

# The Status of Health Status Assessment

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## Introduction

Everyone is a health status assessment expert—at least when it comes to his or her own health status. After all, who knows better? Most of us intuitively evaluate our health status and that of other people with whom we interact. This has occurred for millennia. Feinstein tersely characterized the situation, "Because quality of life is a uniquely personal perception ... [it] can be suitably measured only by determining the opinions of patients."<sup>1</sup> The problem is we don't all use the same evaluation criteria. Some of us place more emphasis on physical attributes such as appearance or aspects of physical fitness while others emphasize behavioral or emotional attributes. Different assessment criteria lead to numerous measurement difficulties that are usually couched in terms of reliability and validity.

Validity deals with the question, "What is this instrument actually measuring?" Since health status ultimately lies in the eyes and mind of the beholder, any standard measure is a compromise and will not be valid for some people. This is especially true when one considers different age and ethnic groups. For instance, health status measures for young children need different metrics than those for the elderly. As such, it is very difficult to come up with measures of health status that are broadly applicable.

Despite the measurement issues, few doubt the importance of health status assessment. The difficulty is the criteria and perspective. Many physicians think in terms of disease constructs and "objective" evidence such as obtained from blood chemistries or imaging studies. No one denies the relevance of these measures, but when people do their own intuitive health status assessment, they do not think in these terms. They

think in terms of how they feel (well-being) or what they can or cannot do (functional status). The challenge is to achieve a blend of criteria that is efficient (i.e., not burdensome in terms of cost of measurement or difficult to understand). Interest in health status assessment has increased markedly in the past decade.

There are two main reasons for the surge in interest in health status assessment. First, medical care is a trillion-dollar industry in the United States alone. When alternative modalities, diet and obesity concerns, skin care, baldness—the list is virtually endless—are added in, the figure is much higher. For many years people assumed medical care was a good value, due in part to insulation from cost by tax-free insurance. This assumption was prompted by breakthroughs in antibiotics and other drug therapies and surgical innovations that occurred during and after World War II. Although the new treatments were remarkably successful, it can be argued that public health improvements such as sanitation have had a greater effect on overall population health status. In any event cost is now the watchword in medical care; variation in practices is rampant,<sup>2</sup> and evidence of outright fraud has been uncovered.<sup>3</sup> There is a need to measure health status, combine it with cost data, and come up with value information. Some question putting a value on health, but it is inescapable; the only question is whether we do it explicitly or implicitly.

The second reason for increased interest in health status assessment is a transition from acute conditions and early mortality to chronic conditions.<sup>4</sup> Since about 1900 there has been a gradual shift from a predominance of acute and often fatal conditions to chronic conditions that often don't kill but diminish health status or quality of life. In addition, early death

from conditions such as cancer and heart disease occurs much less frequently. As such, mortality needs to be supplemented as an indicator of health. Indeed, a 1981 Lancet editorial was titled, "Counting the dead is not enough."<sup>5</sup> Finally, good measures of health status are needed to evaluate existing and new interventions. Before discussing the current situation with health status assessment, it is useful to review the historical context. In most instances history helps us understand the present and may provide guidance for future activity.

### History

There is little evidence of systematic health status assessment in western civilization before the 16th century. In England "Bills of Mortality" (lists of the dead) date back to 1527, but cause of death was not listed routinely until 1592. During the 1600s, plague exacted a severe toll in England; in 1625 about 25% of the population died. John Graunt, a prosperous London tradesman, was concerned about the welfare of his city and began studying the Bills of Mortality. In 1662 he published his findings in the now classic *Natural and Political Observations mentioned in a following Index, and made upon the Bills of Mortality... With reference to the Government, Religion, Trade, Growth, Ayre, Diseases, and the several Changes of the said City*. Graunt's publication led to his election to fellowship in the Royal Society, an unprecedented feat for a businessman. His most original contribution was a new way of juxtaposing population and mortality in a table of survivorship or "life table."<sup>6</sup>

Every nation now has formal death reporting requirements. These data are a crude and incomplete indicator of health status. During the last century most countries have also mandated reporting of certain conditions, usually infectious diseases. In the United States for instance, the federal Centers for Disease Control and Prevention working with the states mandate reporting of numerous diseases. Another development is cancer registries that are maintained in most states. All of these data cast light on health status, but they do not assess the effects of disability on work and personal lives, and the patient's perspective is not captured.

