Chronic Care Education in Medical School
A Focus on Functional Health and Quality of Life

ABSTRACT

The healthcare system is faced with a rapidly increasing number of individuals with chronic conditions and disabilities. The need for a chronic care model of health care with interdisciplinary treatment involving the patient and family with a focus on functional health is recognized but not fully established in the medical community. The education of medical students in a chronic care model is essential so that physicians in all specialties may provide effective and efficient care to their patients. Physiatrists and physicians trained in the specialty of Physical Medicine and Rehabilitation are uniquely situated to be leaders in the education of medical students in the appropriate care for individuals with chronic conditions and disabilities. Academic physiatrists must be involved in the education of medical students. This involvement will result in a higher level of patient care for all patients with chronic conditions and disabilities. In 2007, the Association of Academic Physiatrists formed a task force to evaluate educational models and make recommendations regarding the education of medical students in the management of individuals with chronic conditions and disabilities. The task force also evaluated opportunities for physiatrists to participate in the education of medical students. This article summarizes the work of the task force.

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ongoing physical/structural impairments. Although the report focuses on chronic diseases, such as diabetes, heart disease, and persistent communicable diseases, it recognizes that chronic conditions encompass a wide array of conditions, including injuries caused by trauma. The report discusses the large impact chronic conditions will have on the healthcare system and states that “by the year 2020, chronic conditions, including injuries (e.g., transport injuries that result in persistent disability) and mental disorders, will be responsible for 78% of the global disease burden in developing countries.”

Chronic conditions often but not always result in disabilities. In the International Classification of Functioning, Disability and Health, the World Health Organization defines disability in the context of a biopsychosocial model that incorporates function at the level of the body or body part, the person, and the person in a social context. In this model, disability includes conditions that result in impairments, activity limitations, and participation restrictions. This model states that impairments “are problems in body function or structure such as a significant deviation or loss”; an activity “is the execution of a task or action by an individual”; and participation is “involvement in a life situation.”

There is overlap of chronic conditions and disability such that a chronic condition may be present for years before any disability related to the condition is evident, or the onset of a chronic condition and disability may occur simultaneously. For example, diabetes is a chronic condition that may be managed for years without causing any disability but may eventually result in disability as a result of amputation, renal failure, or vision changes. On the other hand, in the case of a traumatic injury, the onset of a chronic condition and disability occurs at the same time.

It is estimated that there are currently 40–50 million individuals in the United States with a disability, representing at least 13% of the population. This number will continue to increase with the aging of the baby boom generation. In addition, the number of people older than 65 yrs will increase to almost 20% of the population in 2030, an increase from 12% in 2000. Because approximately 40% of individuals older than 65 yrs have a disability, this aging of the population will add millions of individuals with disabilities to the population of the United States. Causes of disability in older adults include cardiovascular problems, dementia, arthritis, other musculoskeletal disorders, diabetes, pulmonary, and vision/hearing problems. Traumatic injuries such as brain injuries and fractures caused by falls are less common but often result in a sudden change in functional status leading to decreased functional abilities and an abrupt change in the ability to live independently. The evaluation of an individual with an acute change in medical status should include a complete functional history to determine their previous functional abilities at home and in the community. It is also important to understand the impact and contribution of chronic conditions (i.e., dementia and arthritis) when there is an acute change in function caused by a stroke or traumatic injury and to take this into account in the determination of the long-term treatment plan.

The number of individuals with a disability will also increase due to improvements in medical care and treatment for chronic conditions and injuries that cause disabilities. These advances in medical treatments will extend the number of years that individuals will live with a disability. To optimize long-term function, these individuals need ongoing medical treatments focused on the disability that are provided by a coordinated treatment team focused on improving function and quality of life. Appropriate medical treatment is also important to prevent and treat secondary conditions that occur with disability and particularly as people age with disabilities.

