
CENTER FOR HEALTH CARE EVALUATION

Research Agenda

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Department of Veterans Affairs Health Care System

and Stanford University

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I. Organizational Structure and Mission

The Center for Health Care Evaluation (CHCE) is an applied health services research center composed of experts trained in health services, health economics, epidemiology, public health, evaluation research, social psychology, medical sociology, and biostatistics. We have primary affiliations with the Department of Veterans Affairs (VA) Health Care System and Stanford University School of Medicine in Palo Alto, California. The Center is also affiliated with the Institute for Health Policy at the University of California in San Francisco and with the Alcohol Research Group and the Center for Mental Health Services Research at the University of California in Berkeley.

Established in 1985, the Center is integrated with four affiliated organizational units: (a) the Coordinating Center for the Substance Abuse Module (CSAM) of the VA Quality Enhancement and Research Initiative; (b) the Health Economics Research Center (HERC); (c) the Program Evaluation and Resource Center (PERC); and (d) the Sierra Pacific Network Mental Illness Research, Education, and Clinical Center (MIRECC). The Center also is closely affiliated with the VA Cooperative Studies Program and with several health services research groups based at Stanford University.

Organizational Structure

Overall, the Center's research focuses on the organization and delivery of health care services; diagnostic assessment, screening, and clinical decision-making; and the costs and outcome of health care. The lead facility for the Center is the Palo Alto VA Health Care System, which includes Livermore; the Center also encompasses the Fresno, Reno, and San Francisco VA Health Care Systems and the VA Northern California System of Clinics.

One affiliated component of CHCE is the Coordinating Center for the Substance Abuse Module (CSAM) of the VA's nationwide effort to develop new knowledge and apply research findings to improve the overall quality of health care. Established in 1998, CSAM coordinates and conducts research to inform the development of clinical guidelines, evaluate the concordance between treatment practices and clinical guidelines, and examine the extent to which guideline concordant care is associated with better treatment outcome.

A second Center closely affiliated with CHCE is the Health Economics Research Center (HERC). Established in 1998 and directed by Paul Barnett, Ph.D., HERC is dedicated to improving the quality of health economics research in VA and helping VA researchers assess the cost-effectiveness of health care and evaluate the efficiency of VA programs and providers.

The third Center closely affiliated with CHCE is the Program Evaluation and Resource Center (PERC), directed by John Finney, Ph.D. Established in 1990, PERC monitors VA substance abuse treatment programs and patients' patterns of care, assesses patients' outcomes, determines what treatments work, and disseminates the resulting information to managers and providers.

CHCE also works closely with the Sierra Pacific Network Mental Illness Research, Education, and Clinical Center (MIRECC), which was established in 1996 and is directed by Jerome Yesavage, M.D. The MIRECC focuses specifically on research on Post-Traumatic Stress Disorder and dementia.

The Cooperative Studies Program (CSP), directed by Phil Lavori, Ph.D., works with investigators who wish to conduct multi-site studies in such areas as the delivery, quality, and cost of VA health care.

Finally, we are also closely affiliated with three Centers at Stanford University that are directed by Alan Garber, M.D., Ph. D.: the Center for Primary Care and Outcomes Research, the Center for Health Policy, and the Center on the Demography and Economics of Health and Aging.

Mission

CHCE's mission is to conduct and disseminate health services research that results in more effective and cost-effective care for veterans and for the nation's population as a whole. We work to develop an integrated body of knowledge about health care and to help the VA and the broader health care community plan and adapt to changes associated with health care reform.

In order to achieve this mission, we have the following goals:

- ***Improve the organization and delivery of health care services***; we identify how to organize health care services to best meet patients' needs
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- **Improve diagnostic assessment, screening procedures, and clinical decision-making;** to aid staff in clinical practice, we refine clinical decision-making techniques and examine the effectiveness and cost-effectiveness of diagnostic methods and treatment
- **Improve treatment for substance use and psychiatric disorders;** we find out what treatments work and how to match patients to the best treatment for their condition
- **Improve health services research methods;** to better attain our other goals, we improve techniques for measuring program characteristics, health status and outcomes, and costs

In planning our research in these four areas, we have a vision of an effective health care system. In addition to the broad principles of access, quality, and cost-effectiveness, we think health care should:

- **Consider the whole person,** including psychosocial and life context factors and primary as well as secondary and tertiary prevention
- **Inform patients** and enable them to be active partners in choosing, planning, and maintaining care
- **Establish continuity and coordination of care** across treatment settings and providers
- **Use outcome-based practice guidelines** to match patients with effective treatment and deliver personalized care guided by flexible standards of care
- **Encompass informal systems of care,** such as mutual help groups, volunteers, and family caregivers
- **Create an effective work environment** for health care staff

II. Conceptual Orientation

There is growing consensus that health services research is more informative when embedded in a conceptual context - when the research tries to explain or generate knowledge about the processes that link health care system and patient factors to treatment outcomes. The model shown in Figure 1 provides a framework to guide our work.

The model shows that a health care system can be described in terms of its physical features, organizational structure and policies, casemix, and health care tasks (Panel I). These factors are associated with the types of patients who enter the system (Panel II); in turn, health care system and patient characteristics affect the selection and allocation of services and the implementation and process of care (Panel III). System factors also affect the work environment and staff morale and performance (Panel IV). In turn, each of these sets of factors influences health care outcomes (Panel V).

Health Care System Characteristics

As just noted, we conceptualize health care system factors in four domains: physical features, organizational structure and policies, casemix, and health care tasks. We have developed instruments to assess these domains in psychiatric and substance abuse programs and in residential facilities for older patients. Because health care staff influence patients' outcomes and because the workplace affects staff morale, we have formulated ways to assess the health care work environment. In several current projects, we are trying to link characteristics of health care programs (Panel I) to staff and patient outcomes (Panels III and V).

Selection and Allocation of Services

We need to learn much more about how patients decide to seek health care and why they select or receive specific services. We are trying to obtain more information about selection and allocation by examining factors that influence hospital markets and service areas, forecasting demand for services, and finding out how patients choose a health care facility. We are also focusing on screening, prevention, and management of a variety of disorders, including HIV infection, cardiovascular disease and its risk factors, stroke, and cancer. In addition, we are examining the development and implementation of clinical guidelines.

Implementation and Process of Care

Before examining the outcome of a service or program, it is important to find out how well the treatment is implemented. We have developed procedures to measure the quality of treatment for psychiatric and substance use disorders and how well health care teams function. We use these and other methods to assess the adequacy of treatment implementation.

To understand how a treatment works, it is important to specify the relevant therapeutic procedures and how these procedures are expected to result in positive

outcomes; that is, to articulate a theory of the treatment process. Treatment process theories specify the components of treatment that should be linked to outcome and the causal chain through which they work. These theories also encompass variables that may mediate the connections between treatment and longer-term outcomes. We are examining these linkages in several projects and are focusing on patient-treatment matching, that is, on how patient characteristics affect the link between treatment and outcome (i.e., between Panels III and V in Figure 1).

Psychosocial Processes and Stress and Coping Theory

Health care systems cannot be considered apart from the patients they serve. In addition to the disease states or disorders that are the targets of health care interventions, it is also important to consider psychosocial processes. Psychosocial processes encompass the personal and environmental factors associated with health care utilization and outcomes. Our work in this area has focused on stress and coping theory - how patients' life stressors, social resources, and coping skills influence entry into and the course and outcome of health care.

A focus on psychosocial processes and stress and coping theory helps put health care in context - it illustrates that treatment is only one of many factors that influence an individual's functioning. Psychosocial processes can provide points of leverage for prevention efforts and can suggest ways to reformulate interventions.

Areas of Current and Planned Focus

Guided by our conceptual model and vision of an effective health care system, we are pursuing a series of projects that involve (1) organization and delivery of services; (2) diagnostic assessment, screening, and clinical decision-making; (3) substance use and psychiatric disorders and their treatment; and (4) health services research methodology. We organize projects by their major aim; however, many projects address more than one of the four goals. Much of our work is collaborative; we name the team leader and major contributors to each project. At the end of the agenda, we identify selected publications and list our current staff.