Studies conducted in the early 1920s in Hagerstown, Maryland, demonstrated that interviewers could obtain useful information about the amount and distribution of disease, circumstances of injury, loss of

time from work, and medical care utilization.<sup>7</sup> The Committee on the Costs of Medical Care conducted health surveys during 1928-31. Prior to World War II, by far the largest survey devoted to gathering comprehensive illness statistics for the nation was a health survey in 1935-36 where interviewers visited 737,000 urban households. They inquired about which household members had experienced disabling illness and which had specific chronic diseases or impairments.<sup>7</sup>

World War II provided the largest experience in history with health status assessment. Over the centuries health status assessment has been used repeatedly in selecting people for military service that requires both physical and mental fitness. A physician or nurse can assess physical fitness with various performance tests and a traditional physical examination. Mental fitness is harder to assess. During World War II psychiatrists screened inductees in the US. However, psychiatrists were in short supply, and Star and co-workers developed the Neuropsychiatric Screening Adjunct (NSA).<sup>8</sup> Although the NSA was never used as a definitive screener, it was administered to over 100,000 potential inductees and the results were compared to the psychiatrists' determinations providing a large body of empirical data on paper and pencil health status assessment.

In the United Kingdom, a Survey of Sickness was initiated during World War II to monitor the health status of a population subjected to wartime scarcity and stress. The survey was conducted from 1943 to 1952 and represented the first attempt to supplement mortality data by collecting annual morbidity data representative of a national population. Moreover, the Survey demonstrated the feasibility of collecting morbidity data regularly.<sup>7</sup>

The end of World War II freed up resources and unleashed pent-up demand for improved living standards. Consumers wanted better food, housing, and medical care. Prior to the war, medical research was funded largely by private foundations. In 1938, the Public Health Service's research budget was only \$2.8 million. In 1950, the National Institutes of Health's research budget was \$28 million, and it more than doubled to \$60 million in 1955.<sup>9</sup> Another key postwar development occurred in 1948 when the World Health Organization (WHO) included the following definition of health in its constitution: "Health is a state of

complete physical, mental and social well being and not merely the absence of disease or infirmity."<sup>10</sup> This definition has been the framework behind many health status assessment efforts.

Two events in the 1950s were particularly important for health status assessment. Recognizing that healthy people are the nation's greatest resource, Congress authorized the US National Health Survey (NHS) in 1956.<sup>7</sup> The goal of the Survey was to produce statistics on disease, injury, impairment, disability, and related topics on a uniform and continuing basis for the Nation. The NHS is not a single survey with only one method and a fixed set of objectives. Rather, it is a program of surveys with evolving methods and objectives. A principle of all the surveys is that the data must refer to a representative population. Initially, there were three parts of the NHS: 1) the Health Interview Survey—a continuous nationwide sampling and interviewing of households, 2) the Health Examination Survey—a physical examination and testing of samples of individuals proceeding in a series of separate cycles, and 3) the Health Records Survey—another series of sample surveys of hospital, medical, dental, nursing, and other health care.<sup>7</sup>

The Health Interview Survey (now called the National Health Interview Survey [NHIS]) was officially launched on July 1, 1957 and data have been collected continuously since that time. In addition to data on specific diseases, disabilities, and activity limitations, the NHIS has an item that asks respondents to rate their overall health. From 1975-81 this question said, "Compared to other persons your age, would you say your health is excellent, good, fair, or poor?" In 1982, major changes were made in the question. The response option of "very good" was added and the phrase "Compared to other persons your age" was removed. Because of this critical conceptual change, comparison of trends in self-assessed health status across the period 1981-82 is inappropriate without major qualifications.<sup>11</sup>

The second noteworthy event occurred in 1959 when Lewis C. Robbins, MD, became Chief of Cancer Control in the Bureau of State Services in the US Public Health Service. Previously, Dr. Robbins had played a role in initiating the Framingham Study of coronary disease. That same year, Dr. Robbins and John Hanlon, MD, at the Department of Preventive Medicine at Temple University, drafted a "Health

Hazard Chart" based on the hypothesis that listing the health hazards of individuals is the first step in reducing premature death. To quantify the major causes of death, Robbins turned to Joseph Sadusk, Jr., MD, at the Department of Preventive Medicine at George Washington University. In 1966, Sadusk and Robbins presented a paper in a Symposium on Comprehensive Personal Health Programming in Practice.<sup>12</sup> Robbins was a steadfast proponent of incorporating health risk appraisal into routine outpatient practice.

