A RAND NOTE

Data Collection for a Study of Variation in Psychiatric Care Resource Use

Peter D. Jacobson, C. R. Neu,
Kenneth Wells

November 1988

40 Years 1948-1988
RAND

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PREFACE

This document was developed as part of a larger Health Care Financing Administration (HCFA) project aimed at exploring alternatives for reimbursing psychiatric care. As part of the project, RAND was requested to provide technical assistance to the Alcohol, Drug Abuse, and Mental Health Administration's efforts to identify the sources of variation in psychiatric care resource use. The document should be of interest to researchers looking generally at reimbursement systems, and to those specifically interested in the provision of psychiatric care. During the preparation of this report, Peter Jacobson was a consultant to RAND. This work was performed under a Cooperative Agreement with HCFA and was supported by the RAND/UCLA/Harvard Center for Health Care Financing Policy Research.

SUMMARY

The provision of psychiatric care is characterized by wide variations in resource use. Identifying cost-homogeneous groups of psychiatric patients for the purposes of prospective reimbursement has proved problematic. To establish a basis for prospectively reimbursing psychiatric care, the sources of variation must be explored and documented more thoroughly. A number of empirical and analytical studies have attempted to identify the key sources of variation, so far without much success.

In this Note, prepared for the Health Care Financing Administration (HCFA), we suggest variables to be included in a data collection effort designed to analyze the sources of variation in psychiatric care. We begin with the literature review that formed the basis for our study. This review reveals little consensus on the variables, individually or as a set, to explain resource use in psychiatric care. Just about the only agreement in the literature is that diagnosis-related groups (DRGs) or other diagnostic groupings alone will not explain a significant portion of the variance. However, virtually all of the studies use methods that limit the extent to which the reported results can be relied upon for public policy purposes. Thus, we also review the data limitations and problems a researcher is likely to face in studying psychiatric admissions.

We then suggest variables to be collected, on the basis of our review of the available literature and consultations with clinicians and experienced medical record abstractors. For each variable, we describe why it might be useful as an explanatory variable and where information to identify the variable can be found in the record. We also describe the existing data sources likely to include the explanatory variables of interest. We then classify the explanatory variables into two categories, depending on the difficulty of data collection. In the first group we include patient, provider, and community characteristics that can be obtained from readily available primary and secondary

sources. The goal is to link together information from various sources to form a more complete picture of the circumstances surrounding particular episodes of hospital care.

The second group consists of factors that we call clinical complexity at admission, such as severity, functional status, and comorbidity. For this second group, we expect that data will not be readily available and will require more intensive primary data collection. However, it may be possible for record abstractors to develop proxies to measure symptoms of interest which in turn might explain resource use. Though these factors will not be easy to measure, we think that future research should be directed toward identifying valid case mix indicators that might explain variation in resource consumption.

The following is a checklist of the variables that should be considered to estimate resource use variation in psychiatric care.

I. Dependent variables

- A. Length of stay
- B. Charges

II. Explanatory variables

- A. Patient background characteristics
  1. Medicare beneficiary number
  2. Age
  3. Sex
  4. Race
  5. Employment/occupation status before admission
  6. Income
  7. Education
  8. Marital status (whether currently married)
  9. Primary payer
  10. Area of residence
  11. Medicaid status

12. Participation in other government programs
13. Availability of supplemental insurance

B. Patient admissions status
   1. Principal diagnosis
   2. Secondary diagnosis
   3. Legal status on admission: voluntary/involuntary commitment
   4. Prior place of residence
   5. Transfer status
   6. Recent prior admission (readmission)

C. Provider characteristics
   1. Facility name, and American Hospital Association (AHA) and Medicare provider number
   2. Setting of care characteristics for this episode
      a. Type
         (1) General hospital "scatter" beds
         (2) Nonexempt general hospital units
         (3) Exempt general hospital units
         (4) Private psychiatric hospitals
         (5) Public psychiatric hospitals
      b. Size
      c. Teaching status
         (1) Intern-to-beds ratio
         (2) Certified Graduate Medical Education (GME) program in psychiatry
      d. Occupancy rate (i.e., demand for beds)
      e. Ownership
         (1) Public or private
         (2) Nonprofit or for-profit
         (3) State or county or other
      f. Urban or rural
      g. Sole psychiatric provider in an area
      h. Referral centers

i. Percentage of patients involuntarily committed
j. Percentage of Medicaid patients
k. Local wage index

3. Physician characteristics
   a. Physician ID
   b. Specialty of admitting and treating physician, e.g., general practitioner or psychiatrist
   c. Education/training (including residency)
   d. Board certification status in psychiatry or other specialty
4. Inpatient treatment characteristics
   a. Process of care
      (1) Procedures
      (2) Medication
      (3) Complications
      (4) Restraints/ward behavior
      (5) Seclusion/isolation
      (6) Abnormal vital signs
      (7) Assaultive behavior
      (8) Availability of inpatient psychosocial services
5. Discharge status and destination

D. Community characteristics
   1. Availability of organized referral and aftercare settings
   2. Availability and accessibility of outpatient resources
   3. General environmental characteristics

E. State variables
   1. Bed-to-population ratios
   2. Physician-to-population ratios
   3. Psychiatrist-to-population ratios
   4. Local variation in Medicaid benefit structure
   5. Regional (state-to-state) variation in resource use and cost

III. Clinical complexity at admission

A. Severity of illness
   1. Suicide
      a. Attempted suicide
      b. Ideation
   2. Psychoses
   3. Violent, assaultive behavior
   4. Grave disability
      a. Recent severe weight loss
      b. Not eating or drinking on admission
      c. Provider's assessment that the patient is unable to care for himself in the community
   5. Severe cognitive impairment
      a. Disoriented or confused
      b. Poor memory
      c. Comatose or semicomatose
   6. Course of illness

B. Previous psychiatric treatment
   1. Any past history of psychiatric treatment (including drug or alcohol treatment and type of facility where treatment was rendered)
   2. Length of stay in previous inpatient episodes under Medicare
   3. Previous diagnoses and specific treatments
   4. Any psychotropic medication at admission

C. Functional status

D. Comorbid conditions

In Appendix A, we summarize the variables discussed, noting likely data sources for each variable, the expected reliability with which each variable is likely to be recorded, and how each variable might be used in devising improved reimbursement schemes. In Appendix B, we describe the medical records prepared by experienced abstractors. Appendix C is a matrix to help identify in the record where the variables of interest may be located.

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We received invaluable assistance on various aspects of this Note from Willard Manning, Grayson Norquist, Jackie Kosecoff, and Beth McGlynn. Their comments greatly facilitated and improved this Note. We also received valuable comments from the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) on an earlier draft. Finally, Grace Carter's comments as a reviewer strengthened this Note.

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I. INTRODUCTION

Developing an adequate reimbursement scheme for Medicare-covered psychiatric care has not been an easy task. Researchers have not been able to develop diagnosis-based groupings for psychiatric care that are homogeneous enough in resource use to establish equitable payment rates. Indeed, psychiatric hospitals and distinct psychiatric units of general hospitals were exempted from the Medicare prospective payment system (PPS) and continue to be reimbursed under separate rules for precisely this reason. A major problem has been the failure of diagnosis-related groups (DRGs) to predict resource use and the failure of alternative classification systems to perform significantly better. In addition, differences in case mix and types of services between various providers lead to fears of systematic error in reimbursement, with some providers being systematically overpaid and others who incur more costly cases being underpaid.

To develop an equitable and efficient payment system, it is necessary to identify the variables that might explain variations in cost, length of stay, and efficient treatment. Because previous studies relying on diagnosis alone have not been able to explain much of the variance in resource consumption, it has become necessary to consider a broader range of variables that might contribute to resource utilization patterns. As part of its efforts to develop a more efficient and equitable reimbursement system for inpatient psychiatric care, the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) proposed a retrospective study to collect data on patient and provider characteristics that might more accurately estimate resource use by psychiatric patients. RAND was requested to provide technical assistance to ADAMHA as part of a larger Health Care Financing Administration (HCFA) project aimed at exploring alternatives for reimbursing psychiatric care.

In preparation for this study, RAND reviewed previous studies and suggested variables to be included in the record abstraction. On the basis of our review and our experience with the proposed ADAMHA methodology, we suggested that a retrospective data collection effort faced serious data limitations, and that a prospective data collection study should be conducted instead. After the retrospective design was selected as a precursor to a prospective study, we prepared a list of suggested variables suitable for the data collection effort.

In this Note, we report on the suggested variables to be included in a data collection effort designed to analyze the sources of variation in psychiatric care. We begin with the literature review that formed the basis for our study, focusing on variables that have been identified in previous studies and on data limitations a researcher is likely to face in studying psychiatric admissions. We then describe the suggested variables and the existing data sources likely to include the explanatory variables of interest. For each variable, we describe why it might be useful as an explanatory variable and where information to identify the variable can be found in the record. We summarize this information (Appendix A), describe the medical record (Appendix B), provide a location of information matrix (Appendix C), and include a Bibliography.

Because this work was designed to answer specific questions, it excluded other important issues of reimbursement for psychiatric care. Most significantly, our work did not encompass the organization of mental health services, the development of alternative categories or payment systems (i.e., by provider type), or differences in practice style. For a comprehensive general review of these issues, we suggest reading Jencks et al. (1987).

The work for this Note was completed in December 1987. Since then, a few articles have appeared on the subject of pyschiatric DRGs and have been added to the Bibliography. None of the new material alters the conclusions reached or our analysis.