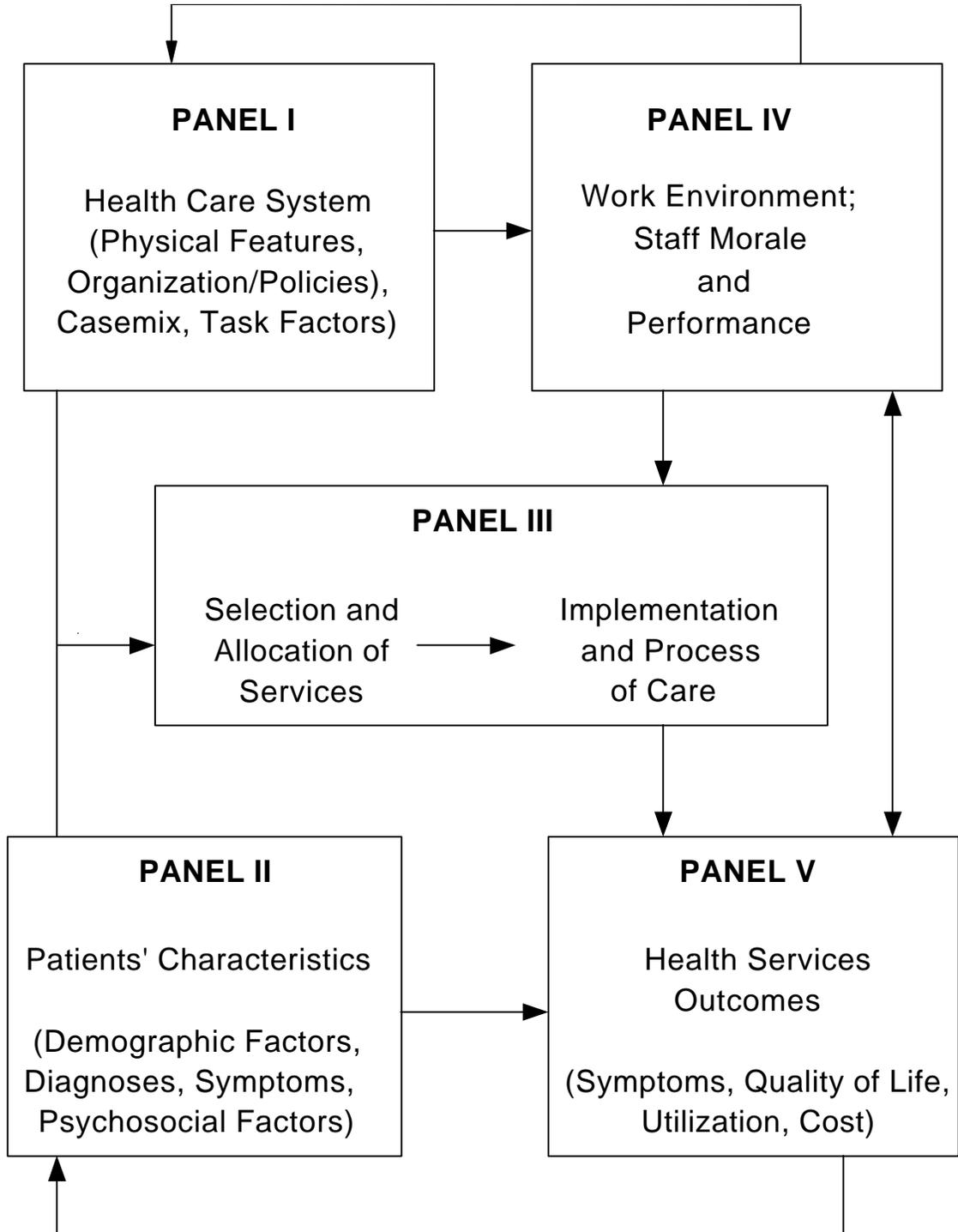


Figure 1. Conceptual Model of Health Care System and Patient Factors and Staff and Patient Outcomes

III. Organization and Delivery of Services

One of our goals is to improve the organization and delivery of health care services. We are focusing on health care organization, ownership, and the demand for health care; health care organization and patients' access to care; improving the efficiency and effectiveness of outpatient care; and the implementation of clinical guidelines.

Health Care Organization, Ownership, and Demand for Care

Health care services are provided by public (federal, state, local) and private (i.e., nonprofit, for-profit) sources. Programs that operate under different ownership serve divergent sets of patients, and ownership has been linked to quality of care. We are examining whether the ownership of health care programs is associated with program organization or patient satisfaction, and how demographic trends affect the organization and demand for care.

Ownership and Substance Abuse Program Organization. Paul Barnett compared substance abuse programs in four ownership categories: public federal, public nonfederal, nonprofit, and for-profit. Hospital, residential, and outpatient programs operated by the federal government were larger than programs owned by other sources, but, in general, they were not as intensively staffed. Federal programs were four times as likely to provide more than one mode of care (i.e., hospital, residential, outpatient) than for-profit programs. Public federal programs were more likely to have continuing care and follow-up services than public nonfederal programs, and were more than twice as likely to offer medical care services as nonprofit programs. These findings indicate that ownership is associated with program size, staffing, and the diversity of modes of care provided.

Ownership and Satisfaction with Diabetes Care. John Piette compared satisfaction among diabetic patients treated in the VA (public federal ownership) with that of diabetic patients treated in a county-funded health care system (public nonfederal ownership). VA patients were more satisfied overall than were county patients, and were more satisfied with their access to care and communication with providers, and the quality of their health outcomes. VA patients reported having more diabetes counseling and shorter clinic waiting times. Each of these process measures was positively associated with patient satisfaction.

Organization and Demand for Health Care among Older Adults. Due to continued attention to the costs of health care, Medicare is the focus of special concern. In projects led by Alan Garber, we are identifying the groups of enrollees and types of care responsible for expenditure growth; projecting future expenditures for the Medicare program; and assessing the impact of alternative policies toward controlling the growth of Medicare outlays. Dr. Garber is also examining Medicare and Medicaid expenditure patterns, transitions into managed care, and relationships between patients' personal characteristics and utilization. These analyses will support simulations of consequences of alternative policy and organizational options.

In related work, Dr. Garber is analyzing the relationship between treatment intensity, costs, and outcomes in elderly patients with any of several major illnesses. Dr. Garber and his colleagues are also studying trends in demography, health and health care, racial disparities in health care, and the effects of these factors on older adults' outcomes and well-being.

Health Care Organization and Patients' Access to Care

A major factor determining the demand for health care is the location of services relative to potential users. Distance from care is an especially critical issue for VA policy because VA patients often must travel farther to receive care than do patients treated in other health care systems. The effect of distance on veterans' use of care merits special attention because access to inpatient care may determine whether patients survive an acute episode, and access to outpatient care may influence patients' morbidity and mortality rates.

Veterans are Willing to Travel for VA Care. Ciaran Phibbs used VA and Medicare data to estimate models of the demand for VA services. Results indicated that veterans are willing to travel long distances to use VA inpatient and outpatient services. Use of the VA declined with increases in travel distance only up to about 15 miles, after which use was relatively insensitive to further increases in distance. Better access to care should be developed to meet the needs of the dedicated group of VA users who are traveling very long distances to obtain VA care.

Outpatient Care is Associated with Myocardial Infarction Patients' Survival. Geographic access is especially important for patients with chronic health problems, such as those resulting from an acute myocardial infarction (MI). In a study that examined VA patients' outcomes after discharge with a diagnosis of MI, we found that

patients who used VA outpatient care were 30% more likely to survive for twelve months or more than were patients who did not use VA outpatient care. Patients who lived more than 20 miles from their admitting hospital were less likely to use VA outpatient care. These findings show that distance poses a barrier to outpatient care, which may be an important factor contributing to survival for patients with cardiac diagnoses.

Distance Reduces Substance Use Disorder Patients' Access to Outpatient Care. Patients who live farther from their source of VA outpatient mental health care are less likely to obtain care following inpatient substance abuse treatment. For each additional travel mile, patients' odds of attending outpatient care fell 3%; only 40% of patients who lived more than 25 miles from the nearest outpatient facility obtained VA outpatient services. Moreover, patients who received outpatient services had fewer visits if they lived farther from their source of care. These findings are of special concern because regular outpatient mental health care is associated with better long-term substance use outcomes.

Efficiency and Effectiveness of Outpatient Care

To improve outpatient care, we are developing and evaluating new methods to manage the treatment of patients with chronic diseases, such as diabetes and arthritis. Many chronically ill patients require weekly or even daily contact to monitor their health and provide education. Thus, we are focusing on novel strategies for using the telephone to deliver cost-effective services to patients in their homes.

Patients with Diabetes Learn from Automated Telephone Calls. John Piette found that low-income patients with diabetes used automated telephone disease management (ATDM) calls to obtain health status information that could improve the quality of their care. Most patients completed the majority of the telephone assessments, reported their self-monitored blood glucose levels, and accessed information about diet and self-care. Patients' responses within assessments were consistent, and the information they provided identified emerging health problems. ATDM calls can improve the information base for diabetes management and relieve some of the pressures of delivering diabetes care under cost constraints.

Automated Telephone Calls and Nurse Educators Improve Care for Patients with Diabetes. In the care of patients with diabetes, the focus of care plans and the evaluation of treatment success has broadened to include patient-centered outcomes,

as well as the maintenance of normal glucose levels. In a randomized controlled trial conducted by John Piette and his research team, the findings showed that, compared to patients who received usual care, patients who received ATDM calls with nurse follow-up by telephone reported more frequent glucose monitoring, foot inspection, and weight monitoring, and fewer problems with medication adherence at a 12-month follow-up. Glycosylated hemoglobin and serum glucose levels were lower in the intervention group and about twice as many intervention patients had levels within the normal range. Moreover, intervention patients reported fewer symptoms of depression and greater efficacy to conduct self-care. These findings show that automated systems can augment service delivery in primary care.

