Finally, since there has been no claim in the literature that general health status directly affects mental health service utilization (i.e., no one has asserted that individuals in poor physical health seek care from mental health specialists for their physical health problems), and because there is no theoretical basis for such a direct relationship, Path 10 is implausible and not included in the model.[8]

Empirical research into the role and significance of help-seeking behavior has generally not focused on the potential offset effect. It is hardly surprising, therefore, that there have not been any efforts to integrate this line of inquiry and its fruits--the empirical findings and the behavioral model--with those of the more offset-specific literature. The time to do so, however, has come.

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8 This is not to suggest that changes in general health status have absolutely no impact on mental health service usage. It is very likely--and has frequently been hypothesized--that they, in fact, do. The relationship, however, by all accounts, is construed to be an indirect one, with mental health status acting as an intervening/mediating factor: changes in general health status may affect mental health status, which, in turn, may affect mental health service utilization.

II. A GENERALIZED MODEL OF HEALTH SERVICE UTILIZATION

As noted in the previous section, various patient characteristics are important to consider. But further elaboration of the basic model thus far developed requires a more complex set of interrelationships than that heretofore considered. For the time being, to keep things from getting too complicated it will be useful to simplistically conceptualize the model thus far developed and depicted in Exhibit I in a slightly different, more aggregative manner. The two health status variables (mental and general) may alternatively be subsumed under the category "Patient Characteristics," as in Exhibit II. Similarly, the two types of health service utilization (mental and general) may be aggregated to comprise more simply undifferentiated "Utilization."

INSERT EXHIBIT II HERE

In this re-conceptualization of the model it is easy to see that one of the relationships earlier discussed, utilization as a function of health status, may now be recast as "Utilization" as a function of "Patient Characteristics." This relationship may be direct--as in the case of the patient's health status characteristics (Path 2 in Exhibit II)--or it may be indirect. An individual's characteristics might indirectly affect his or her utilization by first affecting his perception of the need for, or the availability, acceptability, and the affordability of health care services (as in Paths 3 and 6). These indirect influences of patient characteristics on utilization are frequently lumped together and termed "access"

considerations. Each of these considerations (need for, availability, acceptability, and affordability) constitutes a potential barrier to the use of services, and thereby constitutes a potential factor differentiating access to, from utilization of, services. Access and utilization, therefore, are different constructs, and are incorporated into the model as such.

It should be evident that access to medical care is not an either/or issue: it is a dialectical concept, a question of degrees. Differential access to either mental health services or general health services or both has not been adequately explored. It is possible that some, or all, of the variations in the levels of utilization between mentally ill persons with at least one mental health visit and those without one that have been reported in the quasi-experimental offset literature have very little or nothing to do with the psychotherapy received, but instead are attributable to variations in access to mental health care.

It is necessary, therefore, to incorporate into the behavioral model access considerations, and to investigate the role of potential obstacles to seeking and obtaining care (both mental health care and general health care alike). Such factors include attitudes toward health and health care, whether or not the individual has a regular source of care, the individual's knowledge of the service characteristics of nearby care providers (i.e., types of specialties and treatments, hours of service, appointment time delays, in-office waiting time delays), money prices, confidence in the technical competence and the "humaneness" of the provider, as well as the various dimensions of the affordability consideration (viz., the individual's income, insurance coverage, the travel time to the provider, the travel distance, and the money price of care).

From this list it should be evident that access to care cannot be determined without joint consideration of characteristics of both the individual and of the health care delivery system. Access is not solely a function of the characteristics of the individual patient (or the potential patient-to-be). Those characteristics are only part of the picture and must be considered in combination with particular characteristics of the health care delivery system: specifically, individual providers and treatment characteristics. This joint determination of access is schematically portrayed in Exhibit III by the arrows running from "Patient Characteristics" and "Provider/Treatment Characteristics" to "Access," Paths 3 and 4, respectively.

