A large number of computerized information systems ("CIS") for psychiatric data have been developed to answer specific research questions. These systems are often restricted to certain types of patients and data, thus simplifying design considerations. However, what happens when the system must also support patient care, educational, and administrative, as well as research, goals? The present paper describes a system developed at the Western Psychiatric Institute and Clinic (WPIC), designed to support the above purposes. Particular emphasis is placed on the tradeoffs required to develop an effective research data base while satisfying other goals. To illustrate some of the issues and opportunities involved, specific research studies are summarized, as performed on our expanding patient data base.

Since the early 1970's there have been a number of mental health information systems developed. Two of the best-known are the Missouri Standard System of Psychiatry and the Multi-State Information System, each of which covered a sizable number of large state-related hospitals. Other systems have been contained in single and smaller psychiatric facilities. In general, all of these clinical information systems are intended to support the evaluation and care of psychiatric patients through the collection and processing of clinical data (basic demographic data, mental status, physical exam, symptoms, diagnosis, clinical disposition, etc.) and administrative data (patient census, billing, etc.).

While the main goals of these systems are to support patient care, the computerization of clinical data covering a broad psychiatric population offers some interesting and unique research possibilities. However, the research applications most often described in the literature have been based on systems designed to either collect data on specific types of patients or answer narrow research questions. Examples are systems designed to collect information on mentally retarded patients and to assist in psychotherapy research.

The purpose of this paper is to describe a computerized clinical information system ("CIS") for a large psychiatric facility. Special emphasis is placed on the design considerations and tradeoffs necessary for an effective research resource, which also supports the patient care and educational goals of a comprehensive psychiatric institute. Also presented are specific examples of research performed on the 5,573 patients entered into the CIS at our institute through the end of 1982.

Description of the Clinical Information System at the Western Psychiatric Institute and Clinic

Overall Structure

The design of WPIC's Clinical Information System reflects the patient care organization of this psychiatric facility. Patients seeking care at WPIC are evaluated first at the Diagnostic and Evaluation Center (DEC), a 24-hour-a-day walk-in clinic, or, through a scheduled appointment, at the assessment sections of specific treatment modules. The treatment programs to which patients are referred are organized into specialized modules defined by broad diagnostic categories and age groups, each consisting of inpatient and outpatient units.

The current key components of WPIC's Clinical Information System, which are connected principally with the beginning and the end of each treatment episode, are the Initial Evaluation Form (IEF) (and its associated Brief Evaluation Form, BEF) and the Discharge Summary Form (DSF). The Initial Evaluation Form is completed for all new patients and for those starting a new episode of illness and care who have not had an IEF in the past year.

The IEF's basic structural feature is the complementary interspersing of narrative and standardized components. The IEF includes sections on demographic information, reasons for referral and evaluation, history of present illness, history of other psychiatric disorders, mental status examination, symptom inventory, family history, personal and social history, physical health history and examination, a final diagnostic formulation (using a multiaxial format which covers all five axes of DSM-III plus an axis on current functioning), and dispositional information.

The second component is the Brief Evaluation Form. The BEF represents a subset of the IEF and is focused on the current episode of illness.
The BEF is typically completed for patients who have had an IEF completed in the past year. The Discharge Summary Form is the third component of WPIC's CIS. The major sections of the DSF are the following: summaries of psychiatric, family, developmental, social, and general medical histories; special assessments; treatment course; a symptom inventory identical to that included in the IEF; comparing admission and discharge ratings; a multiaxial diagnostic formulation, again comparing initial and final ratings; and dispositional information.

A unique feature of the DSF process involves the pre-printing of demographic identification and the admission ratings for the symptom inventory and the multiaxial diagnostic formulation. All of this information is taken by the computer from the corresponding IEF or BEF data base and pre-printed on a blank DSF shortly after the patient is admitted. At discharge time, the clinician responsible for the care of the patient completes by hand (by circling and checking) the standardized component of the DSF and dictates the narrative, which is then typed.

Design Considerations and WPIC Goals

Five design considerations were thought to be important for the successful development of the CIS. These included user involvement, simplicity, reliability, validity, and confidentiality. (See Mezzich, Dow, and Coffman, 1981, for a detailed discussion of their implementation.) These considerations were the basic guiding principles used in developing a system which attempts to meet the patient care, educational, administrative, and research goals of WPIC. However, these varied and often conflicting goals required a series of compromises to ensure that the most effective overall system would be developed.

