Overcoming Obstacles to Effective Treatment: Use of Clinical Practice Improvement Methodology

Susan D. Horn, Ph.D.

Clinical practice improvement (CPI) is a method for examining the steps of a care process to determine how to achieve the best medical outcomes at the least necessary cost over the continuum of a patient's care. This methodology includes tracking of medical care process factors (management strategies, interventions, medications), patient factors (physiologic severity of illness and psychosocial deviations at each visit), and outcomes and furnishes information that presents distinct advantages over information furnished by outcomes research or clinical trials in the designing of management protocols. The Managed Care Outcomes Project, a large-scale CPI study, examined the effects of health maintenance organization (HMO) cost-containment strategies on patient outcome and utilization of care. Approximately 13,000 patients with otitis media, arthritis, hypertension, asthma, or ulcer disease were analyzed; since all patient diagnoses and medication use were captured in the CPI model, my colleagues and I were able to assess factors in psychiatric illness diagnosis, treatment, and outcome. Among the findings were the following: (1) the majority of patients receiving psychiatric drugs do not have a specific psychiatric diagnosis; (2) a significant proportion of patients with a specific diagnosis of major depression do not receive antidepressant medication; (3) cost-containment strategies appeared to markedly limit psychiatric referral and frequency of visits and use of serotonin selective reuptake inhibitor treatment; and (4) severity of the primary illness in the study population was markedly increased in patients with a psychiatric diagnosis. Further analysis of data from this study may help to determine which processes of care for depression were associated with better outcomes.

(J Clin Psychiatry 1997;58[suppl 1]:15–19)

My colleagues and I have devised a methodology for assessing steps in medical care processes to determine how to achieve optimal clinical outcome at the least necessary cost over the entire course of a patient's care. The Clinical Practice Improvement (CPI) model[1–4] employs detailed data from actual medical practice settings to define decidable and executable dynamic protocols for care processes in these settings. In a recent study, the Managed Care Outcomes Project,[5,6] we assessed the effects of various health maintenance organization (HMO) cost-containment strategies on patient outcome and the effects of formularies on health care utilization over a 1-year period. Five nonpsychiatric disease groups in a large population of HMO patients were initially analyzed; capturing of all patient diagnoses and medication use in this patient population, however, allowed for analysis of characteristics of psychiatric disease diagnosis, treatment, and management. The CPI methodology and some of the findings regarding psychiatric illness are reported here. Results of analysis of the five nonpsychiatric disease groups have been reported[5,6]; fuller findings of the analysis of psychiatric diseases will be reported elsewhere.

CLINICAL PRACTICE IMPROVEMENT MODEL

CPI is a method of analyzing the content and timing of individual steps of a medical care process in order to determine how to achieve the best medical outcomes at the least necessary cost over the continuum of a patient's care. In particular, CPI methodology consists of recording in detail aspects of the processes of care, controlling for differences in patient conditions and characteristics, and determining which treatments and management strategies are associated with optimal outcome for particular conditions.[1–4] Care process factors that are recorded and analyzed include management strategies, interventions, and medications. Patient factors assessed include disease category; severity of disease, including physiologic signs and symp-

From The Institute for Clinical Outcomes Research, Salt Lake City, Utah.

Supported by an unrestricted educational grant from the Roerig Division of the U.S. Pharmaceuticals Group, Pfizer Inc.

Presented at the symposium "Management of Depression: A Successful Continuum of Care" of the American Psychiatric Association, May 8, 1996, New York, New York.

Reprint requests to: Susan D. Horn, Ph.D., ICOR, 2681 Parleys Way, Suite 201, Salt Lake City, UT 84109.

toms and complexity of psychosocial factors in disease; and overall course of disease and treatment, with assessments of patient condition occurring at multiple points in time. Outcomes assessed include clinical outcomes, health status, cost of care, length of hospitalizations, and number of health care encounters.

We believe that the CPI model poses advantages over other methods of determining optimal treatment and management protocols.[1,4] For example, in connecting outcomes with detailed process steps, the CPI model provides protocols of greater specificity than can be arrived at by traditional outcomes research. Traditional outcomes research is based on clear delineation of outcome failure. In most cases, however, such research includes neither detailed analysis of process steps nor adequate control for differences in severity of illness. Thus, although clear differences in outcome can be distinguished and broadly associated with differences in treatment processes, the information produced is insufficient to permit identification of the factors within the treatment processes that may be associated with better or poorer outcome.

