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The Veterans SF-36 Health Status Questionnaire: Development and Application in the Veterans Health Administration

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Most policy makers concede that reducing costs, maintaining quality of care and ensuring optimal patient outcomes are key priorities for restructuring the healthcare system in the United States. In this rapidly changing environment, accountability for patient care outcomes is a key priority. To meet these challenges of increased competition and accountability, patient-based measures of health are increasingly being adopted by healthcare systems as measures of outcomes. These measures define, from the patients' perspectives, what is important in terms of both physical and psychological functioning.

Patient-based measures are comprehensive assessments of functional status (e.g., physical, psychological, social and role functioning) and overall perceptions of health. They provide accurate and valid summaries of health status that synthesize domains of morbidity, disability, and disease burden. They also give an important summary description of the complex mix of patient characteristics.

The Veterans Health Administration (VHA), is the nation's largest integrated healthcare system with approximately 4 million enrollees in the VA system and about five percent of the total market share for hospital services in the nation.¹ It serves a select group of veterans with complex healthcare needs. Compared to veterans nationally and the general US population, users of the VA healthcare system not only have disabilities that are connected to their military service, they are also older, poorer, less educated, and sicker with more disease.^{2, 3} Lessons learned from the VA can provide a model for monitoring the outcomes of care in other managed care systems, especially those serving older populations. Like other healthcare systems that are seeking to adapt to a changing healthcare environment, the VA needs information about the health of current and prospective patients to anticipate

patient demand, design effective services, and evaluate the outcomes of its care.

In a memorandum in March 1997, the Under Secretary for Health, Dr. Kenneth W. Kizer stated:

The Veterans Health Administration's performance measurement system was designed to ensure the delivery of excellent healthcare value as originally defined by four domains of value: access, cost/price, technical quality, and customer satisfaction. VHA has decided to include functional status as the fifth domain of value, given its increasing importance in clinical medicine.⁴ (*sic*)

In an environment of healthcare restructuring the VHA is aggressively moving towards implementing an outcomes management system. This system will capitalize on well established measures that have been developed both inside and outside the VHA. Measures such as the Veterans SF-36 are well-validated assessments of functional status that can be used to characterize the case-mix of patient populations. These measures can also be used to monitor the process and outcomes of care at the program or system levels.

When administered to a patient population at a point in time, the Veterans SF-36 provides an indication of the case-mix, or disease complexity of a patient group.⁵ Such measures have a direct bearing on patient needs, workload, and costs of care. Through the Office of Quality and Performance in the VHA, systems using the Veterans SF-36 are currently being developed.

The Veterans Health Study

Historically, the information regarding ambulatory care that is available to VA providers,

The Veterans SF-36 and scoring algorithms are available on request from the author.

administrators, and policy makers has been quite limited. The Veterans Health Study (VHS), a service directed project that was launched in 1992, has as its primary goal the development and application of methodology for assessing health-related quality of life (HRQoL) within the VHA. These assessments are primarily structured questionnaires administered to the patient and are reliable and valid in ambulatory populations. The VHS implements and demonstrates the validity of using patient-derived measures of health, since this information reflects the healthcare needs of veterans that can be used for monitoring the outcomes of their care.

The VHS was designed to develop, test, and disseminate information systems for monitoring patient-derived outcomes of ambulatory care within the VA. The VHS has as its principal goal to generate measures of functional status that are tailored to the veterans' needs and represent the complex health characteristics of its patient population. These health characteristics of veterans, or patient-mix, include the sociodemographics and mix of diseases for an ambulatory patient population that uses the VA system of care.

The conceptual framework and methods of the VHS are described elsewhere.⁶⁻⁷ We characterize the health status of patients using multidimensional assessments of HRQoL. In doing this, we build on the work of previous studies, most notably the Rand Health Insurance Experiment and the Medical Outcomes Study (MOS).⁸⁻⁹ These studies have demonstrated the value and utility of patient-based measures of HRQoL.

The VHS has gone beyond this work and has developed a core set of general measures of health status and disease as part of a comprehensive set of assessments, which can be used by the VA and other healthcare systems for research and patient management purposes. Unlike the MOS where administrative data was not available, the VHS has capitalized on the rich secondary administrative databases available in the VA; these include diagnoses, data on utilization of services and procedures, on

an inpatient and outpatient basis. Patient-derived measures of health have been merged with administrative data at the individual patient level. The access to these databases has provided a unique and powerful opportunity to examine patient outcomes in the context of case-mix measures obtained that are external to the patient-derived assessments.

The VHS is a four-year prospective observational study of health outcomes in patients receiving ambulatory care from the VHA. A panel of 2425 patients have been followed annually for clinical and HRQoL assessments. The details of the VHA design and sampling procedures are described elsewhere.⁵ Both general and disease-specific HRQoL assessments have been validated in this study. This methodology is particularly germane to VA healthcare, which serves patients with a complex profile of conditions, sociodemographics, and military history that is strongly related to their eligibility for VA care. The VHS has published 15 articles in peer-reviewed journals with general and disease-specific assessments for the Veterans SF-36, diabetes, osteoarthritis, chronic low back pain, chronic lung disease and alcohol related problems (references and scoring algorithms available on request). In addition, a comorbidity index has also been validated as a case-mix adjuster for measures of health status and healthcare utilization.

One of the cornerstones in the VHS is the development of the Veterans SF-36, a short form health status assessment designed specifically for use among veterans. The Veterans SF-36, adapted from the MOS SF-36,¹⁰⁻¹¹ spans the range of health concepts from physical to psychological status. The Veterans SF-36 provides a means to measure patient outcomes of care.

The Veterans SF-36

The Veterans SF-36 is our primary measure of health-related quality of life. This assessment has been documented as reliable and valid in ambulatory VA patient populations.^{7,12} This assessment builds on the MOS SF-36 and has been adopted by the VHA as one of the performance

measures of functional status. Modifications to the MOS SF-36 include changes to the role items (role limitations due to physical and emotional problems), where response choices that were originally dichotomized yes/no choices are now five-point ordinal choices ('no, none of the time' to 'yes, all of the time'). These changes to the SF-36 increased the precision and discriminant validity of the role scales and physical and mental component summaries. The changes to the role scales of the SF-36 demonstrated increases to the precision of the scales by more than 100 percent for the role-physical and 80 percent for the role-emotional. The changes to these two scales also lowered the floor and raised the ceiling of the metric as reflected in each of the scales' distributions. In addition, the modified scales when used in calculating the physical and mental component summary scales have improved precision by five percent (see summary scale description below).

The Veterans SF-36 has been widely used, disseminated, and documented in the VA.¹³ Like the MOS version of the SF-36, the Veterans SF-36 measures eight concepts of health: physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), general health perceptions (GH), energy/vitality (VT), social functioning (SF), role limitations due to emotional problems (RE), and mental health (MH). A measure of reliability, or the internal consistency, of items measuring a concept about health is given by Cronbach's alpha. This statistic ranges from 0.00 to 1.00, where higher values indicate greater reliability. Scales or concepts with values of 0.70 or higher are considered acceptable. Results for the Veterans SF-36 scales give Cronbach's alphas ranging from 0.93 for physical functioning to 0.78 for social functioning. Items from each concept are summed and rescaled with a standard range from 0 to 100, where 100 denotes the best health. These eight concepts have also been summarized into two summary scores: a physical component summary (PCS) and a mental component summary (MCS). The summary scales are based upon distinct physical and mental constructs well documented

Research Summary: 1998-1999

These abstracts were located after conducting a Medline search for "veterans and functional health status or quality of life."