### Health Hazard Appraisal

The 1966 paper led to a 1968 *JAMA* publication, "Proposal for Health Hazard Appraisal in Comprehensive Health Care."<sup>13</sup> In 1970 Robbins and cardiologist Jack Hall, MD, published *How to Practice Prospective Medicine*.<sup>14</sup> Their goal was to provide physicians with a practice model for primary prevention. Their rationale was that one of the most important roles of the family physician is to provide continuous and comprehensive medical care. Physicians needed a framework—Health Hazard Appraisal—for encouraging preventive practices in well patients. In the late 1970s, Health Hazard Appraisal was re-christened *Health Risk Appraisal* (HRA). More recently the Society of Prospective Medicine defined prospective medicine as, "A field of study aimed at anticipating likely future health status, it is based on the systematic assessment of past behavior, present lifestyle, and personal medical circumstance, and it promotes strategies designed to help people maintain or improve their health status and quality of life."<sup>15</sup>

From the beginning, the emphasis in HRA was preventing premature mortality. Certainly this was a worthy goal as accidents, heart disease, and cancer exacted a heavy toll on many people in the prime of life. Yet to achieve reductions in premature deaths, actual changes in behavior or lifestyle are required. Thus, while the overall goal of HRA was reduced mortality, the proximal goal was getting the attention of individuals and inducing behavior change. Many HRA users and vendors did not recognize this important interim goal, contributing to the lack of impact of HRA. To be sure, behaviors—especially habits and addictions—are hard to change, the rewards are delayed for many years, and reimbursement for these interventions is stingy at best. Seatbelt laws,

cigarette taxes, and advertising prohibitions have probably influenced patients' behavior more than all the HRA exhortations from clinicians.

Robbins' vision was that HRA would be a prominent part of primary care that is continuous and comprehensive by definition. Ideally, family physicians would have intimate knowledge of a patient's history, prognostic characteristics, and habits that would point to the patient's risks and the means to reduce them. In actuality, time is the physician's most precious resource. In today's managed care environment with its emphasis on patient throughput, there is little time for counseling and the personal touch needed to influence behavior, especially habits such as smoking or dietary excess. In addition, many physicians are not oriented to prevention. Most of their training occurs in acute care settings and is focused on disease and treatment. Finally, it is difficult to be excited about things that *don't* happen.

The Society of Prospective Medicine has championed HRA for over 30 years. It has held 34 annual meetings, and proceedings have been published for each meeting starting with the 10th. The *SPM Handbook of Health Risk Appraisals*, Third Edition (Revised) listed 28 providers of HRA instruments.<sup>16</sup> It is impossible to estimate the number of HRAs that are performed annually, but HRA is a standard procedure for any organized health promotion program and is growing in popularity in health maintenance organizations. Unfortunately, HRA is not a prominent part of primary care for reasons cited previously. However, linking HRA and health status assessment (HSA) by combining widely accepted and replicable standard scoring with an educational feedback loop to the individual and healthcare provider makes eminent sense and will hopefully be adopted more widely.

### Health Status Assessment

Health status assessment complements and extends health risk appraisal. The WHO definition of health led to a slow transition from emphasis on mortality and organ function to broader measures of human function and overall health. One of the first of the new generation of health status measures was the Karnofsky Scale, originally developed for patients with cancer in the mid to late 1940s.<sup>17</sup> The Karnofsky Scale relied on clinician reports whereas most of the newer health status assessments use patient self-report, echoing Feinstein's sentiments quoted earlier.

Notwithstanding the difference in observation source, the scale was not used widely due in large part to continuing reliance on "hard" clinical measures such as tumor size.