Although disability is common in older adults, it is not just a condition of older age. It is estimated that 4.8 million children in the United States aged 0–17 yrs have a disability. In children, common causes of disability are developmental or cognitive issues but also include traumatic injuries. Children with disabilities often lose continuity of medical care during the transition from pediatric to adult medical care, resulting in less than optimal medical care. It is frequently challenging for young adults with disabilities to establish adequate medical care and treatment with providers who care for adults and who understand the problems related to the disability.

Although the causes of disabilities include a wide range of chronic conditions, psychological issues are an important cause that must be considered. Mental illness is the second most common cause of disability resulting in activity limitation in adults. A World Health Organization study revealed high levels of disability in persons with mental disorders compared with physical disorders. Therefore, when addressing the needs of persons with chronic conditions and disabilities, it is imperative that the identification and management of psychological issues and mental disorders are addressed.

The optimal medical care provided to individuals with chronic conditions and disabilities differs from the care provided to those with acute medical issues in a number of significant ways. For example, although the primary goal of treatment for acute problems is a cure, the goals of treatment for chronic conditions include improving function or slowing the rate of functional decline, reducing...
morbidity, managing the symptoms of the condition, improving quality of life, and helping the patient and family cope with the impact of the condition. These goals often change over time as the chronic condition or the patient’s circumstances change. Given the chronicity of the condition and the fact that patients have intimate personal experience managing their condition, it is vital that patients and their families or caretakers play an integral role in decision making and the development of treatment plans that take into consideration the patient’s contextual situation. This model is often quite different from the development of a treatment plan for an acute medical problem.

Physiatrists, specialists trained in Physical Medicine and Rehabilitation (PM&R), are uniquely situated given the focus of their training to care for individuals with disabilities with an emphasis on function and quality of life. In fact, individuals with disabilities often identify physiatrists as their primary physician. The long-term care of individuals with spinal cord injury, traumatic brain injury, stroke, multiple sclerosis, muscular dystrophy, amputations, musculoskeletal disorders, and many other conditions is often provided by physiatrists, along with a rehabilitation treatment team. However, given the number of individuals with chronic conditions and disabilities, nearly every physician in every specialty will care for individuals with chronic conditions and disabilities. It is imperative that all physicians are educated and trained to provide optimal care for these individuals. For example, individuals with chronic conditions such as diabetes, arthritis, heart disease, and pulmonary disease are routinely cared for by primary care physicians and specialists other than physiatrists. To provide the best treatment for these patients, these physicians must have an understanding of the issues related to the optimal management of individuals with chronic conditions.

**Recommendations for Chronic Care Education**

Many individuals have recognized the importance of educating medical students and other health professionals in issues related to the care of individuals with chronic conditions and disabilities. The provision of efficient and effective medical care for individuals with chronic conditions is also recognized as an important initiative to improve the quality of medical care.

The Institute of Medicine report, The Future of Disability in America, states that “health care professionals are not necessarily well informed about the primary health care needs of people with disabilities, the prevention and management of secondary health conditions, the challenges that adults face in aging with disabilities, and the transition of young people with disabilities from pediatric to adult services.” The report recommends the development of educational programs to “support health professionals in caring for people with disabilities.” The report goes on to recommend “strengthening education in chronic illness and disability management in curriculum for health care professionals, including education on specific topics of secondary conditions and aging with disability.” This report does not specifically comment on medical student education but does recommend the expansion of “chronic care education in pediatric and internal medicine residency programs” and the addition of “skills in the management of individuals with chronic health care needs to specialty board requirements.”

The effective and efficient treatment of chronic conditions is also recognized as important for the future sustainability of the United States healthcare system. In Redefining Health Care, Michael Porter states that approximately 75% of healthcare spending in the United States is spent on treating chronic conditions. Porter goes on to discuss the importance of coordinated care management for clinicians treating individuals with chronic conditions as part of an effective healthcare system.

