

Health Education and Prospective Medicine: Common Concerns and Shared Goals

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When Lewis C. Robbins, MD died of lymphoma in 1990 at the age of 80, he was at the forefront of what would become one of the most important public health issues of our time - the assessment and quantification of health risks. Robbins' career with the U.S. Public Health Service would take him to all 50 states and 23 countries. He compiled the first Surgeon General's Report on the effects of tobacco, which was published in *JAMA* in 1959. He collaborated in the planning of a longitudinal study of cardiovascular disease in the small town of Framingham, just west of Boston. He fought tuberculosis in Southeast Asia, and conducted feasibility studies of mammography, the Pap smear and flexible sigmoidoscopy. He even invented a gun safety lock. Robbins learned that at least 50 percent of premature morbidity and mortality, especially due to cancers and cardiovascular disease, could be attributed to modifiable behaviors and unhealthy lifestyles. He dedicated the last two decades of his life to the identification and quantification of disease risk factors and investigated ways of communicating their importance to individuals and groups. He was convinced that if patients were presented with a personalized profile of the precursors of diseases to which they were predisposed, the magnitude that each risk factor contributed to their premature mortality, and how these risks could be modified, they would more likely adopt behavior change strategies.

Robbins often relied on nautical analogies. He was fond of Sam Plimsoll's "load line" which was adopted by the British Admiralty as a means of preventing overburdened ships from leaving port thus putting crew and cargo at risk in heavy seas. The line was painted around the circumference of the hull. If the line disappeared below the water, it would clearly identify

a ship at risk. Robbins learned at Framingham- and while Chief of the USPHS Cancer Control Program- that multiple risk factors could have devastating logarithmic effects, that several "subclinical" risk factors could be as deadly as a single major precursor, and that the quantification of risk factors was essential if risk-reduction efforts were to be ultimately beneficial. His speeches were often punctuated with admonishments to stay on the safe side of the load line. He often likened the educated patient to a ship's captain, "Instead of trying to salvage a sinking ship once it has crashed, a good sea captain will change course when he sees danger ahead." Robbins' public health career mirrored the challenges that confronted the profession in the latter part of the 20th century. As he turned his attention from communicable diseases to cancers and cardiovascular disease, he became convinced that patients needed to become responsible and informed partners in their care and that medicine in general needed to evolve a more preventive orientation.

In an effort to influence healthy behavior change, Robbins developed a tool that he hoped would be used by physicians. He believed that the health hazard- now health risk- appraisal could facilitate effective communication between patients and their doctors. The health risk appraisal quantified an individual's risk factors utilizing both the physical examination performed by the physician, and an assessment of lifestyle factors contributed by the patient. Robbins and co-author Jack Hall, MD described their approach in their book: *How to Practice Prospective Medicine*, published in 1970.

It is not surprising that a physician would describe such a methodology as a form of medicine. What is ironic is the lack of interest that health risk appraisal generated among practicing physicians. However, the

potential that prospective medicine would influence likely consumers of medical services was not lost on insurers, public health agencies, voluntary health organizations, private corporations, and health educators.

The early health risk appraisals did not emerge from a specific theoretical model of health behavior. Actuarial data, epidemiological evidence, and medical opinion shaped the calculation of the risk equations used to generate personalized risk profiles.

With the advent of computerized assessments, hundreds of instruments were marketed varying greatly in cost, sophistication, methodology and ease of use. Early instruments relied on public domain, national databases such as the one developed at the Centers for Disease Control. Others generated their own databases compiled from the populations they served. Robbins may well have foreseen the rapid development of the tool, and the corresponding need for a professional organization that would develop guidelines for its ethical use while at the same time serving as a resource for its continued scientific development. Since 1965 the Society of Prospective Medicine has advanced the research, development and evaluation of prospective medicine tools and technologies. The Society has pursued its goals by conducting national conferences and professional seminars, publishing scientific literature, and establishing guidelines of ethical practice. The Society has defined contemporary prospective medicine as "a field of study aimed at anticipating the likely future health status of individuals and populations. Based on the systematic assessment of past behavior, present lifestyle and personal medical circumstance, it promotes strategies designed to help people maintain or improve their health and quality of life."

This definition seems entirely consistent with the often cited description of health education by Lawrence Green and Marshall Kreuter as, "...any combination of learning experiences designed to facilitate voluntary actions conducive to health." Indeed, Gordon DeFries and Cathy Crossland in 1994 described health risk appraisal as, "one of the most widely used forms of educational intervention for the purpose of motivating health behavior change among people at high risk of mortality from one of a number of the so-called lifestyle diseases of our modern era."