Implementing Clinical Guidelines

Better implementation of and adherence to clinical practice guidelines hold promise for improving the quality, outcomes, and costs of health care. Our work in this area focuses on enhancing the guideline-concordant care of hypertension, implementing new heart failure care guidelines, and improving cancer pain management.

Individualized Feedback can Enhance Guideline-Concordant Drug Treatment of Hypertension. In a randomized clinical trial, Mary Goldstein is comparing an intervention that implements standard hypertension care guidelines for all clinicians to an individualized intervention that gives clinicians information on the proportion of their hypertensive patients whose drug treatment is consistent with standard guidelines, as well as a computer-generated advisory at each patient's clinic visit about that patient's concordance with the standards. Preliminary findings showed that clinicians in both groups increased their provision of guideline-concordant therapy, and that clinicians in the individualized intervention group improved more than did those in the general intervention group.

Implementing New Chronic Heart Failure Care Guidelines. Barry Massie is conducting a project to determine the best strategies for implementing chronic heart failure (CHF) care guidelines that recommend the use of beta-blockers. The goal is to compare intensive provider education and guideline promotion to a procedure that includes provider notification and patient empowerment and incorporates several promising interventions (e.g., focusing practitioners on specific patients, involving patients in their care). A third strategy utilizes a specially trained and supervised nurse practitioner to individualize beta-blocker therapy and then return patients to primary

providers for long-term management. The hypothesis is that the third approach will prove more successful in initiating beta-blockers and establishing target doses, and do so without precipitating worsening CHF.

Improving Cancer Pain Management. Cancer patients commonly complain of inadequate pain management. Accordingly, Marilyn Douglas and her research team are determining the effects of two nursing interventions on the improvement of pain management, functional status, and quality of life in veterans receiving outpatient cancer care. In the standard intervention, patients view a video and receive a pamphlet on cancer pain management. In the individualized intervention, patients receive the video and the pamphlet and participate in four telephone coaching sessions focusing on their specific pain management problem. The study tests the hypothesis that, compared to usual care, patients in the intervention conditions will have less intense pain, greater satisfaction with pain management, and better physical and social functioning.

IV. Diagnostic Assessment, Screening, and Clinical Decision-making

Our second overall goal is to improve diagnostic assessment, screening, and clinical decision-making. Our work in this area focuses on screening, prevention, and management of HIV infection and cardiovascular disorders. We also are conducting studies on screening for and management of cancer.

Screening, Prevention, and Management of HIV Infection

The VA sees approximately 17,000 patients who are infected with HIV each year, which makes it the largest provider of HIV services in the United States. Douglas Owens and his colleagues are conducting a program of research on screening for, preventing, and managing HIV infection. An important initiative in this regard is the National Center for Quality Improvement in HIV Care, located at the VA Palo Alto Health Care System, which Dr. Owens advises. The Center promotes innovation and improvement in the care of HIV-infected patients.

HIV Screening Programs Can Be Cost-Effective, Especially if Counseling Can Reduce High-Risk Behavior. The most important determinants of the cost-effectiveness of screening are the prevalence of HIV, the effect of screening on quality of life, and the reduction of transmission of HIV infection by risky sexual behavior or needle sharing. For example, as HIV prevalence in a population increases from .5% to 4%, the cost-effectiveness of screening improves from \$60,000 to less than \$38,000 per

year of life saved. If testing and counseling reduce the frequency of high-risk behavior, the cost of screening (with HIV prevalence of 1%) is less than \$37,000 per year of life saved.

Developing Guidelines for HIV Screening Programs. Early diagnosis of HIV infection permits providers to administer interventions aimed at reducing the morbidity and mortality of HIV disease before antiretroviral therapy is no longer beneficial and irreversible immunologic damage has occurred. Currently, the VA has no guidelines on who should be screened for HIV. Accordingly, we are assessing existing practice patterns for the identification of established HIV infection; evaluating the cost-effectiveness of published guidelines for the identification of established HIV infection when applied to VA populations; developing screening guidelines to identify veterans who have established HIV infection; and performing a pilot demonstration project that implements the developed guidelines and evaluates their effectiveness and cost-effectiveness.

HIV Preventive and Therapeutic Vaccines Would Be Beneficial. Dr. Owens and coworkers evaluated the population effects of potential preventive and therapeutic vaccines for HIV infection in early- and late-stage epidemics, using a model that simulated the course of the epidemic in San Francisco, California. In the model, a preventive vaccine prevented almost 4,000 cases of HIV infection during a 20-year period, reduced the projected prevalence of HIV infection from 12% to 7% in a late-stage epidemic, and gained almost 16,000 quality-adjusted life years. If a therapeutic HIV vaccine reduced the infectivity of the vaccine recipient, its use could produce comparable net gains of quality-adjusted life years. The relative merits of preventive and therapeutic vaccines depended on the stage of the epidemic. In an early-stage epidemic, for example, a preventive vaccine is likely to be more advantageous than a therapeutic vaccine.

Screening, Prevention, and Management of Cardiovascular Disorders

Due to the prevalence of cardiovascular disorders among VA patients, we have devoted considerable effort to their screening, prevention, and management. Alan Garber, Michael Gould, Paul Heidenreich, Douglas Owens, and their colleagues have focused on the cost-effectiveness of risk-factor modification programs, diagnostic strategies for identifying coronary heart disease (CHD), and finding effective strategies to diagnose heart failure and valvular disease. We also are conducting research on the management of coronary heart disease and stroke.

- ***Risk Factor Modification Programs can be Cost-Effective.*** Although risk factor modification has gained wide acceptance as an effective approach to the prevention of CHD, there is considerable uncertainty about the most efficient preventive strategies. Reviews by Alan Garber and his colleagues indicated that smoking cessation and exercise programs typically are highly cost-effective ways to prevent CHD. The detection and treatment of hypertension is also cost-effective, especially when inexpensive drugs with proven effectiveness, such as diuretics or beta-blockers, are used. Hormone-replacement therapy is a cost-effective approach to CHD prevention in most postmenopausal women, although it is uncertain which hormone preparation is best. Cholesterol reduction is a cost-effective strategy for the prevention of CHD in individuals without other treatable risk factors who are at high risk of developing CHD. Secondary prevention using behavior modification and pharmacologic treatments is also likely to be cost-effective compared with other common medical treatments.
 - ***Echocardiography, SPECT, and Timely Angiography are Cost-Effective Approaches to Diagnosing Coronary Artery Disease.*** In addition to examining the cost-effectiveness of strategies to prevent CHD, we are evaluating the cost-effectiveness of alternative approaches to diagnosing coronary artery disease. In a recently completed meta-analysis to determine the accuracy of alternative diagnostic strategies for patients at intermediate pretest risk for coronary disease, Dr. Garber and his colleagues found that life expectancy varied little with the initial diagnostic test. Echocardiography, Single Photon Emission Computed Tomography (SPECT), and timely angiography were the most cost-effective diagnostic tests for patients at intermediate pretest risk for coronary disease. Strategies based on exercise
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testing and planar thallium imaging led to poorer outcomes and, in some groups, higher overall costs than echocardiography. Angiography is better than Positron Emission Tomography (PET) because it produces more favorable health outcomes and costs less.

- **Diagnosing Heart Failure and Valvular Disease.** In work directed by Paul Heidenreich, we are determining the magnitude of heart failure and valvular disease within the VA system and the appropriate diagnostic strategy for patients with these disorders. Specifically, we are examining trends in heart failure mortality and health care expenditures for Medicare patients over the past 15 years, and evaluating regional variation in two quality measures for patients with heart failure: left ventricular function following first admission for heart failure, and early outpatient follow-up after discharge. We are also determining the utilization of proven therapies, such as the use of angiotensin converting enzyme (ACE) inhibition for patients with reduced left ventricular function. The goal is to develop estimates of health and economic outcomes for different diagnostic test strategies.

Management of Coronary Heart Disease. Coronary heart disease (CHD) is the leading cause of death among adults in the United States and a major cause of hospitalization in the VA. Also referred to as coronary artery disease or ischemic heart disease, coronary heart disease accounts for almost 1 in 3 US deaths and nearly \$100 billion in annual health care spending. CHD also complicates the management of other medical conditions and increases perioperative morbidity. In this area, we have focused on treatments for stable angina and for myocardial infarction, the cost-effectiveness of implantable cardioverter defibrillators, and psychosocial factors involved in depression among cardiac patients.

