

Chiropractic in the United States: Training, Practice, and Research

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Daniel C. Cherkin, PhD; Robert D. Mootz, DC

FOREWORD

One hundred years ago, the founder of the chiropractic profession, D. D. Palmer, reportedly used spinal manipulation to restore a deaf janitor's hearing. A series of events following this dramatic incident ultimately led to the establishment of what is now one of the largest health care professions in the United States. From its beginnings, this new profession eschewed more invasive treatments in favor of spinal adjusting (or manipulation) as its central approach to care. During much of its first century of existence, chiropractic was shunned by the medical profession and remained on the fringe of mainstream health care. In fact, as recently as 1980, the American Medical Association's Principles of Medical Ethics proscribed any associations between physicians and chiropractors or other "unscientific practitioners."

In the past 10 to 15 years there have been dramatic changes both within the chiropractic profession and in the relationship between chiropractic and the health care system. Within the profession, significant progress has been made to upgrade the quality of training at the 17 accredited chiropractic colleges in North America. In addition, a small cadre of chiropractic researchers has been trained, initially with grant support from various chiropractic foundations and more recently from the Federal government. As a result, chiropractic researchers have become involved in a variety of studies, including randomized clinical trials, evaluating the effectiveness of spinal manipulation.

Outside of the profession, studies began to document the major role that chiropractors were playing in the care of persons with back and neck problems in spite of the absence of an experimentally validated biological mechanism for the effectiveness of manipulation (Von Kuster, 1980; Mugge, 1986; Shekelle, 1991). Other studies documented high levels of patient satisfaction among persons seeking chiropractic care (Cherkin, 1989; Kane, 1974; Carey, 1995). Persons with back pain who received care from chiropractors were found to be much more satisfied with all aspects of their care than patients of medical doctors (Cherkin, 1989). Several nonrandomized studies have also suggested that chiropractic treatment may be more effective than medical treatment for back pain among injured workers (Assendelft, 1993).

It soon became clear that, even though the effectiveness of chiropractic care remained to be evaluated in a scientifically rigorous manner, chiropractors appeared to be meeting the needs of many Americans suffering from back and neck pain. Whether their apparent success was due to the self-selection of patients with strongly favorable beliefs and expectations about chiropractic, to nonspecific effects of chiropractic treatment, to the confident, positive, and caring attitude common to many chiropractors, or to efficacy of spinal manipulation or other specific chiropractic treatments was not known. Nevertheless, because most standard medical treatments for back pain were of questionable value (Deyo, 1983), chiropractic appeared to many to be a reasonable alternative.

In the past 5 years, spinal manipulation has been the focus of evidence-based literature syntheses and meta-analyses performed by both medical and chiropractic researchers (Anderson, 1992; Shekelle, 1992; Koes, 1991). A formal meta-analysis of the literature concluded that spinal manipulation was of short-term benefit for patients with uncomplicated acute low back pain but that there was insufficient evidence for or against manipulation for patients with nerve root pain or chronic back pain (Shekelle, 1992). A blinded systematic literature review of 35 randomized clinical trials concluded that although the results were promising, the efficacy of manipulation had not yet been convincingly demonstrated (Koes, 1991). Although only five of the randomized trials involved manipulation by a chiropractor, the findings of these literature syntheses provided objective evidence that spinal manipulation was probably at least as effective for low back pain as most standard medical treatments.

Evidence-based national guidelines for the diagnosis and treatment of low back pain have recently been published in the United States (Bigos, 1994) and Great Britain (CSAG, 1994). Guided by the same scientific evidence for manipulation used in the literature syntheses, both national guidelines concluded that manipulation can be helpful for patients with acute low back pain without radiculopathy. Because more than 90 percent of spinal manipulations in the United States are performed by chiropractors (Shekelle, 1992), these recommendations were seen by many to be tantamount to the endorsement of chiropractic manipulation. Thus, almost exactly 100 years after D. D. Palmer's legendary success using spinal manipulation, this technique and the profession most closely associated with its use, chiropractic, have gained a legitimacy within the United States health care system that until very recently seemed unimaginable.

Because of the rapidity of the changes in how spinal manipulation and chiropractic are viewed and the fact that many practicing physicians entered practice during an era when organized medicine portrayed chiropractors as "quacks," the majority of medical doctors have had little interaction with chiropractors and know very little about them. In view of the growing popularity and legitimacy of chiropractic care, it is important that health care providers, insurers, policymakers, and persons with back pain have a clear understanding of the current capabilities and limitations of chiropractic care. At present, sources of information about chiropractors and their care are widely scattered, often biased, and, due to the rapid changes affecting the profession, often out of date.

This monograph, which reflects a collaboration among scholars, researchers, and practitioners from both the medical and chiropractic communities, attempts to provide an unbiased overview of what is and is not known about the profession and practice of chiropractic. Contributors were selected based on their recognized national expertise in one or more of the topics covered in the monograph. All of the individuals involved with this project shared the vision of producing a monograph that presented a comprehensive and balanced overview of the chiropractic profession and its current and future potential role in the United States health care system. It is hoped that this information will not only help policymakers identify the most appropriate role for chiropractors in the health care system of the future, but will also help health care providers and back pain sufferers better understand both the value and limitations of chiropractic.

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CHAPTER I

A BRIEF HISTORY OF CHIROPRACTIC

Reed B. Phillips, DC, PhD

Rarely is the birth of a new idea or a new organization the consequence of a singular event. However, the genesis of a new profession, chiropractic, is attributed to the date of 18 September 1895 and the place, Davenport, Iowa. Daniel David Palmer placed his hands upon an irregular protrusion of the spine of Harvey Lillard and with a forceful thrust reduced the irregularity. As a result, Mr. Lillard claimed to "hear the wagons on the street," something he could not do prior to receiving the treatment (Palmer, 1910).

At the turn of the 19th century in rural America, health care was a craft more than an art. The integration of science into treatment methods and the training process was severely lacking as evidenced by the condemnation of medical colleges in the famed Flexner Report (Flexner, 1910). The consolidation of "cultural authority" (Starr, 1982) by the allopathic physicians had not yet been achieved and there were numerous competing practitioners such as magnetic healers, herbal healers, hydro healers, bone setters, and homeopaths. The growth of health care alternatives paralleled revivalism in religious practices and was thought to provide the physiological counterpart to the theological perfectionism of the time (Fuller, 1989). This crucible of confusion, filled with vitalism and magnetism, leeches and lances and tincture and plaster, provided a seed bed for creative thinking and new ideas. D.D. Palmer and chiropractic were, to a certain degree, a product of their environment.

In early 20th-century America, allopathic providers obtained greater "cultural authority" and the respect of those who influenced decisionmaking. Opposition to unorthodox practitioners increased. The allopathic physician charged the doctor of chiropractic with practicing medicine without a license. The doctor of chiropractic retorted that practicing chiropractic and practicing medicine were different. To emphasize this difference, the chiropractic community developed a different lexicon and rationale for its approach (Keating, 1989). Medicine's search for a disease process, assigning appropriate labels, and providing the remedy of the day were different from chiropractic's search for an interference in the nervous system that was stated to ultimately, if not immediately, lead to dysfunction and disease. The doctor of chiropractic rejected the use of medicines and drugs and never incorporated the practice of surgery. Chiropractic was conceived as a more natural approach to healing, drawing upon the body's own recuperative powers.

Although adversity characterized much of organized medicine's relationship with chiropractic, this polarity was more frequently related to economic, political, and legal considerations than to clinical ones. In fact, D.D. Palmer credits a medical physician, Jim Atkinson, with teaching him about the use of bone setting in other cultures (Palmer, 1910, p. 789). G.H. Patchin, MD, has been credited with helping Palmer edit his book, *The Chiropractic Adjuster*, and one-third of the first graduating class of chiropractors were medical physicians (Palmer, 1910; Gibbons, 1981).

Following the Flexner Report (1910), medical education consolidated and strengthened its position in society and both medical education and research have received external financial support through grants from the Federal government and private foundations. Federal funds initially supported medical care for veterans and, eventually, for the elderly and disabled. By contrast, chiropractic education remained a tuition-driven, inadequately financed enterprise that received no external support for research. In an attempt to eliminate chiropractic, organized

medicine promoted licensing regulations, believing that the inferior education of chiropractic schools would prevent their graduates from passing State Board Licensing Exams (Gevitz, 1988; Wardwell, 1992). This is discussed in more detail in Chapter V. The introduction of Basic Science Boards by the medical profession in 1925 created an additional obstacle to the graduate doctor of chiropractic due to the lack of basic science training in the chiropractic curriculum.

In response, chiropractic schools upgraded their educational process by expanding the curriculum and employing Ph.D.-level instructors to teach the basic sciences. As a result, chiropractors started to pass the Basic Science Boards. Further efforts to improve the quality of the educational process eventually led to the creation of chiropractic's own national accreditation agency, the Council on Chiropractic Education (CCE), which achieved Federal recognition from the Department of Education in 1974. This agency implemented educational standards for the curriculum and the admission processes. Those schools failing to meet the CCE standards closed their doors. By 1995, all chiropractic colleges achieved accreditation by the CCE. Much like the Flexner Report's impact on medical colleges, the CCE elevated the educational standards of many chiropractic schools.

Until fairly recently, chiropractic had been attacked by allopathic medicine as an unscientific cult with no research to support its claims of efficacy (Keating, 1993; Wardwell, 1992) (see Chapter VII). Research was neglected in the early years of the profession. Without funding for research and facilities in the tuition-driven, for-profit educational institutions, the limited resources of the early colleges were focused on teaching skills needed for success in practice rather than on developing the knowledge base of the profession. Gradually, pockets of hope emerged: Watkins, Weiant, Higley, Illi, and Janse, among others, sought answers for unexplained treatment outcomes and recognized that a research base could be used to refute the claims of adversaries. The evolutionary development of the Foundation for Chiropractic Education and Research (FCER) has helped to foster a research mentality (see Chapter IX). Beyond sponsoring research studies, FCER embarked in 1977 on a program to support the training and development of the chiropractic researcher. There is now a growing cadre of critical thinkers within the profession and an expanding number of research-oriented individuals outside the profession who are studying chiropractic. By 1996, Federal research grants had been awarded to four chiropractic colleges.

In recent years there has also been much greater collaboration between chiropractors and the greater scientific and clinical communities in training, research, and practice (Mootz, 1995). Multidisciplinary practice is more common as are editorial and technical collaborations, joint research initiatives, and medical physician support of chiropractors in litigation (Mootz, 1995).

With the profession's increasing involvement in critical investigation and professional improvement, the label of chiropractic as an unscientific cult has difficulty sticking. Research has demonstrated that manipulation, a primary mode of care for the doctor of chiropractic, is effective in the treatment of acute low back pain (Shekelle, 1992). The inclusion of manipulation as a recommended treatment in the Federal guidelines for the treatment of acute low back pain is the result of the findings of researchers both within and outside of chiropractic (Bigos, 1994). As research evaluates the value of chiropractic for other clinical problems, the capabilities and limitations of chiropractic care will become more apparent, appropriate interdisciplinary relationships will be established and patient care will be improved.

It has taken 100 years of self-directed, bootstrap efforts utilizing internal funds to bring chiropractic into the mainstream of health care. As a mainstream provider, the issues of role and scope of practice are now receiving serious attention. Is chiropractic an alternative to medicine? Is there a complementary role that includes collaborative care? Should chiropractic remain a separate and distinct profession or seek inclusion into medicine as a subspecialty in musculoskeletal

conditions? Should chiropractic education seek affiliation with major universities housing medical education? Answers to these questions will have a significant effect on the future of chiropractic education and practice.

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CHAPTER II

CHIROPRACTIC BELIEF SYSTEMS

Robert D. Mootz, DC; Reed B. Phillips, DC, PhD

A. The Origin and Evolution of Chiropractic Belief Systems

The chiropractic perspective on health and disease emphasizes two fundamental characteristics: (1) a testable principle suggesting that the structure and condition of the body influences how the body functions and heals and (2) an untestable metaphor that asserts that the mind-body relationship is instrumental in maintaining health and in healing processes. Even though early chiropractors characterized these perspectives on health as unique (Palmer, 1910), the conceptualization of the relationship between "life" and "matter" actually began with the early Greek philosophers (Hall, 1969, pp. 18-20). In fact, the origins of traditional "chiropractic philosophy" can be found within the classical philosophic disciplines (e.g., metaphysics, ontology), which attempted to explore the "nature of reality" (Phillips, 1992).

The dichotomy between the ontological principles of vitalism (which considers living things to be governed by unknown laws different from those governing inanimate objects) and materialism (which recognizes only one set of physical laws) are represented in the two fundamental characteristics of chiropractic belief systems. The concept of vitalism stems from Plato's view that life is a nonmaterial entity imposed on matter. Materialism on the other hand recognizes that all natural processes, including life, are the result of known (or knowable) physical laws.

Chiropractic beliefs regarding the mind-body relationship and the body's ability to self-heal were characterized by early chiropractors (and even by some contemporary ones) using terminology and metaphors such as: "Universal Intelligence" controls the body's "Innate Intelligence" by directing "Life Force" through the nervous system (Stephenson, 1927; Barge, 1988). These vitalistic concepts implied an intelligent governing entity and thereby were readily perceived as spiritual constructs by many both inside and outside the profession. Early chiropractors often used these metaphorical concepts to rationalize their way of thinking about the body's self-healing capacity.

On the other hand, chiropractic's fundamental perspective relating to a significant role for body structure in the healing process is more readily defined operationally, and hence can be evaluated with the tools of science. At times, chiropractors have attempted to merge both concepts (the testable principle relating body structure to function and the untestable metaphor asserting the role the mind-body relationship plays in healing) using one concept to rationalize the other (Mootz, 1992, 1995). For example, it is common to find references in the early chiropractic literature that incorporate vitalistic beliefs about how the body self-heals intermingled with conceptually reasonable discussions on physiology and anatomy.

Such a blending of ideas regarding an all-pervading energy being a basis for materialism is not unique to chiropractic nor is it new in philosophy and the biologic sciences (Collingwood, 1924, pp. 167; Ledermann, 1970). In the 1920s, Collingwood asserted that it made no difference to "the essence of materialism" if the "substrate behind the variety of empirical fact" was called matter, energy, or space-time. In other words, although the syntax used to characterize the two fundamental components of chiropractic belief systems was unique, the concepts have actually been of interest in classical and contemporary philosophy, as well as medicine and biology.

