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FACULTY PRESENTATION

Identifying Populations at Risk: Functional Impairment and Emotional Distress

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In today's economic and health care climate, interest in reducing health care costs and utilization while improving patient quality of life is paramount to most health care providers, health plans, and consumers. At the same time, the technology to accurately and efficiently measure patient outcomes is evolving, offering new and unique ways to view the benefits generated by the health care system. Furthermore, technological advances have yielded tools to standardize measurement of benefits by geographic area, socioeconomic status, and health plan. We are now able to calibrate patient-reported functional status and quality-of-life instruments, so that the results are reproducible and interpretable.

The technology revolution

Modern psychometric methods and computerized adaptive testing (CAT) have revolutionized the way patients are assessed, screened, and measured. CAT matches the questions to each respondent to achieve an individualized test format in accordance with the examinee's severity level. The efficiency of the CAT process enables a more accurate estimate of performance to be made, usually with many fewer questions than required with traditional paper-and-pencil testing modalities (Wainer, 2000). These technologies, coupled with Internet connectivity, create an extremely low-cost approach to satisfying both scientific standards and practical considerations in measuring health status on a large scale.

The cost of free health care

In the mid 1970s, my colleagues and I set out to evaluate the relationship between the consumption of health care services and the health benefits observed for adults and children in the United States (Brook, 1983; Ware, 1986). More than 7,000 individuals in six geographic re-

gions were randomly assigned to free medical care or to insurance plans with cost sharing in a fee-for-service (FFS) system for a period of 3 to 5 years in the Health Insurance Experiment (HIE). Additionally, 1,000 families at one of the six sites were randomly assigned to either a prepaid group practice health maintenance organization (HMO) or FFS care. We found that when health care service is offered on a free basis, consumption increased substantially from 28 percent to 40 percent, depending on the definition of consumption. We also failed to find a measurable improvement in approximately 100 clinical indicators as well as in health status and quality-of-life indicators for the average person. This study shows that cost sharing in the FFS system and a prepaid group practice form of HMO both yield outcomes similar to those observed with an FFS health care population at a reduced cost. These findings, however, were limited to the upper two thirds of the population in terms of income and health status. Those within 200 percent of the federal poverty line and those in poorest health tended to do better with free care.

Those in the lower third of the income distribution and those who experience the greatest disease burden should be analyzed separately in such studies. In cases in which these more vulnerable populations are included, their findings are typically averaged across the income and disease strata and much valuable information is lost in the averaging process. For example, in the HIE, we found a substantial improvement in cholesterol levels after 5 years in patients assigned to the HMO system. This improvement, however, was confined to persons in the middle-to-high income bracket. No improvements were observed among those within 200 percent of the federal poverty line.

Another example of differences in health outcomes in



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the most vulnerable populations can be drawn from the Medical Outcome Study (MOS) (Ware, 1996). This study included elderly and impoverished subgroups and was designed to compare the physical and mental health outcomes of chronically ill adults treated in HMO and FFS systems. The MOS was a 4-year observational study of 2,235 patients age 18 to 97, with one or more of the following conditions: hypertension, noninsulin-dependent diabetes mellitus, recent acute myocardial infarction, congestive heart failure, and depressive disorder. Patients who were 65 and older, covered under Medicare, and low-income patients (defined as 200 percent of the national poverty level) were evaluated in separate analyses.

Patients were evaluated on the basis of whether their physical and mental health scores improved or declined significantly during a 4-year follow-up, using the MOS 36-Item Short-Form Health Survey (SF-36). We found that physical health declined more often in the elderly population, and mental health remained stable. For the average participant, outcomes during the 4-year follow-up period were the same for those in the HMO and FFS systems. In the subpopulation analyses, however, elderly patients experienced physical health declines more often when treated under an HMO versus an FFS plan (54 percent and 28 percent, respectively). In the poverty group, outcomes were better for patients treated in the FFS group versus the HMO group. The opposite was true, however, for the nonpoverty group, which experienced better outcomes in an HMO setting.

The most vulnerable segment of the population with the greatest disease burden and fewest economic resources needs to be evaluated separately to determine the true nature of their health outcomes. To this end, assessment tools must be developed and patients must be sampled and compared across subgroups to determine who benefits most and who benefits least from medical interventions.