II. LITERATURE REVIEW: PSYCHIATRIC DRGS

OVERVIEW

Numerous articles have been written on the subject of psychiatric DRGs and similar diagnostic groupings. For the most part, they tend to follow two different approaches. One direction is to conduct statistical analyses of the power of diagnostic groupings to explain resource consumption in psychiatric care. The other approach is more theoretical, focusing on suggesting what variables might explain resource use if properly measured in future research. Both, however, reach the same general conclusion: Diagnostic groups alone provide an inadequate explanation of resource variation in psychiatric care. Still in dispute, though, is just what does explain the variance. Explanations range from patient severity on admission to inpatient treatment characteristics and the availability of alternative care settings. What makes this so difficult to analyze, based on the literature, is the lack of consensus and the number of possible variables to consider. These results are not surprising given the differentiation in psychiatric care between different types of facilities and differing treatment patterns (see Jencks et al., 1987).

Despite some of the problems we discuss below, the literature clarifies the underlying issues and provides excellent suggestions for future research. By laying a foundation for other studies, the literature is an important starting point for understanding the nature of the problems to be confronted in explaining resource use variation in psychiatric care.

METHODOLOGY

Our purpose in reviewing the literature was threefold. First, we wanted to identify variables of interest that had already been the subject of empirical analysis. This would help determine the range of variables to be included and identify any variables omitted from previous studies. Second, we wanted to explore the theoretical

literature to identify those variables that had not been studied empirically but that researchers felt might help determine variation in psychiatric care resource consumption. And finally, we wanted to provide an overview of data limitations and methodological problems that data abstractors can anticipate in studying psychiatric care. In particular, we wanted to combine the literature review with our previous experience in studying psychiatric admissions to advise the data abstractors about areas most likely to present problems.

The Bibliography suggests the scope of our literature review. Although we have reviewed much of the reported literature, including several unpublished reports to HCFA, we have not had access to two proprietary systems, MEDIQUAL and Systemetrics. It is unlikely that access to either would alter the nature of this Note, given that Systemetrics' staging system has already been compared to DRGs in the literature, and MEDIQUAL has not yet reported any results of psychiatric care evaluation. We have also limited our review to studies of predictors of inpatient psychiatric care use or costs.

VARIABLES IDENTIFIED

Over the entire range of studies reviewed, a large set of explanatory variables has been considered. Two problems are immediately evident, however. First, no one study combined all of the variables into a full picture of the circumstances surrounding particular episodes of psychiatric care. And second, most studies focus on DRGs or a variant of DRGs (i.e., alternative DRGs) to explain resource use. There is little consensus on which individual variables or set of variables explain resource use in psychiatric care. Just about the only agreement in the literature is that DRGs or other diagnostic groupings alone will not explain a significant portion of the variance. It is likely that some combination of many of the variables discussed below will be needed.

Studies of DRGs and Variants of DRGs

Starting with those studies focusing on DRGs and variant DRG arrangements, Mitchell et al. (1987) compared DRGs to staging and clinically related groups (CRGs--developed by the authors). Since 90 percent of the variance remained unexplained, though both staging and CRGs outperformed DRGs, they concluded that diagnostic groups were poor predictors of resource utilization. Morrison et al. (1985b) also compared DRGs to staging and CRGs, with similar results. But when they factored in additional variables such as regional variation, hospital size, transfers, and readmissions, the model explained 23 percent of cost variation as opposed to 5-10 percent with DRGs alone. Similarly, the American Psychiatric Association (1985) found that DRGs had a high coefficient of variation (generally higher than 1), and explained less than 6 percent of the variation. As a result, the APA suggested that nondiagnostic characteristics, such as the availability of alternative care settings or involuntary status, might explain more of the variation.

Studies by the National Association of Private Psychiatric Hospitals (NAPPH, 1985) (see also Schumacher, 1986) and Taube et al. (1984a, 1984b) further demonstrate the limitations of DRGs in explaining psychiatric resource use. The NAPPH study found a reduction in variance from DRGs of under 4 percent, which improved to only 8 percent using case mix groups composed of major diagnostic code (MDC), patient age, transfer from another facility, and the presence or absence of psychiatric complications and comorbidities. Both of the Taube et al. studies suggest that DRGs are not homogeneous and therefore do not predict resource use, but that alternative DRGs (ADRGs) will improve the amount of variance explained. In both studies, the authors concluded that the hospital type exerted the most significant effects on length of stay. For example, in Taube et al. (1984b), ADRGs alone explain 12 percent of the variance, but the combination of ADRGs and hospital type explains 21 percent of the variance.

Other Predictive Variables

Although the literature is inconsistent on the extent to which nondiagnostic variables explain resource use, studies do indicate that some demographic and treatment variables do help explain the variance. For example, Munley et al. (1977) use age, history of commitment, number of prior psychiatric inpatient episodes, recent employment history, and past suicidal behavior to predict length of stay. In addition, Freiman et al. (1987c) suggest that hospital type and hospital characteristics, including ownership, are significant variables, particularly hospital size, teaching status, and location. McGuire et al. (1987) agree and add that treatment by a specialist will raise costs. Frank et al. (1986) disagree about ownership and teaching status, but their study sampled only scatter beds. According to Morrison et al. (1985b), readmissions and transfers are important determinants of resource use.

Several studies noted the importance of regional and state-to-state variables, including Morrison et al. (1985b), Freiman et al. (1987b, 1987c) (also discussing the importance of hospital characteristics), and English et al. (1986) (hospital region explained 4.9 percent of the ariance). Frank and Lave (1985a) add that a state's Medicaid benefit structure is an important predictor of length of stay (LOS).

To date, the most comprehensive study was conducted by the New York State Office of Mental Health (1987). This study included demographic variables such as age and sex (which did not correlate well with LOS), social characteristics such as marital status, place of discharge, employment history, etc. (which were strong predictors of LOS), and past psychiatric history and legal status on admission, both of which possessed a positive correlation to LOS. On the other hand, resistance to treatment (too subjective), secondary diagnoses (predictive for only one group), symptomatology, medications, medical comorbidity, social support systems, and level of functioning (too subjective or limited data), were not found to be predictive. Unfortunately, the small sample size limits precision of this study, and its focus on New York limits its generalizability, especially since many of the study's findings have

been contradicted by other studies. (For example, Rupp et al. (1985) found age to be an important predictor.)

According to Taube et al. (1984a, 1984b), additional predictive factors may include level of functioning and disability, strength of the patient's support system, physician practice style, the availability of aftercare agencies, and the patient's treatment plan. In contrast to the New York State study (1987), they add that age, legal status on admission, and type of treatment may help explain the variance. Supporting this approach, Jencks et al. (1985) argue that previous psychiatric treatment, disability status, and transfer status need to be considered. They conclude that a predictive model should include severity, functional status, social support systems, occupational history, and hospital type in addition to several of the variables already discussed. Siegel et al. (1985) also support this approach by arguing for the importance of demographic variables (i.e., marital status and area of residence) and availability of community services variables. (See also, Wells (1985) on the importance of social supports in depression, and Leff and Bradley (1986) on the importance of community support systems.)

Severity, Comorbidity, and Functional Status

Although most of the statistical studies focus on the explanatory power of DRGs and other diagnostic groupings, the theoretical literature speculates on whether a wider range of variables might explain resource use. In particular, this body of literature isolates clinical measures of interest for future consideration. For example, some articles raise the issues of severity, comorbidity, and functional status as predictors of resource use. Although the existing studies are inconsistent with regard to how much predictive value these measures might have, they at least go beyond existing DRGs for developing a potential set of variables. Along with that, this nonstatistical literature suggests that community characteristics, such as the availability of outpatient services, alternative care settings, and discharge to a home, may be more predictive of resource consumption than diagnosis.

Several of the nonquantitative studies, such as Siegel et al. (1985) and Leff and Bradley (1986), view severity and functional status on admission as the most important clinical variables, but this view has yet to be verified statistically. Other studies, such as Essock-Vitale (1987), suggest the importance of comorbidities, whereas the NAPPH study (1985) found that the presence of psychiatric complications and comorbidities extended the length of stay. However, the New York State study (1987) found that comorbidities and functional status were too subjective to measure accurately.

The major reason for this inconsistency is the absence of agreed upon measurement instruments for severity, comorbidity, and functional status. Nevertheless, Mezzich and Sharfstein (1985) propose an overall severity scale and a severity measure for a specific disorder, and Horn et al. (1986) have developed a Psychiatric Severity of Illness Index. The success of these models has yet to be determined empirically. Thus, at this point, it is not clear whether these variables explain more of the variation than psychiatric DRG categories.

Treatment Variables

Another area where the literature is inconclusive is on the importance of physician treatment practice patterns and inpatient treatment procedures. Once again, the theoretical approaches suggest that these variables are significant predictors of resource use, but this has not been confirmed empirically. For example, the New York State study (1987) found behavioral manifestations and symptomatology too open to interpretation for predictive purposes, and the NAPPH (1985) results were inconclusive on the effects of various inpatient treatment characteristics. But English et al. (1986) suggested that regional differences in practice patterns were important variables, and Taube et al. (1984a, 1984b) suggest that treatment type is an important characteristic. The lack of standard treatment patterns (Goldman et al., 1984) and the difficulty of ascertaining treatment patterns from the record make this a difficult variable to measure (La Jolla, 1987). It is most likely that major invasive procedures, such as Electro

Convulsive Therapy (ECT), will predict resource use and will be available from the medical record.

GENERAL OBSERVATIONS ON LIMITATIONS OF THE LITERATURE

Several general conclusions emerge from a review of the statistical analyses. As already indicated, no one study looked at all possible explanatory variables, although the New York State Office of Mental Health study (1987) comes close. Perhaps most important, results in the literature are not very consistent. One study may cite the predictive power of previous psychiatric treatment or the importance of comorbidities; another might directly contradict it. It is often difficult to determine whether diagnostic categories are inadequate predictors of psychiatric resource consumption or whether particular diagnoses are of limited use in psychiatric care. In determining the appropriate variables to measure, it thus becomes important to ascertain the reliability of the methodologies used in the various studies.

