Interprofessional care has been promoted by some policy makers and health professionals as a response to rising health care costs and threats to patient safety. Proponents suggest that interprofessional models of care can reduce fragmentation and lower costs through improved coordination between different health professionals. These models encourage the collaboration of supplementary skills between different health care professionals. Effective collaborative models of interprofessional care may be influenced by several variables germane to the interaction and structure of the team of health professionals—temporality, urgency, and degree of structured authority—and the author examines the importance of each variable in delivering interprofessional care. Co-managed models of care have also been proposed. Recent state health reform efforts have catalyzed the adoption of co-managed care models by expanding the autonomy of alternative providers through the broadening of scope of practice. These scope-of-practice changes are intended to permit greater diagnostic and therapeutic authority of nonphysician providers. This effort seems aimed at enhancing the competition between provider groups in the market and expanding consumer choices. Herein, the author presents a conceptual framework to describe different models of interprofessional and co-managed care. The author also considers interprofessional and co-managed care models in the context of the health reform movement. Some of the challenges are considered, as policy makers consider the options for facilitating further development of interprofessional models of practice and the implications for curricular modifications at academic health centers.


As health care expenditures have spiraled upward, some policy makers have suggested that improving the coordination between health care professionals could reduce fragmentation and lower costs. Enhanced coordination of care has long been extolled as a path to better quality and patient safety by optimizing the different skill sets of the health care disciplines. Future health care reforms may suggest opportunities to optimize efficiencies in health care delivery through new models of practice. These changes will likely require educational reform as well.

There are several models of practice that define the relationships between different health professionals around the care of an individual patient. First, interdisciplinary and multidisciplinary care models refer to the care of a patient by comparable health professionals who are from different disciplines—for instance, endocrinologists and surgeons, both physicians, may coordinate the care of a patient with a thyroid nodule. Conversely, interprofessional care refers to the care of a patient by different health professionals—for instance, the care of a patient with low-back pain by physical therapists, physiatrists, chiropractors, and orthopedic surgeons. Co-managed care is yet another model that involves a pairing of different health professionals in the care of a patient with collaborative management; their roles are likely to be complementary, such as when an orthopedist and physical therapist co-manage a patient with rheumatoid arthritis.

It is yet unclear whether practice models that emphasize collaboration among different health care professionals truly offer benefit in the efficiency and effectiveness of health care delivery. To weigh the evidence, a conceptual framework of interprofessional and co-managed care is needed to ensure that there is agreement about the appropriateness of these models in different settings, as well as about parameters of performance. Such a framework can be used to identify the evidence for efficiency and effectiveness of different models of care. Curricular revisions could also be structured to reflect the changes underway in the health care practice environment through different practice models.

A Conceptual Framework for Interprofessional Care

Interprofessional care models conventionally combine complementary skills from health professionals with markedly different training, aptitude, and certification. Effective collaborative models of interprofessional care may be influenced by several variables germane to the interaction and structure of the team of health professionals. These variables—temporality, urgency, and degree of structured authority—are shown in Table 1.

Defining the temporality, or time frame, of interprofessional care is relevant because well-coordinated, interprofessional care can occur either concurrently or sequentially. Thus, concurrent interprofessional care involves the coordination of care between, and among, different health professionals in a single geographic setting—at the same time—usually through team meetings, or during a catastrophic event (e.g., resuscitation). The principal objective with concurrent interprofessional care models is to improve the coordination of diagnostic, therapeutic, and rehabilitative approaches between disciplines. Concurrent interprofessional models of care may involve historical meetings.
that is, a physician is usually responsible included physician-directed management; structured authority are more likely defined and explicit. Higher levels of example, in settings with high urgency care, as shown in Figure 1. For authority is correlated with the urgency of care, and this degrees of structured authority, and this higher than in less urgent situations. Sequential interprofessional care involves the coordination of care between disciplines during different episodes of care in time. Concurrent interprofessional care is more difficult to organize and can often be more expensive to administer because of the excess, standby capacity that is usually required.