Welsh CH, Thompson K, Long-Krug S. Evaluation of patient-perceived health status using the Medical Outcomes Survey Short-Form 36 in an intensive care unit population. *Crit Care Med* 1999 Aug;27(8):1466-71

OBJECTIVE: Baseline patient functional status as assessed by providers is correlated with mortality after intensive care unit (ICU) admission. We wanted to see if patient self-perception of health status before admission to an ICU correlated with functional outcome. **DESIGN:** Prospective survey on a convenience sample. **SETTING:** Single urban university-affiliated Veterans Affairs Medical Center. **PATIENTS:** One hundred ninety-nine patients in surgical and medical/coronary ICUs. **INTERVENTIONS:** None. **MEASUREMENTS:** Patient-assessed baseline health status was monitored with the Medical Outcome Survey Short-Form 36 (SF-36), consisting of 36 questions that evaluate eight health status concepts. In addition, baseline functional status (Zubrod scale) was determined and severity of illness (Acute Physiology and Chronic Health Evaluation [APACHE] II) data were collected. Zubrod functional status, which includes mortality, was determined 6 wks and 6 months after ICU admission, and correlation coefficients were calculated. **MAIN RESULTS:** We found it feasible to collect SF-36 health status data on a 9% sample in this setting. Less than 1% of responses were completed by proxy. The SF-36 data were internally consistent, and several of its scales including general health perception and physical functioning correlated with patient Zubrod functional status ($r^2 = .08$, $p < .001$; $r^2 = .14$, $p < .001$) at 6 wks as did vitality ($r^2 = .04$, $p < .01$), social function ($r^2 = .03$, $p < .05$), and physical role function ($r^2 = .02$, $p = .053$), although to a lesser extent. Similar correlations were also found with 6-month functional status. **CONCLUSIONS:** We conclude that use of the SF-36 is time efficient in an ICU setting and correlates with 6-wk and 6-month functional outcome. It correlates as well with functional outcome as either the baseline Zubrod functional status or the APACHE II severity of illness measurement. The five-question general health evaluation portion correlated almost as well with outcome as

the more extensive 36-item questionnaire. Use of the SF-36 may define patient populations for comparison across hospitals. It may also target individuals with needs for additional posthospitalization care, including rehabilitation services or nursing home placement.

Skinner KM, Furey J. The focus on women veterans who use Veterans Administration health care: the Veterans Administration Women's Health Project. *Mil Med* 1998 Nov;163(11):761-6

Women have served in every war and conflict in our history, but the effects of military duty on women are largely unknown. This article discusses the history of women in the military and presents findings from the Veterans Administration Women's Health Project. This study was designed to describe the health-related quality of life of women veterans who receive Veterans Administration ambulatory care. We assessed health status using the Short Form 36, an easily administered 36-item health survey that has been widely used and that has been shown to be reliable and valid. We compared Short Form 36 scores between veteran and nonveteran women. The results indicate that veteran women score lower on every scale compared with non-veteran women.

Unwin C, Blatchley N, Coker W, Ferry S, Hotopf M, Hull L, Ismail K, Palmer I, David A, Wessely S. Health of UK servicemen who served in Persian Gulf War. *Lancet* 1999 Jan 16;353(9148):169-78.

BACKGROUND: Various symptoms in military personnel in the Persian Gulf War 1990-91 have caused international speculation and concern. We investigated UK servicemen. **METHODS:** We did a cross-sectional postal survey on a random sample of Gulf War veterans (Gulf War cohort, $n=4248$) and, stratified for age and rank, servicemen deployed to the Bosnia conflict (Bosnia cohort, $n=4250$) and those serving during the Gulf War but not deployed there (Era cohort, $n=4246$). We asked about deployment, exposures, symptoms, and illnesses. We analysed men only. Our outcome measures were physical

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health, functional capacity (SF-36), the general health questionnaire, the Centers for Disease Control and Prevention (CDC) multisymptom criteria for Gulf War illness, and post-traumatic stress reactions. **FINDINGS:** There were 8195 (65.1%) valid responses. The Gulf War cohort reported symptoms and disorders significantly more frequently than those in the Bosnia and Era cohorts, which were similar. Perception of physical health and ability were significantly worse in the Gulf War cohort than in the other cohorts, even after adjustment for confounders. Gulf War veterans were more likely than the Bosnia cohort to have substantial fatigue (odds ratio 2.2 [95% CI 1.9-2.6]), symptoms of post-traumatic stress (2.6 [1.9-3.4]), and psychological distress (1.6 [1.4-1.8]), and were nearly twice as likely to reach the CDC case definition (2.5 [2.2-2.8]). In the Gulf War, Bosnia, and Era cohorts, respectively, 61.9%, 36.8%, and 36.4% met the CDC criteria, which fell to 25.3%, 11.8%, and 12.2% for severe symptoms. Potentially harmful exposures were reported most frequently by the Gulf War cohort. All exposures showed associations with all of the outcome measures in the three cohorts. Exposures specific to the Gulf were associated with all outcomes. Vaccination against biological warfare and multiple routine vaccinations were associated with the CDC multisymptom syndrome in the Gulf War cohort. **INTERPRETATION:** Service in the Gulf War was associated with various health problems over and above those associated with deployment to an unfamiliar hostile environment. Since associations of ill health with adverse events and exposures were found in all cohorts, however, they may not be unique and causally implicated in Gulf-War-related illness. A specific mechanism may link vaccination against biological warfare agents and later ill health, but the risks of illness must be considered against the protection of servicemen.

Roche VM, Kramer A, Hester E, Welsh CH. Long-term functional outcome after intensive care. *J Am Geriatr Soc* 1999 Jan;47(1):18-24

OBJECTIVE: Although age-related mortality after intensive care unit (ICU) admission has been studied, functional recovery for different age groups following ICU admission is not well characterized. We hypothesized that compared with younger age groups, fewer patients older than age 65 admitted to an ICU would regain their full prehospitalization functional ability and that their recovery would be slower than that of younger patients. **DESIGN:** A prospective observational cohort study with convenience sampling. **SETTING:** Intensive care units of an urban university-affiliated Veterans Administration Medical Center. **PARTICIPANTS:** A total of 222 patients during the first 72 hours after entry to a medical or surgical ICU at the Denver Veteran's Administration Medical Center between September 1991 and July 1992. **MEASUREMENTS:** We collected baseline data on patient demographics and on the severity of acute illness using the Acute Physiology and Chronic Health Evaluation (APACHE II), Acute Physiology Score (APS), and functional status (highest level of physical activity level 1 month before admission). We recorded survival and patient-perceived global functional status at 6 weeks and 6 months after admission. Post-ICU function was adjusted for baseline function, age, APACHE II, and APS using multiple regression. **RESULTS:** Average patient age was 62 +/- .74 years (mean +/- SEM). Fifty-two percent of the entire cohort returned to baseline function at 6 months. Although baseline function was better for younger people, there was no difference in recovery at 6 weeks in older compared with younger patients. Most functional recovery occurred by 6 weeks, with maintenance of this recovery at 6 months. Baseline function was the major determinant of both 6 week recovery ($P < .001$) and 6 month recovery ($P = .002$), whereas APACHE II was not ($P = .3$). Age predicted recovery significantly ($P = .04$) at 6 months but not at 6 weeks ($P = .26$). APACHE II ($P < .001$) and baseline function ($P = .03$) predicted mortality. **CONCLUSIONS:** Older people had worse functional ability at ICU admis-

sion, but the proportion of older people who recovered and their rate of recovery was the same as for younger people. Baseline functional status, rather than abnormal physiologic status (as measured by APACHE II) on admission, was the major determinant of recovery, whereas APACHE II was the main correlate of mortality. Together, baseline function and physiologic status provide valuable complementary information for clinically relevant outcomes following an ICU admission.