In addition, provider and/or treatment characteristics are likely to be a function of patient characteristics. Particular types of health problems require particular types of treatment regimens, and may require particular types of (specialty) providers. Thus "Patient Characteristics" may directly affect "Provider/Treatment Characteristics," as shown by Path 1.

Furthermore, Lebow (44) has hypothesized that patients shop around until they find a provider of whom they approve. This is less likely to be true of, or as important to, individuals who have more restricted choices, such as persons in small communities and rural areas, or persons enrolled in health maintenance organizations relative to those with standard insurance coverage. These relationships, too, are captured by Path 1.

The remaining unexplained path in Exhibit II is 5. Independent of their effect on access, provider/treatment characteristics may have another, more direct, impact on utilization. Holding all access considerations constant, the perceived quality of

care attributed to a particular individual provider (or provider organization), or associated with a particular treatment protocol, is likely to directly affect whether or not an individual even considers seeking care from that particular provider or accepting and adhering to a prescribed regimen.

In addition, health facilities that do not offer a relatively large number of services or highly specialized medical care providers are, by their nature, less likely to be capable of handling many different types of cases. Other things being equal, simply because of the particular characteristics of such facilities, organizations, and providers, an individual is less likely to turn to them for care, i.e., utilization is a function directly related to their characteristics.

We are now in a position to integrate the two pieces of the behavioral model we have thus far developed independently. Re-extracting general and mental health status from "Patient Characteristics" and breaking utilization into its two component parts (general health service utilization and mental health service utilization) we now pool the relationships captured in Exhibits I and II to obtain "A Behavioral Model of the Medical Offset Effect," shown in Exhibit III.

INSERT EXHIBIT III HERE

III. EMPIRICAL ESTIMATION: MODELING AND DATA CONSIDERATIONS

We have then a behavioral model that explains the utilization of general and mental health services, and the determination of general and mental health status. In its simplest form, such a model would consist of (at least) four dependent variables described by (at least) four equations: [9]

$$GHSU = f(GHS, MHS, MHSU, W)$$

$$MHSU = f(GHS, MHS, GHSU, X)$$

$$GHS = f(MHS, GHSU, MHSU, Y)$$

$$MHS = f(GHS, GHSU, MHSU, Z)$$

Where:

GHSU: General Health Service Utilization

MHSU: Mental Health Service Utilization

GHS: General Health Status

MHS: Mental Health Status

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[9] The most obvious additional endogenous variable that might be incorporated into the model is patient satisfaction. See (45-47) for an example of the development and estimation of a path analytic model explaining general health status, general health service utilization, and patient satisfaction.

W, X, Y, Z: Different vectors containing all other relevant considerations, including patient characteristics, health care delivery system characteristics, and access considerations.

This set of equations comprises a simultaneous equation model. At least initially the "simultaneous" characterization may be troubling: it may be more intuitive to conceptualize time-dependent causal orderings between (at least) some of the endogenous variables. For instance, it is likely (a) that it is an initial change in mental health status that gives rise to an encounter with a mental health specialty provider, rather than vice versa, or (b) that the change in mental health status and the utilization episode occur concurrently. Yet (following up on the same example), since the time it takes an initial change in mental health status to work its way back into another change in mental health status (while varying greatly by individual) is generally likely to be less than the time period between observations, the observed variables must be considered as occurring simultaneously, that is, they must be considered simultaneously related.[10]

As is evident in the preceding discussion (and as represented by the probably overlapping, yet distinct, vectors W, X, Y, and Z) there are a host of confounding influences that need to be controlled for and/or explored if the estimates of the

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[10] The assumption of simultaneity does not preclude the possibility of there being (nor the investigation of) a concurrent lagged impact of one or more of the endogenous but (in this particular relationship) independent variables on one of the other endogenous (but in this instance) dependent variables. It is still possible to test the hypothesis—which several offset researchers have formulated—that the full impact of a mental health intervention may not be immediate, but might instead be of an enduring, cumulative nature.