Virtually all of the studies use methods that limit the extent to which the reported results can be relied upon for public policy purposes. To begin with, many of the studies are composed of nonrepresentative samples. Generally, these studies have examined convenient samples of hospitals or hospital records for a particular geographic area; or have limited their focus either to certain types of facilities, such as psychiatric hospitals, or to hospitals belonging to particular organizations. Thus, it is hard to determine which variables could be obtained from a more nationally representative sampling of facilities, or which variables would predict length of stay in such a sample. This makes it difficult to be confident of a best set of predictor variables.

In addition, the explanatory variables tested vary widely by study, making it difficult to determine the generalizability of results from any particular study. Also, the dependent variable (that is, the indicator of resource consumption) has not been consistent across all studies, i.e., length of stay compared with charges or actual costs. This inconsistency may account for some differences in conclusions. Those studies focusing on the explanatory power of DRGs tend to rely

heavily on the coefficient of variation as the objective function; others examine proportion of variation explained. Studies frequently look at improved R-square in existing diagnostic categories, rather than taking a systematic look at alternative groupings. Where studies do look at alternative groupings, they still tend to use existing diagnostic categories instead of a broader selection of variables.

Another important limitation is that the quality of data abstracted from psychiatric medical records has not been rigorously assessed. Few previous studies have reported reliability statistics or assessed construct or criterion validity by comparing abstracted data with data from other sources such as provider reports. In particular, there is a need to assess biased reliability by type of provider and type of case. Otherwise, estimates may be badly biased and conclusions inappropriate.

One persistent problem identified in the literature is the unavailability of adequate records. There appears to be little or no consistency in record-keeping between different types of facilities, though within the private psychiatric facilities category records seem to be relatively consistent. As a result, it is difficult to conduct a record abstraction by identifying certain parts of the medical record for collection. Because information may be contained in a different part of the record from facility to facility, using the same portion of the record across facilities may or may not provide similar information.

Finally, each study omits potentially important variables that might help explain the sources of variation. Some previous studies have omitted variables that may explain variation in costs but are themselves not suitable for use as payment adjusters, such as race. Although it is not necessarily improper to omit such variables (particularly where correlations are stable over time), in certain instances their omission may bias the estimated effect of included variables, producing misleading conclusions about how payments should be adjusted. The omission of state or regional variables may be particularly problematic in this regard (unless the regional differences are based on an explanatory variable such as case-mix variations). Whether or not such variables should be included in any particular analysis must be decided case by case. Because the primary interest of this study is to collect

data on all variables that might predict resource use, such variables should be included at the data collection stage so that analysts using the data will have a choice. In the next section, therefore, we have considered two general types of variables that should be included in the ADAMHA abstraction: (1) factors that predict length of stay or charges and are an appropriate basis for reimbursement; (2) factors that predict length of stay or charges and are not an appropriate basis for reimbursement but enhance the precision of the analysis.

III. VARIATION IN PSYCHIATRIC CARE RESOURCE USE: SUGGESTIONS FOR VARIABLES TO BE INCLUDED IN A DATA COLLECTION EFFORT

DIFFICULTIES IN STUDYING PSYCHIATRIC ADMISSIONS

In reviewing the literature and our own experience with medical record abstraction at RAND, we have recognized that several aspects of psychiatric hospital admissions make it difficult to conduct a study of a representative sample of such admissions. These aspects need to be considered in collecting the data and selecting a sample of patient records for the ADAMHA study.

Psychiatric hospitalizations are very heterogeneous. By this, we are not simply referring to the heterogeneity of patients and treatment styles, but to the treatment settings and relationships among treatment settings. Patients may receive acute inpatient psychiatric care in general medical beds of acute-care general hospitals; in psychiatric wards of these hospitals; and in free-standing psychiatric hospitals. Patient case mix, treatment styles, and quality of medical records may vary widely across these settings.

This last consideration--variations in the availability or the reliability of data--may be particularly problematic. To restrict an analysis to the "least common denominator"--data reliably available everywhere--may leave very little to work with. But estimates of the predictive power of information found reliably only on the best-quality records are likely to be biased. Some middle ground--a set of variables that are reliably recorded in the typical or average setting--must be sought.

Acute-care psychiatric admissions are difficult to identify, especially in general medical wards. Patients in general medical settings may be admitted for a psychiatric problem, but that problem may not be determined to be psychiatric or may be determined only late in the stay to be psychiatric. It can be fairly arbitrary as to whether the psychiatric diagnosis is recorded at all, or whether it is listed as the primary or one of many other secondary diagnoses. A psychiatric

diagnosis may be listed on the chart, in contrast, but may not be an active problem at admission.

For a certain percentage of psychiatric patients, the history of the psychiatric admission is very complex. For example, a patient may be admitted to a general medical ward for treatment of an ulcer with secondary mild depression; after admission the depression may become more prominent, causing the patient to be transferred to a psychiatric ward (which may or may not be exempt); when the depression is treated, the patient may be transferred back to the medical ward for further management of the ulcer and discharge. If the psychiatric ward is exempt from DRG-based PPS, the psychiatric portion of the admission is administratively a transfer or independent admission. But the true admission, as far as determining the psychiatric rate, could be the entire "admission," from first entry into the acute-care setting. Patients requiring transfers of this sort may have very different charges or lengths of stay from patients admitted directly to psychiatric care.

This example illustrates the importance of developing criteria for identifying a psychiatric admission and distinguishing medical from psychiatric admissions, especially in general medical hospitals or large medical centers, including exempt psychiatric hospitals. In the ADAMHA study, the principal criterion for inclusion of an inpatient episode in the sample will be whether or not that patient was ultimately assigned to a DRG in MDC 19. Fortunately, recent Medicare billing records (UNIBILLs) typically note both the admitting and the discharge DRG. If medical and psychiatric care are recorded as separate admissions, it should be possible to identify such cases by using Medicare billing records. In other projects at RAND, we have been able to piece together complex episodes of care that have been recorded as separate admissions, but doing so is an extremely difficult task. A similar process applied to the tapes from which the sample for the ADAMHA study is drawn could alert the abstractors to the need to seek both psychiatric and medical records from the responding hospital.

Having identified cases of care for multiple conditions, the practical problem for the record abstraction effort will be that it may be administratively difficult, or expensive, to obtain both the medical and psychiatric portions of such a complex record. In our experience, the psychiatric condition is often defined only in the psychiatric portion of the record, and the medical condition in the medical portion.

Predictors of length of stay or charges may differ for different subgroups of patients or providers of policy interest. Although ADAMHA's intent is to determine predictors of length of stay or charges for acute-care psychiatric admissions in general, it will probably be necessary from a policy standpoint to determine whether or not length of stay or charges for some subgroups of patients are predicted as well as for others. Examples are the poor (e.g., those with Medicaid), the very elderly, those with "dual diagnoses" (psychiatric disorder and substance abuse disorder), and ethnic minorities. Similarly, different classes of providers (teaching hospitals, rural hospitals, etc.) may be important for policy purposes. Even if membership in a particular group is not an appropriate basis for reimbursement, we think that ADAMHA is likely to want to know how particular groups may be affected by any proposed reimbursement strategy. Therefore, markers of these policy-relevant subgroups should be included in the ADAMHA study, and we have noted such variables as appropriate.

Psychiatric medical records vary tremendously in quality and level of detail. We are impressed by the variability in medical records, generally, but particularly in psychiatric records. The variability is enhanced by the heterogeneity of settings in which patients are treated. We think this variability is even greater in nationally representative studies, such as the ADAMHA study, because of regional differences in standards of record keeping and terminology.

As a result, we think the ADAMHA study needs to define carefully the psychiatric admission and psychiatric conditions as well as policy subgroups of particular interest. Consideration should be given to the most appropriate indicators of resource consumption. In selecting variables for abstraction, emphasis should be placed on data that are

likely to be obtained from the majority of medical records in a heterogeneous national sample. Variables that have been predictive of resource consumption in past studies, or variables that have been excluded but theoretically could predict length of stay, should be considered. However, the study will need to develop a strategy to determine independently the reliability and validity of the data, because this is a particular weakness of previous studies, and a serious potential flaw of all retrospective designs.

SOURCES OF DATA FOR THE ADAMHA STUDY

It is our understanding that the proposed ADAMHA MDC 19 data collection effort will be restricted to relatively easily available patient- and facility-specific information that is routinely available in the medical record face sheet, admission history and physical, and discharge summary. Because these data are relatively easily available, they have already been used in earlier analyses, typically with disappointing results. Without much more intensive and expensive efforts, the best hope for progress in explaining variations in psychiatric care costs may lie in using the limited information that is readily available in medical records in conjunction with data from secondary sources about patients, providers, physicians, and communities. The idea would be to link together information from various sources to form a fuller picture of the circumstances surrounding particular episodes of hospital care. In the comments on specific variables that follow, we have tried to pay particular attention to sources of such secondary data and to the items found in medical records that are necessary for linking data from these secondary sources to data from the medical record.

We have identified possible explanatory variables from three general types of sources. These appear to be the appropriate sources for the design selected by ADAMHA. Planning for the ADAMHA data collection effort should include attempts to gather data from all three types of sources:

1. Patient medical records. Patient- and episode-specific information will be abstracted from these records. We believe that medical record face sheets, admission histories and physicals, and discharge summaries can be relatively easily abstracted. We also recommend that ADAMHA attempt to abstract information from the first inpatient psychiatric consult. In our experience at RAND, this is the equivalent of the history and physical for the psychiatric condition of patients treated in general hospital wards. It is usually found in the progress notes.

2. A survey of responding hospitals. Some facility-specific information probably cannot be reliably collected from secondary sources. Therefore, it will be necessary to ask responding hospitals to provide information about, for example, their patient populations and teaching programs, in addition to simply supplying requested patient records. A separate instrument should be developed to collect this hospital-specific information.