Authoritative treatment guidelines also fall short of the protocols that can be produced via CPI.[1,4] In most cases, guidelines are undecidable; they provide comparatively vague descriptions of the patient types and thus do not provide for the flexibility and specificity of dynamic protocols triggered by more detailed patient information. In addition, most guidelines are not executable, i.e., they provide menus at each decision node and little guidance (because of the dearth of detailed information) on selecting from items on the menu. Finally, the guideline processes typically are not sufficiently connected to outcome—that is, they do not provide a prediction of what outcome to expect given patient characteristics and particular care process.

Randomized controlled clinical trials provide information on outcomes that is collected in a prospective fashion, avoiding some aspects of bias to which other types of research are susceptible. However, at the same time, the limited patient eligibility serves to alter the population characteristics from those that are encountered in actual treatment settings, eliminating from study, for example, patients with secondary problems or more severe disease. Typically, clinical trial treatment protocols are specified in advance, with failure to adhere to the protocol resulting in elimination from outcome analyses; in this way, too, the information provided by clinical trials differs from information derived from actual practice.

An example of the richness of information captured and utilized in CPI studies is provided by the computerized severity index we frequently use in such studies.[1,5,7,8] This index utilizes more than 2000 individual criteria for severity, subdivided into approximately 2400 disease-specific criteria sets that vary according to such factors as patient age and whether the patient is an inpatient or an ambulatory patient. Treatments are not used as criteria for severity classification. On average, by using information largely derived from medical charts and history, 32 criteria per patient are applied. The index permits derivation of disease-specific and overall severity levels. The index is repeatedly applied at multiple time points that include fixed time points relative to such events as admission, discharge, and intensive care unit admission. The model is capable of capturing and analyzing information on all of the diseases or conditions that an individual patient has and all of the deviations among disease characteristics and patient characteristics within a given disease group. This permits a precise determination of which process steps are associated with poorer and better outcome, facilitating design of more flexible and specific management protocols.

CPI STUDY IN AMBULATORY HMO PATIENTS: MANAGED CARE OUTCOMES PROJECT

We recently performed a CPI study in a large population of ambulatory patients from HMOs located in different regions in the United States (the Managed Care Outcomes Project).[5,6] Each HMO site had various levels of limitations on drugs that could be used, specialist referral, and visit co-payments; three of the HMOs were for profit and three were nonprofit. The purpose of the study was to: (1) examine the effects of various HMO cost-containment strategies on patient outcomes and (2) investigate the effects of formularies and other cost-containment factors on use of health care services. With regard to the latter, we specifically examined whether pharmaceutical cost-containment practices actually decrease use of or cost for medications and attempted to determine what effect formularies have on overall health care costs. All patients presenting to their HMO with any diagnoses in the categories of otitis media, arthritis, hypertension, asthma, and ulcer disease were enrolled in the study. These five diseases currently account for 70% of ambulatory visits in the United States; the patient population selected thus represents a broad spectrum of the ambulatory patient population. According to the study protocol, any disease diagnosis or medical treatment was recorded, and all diseases or conditions in addition to the five primary disease groups were subject to severity analysis and outcome assessments. In this way, a significant amount of information on psychiatric diagnoses and use of psychiatric drugs in HMO populations was obtained.

Overall, approximately 13,000 patients from the six HMOs were enrolled and followed over the course of 1 year. The population accounted for more than 100,000 office visits, more than 500 emergency room visits, more than 1000 hospitalizations, and more than 240,000 prescriptions. All of the health care provided to each patient and the status of each patient with regard to each of the patient's conditions or diseases were monitored at each

Table 1. Psychiatric Diagnoses and Psychiatric Drug Use in Patients With Either Psychiatric Diagnosis (Coded) or Psychiatric Drug Use*

	Psychiatric Drug Use		
Diagnosis	No	Yes	Total
Without psychiatric diagnosis (no code)	0	2668	2668
Psychiatric diagnosis			
Bipolar	4 (15%)	23 (85%)	27
Major/neurotic depression	58 (27%)	154 (73%)	212
Adjustment reaction	17 (63%)	10 (37%)	27
Depression NOS[a]	79 (25%)	235 (75%)	314

*49 patients had more than one diagnosis.
[a]Abbreviation: NOS = not otherwise specified.

contact with the health care system. Findings regarding processes of care for the disease groups of otitis, arthritis, hypertension, asthma, and ulcer disease have been reported elsewhere.[5,6]

PSYCHIATRIC FINDINGS IN THE MANAGED CARE OUTCOMES PROJECT

Of all patients studied, 3199 had either a coded psychiatric diagnosis or were receiving a psychiatric medication. A total of 2668 were receiving a psychiatric medication without having received a coded psychiatric diagnosis. Of the 531 patients who had a psychiatric diagnosis, 373 (70%) were receiving a psychiatric medication. Major/neurotic depression accounted for 212 of the psychiatric diagnoses and depression not otherwise specified (depression NOS) accounted for 314 of the diagnoses (Table 1). Of those diagnosed with major/neurotic depression, 154 (73%) were receiving psychiatric medication; of those with depression NOS, 235 (75%) were receiving psychiatric medication. Women accounted for the majority of patients who either had a psychiatric diagnosis or were receiving psychiatric medication; women accounted for 78% of bipolar codes, 71% of major/neurotic depression codes, 76% of adjustment reaction codes, 77% of depression NOS codes, and 62% of patients taking medication (without a psychiatric diagnosis).