B. Chiropractic's Testable Principle as Materialism

In traditional chiropractic belief systems, a specific mechanistic (or testable) principle is that a spinal adjustment removes a subluxation and thereby affects physiologic function (Figure 1). Such a mechanistic principle is inherently quantifiable and can therefore be operationally defined and measured. This aspect of the chiropractic philosophy lends itself to the critical inquiry of the scientific process. However, materialism and its mechanistic procedures do not explain what the purpose behind the life-matter or mind-body relationship is. Although of lasting philosophic intrigue, the answers to questions regarding the essence and purpose of life are not readily found with the tools needed for basic and clinical research. Therefore, chiropractic's mechanistic principle is merely a way in which the clinician and scientist can describe and investigate that which is observed in his or her patients (Keating, 1987).

Some attempts by early chiropractors to rationalize away the need to measure and quantify the effects of chiropractic care by incorporating vitalistic beliefs about life itself had the unintended consequence of confounding otherwise rational model building. In actuality, the recognition that living things undergo processes beyond what is measurable and understandable at a given point in time is not an "outlier" concept at all. The early physiologic concepts of homeostasis and contemporary models regarding complex behaviors of simple systems form the basis of "holistic" approaches to health care (Mootz, 1995; Schwartz, 1997).

<u>THE TESTABLE PRINCIPLE</u>	<u>THE UNTESTABLE METAPHOR</u>
Chiropractic Adjustment	Universal Intelligence
↓	↓
Restoration of Structural Integrity	Innate Intelligence
↓	↓
Improvement in Health Status	Body Physiology
<i>MATERIALISTIC:</i>	<i>VITALISTIC:</i>
-operational definitions possible	-origin of holism within chiropractic
-lends itself to scientific inquiry	-cannot be proven or disproven

Figure 1. Two chiropractic belief system constructs.

Source: Phillips RB, Mootz RD. Contemporary chiropractic philosophy. In Haldeman S (ed). *Principles and Practice of Chiropractic, 2nd Ed.* Norwalk, CT: Appleton & Lange, 1992. Reprinted with permission.

C. Chiropractic's Untestable Metaphor as Holism

Holism represents a philosophic perspective on the integration of body, mind, and spirit that posits that health depends on obedience to natural laws and that deviation can result in illness. Holism is based on the doctrine of teleology, which implies that there is a design or purpose in nature. An idealistic or vitalistic component can be seen in teleology. Based on the vitalism and metaphysics of his time, D.D. Palmer provided chiropractic a teleological metaphor when he expounded the concept that there is a "universal intelligence" that is manifest in living things as an "innate intelligence," which provides purpose, balance, and direction to all biologic function (Palmer, 1910). The classic medical concept of homeostasis also has its roots in the teleology of holism.

Although many great advances in 20th-century medicine have resulted from the mechanistic application of the scientific method (e.g., antibiotics for bacterial infections), science has also seen advances from theories based on global, contextual overviews of the environment (e.g., Darwinian concepts on evolution) (Mootz, 1995). Mechanistic philosophy in medical practice has made significant contributions in many clinical situations, particularly for emergent conditions. However, mechanistic or reductionistic approaches have not been as successful with chronic degenerative disease.

The concept of holism is difficult to approach with scientific methodology; it cannot be measured, tested, or operationally defined. Holism defies current methods of mechanistic determinism and reductionism because it is not finite (Mootz, 1995). Yet in practice, physicians implicitly rely on a patient's innate ability to heal. Ledermann (1970) articulated physicians' relationship with a patient's "holistic power" (innate ability to self-heal) this way: Physicians "cannot measure this power in units, but they attempt to gauge its strength. A surgeon for instance who envisages a major operation on a patient must assess this person's capacity to stand up to the strain of the operation, and he must therefore estimate his vitality, his holistic power. Any doctor is concerned with the holistic recuperative power of his patients" (Ledermann, 1970, pp. 34-35).

Holism can be taken to a dogmatic extreme and if trusted implicitly, the holistic application of any method of natural healing may fail to prevent illness or restore health. When viable nonholistic alternatives to healing exist, contemporary Western society typically dictates their use if natural methods are insufficient or seem unreasonable. For example, although a bone or joint infection may eventually be able to fully heal with natural means, albeit with deformity and risk of systemic infection, a more reasonable (and socially acceptable) course is to treat the patient with a timely application of antibiotic therapy. As Ledermann (1970, pp. 32-33) states, "the unspecific approach is thus limited, and it is the duty of the therapist to assess each patient's condition and to apply specific measures, based on the mechanistic-materialistic approach, if necessary."

A *complete* reliance on a holistic universal intelligence entails dogma and is not acceptable in current chiropractic philosophy or practice (Phillips, 1992). Although untestable scientifically, the concepts proposed by chiropractic's metaphor (and holistic models in general) can still be subject to critical review and refinement (Milus, 1995). Popper (1960) suggested that the formulation of proper lines of questioning about new knowledge and ideas can be useful. For example, rather than defending assertions (or questioning the source of knowledge) about the body's self-healing capacity, one might try to identify and revise conceptions regarding self-healing that are inconsistent with available evidence.

D. Chiropractic's Unique Perspective

Although chiropractic shares much with other health professions, its emphasis and application of philosophy distinguishes it from modern medicine. Chiropractic philosophy gravitates toward a contextual, naturopathic approach to health care (Black, 1990). Aspects of the chiropractic perspective that reflect its holistic orientation are listed in **Table 1**. By comparison, the traditional, allopathic model suggests that disease is the result of an environmental agent's virulence overwhelming the host organism (Mootz, 1995). Since the perceived cause is environmental in nature, the solution is to counter the perceived environmental factor (e.g., using an antibiotic for a bacterial infection). The naturopathic approach provides a different perception as to the nature of disease causation. As Palmer originally queried, why would one individual working in the identical environment become sick when the other remained healthy (Palmer, 1910)? The traditional naturopathic answer is that one exhibited a decreased host resistance, hence, the appropriate solution would be to direct treatment at the host in order to strengthen it, regardless of the nature of any environmental agents. In contemporary clinical practice, one can find elements of both naturopathic and allopathic philosophy among all types of providers.

Table 1. Chiropractic Perspectives That Reflect a Holistic Approach to Patient Care

-
- noninvasive, emphasizes patient's inherent recuperative abilities
 - recognizes dynamics between lifestyle, environment, and health
 - emphasizes understanding cause of illness in an effort to eradicate, rather than palliate, associated symptoms
 - recognizes the centrality of the nervous system and its intimate relationship with both the structural and regulatory capacities of the body
 - appreciates multifactorial nature of influences (structural, chemical, and psychological) on the nervous system
 - balances benefit versus risk of clinical interventions
 - recognizes as imperative the need to monitor progress and effectiveness through appropriate diagnostic procedures
 - prevents unnecessary barriers in the doctor-patient encounter
 - emphasizes a patient-centered, hands-on approach intent on influencing function through structure
 - strives toward early intervention emphasizing timely diagnosis and treatment of functional, reversible conditions
-

The difference between chiropractic and traditional naturopathy and osteopathy may be less obvious. Osteopathy originally emphasized the relationship body structure was thought to have with the circulation of "vital body fluids." However, the osteopathic profession in the United States essentially evolved parallel with traditional medicine. The result has been that many, if not most, contemporary osteopathic physicians practice nearly identically to medical providers. Osteopathy has long incorporated surgical and pharmaceutical approaches in training and practice, in great measure to the exclusion of manual procedures.

Much like chiropractic, contemporary osteopathic approaches to manual treatment methods have also emphasized neurological aspects of the body's structure/function relationships over their original circulatory models. Today, the similarities between some contemporary chiropractic and osteopathic approaches are substantial; however, the chiropractic profession as a whole centers itself exclusively on manual (e.g., spinal adjusting, manipulation, muscle work, exercise) and physiologic (e.g., nutrition, lifestyle modification) approaches to healing.

As with traditional naturopaths, there is vigilance among chiropractors to the adage *do no harm*, which continues to position mainstream chiropractic as a drugless (as well as nonsurgical) healing art. Naturopaths tend to emphasize physiologic approaches to healing more than many chiropractic traditionalists. Interestingly, the early evolution of chiropractic and naturopathy had much in common. Many of the early naturopathic and chiropractic schools offered dual degree tracts and there was much incorporation of each other's clinical approaches in practice.

Another characteristic of chiropractors' training is an emphasis on the importance of clear communication with patients. Chiropractors have traditionally allowed time to provide detailed reports of clinical findings and discussion of treatment plans to patients in clear, understandable terms. However, like all health care providers, contemporary chiropractic physicians are confronting the challenges of increased demands for clinical efficiency and cost-containment.

E. Distinctions Between Traditional and Contemporary Chiropractic Belief Systems

Traditional and contemporary chiropractic philosophies both display the dualism of testable principle (materialism) and untestable metaphor (holism). However, contemporary chiropractic incorporates a new *perspective* that escaped the early traditionalists (Milus, 1995; Phillips, 1992). There is recognition that the untestable constructs of holism cannot be used to rationalize explanations for clinically observed phenomenon. There is also appreciation for and understanding of the nature of scientific inquiry. Contemporary chiropractic philosophers have communicated a greater understanding of scientific methods and critical inquiry (Mootz, 1995; Milus, 1995). Theory development, even in qualitative domains and with scientifically untestable models, can be subject to critical review and refinement.

Modern-day chiropractic also recognizes that confidence in chiropractic methods is not a substitute for substantive description, observation, evaluation, and communication of chiropractic concepts to society at large. A clear elucidation of its philosophy and avoidance of the dogma and rhetoric that has characterized uncritical doctrines in both medicine and chiropractic in the past will enhance the future success of chiropractic. Some self-proclaimed "chiropractic philosophers" of today continue to confuse medical bashing, rhetoric, and enthusiasm for chiropractic with philosophy. Even chiropractic's most prominent early "philosopher," B.J. Palmer, made the distinction between having pride and enthusiasm about what chiropractors do, and philosophy (Mootz, 1992).

F. Variation in Chiropractic Perspectives

The terms "straight" and "mixer" were used by early chiropractors to distinguish between chiropractors whose therapeutic armamentaria included only manual adjusting and those who also used other therapies such as nutritional and lifestyle counseling or physiotherapeutic modalities. Historically, chiropractic schools would affiliate with a particular national professional association that gravitated toward a "straight" or "mixer" perspective. Although there are still remnants of this dichotomy, the situation has changed with the advent of federally recognized accreditation, research consortia, and more collaborative political agendas. Distinctions among current chiropractic perspectives are complex and can no longer be viewed as a simple dichotomy. **Table 2** lists some of the attributes of chiropractic belief systems and indicates the range of perspectives along each philosophical dimension.

A comprehensive survey of chiropractic practitioners' philosophic beliefs could not be found, although a recent study offers some insight into treatment scope preferences (Christensen, 1993). In a nationwide survey of more than 6,000 practicing chiropractors, over two-thirds reported using nonadjustive techniques such as exercise, nutritional counseling, and various physiotherapeutic modalities. More than 93 percent of chiropractors report using a full-spine adjustive approach (i.e., general adjustive procedures that may involve any region of the spine) as their primary chiropractic treatment procedure. The remainder characterized themselves as emphasizing upper cervical methods (2 percent) or other techniques (5 percent).

Table 2. Range of Belief Perspectives in Chiropractic

Perspective Attribute	Potential Belief Endpoints	
Scope of practice:	narrow ("straight")—	—broad ("mixer")
Diagnostic approach:	intuitive—	—analytical
Philosophic orientation:	vitalistic—	—materialistic
Scientific orientation:	descriptive—	—experimental
Process orientation:	implicit—	—explicit
Practice attitude:	doctor/model-centered—	—patient/situation-centered
Professional integration:	separate and distinct—	—integrated into mainstream

There are two significant, well-established national chiropractic trade associations. The largest is the American Chiropractic Association (ACA), which is believed to include about 25 percent of chiropractors in the United States as members. The ACA (and its precursor organization the National Chiropractic Association) has historically been associated with a broad-scope approach to chiropractic practice and appears to be most representative of the mainstream of the profession. The International Chiropractors Association (ICA) is primarily a U.S.-based alternative to the ACA and has a much smaller membership (believed to count between 5-10 percent of chiropractors among its dues-paying members). The ICA tends to position itself as representative of members with more traditional chiropractic perspectives. A few other national groups identify with more extreme perspectives. The National Association of Chiropractic Medicine (NACM) supports limiting chiropractors to only the treatment of certain musculoskeletal conditions, while the World Chiropractic Alliance (WCA) promotes addressing only a single chiropractic spinal lesion, the vertebral subluxation. However, both organizations are proprietary (as opposed to being

representative of their memberships) and have a very small number of members (believed to be in the low hundreds).

G. Summary

Traditional chiropractic belief systems focused on the body's ability to self-heal, the nervous system's role in overall health, and the role body structure was thought to play in function of the nervous system. Early articulation of these concepts by chiropractors was often cloaked in terminology that conveyed spiritual connotations. In addition, vitalistic explanations of self-healing confounded many outside the profession when used by early chiropractors to deny the value of quantitative evidence on clinical effectiveness.

Contemporary chiropractic belief systems embrace a blend of experience, conviction, critical thinking, open-mindedness, and appreciation of the natural order of things. Emphasis is on the tangible, testable principle that structure affects function, and, the untestable, metaphorical recognition that life is self-sustaining and the doctor's aim is to foster the establishment and maintenance of an organism-environment dynamic that is the most conducive to functional well-being.

Contemporary chiropractic philosophy recognizes its partnership with the greater body of philosophy and science in general. Most contemporary chiropractors and their organizations distinguish between what is known and what is believed. Chiropractic belief systems embrace the holistic paradigm of wellness while incorporating deterministic materialism for the establishment of valid chiropractic principles. Chiropractic's philosophic foundation serves as the basis for theoretical development, not a substitution for it (Phillips, 1992).

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CHAPTER III

CHIROPRACTIC TRAINING

Ian D. Coulter, PhD; Alan H. Adams, DC; Ruth Sandefur, DC, PhD

A. Chiropractic College Profile

In 1996, there were 16 colleges of chiropractic in the United States (Table 3). The geographic distribution of chiropractic educational institutions demonstrates concentrations in the Midwest and the West with five colleges in each region. Ten of the colleges were established prior to 1945, though they may have gone through several reorganizations or mergers before achieving their current name and status. The most recently established college in the U.S. is the University of Bridgeport College of Chiropractic in Connecticut.