The urgency of required care can influence how different health professionals are involved in the delivery of health care. For instance, in high-urgency settings, such as intensive care units, interprofessional teams of nurses, physicians, and pharmacists may communicate concurrently or sequentially. Although the temporality of interprofessional care can vary in these settings, the resource intensity is usually higher than in less urgent situations. Interprofessional care also has varying degrees of structured authority, and this authority is correlated with the urgency of care, as shown in Figure 1. For example, in settings with high urgency (e.g., emergency room, intensive care units), the structured authority is more defined and explicit. Higher levels of structured authority are more likely to include physician-directed management; that is, a physician is usually responsible for diagnostic and therapeutic decisions in the management of the patient. These settings often involve specialist physicians who may be trained in intensive care, emergency medicine, or surgery. Settings with less urgency may be amenable to different structured levels of authority and, therefore, more flexible in terms of interprofessional practice models of care.

Low-Intensity Settings and Co-Managed Models of Care
As shown in Figure 1, in settings of lower intensity, such as primary or rehabilitative care, the structured authority is less defined, the temporality is less urgent, and there is more latitude for shared decision making. Therefore, there are opportunities for less physician-directed management, and some have advocated models of co-managed care for selected illnesses in these settings. By far, the growth of co-managed care has been most prodigious in primary care—approximately one quarter of primary care office-based physicians employ physician assistants or nurse practitioners who co-manage many aspects of patient care. Other collaborative models of care exist that include elements of patient responsibility and self-care. Some authorities have been particularly supportive of these models for management of chronic illnesses, largely because they include collaborative

![Figure 1](image-url) Degree of structured authority of interprofessional care according to urgency.
targeting for clear patient-care objectives, involve educational initiatives aimed at self-management techniques, and include sustained follow-up and continuity.6

The role definitions in a co-managed model of care can be surprisingly ambiguous, and expectations frequently differ. Thus, the spectrum of responsibilities in co-managed models of care range from side-by-side delegated management to independent practice authority. Largely because of workforce shortages, there are advocates for fundamental changes in the scope of practice to accommodate more delegated management by physicians to nonphysician providers. Changes in scope of practice would potentially expand the nonphysician provider workforce available for direct care and allow the substitution of different health professionals for direct care. The motivating policy imperative for scope-of-practice changes largely assumes that nonphysician health professionals provide comparable substitute care—usually at a lower cost. Given the workforce shortages in certain areas, such as primary care, nonphysician health professionals may be needed to fulfill practice needs, especially given trends in specialty preferences of current medical school graduates. However, scope of practice is largely a state function—appropriate practice acts are enacted by state legislatures as statutes or codes. State regulatory agencies, such as medical boards, write the rules and regulations that implement practice acts.7 Nonetheless, because of increasing pressures on states to enact health reform to address the upward-spiraling costs of health care and physician workforce shortages, scope-of-practice changes that enable more co-managed models of care may be on the horizon.

Interprofessional Care and Health Reform
Several state governments have introduced a comprehensive health reform plan as a prescription for expanding coverage to the state’s uninsured. One such plan, in Pennsylvania, broadened the effort beyond just coverage of the state’s uninsured. It also embraced alternative models of care by expanding the role of nurses and other nonphysician providers in treating patients, positing that these reform endeavors would help control costs.8 Comprehensive health reform legislation at the state level, as in Pennsylvania, aims to reduce health care costs by expanding the scope of practice to nonphysician providers and increasing the competitive environment for clinical services. Pennsylvania is the first state to reform its health care delivery system with a package that includes transformation of the scope of practice for its workforce. Oddly, in view of projected physician and nursing shortages, workforce reforms have been overlooked in most health care reform proposals. The workforce policy initiatives included in Pennsylvania’s health reforms aim to increase coverage for its 900,000 uninsured citizens by (1) lowering overall health care costs, and (2) improving access to lower-cost primary care. Thus, under the state’s new plan, a variety of nonphysician providers (e.g., certified registered nurse practitioners, clinical nurse specialists, physician assistants, nurse midwives) are now permitted to “take medical histories, perform physical or mental examinations and to provide acute illness or minor injury care or management of chronic illness in the same manner as physicians and dentists.”8 Further, this state’s legislation removed a host of obstacles that traditionally have thwarted nonphysician providers from sharing in components of direct medical care. Among them, there were reforms that mandated inclusion of qualified, nonphysician providers in health plan networks. Overall, this state’s health reform plan represents the first attempt to introduce models of interprofessional care as a vehicle for controlling costs and expanding coverage to the uninsured.