Taft CT, Stern AS, King LA, King DW. Modeling physical health and functional health status: the role of combat exposure, posttraumatic stress disorder, and personal resource attributes. *J Trauma Stress* 1999 Jan;12(1):3-23.

This study examined associations of combat exposure and posttraumatic stress disorder (PTSD) with physical health conditions and also incorporated hardiness and social support as mediators and functional health status as an outcome. Data were derived from 1,632 male and female Vietnam veterans who participated in the National Vietnam Veterans Readjustment Study. Path analysis revealed that hardiness and social support operated primarily as intermediary variables between combat exposure and PTSD, and PTSD emerged as the pivotal variable explaining physical health conditions and functional health status. Gender-based differences in means and patterns of associations among variables were found. The results stress the importance of assessing trauma in clinical settings as a meaningful determinant of health outcomes.

Kunik ME, Benton CL, Snow-Turek AL, Molinari V, Orengo CA, Workman R. The contribution of cognitive impairment, medical burden, and psychopathology to the functional status of geriatric psychiatric inpatients. *Gen Hosp Psychiatry* 1998 May;20(3):183-8

In order to define the contributions of cognitive impairment, medical burden, and psychopathology to the functional

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Summaries of Efforts to Evaluate Outcomes of Veterans' Health

These citations were selected from VA HSR&D Seventeenth Annual Meeting February 24-26, 1999 Abstracts at <http://www.va.gov/resdev/abstracts1.htm>.

Do Oral Health-Related Quality of Life Measures Relate to Use of Dental Care?

Contact: Judith Jones, DDS, MPH, Nancy Kressin, PhD, A Spiro III, PhD, Donald Miller, ScD and Lewis Kazis, ScD. Bedford VA Medical Center, Bedford, MA. RI Garcia.

Objectives: Valid dental outcome measures should vary with the use of dental services. The purpose of this analysis is to examine the relationship of oral health-related quality of life measures to past use of dental care in two populations.

Methods: We examined the retrospective relationships of self-reported oral health measures to self-reported use of care in two contrasting samples of veterans, the Veterans Health Study (VHS, N=538, mean age=62) and the VA Dental Longitudinal Study (DLS, N=278, mean age =71). Self-reported oral health measures included a single-item self-report measure of oral health (OH1), the 3-item Oral Health-Related Quality of Life measure (OHQOL, Kressin, et al, 1996) the 12-item Geriatric Oral Health Assessment (GOHAI, Atchison & Dolan, 1990), and the 49-item Oral Health Impact Profile (OHIP, Slade & Spencer, 1994). Use of care was categorized into ≤ 1 year, > 1 year; and ≤ 2 years, > 2 years. Reason for last visit was divided into emergency and routine care (exam and cleaning, fillings, other).

Results: In the VHS sample, better oral health (OH1) was associated with recency of dental visit, i.e., better oral health was associated ($p < 0.05$) with more recent use (in last year and last 2 years). Better scores on the OH1, OHQOL and OHIP were significantly associated with reason for last visit, with approximately 0.5 sdev lower scores, on average, in persons who used emergency as compared to routine care. In the DLS sample, there were no significant differences in mean self-reported oral health scores by recency of use or reason for last visit; however trends were in the expected directions.

Conclusions: The validity of these self-report measures of oral health is suggested by the association with recency of dental care and reason for last visit in VA health care users. However, no significant associations were observed in the DLS, most of

whom use routine dental care.

Impact: Self-reported oral health measures may be useful to monitor the effects of dental care on patients' quality of life in users of VA health care.

Is Depression Associated with Oral Health-Related Quality of Life?

Contact: Nancy Kressin, PhD, Avron Spiro III, PhD, Katherine Skinner, PhD and Judith Jones, DDS, MPH. Bedford VA Medical Center, Bedford, MA.

Objectives: The health-related quality of life (functional status, emotional well-being) of patients with depression is often as low as, or lower than, that of patients with chronic medical conditions.

However, we do not know whether depression has a similar effect on oral health-related quality of life (oral QOL). VA dental policymakers, clinicians and researchers are increasingly relying on oral QOL ratings to evaluate dental treatment needs and outcomes of care. Thus, it is important to understand what factors influence such ratings.

Methods: We examined the association between depression (measured by the CES-D) and oral QOL, using two different indices: the Geriatric Oral Health Assessment Index (GOHAI) and the Oral Health-Related Quality of Life measure (OHQOL). Using data from 3 veteran samples: male VA patients in the Veterans Health Study (VHS), female VA patients in the VA Women's Health Project (WHP), and male community dwelling veterans who do not use VA care (Normative Aging Study (NAS)), we examined whether individuals who screened positive for depression (scoring above the standard cutpoint) had worse oral QOL than those who were not, controlling for sociodemographics (age, education, marital status), and self-reported oral health.

Results: In bivariate analyses, being depressed was associated with worse OHQOL scores in both the VHS and WHP veteran patient samples, as well as in the NAS. Depressed individuals had worse GOHAI scores in the VHS and WHP, but not in the NAS. After controlling for self-reported oral health, age, income, marital status and education, depression remained significantly associated with

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both oral quality of life measures in all samples, and the independent and control variables together explained between 15 and 30% of the variance.

Conclusions: These results suggest that there is a strong association between depression and oral quality of life, suggesting further negative health impacts of depression in addition to those already quantified with regard to physical health. However, these cross-sectional data cannot prove causality. Future research should further explore the mechanisms of the association of depression and oral quality of life through the use of longitudinal data.

Impact: The understanding of psychosocial and other factors which influence patients' ratings of quality of life is crucial to the accurate interpretation of findings by researchers, clinicians, and policy makers. Recognizing that depression is a significant correlate of oral health outcomes improves the measurement of oral quality of life and provides a potential avenue for interventions to improve oral health outcomes.

Prostate Cancer Quality of Life and Outcomes Research among Patients with Low Socioeconomic Status: An Overview of the VA Cancer of the Prostate Outcomes Study (VA CaPOS)

Contact: Simon Kim, MPH. Chicago, VA Hospital. SJ Knight, E Moran, CN Robertson, and JE Smith. Charles Bennett, MD, PhD. Chicago VA Hospital, Chicago, IL.

Objectives: Outcomes assessment for prostate cancer are important, because of debates over the benefits and costs of alternate treatments and outcomes. Because of a lack of evidence of survival benefits with specific therapies, quality of life (QOL) evaluations have taken on increased importance. QOL is rarely assessed among racial/ethnic minorities and men of lower socioeconomic status, who make up a disproportionately large part of the prostate cancer burden. We have initiated the first multi-center QOL outcomes study of lower socioeconomic status men, the VA Cancer of the Prostate Outcomes Study (VA CaPOS).

Methods: VA CaPOS QOL information is collected from prostate cancer patients, spouses, and physicians at six VA medical centers. Because of low rates of literacy, interviewers assess QOL, involvement in care, and the relative importance of likely outcomes following alternative treatments. Spouses provide proxy ratings of patient QOL.

Physicians provide information on patients' performance status and the patients' perceived preferences for alternate outcomes. Medical records and electronic databases are reviewed for sociodemographic characteristics and relevant clinical characteristics.

Results: Currently, 601 men with prostate cancer are included in the VA CaPOS, over half of whom are African American. The mean time since diagnosis was 1.4 month for newly diagnosed patients and over 4 years for the rest. QOL responses were most favorable for newly diagnosed, intermediate for stable metastatic disease, and poorest for progressive metastatic disease patients, most of whom had been followed for several years. Spouse emotional well-being assessments were significantly worse than those of individual patients. While patients were not able to provide reliable estimates of their own preferences for future QOL states, they were able to respond reliably to questions phrased as a comparison of the preferences of two hypothetical patients. While African American prostate cancer patients were more likely to have advanced stage disease at the time of diagnosis, after adjustment for differences in health literacy, race was no longer a significant predictor of having advanced prostate cancer.