Table 3. Chiropractic Colleges in the United States (1996)

West	Midwest	South	Northeast
Cleveland Chiropractic College Carl S. Cleveland, III, DC President 590 N. Vermont Avenue Los Angeles, CA 90004	Cleveland Chiropractic College Carl S. Cleveland, III, DC President 6401 Rockhill Road Kansas City, MO 64131	Life College Sid E. Williams, DC President 1269 Barclay Circle Marietta, GA 30060	New York Chiropractic College Kenneth W. Padgett, DC President PO Box 800 Seneca Falls, NY 13148
Life Chiropractic College West Gerard W. Clum, DC President 2005 Via Barrett San Lorenzo, CA 94580	Logan College of Chiropractic George A. Goodman, DC President PO Box 1065 Chesterfield, MO 63006	Parker College of Chiropractic James W. Parker, DC President 2500 Walnut Hill Lane Dallas, TX 75229	University of Bridgeport College of Chiropractic Frank A. Zolli, DC Dean Bridgeport, CT 06601
Los Angeles College of Chiropractic Reed B. Phillips, DC, PhD President 16200 E. Amber Valley Drive Whittier, CA 90609	National College of Chiropractic James F. Winterstein, DC President 200 East Roosevelt Road Lombard, IL 60148	Sherman College of Straight Chiropractic Thomas A. Gerald, DC President PO Box 1452 Spartanburg, SC 29304	
Palmer College of Chiropractic West Peter A. Martin, DC President 90 E. Tasman Drive San Jose, CA 95134	Northwestern College of Chiropractic John F. Allenburg, DC President 2501 W. 84th Street Bloomington, MN 55431	Texas Chiropractic College Shelby M. Elliott, DC President 5912 Spencer Highway Pasadena, TX 77505	
Western States Chiropractic College William H. Dallas, DC President 2900 NE 132nd Avenue Portland, OR 97230	Palmer College of Chiropractic Virgil Strang, DC President 1000 Brady Street Davenport, IA 52803		

Since 1974, standards for chiropractic education have been established and monitored by the Council on Chiropractic Education (CCE), a not-for-profit organization located in Scottsdale, Arizona (CCE, 1995). Recognized by the U.S. Department of Education as the specialized accrediting agency for chiropractic education, the CCE sets standards for the curriculum, faculty and staff, facilities, patient care, and research. One of the CCE's major functions is to assess chiropractic institutional effectiveness and outcomes. This involves a periodic cycle of accreditation where member institutions perform a self-study of their strengths, weaknesses, and educational outcomes as they relate to CCE Standards. A visitation team made up of educators and practitioners conduct a site visit to review compliance with CCE Standards and the institution's mission and goals. The visitation team to the CCE Commission on Accreditation generates a report. The Commission holds a hearing for the institution for further clarification and verification of information and then renders a decision. The maximum length of accreditation is 7 years. Member institutions file yearly reports of their activities as they relate to CCE Standards.

All 16 chiropractic educational institutions currently have accredited status with the CCE. Regional accrediting bodies such as the North Central Association of Schools and Colleges also accredit 13 of the colleges. Admissions requirements of chiropractic colleges are influenced by CCE Standards and chiropractic licensing board requirements. A minimum of 2 years of undergraduate education are required with successful completion of courses with a grade of "C" (a 2.5 grade point) or better in Biology, General Chemistry, Organic Chemistry, Physics, Psychology, English/Communication, and the Humanities (CCE, 1995). Each required science course must include laboratories. The cumulative grade point average must not be less than 2.25. The total college preprofessional credit units must be at least 60 semester units. Two colleges currently require 75 semester units and one requires 90 semester units. Four colleges will soon require a bachelor's degree for admission. Currently, six State Licensing Boards require a bachelor's degree in addition to the doctor of chiropractic degree for licensure (Federation of Chiropractic Licensing Boards, 1997).

The chiropractic college admissions process usually includes an application review, assessment of academic transcripts, letters of reference, and an interview. Currently, there is no standardized admissions test. At most chiropractic colleges a "rolling" admissions process is used with qualified applicants being admitted on an ongoing basis. The "typical" (median) successful applicant has completed more than 90 college credits with a "B–" (2.7) average (Coulter, submitted).

B. Chiropractic Students

Total enrollment in the United States chiropractic colleges in the fall of 1995 was 14,040. The mean enrollment per college was 878. Between 1990 and 1995 enrollment increased by 44 percent. During the same period the total number of graduates per year increased 13 percent, from 2,529 to 2,846 (CCE Report, 1996).

Wardwell described the characteristics of a chiropractic student in his comprehensive historical account of the chiropractic profession, *Chiropractic: History and Evolution of a New Profession*, published in 1992. Studies conducted more than 40 years ago found that students often pursued chiropractic as a second career. A 1978 study reported that chiropractic students are primarily from working and middle class backgrounds (Wardwell, 1992). A more recent study reported that the predominant reason students decided to pursue the DC degree was influence from a family member or friend who was a chiropractor (Kaynes, 1992). Secondary reasons were interest in health care and personal health interests. Wardwell concluded his profile of the chiropractic student by stating that today's students are most attracted to the profession of chiropractic by its holistic, drugless, and natural approach to health.

In an inventory of preadmission requirements comparing schools of medicine, dentistry, osteopathy, podiatry, chiropractic, and optometry (Doxey, 1997), chiropractic students scored the lowest of all professions evaluated on four outcome measures (minimum number of semester hours, completion of 4-year bachelor's degree, minimum GPA required on entrance, and average GPA of previous year's entering class). The study examined printed resources collected during 1995 from 17 medical schools, 16 chiropractic schools, 15 dental schools, 16 optometry schools, 16 osteopathic schools, and 7 podiatric schools. All of the included colleges were located in the United States and represented a broad geographic distribution. Table 4 compares the various professions in terms of entrance requirements. The authors were careful to note that although the data reflect differences among health care professions on a limited number of entrance criteria, they do not explain the causes of the differences nor do they offer any insight as to how these measures correlate with successful practice or patient care.

Table 4. Comparison of Four Preentrance Requirements Among Professional Training Programs

	Average Minimum Semester Hours on Entrance	Average % of Applicants with Bachelor's Degree on Entrance	Average Minimum GPA Required on Entrance	Average Cumulative GPA on Entrance
Allopathy	100.9	99.4	3.16	3.56
Chiropractic	64.1	42.2	2.38	2.90
Podiatry	90.0	89.4	2.76	3.06
Dentistry	80.0	66.9	2.79	3.13
Osteopathy	95.6	97.0	2.68	3.26
Optometry	90.0	76.9	2.55	3.30

Source: Doxey TT, Phillips RB. Comparison of entrance requirements for health care professions. *J Manipulative Physiol Ther* 1997;20(2):86-91.

C. Curriculum

1. Program Length

A chiropractic program consists of 4 academic years of professional education averaging a total of 4,822 hours, and ranging from 4,400 hours to 5,220 hours in the 16 colleges.¹ This includes an average of 1,975 hours in clinical sciences and 1,405 hours of clinical clerkship. The minimum hours for accreditation by the Council on Chiropractic Education is 4,200 hours.

2. Structure and Organization

The program of study at all chiropractic schools is divided into Basic and Clinical Sciences. The average total number of basic science contact hours is 1,420, which accounts for 30 percent of the entire chiropractic program.² Basic sciences education includes an average of 570 hours of anatomy (40 percent of all basic science hours), 305 hours of physiology (21 percent), 205 hours

of pathology (14 percent), 150 hours of biochemistry (11 percent), 120 hours of microbiology (8 percent), and 70 hours of public health (5 percent).

On average, 70 percent of the program is composed of clinical education. Chiropractic schools devote an average of 3,380 contact hours to clinical education: 1,975 hours (58 percent) are spent in chiropractic clinical sciences and the remaining 1,405 hours (42 percent) are spent in clinical clerkships. These contact hours are in lectures, laboratories, and clinics. Table 5 shows the distribution of hours in these three settings for both basic and clinical sciences.

Table 5. Chiropractic Education in Terms of Average Hours of Lectures, Laboratories, and Clinics in 16 Chiropractic Colleges

Variable	Chiropractic Schools		
	Total	Basic Science	Clinical Science
Lecture hours	2675	1020	1655
Laboratory hours	1115	400	715
Clinical hours	1010	0	1010
Total	4800	1420	3380

Source: Center for Studies in Health Policy, Inc., Washington, DC. Personal communication of 1995 unpublished data from Meredith Gonyea, PhD.

There are five curricular areas that are emphasized in chiropractic education: adjustive techniques/spinal analysis (averaging 555 hours or 23 percent of the clinical program), principles/practices of chiropractic (averaging 245 hours or 10 percent), physiologic therapeutics (averaging 120 hours or 5 percent), and biomechanics (averaging 65 hours or 3 percent).

The clinical courses offered in chiropractic colleges are shown in Table 6. Subjects dealing with diagnosis and chiropractic principles are given the most time, followed by orthopedics, physiologic therapeutics, and nutrition. Three areas within the clinical sciences shown in Table 6 (adjustive techniques/spinal analysis, physical/clinical/laboratory diagnosis, and diagnostic imaging) account for an average of 52 percent of the education in clinical sciences. Thus the emphasis in chiropractic clinical sciences is clearly on diagnosis and manipulative therapy.

3. Content

The sequencing of subjects in two chiropractic colleges are illustrated in Tables 7 and 8 (Coulter, submitted). Table 7 represents a year-round trimester program and Table 8 illustrates a semester program. Both programs are representative of other colleges in terms of total numbers of hours of clinical and basic sciences. The program from Table 7 is spread over 4 years with 10 trimesters. The first 2 years of the program are heavily focused on the basic and clinical sciences. In year 1 (three trimesters of 15 weeks each) there are a total of 1,515 contact hours (960 hours in basic sciences and 555 in clinical education), of which 585 are spent in lectures and 930 in the

laboratory. This represents an average of 34 contact hours per week for the students.

In year 2, the focus is again on basic sciences (375 hours) and clinical sciences (1,110 hours). There are a total of 1,485 contact hours in year 2 (795 in lectures, 690 in laboratory), and there are an average of 33 contact hours per week. In year 3, all of the contact hours are spent on clinical education (which includes clinical sciences and clinical clerkships). Year 3 has a total of 1,410 contact hours (330 in lectures, 300 in laboratory, 780 in clinic), an average of 31 contact hours per week. Year 4 is given over to a clinical internship for 15 weeks (one trimester) for a total of 450 hours or 30 hours per week.

Table 6. Average Total Contact Hours in Specific Clinical Subjects Taught in 16 Chiropractic Colleges (Includes lectures and laboratories).

Clinical subject	Hours	% of Total
Adjustive technique/spinal analysis	555	22%
Physical/clinical/laboratory diagnosis	410	17%
Diagnostic imaging, radiology	305	12%
Principles of chiropractic	245	10%
Orthopedics	135	6%
Physiologic therapeutics	120	5%
Nutrition/dietetics	90	4%
Professional practice & ethics	65	3%
Biomechanics	65	3%
Gynecology/obstetrics	55	2%
Psychology	55	2%
Research methods	50	2%
Clinical pediatrics & geriatrics	50	2%
First aid & emergency	45	2%
Dermatology	30	1%
Otolaryngology	25	1%
Other	160	7%
Total hours of clinical training	2460	100%

Source: Center for Studies in Health Policy, Inc., Washington, DC. Personal communication of 1995 unpublished data from Meredith Gonyea, PhD.

4. Faculty

Despite a growing body of literature about chiropractic education, the role of faculty has received little attention. As a result of standards set by the Council on Chiropractic Education (CCE) for chiropractic college faculty, all basic sciences faculty members at chiropractic colleges have earned university degrees of MS or PhD in their discipline, and many of the D.C. faculty also hold higher degrees (Wardwell, 1992). Clinical sciences faculty must either have a baccalaureate degree, several years of chiropractic experience, or teaching experience at an institution of higher education (CCE, 1995).

Table 7. Subjects Taught in a Typical Trimester-Based Chiropractic Program, by Year and Numbers of Contact Hours

Year 1	Year 2	Year 3	Year 4
General anatomy (210)*	Pharmacotoxicology (30)	Integrated chiropractic clinical application (90)	Clinical internship (450)
Functional anatomy and biomechanics (210)	Clinical microbiology (90)	Physiological therapeutics (30)	
Histology (90)	Pathology (135)	Chiropractic principles (75)	
Human biochem. (105)	Chiropr. principles (60)	Practice management (75)	
Chiropr. principles (90)	Chiropr. procedures (300)	Imaging interpretation (90)	
Clinical chiropractic (60)	Physics and clinical imaging (90)	Radiological position and technique (30)	
Palpation (120)	Clinical orthopedics and neurology (180)	Differential diagnosis (90)	
Neuroscience (120)	Nutritional assessment (60)	Clinical application of manual procedures (60)	
Normal radiological anatomy (90)	Community health (60)	Clinical internship (390)	
Human physiology (135)	Physiological therapeutics (105)	Dermatology (15)	
Fundamentals of nutrition (60)	Clinical nutrition (60)	Clinical psychology (15)	
Introduction to physical examination skills (120)	Research methods (30)	Obstetrics/gynecology (15)	
Chiropractic procedures (105)	Practice management (30)	Pediatrics (15)	
	Imaging interpretation (75)	Geriatrics (15)	
	Differential diagnosis (90)	Clinical laboratory clerkship (15)	

	Clinical chiropr. applied (90)		
Total hours: 1,515	TOTAL HRS: 1,485	TOTAL HRS: 1,410	TOTAL: 450

*Number of contact hours is noted in parentheses.

Source: Los Angeles College of Chiropractic, Whittier, California.

5. Recent Trends and Innovations

Within the health sciences in the past decade there have been numerous innovations in educational principles and practice. In chiropractic, most of the teaching institutions are involved in curriculum reform. Key innovations include the move to problem-based learning, self-directed learning, computer-assisted learning, the use of standardized patients, and the use of objective structured clinical examinations (Adams, 1991; Traina, 1994).

Unlike most public- and private-sector institutions of higher learning, limited external education and research funding have hindered chiropractic institutional development thereby contributing to excessive tuition dependence. Recent Federal initiatives focusing on developing and prioritizing research within the chiropractic profession have highlighted this issue, emphasizing the need for directed educational research and faculty development (Adams, 1997). A number of chiropractic schools are well aware of the challenges confronting their programs and attempts are under way to fund innovative ways of enhancing chiropractic educational programs (Adams, 1997). However, if significant improvement is to occur, substantial resources will need to be identified and earmarked for educational enhancement.