3. Secondary sources. Patient- and episode-specific information will be available from Medicare billing and eligibility files. Physician-specific information may be available from various medical directories and from state licensing bodies. Institution-specific data will be available through Medicare cost reports and AHA surveys. Community characteristics will be available in the Area Resource File and other data bases.

In the comments that follow, we have classified explanatory variables into two categories, called Explanatory Variables and Clinical Complexity At Admission, depending on the difficulty of data collection. In the first group, much of the information can be obtained readily from face sheets, admitting history and physical, the first psychiatric consult, discharge records, or readily available secondary sources. These are the data most accessible for the ADAMHA MDC 19 effort. The second group consists of data that might be collected through more intensive primary data collection efforts than are likely to be possible in the ADAMHA effort. Because of the inconsistent results cited in the literature, we recommend that all the accessible variables be collected

and analyzed in the ADAMHA MDC 19 study, along with whatever proxies for the other variables it may prove feasible to collect.

DEPENDENT VARIABLES

1. Length of Stay. This information is available from the medical record and HCFA billing files, though HCFA files reliably report only covered days. Since the actual stay may be longer than the reimbursable stay, this could be important in adopting a payment system if catastrophic care provisions are added to Medicare benefits.

2. Charges. The same comment for length of stay applies here, with the added note that obtaining accurate charge information may be much more difficult.

EXPLANATORY VARIABLES

Most of the variables discussed in this section have been found to increase the variance explained in at least one study. Unfortunately, many of the variables had limited predictive power, and the studies produced inconsistent results. Except where otherwise noted, these variables should be obtainable readily from the sources listed above, especially the medical record (face sheet, admission history and physical, first psychiatric consult, or discharge summary), or HCFA files. As a further guide to obtaining these variables, we are attaching a Location of Information matrix (Appendix C) recently prepared by La Jolla Management Corporation, as well as our own chart (Appendix A), which has already been mentioned.

Patient Background Characteristics

1. Medicare beneficiary number. This will be essential in making links to information in HCFA data files. The source of data is often, but not always, the medical record. It will usually appear on the face sheet, along with the Medicare beneficiary or Social Security number. Patient's full name (including middle initial), date of birth, and social security number should also be obtained.

2. Age. There is some dispute in the literature about the explanatory power of age (Frank and Lave, 1985a; Munley et al., 1977; NAPPH, 1985; New York State, 1987; Rupp et al., 1985; Taube et al., 1984b). The source of data is the medical record and can be confirmed from Medicare billing records. An important point to consider is the prominence of the nonelderly in the MDC. The diseases, coverage, and other characteristics of the nonelderly and the elderly are quite different. (The nonelderly are disabled, and thus may be a sicker population than the Medicare population.) Age may be a predictor in a general population but not necessarily for an elderly population. Thus, one approach might be to create a dummy variable for under 65 and 65 or over, with the expectation that the under 65 will be the sicker population.

3. Sex. Patient's sex may have some explanatory power (Frank and Lave, 1985a; Frank et al., 1986) and is currently used to determine capitation under the average adjusted per capita cost (AAPCC). The source of data is the medical record and can be confirmed from the Medicare billing records.

4. Race. Although patient's race may have some explanatory power (Frank and Lave, 1985a; Frank et al., 1986; but see Morrison et al., 1985a; Morrison et al., 1985b), it is probably inappropriate as a basis for reimbursement. The source of data is the medical record but is not always reliably reported, particularly since it may be based on observation. It can be confirmed from the Medicare billing records. This variable may help to identify a subgroup of medically underserved persons.

5. Employment/occupation status before admission. Ideally, one would want data on current employment status and specific occupation. At best, we suspect that current employment/retirement status is all that can be obtained. Information on socioeconomic status (occupation, income, education) other than Medicaid status is difficult or impossible to obtain reliably from the average medical record.

6. Income. This information is very difficult to gather and is not reliably reported in the medical record.

7. Education. This is not appropriate as a payment adjuster but may have some explanatory power. Again, this information is very difficult to gather and is not reliably reported.

8. Marital status (whether currently married). In our experience, information on this variable is not reliably reported on the average medical record. What might appear is whether the patient is currently living with someone. One study, (New York State, 1987) found marital status, living arrangement, employment history, and income source to be highly correlated with length of stay, as proxies for level of functioning and community support.

9. Primary payer. The nature of insurance benefits may explain some of the variance. It should not, however, be a basis for reimbursement. This information is available from the UNIBILL File, the provider's billing form, and perhaps on the face sheet or admission form, but is not always reliably recorded if Medicare is not the primary payer.

10. Area of residence. In practice, area of residence can be indicated by the MSA and zip code of the patient's residence (available in Metropolitan Statistical Area Medicare Patient Records). This variable might be useful for a number of reasons. Some commentators (Knesper et al., 1988; Siegel et al., 1985) have suggested using residence in a geographical area with a high prevalence of mental disorders to identify those at greater risk for mental disorders. If this correlates well with the local mental health system, other social support services, or socioeconomic status, it might be worth pursuing as an indicator for the presence or absence of viable alternative or support systems (as described below). This may also help to identify innercity areas (as a proxy for poverty) or disproportionate-share facilities. It may not apply, however, to residents of nursing homes or psychiatric facilities.

11. Medicaid status. Medicaid status may be the best single indicator of poverty available in the medical record (i.e., the face sheet or history and physical). Confirming data are available from

state welfare agencies. The HISKEW (Health Insurance Skeleton Eligibility Writeoff) File (described in #12 below) can be used to supplement the medical record for missing data.

12. Participation in other government programs. Participation in government programs other than Medicaid and Medicare may be proxies for disability, socioeconomic status, or availability of resources. Receipt of workers' compensation benefits may be useful in explaining psychiatric care costs, particularly in conjunction with variables describing local program benefit structures. The HISKEW file, maintained by HCFA and updated quarterly, contains records of each Medicare beneficiary's eligibility for such benefits as Medicaid, workers compensation, federal employees' health benefits, and Veterans Administration and disability benefits. In most cases, these eligibility indicators are not current but apply to the previous year. Although we have no direct experience with this file, these indicators may prove useful (if the data prove to be reliable), particularly for a retrospective analysis.

13. Availability of supplemental insurance. The availability of supplemental insurance coverage (such as Medigap) could have an effect on length of stay. Sometimes, however, obtaining this information may be difficult, although one study (La Jolla, 1987) found it on the face sheet. We have not seen it analyzed. (See Frank and Lave (1986) for a related discussion.)

Patient Admissions Status

1. Principal diagnosis. Most of the previous studies assess the explanatory power of DRGs or various competitors to DRGs, concluding that diagnoses explain only a small percentage of the variance (APA, 1985; English et al., 1986; Frank and Lave, 1985b; Jencks et al., 1987; Mitchell et al., 1987; Morrison et al., 1985a, 1985b; NAPPH 1985; Schumacher et al., 1986; Taube et al., 1984b). However, schizophrenia, dementia, mental retardation, childhood disorders, and sexual disorders were found in some studies (Freiman et al., 1987c; New York State, 1987; Taube et al., 1984b) to have longer lengths of stay than other diagnoses. In our experience, ICD-9-CM codes and sometimes DSM-III

codes are available in the medical record. At a minimum, the ADAMHA study should record the primary, secondary, and other ICD-9-CM diagnoses or DSM-III codes. A serious limitation of the data is the reliability of this diagnostic information. Different providers use different criteria within and across hospitals and regions of the country. Thus, we think it is necessary to abstract information on major psychiatric symptoms, such as psychosis and suicidal behavior, present at admission. These data can be obtained from the discharge summary, admission history and physical, and first psychiatric consult. This information may be reported more reliably and thus may predict resource consumption better than diagnostic category. Additional information on the admitting DRG code can be obtained from the UNIBILLs, although we have questions about its clinical reliability.

2. Secondary diagnosis. The effects of severity and comorbidities (both medical and psychiatric) will be discussed below. Because additional medical or psychiatric illnesses tend to extend the inpatient stay, it is important to collect and to analyze both principal and secondary diagnoses. Secondary diagnoses are more readily available on PPS records than non-PPS records, and this may introduce a bias.

3. Legal status on admission: voluntary/involuntary commitment. The literature is split on the importance of this distinction, with some studies (La Jolla, 1987; Taube et al., 1984b) identifying it as an important explanatory distinction, and others (Frank and Lave, 1985a) not. For the most part, this is an issue for public hospitals, especially state facilities. Two important issues are that different states have different criteria for commitment and different states have different requirements and styles for noting commitment status on the chart.

4. Prior place of residence. Whether the patient lived at home, was homeless, lives alone or with a family or in an ICF/SNF may serve as a proxy for social support. In our experience, what can be obtained from the medical record is whether or not the patient lived in a home, an acute-care facility, a subacute facility, or some other placement, and whether the patient was living alone or with others. This information indicates available social supports and alternative

aftercare arrangements. This information may be obtained from the admission history and physical, the first psychiatric consult, the discharge summary, or the emergency room note. It might also be found in detailed social work notes or in discharge planning notes. The UNIBILL File also contains information about the source of admission and referrals, but the information is not reliable.

5. Transfer status. One study (Morrison et al., 1985a, 1985b) found resource use to be three times greater for the receiving than for the sending facility, but the inferences are doubtful given the small sample size. In this sense, transfer may be a proxy for severity or triaging methods. Providing higher payments for transfers introduces opportunities for "gaming," and transfers might not be a suitable basis for reimbursement. Information is available from the MEDPAR File, but it is unclear how reliable it is. This information should be collected, and its reliability checked, during the ADAMHA MDC-19 abstraction. Some information on transfers will be available from the medical record.