Conclusions: The VA CaPOS provides useful information on health status, QOL, and low literacy for VA prostate cancer patients. Our results indicate that valid and reliable assessments in low literacy populations are feasible, but that long-term evaluations are needed to detect clinically meaningful information on QOL as the disease progresses.

Alternative sources of QOL information, such as spouses, provided results that had poor concordance for emotional and social functioning, but were generally valid for other dimensions of health. The reliability of patient ratings

of future QOL states was increased when questions were based on two hypothetical friends rather than consideration by the patients themselves of two potential, but different, future health states. Observational database efforts are potential sources of important information for lower socioeconomic status patients who are faced with difficult therapeutic decisions, limited financial resources, and concerns over both quantity and quality of life outcomes with alternative therapies.

Impact: VA CaPOS provides useful information on health status, QOL, and low literacy for VA prostate cancer patients. It also provides useful information about spouse proxy ratings of patient QOL.

A Disease-Targeted Measure of Health-Related Quality of Life (HRQOL) for Patients with Chronic Liver Disease the LDQOL 1.0.

Contact: Ian Gralnek, MD, MSHS. West Los Angeles VA Medical Center, Los Angeles, CA. RD Hays, HR Rosen, EB Keefee, DM Jensen, and P Martin.

Objectives: The development and validation of a patient-centered HRQOL outcomes measure is timely and needed for individuals with chronic liver disease.

Disease-targeted measures can capture small, yet clinically meaningful changes in patients' health status due to an intervention or disease progression that a generic instrument may fail to detect.

Therefore, the objective of this study is to evaluate the psychometric properties (reliability and validity) of a newly developed disease-targeted HRQOL instrument (the LDQOL 1.0) for individuals with chronic liver disease.

Methods: Disease-targeted items in the LDQOL 1.0 were developed from focus groups of patients with chronic liver disease awaiting liver transplantation, expert hepatology panel input, and an extensive review of the literature.

Cognitive interviews were conducted to detect potential problems with instrument design or wording of items. The HRQOL instrument was then constructed consisting of 36 generic items (SF-36)

Use of a Generic Cost-Effectiveness Measure in Veterans Administration Patients

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Generic cost-effectiveness analysis requires that the same unit of effectiveness be used regardless of diagnosis. A complement to generic cost-effectiveness analysis is disease-specific cost-effectiveness analysis. The primary advantage of generic cost-effectiveness analysis is the ability to compare cost-effectiveness ratios across a variety of diagnostic groups. A Department of Health and Human Services working group has recommended the quality-adjusted life year (QALY) as the effectiveness units for cost-effectiveness studies.¹

The original interviewer-version Quality of Well-Being Scale (interviewer QWB) is a generic health-related quality of life (HRQL) measure that produces QALYs as an output and was designed for use in cost-effectiveness analyses. The interviewer QWB has been used in numerous cost-effectiveness studies over the past 25 years. However, only recently has the interviewer QWB been used in the assessment of mental health outcomes.²⁻⁵ One of the frequent criticisms of the interviewer QWB that has limited its widespread use in research and clinical settings is the requirement of a trained interviewer to collect the data, making it more expensive to administer than self-administered measures.

In response to this criticism, a self-administered version of the Quality of Well-Being Scale (QWB-SA) was developed.⁶ The QWB-SA includes the same four subscales as the interviewer QWB (symptom/problem complex, mobility, physical activity, and social activity), can be printed on two sides of a single page, is available in a scannable form, and usually takes less than seven

minutes to complete. The output from the QWB-SA is a preference-weighted index score between 0.0 (death) and 1.0 (perfect health), similar to the interviewer QWB. A comparison between the interviewer QWB and QWB-SA, using the same scoring algorithm for each instrument, found relative equivalence between the two types of administration and good test-retest reliability.⁶

Content of the QWB-SA

The QWB-SA items are based on those used in the interviewer QWB. The primary differences between the QWB-SA and interviewer QWB are the mode of administration, the number of symptoms and problems, and the format of the questions.^{6, 7} The total number of items on the QWB-SA is 76 compared to 43 on the interviewer QWB. The QWB-SA includes 58 symptoms or problems compared to 26 in the interviewer QWB. The increased number of symptoms resulted from a disaggregation of some of the original symptoms/problem complexes into individual items and an increased number of mental health and self-rated health items. In addition, a group of physicians suggested the inclusion of some new symptoms to make the form more similar to a review of systems examination, which is typically part of a thorough physical exam. The review of systems examination will include questions about current symptoms from all major body systems (e.g., cardiovascular, respiratory, neurologic, etc).

The format for the QWB-SA includes five parts. Part I asks about acute and chronic symptoms. First, respondents are asked to respond yes

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or *no* if they have each of 19 chronic symptoms or problems. Examples of the symptoms include blindness or severely impaired vision in both eyes (a separate item asks about one eye), and speech problems. Part I also asks about 25 acute physical symptoms (e.g., headache, coughing or wheezing) and 11 mental health symptoms (e.g., spells of feeling upset, downhearted, and blue). The format for these items asks respondents to think back over the last three days and to indicate if the symptom was present yesterday, two days ago, and/or three days ago. Part II uses a similar format and asks about self-care. It includes two items and asks if the respondent had been a patient in a hospital or other healthcare facility and whether he or she had needed help caring for him or herself. Part III asks about mobility (e.g., use of public transportation or driving). Part IV asks about physical functioning (e.g., walking, confinement to a bed or chair). Part V asks about performance of usual activity (e.g., work, school, or housework).

Initial studies have demonstrated that the QWB-SA possesses good psychometric properties.^{6, 8} In addition, the QWB-SA was found to be sensitive to clinically significant changes in the HRQL of migraineurs,⁹ differences between a clinic sample and patients with rheumatoid arthritis,¹⁰ and pre to post-operative changes in a sample of patients who have undergone cataract surgery.¹¹ Others have shown that the QWB-SA is acceptable to older adults as a mail-out survey.¹²

It should be noted that the weighting system for the QWB-SA is different from the original interviewer QWB. Although the measures are highly correlated, scores on the QWB-SA are typically systematically lower by approximately 0.11 units. It is not known how this systematic difference between cross-sectional QWB-SA and interviewer QWB scores will affect the comparison of HRQL change scores or QALYs associated with particular interventions using the QWB-SA or interviewer QWB. Because QALYs comprise the denominator of cost-effectiveness ratios, it is important to know the relationship

between QALYs derived from the QWB-SA and interviewer QWB for comparison across samples. This issue is being explored in current studies utilizing both QWB measures.

A separate scoring algorithm derived specifically for the QWB-SA is currently available and several ongoing investigations are documenting the instrument's reliability, validity, and sensitivity in a variety of populations. The QWB-SA scoring algorithm is based on preferences for QWB-SA health states derived from a primary care patient sample of over 1000 subjects. The preferences for QWB-SA health states were elicited using a categorical rating scale method similar to that used for the interviewer QWB. A multiattribute utility model was then used to assign the actual weights.

VA experience with the QWB-SA

As mentioned above, the QWB-SA is being used in a variety of ongoing studies to evaluate its feasibility, reliability, validity, and sensitivity to change. VA studies using the QWB-SA as a generic HRQL measure include samples of patients with major depression and post-traumatic stress disorder. Non-VA samples where the QWB-SA is being used include patients with migraine headache, rheumatoid arthritis, cataract, diabetes mellitus, chronic obstructive pulmonary disease, multiple sclerosis, back pain, and cancer. To date, the majority of our VA experience using the QWB-SA is limited to samples of patients with major depression.