In the 1960s, the California State Department of Health established a Human Population Laboratory (HPL). The HPL did pioneering work in developing measures of mental, physical, and social health.<sup>18</sup> The Alameda County Study, launched in 1965, examined the relationship between physical health status and health practices such as sleep, weight control, exercise, alcohol consumption, and smoking. After 9.5 years, all of these practices were significantly related to physical health status in survivors of the 1965 cohort.<sup>19</sup> One particularly important methodological finding was that respondents would complete long surveys by mail.<sup>20</sup>

The 1970s saw the development of a number of new scales including the Quality of Well-Being Scale (QWB),<sup>20</sup> the Sickness Impact Profile (SIP),<sup>21</sup> and the McMaster Health Index Questionnaire (MHIQ).<sup>22</sup> Each of these instruments addressed different measurement objectives. The QWB was intended for priority setting and program evaluation, the SIP for health care evaluation, and the MHIQ for clinical and health services research. All of these measures were quite lengthy and not well suited for use in the clinical setting.

Despite the work of the Committee On the Costs of Medical Care and other efforts over the years, medical care costs rose at rates considerably above overall inflation. Moreover, in the early 1970s the wisdom of a national or universal health insurance plan was actively debated. Proponents of universal coverage pointed to the number of uninsured, while opponents were concerned about increased demand, costs, and "unnecessary" care. To address these issues, a Health Insurance Experiment (HIE) was conducted from 1974 to 1982.

The principal objective of the HIE was to assess the consequences of alternative cost-sharing levels on both cost and health outcomes.<sup>23</sup> When the experiment began, health status measures were primitive, so another objective was to develop better techniques for measuring health outcomes in a general population.

Even though psychometric methods of scale construction had been available since the 1920s, most health measures used before 1970 did not incorporate these techniques. In addition, the earlier measures

focused on the presence or absence of negative health status, functional limitations, disease symptoms, and acute and chronic conditions. The HIE was one of the most extensive applications of psychometric theory and methods to the development and refinement of health status surveys. The goal of the HIE health status measurement effort was to develop the best possible scales for measuring functioning and well being for non-aged adults (under 65) and children.

In the HIE, separate measures of health were constructed for adults and children. In addition, health was viewed as a multidimensional concept and there was no attempt to construct a measure that would yield one number representing an individual's overall health status. The adult measures were grouped into five categories: 1) general health, including physical, mental, and social health and the General Health Index (GHI), a measure of health perceptions; 2) physiologic health (presence and effect of various chronic diseases); 3) prevalence of symptoms and disability days; 4) health habits; and 5) risk of dying.

The HIE measured both physiologic and perceived health in children. The physiologic measures consisted of data related to five conditions that were readily detectable, prevalent, amenable to medical treatment, and have important adverse effects if untreated: anemia, hay fever, visual acuity, hearing loss, and fluid in the middle ear. The health perceptions component included parental worry about the physiologic conditions, role limitations, mental health, and general health.

The HIE was a multi-million-dollar effort, but it was not the only health status measurement activity in the 1970s. The Nottingham Health Profile with 38 items and six summary scales was developed for use in population surveys.<sup>24</sup> The Duke Health Profile was developed for use in primary care and contained 63 items profiling four health concepts.<sup>25</sup> Two noteworthy HSA developments in the 1980s included the Dartmouth COOP Charts<sup>26</sup> and the Medical Outcomes Study instruments.<sup>27</sup> The Dartmouth COOP Charts, which contain only nine items and provide visual depictions of health conditions, are easy to administer and score, an advantage obtained at the expense of decreased precision.

The Medical Outcomes Study (MOS) is a quasi-experimental study of variations in physician practice styles and patient outcomes in different health

care delivery systems. The MOS built on the HIE and dealt with two methodological questions. First, can health assessment techniques used in the HIE be used in sicker and older groups?<sup>27</sup> Second, can more efficient health assessment scales be constructed? Although the MOS is ongoing, both questions are being answered in the affirmative. The MOS is the first large-scale study in which patients with different medical and behavioral conditions completed the same measures of functioning and well-being. The popular SF-36 Health Survey was developed for the MOS and measures eight health concepts with 36 items.<sup>28</sup>

In 1988, Ellwood challenged medicine to develop a "technology of patient experience" for systematically evaluating and improving care.<sup>29</sup> Ellwood's vision included assembling large data-bases that could be used to assess diagnostic and therapeutic interventions and provide decision support in the exam room. One major difficulty in achieving this vision is lack of measurement precision for individual patients. Short instruments are needed to reduce response burden, but their precision is also reduced. Although there are clinicians who have found tools such as the SF-36 useful in working with individual patients,<sup>30</sup> most of the applications have been at the group level. Methods that increase precision without increasing response burden are needed.