With regard to antidepressant drugs alone, 1067 patients were receiving antidepressant medication without a psychiatric diagnosis code for major/neurotic depression. Of the 212 patients with a diagnosis of major/neurotic depression, 60% (128) were receiving antidepressant medication. Patients with the major/neurotic depression diagnosis code who were receiving an antidepressant drug thus accounted for 11% of all patients receiving an antidepressant drug.

We identified two cost control mechanisms in the HMOs studied: limited use of specialty care and limited use of certain drug types. With regard to the first, it was found that 306 (9.6%) of the 3199 patients who either had a psychiatric diagnosis or were receiving psychiatric medication had visited a psychiatrist at least once. A total of 3005 (93.9%) had visited a primary care physician at least once and 1545 (48.3%) had visited a health care provider other than a psychiatrist or primary care physician. Patients who visited a psychiatrist at least once had more severe illness over the course of the year than did those who did not visit a psychiatrist; the mean severity score, as assessed by the sum of the Ambulatory Patient Severity[5,6] (APS) visit scores throughout the year, for the patients who visited a psychiatrist was 89, compared with a score of 82 for those with at least one visit to a primary care physician or another provider. Table 2 shows the mean number of visits per year to health care providers among all patients receiving psychiatric drugs or having a psychiatric diagnosis. Patients who were receiving psychiatric medication without a psychiatric diagnosis very rarely visited a psychiatrist; although those with a psychiatric diagnosis and those with a psychiatric diagnosis who were receiving psychiatric medication saw a psychiatrist more frequently, they averaged fewer than two visits per year. Patients who both had a psychiatric diagnosis and received psychiatric medication had more severe disease and had a greater number of health care contacts. Further analyses of these data will provide information on which types of provider contacts were associated with superior outcome for patients of different categories.

The HMOs in this study attempted to limit the usage of serotonin selective reuptake inhibitors (SSRIs) in antidepressant treatment, encouraging use of tricyclic antidepressant agents (TCAs). Of patients receiving antidepressant medication, 263 received an SSRI, 792 received a TCA, and 126 were switched from a TCA to an SSRI. The mean APS score at the initial visit was higher among SSRI recipients (11.0) than among TCA recipients (10.6), indicating that those patients given SSRIs were somewhat sicker than those given TCAs; patients switched from TCAs to SSRIs had even more severe illness (index of 12.3). However, SSRI recipients had a significantly lower mean number of HMO visits during the year compared with TCA recipients (9.5 vs. 10.0). Patients switched from TCA to SSRI treatment averaged 12.5 visits during the year. Mean APS score over the course of the year was lower among the SSRI recipients than among the TCA recipients (74.7 vs. 77.6); mean APS score among patients switched from TCA to SSRI treatment was highest (96.1). These differences in severity of illness and improvement as indicated by reduction in health care contacts are currently being analyzed.

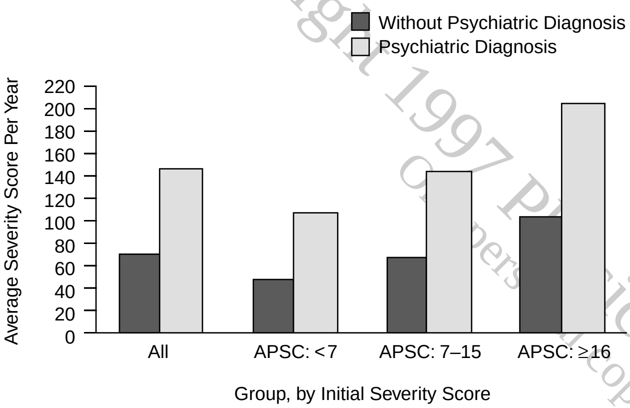
Another preliminary finding in the Managed Care Outcomes Study currently being analyzed in greater detail is that the mean severity of the primary illness of patients in the study was greater in those patients who also had a psychiatric diagnosis. Figure 1 shows the mean severity score for asthma over the course of the year of study (APS continuous score summed over all visits) according to the initial severity index and according to whether a psychiatric