6. Recent prior admission (readmission). If a readmission occurs within 24 hours, a substantially longer length of stay results than if it occurs between one and seven days (Morrison et al., 1985a, 1985b). This suggests that readmission to a different facility results in greater costs. Most readmissions occur within six months to one year, although this varies by diagnosis and severity, and the presence of outpatient treatment may affect readmission rates. Data collection should note whether readmission occurred to the same or to a different facility, and the type of facility, although it is questionable whether this is a suitable basis for reimbursement.

Provider Characteristics

1. Facility name, and AHA and Medicare provider numbers. These are essential for linking information from secondary sources. The information can be obtained from the medical record and surveys of participating hospitals. The provider number also indicates whether the admission was reimbursed under DRG-based PPS or Tax Equity and Fiscal Responsibility Act.

2. Setting of care characteristics for this episode.

a. Type

(1) *General hospital "scatter" beds.* These are general medical/surgical beds used by psychiatric patients. Currently, these beds are covered under PPS. This information can be obtained either through a more thorough review of the medical record, or by linking data from the face sheet to descriptions of specific wards obtained from hospital surveys.

(2) *Nonexempt general hospital units.* These are identified beds and wards for psychiatric patients and are currently covered by PPS. They are identified by the Medicare provider number and hospital survey data.

(3) *Exempt general hospital units.* These are distinct psychiatric units exempt from coverage under PPS but covered under TEFRA. These can be identified by determining unit status from the record and payment status from the Medicare provider number.

(4) *Private psychiatric hospitals.* These facilities are covered under TEFRA, not PPS.

(5) *Public psychiatric hospitals.* These facilities are covered under TEFRA, not PPS. Private and public psychiatric hospitals can be identified by the Medicare provider number, although some psychiatric hospitals may have exemptions as long-stay facilities.

Additional detail on facility type is available in Jencks et al., (1987). It is clear that facility type is an important explanatory variable, given differentiation in psychiatric treatment (Jencks et al., 1985, 1987). Average cost per admission within DRGs is much greater for exempt than for nonexempt units (Freiman et al., 1987c; Jencks et al., 1987; Morrison et al., 1985a, 1985b), perhaps reflecting differing case mix and increased physician specialization. Much of the information for "facility characteristics" can be obtained from HCFA Impact Analysis Public Use Files and from Medicare cost reports. It may not be

possible, however, in nonexempt units to distinguish between scatter bed and unit discharges. Facilities with nonexempt units should be asked, case by case, whether a discharge came from the unit or from a scatter bed.

b. Size.

Psychiatric bed size may be a proxy for case-mix complexity, economies of scale, and teaching status. Some studies (English et al., 1986; Frank et al., 1986; Freiman, 1987c) suggest that larger hospitals have higher costs. The best source is to collect the data directly from the provider, though data are also available from AHA and HCFA.

c. Teaching status

(1) *Intern-to-beds ratio.* Information on whether teaching occurs, and the level of teaching activity as measured by the ratios of interns- and residents-to-beds, may be useful. The intern-to-beds ratio is available either from Medicare Cost Reports or AHA survey data, and should be obtained for the facility (Medicare data) and for any separate psychiatric unit (AHA data).

(2) *Certified Graduate Medical Education program in psychiatry.* Its presence or absence should be noted for each facility. Directories of residency training programs from medical schools might also provide information for teaching status.

d. Occupancy rate (i.e., demand for beds)

Occupancy rates have not been systematically studied to determine effects on length of stay. Although some clinicians hypothesize that occupancy rates may help explain length of stay, collecting data on this will be extremely difficult and time-consuming. Occupancy rates for exempt units should be separated from overall facility occupancy rates. Data on occupancy rates may not be readily available, but the facility should be able to provide them, broken down by unit. Aggregate occupancy rate data should be available from the American Hospital Association. Even if found to be explanatory, it is subject to gaming if used to adjust reimbursements.

e. Ownership

(1) Public compared with private,

(2) Nonprofit compared with for profit,

(3) State compared with county compared with other.

In one study (Frank et al., 1986), hospital ownership and teaching status had little effect on length of stay, but other studies differ, particularly with regard to specialty settings (that is, private psychiatric hospitals) (English et al., 1986; Freiman, 1987c; Jencks et al., 1987; Morrison et al., 1985a, 1985b). These data are available from AHA records.

f. Urban compared with rural

Some studies (Freiman et al., 1987a, for example) indicate that urban facilities are likely to have higher costs. Hospital location is available from the AHA. HCFA classifies hospitals as urban if they are located within a metropolitan statistical area. This study can help determine the extent to which identified cost differences are due to differences in wage rates, triaging, or case mix.

g. Sole psychiatric provider in an area

There is concern that a sole psychiatric provider may treat a more complex case mix, and it may also be a proxy for the availability of alternative community resources. To the best of our knowledge, it has not yet been studied as a separate variable. Information may be collected from NIMH provider type variables and inferred from provider location data.

h. Referral centers

Patients transferred to other facilities are often more severely ill and thus tend to have a longer length of stay. As a proxy for case-mix severity, the percentage of patients transferred in should be obtained from the facility. As with transfers from another institution, this introduces opportunities for "gaming," and so might not be a suitable basis for reimbursement.

i. Percentage of patients involuntarily committed

This may be a proxy for case-mix severity.

j. Percentage of Medicaid patients

The current PPS recognizes that hospitals with a "disproportionate share" of Medicaid cases typically have higher costs. As noted before, Medicaid eligibility is also a proxy for poverty. Medicare Cost Reports provide necessary information.

k. Local wage index

Inpatient care is labor intensive and the current PPS provides for reimbursement adjustments based on local wage levels. HCFA regularly publishes a hospital wage index for each MSA and for rural areas in each state. To link these indices to particular case records, the MSA of the hospital must be known.

3. Physician characteristics

a. *Physician ID.*

This is essential for linking the physician to important data available through secondary sources. Sometimes getting the physician's name is difficult because of hastily written signatures, but the UNIBILL File maintains ID numbers for the admitting physician for use by the PRO. An additional "crosswalk" or "index" of physicians from hospitals or PROs will be necessary. We have no direct experience with either the "crosswalk" or the "index," so we do not know how reliable they are. One problem with these data is that a physician listed as attending may not provide the psychiatric care. Instead, the patient may be treated by a resident or a consulting psychiatrist, which would be missed by reliance on admitting physician ID. ADAMHA should also ascertain which physician saw the patient most often, although this may be difficult to determine from the records. Thus, defining the physician is an important, but not necessarily simple, task.

b. *Specialty of admitting and treating physician, e.g., general practitioner or psychiatrist*

Costs are considerably higher when a patient is admitted and treated by a specialist (McGuire et al., 1987; Morrison et al., 1985a, 1985b). Data on this and the other physician characteristics are available, if the physician's name is known, from secondary sources, primarily data published by the American Medical Association, state medical directories, and probably the American Psychiatric Association. Using these data sources could require substantial effort.

c. *Education/training (including residency)*

Years since graduation and years of residency training may be a proxy for treatment style. This variable was not included in studies cited in our literature review.

d. *Board certification status in psychiatry or other specialty*

This would be a dummy variable, certified as eligible or not eligible.

4. Inpatient treatment characteristics. In our experience, obtaining data on most specific processes of care requires a difficult and in-depth record abstraction. Many procedures, such as ECT, are often recorded on the discharge summary, physician notes, and orders list, but not the use of psychotherapy or responses to therapy, or even many major medical tests such as a CT scan. One problem is that the noninvasive procedures may have been done even if they do not appear in the medical record. Data on intensity of nursing services and the major determinants of cost are not available from the portions of the record that ADAMHA plans to abstract. Thus, unless ADAMHA is prepared to spend considerably more money to collect data on clinical processes, we recommend focusing on dramatic events (ECT and invasive procedures, such as surgery) which can be easily obtained and which provide an indication of resource consumption. If a procedure is noninvasive, it may not be reliably reported without a detailed search of the medical record. Comments on the treatment variables which might be reviewed (or which were mentioned in previous studies) follow.

a. Process of care

(1) *Procedures.* Some studies (Fogel et al., 1985; NAPPH, 1985) found ECT and electroencephalograph in particular to predict length of stay (see also, Essock-Vitale, 1987). ECT and invasive procedures are reliably obtainable from the discharge summary and physician notes. As noted above, CT scans and other noninvasive procedures are generally not available without a detailed record abstraction.

(2) *Medication.* One study (New York State, 1987) found no consistent effects of medication use on resource consumption. Generally, discharge notes do not always describe the medications prescribed at discharge and almost never contain a history of all medications prescribed during the hospitalization. A thorough review of the medical record, including an orders list and the physician and nursing notes, will provide the data. To collect evidence on the appropriateness of medications requires either: (1) development of complicated algorithms linking data on clinical status, drugs, and complications, or (2) physician judgments. Both methods are quite expensive.

(3) *Complications.* Life-threatening complications, such as cardiac arrest, acute myocardial infarction, stroke, seizure, shock, coma, and fractured bones, should be reliably reported on the discharge summary. Physician and nursing progress notes must be reviewed for lesser complications or to confirm the discharge summary. Although some complications may result from poor quality care, life-threatening complications explain resource consumption and should be considered as a basis for payment.

(4) *Restraints/ward behavior.* One study (La Jolla, 1987) found these data unreliable, difficult to locate, and time-consuming to collect. Data are not reliably reported on discharge summaries and are available only through detailed abstraction of physician and nursing notes.

(5) *Seclusion/isolation.* Same comment (NAPPH, 1985) as for restraints.

(6) *Abnormal vital signs.* This may indicate a need for greater resource use. Data should be available from the medical record, but may require a complicated algorithm for interpretation.

(7) *Assaultive behavior.* Same comment as for restraints, although one study (NAPPH, 1985) found some explanatory power in assaultive behavior.