Table 8. Subjects Taught in a Typical Semester-Based Chiropractic Program, by Year and Number of Contact Hours

Division	First Year	HRS	Second Year	HRS	Third Year	HRS.	Fourth Year	HRS
		.		.				.
Biologic. Sciences	Human Anatomy	180	Pathology	174	Lab. Diagnosis (II)	32	Clinical Nutrition	26
	Microscopic Anatomy	140	Lab. Diagnosis (I)	40	Toxicology	13	Community Health	39
	Neuroanatomy	72	Microbiology & Infectious Dis.	100				
	Neuroscience (I)	32	Neuroscience (II)	87				
	Biochemistry	112	Nutrition	58				
	Physiology (I)	36	Immunology	13				

Chiropr. Sciences	Chiropractic Principles (I)	56	Chiropractic Principles (II)	58	Chiropractic Principles (III)	42	Integrated Chiropractic Practice	95
	Basic Body Mechanics	96	Chiropractic Skills (II)	145	Clinical Biomechanics	100	Jurisprudence & Pract. Development	46
	Chiropractic Skills (I)	100	Spinal Mechs.	42	Chiropractic Skills (III)	145		
					Aux. Chiro. Therapy	58		
					Intro Jurisprudence & Practic. Develop.	16		
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Clinical Science	Normal Radiographic Anatomy	16	Intro. Diagnosis	87	Orthopedics & Rheumatology	92	Clinical Psychology	46
	Rad. Biophysics & Protection	44	Intro. Bone Pathology	48	Neurodiagnosis	42	Emergency Care	52
			Normal Roentgen Variations & Roentgenometrics	39	Differential DX.	32	Child Care	20
					DX. & Symptomato.	116	Female Care	29
					Radiological Techn.	39	Geriatrics	20
					Arthritis & Trauma	48	Abdomen, Chest, Special X-Ray Procedures	40
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Clinical Education	Observer (I)		Observer (II)		Observer (III)	406	Internship	752
							Auxiliary Chiropr. Therapy Clerkship	33
							Clin. Lab Clerkship	21
							Clin. X-Ray Techn.	71
							Clin X-Ray	
							Interpretation	69

							Chiropr. Mgmt.	31
							Observer (IV)	
<hr/>								
Research					Applied Research & Biometrics	32	Research Investigation Project	
<hr/>								
TOTALS		912		978		1213		1390

Source: Canadian Memorial Chiropractic College. Toronto, Ontario, Canada.

D. Specialty Training

Specialty training is available through U.S. chiropractic colleges for part-time postgraduate education programs or full-time residency programs. Postgraduate education programs are available in family practice, applied chiropractic sciences, clinical neurology, orthopedics, sports injuries, pediatrics, nutrition, rehabilitation, and industrial consulting. Rehabilitation has become a particularly popular program (Liebenson, 1996). Residency programs include radiology, orthopedics, family practice, and clinical sciences (Christensen, 1993). A typical residency program is 2-3 years in duration and includes ambulatory care and inpatient clinical rotations at chiropractic and medical facilities, along with didactic and research experiences. Other less rigorous postgraduate training programs may take 1-3 years to complete on a part-time basis. Both the residency and postgraduate programs lead to eligibility to sit for competency examinations offered by specialty boards recognized by the American Chiropractic Association, the International Chiropractors' Association, and the American Board of Chiropractic Specialties. Specialty boards may confer "Diplomate" status in a given area of focus upon successful examination. Chiropractic orthopedics and sports chiropractic are the most prevalent specialty certifications.

Opportunities for chiropractors to participate in medical and multidisciplinary residencies are currently limited. Some fellowship programs exist in orthopedics and radiology and new opportunities in occupational medicine and physiatry may be on the horizon. Some chiropractic schools are pursuing joint training opportunities in the areas of public health, epidemiology, and health care administration.

E. Continuing Education

Participation in Continuing Education by chiropractors is commonplace as 47 of 50 States have mandatory continuing education requirements to maintain or renew a license to practice (FCLB, 1997). The annual number of required hours ranges from zero in 3 states to 50 in Kansas (FCLB, 1997) (see Table 12 in Chapter V). The most prevalent requirement is 12 hours per year (25 of the 50 States). In addition, a number of States specify that topical content areas are to be included in annual continuing educational requirements. Examples include diagnostic imaging, chiropractic technique, risk management, public health (infection control and AIDS prevention), and professional boundaries issues. Several State Licensing Boards limit who may sponsor continuing educational activities (e.g., accredited chiropractic colleges or approved associations) and what the

program is about (e.g., practice management seminars are typically excluded).

Chiropractic continuing education programs often involve a 1- to 2-day seminar or conference (8-16 hours) focusing on a variety of topics related to chiropractic principles, clinical skills development, diagnosis, patient care, and practice management. These programs are usually sponsored by chiropractic colleges and other educational institutions, professional associations, and sometimes by commercial vendors or individual entrepreneurs. There is a growing interest in practice-based continuing education and distance learning (Jamison, 1991; Ebrall, 1995). Several colleges and publishers have created opportunities for chiropractors to participate in distance learning activities including the use of self-directed learning modules with audiovisual support and computer-enhanced learning. In addition, several States grant continuing education credits for self-directed learning.

F. Comparison with Medical Education and Training

A recent study comparing chiropractic and medical education collected data on all chiropractic and medical schools in North America and performed an in-depth analysis of three chiropractic and three medical schools (Coulter, submitted). Three States providing a broad geographic representation of the United States were chosen: California, Iowa, and Texas. These States account for almost half of the chiropractic colleges in the United States. A single chiropractic college and school of medicine were studied in each State.

The chiropractic schools included in this study had enrollments of 521, 773, and 1880, compared with a mean enrollment for all colleges of 878 (CCE Report, 1996). The three medical schools had enrollments of 691, 734, and 745, all moderately above the national average of 536 (*JAMA*, 1995).

1. Program Length

The chiropractic programs consist of 4 years of undergraduate education totaling approximately 4,800 contact hours. The medical programs consist of 4 undergraduate years, with approximately the same number of contact hours (4,667), but typically with an additional 3-year residency to meet the requirements for practice.

2. Selection of Students

Medical schools require at least 3 years of college education prior to admission, while chiropractic colleges require a minimum of 2 years. In fact, most medical students complete 4 or more years of college (Coulter, submitted). However, national data on graduate chiropractors show that 78 percent have degrees other than chiropractic, of which 54 percent are Bachelor's or higher. Most chiropractors completed these degrees prior to the D.C. degree (Christensen, 1993).

A recent study found the grade point average of students entering chiropractic schools is 2.7 compared to 3.5 for those entering medical schools (Coulter, submitted). Medical schools use the results of a standardized examination, the MCAT, as part of the selection process. Chiropractic schools have no standardized equivalent.

3. Prerequisites

There is considerable overlap in the two professions in terms of the courses they require as prerequisites for entrance. Both require biology, general inorganic chemistry, organic chemistry, and general physics. In medicine it is common to require mathematics, which is not required in chiropractic. Both require a humanities prerequisite with chiropractic also requiring a social science/psychology credit as well as English and/or communication skills.

4. The Curriculum

Two questions are of paramount importance in comparing the curricula of the two professions; what subjects are taught and how much is taught? The two programs are relatively similar in total student contact hours: an average of 4,822 hours in chiropractic schools compared with 4,667 hours in medical schools (Coulter, et al, submitted).

Basic science comprises 25-30 percent of the total contact hours in both the chiropractic and medical programs (Table 9) and the two programs have roughly similar contact hours in biochemistry, microbiology, and pathology (Table 10). Chiropractors receive substantially more hours in anatomy education and physiology but many fewer in public health.

Table 9. Comparisons of the Overall Curriculum Structure for Chiropractic and Medical Schools

	Chiropractic Schools		Medical Schools	
	Mean	Percentage	Mean	Percentage
Total Contact Hours	4822	100%	4667	100%
Basic science hours	1416	29%	1200	26%
Clinical science hours	3406	71%	3467	74%
Chiropractic science hours	1975	41%	0	0
Clerkship hours	1405	29%	3467	74%

Source: Center for Studies in Health Policy, Inc., Washington, DC. Personal communication of 1995 unpublished data from Meredith Gonyea, PhD.

Table 10. Comparison of Hours of Basic Sciences Education in Medical and Chiropractic Schools

Subject	Chiropractic Schools		Medical Schools	
	Hours	% of Total	Hours	% of Total
Anatomy	570	40	368	31
Biochemistry	150	11	120	10
Microbiology	120	8	120	10
Public Health	70	5	289	24
Physiology	305	21	142	12
Pathology	205	14	162	14
Total Hours	1,420	100	1,200	100

Source: Center for Studies in Health Policy, Inc., Washington, DC. Personal communication of 1995 unpublished data from Meredith Gonyea, PhD.

The contrast between the two programs is dramatic in the area of *clinical clerkships*, which averaged 3,467 hours in medicine versus 1,405 hours in chiropractic. In medicine this comprises, on average, 74 percent of the total contact hours, while in chiropractic it comprises only 29 percent (Table 9). Part of the difference can be explained by the way in which the programs are structured. In chiropractic 41 percent of the program (averaging 1,975 hours) is allocated to chiropractic clinical sciences, which consists of extensive laboratory and hands-on training in manual procedures and has no equivalent in medicine. Combining the chiropractic clinical sciences with the clinical clerkships, the percentage of a chiropractic program devoted to *clinical education* is 70 percent compared to medicine's 74 percent. The major difference therefore is in didactic teaching and clinical experience.

Thus, on average, medical students receive twice the number of hours in clinical experience but receive over 1,000 fewer hours in lectures and laboratory education. If the medical residency is included, the total number of hours of clinical experience for medicine rises to 6,413 (Coulter, submitted).

1. Center for Studies in Health Policy, Inc., Washington, DC. Personal communication of 1995 unpublished data from Meredith Gonyea, PhD.

2. Source: Center for Studies in Health Policy, Inc., Washington, DC. Personal communication of 1995 unpublished data from Meredith Gonyea, PhD.

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CHAPTER IV

SUPPLY, DISTRIBUTION, AND UTILIZATION OF CHIROPRACTORS IN THE UNITED STATES

Ian D. Coulter, PhD; Paul G. Shekelle, MD, PhD

A. Current and Projected Supply of Chiropractors

In 1970, there were an estimated 13,000 chiropractors licensed in the United States (Cooper, 1996). This number had increased to 40,000 in 1990 and to approximately 50,000 in 1994. Thus, there is roughly one chiropractor for every 5,000 U.S. residents. Estimates of the proportion of chiropractors who are in full-time practice range from 82 percent in a large national survey conducted in 1993 (Christensen) to 96 percent in a 1995 survey of members of the American Chiropractic Association (Goertz, 1996). Almost 90 percent of chiropractors report working at least 30 hours per week (Christensen, 1993) and the average chiropractor claims to work about 42 hours per week (Goertz, 1996). Estimates of the percentage of chiropractors in solo private practice range from 67 percent (Christensen, 1993) to 76 percent (Goertz, 1996), indicating that most chiropractors have remained in solo practice.

In 1995, there were 14,040 students enrolled in the 16 accredited chiropractic colleges, 2,864 of whom graduated in that year.³ The enrollment patterns in chiropractic colleges have been stable for the last several years with no new colleges being established since 1994. It appears that enrollments in chiropractic colleges are beginning to stabilize after a period of growth. However, with about 2,900 graduates per year, an increasing proportion of chiropractors is recent graduates.

A recent study estimated that the number of chiropractors will double by the year 2010 (to over 100,000), far exceeding the 16 percent increase projected for medical doctors (Cooper, 1996). This projection is based on two assumptions: (1) the number of chiropractor students will increase by 25 percent over the next 5 years and then stabilize and (2) 27 percent of currently active chiropractors will die or retire by 2010. Thus, it appears that chiropractors will represent a substantially larger proportion of health care professionals in the coming years.

B. Geographic Distribution

Colleges of chiropractic are not evenly distributed throughout the United States. Of the 16 accredited schools, 4 are in California, 2 in Texas, 2 in Missouri. The other eight are distributed in Oregon, Minnesota, Illinois, New York State, Georgia, Iowa, Connecticut, and South Carolina. Partly as a result of the distribution of the colleges, the practitioners are not evenly distributed throughout the states. Data from the Federation of Chiropractic Licensing Boards (FCLB) on the number of chiropractors licensed in each of the States in 1993 and 1995 (FCLB, 1996) are presented in Table IV-1. States with more than 3,000 chiropractors in 1995 were: California, New York, Florida, Pennsylvania, and Texas. Twenty-two States had more than 1,000 chiropractors. California, with 9,879 licensed chiropractors, had twice the number of the next largest state (New York).

The FCLB information, in conjunction with data on the estimated population in each state during these years, permitted estimation of the number of licensed chiropractors in each state per 100,000 population (Table 11). Because some chiropractors are licensed in more than one state and a substantial fraction is not practicing full-time (or at all), these numbers undoubtedly overestimate the supply of chiropractors. In addition, the dramatic differences in the reported number of chiropractors between 1993 and 1995 in some States (e.g., Hawaii, Illinois, New York, and Pennsylvania) casts further doubt on the accuracy of these data. Alternatively, changes in examination requirements, maintenance of inactive vs. active licenses and examination and license fees may account for year to year differences.

Nevertheless, the data are probably adequate for identifying States or at least regions that have particularly high or low population-to-chiropractor ratios. Specifically, States with the fewest chiropractors per 100,000 population in 1995 were: District of Columbia, Louisiana, Maryland, Mississippi, and West Virginia. The States with the most chiropractors per capita were: Arizona, Colorado, and Hawaii. It appears that States in the West have been generally more hospitable to chiropractors than those in the South and East. About 60 percent of chiropractors worked in urban or suburban communities, 35 percent in small towns, and 5 percent in rural areas (Goertz, 1996).