As states consider changes in scope of practice, there will likely be debate on the effectiveness of co-managed models of care—especially those that require broadening the scope of practice to nonphysician care providers. If limited to low-intensity settings, this may set a battleground between primary care physicians and scope-of-practice-expansion advocates. The deliberations almost assuredly will center on evaluating the evidence of effectiveness.

Weighing the Evidence
Models of interprofessional and co-managed care represent changes not only in the structure of care but also in the process of care. Judging the success of different models requires a definition of favorable outcomes so that policy makers can appropriately weigh the evidence. With a conceptual framework established and outcomes identified, policy makers can evaluate where different models of care are more efficient, more effective, or both.

Is there evidence that interprofessional models of care improve outcomes—specifically, morbidity and mortality? Because frail, elderly patients frequently require care from multiple disciplines and involve intensive resources, interprofessional models could result in better outcomes. In fact, geriatric assessment units are among the best examples of interprofessional models of low-intensity chronic care that have been evaluated for effects on patient-care outcomes. In the largest randomized trial to date, frail, elderly patients were enrolled to determine the effects of care from interprofessional teams in inpatient and outpatient geriatric units. Although there were no improvements in mortality, significant reductions were observed in functional decline and in mental health problems.8 Other randomized trials of comprehensive geriatric assessment by interprofessional teams seem to consistently indicate improvements in functional status, without increasing costs.10

For high-intensity settings, there is a surprising dearth of evidence that efforts to implement models of structured, interprofessional teamwork have been rewarding. Given the intensity of events such as cardiopulmonary resuscitation, it would seem appealing to test the effects of practicing formally structured roles on patient outcomes. In similar high-precision, high-risk fields, such as air traffic control, formal roles are frequently practiced to optimize precision and avert errors.11 Some might suggest that evaluating formal role definitions for interprofessional health care teams are unnecessary, because they are already empirically established. However, there is evidence to suggest that our current educational curricula may be insufficient to prepare health professionals for roles in a health care team. For example, one study showed that residents frequently report training deficits where they are taught how to serve as cardiac arrest team leaders.12 Conversely, another study evaluated the effects of implementation
of a team training and human error curriculum to a neonatal resuscitation program and measured its effect on teamwork during resuscitations.\textsuperscript{13} The educational intervention led first-year residents to exhibit more team behaviors during simulated resuscitations.

What about the evidence that interprofessional care models affect the costs of health care? Costs could be lowered by improving coordination, because better-coordinated care among different health disciplines reduces fragmentation and diminishes redundancy.\textsuperscript{14} Unfortunately, substantiation of reduced costs by better-coordinated, interprofessional care is not abundant across different care settings. There is not, for example, compelling evidence that improvements in structured nurse–physician rounds, or team meetings, reduce health care costs.\textsuperscript{15} Nevertheless, some health care disciplines have begun to develop areas of case-management expertise, targeting specific chronic illnesses in co-managed models. For example, pharmacists have concentrated much effort on medication management for chronic diseases, such as asthma and diabetes. When co-managing patients, pharmacists make recommendations directly to patients’ primary care physicians if potential therapeutic improvements are identified. In some community settings, these efforts seem to have paid off, with both improved patient outcomes (e.g., lowered glycosylated hemoglobin levels in diabetics) and lower costs.\textsuperscript{16}