- **Beta-Blockers are Effective for Stable Angina.** Physicians in the United States are most apt to prescribe a calcium antagonist for stable angina patients. They tend to shy away from beta-blockers because of their side effects, including depression, sexual dysfunction, dizziness, and fatigue. Directed by Dr. Heidenreich, we used meta-analysis to compare the relative efficacy and tolerability of first-line treatment for stable angina with calcium antagonists, beta-blockers, and long-acting nitrates. Beta-blockers provided
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similar clinical outcomes and were associated with fewer adverse events than were calcium antagonists. Too few trials compared nitrates with calcium antagonists or beta-blockers to draw firm conclusions about their relative efficacy.

- **Increased use of Effective Treatments Improve Survival after a Heart Attack.** Paul Heidenreich reviewed trends in treatment and survival for patients with acute myocardial infarction over the last 20 years. He found that the use of acute treatments that are known to improve survival among patients with MI has increased markedly, leading to an estimated 9.6% reduction in 30-day mortality. The increase in use of aspirin, beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, and reperfusion explained 71% of this decline. The largest effect was for aspirin, which accounted for 34% of the decrease in 30-day mortality, followed by thrombolysis (17%), primary angioplasty (10%), beta-blockers (7%), and ACE inhibitors (3%).
 - **Implantable Cardioverter Defibrillators May Be Cost-Effective.** A research team led by Douglas Owens compared the probable cost-effectiveness of implantable cardioverter defibrillators (ICDs) with that of amiodarone treatment (a promising pharmacologic alternative) for preventing sudden cardiac death. The research found that, in high-risk patients, treatment with an ICD would cost between \$37,000 and \$74,000 (depending on the reduction in the mortality rate) per quality-adjusted life-year saved relative to amiodarone therapy. The findings also showed that early ICD implantation is likely to be more cost-effective than delayed implantation.
 - **Social Support and Approach Coping May Reduce Depression in Cardiac Patients.** Many cardiac patients experience elevated levels of depression, which are associated with poorer prognoses. In a study of patients with chronic cardiac illness, Rudolf Moos and Penny Brennan (with Charles Holahan and Carole Holahan of the University of Texas) found that patients who had more social support and relied more on approach coping at a baseline assessment had fewer depressive symptoms at 1-year and 4-year follow-ups. These findings can help identify and target interventions to improve outcomes among high-risk cardiac patients.
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Management of Stroke. In this area, we have focused on the cost effectiveness of warfarin, the value of incorporating patient preferences into practice guidelines for stroke prophylaxis, and the use of heparin as a treatment for blood clots.

- ***Cost-Effectiveness of Warfarin Depends on Patients' Risk of Stroke.*** In a comparison of the cost-effectiveness of warfarin and aspirin for prophylaxis of stroke, Douglas Owens concluded that warfarin-eligible patients with nonvalvular atrial fibrillation (NVAF) should be treated based on their risk of stroke. Treatment with warfarin is cost-effective in patients with NVAF and one or more additional risk factors for stroke. In patients with NVAF but no other risk factors for stroke, prescribing warfarin instead of aspirin increases costs significantly, but has minimal if any effect on quality-adjusted survival.
 - ***Clinical Guidelines for Stroke Prophylaxis Should Incorporate Patient Preferences.*** In this project, Douglas Owens and colleagues asked patients who had atrial fibrillation to estimate the quality-of-life associated with mild, moderate, and severe potential strokes and with stroke prophylaxis with either warfarin or aspirin. The rated quality of life with warfarin therapy was lower than that with aspirin therapy. In fact, some patients rated their quality of life with warfarin therapy so low that aspirin therapy provided a greater quality-adjusted life expectancy. These findings suggest that stroke prophylaxis guidelines should incorporate patients' preferences; they also point to the importance of assessing patient preferences instead of relying only on functional status when evaluating stroke patients' outcomes.
 - ***Low-Molecular Weight Heparins are Effective for Treating Blood Clots.*** Low-molecular weight heparins may simplify the management of deep venous thrombosis. A critical clinical issue is whether this more convenient therapy is as safe, effective, and cost-effective as treatment with unfractionated heparin. In a meta-analysis to examine this issue, Michael Gould and Alan Garber concluded that low-molecular-weight heparin treatment reduces mortality rates after deep venous thrombosis, that these drugs are as safe as unfractionated heparin with respect to major bleeding complications and as effective in preventing thromboembolic recurrences, and are highly cost-effective for inpatient management of venous thrombosis.
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Screening for and Management of Cancer

CHCE researchers are focusing on whether screening for risk factors associated with gastric cancer and breast cancer is cost-effective. In addition, we are trying to identify cost-effective strategies for staging lung cancer, an especially prevalent type of cancer among VA patients. Research in progress is designed to characterize the prevalence and treatment patterns of breast cancer in the United States, and to understand how variations in treatment patterns are associated with the costs, outcomes, and cost-effectiveness of care.

- **Screening for *H. Pylori* Infection May Be a Cost-Effective Way to Prevent Gastric Cancer.** In an analysis of the costs and benefits of screening for *Helicobacter pylori* once at age 50 and treating infected individuals with antibiotics, Douglas Owens compared two alternatives: Screen for *H pylori* and treat those with a positive test, or do not screen and do not treat. In the base-case analysis, it was assumed that *H pylori* treatment prevented 30% of attributable gastric cancers; cost-effectiveness was estimated to be \$25,000 per year of life saved. In a high-risk group, such as Japanese Americans, screening and treatment would require less than \$50,000 per year of life saved, even at 5% treatment efficacy. These results suggest that screening and treatment for *H pylori* infection is potentially cost-effective in the prevention of gastric cancer, particularly in high-risk populations.
 - **Selective Genetic Testing for Breast Cancer Risk Could be Cost-Effective.** Mary Goldstein and Douglas Owens evaluated the financial and medical implications of BRCA1 testing to identify the risk of breast cancer in women. The results indicated that, for a population of 500,000 women, BRCA1 testing would result in only 7 fewer women being diagnosed with breast cancer (due to their use of prophylactic surgery) and in only 3 fewer women dying of breast cancer (due to shifting the detection of their tumors to an earlier stage). However, 500 women would be incorrectly told that they carry a BRCA1 mutation. Screening in the general population would cost \$33 million per life saved. Selective strategies that test only women at high risk of carrying a BRCA1 mutation are likely to be more efficient and should be the focus of further study.
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- **Orchiectomy is a Cost-Effective way to Treat Metastatic Prostate Cancer.** Cancer of the prostate causes more than 31,000 deaths in the United States each year. Annual Medicare expenditures for prostate cancer exceed \$1.4 billion. Metastatic prostate cancer is incurable, but medical and surgical androgen suppression can palliate its symptoms and may prolong survival. When Dr. Garber and his colleagues estimated the value of six antiandrogen therapies for advanced prostate cancer, they found that orchiectomy is the most cost-effective androgen suppression strategy. At a cost of \$7,000, orchiectomy was associated with a gain of more than 5 quality-adjusted life years, resulting in an incremental cost-effectiveness ratio of \$7,500 per quality-adjusted life year relative to DES (diethylstilbestrol), the least expensive therapy.
- **Screening, Prevention, and Management of Lung Cancer.** Michael Gould is leading our research efforts to improve outcomes and reduce costs in the area of lung cancer diagnosis and staging. He conducted a meta-analysis which showed that positron emission tomography (PET) had high sensitivity and intermediate specificity for identifying malignant pulmonary lesions. In an ongoing project, Dr. Gould is evaluating the cost-effectiveness of PET-based diagnostic strategies for pulmonary nodule diagnosis relative to strategies that do not include PET. The next step will be to evaluate the effectiveness and cost-effectiveness of PET for regional lymph node staging in patients known to have non-small cell lung cancer.

V. Substance Use and Psychiatric Disorders and their Treatment

Treatment for veterans suffering from substance use and psychiatric disorders is a major undertaking in the VA. In fiscal year 2000 (FY00), more than 820,000 patients with a substance abuse and/or psychiatric disorder received VA inpatient or outpatient care. Our work in this area focuses on the process, cost, and outcome of care. More specifically, we are:

- specifying organizational factors that influence the outcome of care;
 - conducting outcome evaluations of major treatment modalities;
 - identifying effective treatments for high-risk and underserved patient populations;
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- focusing on mutual help groups as adjuncts and alternatives to mental health care; and
- examining the long-term course of treated and untreated mental disorders.

As part of a system-wide evaluation of VA services, we identify all unique patients with substance use disorders seen annually in the VA, classify these patients by their diagnoses, and describe their use of inpatient and outpatient services. The findings highlight the changing characteristics of VA substance abuse patients and services. There have been sharp increases in the last few years in the proportion of patients who have both drug and alcohol diagnoses and in those who also have a psychiatric diagnosis. Substance abuse patients are much less likely now to receive inpatient or residential services; however, they received more intensive outpatient services in FY00 than they had five years earlier.