(8) *Availability of inpatient psychosocial services.* One study (Lyons et al., 1987; see also English and McCarrick, 1986) demonstrated that early social work intervention and other similar services, particularly liaison psychiatric services, reduced length of stay. Measuring these will require some review of hospital records and organization, which must be collected from the provider. The time of the first discharge evaluation can be obtained from the medical record, but this requires a review of the physician progress notes and often the nursing notes.

5. Discharge status and destination. Indicators of discharge status may not be appropriate bases for reimbursement. Some studies (APA, 1985; English et al., 1986) have found discharge against medical advice to explain some of the variance. One study (New York State, 1987) found discharge destination to be the strongest explanatory factor for length of stay. Other studies (APA, 1985; Siegel et al., 1985) suggest that length of stay is shorter if the patient is discharged to either the previous home setting or to an organized community setting. Availability of family supports is an important determinant of resource

consumption and discharge destination. Data may be found in the discharge summary, particularly under PPS (apparently because of improved record-keeping), but a more thorough review of the physician and nursing notes and the social work notes may be required.

Community Characteristics

1. Availability of organized referral and aftercare settings. The availability of alternative care settings may be a critical variable in determining length of stay, because discharge may be delayed until facilities are available. The source of information is likely to be secondary data, including the Area Resource File, local social service agencies, the state office of mental health, or the social workers department at the discharging facility. Various NIMH provider lists might also be reviewed.

2. Availability and accessibility of outpatient resources. This may be an important variable, and relevant information can be obtained from the Area Resource File and various NIMH provider lists. An indirect source that might be used in conjunction with the Area Resource File is HCFA's Outpatient Bill Skeleton File (a 5 percent sample). Other information may be available from local social service agencies, the state office of mental health, or the social workers department at the discharging facility. However, much of the information is incomplete and may not be reliable.

3. General environmental characteristics. Bed-to-population ratios, physician-to-population ratios, psychiatrist-to-population ratios, integration of care systems, number of available CMHCs and Board and Care Homes, wage rates, and other labor market characteristics should be evaluated from secondary data sources such as the Area Resource File.

State Variables

1. *Bed-to-population ratios.* This can be obtained from the Area Resource File.

2. *Physician-to-population ratios.* This can be obtained from the Area Resource File.
3. *Psychiatrist-to-population ratios.* This can be obtained from the Area Resource File.
4. *Local variation in Medicaid benefit structure.* The evidence on this seems split, but one study (Frank and Lave 1985a) notes the importance of Medicaid benefits on length of stay. We think this deserves further attention both as a predictor of length of stay and as having an impact on patterns of care, especially to the extent that it implies generosity of benefits.
5. *Regional (state-to-state) variation.* Studies (English et al., 1986; Freiman et al., 1987a, 1987b, 1987c; Morrison et al., 1985a, 1985b) suggest significant state-to-state and regional variation. Differences in state mental health systems may be a factor in explaining regional variation. If so, it may be necessary to gather data from secondary sources for inclusion in the ADAMHA study. As a start, a state or regional dummy can explain some of the variance. State-level data are available from NIMH and from the Area Resource File. Among the data to be collected are state spending levels, involuntary commitment practices, and inpatient, community-based, and outpatient services.

CLINICAL COMPLEXITY AT ADMISSION

Factors describing a patient's clinical condition (i.e., severity and functional status) may be crucial to explaining variance but are difficult to measure. Unlike medical/surgical DRGs, reimbursement based on psychiatric DRGs is not adjusted for clinical case-mix indicators, such as severity, psychiatric or medical comorbidities, or complications of course of illness indicators. In medical DRGs, for example, a myocardial infarction would be adjusted for congestive heart failure as indicating more intensive treatment. But for psychiatric DRGs, there would be no similar adjustment for more intensive suicidal ideation as indicating other depressed conditions.

Most people agree that any reimbursement strategy should seek to ensure that persons with true need receive the amount of care required at an acceptable cost. Thus, we think it is extremely important to attempt to identify valid case-mix indicators that might explain variation in resource consumption (English et al., 1986; La Jolla, 1987; Morrison et al., 1985a, 1985b). Several commentators (APA, 1985; English & McCarrick,1986; Horn et al., 1986; Jencks et al., 1985; La Jolla, 1987; Leff and Bradley, 1986; Mezzich and Coffman, 1985; Mezzich and Sharfstein, 1985; Siegel et al., 1985; Taube et al., 1984b, 1985) have suggested research along these lines, but very little empirical work has been completed to determine whether these variables actually explain more of the variance than psychiatric DRG categories. The fact is that the indicators now available for severity, comorbidity, and functional status are still rather crude. As initial guidance, we identify four clinical factors that may influence cost at admission: (1) severity of illness, (2) past psychiatric history, (3) functional status, and (4) psychiatric/medical comorbidity.

Severity of Illness

We recommend selecting general indicators of severity (discussed below) that apply across psychiatric diagnoses and a few indicators that apply to a few specific common subgroups of diagnoses. The recommended subgroups are affective disorder, schizophrenia, and organic brain disorder, which account for the vast majority of Medicare psychiatric admissions. Symptoms present on admission that match these categories are suicide attempts and recent weight loss for affective disorders, psychotic symptoms for schizophrenia, and cognitive impairment for organic brain disorder. What we provide here is a general framework for analyzing severity. It will be necessary for the abstractors to develop guidelines for identifying and placing symptoms within the appropriate indicators.

We are not suggesting that ADAMHA use a tracer sampling methodology. Data should be collected on all conditions, but certain indicators can be targeted to defined subgroups. If ADAMHA decides to

analyze predictors within diagnostic subgroups, it should also look at severity indicators appropriate for these subgroups. For example, for affective disorder, all ICD-9 codes included in 296, plus 298.0, 298.1, 300.4, 300.5, 309.0, 309.1, and 311 should be considered as one subgroup. For schizophrenia, all ICD-9 codes included in 295 should be considered to identify one subgroup. And for organic brain disorder, all ICD-9 codes included in 290, plus nonalcoholic dementia and delirium, such as 294.0, 294.1, and all codes included in 310, should be considered as a subgroup.

A general distinction should be made between severity at admission, a suitable payment variable, and severity during the hospitalization, which partially reflects the effects of treatment and thus may be less suitable as a payment variable.

Suicide (General Indicator; Affective Disorder Indicator)

- *Attempted suicide.* As a reason for either the present or a previous admission, attempted suicide does not appear to explain much variance, although one study did find some explanatory power (Munley et al., 1977). A distinction should be made between a suicide attempt on admission and one during hospitalization. The former might be a payment variable, whereas the latter is probably explanatory of resource use. Data for these variables should be available on the admission history and physical and the discharge summary. Recency of suicide attempt (e.g., day of admission, 2-14 days before admission, or more than two weeks before admission) may be an indicator of severity.
- *Ideation.* Suicide ideation (thoughts of suicide) is much more common at admission than suicide attempts. Clinicians make an important distinction between an active plan and thought without a plan. The data to make the distinction, however, are sometimes available only in the nursing notes. Suicide ideation may also be more gameable than suicide attempt. We have found that the data are not always present in the medical record, even for depressed subjects.

Psychoses (General Indicator; Schizophrenia Subgroup Indicator)

As an indicator of severity, the medical record should be reviewed to ascertain psychotic processes (hallucinations, delusions) or extremely bizarre behavior on admission. Information from the medical record, the emergency room record, and the discharge summary should be reviewed, though data are not always recorded. On some charts, the information is recorded only in the nursing or admission notes. Further, we have found it to be virtually impossible to distinguish reliably between depressive and nondepressive psychotic symptoms based on data in the medical record.

Violent, Assaultive Behavior (General Indicator)

Same comment as for psychoses, except that the data are even less reliable. It is difficult to measure, and can often be found only in nursing notes. One study (New York State, 1987) looked at several symptoms including assaultive, psychotic, paranoid, dependent, and depressed behavior clusters with minimal effects. The study also found that documentation and assessment of these behaviors was inconsistent in hospital records.

Grave Disability (General Indicator)

1. *Recent severe weight loss*
2. *Not eating or drinking on admission*
3. *Provider's assessment that the patient is unable to care for himself in the community*

Grave disability is one of the most important indicators for acute care in psychiatric admissions. It refers to the inability of the patient to function or to survive in the usual environment. We have found it possible to identify: (1) specific statements by providers that the patient is disabled (perhaps 10 percent of the time); and, (2) indicators of failure to thrive (severe weight loss or cacchexia, not eating or drinking, marked dehydration), and poor hygiene. However, data on hygiene and functioning are almost never available in physician notes. (When available, they are in progress notes.) Thus, we

recommend relying primarily on indicators of weight loss or of not eating or drinking. Poor appetite alone is not severe enough (not specific enough) to identify severe disability.

Severe Cognitive Impairment (General Indicator; Organic Brain Disorder Indicator)

1. *Disoriented or confused*
2. *Poor memory*
3. *Comatose or semicomatose*

These data are usually available from the medical record, particularly the admission history and physical and the physician and nursing notes, although sufficient data are often not present to make the required clinical judgment. We have found it difficult to distinguish between mild and severe memory loss.

Course of Illness (General Indicator)

We have found it to be extremely difficult to identify course of illness indicators, such as age of onset, number of prior episodes, or even duration of present episode, based on medical record data. We do think it is possible, however, to obtain a general indicator of chronicity of at least two years' duration. The chart will typically note that "patient has been sick on and off for ten years or so," or will note "chronic depression."

There are other alternative approaches to severity that might be considered, but that we find unsatisfactory. For example, Susan Horn and her colleagues (Horn et al., 1986) have developed a general measure of severity of psychiatric condition. This measure requires review of the complete record, however. In addition, her measure uses intensity of resource consumption as an indicator of severity. This is a serious flaw for purposes of identifying a payment scheme. One study (NAPPH, 1985) used an admission Global Assessment Scale Rating as a measure of severity, but in our experience, this measure is available only in certain psychiatric hospitals.