To achieve this goal, an approach using computerized adaptive testing and item response theory is advocated.<sup>31,32</sup> In this paradigm an algorithm selects the next question based on the score calculated from previous answers. Questions are taken from a calibrated item pool, and the desired confidence interval is specified in advance—more responses are needed to reduce the confidence interval. The initial score is estimated using demographic data, previous results, or a guess. For instance, if the respondent is 20 years old, then the first physical function item should involve the most difficult task—vigorous activity—unless previous information indicates the person has a limitation. Item response based instruments will definitely produce smaller confidence intervals, but McHorney estimates that three to eight years will be needed to develop useful tools based on item response theory.<sup>31</sup> Bjorner and Ware, however, anticipate a prototype will be available in 1999.<sup>32</sup>

Stewart and Ware list four pressing applications for HSA:<sup>27</sup>

1. Health monitoring in the general population
2. Health care policy studies to evaluate alternatives for organizing and financing health care services
3. Clinical trials of new interventions and technology
4. Clinical decision-making in medical practice

Population health monitoring requires the least precision and can use a number of instruments. The NCHS has considered various measures but has yet to use more than the single health status question in the NHIS. Increasing levels of precision are needed for the other uses. Although there is every reason to believe that precision will improve in the future, there are significant obstacles to surmount for the advancement of HSA.

### Issues in Health Status Assessment

A discussion of HSA must begin with reliability and validity—the most important concerns for measures of health status. Users must recognize that all measures have inherent error. Indeed, quality improvement expert W.E. Deming stated, "There is no true value of anything."<sup>33</sup> That does not mean we should be "measurement nihilists," rather, HSA users must be aware of the characteristics of the measures. In terms of reliability, the goal is to recognize the nature and amount of error. Some thoughts on validity were mentioned in the introduction; detailed discussion of these concepts is beyond the scope of this chapter, but one conclusion is apparent: there is no single universally applicable HSA instrument.