To provide an overview of the nature of substance abuse services in the VA, we regularly obtain information on program staffing, policies, and services. We use data from program surveys completed every two or three years to describe changes in the VA substance abuse treatment system and to examine the association between program structure, processes, and outcomes. Keith Humphreys, John McKellar, and John Piette are coordinating this work.

Organizational Factors and Program Effectiveness

The models of treatment for substance use disorders range from medical approaches with pharmacologic therapy to psychosocial intervention and 12-step counseling. Because these models vary in treatment intensity and use of staff resources, their costs also vary. To identify cost-effective patterns of care, we are examining program and service episode characteristics and their associations with patients' symptom and functioning outcomes. In one study, coordinated by Paul Barnett, we found that higher cost inpatient substance abuse programs were smaller, and had a higher intensity of staffing and a longer intended length of stay. Smaller size and longer intended stay were associated with lower rates of readmission for substance use and psychiatric disorders. However, the incremental cost of this extra effectiveness was high. Christine Timko and Rudolf Moos are coordinating other work in this area.

- ***Specialty Mental Health Care Improves Patients' Outcomes.*** We have described the implementation of a nationwide program to monitor the quality of treatment for substance use disorders in the VA. More than 21,000 VA
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patients in treatment were assessed at baseline and again an average of 12 months later. Overall, patients who received specialty outpatient mental health care experienced better risk-adjusted outcomes than did patients who did not receive such care. Patients who had longer episodes of mental health care improved more than did those who had shorter episodes. These findings indicate that more emphasis should be placed on ensuring that patients with substance use disorders enter specialty care and on keeping them in treatment.

- ***Supportive and Goal-Directed Programs Enhance Patients' Outcomes.*** We are using information on more than 90 substance abuse and psychiatric programs to examine the relationship between program policies and services, treatment climate, and program-level indices of treatment process (Panel III in Figure 1) and proximal outcomes (Panel V). Our findings show that supportive programs that emphasize personal expression and learning work and social skills enhance patients' activity levels and participation in treatment services. These program characteristics may be especially beneficial for more impaired patients.

Outcome Evaluations of Major Substance Abuse Treatment Modalities

The ultimate goal of mental health care is to improve patients' longer-term outcomes, especially their symptoms and psychosocial functioning. With respect to VA patients, policymakers need more definitive information about the type, amount, and cost of treatment associated with better outcomes. In addition to conducting meta-analyses of the substance abuse treatment outcome literature, we are addressing these issues in several major outcome evaluation projects.

Meta-Analyses of Substance Abuse Treatment Outcome Research.

Integrated analyses of prior research in an area can help to clarify existing knowledge and plan future research. We have completed a meta-analysis of alcoholism treatment outcome studies and have conducted projects on specific topic areas within this literature such as patient-treatment matching and the effectiveness of brief interventions. John Finney is coordinating this work with Anne Moyer.

- ***Effective Psychosocial Treatments for Substance Use Disorders Emphasize Patients' Coping Skills and Life Contexts.*** Our review of the literature on the outcome of treatment for alcohol use disorders shows that,
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for the most part, cognitive-behavioral interventions are the most effective. These interventions focus primarily on enhancing patients' skills in coping with everyday life circumstances, and on improving the match between patients' abilities and environmental demands. Social skills training and the community reinforcement approach are two modalities that are consistently found to be effective. Other effective treatments include motivational counseling, stress management training, behavior contracting, behavioral marital therapy, and relapse prevention training. The common feature of most of these treatments is their focus on enhancing patients' coping skills and/or altering reinforcement contingencies in their natural environment.

- ***Using Study Methodology to Explain Varying Outcomes for Matching Patients to Alcohol Treatment.*** By examining methodological features associated with finding evidence for patient matching to alcohol treatment, we sought to explain varying study outcomes in this area. We found that only the number of statistical tests for interactions predicted the number of patient-treatment interactions identified per study whereas the number of study participants, whether or not they were randomized to treatment conditions, and whether or not tested interactions were theoretically-guided, did not. Overall, the average number of tests conducted per study was large, suggesting that capitalization on chance may have contributed to study effects identified. Low statistical power also was a common problem. This review points to the need for more focused studies such as examining patients at the extremes of matching variables and studying distinctive treatments.
 - ***Research Synthesis Reveals Additional Positive Support for Brief Interventions.*** In another meta-analytic review, we considered comparative studies of brief interventions. We examined several drinking-related outcomes and took into account the critical distinction between treatment-seeking and non-treatment-seeking samples. Most investigations fell into two types: those comparing brief interventions to control conditions in non-treatment-seeking samples, and those comparing brief interventions to extended treatment in treatment-seeking samples. We found evidence supportive of the effectiveness of brief interventions that are typically delivered by health care professionals to non-treatment-seeking samples.
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Although extended treatment conditions were not consistently superior to brief interventions for treatment-seeking persons, in many studies the two conditions were not substantially different in intensity. Thus, the results of this review do not support the wholesale replacement of specialist, extended treatment with considerably briefer interventions. Brief interventions may, however, be an appropriate first treatment for many people if delivered in ways similar to their delivery in the studies reviewed.

- **Identification of Prognostic Indicators may Clarify how to Match Patients with Specific Substance Use Treatments.** In a new meta-analysis, we are identifying patient characteristics that predict better outcome in specific types of treatment. This synthesis of differential relationships between patient pretreatment characteristics and outcome, depending on treatment condition, complements the one outlined above. Isolating patient prognostic indicators within treatment programs requires heterogeneity among patients, whereas identifying the effects of different treatment programs on the basis of aggregate treatment outcome requires relatively homogeneous patient populations. Meta-analyses of each of these types of findings should help us better understand the patient-treatment matching process.

Treatment Orientation and the Process and Outcome of Substance Abuse Care. We are addressing a number of issues in a multi-site evaluation of the three most prevalent forms of substance abuse treatment in the VA: 12-step treatment, cognitive-behavioral treatment, and a combined 12-step and cognitive-behavioral approach we label eclectic. John Finney, Rudolf Moos, and Jennifer Ritsher are coordinating this project.

- **12-Step Treatment is as Effective as Cognitive-Behavioral and Eclectic Treatment.** The 1-year follow-up findings show substantial improvement among patients in all three types of programs. Alcohol and drug consumption declined, as did patients' substance use problems, psychiatric symptoms, and arrests. Overall, the three types of programs were equally effective, although patients in 12-step programs were somewhat more likely to be abstinent at the 1-year follow-up. These findings provide important new evidence for the effectiveness of 12-step treatment.
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- ***Continuing Outpatient Mental Health Care is Associated with Better Substance Use Outcomes.*** Because an index episode of acute treatment is only one aspect of a continuum of care, we examined the role of continuing formal and informal care on patients' 1-year outcomes. Patients who participated in either outpatient mental health treatment or 12-step groups had better 1-year and 2-year outcomes than did patients who did not obtain continuing care. Moreover, patients who received consistent outpatient care over a longer time period fared better than those who did not, as did those who attended 12-step self-help groups more frequently. Thus, to maximize clinical gains, patients should maintain regular contact with a formal mental treatment provider and/or an involvement in 12-step self-help groups.

Identifying Effective Models of Community Residential Care. There currently is renewed emphasis on providing substance abuse care in the least restrictive and least expensive setting. Community residential care is one option for substance use disorder patients who are not yet ready for independent life in the community. Rudolf Moos is coordinating an evaluation to describe the characteristics of community residential facilities, the most effective types of facilities, and the kinds of patients who benefit most from such community treatment.

- ***More Directed Treatment and Longer Episodes of Community Care Improve Patients' Outcomes.*** In a nationwide study of more than 2,300 patients with substance use disorders, we identified four types of community residential facilities based on the major emphasis of the treatment program. Patients in programs that relied on therapeutic community, psychosocial rehabilitation, or 12-step approaches had comparable 1-year symptom and functioning outcomes that were better than those of patients in undifferentiated programs. A more directed treatment orientation, a longer episode of community care, and completion of care were independently related to better 1-year outcomes. As an increasingly important locus of specialized care, community residential facilities need to develop and maintain more differentiated and distinctive treatment orientations.
 - ***Community Residential Patients who Participate in Outpatient Mental Health Care and Self-Help Groups have Better 1-Year Outcomes.*** Our 1-year follow-up of patients who were treated in community residential facilities showed that those who obtained regular outpatient mental health care over a
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longer interval, and those who attended more self-help group meetings, had better 1-year substance use and social functioning outcomes than did patients who were less involved in formal and informal care. The amount of outpatient mental health care did not independently predict 1-year outcomes. The provision of low intensity treatment for a longer time interval may be a cost-effective way to enhance substance abuse and psychiatric patients' long-term outcomes.

The Process and Outcome of Opioid Substitution Treatment. Although a series of controlled clinical trials have led to specific practice guidelines, there is considerable variability in how opioid substitution treatment is actually delivered. Paul Barnett and Keith Humphreys are conducting projects in this area.