For example, it was required that evaluation forms be flexible enough to describe the psycho-pathological and personal particularities of the large variety of patients seen at WPIC, while maintaining some degree of evaluation process uniformity. This requirement was met by interspersing narrative sections, for flexibility in describing the patient, with standardized sections, for evaluation process uniformity and computerization. This arrangement, coupled with the need for simplicity, meant that certain data for some research questions might not be readily available.

Specific Research Uses of the CIS at WPIC

The CIS has served the research needs of WPIC in three major ways. The first consists of using the system to identify the potential pool of patients available for research protocols. For example, a researcher may want to propose a study for patients with a diagnosis of anorexia nervosa. Without clear evidence that a sufficient patient population exists for study, the proposal would not be accepted by funding agencies.

The second research need consists in the identification of patients for retrospective studies. For instance, we can supply a set of patient numbers for patients with a pre-defined set of characteristics. Once the patient numbers are available, the researcher can then review the full clinical records of each pertinent patient.

The third research need involves the conducting of studies designed to address specific research and epidemiological questions. Exemplary studies of this type are described below.

Depression and Multiaxial Diagnosis. The purpose of this study was to use the IEF data base to present the multiaxial characterization of depressed vs. non-depressed patients obtained through the use of an expanded DSM-III formulation on 2,202 new patients presenting for care at WPIC during the course of one full year. It was found that a considerable number of depressive patients received an additional diagnosis in Axis I, particularly substance use disorder and condition not attributable to a mental disorder. Also, differential distributions for depressive patients were found in terms of personality disorders, physical disorders, and psychosocial stressors. As measured through the quantitative axes, depressive patients tended to have a higher overall stressor severity level and better adaptive functioning, both as highest level in the past year and in terms of current functioning.

Schizophrenia Criteria and DSM-III Diagnoses. This study statistically investigated the relationships between individual DSM-III criteria for schizophrenia and the clinical diagnosis of this disorder. Subjects were 1,111 psychiatric patients evaluated with the IEF. Results indicated that the symptom most strongly correlated with a diagnosis of schizophrenia was thought process disorganization. The DSM-III diagnostic criterion involving "characteristic symptoms" had the highest specificity and the strongest overall association with a diagnosis of schizophrenia. The criterion involving absence of manic and depressive syndromes had the highest sensitivity. The combination of these two criteria had the best overall "hit rate" among all possible combinations of criteria, including the full DSM-III criterion set. Findings clarified the clinical use of DSM-III criteria for schizophrenia, quantitatively documenting the relationship between specific clinical features and the diagnosis of schizophrenia.

Admission Decisions and Multiaxial Diagnosis. This study comparatively examined the relevance of the various components of an expanded DSM-III diagnostic formulation to admission decisions by studying all 745 new patients who presented at our 24-hour walk-in clinic during a six-month period and who were admitted to either inpatient or outpatient care at WPIC. A diagnosis of psychotic disorders was found to be significantly associated with hospitalization; while anxiety disorders, adjustment disorders, personality disorders, and non-mental disorder conditions were associated with outpatient referral. However, the strongest correlations with hospitalization were obtained for current adaptive functioning and, to a lesser extent, for highest level of adaptive functioning in the past year.
Planned Research Studies

There are also a number of research studies being planned for the CIS at WPIC. One study consists of an attempt to clarify the relationship between length of stay on an inpatient unit and the admission diagnosis, symptoms, and other clinical features. The use of outpatient services will be studied as well.

Another research study involves comparing symptomatology and multiaxial diagnostic formulation, as recorded on the IEF or BEF, to the same data recorded at discharge on the DSF. This study is intended to serve as a means of evaluating the ability of the various axes of DSM-III to predict short-term outcome, as well as to explore the impact of specific treatment programs.

Other studies are planned to compare various groups of patients, based on data contained in the IEF, BEF, or DSF. For example, these comparisons will involve violent versus non-violent patients, adult versus geriatric patients, and children and adolescents versus adults.

Conclusion

The need for the development of a multi-purpose clinical information system significantly complicates design and implementation requirements. The conflicting needs of the various users require a series of trade-offs in order to obtain a system which is considered useful for everyday work while maintaining a valid research data base. Our experience has shown that a CIS can be developed which is useful from both service and investigational viewpoints.

References


5. Mezzich, J.E., Dow, J.T., and Coffman, G.A.: Developing an efficient clinical information system for a comprehensive psychiatric institute: I. Principles, design, and implement-