Previous Psychiatric Treatment

Previous studies have reached conflicting conclusions about the predictive power of prior treatment variables. Although some studies (Jencks et al., 1985; Munley et al., 1977; NAPPH, 1985; Taube et al., 1984b) suggest that previous treatment history is an important variable for explaining resource use variation, others (Frank and Lave, 1985a; Morrison et al., 1985a, 1985b) disagree, or suggest (Siegel et al., 1985) that it may predict resource use over a patient's entire lifetime more accurately than it predicts resource use for any one inpatient episode. Disagreement has also occurred over the explanatory importance of hospitalizations within a 12 or 24 month period (McGuire et al., 1987; New York State, 1987). These studies tend to treat prior inpatient treatment as an aggregate number of episodes rather than looking at type and intensity of prior episodes. According to one study (APA, 1985), the effects of previous hospitalizations vary based on the number and timing of prior episodes and current diagnosis. Despite the emphasis on proper treatment variables in previous studies, in our experience it is extremely difficult to obtain detailed information on treatment from an adequate percentage of charts in a retrospective national study. This difficulty is greatest in records of patients treated in general medical wards. A major problem is that the only record of prior treatment may be a note on the admission history and physical that the patient had a history of receiving a specific psychotropic medication, without a statement of why the medication was prescribed. To use this information in a record abstraction, the abstactor must be able to recognize clinically such medications and the conditions for which they are likely to be prescribed. Obviously, this is a difficult task.

Specific variables that we think can be obtained are:

1. Any past history of psychiatric treatment (including drug or alcohol treatment and type of facility where treatment was rendered). This is often available in the medical record, but the data are not precise or reliable.

2. Length of stay in previous inpatient episodes under Medicare. This will be available from Medicare claims files (if prior admissions were covered by Medicare), but not from the medical record.
3. Previous diagnoses and specific treatments. This information is not usually available from the medical record, but may be available from previous Medicare discharges or from previous hospital claims.
4. Any psychotropic medication at admission. This is often, but not always, recorded in the admission history and physical. The abstractors would need a list of all appropriate drugs for identification.

Functional Status

We do not feel optimistic about obtaining information on functional status on admission. Such data are often available only through a detailed abstraction of the nursing or social work notes. One group of clinicians (APA, 1985) suggested that functional status at time of admission might help explain some of the variance. Another (New York State, 1987) agreed at time of discharge, but suggested that the measurements are too subjective. Functioning can be viewed from two perspectives--measures of mental functioning and of physical functioning. Measures of functional status not directly related to psychiatric conditions, such as Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs), indicate general functional status, which reflect both psychiatric and medical problems (primarily the latter). In our experience, data can be obtained on ambulatory status and urinary continence, but we have found that nursing admission notes are required to obtain this information. Mental functioning indicators were described in the section on severity.

Comorbid Conditions

The importance and difficulty of measuring the effects of comorbid conditions, both medical and psychiatric, on the presenting condition are emerging in the literature. As yet, there is no agreed upon measure for comorbidity, but the literature does suggest that comorbid conditions affect length of stay. Previous studies analyzing comorbidities reached conflicting conclusions about the amount of variance explained (English and McCarrick, 1986; English et al., 1986; Essock-Vitale, 1987; Fogel et al., 1985; Lyons et al., 1987; NAPPH, 1985; New York State, 1987). Two problems make it difficult to control for comorbidities. First, in our experience, ICD-9 codes and even the admission history and physical and discharge summary may fail to record important comorbidities. Instead, they are noted throughout the physician notes. Second, it is difficult to determine whether listed comorbidities are a serious problem at the time of admission, and it is difficult or impossible to determine either the severity of comorbid conditions or complications of these conditions during the inpatient stay based on data in the discharge summary. In some cases, comorbid conditions can be determined from information in physician progress notes. Detailed information on physical health status is commonly missing, however, from records of patients treated on psychiatric wards.

We recommend a strategy similar to that for assessing severity of the psychiatric condition: indicators of important comorbidities across psychiatric conditions; and additional indicators of comorbidities that are particularly relevant to a few main diagnostic groupings (e.g., affective disorder, schizophrenia, and organic brain syndrome). At a minimum, each of these three major subgroups of psychiatric disorders should be noted as major psychiatric comorbid factors. To identify comorbid medical problems, we recommend reviewing all the ICD-9 codes at admission and reviewing the history and physical, first psychiatric consult, and discharge summary for evidence on major medical illnesses present at admission. In addition, we recommend identifying substance abuse as an important comorbid condition. We have found it difficult to identify substance abuse based on the admission history and physical;

however, such information is often found in the first psychiatric consult, social worker notes, or nursing admission notes.

In our experience, data abstractors can be taught to identify a history (at admission) of cardiovascular heart disease (recent myocardial infarction (MI), angina, congestive heart failure), arterial or ventricular arrhythmia, recent stroke, epilepsy, tardive dyskinesia, bypass surgery of leg arteries, hypertension, diabetes mellitus, cirrhosis, chronic obstructive pulmonary disease (COPD), thyroid disease, cancer, hemodialysis, chronic renal failure, recent fractured bone, recent operative procedures, and Parkinson's disease, based on admission notes. However, it is generally not possible to assess the severity of these conditions. One exception is that abstractors can be taught to distinguish between good and poor prognosis cancers. In addition, we recommend noting bed sores/decubiti on admission and fevers on admission greater than 101 degrees Fahrenheit. Data on decubiti may be available only in nursing notes; data on fever may be available only on vital sign records. The ICD-9 codes do not necessarily reflect these conditions, so review of notes is essential. However, the relevant data are often in the first psychiatric and medical consults, rather than the admission history and physical. Thus, with some effort, it should be possible to identify a history of ever having serious medical problems.

Appendix A

VARIABLES TO BE COLLECTED

Variable	Source	Reliability	Use**
A. Dependent variables			
LOS*	Medical record (face sheet, nursing notes, discharge summary), HCFA billing files	Reliable, but HCFA limits to covered days	DV
Charges	Hospital billing record; HCFA billing files	Reliable, not difficult to obtain for covered charges	DV
B. Variables available from the medical record			
Age*	Medical record (face sheet, admission history and physical, discharge summary); HCFA billing files	Usually available and reliable	E/P
Sex*	Medical record (face sheet, admission history and physical, nursing notes); HCFA billing files	Usually available on HCFA billing files	E
Race/ ethnicity	Medical record (face sheet, admis. history and physical, nursing notes); HCFA billing files	Usually available on HCFA billing files; not always reliable	E
Employment/ occupation	Admis. h&p. soc. wk. notes, disch. planning notes	Reliable when found, but often not available	E
Income	Admis. h&p, soc. wk. notes, disch. planning notes	Fairly reliable when found, but often not available	E
Education	Admis. h&p, soc. wk. notes, disch. planning notes	Reliable when found, but often not available	E
Marital status	Admis. h&p, soc. wk. notes, disch. planning notes	Reliable when found, but often not available	E
Primary* payer	Admis. form, face sheet, billing form, MEDPAR	Reasonably reliable if Medicare; may not be reliable if other than Medicare	E

Medicaid eligibility*	Medical record; HISKEW	Reliable	E
Principal diagnosis*	Medical record (face sheet, admis. h&p, ER record, MD notes, psychiatric consult reports); DSM-III, ICD-9; HCFA billing files	Not entirely clinically reliable (esp. for family practitioner); available on post-DRG records	P
Secondary diagnosis* (med. v. psych.)	Medical record (face sheet, admis. h&p, ER record, MD notes, psychiatric consult reports); DSM-III, ICD-9; HCFA billing files	Better on PPS rec. for med. diag; med. much easier to obtain than psych. (except in special psych. hospitals); any med. diag. is highly unreliable in psych. wards	P
Legal status at admission*	Face sheet, admis. h&p, ER records, discharge summary; note also that a temporary hold could be recorded differently from a permanent conservatorship; HCFA billing files	Generally reliable when available, but very gameable	E/P
Prior place of residence*	Medical record (face sheet, nurses notes, soc. wk. notes, transfer summary); HCFA billing files; zip code	Reliable	E
Transfer status*	Medical record (face sheet, admis. h&p, MD consult. notes, discharge summary, ER record, admission chart); secondary sources include PRO records and the Medicare Claims File, but the medical record is a better source; HCFA billing files	Reliable if available (but may be missing)	E
Inpatient treatment chars. (symptoms)	Medical record (admis. h&p, MD/nursing consult notes, MD orders list, lab reports, discharge summary), ER record; requires detailed record abstraction	Somewhat reliable to unreliable	E/P

Inpatient procedures	MD/nursing progress notes, MD/nursing consult rpts., lab rpts., order sheet, discharge summary, test/proced. rpts.; detailed record abstraction needed for noninvasive procedures	Reliable on invasive proceds. (surg/ECT), but unreliable on noninvasive proceds (CT scan); difficult to obtain	E/P
Medication (on admission)	Medical record (admis. h&p, MD/nursing progress notes), ER record, discharge summary, order sheets, lab tests	Reliable, but not always available	P
Complications	Discharge summary, MD/nursing notes	Reasonably reliable	E
Restraints	Nursing notes	Unreliable	E
Seclusion/isolation	Nursing notes	Unreliable	E
Vital signs	Medical record, but may require use of a complex algorithm	Reliable	E
Discharge destination*	MD/nursing notes, soc. wk. notes, MD orders, disch. planning notes, discharge summaries; under PPS, more reliably recorded in discharge summary	Somewhat reliable, not always avail. (gameable)	E
Severity at admission	New instruments needed, but use admis. h&p, medical-surgical consult rpts., first psychiatric consult, discharge summary, MD/nursing progress notes	Not reliable	P
Severity during stay	Same as for severity at admission	Not reliable	E
Prior psychiatric treatment	Secondary sources are better for these data, including PRO and Medicare Claims File data; also, check admission h&p, first psychiatric consult, nursing/physician notes, old medical records; the medical record will provide general indications of prior treatment, but secondary sources are needed for more specifics	Problem of availability	E