offset are to be as accurate and robust as possible. Multiple regression lends itself uniquely to solving three of the most serious shortcomings pervading the offset literature: selection bias, statistical regression to the mean, and a greater degree of specificity with respect to the client, the provider, and the treatment. Nevertheless, it does not provide a vehicle for unequivocally establishing causality. All it is able to do is establish the existence of correlations. Herein lies the importance of distinguishing between a descriptive and a causal or behavioral model: The more circumspect one is in constructing a model based on plausible, causal relationships, explicitly hypothesized and posited, the greater the degree of confidence one may have in interpreting the results as representative of a causal, as opposed to simply a correlational, relationship.

The next step is to specify the model by developing explicit hypotheses concerning the causal relations (i.e., explaining each of the arrows in Exhibit III), and delineating the theoretical rationale for including (or excluding) particular variables from the analysis. Clearly, this hypothesizing cannot be undertaken in isolation from considerations of how the posited relationships might be measured, and whether or not the necessary data exist and are available.

The data requirements for testing the "full" behavioral model outlined are clearly prodigious. It is highly unlikely that any single data set will contain adequate measures of all of the necessary data elements. Since existing data sets contain different types of variables that reflect the different purposes for which they are collected, some data sets will be useful for addressing some of the hypotheses/issues related to the offset effect, but will be inadequate for others. Data availability and accessibility will not only largely determine the particular potential research issue menu, but will also largely circumscribe the particular

analytical techniques that may be employed. These are salient issues molding the specific characteristics of the final model.

For purposes of elucidating the process of specifying this model, a sampling of the variables that might be analyzed (depending on data availability) is presented in Exhibit IV.

CONCLUSION

Important though data considerations are in circumscribing the exact nature of the model that may be specified and estimated, they are secondary. The first step—the conceptualization, development, and use of a behavioral model benchmark—constitutes the framework within which to organize and pursue subsequent steps in the process of empirically operationalizing such a model. It is largely the failure to conceptualize, identify, and construct a behavioral model, a priori, that leaves many researchers working at cross purposes, and which too often serves only to further obfuscate the meaning of new findings and, concomitantly, what it is that we really know about the complex phenomenon known as the medical offset effect.