C. Utilization of Chiropractic Services

The proportion of the United States population that uses chiropractors and the number of chiropractic visits per capita have about doubled in the past 15-20 years. A 1980 national survey commissioned by the United States Department of Health, Education, and Welfare reported that 3.6 percent of the population used chiropractors that year and that there were 62 visits per 100 person-years (Von Kuster, 1980). The 1980 National Medical Care Utilization and Expenditure Survey found that 4 percent of the population saw a chiropractor (Mugge, 1984; Mugge, 1986). A community-based study of claims data collected between 1974 and 1982 reported that there were 41 chiropractic visits per 100 person-years (Shekelle, 1991). Each of the above studies also reported both large-area and small-area geographic variations in chiropractic use. More recently, a national telephone survey of the United States adult population reported that 7 percent of persons had used a chiropractor in the prior year (Eisenberg, 1993), and the chiropractic visit rate, as calculated from a recent cluster sample in 5 communities in the U.S., was 100 visits per 100 person-years (Hurwitz, in press). In this study, there were only small (less than 10 percent) differences in the estimated use rates among sites (San Diego, California; Portland, Oregon; Vancouver, Washington; Minneapolis-St. Paul, Minnesota; Miami, Florida).

Table 11. Number of Licensed Chiropractors per 100,000 Population, by State: 1993 and 1995

STATE	1993		1995	
	<i>Licensed Chiro.</i>	<i>Number per 100,000</i>	<i>Licensed Chiro.</i>	<i>Number per 100,000</i>
<i>Alabama</i>	661	16.4	671	16.6
<i>Alaska</i>	162	29.4	186	33.8
<i>Arizona</i>	2,167	59.1	2,384	65.1
<i>Arkansas</i>	493	21.0	508	21.6
<i>California</i>	10,692	35.9	9,879	33.2

<i>Colorado</i>	1,566	47.6	1,696	51.5
<i>Connecticut</i>	893	27.2	858	26.1
<i>Delaware</i>	200	30.0	209	31.4
<i>Dist. Columbia</i>	93	15.3	39	6.4
<i>Florida</i>	3,896	30.1	4,355	23.0
<i>Georgia</i>	2,026	31.3	2,237	44.7
<i>Hawaii</i>	486	43.8	712	64.3
<i>Idaho</i>	301	29.9	338	33.6
<i>Illinois</i>	2,399	21.0	2,912	25.5
<i>Indiana</i>	919	16.6	900	16.2
<i>Iowa</i>	1,270	45.7	1,231	39.1
<i>Kansas</i>	614	24.8	637	25.7
<i>Kentucky</i>	1,162	31.5	1,055	28.6
<i>Louisiana</i>	566	13.2	592	14.0
<i>Maine</i>	358	29.2	375	30.5
<i>Maryland</i>	489	10.2	488	10.2
<i>Massachusetts</i>	1,422	23.6	1,220	20.3
<i>Michigan</i>	2,390	25.7	2,440	26.2
<i>Minnesota</i>	1,582	36.2	1,613	36.9
<i>Mississippi</i>	335	13.0	330	12.5
<i>Missouri</i>	1,864	36.4	1,856	36.3
<i>Montana</i>	364	45.6	228	28.5
<i>Nebraska</i>	263	16.7	281	17.8
<i>Nevada</i>	308	25.6	326	27.1
<i>New Hampshire</i>	401	36.2	435	39.2
<i>New Jersey</i>	2,850	36.9	2,701	34.9
<i>New Mexico</i>	558	36.8	577	38.1
<i>New York</i>	7,558	42.0	4,926	27.4
<i>North Carolina</i>	1,101	16.6	1,292	19.5
<i>North Dakota</i>	205	32.1	224	35.1

Ohio	1,563	14.4	1680	15.5
Oklahoma	960	30.5	980	31.1
Oregon	785	27.6	877	30.9
Pennsylvania	5,127	43.1	3,190	26.8
Rhode Island	161	16.0	158	15.8
South Carolina	1,015	29.1	1,097	31.4
South Dakota	188	27.0	201	28.9
Tennessee	600	12.3	780	16.0
Texas	3,347	19.7	3,682	21.7
Utah	425	24.7	580	33.6
Vermont	330	58.6	261	46.4
Virginia	950	15.4	1,090	17.6
Washington	1,593	32.7	1,625	33.4
West Virginia	280	15.6	255	14.2
Wisconsin	1,661	34.0	1,764	36.1
Wyoming	198	43.6	183	40.3

Source: Federation of Chiropractic Licensing Boards. Official Directory: Chiropractic Licensure and Practice Statistics: 1996-97 Edition.

3. Center for Studies in Health Policy, Inc. Washington, DC. Personal communication of unpublished 1995 data from Meredith Gonyea, PhD.

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CHAPTER V

LICENSURE AND LEGAL SCOPE OF PRACTICE

Ruth Sandefur, DC, PhD; Ian D. Coulter, PhD

A. Licensure in 50 States

The practice of chiropractic is licensed and regulated in all 50 of the United States and in over 30 countries worldwide (Christensen, 1993). Attainment of licensure was the culmination of years of struggle by the profession (Wardwell, 1992). The quest began in the State of Minnesota in 1905 and ended in 1974 when Louisiana became the final State to license chiropractic (Peterson, 1995). Licensure helped to make the practice of chiropractic legitimate as well as helping to define the scope of chiropractic practice. Because there are 50 different legislative bodies involved in the licensing process, there is a wide variation in scope of practice from State to State. For example, in a recent survey of chiropractic licensing boards in the United States and Canada, it was shown that a few States allow very little other than spinal manipulation to be performed while others permit a number of diverse procedures such as acupuncture, electromyography, and laboratory diagnostics (Lamm, 1995).

The legislation that led to licensure also authorized the formation of State Licensing Boards that regulate, among other factors, the education, experience, and moral character of candidates for licensure. One of the main purposes of the State Licensing Boards is to protect the public health, safety, and welfare (FCLB, 1997). To varying degrees, State boards construct and administer examinations to candidates for licensure or require examinations administered nationally by the National Board of Chiropractic Examiners (described later). Additionally, some State boards may stipulate which of the chiropractic colleges are eligible to have their graduates take the State's licensing examination. Currently, students who have graduated from any of the 16 chiropractic colleges accredited by the Council on Chiropractic Education may take the licensing examination in all 50 States (FCLB, 1996). In 1996, all chiropractic colleges in the United States were accredited.

Because each State has a different governing board and regulatory structure, there are a variety of testing and licensing procedures across States. For example, only five States, Kansas, Illinois, Missouri, New York, and Virginia, grant licenses to applicants based solely upon the successful completion of the National Board of Chiropractic Examiners' battery of tests.

The National Board of Chiropractic Examiners (NBCE), established in 1963, functions similarly to the National Board of Medical Examiners (NBME). Part I of the NBCE covers the basic sciences and may be taken after the first year of chiropractic college education. Part II covers clinical sciences and is administered when a student is in his/her senior year of chiropractic college. Part III is a written clinical competency examination that requires an examinee to have passed Part I and be within 8 months of graduation (if taken while still in school). The optional NBCE Physiotherapy Examination may be taken following the completion of 120 hours of physiotherapy coursework. This exam is independent of Parts I, II, and III. The Physiotherapy Examination was initiated in 1965 as a response to requests from representatives of several State boards. Since the subject was being taught in many of the chiropractic colleges and because the use of physiotherapy was widespread among practicing chiropractors, there was interest in

evaluating competency in the subject. The Physiotherapy Examination is maintained as a separate test because a few chiropractic institutions have not incorporated physiotherapy into their curricula and some States' scope of practice laws restrict the use of physiotherapy modalities by chiropractors.

Recently, another national examination has been developed at the request of the Federation of Chiropractic Licensing Boards (FCLB). The Part IV practical examination (Objective Structured Clinical Examination) tests students' practical skills in three areas: x-ray interpretation and diagnosis, chiropractic technique, and case management. This examination may be taken following successful completion of Part I and Part II of the NBCE when a student is within 6 months of graduation (FCLB, 1996).

All States, except the five States mentioned previously that do not have a separate examination, require passing scores on all or part of the NBCE tests as well as on one State-administered test. The content and format of the State-administered examinations vary considerably. Approximately one in three States require one State-administered evaluation. This may involve written questions regarding State regulations and statutes, an interview, or a practical examination covering diagnostic and management procedures. The remaining States require from two to four additional examinations. These State-administered examinations may cover clinical sciences, diagnostic sciences, x-ray interpretation, and spinal manipulative techniques, as well as questions about State statutes. Table 12, based on information from the Federation of Chiropractic Licensing Board's annual publication, provides detailed information about these individual requirements (FCLB, 1996, 1997).

1. The National Board of Chiropractic Examiners

The National Board of Chiropractic Examiners (NBCE) was established in 1963 to foster consistency and reciprocity among State boards (Wardwell, 1992). Initially the NBCE was met with resistance from some State examining boards, but by 1970, it was recognized in 29 States and by 37 licensing boards (Peterson, 1995). At present, all 50 States recognize the national examination and 49 require Part I for licensure (FCLB, 1997). Part II of the examination is required by all States except Maryland and Michigan (Table 12), and Part III is required by 45 States (FCLB, 1997). Part IV, the Objective Structured Clinical Examination, is currently required in 21 States. Despite wide acceptance of the NBCE, all but 10 States continue to administer their own examinations. Some of these examinations consist of a personal interview, some consist of questions about the State statutes governing the practice of chiropractic, and others give written/practical examinations in various subjects, such as radiology, adjusting techniques, clinical science subjects, or other areas of particular interest to that State (FCLB, 1997).

2. Establishment of the Federation of Chiropractic Licensing Boards

There was an obvious need for the 50 separate State agencies to establish a single body to facilitate coordination and communication. A board, originally known as the Council of State Chiropractic Examining Boards (CSCEB) was established in 1933, with the mandate to promote

Table 12. Licensing and Reciprocity Regulations by State

State	Pre-Prof. Education	State Admin.	NBCE Required	Cont. Ed. hrs/yr.	Reciprocity
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AL	I	A,B,C,D	1,2	18	NO
AK	II	A,B,C	1,2,3,PT	12	YES
AZ	I	B,C	1,2,3,4,PT	12	YES**
AR	II	A,B,C	1,2,3,PT	24	NO
CA	III	B	1,2,3,4,PT	12	YES
CO	I	B,C	1,2,3	15	YES
CT	II, III	B	1,2,3,PT	0	NO
DE	I	A	1,2,3,PT	12	YES
FL	Other	B,C	1,2,3,PT	20	YES**
GA	II, III	B,C	1,2,3	12	YES
HI	III	B,C	1,2,3,PT	10	NO
ID	II	A,B,C	1,2,3,PT	12	YES**
IL	II	0	1,2,3	Required‡	YES
IN	II, III	A,B,C	1,2,3,PT	12	YES
IO	II	B	1,2,3,4,PT	30	YES*
KS	III, IV	D	1,2,3,4,PT	50	NO
KY	III	B	1,2,3,4	12	NO
LA	III	B,C	1,2,3,PT	12	YES
ME	II	B,C	1,2,3,PT	12	YES*
MD	IV	A,B,C	1	24	YES
MA	II	C	1,2,3,4,PT	12	YES
MI	II	A,B	None	12	YES
MN	II	A,B,C	1,2,3,4,PT	20	NO
MS	II	B	1,2,3,4,PT	12	NO
MO	III	0	1,2,3,4,PT	20	YES
MT	IV	A,B,C	1,2,3,4,PT	12	NO
NE	Other	B	1,2,3,4,PT	15	YES
NV	III	B,C	1,2,3,PT	12	NO
NH	I	C	1,2,3,4	10	YES
NJ	II	B	1,2,3	0	NO

NM	II	A,B,C	1,2,3	10	YES*
NY	II, III	0	1,2,3,4	Required‡	YES
NC	IV	A,B,C	1,2,3,PT	24	YES
ND	II	B,C	1,2,3,4	12	YES
OH	III	B,C	1,2,3,PT	12	NO
OK	III	A,B,C	1,2,PT	12	YES**
OR	II	A,B,C	1,2,3,PT	15	YES
PA	II	B,C,	1,2,3,4	12	YES
RI	IV	B	1,2,3	12	YES*
SC	II	B,C	1,2,3	12	NO
SD	II	A,B	1,2,3,4,PT	20	YES**
TN	II	A,B,C	1,2,3,PT	12	YES*
TX	II	B,C	1,2,3,4,PT	16	NO
UT	II	C	1,2,3,4,PT	15	YES*
VT	II	A,B	1,2,3,4,PT	12	YES*
VA	I	0	1,2,3,4	0	NO
WA	II	A,B	1,2	25	YES*
WV	II, III	A,B	1,2,3	12	YES*
WI	II, III, IV	A,B,C	1,2,3	20	NO
WY	II	C	1,2,3,4,PT	12	YES

KEY: I=No requirement; II=Two Years College; III=60 Credit hrs; IV=Bachelor's Degree. A=Written exam in specific subjects; B=Practical or oral exam in specific subjects; C=Written or oral exam on state laws; D=Interview. 1=NBCE Part I; 2=NBCE Part II; 3=NBCE Part III; 4=NBCE Part IV; PT=NBCE Physiotherapy. *=State Exam; **=State Exam plus other requirements; ‡=CE required/# hours unknown.

Sources: Official Directory of FCLB, 1996-97 and 1997-98.

unified standards for chiropractic licensure. It was renamed the Federation of Chiropractic Licensing Boards (FCLB) in 1974 and has had the following mission:

- a. To promote unified standards in the operation of all chiropractic licensing boards
- b. To aid in problems confronting individual chiropractic licensing boards
- c. To promote and aid cooperation between chiropractic licensing boards

- d. To disseminate information of mutual interest to various chiropractic licensing boards, and
- e. To encourage uniformity of educational standards in colleges teaching chiropractic (Peterson, 1995).

The FCLB publishes a directory that provides information about licensing requirements for each State (FCLB, 1997).

3. Effect of Licensing upon Chiropractic Educational Institutions

The FCLB was instrumental in the efforts to establish an independent accreditation agency for chiropractic educational institutions (Peterson, 1995). Federal recognition of the Council on Chiropractic Education (CCE) as the accrediting body for chiropractic colleges in 1974 was a landmark event in the history of chiropractic education (Keating, 1992). The CCE regulates preprofessional requirements for admission to chiropractic colleges as well as educational requirements for graduation from chiropractic colleges (Peterson, 1995).

B. Reciprocity Agreements

The term reciprocity has traditionally been used when describing the policy of States agreeing to grant licensure to practitioners licensed to practice in another State. In reality, however, there are no States that automatically provide a license to a chiropractor based solely on possession of a license to practice in another State (FCLB, 1996). Every State has set a minimum standard that must be met in order to obtain a license. Requirements for reciprocity are generally less stringent than those imposed for initial licensure.