Data collection on a one year observational longitudinal QWB-SA study of VA inpatient and outpatient depressed subjects was recently completed ($n=67$). In earlier studies we found the interviewer QWB to be sensitive to cross-sectional and longitudinal depression severity over a period of six months.^{2, 3} One specific aim of the QWB-SA study was to evaluate the sensitivity of the QWB-SA to acute depressive symptom change (over a course of four weeks) and changes with longitudinal observations. During a face to face research interview we collected data on depression severity using the Hamilton Rating Scale for Depression

(HRSD-17) and the Beck Depression Inventory and completed the interviewer QWB and QWB-SA. The research subject completed the QWB-SA during the research interview, and different members of the research staff completed the HRSD-17 and interviewer QWB in order to maintain the independence of assessment. We conducted the research interviews weekly for four weeks or until the subject's depressive symptoms decreased by 50 percent according to the HRSD-17. We then repeated the interview quarterly for one year.

We found that the VA patients in this study were willing and able to complete the QWB-SA easily with minimal to no assistance from the research staff. In general, it took patients 5 to 15 minutes to complete the questionnaire. The average time to complete the QWB-SA in non-mental health samples is approximately seven minutes. Because the QWB-SA was completed as part of an in-person interview, we had the opportunity to review the questionnaire prior to the patient leaving the interview site, and therefore, missing data was minimal. We are currently analyzing the data to verify the sensitivity of the QWB-SA to acute and long-term changes in depression severity.

Overall we have been encouraged by the performance of the QWB-SA in measuring HRQL and calculating QALYs in VA patients with depression. The interviewer QWB and QWB-SA were designed for use in cost-effectiveness analyses and to inform broad health policy decisions through the use of a common measure of effectiveness. The QWB-SA appears to be acceptable to VA patients and feasible as a self-administered measure. Soon we will report on its sensitivity to acute and long-term sensitivity to change. If the QWB-SA is confirmed as a sensitive HRQL instrument in a wide variety of physical and mental illnesses, then cost-effectiveness ratios, using a common self-administered measure of effectiveness, could be determined for a variety of conditions and treatments within the VA healthcare system. These cost-effectiveness ratios would provide patient-generated data to inform the VA health policy decisions regarding the most efficient blend of

The New VA: Using Patient Outcomes to Drive Health System Performance

Thomas L. Garthwaite, MD, MPH

Dr. Thomas L. Garthwaite was appointed Acting Under Secretary for Health in the Department of Veterans Affairs on July 1, 1999. In this capacity, Dr. Garthwaite is the highest official in the Veterans Health Administration.

Despite its unique missions, funding, and structure, the Veterans Health Administration (VHA) within the Department of Veterans Affairs (VA) shares the same fundamental challenge facing all healthcare systems: providing healthcare value. To meet this challenge, we began a transformation in 1995 that dramatically changed the way we do business. This article will examine the underlying principles for that transformation, the key operational strategies and their rationale, and will emphasize the critical role that performance measurement has played in our success.

Underlying Principles and Challenges

The first principle underlying the transformation is that the business of the Veterans Health Administration is healthcare, not hospitals. Traditionally, independent medical centers competed for programs and funding. Success was measured in number of beds, number of programs and total budget. We believe that collaboration and coordination must replace competition and that success is measured by improved patient outcomes. As a result, we have reorganized into geographic networks of owned facilities and contracted services. We changed the focus of the networks from symptomatic users to an enrolled population.

A second principle is that healthcare has become primarily an outpatient activity. Arcane eligibility rules, unclear reimbursement models, and a comfortable practice pattern habit all had led VA to emphasize inappropriate inpatient care. Based on the belief that the site of care is important only if it affects outcome, we have opened over 250 new sites of care and have integrated 52 facilities into 25 collaborative systems. We have also closed more than 50 percent of all acute inpatient beds, decreased admissions by a third and increased outpatient visits from 25 to 35 million per year.

A third principle is that healthcare is fundamentally a local activity. Goals for healthcare are similar everywhere in accordance to national care guidelines. But local flexibility in achieving the

goals leads to creative improvement. VA had been centralized, hierarchical, and bureaucratic.

Therefore, changes have been made so that we can delegate many decisions to our networks while emphasizing the need to measure compliance with national standards.

A fourth principle is that the success of future healthcare systems will depend on their ability to integrate and manage information. VA's information system has been lauded for its clinical usefulness, yet it has difficulty sharing data with private or other federal systems. In cooperation with other federal partners, we are committed to making our future versions compatible with emerging national standards. We believe that information management is the key to improving the consistency and quality of care while controlling costs thereby providing value. We have evolved our information system to be able to aid in the provision of care and in analyzing the effectiveness of our system.

A fifth principle is that healthcare must reorient itself to be population-directed, community-based, and health-promotive. All of American healthcare had been guilty of focusing on large medical centers that delivered high-tech interventions for patients with advanced disease. We believe that the goal of the healthcare system must be to maximize the health potential of the population it serves. For example, VA has published studies that demonstrate that the systematic administration of pneumovax leads to favorable outcomes: fewer hospital days, fewer dollars expended and fewer deaths.

A sixth principle is that healthcare must become more accountable and responsive to those who purchase it and those who use it. In the absence of resource distribution systems that clearly provide incentives for quality, we believe that we should keep the distribution system simple and measure the quality of care as precisely as possible so that we can provide credible and meaningful data that demonstrate the effectiveness and value of our care. We believe that we have implemented the most extensive quality measurement of any healthcare system (for example, our National Surgical Quality Improvement Program's database

contains high quality data on over 700,000 major operations).

A seventh principle is that medical education and research are accountable public goods. For the VA, education and research are powerful assets that enhance our ability to provide quality care. In addition, they provide an opportunity for us to lead in developing the healthcare systems of tomorrow. Health system administrators often make important and expensive decisions based on too little data with too few statistics. Further, health service researchers often have important data with copious statistics that sit quietly in journals waiting to be discovered and acted upon by administrators so data should drive health system design. With these points in mind, key VA administrators and health service researchers now meet regularly to share information and to plan new studies of relevant issues.

Key Strategies

The most important strategy used to transform the VA healthcare system has been the deployment of a performance measurement system. This system has several key components that are critical to its success. The first component is the performance contract. The contract is written and signed by each Network Director and the Under Secretary for Health. The contracts have four parts: core executive competencies, comprehensive quality framework adherence, quantitative measures, and organizational emphasis, such as fair workforce treatment, occupational safety and national contributions.

Quantitative measures are the cornerstone of the contract and are developed by a committee and approved by the Under Secretary. The measures represent areas that need improvement or monitoring or that are important new initiatives for the year. The contracts articulate a clear direction and emphasis for the coming year. They also make the assessment of success more objective than had been common previously. Since the majority of the measures relate to patient care and clinical outcomes, if Network Directors are to improve the

Network's performance (and therefore their own performance) they must engage the clinical staff in the process of understanding the measures and then in changing staff behavior or system design. As long as the measures are clinical and important, this system encourages administrators and clinical staff to work together to improve outcomes.

A second component of the system is the measurement development process. Each measurement and the method of collection are clearly defined at the beginning of each year. The measurements target key organizational goals: healthcare value, employer of choice, exceptional accountability, and organizational effectiveness. Our primary goal is to deliver healthcare value, which we define as quality of care per unit of price or cost. We have further defined four domains of quality: technical quality (accurate, consistent, and adherent to current national standards/guidelines), patient satisfaction (patients' perception of quality), access (geographic, temporal, knowledge/specialist, and covered benefit), and functional status (health outcome).

In addition to the measures used in the performance contracts, many performance measures are in the process of development, testing, and use throughout the year. A committee with representation from both headquarters and the field facilities selects the panel of measures for inclusion in the performance contracts and oversees the development of additional measures for development. The Office of Quality and Performance supports the committee and coordinates the collection and communication of the data.