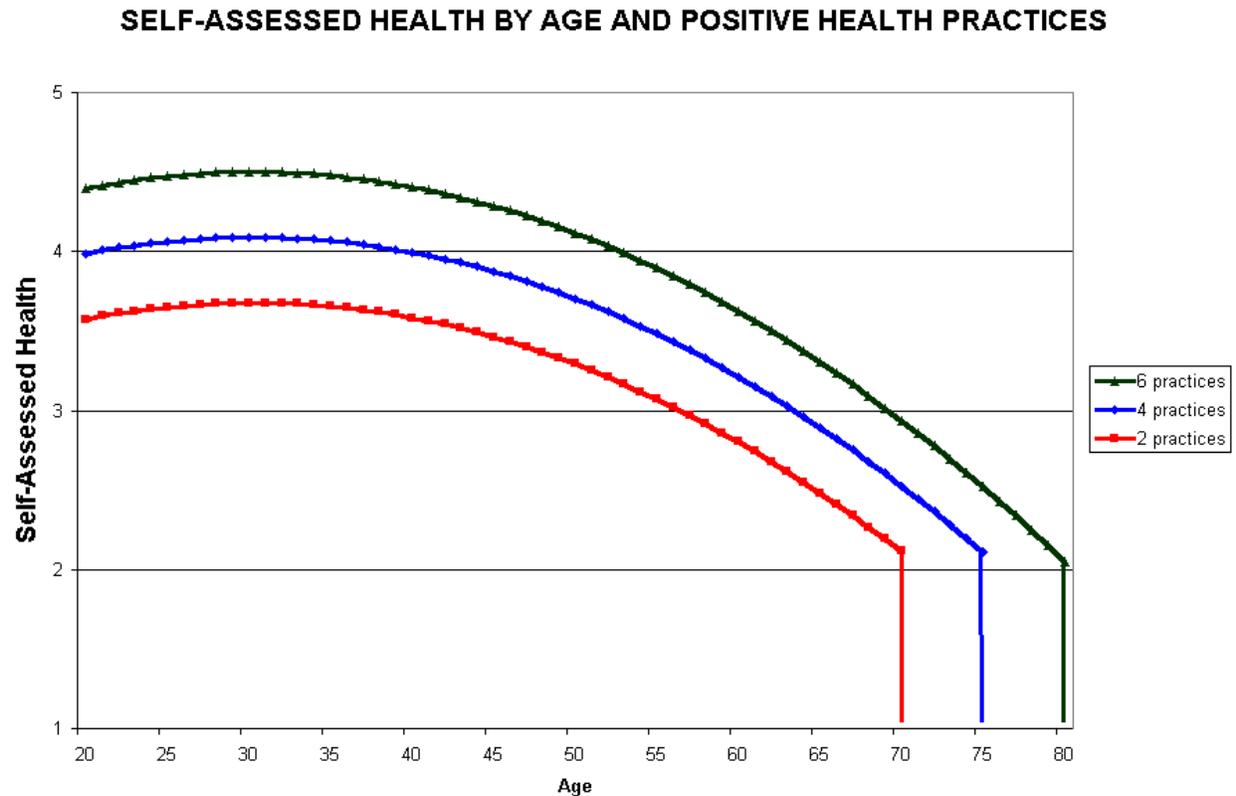
One of the biggest HSA debates involves generic versus condition-specific health measures. It is increasingly clear that both are important; the goals of the situation should dictate the type of measure used. If high-level control of resource allocation is the goal, then generic measures are most useful. Conversely, if one is interested in the best intervention(s) for a defined condition, then condition-specific measures are more appropriate. However, if the results of treatments for different conditions are being compared, then generic measures are required. Many studies and outcomes activities utilize both types of measures concurrently.

Just as HRA is intended for use by primary care clinicians in working with patients to reduce their mortality risks, HSA could play a similar role in pointing the way to improved health for patients. However, some of the shortcomings mentioned previously need to be overcome. Specifically, ceiling

and floor effects and the wide confidence intervals for individual measures need to be reduced. Computerized adaptive testing and item response theory promise to remove much of the imprecision. HSA today can be compared to X-ray imaging in the 1940s. Roentgen discovered X-rays in 1895. Yet 1940s technology had nowhere near the resolution available today. In just the past 20 years, new imaging modalities have been developed based on both X-ray (CAT scan) and non X-ray modes (MRI). There is every reason to believe that rapid improvements will occur in the near future providing much more accurate HSA tools. These improved tools will be a boon to clinicians working with individual patients and also assist in broader health policy arenas.

Clinicians also need better ways to communicate HRA and HSA findings to patients. The original HRA results consisted of forms or computer printouts that had no eye appeal. Most vendors now use graphs and color, but there is tremendous room for improvement. Countless dollars have been spent on determining the effect of various factors on longevity, but virtually nothing has been spent on finding the best ways to communicate results. One thing does seem to be true—one size does not fit all. Just as different HSA instruments are needed to understand the nuances of health for people with different conditions, different feedback modalities need to be assessed. For instance, some people like graphs and some do not. In this regard it is important to remember that the goal is not to convey knowledge but to influence behavior.

HRA deals only with life expectancy and is one-dimensional. HSA is also one-dimensional in measuring health status. Combining HRA and HSA yields two dimensions as illustrated in Figure 1. Using data from the National Survey of Personal Health Practices and Consequences,<sup>34</sup> it is possible to estimate the effects of positive health practices (eating breakfast, favorable body weight, exercise, adequate sleep, not smoking, and prudent alcohol use) identified in the Alameda County studies<sup>19</sup> on life expectancy and self-assessed health. The figure indicates that six positive health practices increase life expectancy by about 15% over that with only two positive practices. However, if both dimensions are considered, then the area under the six practice curve is about 40% greater (in the figure, 5 is excellent self-assessed health and 1 is poor self-assessed health). The important point is



**Figure 1**

that people not only live longer, but they feel better throughout their lives. Simple graphs such as Figure 1 may be a way to promote better health practices.