The cost savings realized from co-managed care depend on two sources: (1) the magnitude of the salary differential between health professionals, and (2) the different diagnostic and therapeutic approaches recommended by alternative providers. However, because of lower productivity of some health professionals who may substitute for physician-directed care, true savings may be elusive, or costs may remain unchanged because different health professionals may generate an unidentified demand for care. Thus, chiropractors are less likely to recommend surgery for low-back pain; however, the cost savings from fewer surgeries may be offset by other practice patterns (e.g., higher use of radiographs). Nevertheless, there is evidence that some co-managed models of care work. For example, when nurse practitioners are given the same degree of independence, similar authority, and comparable patient populations as primary care physicians, patient outcomes seem to be comparable.\textsuperscript{17} Outcomes from care with alternative providers are mixed. For some chronic conditions where therapeutic clarity is absent, alternative models of care may be just as effective as conventional care by harnessing the placebo effect.\textsuperscript{18} For example, in one randomized trial, yoga was shown to be an effective method for improving function and reducing chronic low-back pain.\textsuperscript{19} Spinal manipulation and massage therapy may also offer benefits, if even to avert unnecessary, expensive surgery.\textsuperscript{20}

Clearly, there is evidence that some co-managed models of care, especially in low-intensity settings, can be effective and cost-efficient. For further maturation of the paradigm of interprofessional care, however, curricular changes are needed to accommodate practice model changes.

The Future of Interprofessional Models of Patient Care and Education

The future development of interprofessional models of care will likely depend on a variety of influences. First, the framework for interprofessional education and practice has developed much more slowly in the United States than in other developed countries. In Europe, for instance, interprofessional curricula have been in place for many years.\textsuperscript{21} As a result, health professionals from different disciplines work more closely in practice in the European model, and European models of care are less expensive than American approaches, arguably with better outcomes. This is particularly true with illnesses that lend themselves to interprofessional care, such as cancer.\textsuperscript{22} In fact, interprofessional education and practice have become global concerns, and interest in such models has continued to increase in terms of the advantages of collaborative practice models. Chiefly, this interest has arisen from worldwide shortages of health professionals, estimated to be more than four million physicians, nurses, and other health care workers.\textsuperscript{23} More recently, the World Health Organization has established the Study Group on Interprofessional Education and Collaborative Practice that will examine and synthesize the evidence for the success of interprofessional education and practice models.\textsuperscript{24}

In the United States, there have been numerous attempts to reform the educational curricula of health professional training to include interprofessional opportunities. Among them, the Institute of Medicine, as a part of its Quality Initiative, issued its 2001 report, \textit{Crossing the Quality Chasm}, and recommended that an “interdisciplinary summit” be held to address curricular reform of health professional education. The results of this summit, published in 2003, recommended that all health professionals “should be educated to deliver . . . care as members of an interdisciplinary team,”\textsuperscript{25} and the authors noted that even the term “interdisciplinary” generated confusion—prompting some attendees to note the issues related to terminology among the different health professionals. Thus, another recommendation from the summit was to encourage the development of a common language among health professionals.

In the United States, physicians have uniquely institutionalized their influence, maintaining the authority to order diagnostic tests and write prescriptions. For some physicians, the political concern over the potential for conceding this professional sovereignty often trumps the benefits of substitute care. It also creates an unusual paradox—some physicians actually embrace co-management models that involve shared authority in patient care, and yet, they may resist legislative efforts to formally surrender their authority to transdisciplinary care models.

The broadened scope of practice for nonphysician providers in Pennsylvania was a clear attempt to widen the market and, presumably, extend competition among different health care providers. It is less clear whether this effort will pay off with lowered health care costs or reduced insurance premiums for employer groups. The area in which there may be the most traction could be among those individuals enrolled in consumer-directed health plans. These plans typically have high deductibles that attempt to leverage consumer choice to extract provider discounts. Unfortunately, consumers are ill prepared to distinguish among providers, even when well informed.\textsuperscript{26}
Regardless of the political context and consumer interests in interprofessional care, there is a compelling need to examine the evidence about whether different models of interprofessional care can affect the costs and quality of patient care. Clearly, more attention is needed to improve the coordination of roles and communication between different health professionals involved in patient care. In nonurgent, chronic care settings, as well as intensive care environments, there is little evidence that the structure of health care teams has been adequately evaluated or that the roles of different health professionals have been elucidated. As the health care landscape faces modifications, clarification of the changing roles of different models of interprofessional care, there is a compelling need to examine the evidence about whether consumer interests in interprofessional care, 1995–1999. Health Aff (Millwood). 1996;25:332:1345–1350.