A third component of the system is the actual measurement process. Every effort is made to be certain that the performance measures are accurate and objective. The integrity of the process is enhanced by the use of an external contract for trained chart reviewers. If the needed data is available in our information systems, that data is used. Verification may also include audits by either the Medical Inspector or the Inspector General.

A fourth component of the system is the publishing of the results. Data is

compiled and published quarterly to allow every employee to see the network's progress toward its goals. The reports are released within 30 days of the end of each quarter and the yearly performance report is released within 30 days of the end of the year. The rapid reporting of the data is critical to allow employees to relate the measures to the actions they are taking to make improvements toward the network's goals. While the open reporting has created some pressure to compete, the use of approximately 20 measures per year has allowed each network to find both strengths and weaknesses. Educational efforts and the promotion of sharing of innovations have helped move the entire system toward improvement rather than focal excellence at the expense of other networks (and patients).

Other important strategies used to transform the VA healthcare system have included universal assignment of patients to primary care providers or teams, facility integrations, optional use of service lines rather than traditional departments, case management, clinical practice guideline implementation, performance-based interviewing to select employees, enhanced computer systems, and many others. Each strategy is aimed to improve care. Most strategies should have an effect on one or more of the performance measures. While the system of care is often too complex to relate a specific action or strategy to a specific measure, the composite effect is evident in the improvements seen in the measurements.

Future Directions

Future efforts in performance measurement will be directed toward the solution of two fundamental issues. The first issue is measurement definition and accuracy. Many health outcomes that we would like to measure are difficult to assess and capture. For example, outcomes in mental health and chronic medical conditions are more difficult to capture than outcomes from surgery. Even in surgery, we have found that measures of morbidity and mortality are more easily monitored than are functional status changes that result from the

Quality Outcomes of the Performance Management Program in “The New VA”

Jonathan Perlin, MD, PhD, MSHA

Dr. Perlin became Chief Quality and Performance Officer for the Veterans Health Administration (VHA) of the Department of Veterans Affairs on November 1, 1999. In this capacity, he has responsibility for supporting quality improvement and the performance management program throughout VHA's 22 regional networks which operate over 170 medical centers, 650 other facilities including outpatient clinics, and 70 home-care programs.

Editor's Note: The accompanying article by Dr. Thomas Garthwaite, “The New VA: Using Patient Outcomes to Drive Health System Performance” describes the principles and challenges which undergird the transformation process of the Veterans Health Administration (VHA) since 1995 and provide rationale for the comprehensive Performance Management Program.

The successful application of measures of structure and, especially, process and outcome, has been critical to rapidly advancing quality in “The New VA” to levels that increasingly surpass performance in other healthcare settings. This article (1) provides an overview of the Performance Management Program and (2) reports rates of evidence-based preventive healthcare services (e.g., cancer screening and immunization) and secondary prevention and therapeutic interventions (e.g., care for patients with diabetes and ischemic heart disease), which establish national benchmarks.

Overview of the Performance Management Program

The Veterans Health Administration (VHA) of the Department of Veterans Affairs (VA), the nation's largest integrated health system, implemented the Performance Management Program in 1995 to support its strategic plan to meet challenges of inconsistent healthcare quality and economic inefficiency. The Performance Management Program centrally embraces quality management and operates with the presumption that desired clinical, economic, and other outcomes can—and should—be specified. VHA leadership is committed to accountability in performance expectations as specified under the Performance Management Program.¹ This Program constitutes the broadest application of performance measures in healthcare management.

Performance measures address a broad range of relevant processes and outcomes supporting mission and strategy. Specific measures address both administrative and clinical activities. Administrative measures evaluate factors such as occupational safety, employee education, and labor relations necessary to support operational and clinical improvement. Clinical measures are

designed to support systemization of the best research and best practices in provision of healthcare services. This approach is designed to achieve consistent, reliable, efficient, and satisfying care of the highest quality that objectively surpasses governmental goals and existing community benchmarks.

Performance measures are also framed by what VHA defines as five Domains-of-Value. The value domains simultaneously constitute areas traditionally presenting challenges in healthcare and, as such, provide focal points for performance measurement and improvement. These domains include: access to care, quality of care, patient functional status, cost of care, and customer satisfaction.

Performance measures have been developed around each of these domains. For instance, measures of geographic access and waiting time have been developed to support evaluation and improvement of access to care. Appropriate disease-specific interventions and outcomes (e.g. blood pressure control in hypertension, blood sugar control in diabetes) exemplify measures of care quality.

The most comprehensive longitudinal and cross-sectional program for assessment of patient functional status ever performed has been implemented by VHA. Almost 2 million patients have now received a version of the SF-36 optimized and calibrated specifically for Veterans.² Importantly, VHA has made a commitment to serially tracking functional status, with the performance goal of improving functional status where possible and slowing the rate of decline where inevitable. Consideration of functional status has been operationalized through specific performance measures.

Clinical Performance Measures are supported by development and promulgation of national Clinical Practice Guidelines. Specific guidelines and clinical performance measures are, in part,

Health Systems Improvement

Table 1: VHA Prevention, Chronic Disease, and Palliative Care Indices

VHA Index	Component Indicators
Prevention	Immunization: Influenza Immunization Pneumococcal Vaccination Cancer Screening: Breast Cancer Screening Cervical Cancer Screening Colorectal Cancer Screening Prostate Cancer Screening Substance Use: Alcohol Use Tobacco Use Smoking Cessation Counseling
Chronic Disease Care	Chronic Obstructive Pulmonary Disease (COPD):
(Inpatient)	Inhaler Use Observation / Education
(Outpatient)	Inhaler Use Observation / Education
	Diabetes Mellitus:
	Annual Pedal Pulse Evaluation
	Annual Sensory examination of Feet
	Annual Visual Foot Inspection
	Annual Hemoglobin A1c
	Annual Retinal Exam
	Hypertension:
	Exercise Counseling
	Nutrition Counseling
	Ischemic Heart Disease:
	Aspirin Use post-Myocardial Infarction
	Beta-Blocker use post-Myocardial Infarction
	Cholesterol Management post-Myocardial Infarction
Palliative Care	Advance Directives:
	Discussion of Resuscitation Status
	Clinical Management:
	Hydration / Nutritional Assessment
	Depression Management Plan
	Dyspnea Management Plan
	Pain Management Plan
	Continuum-of-Care Coordination:
	VA Home-Based Primary Care
	VA Hospice Enrollment
	Community-based Hospice Enrollment
	Psychosocial Care:
	Psychosocial Support
	Caregiver Support

determined by high-volume, high-risk conditions. Leveraging the size and scope of VHA and its multiple academic affiliations, multidisciplinary panels of national experts within the health system review and incorporate the best evidence derived from research into guidelines. Accountability is introduced into the process as clinical experts and administrative leaders track clinical performance measures indicating guideline adherence.

Through documents such as per-

formance contracts, managers are specifically accountable for achieving realistic but challenging performance targets in defined timeframes. Organizational transformation and the use of performance measures have compressed performance improvement, in a system as large as VHA, from years to months.

The measurement system is itself grounded in scientific methods of data measurement, which requires methodologically rigorous data definition, collection, and validation. Statistically

valid sampling and frequent feedback to accountable managers is provided to show progress toward goals.

In the clinical area, some measures have been devised to facilitate external benchmarking. In other instances, developers of performance measures have turned heavily to health services research to devise new ways to measure performance as a fundamental instrument for change management. Examples include development of the Prevention Index, the Chronic Disease Index, and the Palliative Care Index shown in Table 1.