- ***Methadone Maintenance Is Cost-Effective.*** Paul Barnett estimated the effectiveness of methadone maintenance using information on opiate-dependent patients' mortality rates and the cost and duration of treatment. Compared to drug-free treatment, methadone maintenance cost only \$7,800 per life-year gained, an amount that is much lower than that of many common treatments for medical disorders. These findings indicate that methadone maintenance is a cost-effective treatment modality. They have prompted us to try to identify the most important components of effective methadone treatment, and to conduct an observational study using VA databases to determine the effect of methadone maintenance on mortality, morbidity, and health services utilization.
 - ***Guideline Concordance and Outcomes in Opioid Substitution Programs.*** Clinical practice guidelines for methadone maintenance recommend that patients be dosed in the 60-100mg range, and that a variety of psychosocial services be available to patients. Even though both of these guidelines have been supported in well-controlled randomized clinical trials, many VA and non-VA methadone clinics do not follow them. Therefore, Keith Humphreys is conducting an evaluation to determine how patient outcomes and health care costs are affected when methadone clinics more closely adhere to clinical practice guidelines.
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High-Risk and Underserved Patient Populations

Selected subgroups of mental health patients are at high risk for poor outcomes and utilize a disproportionate share of health services, whereas other subgroups have access problems and underutilize mental health care. Program managers need to know how to identify and develop effective treatment programs that meet these patients' needs. We are addressing these issues by focusing on specific subgroups of patients with substance use and psychiatric disorders, on patients with late-life substance use disorders, and on women patients.

In an ongoing project directed by Christine Timko, we are comparing hospital and community residential programs and examining the effects of program structure and services on dually diagnosed substance use disorder patients' treatment and outcomes. This project is focusing on the extent to which relationships between program structure and services and patients' outcomes are moderated by patients' level of disturbance and other pretreatment functioning characteristics.

Patients with Posttraumatic Stress Disorder. Patients who have both substance use and posttraumatic stress disorders (PTSD) may be at high risk for poor treatment outcome, especially when they do not receive specialized PTSD care. In a series of projects coordinated by Paige Crosby Ouimette, we are examining in-treatment changes on proximal outcomes (such as coping skills and beliefs about substance use) among these dually diagnosed patients. We also are focusing on the effect of counseling for substance use problems and family problems, as well as 12-step self-help group involvement, on these patients' outcomes.

- ***Reliance on Avoidance Coping and Positive Expectations about the Effects of Substance Use are Risk Factors for PTSD Patients.*** We compared 1-year outcomes among patients with substance use disorders and PTSD, patients with only substance use disorders, and patients with substance use and Axis I psychiatric diagnoses other than PTSD. Patients with PTSD had more substance use problems and psychological distress and reported less support from friends. PTSD patients were less likely to be employed and more likely to be readmitted for inpatient or residential treatment. In part, these poorer outcomes were due to PTSD patients' greater reliance on emotional discharge coping, more positive expectations about the effects of substance use, and less positive expectations about the benefits of quitting substance use.
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- ***Supportive and Well-Organized Treatment Programs Enhance PTSD Patients' Outcomes.*** We found that patients with PTSD improved during substance abuse treatment, but showed less benefit relative to patients with only substance use disorders. Consistent with findings on other groups of more impaired patients, PTSD patients in supportive and well-organized programs had fewer psychological symptoms at discharge. Substance abuse programs that treat patients with PTSD should emphasize support, not confrontation, and provide a regular, organized daily schedule. In addition, treatment providers should increase PTSD patients' intensity of care, provide family counseling, and encourage self-help group participation.

Patients with Late-Life Substance Use Disorders. Late-life substance use disorders are much more prevalent than commonly recognized; moreover, many individuals who suffer from these disorders do not obtain adequate treatment. Penny Brennan, Sonne Lemke, and Rudolf Moos are coordinating two prospective longitudinal projects in this area. These projects will provide new information about patterns of service use, remission and relapse, and predictors of treatment outcome.

- ***Residential Treatment and Outpatient Mental Health Care may improve Outcomes among Older Substance Use Disorder Patients.*** In one set of database studies, we followed more than 10,000 late-middle-aged and older VA substance use disorder patients over a 10-year interval. These patients' 1-year and 4-year readmission rates were higher than those usually reported in young and mixed-age samples. Readmission was predicted by younger age, unmarried status and need, as indexed by several diagnostic and treatment characteristics. Two indices of continuity of care, treatment on a residential unit and a longer episode of acute care, reduced the likelihood of subsequent mental health readmissions. We also found very high mortality rates in this population; enhanced outpatient mental health care and remission were associated with lower mortality.
 - ***Older Medicare Patients with Substance Use Disorders Receive Little Specialized Outpatient Care.*** We identified almost 5,000 older patients who had had an episode of inpatient care for a substance use disorder and determined their outpatient mental health care four years following hospital discharge. Only about 18% of surviving patients obtained diagnostic or evaluation mental health services, 22% obtained psychotherapy, and 9%
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received medication management. Of patients who obtained outpatient mental health care, most made ten or fewer visits over the entire four years. Younger, non-black, and women patients were more likely to obtain outpatient care, as were patients with prior substance-related hospitalizations and comorbid psychiatric diagnoses. Overall, Medicare providers need to strengthen their emphasis on continuing outpatient care, which should improve older patients' outcomes.

Depressed Patients. Our work in this area focuses on understanding the processes involved in remission and relapse in the course of depression, which is one of the most prevalent psychiatric disorders among VA patients. Overall, life context factors help to differentiate patients who are likely to experience persistent or recurrent depression and those who return to normal levels of functioning. Ruth Cronkite and Rudolf Moos are coordinating this work.

- ***More Life Stressors and fewer Social and Coping Resources Predict Long-Term Non-remission of Depression.*** Research on the long-term outcome of treatment for depression can contribute to practice guidelines by identifying high-risk patients who might benefit from more intensive care. To address these issues, we used 10-year follow-up data to identify risk factors associated with partial remission and non-remission among treated depressed patients. Compared with stably remitted patients, partially remitted and non-remitted patients experienced more life stressors and fewer social resources, were less easygoing, and relied more on avoidance coping. More depressive symptoms and medical conditions also predicted non-remission. Patients and providers can learn to recognize these early warning signs of relapse so they can take timely preventive action.
 - ***More Intensive Treatment may reduce the Likelihood of a Chronic Course of Depression among High-risk Patients.*** The high likelihood of a chronic course of depression led us to identify symptom-based risk factors at intake to treatment that predicted a 10-year chronic course of depression. The prototypic chronically depressed patient was an individual who at baseline experienced more severe symptoms of fatigue, loss of interest in usual activities, trouble sleeping, and thoughts about death or suicide; was not calm, successful, or self-confident; did not socialize with friends; and frequently coped with stressors by avoiding other people. High-risk patients
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who received more psychological treatment during the index episode were more likely to experience a long-term course of remission or partial remission.

Mutual Help Groups as Adjuncts to Mental Health Care

Formal and informal health care systems can work together to maximize long-term recovery from substance abuse and psychiatric disorders. Within the VA, the majority of substance use disorder patients participate in Alcoholics Anonymous (AA) and many psychiatric patients participate in mutual support groups. These groups are an important source of guidance and support for many patients; however, very little is known about the types of patients who benefit from these groups or about how these groups can serve as adjuncts and alternatives to formal treatment. Keith Humphreys is coordinating a program of research to address these issues.

- ***Involvement in Self-Help Groups Contributes to Lower Substance Use Treatment Costs.*** In a three-year prospective study, we followed alcoholic individuals who chose to attend outpatient treatment or AA. Although the AA group had somewhat worse prognoses, their 1-year and 3-year outcomes were comparable to those of outpatients. Per-person treatment costs for the AA group were 45% lower than costs for the outpatient group. In ongoing work, we are trying to identify individuals who benefit from AA and to find out when AA can substitute for formal treatment and when it enhances the effects of treatment.
- ***Veterans in 12-Step Formal Programs have Lower Health Care Costs.*** Drug- and alcohol-dependent veterans who obtained inpatient treatment in 12-step oriented or cognitive-behavioral programs were compared on their outcomes and health care costs at a 1-year follow-up. Patients treated in 12-step oriented programs were more likely to be abstinent and to rely on self-help groups rather than outpatient mental health care for support post-discharge. This reduced healthcare costs by about \$5,000 per patient, a significant savings to the VA.

The Course of Treated and Untreated Mental Disorders

Substance use and psychiatric disorders are often resistant to treatment. To formulate more adequate long-term care strategies, we are studying the extended course of these disorders and the personal and life context factors that influence remission and relapse.

Treated and Untreated Alcohol Abuse. Better understanding of how to treat alcohol use disorders may flow from information about their course, the factors associated with obtaining help, and the outcomes of these disorders with and without formal treatment. We are examining these issues in a prospective study of persons who at baseline had no prior formal treatment for alcohol abuse. Christine Timko, John Finney, Keith Humphreys, and Rudolf Moos are conducting this work.

