Reforming the United States Health Care System:
Implementing an Effective Approach to Chronic Disease

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The Challenge

It is widely acknowledged that the future of the United States health care system is challenged with the rising prevalence of chronic disease (1). The cost of health care per capita is increasing, but there is evidence that children born today will have on average a shorter life expectancy than their parents due to the rising incidence and subsequent burden of chronic disease (2). Thus, the United States health care system is facing a looming crisis. Medicine is in need of a new form of clinical education for physicians as well as an alteration in the health care delivery system that provides more effective preventive care and chronic disease management (3).

Disease Diagnosis versus Early Assessment

The origin of the problem lies in part with the emphasis on disease diagnosis and treatment. This coupled with the absence of an effective system that assesses and intervenes at an early state of illness before the onset of a disease has resulted in the increasing application of ever more expensive intervention and hospitalization (4). Presently the majority of the financial incentives in the health care system are focused on disease diagnosis and treatment by specialists. This translates into less than 10% of students in United States medical schools presently planning on going into the primary component of the health care system for the prevention and management of chronic disease: family practice.

What is Missing

The United States health care system is a very effective provider of hospital-based, specialty disease care, but is not as effective in providing intervention related to the prevention of disease. In 1983 Lewis Thomas, M.D. and past editor of the *New England of Medicine* authored a book entitled "*The Youngest Science"* in which he described how medicine was evolving from a descriptive science where disease diagnosis was the most important feature of medicine to a predictive science based upon the understanding of the etiology of disease. He predicted that by the start of the 21st century the biomedical sciences would have discovered enough about the origin of chronic disease to treat the early cause of the disease, and not just its late state effects (5). His prediction has proven to be largely correct. Over the past thirty years the underlying physiological dysfunctions that give rise to later disease have been discovered. We are witnessing the transition in medical thinking from that which is *reactive* (i.e. pathology-based) to that which is *proactive* (i.e. prognostic-based) based on the understanding of the early alterations in physiological function (6). The emerging understanding of the origin of chronic diseases is that they result from a complex interaction between the genetic uniqueness of the individual with their lifestyle and environment (7). Chronic disease is therefore the result of an alteration in physiological function in the individual that reflects the translation of

genetic susceptibilities through the exposure to specific lifestyle and environmental factors (8).

Functional Prospective Medicine

The present debate surrounding health care reform has focused heavily on universal access to health care and the institutional and financial implications of this objective. These are important objectives, but absent in this dialog has been a discussion concerning the type of health care that will be provided. A continued dominant focus on access to disease treatment in the absence of an equally serious discussion as to how lifestyle medicine will be effectively implemented in medicine to improve physiological function will result in a continued perpetuation of the costly disease intervention focused model.

Synderman and Hood have termed the medicine focused on improving the functional health of the individual as “Prospective Medicine” which has the four characteristics of personalized, predictive, preventive and participatory (9,10,11,12). This medical approach is built upon the emergent science of systems biology which focuses on the underlying functional disturbances in physiology at an early stage in its development prior to the onset of severe pathology (13).

Improved Clinical Outcome with Functional Predictive Medicine

A clinical example of the application of this type of medicine comes from a patient at the Functional Medicine Research Center in Gig Harbor, Washington which I oversee. John H was a 53 year old who has type 2 diabetes. He also has early stage cardiac disease. He was being seen by three different medical specialists each of which was treating under accepted standards of practice one aspect of his complex chronic disease presentation. His diabetes was being managed through the use of insulin injections and insulin stimulating medications, his elevated cholesterol and triglycerides were being managed by another physician with the administration of a statin and fibrate medication, and his hypertension and erectile dysfunction was being managed by a third physician with an angiotensin converting enzyme inhibitor and nitric oxide modulating medications. When he presented to our clinic he was still feeling poorly and his disease indicators were still significant. Using a systems biology, functional approach to his condition the underlying antecedents and lifestyle/environmental factors that underlie his diseases were identified. Using this patient-focused rather than disease-focused approach he was then given a treatment program that fulfills the criteria of personalized, predictive, preventive and participatory. His outcome on this program over twelve weeks was outstanding with an improvement in all his disease indicators, and a concomitant reduction or elimination of all the medications that he was initially taking.

This is a representative example of the type of outcome that can be achieved through the effective application of a systems biology-based intervention program. This is but one of countless hundreds of clinical outcome examples that have been achieved in patients with a variety of chronic diseases through the application of a functional prospective medicine approach.

The cost-effectiveness of this program is enhanced by the use of health extenders in its clinical application. A physician's time is a limited resource. Improvement in both patient outcome and a reduction in the cost of the delivery of a prospective, functional medicine approach to chronic disease have been achieved by the use of health care extenders such as nurses, dietitians, physician assistants and certified lifestyle educators. The use of such resources within the health care team has been demonstrated to improve compliance and personalization of the program to the patient's needs (14).

Recently, Elias Zerhouni, M.D. described in an article in the *New England Journal of Medicine* the importance of translating the latest in biomedical research progress into clinical practice to improve patient outcomes (15). He stated that it is "time for a new vision". This concept is applicable for both the management of chronic as well as acute diseases. The *Textbook of Functional Medicine* describes a successful way of introducing systems biology thinking and prospective medicine into clinical practice for the management of complex chronic diseases (16). In a recent article in the *New England Journal of Medicine* AL Barabasi indicated that the future of medicine will be in the implementation of a system that incorporates the understanding that disease arises from a complex alteration in the physiological network that connects genetic uniqueness to environmental and social factors (17). The Institute for Functional Medicine has been providing continuing medical education courses surrounding the concept of a patient-centered, systems biology approach to the management of chronic disease since 1991. There are presently more than 10,000 physicians who have attended the Institute for Functional Medicine courses, and are utilizing aspects of this patient-centered, prospective approach to health care for the successful management of their patients.

The Tools We Need Are Available Now

We are standing at the frontier of a new medicine based upon the recent biomedical discoveries of the origin of chronic diseases, and the recognition that they are rooted in the gene-environment interaction. This new medicine is systems biology rather than disease focused (18). It is a medicine that takes its lead from the understanding of the human disease network that connects the individual's genetic uniqueness with their lifestyle, environment and social network (19). It redefines chronic disease as a functional alteration in the physiological network that requires a system approach to clinical intervention to improve both the safety and effectiveness of therapy (20,21).

We have the tools to create a more effective health care delivery system today. We need to seriously address how to implement a nationwide clinical training program in prospective, functional medicine. We need to develop reimbursement procedures for prospective, functional interventions that provide support for assessment, patient education, and therapy. We need to harness the talents and expertise of health care extenders to provide patient services in the delivery of a personalized, predictive, preventive and participatory medicine for the reduction in the burden of chronic disease.

The tools we need are available, the effectiveness of the approach has been demonstrated through the successful clinical application of this model by thousands of health care providers over the past fifteen years, and the development of many of the clinical

biomarkers for the functional assessment of patients has been accomplished (22). What is now needed is a fundamental paradigm shift in the way regulators, overseers of institutional medicine, and third party payers think about the origin of chronic disease from a systems biology, functional perspective (23).

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