The provision of comprehensive interdisciplinary care is also recognized as one means of improving quality of care. An Institute of Medicine report, Crossing the Quality Chasm, recognizes the impact of increasing numbers of individuals with chronic conditions on quality of care. The report discusses the lack of coordinated services for individuals with chronic conditions and states that medical care should be provided as part of an interdisciplinary team in collaboration with the patient. The report goes on to state that “the American healthcare system does not have well organized programs to provide the full complement of services needed for people with such chronic conditions as heart disease, cancer, diabetes, and asthma.” There is a shift in health care from acute management to chronic care, and healthcare professionals will spend an increasing amount of time caring for individuals with chronic conditions. Future clinicians will need to be trained to work in interdisciplinary teams in the model of chronic care delivery to provide optimal quality of care for their patients.

In the 1990s, Dr. Ed Wagner developed a Chronic Care Model to provide a conceptual framework for improving outcomes of individuals with chronic conditions. The model is based on four components: (1) self-management support to improve the ability of the patient and family to manage their chronic condition; (2) delivery system design including interdisciplinary team treatment.
and use of care managers; (3) decision support to improve the use of evidence-based practice; and (4) clinical information systems to provide data about individual patients or populations of patients.8,9

During the past several years, the Association of American Medical Colleges (AAMC) has used this Chronic Care Model as part of the Enhancing Education for Chronic Illness Care Initiative to improve the education of physicians in how best to care for individuals with chronic conditions. In 2005, the AAMC launched this program in collaboration with 10 academic medical centers across the United States to “undergo extensive redesign of their chronic care strategies and provider education.”10 The AAMC awarded grants in 2006 to these 10 academic medical centers “to redesign medical school curricula and residency training programs to incorporate a contemporary approach to understanding and treating chronic diseases.”11 These grants focus on improving the curriculum in undergraduate medical education and family medicine and internal medicine residency programs. One goal is that medical students will have exposure to principles of chronic care management in all years of medical school and will be able to follow patients with chronic conditions long-term during medical school. Another goal is to develop core competencies in chronic care management and to develop medical school curricula to teach students these competencies. Each of the 10 academic medical centers awarded one of these grants is currently working on developing and testing different curricula and strategies for incorporating chronic care teaching into medical school and residency education.12–14 In the near future, we anticipate program evaluation results from each of these 10 centers that may shed further light on the effectiveness of a variety of educational models of chronic care management.

Another recent effort to improve medical education in terms of chronic care management includes updating accreditation standards. The Liaison Committee on Medical Education establishes accreditation standards for education programs leading to the M.D. degree in the United States and Canada. The Liaison Committee on Medical Education is sponsored by the AAMC and the American Medical Association. In 2008, the standards were updated and included language regarding the education of chronic care principles. The standards state that “clinical instruction must cover all organ systems and include the important aspects of preventive, acute, chronic, continuing, rehabilitative, and end-of-life care.”15 This revised and updated standard highlights the importance and recognition of chronic care in the education of our future physicians. Instruction in chronic care is met in many ways by medical schools, including formal clerkship experiences in chronic care or as part of other clinical experiences in internal medicine or geriatrics. Only a small number of medical schools have a formal medical student clerkship focused on the treatment of individuals with chronic conditions.

**Model Chronic Care Curricula**

**Current Status Nationally**

In many medical schools, teaching content about the management of chronic conditions and disabilities is limited and not reinforced by patient care experiences. Knowledge about chronic conditions and disabilities is attained primarily through disparate lectures in the epidemiology, pathophysiology, and pharmacology of specific diseases during the preclinical years. During clinical rotations, much of the bedside teaching centers on diseasespecific management rather than on a holistic view of the biopsychosocial needs of the patient. Elective courses in geriatrics and rehabilitation are offered at some medical schools, but only a small minority makes them a requirement for all students. Physical diagnosis courses teach rudimentary skills in social history and almost never touch upon functional assessment.