Clinical Quality Outcomes

The Prevention Index, the Chronic Disease Index, and the Palliative Care Index are each composed of a number of component indicators. In turn, each indicator is supported by a methodologically viable measure, generally a process measure. Each indicator encompasses the use of best evidence supporting particular healthcare interventions. The indices, serving as healthcare process summaries, characterize—and encourage—preventive, therapeutic, and palliative healthcare interventions in particular states of health and disease and in appropriate types of healthcare encounters.

From its inception in 1996, the Prevention Index has improved by 239 percent, increasing from a value of 34 to 81 on a 100-point scale. Similarly, the Chronic Disease Index has improved 190 percent from 47 to 89. It is exciting that mounting evidence is beginning to link improvements in these process indices with improved health outcomes.

Increases in one-year survival for a number of conditions represented in high volume in VA have been noted including: angina pectoris, chronic renal failure, congestive heart failure, chronic obstructive pulmonary disease, and pneumonia. This trend is also observed in mental health disorders: bipolar disorder, major depression, and schizophrenia.³ Statistically robust improvements in intermediate outcomes including control of hypertension, improved hemoglobin A1c, and lipid profiles have been noted for patients with diabetes.⁴ Preliminary evidence demonstrat-

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in the literature.¹⁵ Ninety percent of the reliable variance in the eight Veterans SF-36 scales are explained by the physical and mental dimensions of health. As in the MOS version of the SF-36, the two component summary scales are each scored using weights derived from a national probability sample of the US population. They are standardized to the US population and norm-based so that the scores have a direct interpretation in relation to the distribution of scores in the US population with a mean of 50 and a standard deviation of 10. Higher scores indicate better health. Each summary is expressed as a T score, which facilitates comparisons between the VA patients and the general US population. Conversion formulas have been developed and validated where comparisons of VA patients with established norms using the MOS SF-36 are possible. In this case the results using the Veterans SF-36 are rescored so that the summary scores for physical and mental are comparable to the original version of the MOS SF-36.

Prior published work indicates that measures of the Veterans SF-36 are strongly correlated with sociodemographics and morbidities of the veterans.⁷ Younger veterans between 20 and 49 years of age are sicker in their mental health status than older veterans who are 50 years of age or older. Veterans who use ambulatory care in the VHS reported lower levels of health status reflecting more disease than a non-VA civilian population. These measures of health are important indicators of the disease burden or case-mix of the patient and pertinent to health systems such as the VA for resource allocation decisions and as outcomes of care.

Norms have been developed for the VA. Nationally based upon the 1998 National Survey of Veterans in Ambulatory Care. The VA national average for PCS is 35.2 and for MCS is 43.6.¹³ The PCS is about 1.5 standard deviations below the US population and the MCS is 0.7 of one standard deviation below.

Application of the Veterans SF-36 in the VA

Since 1996 close to 2 million Veterans SF-36 questionnaires have been administered nationally in six national surveys. The VHA has adopted the Veterans SF-36 as one of the outcome measures in setting its performance measurement system. Several reports documenting these findings have been published and disseminated widely in the VA.

These measures are now being used by VHA for multiple purposes. The first is as a measure of disease burden, or disease complexity of the patient. The VHA is composed of 22 regions or Veterans Integrated Service Networks, also termed VISNs. These VISNs are geographically divided among the VA hospitals. VA is keenly interested in determining how to allocate its resources among the VISNs. Based upon the utilization and cost data available in the VHA, it has been determined that veterans 10 points lower (worse health) than other veterans on the physical summary require \$1482 per patient per year more than the others. Those veterans who score 10 points lower on the mental health summary require \$864 per patient per year in higher costs. The Veterans SF-36 provides a useful indication of greater case-mix, or disease burden, among certain veteran groups. Data has also indicated that the Veterans SF-36 scores vary by more than 50 percent of one standard deviation amongst the VISNs. Those VISNs in the northeastern and western regions of the country have significantly higher physical summary scores (better health) than those VISNs in the southeastern regions. This discrepancy is an indication of differences in the case-mix of patients among these VISNs and has important implications for future resource allocation decisions in the VA.

Second, as an outcome measure, the Veterans SF-36 is being administered over time to provide measures of patient outcomes. To this end, the VHA has instituted a system of goals to measure system performance using functional status. These goals were issued by the VA

to the United States Congress in 1999. One of these goals states:

Veteran health scores for physical, mental and social functioning will improve by 1.5% per annum when compared to 1999 baseline norms. The population of veterans served by the VHA will improve by 9% through the year 2005. (*sic*)

The goal is to examine the changes in functional status overall for the system. The Veterans SF-36 is being measured nationally on an annual basis through the year 2005. A cohort of over 90,000 veterans to be followed annually using the Veterans SF-36 scores has been established to meet this goal and monitor the outcomes of care.

The third purpose is for the monitoring of health status for individual patients using summary information from the Veterans SF-36. This information will be made available to clinicians as part of the electronic medical record during the clinic visit. A nationally based clinical trial is now being planned to evaluate the efficacy of this information. The difference in this study with previous published work is that the information is made available to the clinician in real-time during the clinic visit. Patients are administered the health status questionnaire using a computer-based telephone system at home prior to the visit. The profiling of the information will alert the doctor to the specific items that are important for that visit.

Summary

In the next few years, the VHA is quickly becoming a flagship for developing a system based on outcomes management using patient-centered measures of health status. The distribution of illness in the VA patient population differs markedly from that in the general population and from that of most other healthcare organizations. The Veterans SF-36 is an important assessment tool for system-wide monitoring of case-mix and in the future for assessing outcomes of care.

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Research and Policy cont'd from page 4

operation. We plan to pursue research on health outcome assessment as part of our health services and quality enhancement research agendas. The second issue is measurement capture. While we believe that our performance measurement system has been valuable, we invest heavily in the collection and analysis of data. Ideally, the collection of relevant performance data will occur automatically as we care for patients and

the data will be automated such that the aggregation and analysis of it will be highly efficient. As we evolve our computerized patient record, we believe that it is critical to build in outcome measurement as a key functionality of the system.

Summary

The transformation of the Veterans Health Administration over the past five

years has relied on performance measurement, primarily of health outcomes, as its main driving force. These measurements have defined the direction, set priorities, and demonstrated the progress. Our focus on health outcomes has helped to direct the administrative and clinical energy where it belongs--improving patient care. ❖

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supplemented with 77 disease-targeted items. A multicenter, cross-sectional field test was conducted. Results: 221 consecutive ambulatory adult patients being evaluated for liver transplantation participated in this field test (64.1% male; median age = 51 years (range 23-78 years); 68.9% white, 6.8% Asian/Pacific Islander, 3.9% African-American, 1.9% Native American, 18.5% other or multiracial). The LDQOL 1.0 is a self-report measure that includes 21 multi-item scales (number of items): physical functioning (10), role limitations-physical (4), pain (2), liver disease-related symptoms (19), emotional well-being (7), role limitations-emotional (3), energy (4), cognitive function (6), memory (4), concentration (3), hopelessness (7), loneliness (6), stigma of liver disease (8), social function (2), quality of social interaction (5), sexual function (3), sleep (6), general health perceptions (7), health distress (4), effects of liver disease (9), and impact of liver disease (4). Internal consistency reliabilities (Cronbach's alpha) ranged from 0.67 to 0.95 (median = 0.86); 20/21 reliability estimates were excellent, alpha $\geq$ 0.70. All 21 scales were significantly ($p < 0.05$) associated with self-reported severity of symptoms and 4 scales with duration of liver disease (better HRQOL related to less severity and shorter duration of liver disease). Role limitations-physical was most strongly related to severity of symptoms ($p < 0.01$); sleep was most strongly associated with duration of disease ($p < 0.05$). Worse physical functioning ($p < 0.01$), worse sexual functioning among males ($p < 0.01$), role limitations-physical ($p < 0.01$), more liver disease-related symptoms ($p < 0.05$), and greater negative effects of liver disease ($p < 0.05$) were all significantly associated with higher Child-Pugh class. Conclusions: This multicenter study demonstrates the high degree of reliability and construct validity of the LDQOL 1.0 for individuals with chronic liver disease. This HRQOL outcomes instrument is able to measure significant impairment of daily functioning not detected by more traditional clinician-rated methods (e.g., Child-Pugh classification). The LDQOL 1.0 is now ready for implementation into prospective, longitudinal studies. Impact: 1. The LDQOL 1.0 will allow for a better understanding of HRQOL in patients with