Table 2. Mean Number of Provider Visits and Mean Severity Score

	Psychiatric Diagnosis Only (N = 151)		Psychiatric Medication Only (N = 2668)		Both (N = 380)	
	Number of Visits	% of Patients With Visits	Number of Visits	% of Patients With Visits	Number of Visits	% of Patients With Visits
Mean number of visits (and percentage of patients with visits) to:						
Psychiatric provider	1.20	15.5	0.2	2.2	1.72	13.7
Primary care physician	3.66	47.2	4.69	51.5	5.72	45.5
Other	2.89	37.3	4.21	46.3	5.14	40.8
Mean severity score[a]	64.2		72.4		91.4	

[a]Ambulatory Patient Severity Scale sum of visits.

Figure 1. Asthma and Psychiatric Diagnosis Mean Severity Comparison*



*Mean sum severity score per year among patients with asthma with a psychiatric diagnosis or without a psychiatric diagnosis according to continuous severity score for patients at initial visit (APSC).

diagnosis was present. It was found that patients with higher initial asthma severity index had greater mean severity scores over the course of the year and that those with a psychiatric diagnosis had markedly more severe illness. Similar findings were made when the other primary study illnesses were analyzed.

CONCLUSION

The preliminary findings in the Managed Care Outcomes Study regarding psychiatric diagnoses and medications have a number of broad implications. First, it would appear that given the wide use of psychiatric medications without psychiatric diagnoses, there is substantial underdiagnosis of psychiatric illness in the ambulatory patient population. Depression accounts for the majority of psychiatric diagnoses that are made. A significant proportion of patients with psychiatric diagnoses are not receiving psychiatric medication; an even greater proportion of patients with a specific diagnosis of major depression are not receiving antidepressant medication. Further, antidepressant medication is being widely used in patients who have not received any psychiatric diagnosis. Cost-containment strategies in the HMOs studied appeared to have strongly limited referral to psychiatrists. Those patients referred to psychiatrists had more severe psychiatric illness; however, even those patients referred to psychiatry averaged a very small number of visits per year as part of their treatment. Another cost-containment policy identified was that of limiting the use of SSRIs in antidepressant treatment. Patients prescribed SSRIs had more severe illness at presentation but subsequently averaged fewer visits and lower severity scores over the year of study. Patients switched from TCA to SSRI treatment had the greatest initial severity of illness, greatest mean severity, and greater mean number of visits. Finally, mean severity of the primary illnesses analyzed in the Managed Care Outcomes Study was markedly increased in patients who had a psychiatric diagnosis.

The findings that psychiatric illness is associated with persistently greater severity of common primary illnesses, that psychiatric illness is underdiagnosed in the population, and that management of such illness is inconsistent and inappropriate all point out a need for better diagnostic and management protocols to improve outcome of both concomitant medical illness and psychiatric illness. Further analysis of data from this study may help to determine which processes of care actually being used in these HMO environments are associated with better outcome for both the primary and the psychiatric illnesses.

REFERENCES

1. Horn SD. International classification of disease, 9th ed. Clinical modification, severity adjusted (ICD-9-CM-SA). New Haven, Conn: Health Systems International, 3rd ed; 1989
2. Berman S. Using clinical practice improvement: an interview with Susan Horn. Joint Commission Journal on Quality Improvement 1995;21:301–308
3. Horn SD. The clinical practice improvement (CPI) model and how it is used to examine the availability of pharmaceuticals and utilization of ambulatory healthcare services in HMOs: results from the Managed Care Outcomes Project (MCOP). Pharmacoeconomics 1996;10:50–55
4. Horn SD, Sharkey SS. Translating national guidelines for local use. In: APhA Guide to Drug Treatment Protocols: A Resource for Creating and

Using Disease-Specific Pathways. Washington, DC: American Pharmaceutical Association; 1996:7-1–7-14
5. Horn SD, Sharkey PD, Gassaway J. Managed Care Outcomes Project: study design, baseline patient characteristics, and outcome measures. Am J Managed Care 1996;2:237–247
6. Horn SD, Sharkey PD, Tracy DM, et al. Intended and unintended consequences of HMO cost-containment strategies: results from the Managed Care Outcomes Project. American Journal of Managed Care 1996;2:253–264
7. Horn SD, Sharkey PD, Buckle JM, et al. The relationship between severity of illness and hospital length of stay and mortality. Med Care 1991;29:305–317
8. Averill RF, McGuire TE, Manning BE, et al. A study of the relationship between severity of illness and hospital cost in New Jersey hospitals. Health Serv Res 1992;27:587–617