Each State has established its own reciprocity policy (Table 12). A few States indicate that they do not reciprocate, which means that a licensee from another State must approach the board in the same manner as a new candidate for licensure. Other States, despite claiming that they grant reciprocity, still require that the chiropractor seeking reciprocity fulfill all of the same requirements as a new candidate. Several other States have specific requirements and/or examinations that must be passed. Some States require that a practitioner coming from another State provide a current measure of clinical competency by taking and submitting a score transcript on the NBCE Special Purposes Examination for Chiropractic (SPEC). This examination is designed to measure the competency level of an individual who has been in practice for at least 2 years.

C. Legal Scope of Practice

Chiropractic is licensed and regulated in every State (Lamm, 1995). State statutes and regulations determine the scope of clinical procedures chiropractors may legally perform in their respective jurisdictions. Within these legal boundaries individual practitioners may practice as they wish. Providing care for musculoskeletal conditions using manipulation as a primary intervention is within the legal scope of chiropractic practice in all 50 States. The legal right to use other procedures including modalities, myofascial work, acupuncture, and nutritional therapy varies from State to State.

The United States and State constitutions empower States to grant licensure and to regulate scope of practice (Christensen, 1993). State regulatory agencies, established by the legislature of each State, manage the licensing process and disseminate information regarding scope of practice. In most States, the extent of the scope of practice will be influenced by laws enacted through legislation, policies, or guidelines issued by the regulatory agency responsible for licensing, and by court decisions.

All States currently exclude prescribing drugs and performing major surgery from chiropractic practice. Otherwise, differences in scope of practice vary considerably from State to State. These variations are categorized here as: (1) restrictive, (2) expansive, or (3) intermediate. States are considered restrictive in scope if they explicitly prohibit chiropractors from performing two or more of the following: venipuncture for diagnostic purposes, use of physiotherapy modalities, dispensing of vitamin supplements, or provision of nutritional advice to patients. Michigan is an example of a State with a restricted scope of practice (FCLB, 1996). In Michigan, the license limits chiropractors to the use of spinal analysis and x-ray to detect spinal subluxations and misalignments and the administration of spinal adjusting procedures to correct these subluxations. Michigan prohibits the use of any type of physiotherapy, a rather standard adjunct to chiropractic procedures in most jurisdictions. Chiropractors may give patients advice about nutrition but cannot dispense nutritional supplements. They are not allowed to perform venipuncture, even for diagnostic purposes. Five other States share similar restrictions with Michigan and can also be considered restrictive: Mississippi, New Jersey, South Carolina, Tennessee, and Washington.

A State classified as having an expansive scope of practice allows three or more of the following practices: specialty diagnostic procedures, pelvic and rectal examinations, venipuncture for laboratory diagnosis, signing of birth and death certificates, and acupuncture using needles. An example of a State with an expansive scope is Oregon (FCLB, 1996). In Oregon, chiropractors are allowed to perform minor surgery, proctology, and obstetrical procedures. They also employ "chiropractic diagnosis, treatment and prevention of body dysfunctions, correction, maintenance of the structural and functional integrity of the neuromusculoskeletal system and the effects thereof or interferences therewith by the utilization of all recognized and accepted chiropractic diagnostic procedures and the employment of all rational therapeutic measures as taught in approved chiropractic colleges" (FCLB, 1996). Chiropractors practicing in Oregon may utilize physiotherapy devices, perform venipuncture to collect blood specimens for laboratory diagnosis, give nutritional advice, and dispense nutritional supplements from their offices. Three other States share the characteristics of an expansive scope of practice: Idaho, Ohio, and Oklahoma.

The remaining 40 States have practice statutes that fall somewhere in between the extremes of expansive or restrictive. An example of a state with an intermediate scope of practice is Kansas, where chiropractors may use venipuncture for diagnostic purposes, employ acupuncture using needles if certified, and utilize physiotherapies, but may not perform pelvic examinations or sign birth or death certificates. Lamm (1995) published a report that provides detailed information regarding specific diagnostic and treatment procedures that are either allowed or prohibited in 46 States whose board representative responded to a questionnaire.

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CHAPTER VI

INSURANCE COVERAGE OF CHIROPRACTIC SERVICES

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A. Sources of Reimbursement for Chiropractic Services

Although many patients still pay out-of-pocket for chiropractic services, most now have insurance that pays part of the cost. The two best sources of information about payment for chiropractic services are the annual survey of the members of the American Chiropractic Association (who comprise roughly 25 percent of all the licensed chiropractors in the U.S.)⁴ and a recent study of chiropractic utilization in five geographic areas of the U.S. (Goertz, 1996; Hurwitz, in press). The 1995 ACA data describe the percentage of total revenues chiropractors received from specific sources. The Hurwitz study reports the percentages of chiropractic patients with specific types of insurance coverage around 1990.

Despite differences in the nature and dates of the two studies, their results are similar (Table 13). The predominant sources of payment are private insurance and direct payments from the patient, together accounting for about 60 percent of gross practice revenue. Worker's Compensation and automobile insurance account for about 10 percent-15 percent each, and Medicare represents an additional 8 percent. Medicaid, prepaid or managed care, and all other forms of payment contribute relatively little, accounting in aggregate for about 10 percent of payments. However, because the market share of managed care coverage is increasing rapidly in many areas, these percentages seem likely to change (Coile, 1995).

B. State Mandates for Chiropractic Benefits

State-mandated benefits are State laws, which prescribe the terms of coverage for group health plans purchased from Blue-Cross Blue-Shield (BCBS) and commercial insurers. Mandates for chiropractic benefits are common. As of 1994, 45 States had them; only Hawaii, Idaho, Oregon, Vermont, and Wyoming did not (Health Benefits Letter, 1994).

Delaware enacted the very first mandate for chiropractic benefits in 1963. Legislative activity was minimal for the remainder of the decade, with only Nebraska (1967) and New Hampshire (1969) enacting such mandates. During the 1970s, 17 additional States enacted mandate laws. Another 24 States passed mandates during the 1980s, and the most recent State to act passed its chiropractic mandate in 1990 (Health Benefits Letter, 1994).

Table 13. Payment for Chiropractic Services, by Source

Payment Source	ACA Survey ¹ (% of income)	RAND Study ² (% of patients)
Direct payments from patients (cash)	27.7	20.9
Private Insurance (Indemnity)	28.6	41.8
Auto Insurance	14.5	9.8
Worker's Compensation	10.8	10.4
Medicare	8.4	7.3
Prepaid/Managed Care	8.6	3.7
Medicaid	1.2	1.5
Other	0.9	2.3

¹ Source: Goertz C. Summary of 1995 ACA annual statistical survey on chiropractic practice. *J Amer Chiropr Assoc* 1996;33(6):35-41.

² Source: Hurwitz EL, Coulter ID, Adams AH, Genovese BJ, Shekelle PG. Utilization of chiropractic services in the United States and Canada: 1985-1991. *Am J Publ Hlth* (In press).

There are two types of mandated benefits for chiropractic. The first, in effect in 44 States, consists of a minimum coverage standard for all group policies sold in a State. These laws, called "mandatory inclusion" mandates, require that group policies sold contain certain provisions specified by the State. For example, some mandates require that policies cover a specified number of chiropractic visits per year or that services performed by a chiropractor that are covered by other providers must also be covered when performed by chiropractors. The second type of mandate requires insurers to offer specified chiropractic coverage for sale; the decision of whether to buy it, however, is left to the purchaser. This type of law, present only in the State of Washington, is called an "available-for-sale" mandate (Health Benefits Letter, 1994).

The extent to which State-mandated benefits have influenced private health insurance for chiropractic care is unclear. Mandates typically apply only to conventional fee-for-service (FFS) group policies sold by health insurers. Most States exempt health maintenance organizations (HMOs) from compliance, and some also exempt preferred provider organizations (PPOs) (Mandated Benefits Manual, 1992). Group insurance plans that are "self-insured" are also unaffected, because the 1974 Employee Retirement and Income Security Act (ERISA) preempts States from regulating these plans (Jensen, 1993). Thus, it is only one segment of the market, *non-self-insured fee-for-service plans*, also referred to as "purchased conventional plans," that are typically affected by the laws.

At the time most States enacted mandates for chiropractic coverage, between 1975 and 1985, the majority of workers with employer-sponsored coverage should have been affected because most belonged to a purchased conventional plan. Although managed care and self-insured plans existed during that period, it was not until the late 1980s that they had a significant presence in the market

(Jensen, 1987; Gabel, 1989). Today's group insurance market, however, is dominated by managed care and self-insurance. The consequence is that only a small segment of current coverage is actually subject to State chiropractic mandates. In 1995, for example, only 13 percent of all workers in employer-sponsored plans belonged to a non-self-insured conventional plan subject to State mandates (Jensen, 1997). The rest were either in managed care (73 percent) or conventional self-insured plans (14 percent). Thus, the vast majority of persons covered by employer-sponsored plans are now exempt from these laws.

Nevertheless, even though most plans are no longer required to cover chiropractic, Jensen (in press) found that, with the exception of health maintenance organizations, most employer plans still include chiropractic benefits. Even self-insured plans provide these benefits. Overall, 75 percent of workers receive chiropractic coverage under their plan. The fact that chiropractic coverage is still widespread suggests that by having made such coverage "standard" years ago, mandates may have brought chiropractic into the mainstream of today's benefits.

C. Employer-Sponsored Insurance Benefits

Employer-sponsored health benefits, the source of health insurance for almost 70 million workers and their families, are a major source of insurance for chiropractic services. Much of what we know about these benefits comes from a recent study by Jensen, et al. (In press). This study drew on data from two sources: a 1993 survey of 1,953 private and public employers nationwide and a 1995 survey of 127 firms included in the former survey that indicated that their plan(s) covered chiropractic. In the second survey, benefit booklets for the health plans were obtained.

1. The Prevalence of Chiropractic Insurance Benefits

Table 14 reports the prevalence of coverage for chiropractic services among workers with employer-sponsored health benefits. Three out of four workers with direct employer coverage had coverage for chiropractic under their plan. Nineteen percent had a health plan that excluded coverage for chiropractic, and for the remaining 6 percent, coverage status was unclear.

Table 14. Percentage of Insured Workers with Benefits for Chiropractic Care Among All Workers with Health Insurance Through Their Employer, 1993

	Millions of Workers		Workers with Chiropractic Benefits		Workers without Chiropractic Benefits		Coverage Status Uncertain
Total	68.8		75%		19%		6%
Among Workers in:							
Conventional Plans	33.7		84		11		6
HMOs	15.1		44		45		10
PPOs	13.8		83		13		5
Point-of-Service Plans	6.2		81		13		6

Source: Jensen G, et al., citing the 1993 KPMG Peat Marwick/Wayne State University Survey of 1,953 Employers.

Chiropractic coverage varied notably by the type of policy. Enrollees in conventional, PPO, or point-of-service plans were almost twice as likely as HMO enrollees to have benefits for chiropractic (81-84 percent vs. 44 percent, respectively). The 44 percent of HMOs with chiropractic benefits reported in this study is consistent with the 46 percent reported by the Group Health Association of America (GHAA, 1994). It should be noted that these benefits are not among those required for an HMO to be "federally qualified" under the 1973 Health Maintenance Organization Act.

Jensen (in press) also examined whether the workers in conventional non-self-insured plans, i.e., those clearly subject to State mandates, in fact had chiropractic benefits when their State laws required it.⁵ In 1993, such plans covered 13.5 million workers in the United States, or 19 percent of all employees who received health insurance from their employer (Gabel, 1994). Looking only at States that had a mandate for chiropractic, they found that 77 percent of enrollees in non-self-insured conventional plans had coverage. Seventeen percent of enrollees in these plans lacked chiropractic coverage, and for 6 percent of enrollees, coverage status was unknown. Thus, the rate of noncompliance with State mandates for chiropractic was between 17 and 23 percent in 1993.

Although self-insured plans were exempt, most chose to cover chiropractic. Among workers in self-insured conventional plans in these same States, 88 percent had chiropractic coverage within their benefit package, 8 percent lacked coverage, and for the remaining 4 percent it was unclear. This high rate of chiropractic coverage in plans exempt from mandates was even higher than that for plans that were required by law to have such coverage. Thus, by 1993—the time of their survey—it was clearly not the case that employers systematically avoided coverage for chiropractic when allowed to do so.

2. Benefit Provisions in Plans Covering Chiropractic Care

The Jensen study (Jensen, in press) also provides information from plan benefit booklets describing how employers covered chiropractic services. Table 15 summarizes several aspects of such coverage. When chiropractic was covered, the benefits were usually less generous than those governing physician care. This more restrictive coverage for chiropractic was characteristic of conventional insurance, HMOs, and PPOs. Only a third of the plans treated chiropractic and physicians' visits the same, i.e., the exact same deductible and coinsurance provisions. Conventional plans were most likely to have congruence of this sort, while PPOs were least likely.

About a fifth of plans had chiropractic benefits that were less generous than physician benefits but the same as those governing physical therapy. Typically, when this occurred, the benefits for both were integrated into a set of provisions governing "other health care providers," which might include chiropractors, physical and speech therapists, and possibly some other nonphysician providers. Where benefits for chiropractic visits and physical therapy differed, some plans covered chiropractic more liberally than they did physical therapy, while other plans did the opposite.

Most of the plans covering chiropractic explicitly limited the use of such services, separate from the limits placed on physician care. While plans used a variety of limits, the most common were ceiling-type limits, such as limits on the number of chiropractic visits. About 30 percent of the booklets imposed a specific visit limit (Table 15). Plans varied in terms of the period to which the limit applied. Some applied it per week, others, per year, and still others, per "benefit period." An example of the last would be "no more than 20 visits during the 60 days following the initiation of chiropractic treatment."

Dollar limits on reimbursements for services were another common type of ceiling placed on benefits. These also varied in terms of their period of application. Some plans established a dollar

limit per visit, others imposed a dollar limit per year, and as with visit limits, some applied it per benefit period. Further, in some plans these limits were integrated with dollar maximums for other treatments, such as physical therapy. Aside from these ceiling-type limits, some plans stipulated chiropractic-specific deductibles and/or a special coinsurance rate for chiropractic expenses. Finally, some plans specified that chiropractic benefits applied only to spinal manipulation, and not to other services sometimes provided by chiropractors such as x-rays, body massage, heat treatment (e.g., prior to adjustments), or nutritional counseling.