chronic liver disease. 2. The LDQOL 1.0 fits well with the VHA's initiative to build a system of data collection that will integrate both generic and disease-targeted functional status instruments into a routine process of HRQOL data collection. 3. HRQOL data collection in chronic liver disease will allow for case mix comparisons, evaluation of changes in patient functional status over time and its potential relationship to processes of care, and generation of patient summary information for the clinician in their care of patients with chronic liver disease. 4. The LDQOL 1.0 may provide important information on resource utilization within the VA health care system such as response to therapeutic interventions (e.g., therapies for chronic viral hepatitis and liver transplantation). ♦

HEALTHCARE & THE INTERNET: RISKS AND OPPORTUNITIES

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status of geriatric psychiatric patients, a forward-looking, retrospective study of 106 consecutive admissions to a geriatric psychiatric unit at the Houston Veterans Affairs Medical Center Hospital was done. It was found that psychopathology and cognitive status, but not medical burden, contributed to the variance in functional status of geriatric psychiatric inpatients for both admission scores and for changes in scores during hospitalization. Improvements in cognitive state and psychopathology were associated with improvements in functional status during hospitalization. ♦

Health Systems Improvement cont'd from page

Table 2: Benchmark Clinical Quality Outcomes of the Performance Management Program

Prevention Index Component Indicators	VHA 1999 (%)	US PHS HP 2000 Goals (%)	NCQA HEDIS 1999* (%)	VA Improvement from 1996 baseline (%)
Immunization:				
Influenza Immunization	76	60	N/A	271
Pneumococcal Vaccination	77	60	N/A	275
Cancer Screening:				
Breast Cancer Screening	91	70	73	134
Cervical Cancer Screening	94	70	71	147
Colorectal Cancer Screening	74	55	N/A	218
Prostate Cancer Screening	66	N/A	N/A	>500
Substance Use:				
Alcohol Use	69	100	N/A	>500
Tobacco Use	95	100	N/A	194
Smoking Cessation Counseling	93	100	63	266

*<http://www.ncqa.org/docs/hedis/benchmk.doc>

US - United States

PHS - Public Health Service

HP 2000 Goals - Healthy People 2000

NCQA - National Committee for Quality Assurance HEDIS - Health Plan Employer Data & Information Set

(%) - Percent successfully meeting goal

ing lower rates of vascular complications of diabetes is now accruing.

Improvements in component indicators of the three indices have been observed that exceed U.S. Government Healthy People 2000 goals and private sector performance.

For example, current VHA rates of pneumococcal vaccination (77 percent) and influenza immunization (76 percent) in patients with chronic disease or over 65 years of age exceed the U.S. Public Health Service Healthy People 2000 goal of 60 percent by 17 percent and 16 percent, respectively. VA success rates also exceed community rates published by the Centers for Disease Control (CDC) as well as more recent population-based rates of vaccination in older persons or those with chronic disease of 51 percent for the pneumococcal vaccine and 68 percent for influenza immunization.^{5, 6}

The evidence supporting preventive healthcare interventions is predicated on an observed correlation between those interventions and improved definitive outcomes. The clinical benefit predicted by robust support for the preventive health services embraced by the Prevention Index is significant. With respect to immunization, for example, a recent publication describing clinical outcomes of VA patients with chronic

lung disease reports a 43 percent reduction in the number of hospitalizations for pneumonia and influenza, and a 29 percent reduction in the risk of death from all causes, with administration of the pneumococcal vaccine alone.

During the two year outcome period, a 72 percent reduction in hospitalizations for influenza and pneumonia and an 82 percent reduction in deaths from all causes was observed for patients receiving both immunizations appropriately. Moreover, this was associated with a cost savings of \$294 per vaccine recipient over the two-year period.⁷ Table 2 summarizes accomplishments in preventive healthcare supported by the Prevention Index.

Another significant intervention that has been driven by the use of performance measures is the administration of beta-blocker medications after heart attack. Beta-blocker therapy after heart attacks reduces risk of death in the subsequent two years by 43 percent and reduces the risk for rehospitalization by 22 percent.⁸ The 1999 VA rate of beta-blocker administration after heart attack is 94 percent, exceeding 1999 non-VA administration rates of 82 percent recorded by the National Committee for Quality Assurance (NCQA) and far

exceeding rates of 49 percent recorded previously across a broad cross-section of non-governmental hospitals.^{9, 10} While ultimate outcomes data, including survival, is still accruing, VA performance on these process measures predicts a substantial number of averted deaths and hospitalizations relative to published levels of performance in other healthcare environments.

From an operational perspective, it is important to recognize that these improvements in clinical quality outcomes occurred while providing care to a larger number of veterans on a neutral budget. During this time, the overall percentage of satisfied patients (customer satisfaction domain) recorded an increase from 86 percent in 1995 to 91 percent in 1999.

Functional Health Status Outcomes

The large scale cross-sectional assessment of functional status and the longitudinal Veterans Health Study have provided significant insight into the health-related quality of life of VHA patients. Results of the Veterans Health Study demonstrate correlation between functional status and patient satisfaction,¹¹ treatment decisions in mental health,¹² leg

pain,^{13, 14} and chronic lung disease.¹⁵ Specific performance measures are attached to these clinical conditions as well as patient satisfaction.

The Veterans Health Study provides insight into the relative disease burden of the VHA population. VHA averages for the physical and mental component summary scores are significantly below the national means for non-VA population.² Additional insight into regional variations in disease burden throughout the VHA system carries important implications for resource allocation.

On the basis of disease, age, and locality, cohort -specific variation provides insight into opportunities for clinical performance improvement. For example, these studies reveal that younger veterans are disproportionately afflicted with poorer mental health than older veterans.² Another finding suggests that providing patients with the opportunity to become more involved in their own healthcare decision-making increases patient satisfaction.¹¹ In summary, VHA has committed to tracking and managing functional status outcomes. Further investigation into mechanisms to most successfully utilize functional status data for improving health-related quality of life and other outcomes is necessary.

Conclusion

The Performance Management Program has achieved improvements in clinical quality that exceed U.S. Public Health Service Healthy People 2000 goals, private sector standards (e.g., NCQA), and published levels of performance. The Performance Management Program unifies managers and clinicians in purpose and provides the first demonstration of a health system consistently using the best scientific evidence in clinical practice to reliably and efficiently achieve the highest quality health outcomes. VHA accomplishments using the Performance Management Program are unmatched by any other health system in scope, magnitude, or speed; it serves as a model for improvement in other healthcare set-

tings. Critical innovations of the Performance Management Program include systematized commitment to the best scientific evidence for clinical practice, explicit accountability for measured performance, incorporation of functional status measurement and management, and precise alignment of the program as a strategy for fulfilling the Department of Veterans Affairs' mission to provide the highest quality healthcare for America's veterans.

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clinical services. We may find that current clinical priorities need to be modified to better reflect the most efficient use of VA healthcare resources from a cost-effectiveness point of view. As a self-administered measure, the QWB-SA may be a useful and practical tool for use in research and clinical settings to inform healthcare resource allocation decisions both within and across service sectors within the Veteran Health Administration.

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