- ***Individuals with more Severe Problems and Life Stressors are more Likely to Enter Treatment.*** Entering substance abuse treatment is a response to a stressful situation and is employed after other resources have failed to alleviate the problem. The severity of drinking problems plays a central role in treatment entry and mediates the effects of other personal and environmental factors that imply a need for treatment. With respect to selection into specific types of treatment, individuals with more serious drinking problems, fewer financial resources, and poorer functioning are more likely to enter inpatient than outpatient treatment.
- ***Individuals who Obtain Help Quickly and Continue in Formal or Informal Care Experience Better Substance Use Outcomes.*** At the 1-year, 3-year, and 8-year follow-ups, individuals who entered treatment or joined AA improved more on drinking-related outcomes than did individuals who received no help. Participation in AA or formal treatment during the first year of follow-up was associated with better drinking outcomes at eight years. In addition, more formal treatment and AA attendance were associated with better drinking-related outcomes. A 16-year follow-up is allowing us to chart individuals' functioning over a longer interval and to examine how psychosocial and life context factors affect treatment utilization and the course of the disorder.

Psychosocial Factors and Late-Life Substance Use. A related project focuses on late-middle-aged and older individuals who are early-onset, late-onset, or remitted problem drinkers; there also is a comparison group of non-problem drinkers. We assessed these individuals at baseline and at 1-year, 4-year, and 10-year follow-ups. Penny Brennan, Kathleen Schutte, and Rudolf Moos are coordinating this project.

- ***Recent Onset and less Severe Problems Predict Remission among Late-Life Problem Drinkers.*** At our 10-year follow-up, we compared older
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baseline problem drinkers who maintained long-term remission to baseline problem drinkers whose drinking problems did not remit and to lifetime non-problem drinkers. Overall, 30% of the untreated late-life problem drinkers achieved stable long-term remission. Being female, having more recent onset of drinking problems, fewer and less severe drinking problems, friends who approved less of drinking, and drinking less and less frequently at baseline predicted remission. The functioning and life contexts of untreated remitted problem drinkers improved over time, but some deficits persisted at follow-up. Systematic screening and identification of older problem drinkers and brief interventions may accelerate and augment improvements in life context and functioning that some late-life problem drinkers are able to achieve without formal interventions.

- ***Incipient Problems, Friends' Approval of Drinking, and Avoidance Coping Predict Late-onset Drinking Problems.*** As part of our overall study, we compared two groups of older adults who, at baseline, were nonproblem drinkers: Individuals who developed drinking problems over the next seven years and those who did not. Compared with stable nonproblem drinkers, late-onset problem drinkers at baseline were more likely to report incipient problems, heavier alcohol consumption, greater friend approval of drinking, and more reliance on avoidance coping. In addition, late-onset problem drinkers were more likely to have a history of responding to stressors and negative affect with increased alcohol consumption. These findings may assist older adults' physicians to identify and intervene with late-onset problem drinkers and older adults at risk for developing drinking problems.

VI. Health Care Evaluation Methodology

In order to better attain our other goals, we are formulating methods to assess patients' health status and outcomes, including their preferences for health outcomes and their life context and coping (Panels II and V in the model). We also are developing techniques for measuring characteristics of treatment programs, such as their policies and services, treatment climate, treatment orientation, and workplace for staff (Panel I in the model). Other studies focus on the development of practice guidelines, estimating the demand for and outcome of care, and methodological issues in resource allocation and cost-effectiveness analysis.

Measures of Patients' Health Status and Outcomes

With the growing emphasis on outcome-based evaluation of the quality of care, there is a need for reliable and valid measures of patients' health status and psychosocial functioning. In this area, we are focusing specifically on patients' preferences for health outcomes, standard indices of mental health outcomes, coping and help-seeking skills, and life stressors and social resources.

Patients' Preferences for Health Outcomes. Many medical treatments are designed as much to improve the quality of life as to prolong longevity, yet investigators have found it difficult to incorporate quality-of-life considerations in cost-effectiveness and cost-benefit analyses. The quality-adjusted life year (QALY) is the primary measure of health outcomes that incorporates the concept of quality of life. The idea behind QALYs is that not all survival outcomes are equal; for example, that a year of life with some impairment is not worth as much as a year of healthy life. Although many investigators accept the QALY as an appropriate measure of health outcomes, methods for assessing patients' preferences about health outcomes and the impact of treatment on QALYs remain controversial and often unreliable.

To overcome some of these problems, Alan Garber and Mary Goldstein developed a computer-based multimedia assessment procedure that elicits patients' preferences about alternative states of health. The procedure was used to assess the consistency of preferences for health states associated with Gaucher's disease and with treatment for gastro-esophageal reflux disorder. More recently, Dr. Garber and Dr. Goldstein completed the development of software designed to elicit health state utilities for activities of daily living impairments from elderly patients. Currently, a new version of the software program is under development that will improve the ease of use and create a platform-independent design for use with web technology. This work provides a method to give interventions that improve functional status their proper weight in health policy decisions.

Standard Mental Health Outcome Indices. Reliable and valid indices of patients' symptoms and psychosocial functioning are needed to assess changes in these areas over time and estimate the effects of treatment. Moreover, to compare outcomes for the entire range of patients seen in mental health programs, a general set of outcome indices is needed that can apply to this diverse patient population. We have focused on these issues by developing indices to measure substance use problems and

outcomes, examining a well-known rating procedure as a potential predictor of outcome, and, in ongoing work, formulating a standard set of mental health outcome indices.

- ***Self-Report Procedures to Assess Substance Abuse Patients' Outcomes show Promise but Further Development is Needed.*** In a project conducted by Craig Rosen and colleagues, we examined the value of a self-administered version of the Addiction Severity Index (ASI) to monitor substance abuse patients' symptoms and functioning. Self-report and interview scores on substance use, psychiatric, and psychosocial indices were highly correlated. Baseline scores from one format predicted later outcomes assessed with the other format. However, patients endorsed more psychiatric and family problems by self-report than by interview. Accordingly, self-reports can be used to reliably assess several outcome domains, but further modifications are needed before self-report scores on psychiatric and family problems can be directly compared with interview-based scores.
 - ***Assessing Drinking Problems among Older Adults.*** In a project led by John Finney, Penny Brennan, and Rudolf Moos, we developed a measure of alcohol problems specifically tailored for older adults. A specialized instrument was needed because older adults are less likely to be at risk for standard adverse consequences of alcohol use (such as problems at work or with spouse), but more likely to be at risk for less standard consequences (such as falls and social isolation). The Drinking Problems Index (DPI) is internally consistent, relatively stable over time, and predictably associated with patients' levels of alcohol consumption and aspects of psychosocial functioning. We are using the DPI as an outcome measure in our studies of older adults with alcohol-related problems.
 - ***Clinicians' Ratings of Global Functioning do not Predict Substance Abuse Patients' 1-Year Outcomes.*** The Global Assessment of Functioning (GAF) Scale, which is a standard part of the current multidimensional psychiatric diagnostic rating system, should reflect patients' current level of psychosocial functioning and predict substance abuse and psychiatric patients' treatment outcomes. However, Rudolf Moos and colleagues showed that patients' clinical diagnoses and psychiatric symptoms were stronger predictors of GAF ratings than was their current level of social and occupational functioning. Moreover, GAF ratings were only minimally
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associated with patients' 1-year outcomes. These findings raise serious questions about the conceptual and clinical value of the standard method of assessing mental health patients' global level of functioning.

Coping and Help-Seeking Skills. Patient's coping skills, especially their proneness to seek guidance and support, are an essential determinant of participation in treatment and psychosocial adaptation. Patients who rely more on approach coping styles, such as logical analysis and problem solving, are more likely to resolve their problems successfully, whereas those who rely more on avoidance coping typically have poorer outcomes. One goal of mental health treatment is to try to change patients' coping responses, which thus provide an index of the initial or proximal outcome of treatment. Although coping skills are an essential determinant of patients' adaptation, until recently there has been no standard way to assess this domain.

To address this issue, Rudolf Moos led a project to construct an inventory that enables patients to describe the coping strategies they use to manage stressful situations. The Coping Responses Inventory (CRI) measures coping responses in terms of their focus (approach versus avoidance) and method (cognitive and behavioral). The CRI has good psychometric properties and is applicable to both psychiatric and medical patients. We have used this measure to show that patients' over-reliance on avoidance coping is a risk factor for continuing substance abuse and depression.

Life Stressors and Social Resources. Patients' life stressors and social resources are important determinants of whether and when they seek health care, how much they participate in treatment, and their treatment outcome. In an effort led by Rudolf Moos, we developed the Life Stressors and Social Resources Inventory (LISRES), which taps a person's stressors and resources in each of eight domains, including the workplace, spouse or partner, children, extended family, and friends. Because changes in patients' life contexts are a proximal goal of treatment and are related to treatment outcome, we are using selected parts of this measure in ongoing studies of the outcome of treatment for substance abuse.