Suicide (attempt on day of admission)*	Medical record (admis. h&p, first psychiatric consult, MD/nurses notes), ER record, discharge summary; look for both recent and during hospitalization	Somewhat reliable, not always avail.	E/P
Suicide (attempt on other than day of admission)	Same as for suicide (day of admission), except that data are less likely to be recorded if not on day of admission	Somewhat reliable, not always avail.	E
Suicide (ideation)	Same as for attempted suicide (other than day of admission)	Somewhat reliable, not always avail.	E
Psychoses*	Same as for attempted suicide	Somewhat reliable, not always avail.	P
Chronicity*	Admission history and physical	Somewhat reliable, usually available	E
Symptom-atology	Medical record requires development of guidelines to describe specific symptoms	Somewhat reliable, but requires detailed record abstraction	E
Violent assaultive behavior*	Same as for attempted suicide, with emphasis on nursing notes	Less reliable, not always available	E
Grave disability (severe weight loss)*	Same as for attempted suicide	Somewhat reliable, not always available	E
Functional/ disability status	Same as for severity at admission, plus physical therapy evaluation	Not reliable	P
Comorbidities (psych. & med.)*	Same as for severity at admission	Clinically uncertain; available for more severe comorbidities	P
C. Variables available from secondary sources			
Area of residence*	Zip code directory, HCFA billing files (MEDPAR)	Reliable	E
Other govt. programs*	HISKEW	Reliable, if available	E

Supplementary insurance	Hospital billing records, face sheet	Reliable, if available, but may be difficult to obtain	E
Recent prior admission (readmission)	Secondary sources are better for these data, including PRO and Medicare Claims File data; also, check the admis. chart (previous records if same hospital)	Questionable reliability (depends on data from a prior Medicare admission)	E
Provider type*	AHA/HCFA (PPS Impact Analysis Files), Medicare Cost Reports, provider	Reliable	P
Provider size*	AHA, HCFA (Provider of Service File), provider	Reliable for hospital. Size of units can be problematic.	E/P
Teaching status*	AHA, HCFA, provider, residency program lists	Reliable if avail. (gameable)	P
Intern/bed ratio*	AHA, Medicare Cost Reports, provider	Reliable if avail.	E
GME	Medical schools, AHA	Reliable if avail.	E
Occupancy rates	Provider, HCFA, AHA	Not entirely reliable	E
Ownership*	AHA, provider	Reliable	E
Urban/ rural*	AHA, HCFA, MSA	Reliable	P
Sole provider in area*	NIMH provider file, AHA, HCFA, MSA	Reliable	P
Referral center	Provider	Reliable, but gameable	P
Percent involuntary admissions	Provider; possibly from Unibill	Reliable, but gameable	E/P
Percent Medicaid*	Medicare Cost Reports	Reliable	E
Local wage index*	HCFA, MSA	Reliable, at least in official sense.	P

Physician	Chart and provider	Reliable, but hard to obtain	P
Physician specialty (board certification)	AMA, APA	Reliable, but hard to obtain	P
Physician education/ training	AMA, APA	Reliable, but hard to obtain	P
Inpatient psycho-social services	Provider, AHA, social work and physician progress notes	Somewhat reliable, but hard to obtain	E
Community chars.	Secondary sources, Area Resource File, NIMH	Reliable, but not always available	E
Outpatient services	Area Resource File, HCFA Outpatient Bill Skeleton File, other secondary sources	Incomplete, not always reliable	E
Referral and aftercare services	Area Resource File, other secondary sources, NIMH	Incomplete, not always reliable	E
Environ-mental chars.	Area Resource File, other secondary sources	Incomplete, not always reliable	E
State/ regional variations*	Area Resource File, NIMH	Incomplete, not always reliable	E
Medicaid benefit structure*	HCFA	Reliable	E

D. The following variables should be collected for completeness. All are reliable and available.

Zip Code*	HCFA billing files, medical record	Needed for prior residence
County*	HCFA billing files	Needed to adjust other variables
Beneficiary number*	Medical record, HCFA billing files	Needed to confirm identification

*Variables that can be readily collected and evaluated within the ADAMHA guidelines. This is not to suggest that these variables alone will explain resource use variation, or that they are necessarily the most significant variables. We believe, however, that among the variables discussed, these are most easily abstracted from the portions of the medical record that ADAMHA intends to review.

**DV - dependent variable;
E - explanatory variable;
P - possible payment variable.

KEY to abbreviations:

admis.	admission
AHA	American Hospital Association
AMA	American Medical Association
disch.	discharge
DSM-III	Diagnostic and Statistical Manual
ER record	Emergency Room record
h&p	history and physical
HCFA	Health Care Financing Administration
HISKEW	HCFA Skeleton File
ICD-9	International Association of Disease
Medpar	Medicare patient files
NIMH	National Institute of Mental Health
MSA	Metropolitan Statistical Area
PRO records	Peer Review Organization
soc. wk. notes	social work notes

Appendix B

DESCRIPTION OF THE MEDICAL RECORD

In general, hospital medical records will have the following standardized format:

- ADMITTING FORM. This is called the "face sheet" and contains basic demographic information including the patient's name, address, date of birth, sex, the admitting diagnosis, how the patient was admitted, and health insurance status.
- DISCHARGE SUMMARY. This is a summary of the hospitalization describing the history of the present illness, hospital treatment, course in the hospital, disposition, and final diagnosis.
- ADMITTING HISTORY AND PHYSICAL. The admitting history and physical is the major note written by the admitting physician on the day of admission. The format is somewhat standard: chief complaint (reason for admission), history of present illness, prior medical history, family history, social history (includes alcohol intake and smoking), physical exam, laboratory test results, diagnostic impressions, and a treatment plan.
- CONSULTATION REPORTS. Consultations are ordered by the attending physician when "specialty" opinions or treatments by physicians and others are needed.
- MD PROGRESS NOTES. These are usually handwritten notes, made by every physician treating the patient. They document the patient's status and are written each time he/she sees the patient or reviews his/her tests.
- MD ORDER SHEETS. These are handwritten notes made by the physician whenever he/she orders a test, treatment, or medication.

- NURSING ADMISSION ASSESSMENT OR DATA BASE. This is an admitting note made by the nursing staff when the patient is assigned to a particular ward or unit. It includes a description of the patient's condition and vital signs on admission. It may also include a review of systems and psychosocial information.
- NURSING NOTES. These are handwritten notes by a nurse or nursing assistant documenting his/her assessment of the patient's current condition and response to treatments and care. These data include round-the-clock documentation of the patient's condition, particularly with regard to the patient's pain, symptoms, symptom resolution, and activity level.
- LABORATORY RESULTS. The different categories of laboratory reports are (in no particular order):

  Chemistry
  Hematology
  Immunology
  Pathology
  Cytology
  Blood Bank/Transfusions
  Nuclear Medicine
  Radiology

- OPERATIVE REPORTS. All operations will be described in complete detail, including a preoperative diagnosis, the techniques used, the findings, and a postoperative diagnosis. In some hospitals, the format will include the indication for the procedure.

There is usually also an Anesthesia Record which documents the patient's condition (vital signs, medications, and fluid intake) while under anesthesia and a Recovery Room Record documenting the patient's condition just after surgery but before returning to his/her room.

- TEST/PROCEDURE REPORTS. X-rays, EKGs, and some special tests and procedures will have a formal report of the results filed in the chart. These and procedures reported may include echocardiograms, cardiac catheterizations, insertion of pacemakers, etc.
- MEDICATION SHEETS. These notes reflect the medication prescribed and the medications actually given by the nursing staff.
- NURSING FLOW SHEETS. These are sheets with prelabeled rows or columns that allow the nurses to document easily patient activity levels and/or treatments. The specific format varies from hospital to hospital.
- GRAPHIC CHARTS. These are graphic recordings of the patient's vital signs (temperature, pulse, respiration, and blood pressure). They may also include information about the patient's fluid intake, weight, bowel and urinary output, or various treatments.

SOURCE: The RAND Corporation and Fink & Kosecoff, Inc., 1987.

Appendix C

LOCATION OF INFORMATION MATRIX

DATA ELEMENT	Facesheet	Discharge Summary	Admitting Note	Final Progress Note	Initial Treatment Plan	Other Document	Info Not Found
age	125	13					
date of birth	124	12	1				1
sex	125	13					
supplemental insurance	101						37
source of admission		96	17		1	21	3
adm living arrangement *	1	31	7	1	1	28	9
voluntary admission?	6	110	9	1		12	
if involuntary *	4	33	2			6	
prior hosp for psych cond	2	85	24	1		15	11
suicidal on admission	1	90	11	2	2	15	17 +
prior suicide treatment		22	6		1	6	103 +
adm functional status **		112	18	1		7	1 +
adm restraints· room	11	40	2	3	1	25	56
· personal		9	1	1		62	65
observation frequency		3				65	70
principal diagnosis	86	52					
other diagnoses *	114	110	5		1	8	
medications *		296		1		179	
procedures *	14	101	2		9	24	
discharge status	5	119		12		2	
destination		116		14		7	1
dschg living arrangement *	1	45	4	7		15	17
dschg functional status **	2	120		10		6	
dschg restraints· room	8	25		4	1	22	78
· personal				1		57	80
completed treatment?	6	123		8		1	
continuing care plan		116		13		8	1

* This data element is not applicable in certain cases (see abstract form).

** More than one response may have been selected.

\+ In one case the abstractor accidently skipped this section of the abstract.

Exhibit 5-5. Location of Information Summary for All Hospitals Combined (138 records reviewed).

SOURCE: La Jolla Management Corporation, 1987.

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