EXHIBIT I

BEHAVIORAL FOUNDATIONS OF THE MEDICAL OFFSET

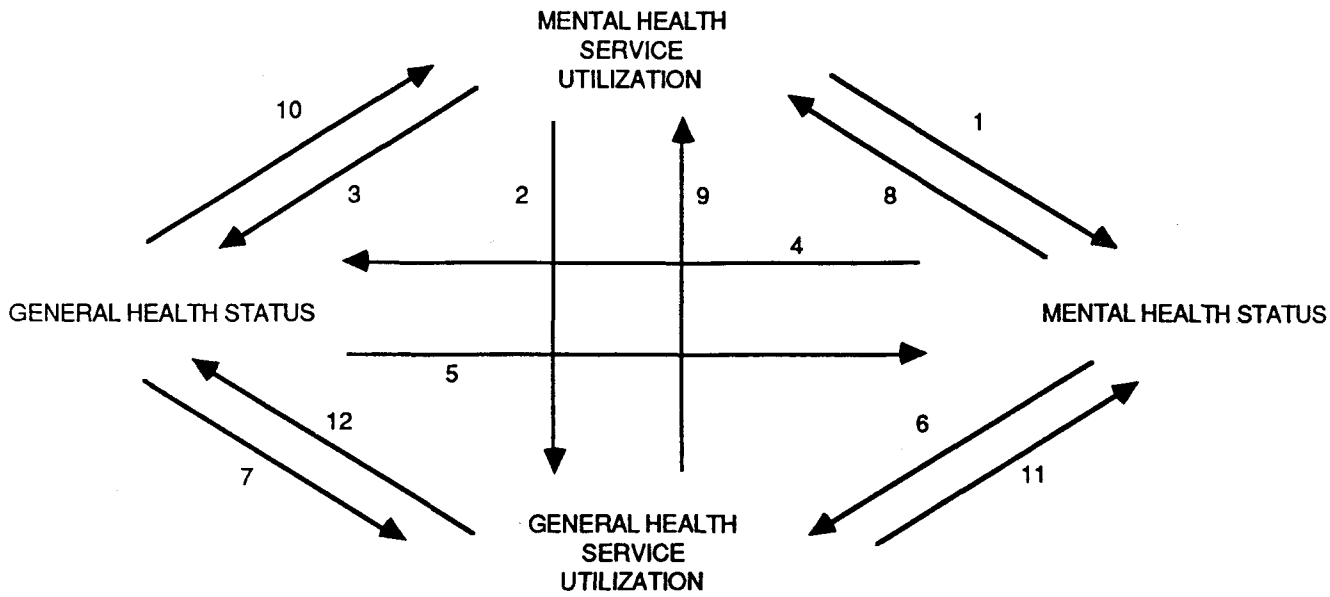

EXHIBIT II

CONSTRUCTING A BEHAVIORAL MODEL OF THE MEDICAL OFFSET: A SIMPLIFIED VIEW OF THE GENERAL CAUSAL MODEL

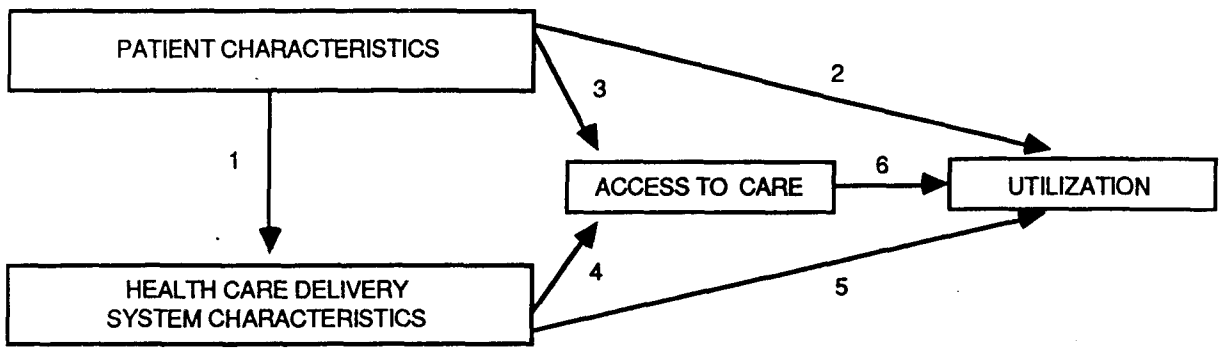

EXHIBIT III

A BEHAVIORAL MODEL OF THE OFFSET EFFECT

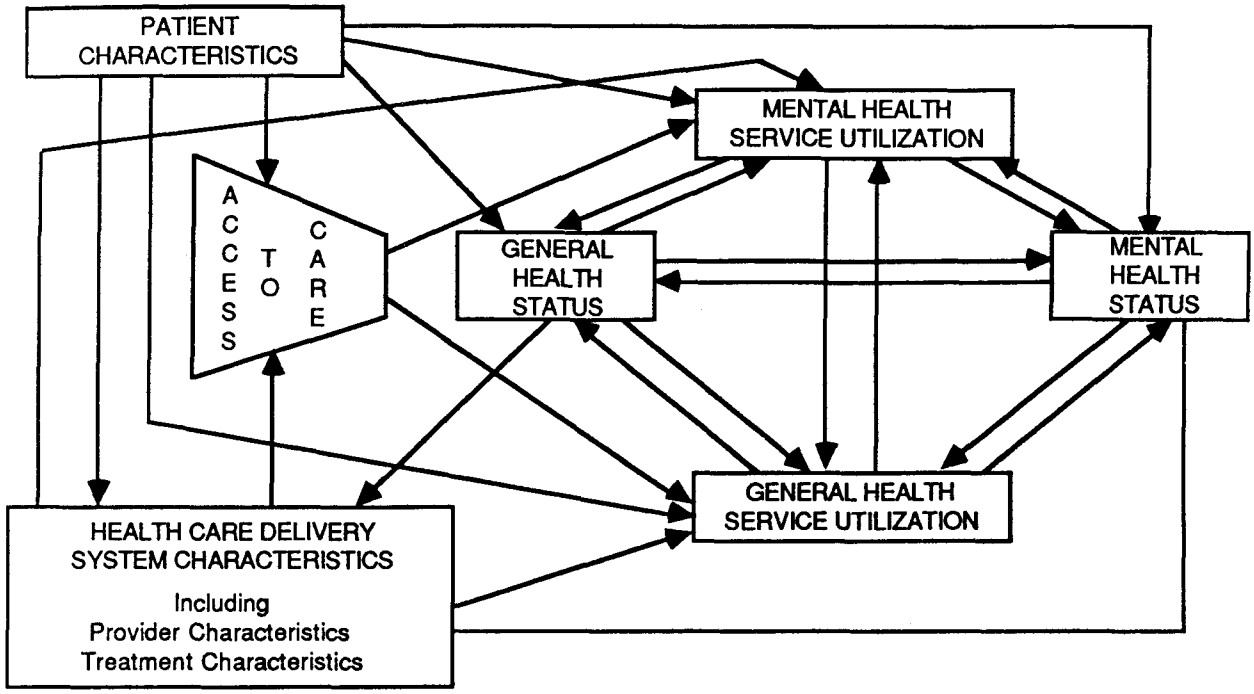

EXHIBIT IV

PERTINENT VARIABLES FOR THE SPECIFICATION OF A BEHAVIORAL MODEL OF HEALTH CARE UTILIZATION

I. CHARACTERISTICS OF THE INDIVIDUAL

A. Predisposing Variables: Factors Hypothesized to Affect the Proclivity to Need/Use Health Care Services

1. Health and Utilization Attitudes and Values

(a) Perception of the value of health
(b) Definitions of health and illness
(c) Threshold(s) for reacting to illness(es)
(d) Coping styles
(e) Perception of appropriate help-seeking behavior
(f) Perception of available, relevant services
(g) Perception of the effectiveness of available, relevant treatments
(h) Perception of the technical competence of relevant providers
(i0 Perception of the humaneness of relevant providers
(j) Tendency to comply with provider's instructions

2. Individual and Family Characteristics

(a) Age
(b) Sex
(c) Family size
(d) Marital status

3. Social Structure

(a) Race/culture
(b) Education
(c) Occupation
(d) Religion
(e) Social support network
(f) Place of residence (rural vs urban)

B. Utilization Enabling Factors

1. Income
2. Insurance (quantity, quality and newness of coverage)
3. Education
4. Occupation
5. Has a regular source of care
6. Number of provider affiliations

C. Need for Services

1. General health status
2. Mental health status

II. CHARACTERISTICS OF THE HEALTH CARE DELIVERY SYSTEM

A. Resources

1. Number, type, and capacity of providers/facilities
2. Location of providers/facilities

B. Organization

1. Entry
   (a) Distance to provider/faciilty
   (b) Transportation available toprovider/facility
   (c) Usual appointment time delay
   (d) Usual travel time to provider/facility
   (e) Usual waiting time at provider/facility

2. Structure
   (a) Comprehensiveness of services provided
   (b) Continuity of care provided

C. Individual Provider Characteristics

1. Personal Characteristics
   (a) Age
   (b) Sex
   (c) Religion
   (d) Attitude towards mental illness and treatment

2. Professional Characteristics
   (a) Type of Specialty
   (b) Diagnostic and Teatment Skills
   (c) Interpersonal Communication Skills ("bedside manner")
   (d) Referral Network

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