Health-related quality of life

The continuum of health outcomes includes measures at five levels: biological and physiological factors, symptoms, functioning, general health perceptions, and overall quality of life (Wilson, 1995). This classification includes both specific clinical outcomes, as well as patient-based assessments of the burden of disease and the impact of treatment. To obtain a clear understanding of these patient-based outcomes, it is necessary to measure each major domain of health outcome in at least three ways: in terms of functioning or what people are able to do, the patient's thoughts or feelings of well-being, and how each patient evaluates his or her health status. When these perspectives are combined, the result is a comprehensive indicator of performance and capacity for each

domain of health, and we have found this approach to be extremely useful for both.

Standardization: the SF-36

Despite the increasing availability of data from short- and long-form health assessments, it has been difficult to compare and interpret outcomes across health plans, geographic regions, and socioeconomic groups, due to a lack of standardization. One advantage of a standardized scoring system for generic health measures like the SF-36 Health Survey is that it provides a clear picture of the burden of an illness and the associated morbidities within an affected population, in comparison to an unaffected population. For example, using the SF-36, one can standardize a physical health measure to have a mean of 50 and a standard deviation (SD) of 10 in the general population. In that population, persons without chronic conditions will score about 0.5 SD units — five points — above the mean. Patients scoring 40 have reduced mobility and increased morbidity. For example, below that point, half cannot walk 300 meters without substantial difficulty. A five-point gain from about 45 to 50 reflects a 50 percent reduction in disability, a one-third reduction in the probability of one or more overnight hospitalizations in the next 6 months, and a substantial increase in work productivity (Ware, Kosinski, 2001).

It is important to mention the role of cognitively mediated effects in interpreting patients' evaluations of their health status. It appears that patients' level of confidence in their health is, as least in part, a direct result of the information they have received about their conditions and their prognoses. A patient's perception of his general health is, in turn, a major predictor of his demand for health care in the future, his return to work, and his ultimate health outcome, including his survival.

Generic health-related quality-of-life measures have been used in conjunction with cholesterol and other coronary risk factors to monitor improvements during cardiac rehabilitation and other treatments (Morrin, 2000).

These studies have documented substantially lower SF-36 profiles, particularly, lower physical-health summary measures for dyslipidemic patients. As detailed by physicians who use the SF-36 and other patient-based assessment tools routinely in practice (Wetzel, 2000), health-related quality-of-life profiles and summary measures have a number of uses in everyday clinical practice. These uses include serving as: another "vital sign" or test that is employed when screening patients (e.g., for fatigue or disabling pain); a tool for screening for psychological distress that is likely to be associated with a diagnosis of depression; a way to monitor health outcomes over time, particularly for patients with multiple complaints; and

patient registries designed to heighten understanding of the care process-outcome relationship.

Risk-adjustment models

Consider that the average senior treated under Medicare is twice as likely to worsen relative to physical performance and capacity than to experience an improvement during a 2-year follow-up period. This age-related declining health gradient appears to begin in middle age and to increase with increasing age. It has been reported in numerous longitudinal studies of physical functioning but has only recently been observed for the mental health domain in the ongoing Medicare Health Outcomes Survey (HOS) sponsored by the Centers for Medicaid and Medicare Services (NCQA, 2002).

Additional characteristics that are predictive of declines in physical performance and capacity include: income (i.e., being below 200 percent of the poverty level), higher levels of disease burden, less education (lack of a high school diploma), and race (i.e., black in comparison to white). In addition to comparing these and other risk factors, the HOS will compare 2-year health outcomes in HMOs, and for members of for-profit HMOs and not-for-profit HMOs. To facilitate the interpretation of difference in health outcomes, risk adjustment methods will be utilized (NCQA, 2002).

Computerized dynamic health assessments

At present, tools are generally in place to measure the burden of disease over the range of about two to three SDs worse than the average for many disease groups of interest. The tools lacking are those that measure the disease burden of the great majority of patients with mild to moderate disease. One solution is to measure the burden of disease across a wider range of functional health and well-being levels by raising the "ceiling," using measures like the SF-36. When this is done, however, it is crucial that large gaps (as wide as one SD unit) are avoided at the patient level and that the improved measures have clinical utility. More recent advances in measurement technology have yielded much improved psychometric models that can be used to program computerized

dynamic health assessments. For example, if an answer to a question indicates a high level of functioning, the system is triggered to ask a more probing question at that high level. Or, the system can be programmed to move on to the next domain of health. These tools make it possible to screen patients quickly in terms of functioning or well-being, or both, and to give providers scores that satisfy clinical standards of precision.

In conclusion, dynamic health assessment provides more accurate risk screening, which makes more targeted intervention possible. It also achieves a level of precision that allows information to be used in clinical decision making at the individual patient level. Moreover, the cost of health assessments will become minimal due to the advent of Internet technologies.

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