Measures of Health Care Programs

As noted earlier, we developed a model of the characteristics of substance abuse and psychiatric programs that encompasses their policies and services, treatment climate, and orientation toward treatment. We have used our measures to characterize

VA substance abuse treatment programs nationwide and to examine the associations between program characteristics and patients' outcomes.

Policies and Services. Although the structure and service intensity of mental health programs seem to be associated with patients' outcomes, there has been no overall conceptualization or measure of these domains. To characterize these aspects of treatment programs, Christine Timko developed the Policy and Services Characteristics Inventory (PASCI). This inventory assesses mental health programs' expectations for patients' functioning, the balance between patients' individual freedom and program structure, and the provision of services and activities. The PASCI is composed of dimensions that distinguish between hospital- and community-based programs, and are associated with program-level outcomes such as the proportion of patients who successfully complete treatment. We are using the PASCI to help assess the match between VA mental health programs' structure and patients' impairment.

Treatment Climate. In part, program policies and services influence patients' outcomes by the treatment climate they create. For example, by having policies that provide patients more choice in their pattern of daily activities, programs establish a more independence-oriented treatment climate, which leads to better patient outcomes. In an early phase of our work in this area, Rudolf Moos led a project to develop procedures to characterize the treatment climate of hospital-based (the Ward Atmosphere Scale; WAS) and community-based (the Community-Oriented Programs Environment Scale; COPES) mental health programs. These programs were characterized by three common sets of dimensions: the quality of interpersonal relationships, the goals toward which treatment is directed, and the level of organization and clarity.

These program characteristics are associated with patients' treatment outcomes. Programs that lack support and organization tend to have high patient dropout and treatment failure rates. Further, better functioning patients seem to benefit more from supportive and well-organized programs with moderate to high performance expectations, whereas more impaired patients tend to need more structure and somewhat fewer performance demands. We are using the COPES to try to identify treatment climates that are especially effective for patients with psychiatric and/or substance use disorders.

Theoretical Orientation of Treatment. Many clinicians believe that the most active ingredient of mental health treatment involves its theoretical orientation, such as whether it is primarily psychodynamic, based on learning theory (cognitive-behavioral) or, for substance abuse patients, based on 12-step principles. To focus on this issue, we developed the Drug and Alcohol Program Treatment Inventory (DAPTI) to assess eight common treatment orientations. We have used the DAPTI to characterize VA substance abuse programs and community residential facilities, and to analyze the associations between treatment orientation and patients' outcomes. For example, we found that patients in community residential programs with a therapeutic community or 12-step orientation experienced better 1-year substance use and psychosocial outcomes than did patients in programs with less differentiated orientations.

The Health Care Workplace. In projects conducted by Jeanne Schaefer and Rudolf Moos, we developed two indices to characterize the health care workplace. One measure, the Work Environment Scale (WES), assesses the quality of interpersonal relationships at work, the goals of the workplace, and workplace structure. In addition to the overall quality of the workplace, specific work stressors can erode staff morale and impede the quality of patient care. Accordingly, we constructed the Work Stressors Inventory (WSI), which measures workplace stressors due to relationships with coworkers and supervisors, patient care tasks, and organizational factors such as scheduling and workload. These scales can be used to compare work groups, examine the associations between aspects of the workplace and staff morale and patient outcomes, and conduct interventions designed to improve the overall functioning of the workplace.

Modeling Risk Adjustment and Patient Selection Processes

We are addressing two methodological issues in health care evaluation: how best to adjust for pre-existing patient characteristics (casemix) when comparing program outcomes, and how to model the processes by which patients select and utilize health care services. We are also addressing some methodological problems involved in meta-analyses.

Risk Adjustment Models Should Include Information Obtained Directly from Patients at Baseline. A key element in accurately determining the relative outcomes and costs of health care interventions is to adjust for differences in pre-existing patient risk characteristics (casemix). One key question is whether adequate risk adjustment can be made using data that are routinely collected and are available from health care

utilization databases, or whether it is essential to obtain information directly from patients about their baseline substance use, symptoms, and social functioning. When we developed risk adjustment models using these two procedures, the findings showed that baseline information from patients was the strongest predictor of outcome and significantly added to the model for all outcomes. Patients' relative outcomes across programs differed when baseline status was added to the risk adjustment model. These findings highlight the importance of including information about patients' baseline status in risk adjustment.

Modeling Self-Selection. Because random assignment to treatment conditions is neither possible nor ethical in many evaluations of health care interventions, the effects of self-selection must be modeled in order to accurately interpret data about patients' outcomes. We examined how well two-stage sample selection models that use instrumental variables can address this issue. Keith Humphreys, Ciaran Phibbs, and Rudolf Moos compared covariate control and two-stage sample selection models in a longitudinal study of the effects of participation in AA on alcohol use. The two-stage procedure showed that patients who selected AA had worse prognoses than patients who did not; this finding strengthened the conclusion that participation in AA helped to lead to a reduction in substance abuse.

Methodological Issues in Meta-Analyses. Meta-analyses help synthesize findings from diverse studies of the effectiveness of specific health care procedures. However, meta-analyses of the effects of mental health treatments typically have overlooked the importance of research design and methodological factors that may alter the conclusion about whether a treatment has a significantly better effect on outcome than does a comparison condition. To address this issue, John Finney developed a method to incorporate information in meta-analyses about the strength of the competition against which treatment modalities were compared and about specific study design factors. Adjustments for these factors led to some changes in conclusions about the relative effectiveness of specific alcoholism treatment modalities. This work provides methodological tools to help control for extrinsic factors when comparing the findings of diverse studies on the relative effects of different treatment modalities.

Methodological Quality. With the increasing emphasis on identifying evidence-based practices and enhancing the quality of care, the caliber of studies evaluating interventions is of special significance. A rating system was developed to evaluate the methodological quality of studies examining treatment for alcohol use disorders.

Applying this to the literature reported over the past 30 years indicated that overall methodological quality has improved somewhat from the 1970s to the 1990s. Specific areas of strength included reporting the initial number of participants and conducting follow-ups of 12 months or longer. The areas with the most room for improvement were: ensuring that follow-up data are collected when respondents are not under the influence of alcohol, testing whether there is differential dropout among treatment groups with respect to participant background characteristics, reporting the number of individuals being treated in the programs from which samples were drawn, noting the reliability and validity of measures used, and conducting process analyses to examine potential mechanisms underlying treatment effects.

Resource Allocation and Cost-Effectiveness Analysis

We are developing methods for VA-based cost-effectiveness analysis and are trying to clarify the economic foundations of cost-effectiveness analysis.

Methods for VA-Based Cost-Effectiveness Analysis. Estimates of the cost of health care provided to specific patients is needed to evaluate VA health care programs; however, VA financial systems do not yet provide such estimates. Paul Barnett developed an “average cost” method of estimating VA health care cost. A comprehensive set of estimates of the cost of every VA health care encounter since October 1, 1997 is being created, along with documentation, including criteria for the appropriate use of these estimates. Dr. Barnett is also documenting VA databases needed for economic research, with a focus on the use of the Decision Support System as a research tool. He is also identifying changes in VHA information policy needed for economics research.

Economic Foundations of Cost-Effectiveness Analysis. To address controversies in the application of cost-effectiveness analysis, Alan Garber and Charles Phelps (University of Rochester) have examined the principles underlying the technique and focused on implications for the evaluation of health care interventions. Using a standard utility framework, these authors showed how a cost-effectiveness criterion can guide resource allocation decisions, and how it varies with age, gender, income level, and risk aversion. Nevertheless, even though cost-effectiveness analysis can be a useful tool, a uniform cost-effectiveness criterion applied to a heterogeneous population may not yield optimal resource allocation decisions.

VII. Conclusion

We are using an integrated conceptual approach to plan and conduct research at multiple levels in the health care system. Our work on the organization and delivery of services has potential nationwide implications for the way in which health care is provided. The focus on access to care and patient demand for services is particularly timely in this era of health care reform. It can help ensure that the VA remains competitive with other providers, while fulfilling its mission to provide quality care to eligible veterans in all parts of the United States. CHCE's research on diagnostic assessment, screening, and clinical decision-making should continue to produce results that help bring patients who are in need of treatment into the health care system and enhance efficiency in identifying and treating specific disorders.

Our work in the area of substance abuse and psychiatric treatment is focused on improving the continuity and outcome of care for these disorders. In addition to examining patient prognostic indicators and the outcome of care, our projects focus on the quality of treatment, psychosocial factors, and the process of patient-treatment matching. To address these issues, we are continuing to develop new assessment procedures and to conduct studies that employ a full range of research methods, including single site and multi-site designs, naturalistic and randomized designs, and meta-analyses. Findings from these projects should help to improve health services in the VA and in the broader health care community.

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