The goals of prospective medicine and its principal tool, the health risk appraisal, mirrors the priorities articulated in the proposed national health promotion and disease prevention objectives, "Healthy People

2010." Since most of the data used to generate the algorithms needed for estimating risk are derived from national mortality data, population studies and actuarial tables, the leading causes of death for all age groups are those for which behaviors and physical indicators are best known and quantified. Although the risk factors for selected cancers and cardiovascular disease are continually reevaluated; much has been learned regarding the role of tobacco use, inactivity, poor nutrition, stress and pharmacological noncompliance as contributing factors for these leading causes of death. Modification of the major risk factors are among those priorities adopted by leading organizations representing medicine, public health, insurance underwriters, managed care, government, and health education.

A major force sustaining interest in health risk appraisal has been private industry. The escalating costs of providing medical care benefits to employees has encouraged the development of strategies that have the potential to reduce unnecessary medical expenditures while simultaneously increasing healthy lifestyles among the insured. Most contemporary health risk appraisals have the capability of compiling "group profiles" that allow a company to estimate the overall health of its workforce and identify those behavioral or environmental challenges susceptible to organized interventions. The central question regarding prospective medicine technology remains; does it change behavior?

The literature supports the success of carefully planned, coordinated and comprehensive health education interventions in a variety of settings. We know that many variables interact with health promotion interventions including subjects' knowledge, beliefs, cultural influences, social and environmental factors, and willingness to change their behaviors. Studies have shown that risk appraisals alone are unlikely to facilitate long-term healthy behavior change. However, as a part of a comprehensive health promotion intervention, the health risk appraisal may be an important means of enhancing the educational experience, while providing the health educator with a means of measuring the effectiveness of the overall program.

Significant challenges remain for the users and developers of prospective medicine technologies. While the health risk appraisal did not evolve from a model of health behavior, developers are utilizing contemporary behavioral theories in the construction of educational and reinforcement materials generated by appraisal tools. A number of appraisals have been developed that

tailor messages based on a progression of users' responses to behavioral inventories. Stages of receptivity to behavior change have been incorporated in some instruments while others measure self-efficacy, locus-of-control and perceived susceptibility. Disease specific instruments such as the National Cancer Institutes' breast cancer tool allow both practitioners and potential patients an opportunity to explore risk reduction options. Personalized profiles are provided by most health-oriented websites and are a major feature of health promotion textbooks, magazines, books and articles for the lay public. A proliferation of home clinical testing kits allows appraisal users the option of adding important physical measures to the risk calculations. The implications of the Human Genome Project for the comprehensive risk assessment of individuals and groups will be profound. It is likely that our technological expertise in this area will far outpace a full appreciation of its consequences.

When Robbins and Hall published their methods in 1970, only a few of the major causes of death had known risk factors that could be reliably quantified. As we learn more about these, other causes of mortality, risk factors (both modifiable and unalterable), health risk appraisals will become more comprehensive accounting for an even greater proportion of the total variability in mortality and morbidity risk. Developers of risk appraisals must ensure that their science is sound and their assessments valid. It is not helpful to ignore confounding variables or arbitrarily generate levels of risk for factors that reveal little evidence supporting a quantifiable relationship with an undesirable outcome. Educational messages that accompany personal profiles need to be constructed that are consistent with the highest ethical and scientific principles of contemporary health education practice. The active participation of formally trained health educators in the development, use and evaluation of prospective medicine tools is essential if the technology is to realize its full potential.

In recent years the use of health status assessments and quality-of-life inventories have proliferated as well. Their history is similar to that of health risk appraisals especially in that their use solicits personal histories, lifestyle preferences, opinions and commentaries from individuals currently receiving (or likely to receive) medical care. The results of these analyses allow medical practitioners and health care planners to predict likely outcomes, highlight favorable therapies, monitor disease progression and determine the success of treatment options from the patient's perspective. Future health risk appraisal research will likely utilize these

measures to assess the overall impact of comprehensive educational and motivational interventions associated with prospective medicine technologies.

While the future appears favorable for the continued development and use of health risk appraisals in a variety of forms, the challenge facing prospective medicine in particular, and health education in general seems rooted in the inexplicable lack of resource allocation for prevention oriented programs and risk-reduction behavioral research. Regardless of terminology: health education, prospective medicine, health promotion or preventive medicine, the goals and objectives are complimentary. Collaboration is essential and the methods must be interdisciplinary if those engaged in health promotion are to succeed in an environment that is oriented toward crisis care and disease management. Robbins would surely be pleased by the technological advances in risk prognostication made in the last decade, and by the many professionals from diverse disciplines who have collaborated on effective ways to improve quality-of-life and health status. As a scientist, he would continue to build on an already impressive body of evidence that prevention is a cost-effective means of reducing premature injury, disability and mortality.

As a futurist, Robbins would chart a course for prospective medicine that is dynamic, multidisciplinary, and scientifically rigorous.

References

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