Medical care costs are a direct function of clinical decision-making in medical practice. There is ample evidence that clinical decision-making is extremely variable and can be improved.<sup>2</sup> Just as Robbins' original vision was to use HRA in advising individual patients, some have tried to use HSA at the point of care. The results have been mixed. Street and co-workers found no benefit in using the SF-36 with prenatal patients.<sup>35</sup> However, the physicians in Street's study received little training in using the instrument. Meyer<sup>30</sup> and Rubenstein<sup>36</sup> have reported more favorable

results. More research is needed to determine the best ways to use HSA in patient care. One factor is clear: adding HSA at the point of care involves trade-offs. Many visits will be longer, particularly because more

psychosocial issues are detected. Since these are the roots of many problems in primary care, it makes sense to deal with them. Yet existing reimbursement and provider payment systems emphasize "production" of visits instead of patients' health. In today's system, three ten-minute visits are valued more than one 30-minute visit even though the latter produces more health because the real problem is more likely to be uncovered and treated.

Cost is a major hurdle. Since 1960, health care's proportion of the gross domestic product in the United States has more than doubled.<sup>37</sup> Many observers question whether this increase in spending has led to commensurate increases in benefits. Without good measures of health status there is no way to assess the situation. Given limited resources, value-based purchasing in health care is the only rational possibility. Currently, cost-based purchasing is the norm in the absence of good measures of benefit.

Improved health status assessment will provide required information for the value equation. The goal is to provide the highest overall level of health in the population for a given level of expenditure. Using value as the criterion in health resource allocation (as opposed to tradition and "trust me, I'm a doctor") is controversial—"utopian" in some eyes<sup>38,39</sup>—but there is no feasible alternative.

The last issue is priorities. In the industrialized world, we buy doctor visits, hospital days, and medicines, not health. This is not a new development. In 1978 Williamson wrote, "Today, providers are paid for what they do, not for what they accomplish."<sup>40</sup> A year earlier Holtzman stated, "despite lip service, health may not be among our highest priorities."<sup>41</sup> At the same time Wildavsky offered this insight:

*According to the Great Equation, Medical Care equals Health. But the Great Equation is wrong. More available medical care does not equal better health.... No one is saying that medicine is good for nothing, only that it is not good for everything. Thus the marginal value of one—or one billion—dollars spent on medical care will be close to zero in improving health.*<sup>42</sup>

We need to ask, "What are our priorities?" If improved health is the goal, then our actions may be different than if provision of health services is the goal. Health is too important to be entrusted only to doctors and economic vagaries. Existing financial incentives need to be realigned to reward producing health.<sup>43,44</sup> For many years HSA instruments were inadequate for use in resource allocation. This is no longer the case, and now is the time to change incentives to reward producing health instead of health care.

### Conclusion

Forty years ago Dr. Lewis Robbins began to articulate his idea for health hazard appraisal to encourage preventive practices in well patients. At the same time, Congress authorized the National Health Survey to produce statistics on health in the United States. In the meantime, health care costs skyrocketed and medicine changed from a cottage to a corporate industry where dollars, not health, are the bottom line. As a result, patients are increasingly frustrated by a system where access and coverage decisions seem arbitrary. Some of the frustration is due to unreasonable expectations. It

is not possible to live carelessly and expect medical care to provide a rescue for every ill.

In a free society, each of us chooses our health practices. From the beginning, HRA proponents emphasized *informed* choice by individual patients. A strength of HRA has been the emphasis on consumer-oriented feedback to the respondent. However, there is no single widely accepted and validated standard for HRA scoring, and life expectancy is emphasized. For many people, the prospect of a two- or even five-year reduction in life expectancy 50 years hence is too remote to be meaningful. HSA provides a second dimension with its emphasis on function and well-being. HSA's strength is validated and standardized scoring, ensuring that results are consistent over time and across populations. But little attention has been focused on providing HSA results to individuals.

Now is the time to combine these approaches and give patients meaningful information that they can use to make informed choices. At the same time, these data can be used to evaluate the effectiveness of interventions and become the basis for more rational and fair resource allocation decisions. Educated and informed citizens are the foundation of a strong and healthy society. Judicious juxtaposition of HRA and HSA can lead to better lives for more people.

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