Several authors have recommended chronic care competencies that should be covered in medical training.16–18 A recent survey of program directors also demonstrates that although there is agreement about certain competencies, there is considerable variation in how these are taught.19 Furthermore, a search of the literature reveals no “best practices guidelines” or published curricula for teaching students about the care of patients with chronic conditions and disabilities. The AAMC conducts an annual survey of medical school seniors on graduation.20 In the 2008 survey, 35.7% felt inadequately prepared in rehabilitative care, and 21.3% felt inadequately prepared in palliative care and pain management. Regarding the care of older adults, 18.4% felt inadequately prepared to assess fall risk or activity of daily living function. Only 19.1% reported having substantial contact with individuals with disabilities, and only 27.6% participated in a field experience with home care. The results of this survey highlight the need for additional and more systematic education of medical students regarding the treatment of individuals with chronic conditions and disabilities.

The Association of Academic Physiatrists Council of Medical Student Clerkship Directors conducted a survey of U.S. medical school PM&R departments in 2007, with 29 schools responding (personal communication, Mary Bryant, MD). All offered electives in PM&R. Of those, seven currently have required PM&R, musculoskeletal, or chronic care and disability clerkships. The clerk-
ships range in length from 1 to 4 wks. Six of the clerkships are of 2 wks or less duration, and four were integrated as part of a neuroscience rotation or musculoskeletal rotation. The Department of PM&R at the University of Colorado has, for example, developed a required third-year clerkship in Musculoskeletal Medicine by partnering with orthopedic surgery and rheumatology (personal communication, William Sullivan, MD). Although a Musculoskeletal Medicine clerkship will allow an opportunity for education regarding the principles of PM&R, depending on how it is structured, it may not have a focus on the management of chronic conditions and disability. Additionally, one school which previously had a required selective in rehabilitation has dropped this requirement as of 2007. At Northwestern University, there is a 1-week required clerkship at the Rehabilitation Institute of Chicago as part of the neurology core clerkship. The only longer required clerkship (4 wks) is at the University of Washington, where students in a required Chronic Care Clerkship select a primary focus of rehabilitation medicine, geriatrics, or palliative care (personal communication, Peter Esselman, MD). The University of Medicine and Dentistry of New Jersey also has a model curriculum in which elements of rehabilitation are woven throughout all 4 yrs of the curriculum, including a mandatory 2-wk clerkship (personal communication, Patrick Foye, MD). At The Johns Hopkins University School of Medicine, the curriculum committee has recently approved a required 4-wk advanced clerkship in Chronic Care and Disability, which encompasses a variety of clinical settings in the pediatric, adult, and geriatric populations.21

Opportunities in Education Programs

It is clear that medical schools have an obligation and a requirement to ensure that medical education includes teaching of chronic condition and disability management. This education should include the important aspects of chronic care management that are core principles in the specialty of PM&R. This includes education regarding team management with an interdisciplinary team; a focus on quality of life, including respect for individuals with disabilities; treatment across the continuum of care, including acute care, inpatient and outpatient care, subacute care, and skilled nursing facility; and the assessment and treatment of functional health with an emphasis on maximizing function at home and in the community.

Although the focus of treatment for many chronic conditions such as diabetes and cardiac disease will be on medical management, physiatrists provide a special perspective with respect to functional health in patient groups with disability and dependence. Healthcare providers managing individuals with chronic conditions and disabilities need to focus on disease management together with maintenance and improvement of functional health. In managing the care of a person with a chronic condition or disability, it is important to establish a baseline of functional health and then monitor for changes in function over time in response to treatment or with progression of the condition. Assessment of function includes the interaction of physical, emotional, and social factors concurrently which result in the potential loss of independence and need for a higher level care. This potential loss of function may be delayed or even avoided with appropriate intervention. Medical student education should include an awareness of the importance of the assessment of function, which may include use of the FIM™ instrument. This instrument is designed to measure function in performing personal care. Concurrently, it assesses the burden of care, approximating the number of minutes or hours another person must spend providing personal care assistance to a person with a disability to accomplish the activities of daily living. The concept of burden of care is important in the determination of the level of care necessary to care for an individual, be it in a hospital, rehabilitation, long-term care, or home setting. The FIM instrument contains 18 items, including motor function, daily activities, and cognitive items. The items are scored on a scale of 1–7, with a rating of 1 indicating total dependence for the activity to a score of 7, complete independence. Generally, a FIM score of 60 is equivalent to about 4 hrs per day of necessary personal care assistance, and a score of 80, 2 hrs of necessary personal care. Incorporating into medical education the measurement of function using a well established, valid instrument such as the FIM will increase the awareness of the importance of function in patient care and quality of life.22–24