Table 15. Benefit Provisions in Employer-Sponsored Plans That Cover Chiropractic Services, 1995

		Percent with Trait Among:		
		Conventional	HMOs	PPOs
Benefit provisions for chiropractic care are . . .				
identical to those applying to physician visits.		44%	36%	23%
identical to those applying to physical therapy.*		15	36	13
different from both those applying to physician visits and those that apply to physical therapy.*		38	14	56
unclear, although booklet asserts that chiropractic is covered.		3	14	8
At least one of the following limits imposed for chiropractic services:				
Visits to a chiropractor limited		30	34	27
Special dollar limit applies to chiropractic benefits		29	7	42
Separate deductible applies for chiropractic services		6	35	21
Separate chiropractic coinsurance rate		24	34	13
Coverage only for spinal manipulation		24	7	33
Two or more of above limits imposed for chiropractic services				
		38	14	64

Prior authorization required for any use of chiropractic		6	88	13
Number of plan booklets examined		45	34	45
<p>*Chiropractic benefits less generous than benefits for medical physician visits.</p> <p>Source: Jensen G, et al., based on the 1995 Wayne State University Survey of 127 Employer Health Plans with Chiropractic Benefits.</p> <p>Note: Data for POS plans are not reported due to an insufficient number of booklets (3).</p>				

Among all the plans that covered chiropractic, over half had at least one explicit limit placed on their benefits (out of the five possible limits described above), and many imposed a combination of these provisions. For example, one conventional plan allowed a maximum of 40 visits per year, limited reimbursement to \$25 per visit, and restricted the covered service to spinal manipulation only. Another plan, a PPO, required 50 percent coinsurance toward chiropractic care, and limited the plan's total reimbursements to \$700 per year. There was a tremendous amount of heterogeneity in terms of "how" plans limited chiropractic benefits.

The nature and number of limits imposed varied by type of plan. PPO plans were most likely to impose multiple limits, and HMOs least likely. HMOs generally limited coverage through separate deductibles or coinsurance rates for chiropractic or by limiting the number of chiropractic visits. Unlike PPOs and conventional plans, HMOs rarely imposed dollar limits or restricted chiropractic coverage to spinal manipulation. The Jensen study also found that conventional or PPO plans rarely required prior authorization for chiropractic services, while in HMOs, prior authorization was almost always required. These requirements are consistent with the policies of most HMOs requiring that services not provided by a patient's primary care physician be authorized by that physician in order to be covered by the plan. Additional discussion of how managed care has impacted chiropractic can be found in Chapter VII, section C: Accountable Delivery Settings and Chiropractic.

D. Chiropractic in Workers' Compensation Systems

Most workers' compensation statutes and regulations are based on long-standing compromises between the employer and labor communities. In exchange for providing 100 percent coverage for injuries and illnesses incurred on the job, employers frequently receive liability protection through regulations that provide explicit finite remedies for disabilities and loss of life. In return, employees have frequently been allowed to seek the care and providers they prefer. Some States require an injured worker to seek care from a company-approved physician or clinic, but most delineate specific appeals processes if the worker is dissatisfied or feels care is ineffective.

Chiropractic physicians are explicitly recognized by regulation or statute as "attending providers" (i.e., providers whom workers may access directly and who can oversee management of the case) in the workers' compensation systems of 39 States and the District of Columbia (Eccleston, 1995). One State (Oregon) allows chiropractors to be treating physicians for only the first 30 days, requiring medical referral thereafter. The 10 remaining states (Illinois, Indiana, Maine, Maryland, Minnesota, Missouri, New Hampshire, New Jersey, Pennsylvania, Vermont) do not delineate which provider types can or cannot be attending providers for injured workers. The benefits allowed under each State's workers' compensation system vary considerably and no inventory of detailed chiropractic benefits is readily accessible. Workers' compensation laws tend to be

liberally construed in the workers' favor in most States by statute or administrative rule.

In recent years, there has been an increasing trend to closely manage care in "State-fund" benefits systems and by private sector insurers. A variety of cost-containment strategies, including utilization review, practice guidelines, and reporting requirements that have been used to control medical costs, have also been used to control costs of chiropractors. An increasing number of States are allowing benefits to be delivered entirely through managed care plans at the employer's discretion (Hughes, 1995). Patient access to chiropractic services in this situation then becomes subject to provider access protocols of each individual HMO, PPO, or other provider network. A more detailed discussion of issues surrounding chiropractic access and participation in managed care settings can be found in Chapter VII.

E. Other Insurance Coverage

1. Personal Injury Protection

Personal injury protection (PIP) insurance is a form of insurance that covers immediate medical needs of the policyholder, freeing them from the burden of recovering costs from any responsible third party. Automobile insurance and some types of homeowners' insurance typically incorporate such PIP coverage. This is the only form of insurance where insurance equality laws in most States serve to permit chiropractors access to reimbursement on par with all other providers. Hence, personal injury care has been an integral part of chiropractic practice representing the third largest source of income (Table 13) for chiropractors nationally (Goertz, 1996).

2. Medicare and Medicaid

The Federal Medicare program, overseen by the Health Care Financing Administration (HCFA) of the United States Department of Health and Human Services, first incorporated a chiropractic benefit in 1972 (Wardwell, 1992). The Medicare chiropractic benefit allows for 12 visits annually and covers only one service, manipulation of the spine by a chiropractor. Further, Medicare policy mandates (but does not reimburse patients for) spinal x-rays to justify the need for chiropractic care, however, by recent congressional mandate, that requirement is scheduled to expire in the year 2000. Because of the economic importance of HCFA's programs, benefits and reimbursement policies set for Medicare coverage can become benchmarks for programs nationwide. As a result, chiropractic trade associations and professional organizations have placed a high priority on influencing Medicare coverage for chiropractic services, even though Medicare payments account for only about 8 percent of chiropractors' income (Goertz, 1996). Congressional lobbying for Medicare reform has been an important and regular focus of political efforts of chiropractic trade associations.

The Medicaid program, also overseen by the Department of Health and Human Services, provides some basic medical coverage, at highly reduced rates, to individuals under the poverty level. Although chiropractic services are allowable in this program, health and human service agencies at the State level regulate specific benefits. Hence, Medicaid coverage for chiropractic services is highly variable from State to State. Data from the American Chiropractic Association's national membership survey indicates that less than 2 percent of chiropractic income is derived from Medicaid reimbursement (Goertz, 1996).

3. Other Federal Programs

There are three other Federal health care programs of interest in terms of their coverage of chiropractic services. The military currently does not cover chiropractic services either through its CHAMPUS coverage or as part of Veterans' Administration benefits. However, the Department of

Defense is currently studying the issue and has implemented demonstration projects at several bases around the country to study the usefulness and feasibility of making chiropractic services available. The Longshore Harbor Workers' Act permits chiropractic benefits for longshoremen injured on the job along the lines of Medicare coverage. Like Medicare, treatment is limited only to care of spinal subluxations demonstrated on x-ray. Although injured patients may directly access a chiropractor, patients may only select the first physician following an injury. Variability exists regionally, and often chiropractic subluxation must be verified by a medical radiologist for care to be allowed. Chiropractic care is also covered under the Federal workers' compensation system. This too follows the Medicare benefits package but is subject to substantial variability according to policies of the regional carrier medical director for each plan. Some plans cover radiology services, some limit total visits to 12 or 20 per year, and some require referral from a medical physician gatekeeper.

F. General Coverage Issues for Chiropractic Services

Specific coverage decisions on chiropractic services are typically up to individual insurers within the constraints of State and/or Federal laws under which they are chartered. As a result, there is a great deal of variation in types of insurance products and interpretation of coverage requirements across plans and jurisdictions. The evolution of managed care programs, typically regulated separately from the rest of the insurance industry, further complicates matters. The relatively few chiropractors that provide input on specific coverage decisions have found it very difficult to provide advice on coverage that varies greatly from State to State and plan to plan.

Coverage decisions usually reflect specific issues and concerns (as well as experience and expertise) of the respective insurers: Medicare policies are driven by considerations of geriatric populations; workers' compensation emphasizes injury and care and occupational exposures; managed care and employer health programs are directed towards general family health issues. Therefore coverage decisions on chiropractic services may be based on economic and other nonclinical issues, as exemplified in the previous discussion on Medicare coverage. This situation is not unique to chiropractic care, and efforts at technology assessment (synthesizing relevant scientific literature, expert and clinical opinion) and guideline development is increasingly being relied upon to help fill the void (see Chapter VIII).

Typically, coverage decisions are made on a procedure-by-procedure basis, and rarely restrict services by patient demographics (e.g., age or gender). If a plan covers chiropractic, all patient populations are subject to the limitations of the particular policy. For example, in addition to older patients, Medicare covers Social Security disability cases. Hence a 15-year-old with a Social Security pension is subject to the same coverage restrictions as the elderly Medicare recipient. Similarly, limitations of a policy and the particulars of a treatment or diagnosis, rather than the age, usually govern chiropractic coverage for pediatric patients in employer-sponsored health plans.

G. Effect of Cost Sharing on Chiropractic Services

Cost sharing, capitation, and other mechanisms of insurance payment are increasingly being used to control health care use. An analysis of data from the 1974-82 RAND Health Insurance Experiment assessed the effect of cost sharing on the use of chiropractic services (Shekelle, 1996). This study reported that any level of cost sharing equal to or greater than 25 percent (which was the smallest level of cost sharing tested in the experiment) decreased chiropractic use by half, compared to free care. This made chiropractic care more sensitive to cost sharing than general medical care, outpatient medical care, or dental care, and about as sensitive as outpatient mental health care. Additionally, a likely cross price effect (the substitution of one service for another

depending on price) between chiropractic care and medical care was shown. Persons with access to free medical (but not chiropractic) care used less than half as many chiropractic services as persons who had to pay equally for medical and chiropractic care. In view of the substantial changes in the nature of health insurance coverage for medical and chiropractic services in the past 15 years, it is not clear if these findings would still hold true.

Little is known about the effect of capitation on chiropractic care. Although anecdotal reports suggest that the number of visits per episode of care is reduced substantially when chiropractors enter capitated contracts, published reports could not be identified.

4. The ACA had 12,252 members (excluding students) as of November 1, 1996 (Personal communication from Dr. Christine Goertz, Vice President; Research Policy and Information Services, American Chiropractic Association, November 25, 1996). This represents roughly 25 percent of the 50,000 chiropractors believed to be licensed in the United States (Cooper, 1996).

5. The data set contained too few observations to examine the provision of chiropractic benefits in the five non-mandate states.

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CHAPTER VII

CHIROPRACTIC IN THE HEALTH CARE SYSTEM

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Chiropractic occupies a unique position in the United States health care system. It is the most widely disseminated indigenous American system of healing and the most frequently used type of alternative health care in the United States (Gaucher-Peslherbe, 1995; Eisenberg, 1993). Its steadily increasing acceptance and use by the public, third-party payers, and the Federal government indicate that chiropractic is no longer the "marginal" or "deviant" profession it was once considered to be (Wardwell, 1952). In recent years, a number of outside observers have suggested that the profession has now entered the health care mainstream (Coile, 1995a, 1995b; Stano, 1992; Wardwell, 1988). At present, chiropractic is both alternative (in that it approaches health care from a distinctly different perspective than that of the dominant health care profession, medicine) and mainstream (in that it has gained popular acceptance). This chapter discusses the characteristics of the profession that contribute to its distinct perspective and approach to patient care, and how these affect its position within the U.S. health care system.

A. Different Perspectives on the Role of Chiropractic in the Health Care System

Precisely what roles chiropractors could or should play in the health delivery system is a complex and unresolved issue. In general, three distinct (but not mutually exclusive) roles for chiropractors have been discussed in the chiropractic literature (Hawk, 1996a; Wardwell, 1992):

- limited musculoskeletal specialists on interdisciplinary primary health care teams
- primary health care gatekeepers focusing on ambulatory musculoskeletal complaints
- generalist primary health care providers of "alternative/complementary" medicine, managing or co-managing more than just musculoskeletal problems.

Patients, the chiropractic profession itself, medical physicians, third-party payers, and the managed care industry all have different perspectives on what role would be most appropriate for chiropractors. Although there is some agreement among the various constituencies, substantial differences exist, highlighting the key issues that the profession and policymakers will need to address in the future.

1. The Patient /Consumer Perspective

Chiropractors already play a significant role in health care delivery for many Americans. A recent study estimated that approximately 7 percent of adults in this country had received chiropractic treatment in the past year (Eisenberg, 1993). A substantial fraction (25-42 percent) of patients seeking care for back pain receives chiropractic care (Deyo, 1987; Shekelle, 1995; Hawk, 1995; Carey, 1995, 1996). An analysis of the 1974-82 RAND Health Insurance Experiment data found that chiropractors were the first health care providers seen for 38 percent of episodes of back pain and that chiropractors were the "primary" provider (i.e., the provider type that delivered the majority of care) for 40 percent of back pain episodes (Shekelle, 1995). Furthermore, this study determined that chiropractors were retained as primary provider for 92 percent of their patients

who had a second episode of back pain, compared to 75 percent retention for general medical practitioners. Thus, many back pain patients have used chiropractors as first contact primary providers of care for at least this one common problem. Although some people may also use chiropractors as alternative/complementary care generalists like acupuncturists or homeopaths, the evidence suggests this does not frequently occur (Hurwitz, in press; Christensen, 1993; Goertz, 1996).

Several studies have examined whether chiropractic care substitutes for medical care. Yesalis (1980), in a study in rural Iowa, found that as chiropractic care increased, medical use also increased. Chiropractic services did not appear to substitute for medical services in a group of Canadian elderly (Shapiro, 1983). In fact, chiropractic users tended to use all health services with more frequency. Other studies have also noted that patients use different providers simultaneously, even for the same problem (Eisenberg, 1993; Thomas, 1991). Thus, to date, there is no evidence that chiropractic care substitutes for medical care. Much study is still needed to determine what impacts patients' decisions to utilize one provider over another. In fact, chiropractic researchers consider this issue as a priority for their health services research agenda (Mootz, 1997).

2. The Chiropractic Profession Perspective

Because chiropractors have had to fight for their existence, they have jealously guarded their independent practice status granted them through State licensing. Organized medicine's refusal to permit physician referral to or from chiropractors ensured that direct access was the only route by which patients could receive chiropractic services. As a result, chiropractors often developed loyal patient bases and played what many chiropractors viewed as a primary care role for their self-referred patients. It is not surprising then, that most chiropractors see themselves as "primary care" practitioners (Hawk, 1996b).