There are many opportunities for the involvement of physiatrists in educational programs related to chronic care. Physiatrists should engage with medical school administration in implementing a strategy for meeting the requirements for the introduction of chronic care and disability management in the undergraduate medical curriculum. During curriculum review, if the medical school has a PM&R department, the chairperson should ensure that a physiatrist sits on the undergraduate medical curriculum committee to provide guidance on the importance of these educational programs as well as to provide content expertise. If the medical school has an established PM&R Department, then a physiatrist should be involved in the early (i.e., starting in the first year of medical school) undergraduate medical education as well as throughout the medical school training. As a con-
sequence of their training and experiences, physiatrists are in an ideal position to teach medical students important aspects of the treatment of individuals with chronic conditions and disabilities. This includes education on the biopsychosocial model of patient care, interdisciplinary treatment, the focus on function, and participation in the community for individuals with disabilities.

If the medical school does not have an established PM&R Department or Division, the Association of Academic Physiatrists could serve as a resource to the medical school administration and curriculum committee to promote the increase of the knowledge, skills, and attitudes of the medical students in chronic condition and disability management. Undergraduate curriculum in the treatment of chronic conditions and disabilities should be developed for every medical school with standardized core competencies. This curriculum may not be one course or clerkship but include principles that are part of many courses spanning the 4 yrs of medical school. Components of an undergraduate medical curriculum might include the following:

### Year 1

Students can learn functional assessment and evaluation as part of basic physical examination skills. Physiatrists can participate in the first year as part of teaching the musculoskeletal examination and clinical correlations in basic science courses, such as anatomy.

### Year 2

Patient cases that include scenarios of individuals with disability can be used in problem-based learning curriculum. For example, a problem-based learning case of a patient admitted with an aortic aneurysm that resulted in paraplegia can be used to teach diagnosis of abdominal pain, cardiovascular disease, and anatomy of spinal cord/blood supply and functional consequences of paraplegia.

Physiatrists should be resources to the development of standardized patients throughout medical school. This can include participation in the development of the standardized patient case and the training of the standardized patient. The use of standardized patients with a disability cannot only teach students medical skills but also teach the concepts used in the management of individuals with chronic conditions and disabilities.

Beginning in year 2 of medical school and throughout years 3 and 4, medical students should learn the importance of working in interdisciplinary teams. This should include practical experience with physician role models who are comfortable working in teams and leading treatment teams. Physiatrists have a long history and expertise in working as part of an interdisciplinary team and often serve as the team leader. Physiatrists are uniquely qualified to develop a curriculum regarding interdisciplinary team training.

**Year 3 and 4**

A clinical clerkship in chronic care and disability can be primarily a PM&R clerkship or be combined with other areas (pain, palliative care, and geriatrics). A clerkship can be organized in several different ways but could provide an experience across the continuum of care, including postacute care in the community, subacute facility, and skilled nursing facility or assisted living. This clerkship presents an opportunity for education regarding chronic conditions and disabilities and the importance of function and quality of life.

Ideally, a physiatrist should have a key role in the development of this curriculum given the unique expertise and experience of physiatrists in the care of persons with chronic conditions and disabilities.

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