In recent years, a physician "gatekeeper" model of health care delivery has become prominent in managed care plans. The concept that a single physician, familiar with all of a patient's needs, could coordinate and direct care in a "primary care" role remains conceptually attractive. In practice, gatekeeping typically limits access to more expensive specialty care. Perhaps because of a lack of exposure to what services chiropractors provide, primary care physician gatekeepers may consider chiropractic to be similar to medical specialty care, thereby limiting access until various medical diagnostic and care strategies have been tried, or restricting access entirely. Thus, chiropractors have been concerned that direct access by their patients might be eliminated if medical physicians became the sole arbiters of patient flow. Some managed care organizations, however, have allowed direct access to chiropractic services (Coile, 1995b; Simpson, 1996).

Because of the overlay of political and economic issues, there is a great deal of misunderstanding about the meaning of the term "primary care," and debate about who practices it. In the chiropractic community, there are two major positions on this issue. One suggests that chiropractors are not primary care physicians, but musculoskeletal specialists (Nelson, 1993). Current chiropractic patient characteristics and available clinical research support this argument. This position would place chiropractic in a practice model similar to that of dentistry or podiatry. The other position argues that, although chiropractors are not primary "medical" care providers, they may be seen as primary "health" care providers (Ebrall, 1994; Bowers, 1995). This is in keeping with current concepts of community-oriented primary care, a definition of primary care that emphasizes the linkage between community (public) health and individual patient diagnosis and treatment (Hawk, 1996a). Further, chiropractic training typically emphasizes differential diagnosis and conservative management of many common health care problems (Bowers, 1995).

In 1994, the American Chiropractic Association (ACA) attempted to resolve these opposing positions⁶ through a comprehensive statement that refers to characteristics of primary care as described recently by the Institute of Medicine (IOM) (Donaldson, 1994). The ACA statement describes the chiropractor in a primary health care delivery system as a first contact gatekeeper for neuromusculoskeletal conditions characterized by direct access, longitudinal, vertically integrated, conservative ambulatory care of patients' health care needs, emphasizing neuromusculoskeletal conditions, health promotion, and patient-centered diagnosis and management.

3. The Medical Profession Perspective

It is only recently that medicine's opinion of chiropractic has changed from almost universal negativism (Wolinsky, 1994) to one of guarded interest among a substantial fraction of medical doctors (Cherkin, 1989; Cherkin, 1992). Until 1980, the AMA stated that it was unethical to refer a patient to a chiropractor. The loss of a landmark antitrust suit, upheld all the way to the U.S. Supreme Court, finally erased such prohibitions against medical providers working with chiropractors (Getzandaner, 1987). Although many reasons can be offered to explain the original mutual distrust between the medical and chiropractic professions (Curtis, 1992), it is clear that negative attitudes have been reinforced because each profession tends to see the other's treatment failures. It is also noteworthy that, traditionally, medicine has rejected the possibility of efficacy of treatments that were based on explanatory models or theories that they perceived as invalid, such as the original chiropractic theory that spinal lesions (chiropractic subluxations) cause or contribute to an individual's inability to counter disease processes.

Today, the pragmatic emphasis on patient outcomes rather than on hypothetical biologic mechanisms of therapy facilitates a more objective look at the clinical utility of both allopathic and chiropractic treatments. In at least some respects, the chiropractic procedure of spinal manipulation has met the outcomes challenge, for low back pain. Recent literature syntheses performed by researchers, both within and outside the chiropractic profession, have concluded that spinal manipulation is relatively safe (Shekelle, 1992), appears to benefit at least some subgroups of patients with low back pain (Shekelle, 1992; Anderson, 1992; Bigos, 1994; Koes, 1996), and does not appear to be simply a placebo (Hoehler, 1981; Hadler, 1987; Sanders, 1990; Brennan, 1991). These issues are discussed in more detail in Chapter XI.

There may be a great deal of overlap among the types of patients seen by chiropractors, family physicians, and orthopedists particularly relating to back pain, neck pain, and headache. Because medical science has not been wholly successful in understanding these common syndromes, nor in developing highly effective management strategies, there has been increasing curiosity about what chiropractors may have to offer. As a result, chiropractors have begun to develop close collaborations with members of the medical specialties that most commonly treat such complaints (Curtis, 1992; Triano, 1994).

Recent survey data suggest that a significant proportion of medical physicians perceive value in chiropractic. Berman (1995) reported that 49 percent of East Coast family practice respondents found chiropractic to be "legitimate medical practice," and that 56 percent had made referrals to a chiropractor. Cherkin (1989) found similar results in a survey of family physicians in Washington State. Patel-Christopher (1990), quoted in Manga (1993), noted that in Canada, 62 percent of medical physicians refer patients with musculoskeletal pain to chiropractors and that 9.5 percent of medical practitioners are chiropractic patients themselves.

Even though many medical doctors believe chiropractic may be of value, few feel well informed about it and many would like to learn more (Cherkin, 1989). For example, while 70 percent of general practitioners in Nova Scotia felt chiropractic to be useful, and 58 percent made referrals to

chiropractors, only 10 percent admitted knowledge of chiropractic (Goldszmidt, 1995). This lack of knowledge about alternative therapies may partially explain why only 30 percent of patients who use these therapies discuss their use with their medical provider (Eisenberg, 1993). Patients who are aware of organized medicine's past hostility toward chiropractors (Getzendaner, 1987) may be especially reluctant to discuss their use of chiropractic with their medical providers.

The medical profession's perspective on the role of chiropractic is also complicated by the caregiver vs. gatekeeper issue. Although there is now enough scientific evidence to convince many medical physicians that spinal manipulation has a place in managing certain patients, it appears that most medical providers believe that access to chiropractors should be managed by medical gatekeepers, viewing chiropractic as a supplement to, rather than a substitute for, medical care. This perspective is reinforced by concern on the part of many medical physicians about the ability of chiropractors to reliably identify and refer patients with potentially serious medical conditions (Curtis, 1992). However, professional liability experience with chiropractic does not suggest that this is a major problem (see Chapter VIII). In fact, some chiropractors are functioning in supplemental roles even in multidisciplinary settings, without being "gate kept" (Triano, 1994).

Finally, it is worth mentioning that the third potential role of chiropractors, as members of interdisciplinary primary health care teams, has so far largely been ignored by the medical profession. However, such an approach is receiving increasing attention from the government and from academia, as evidenced by education and training efforts funded by the Health Resources and Services Administration (HRSA), which awarded chiropractic colleges contracts pertaining to rural and geriatric practice. The potential for chiropractors to be involved in interdisciplinary primary care in rural settings (Hawk, 1996b) and in primary, secondary, and tertiary capacities within multidisciplinary spine centers have been the subject of discussion in the chiropractic literature (Triano, 1994, 1995).

4. The Third-Party Payer and Managed Care Perspective

In recent years, the insurance industry has made a variety of chiropractic benefits available (see Chapter VI). This development has been influenced by market demand from subscribers, legislation regarding insurance equality, and pressure from chiropractic trade organizations. All providers whose services are covered by insurance, including chiropractors, have had to deal with the realities of managed care delivery systems that have imposed greater competition, oversight, and accountability (Hansen, 1995). These changes and their impact on chiropractors are discussed in Section C below. Because much of the evolution in managed care stemmed from staff and group model HMOs, chiropractic inclusion has not been a central part of most plans, perhaps due to the limited experience with chiropractors in such settings.

The model of primary care gatekeepers traditionally used in HMOs has aimed to exclude delivery of services from providers outside of the plans. Medical physician responsibility for case-management decisions, the limited data on cost-effectiveness of chiropractic care, and the low visibility of chiropractors in medical settings were additional factors that have precluded consideration of an increased role for chiropractic. Thus, the changes taking place in health delivery structures have placed chiropractors at risk of being shut out of reimbursement systems, if not by design, then through benign neglect.

Some experts see a challenging opportunity for chiropractic in this environment. Commentators point to a growing understanding of the popularity of "alternative/complementary" medicine (e.g., Eisenberg, 1993), the money already being spent on chiropractic care (Stano, 1992, 1996), the growing legitimacy of spinal manipulation (Bigos, 1994), the high prevalence of musculoskeletal disorders in the United States (Deyo, 1991), and a new emphasis on pragmatic patient outcomes as

reasons why chiropractic may be expected to thrive in the coming years (Coile, 1995a, 1995b). In fact, many managed care organizations are beginning to use chiropractors through in-house positions or via subcontracts with chiropractic networks (Simpson, 1996). Chiropractors are used alone or in combination with physical therapists, for the evaluation and management of musculoskeletal problems (Coile, 1995a).

B. Interprofessional Relations

In contrast to professions that train and practice within the same context and often within the same institutions, chiropractic's historical development as a separate and distinct profession has required that chiropractors approach interprofessional relations from outside the context of the health care mainstream (Mootz, 1995a). Chiropractic's integration into the health care system has likely been impeded by its isolation from other professions in clinical settings, academic institutions, research, professional organizations, government, and the insurance industry.

1. Professional Isolation from the Health Care Mainstream

A central premise of chiropractic, which emphasizes the therapeutic importance of the body's inherent healing abilities, is in conflict with many traditional biomedical views, which have focused on counteracting external causes of disease (Coulehan, 1985; Coulter, 1983; Cobb, 1977; Inglis, 1964). However, what began in 1895 as a difference in theory eventually resulted in the evolution of two distinct approaches to patient care (Coulter, 1983). The differences between the allopathic and chiropractic approaches were intensified by the antipathy of organized medicine toward chiropractic, which for many years excluded chiropractic from every aspect of the American health care system, including professional educational institutions, government policy, and funding opportunities (Willis, 1984). This isolation fostered professional independence and justified an anti-intellectual attitude among some chiropractors (Keating, 1989).

Chiropractic developed an office-based practice model due in large part to its isolation from the medical establishment and exclusion from hospital-based care (Keating, 1989). This isolation has also affected chiropractic education in that students are not afforded exposure to a broad spectrum of clinical conditions (Keating, 1989; Baer, 1984). Additionally, a lack of access to a university-style research tradition and to government funding has impeded scientific development within the profession.

Chiropractic is best known for its primary treatment mode, manual manipulation of the spine (Shekelle, 1992; Coulehan, 1985; Cobb, 1977). Although a variety of natural and conservative interventions are used by chiropractors, the exclusion of drugs and surgery is a significant factor in separating the chiropractic profession from mainstream health professions. In fact, chiropractors are the only doctors licensed in all 50 States diagnosing and treating physical illnesses who do not use drugs or surgery.

Chiropractic practice, developing outside the medical mainstream, is more "client-dependent" than "colleague-dependent" (Wardwell, 1988; Keating, 1989). Because chiropractors have traditionally received new patients through personal contacts and non-medical referral sources, they often perceive that they have a stronger sense of alliance with patients than with other health professionals.

2. Interprofessional Relations in Clinical Settings

As the profession has become increasingly integrated into the health care system, interprofessional contact in clinical settings has also increased, frequently by patient request. This usually involves simple referrals, but occasionally includes multi- or interdisciplinary arrangements (Triano, 1994).

Although awareness of chiropractic remains limited among other health professions, patient requests, in addition to the increasing evidence for efficacy and patient satisfaction, may prompt medical and other practitioners to view chiropractic more favorably (Cherkin, 1992). However, while nearly all chiropractors (99-100 percent) report they routinely refer patients to medical practitioners (Mootz, 1994), only about 50-60 percent of medical providers refer patients to chiropractic physicians (Cherkin; 1989, Mootz, 1994).

3. Interprofessional Relations in Academic and Research Settings

The historical antecedents of chiropractic relationships to other health professions and the scientific community must be acknowledged in any discussion of current interprofessional relations. Until 1980, the American Medical Association's (AMA) code of ethics expressly forbade any professional association with chiropractors (Wolinsky, 1994). In 1969, the American Public Health Association adopted a policy that urged that, ". . . state legislatures and health agencies not include chiropractors . . . under state health programs" (APHA Policy 6903). It was not until 1983 that the APHA instituted a new policy, which recognized spinal manipulation as safe, and effective for certain neuromusculoskeletal disorders (APHA Policy 8331). The effect of these initially negative pronouncements and policies from such august bodies of health professionals had the effect of further isolating chiropractors from mainstream clinical, professional, and scientific settings.

Almost all chiropractic training takes place in privately supported, freestanding institutions designed expressly for that purpose. Very few chiropractors can be found in nonchiropractic academic settings, although this is gradually changing. Although most individuals end their formal education with a chiropractic degree, a small group pursues additional education, in public health, medicine, or other disciplines. These chiropractors have had important beneficial effects on the relationship between chiropractors and other professions. Many chiropractors are authors or co-authors with other health providers on a variety of topics and are beginning to publish in mainstream scientific journals as well as in the peer-reviewed chiropractic literature. Greater collaboration with researchers in other fields is also occurring (Mootz, 1995a).

Established scientific journal and textbook publishers have discovered that chiropractic is a significant professional market. There are now at least eight peer-reviewed journals competing for chiropractic-related readership. All have editorial boards that include other health professionals. The *Journal of Manipulative and Physiological Therapeutics (JMPT)*, established in 1976, is the profession's leading research vehicle and draws submissions and readership from scientific and clinical fields beyond chiropractic. It is indexed in a number of databases, including Index Medicus and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). Four of the profession's other scholarly journals (*Topics in Clinical Chiropractic*, *Chiropractic Technique*, *Chiropractic History*, and the *Journal of Chiropractic Humanities*) are also indexed in CINAHL.

Many major textbook publishers have commissioned chiropractic-related books, frequently with chapters contributed by other health professionals. Some of these have wide distribution beyond the chiropractic market and are available in medical bookstores.

There are a small number of organizations that fund or otherwise contribute to chiropractic research in the United States (see Chapter IX). Each of these maintains a proposal review board consisting of scientists and providers from a variety of backgrounds.

From initial research funding by the Veterans' Administration to researchers at National College of Chiropractic through recent chiropractic project grants from the National Institutes of Health, the chiropractic research enterprise has seen steady growth. Multidisciplinary panels have been

convened and funded by both private (the RAND corporation) and public sources (Agency for Health Care Policy and Research) to arrive at clinical consensus on the appropriateness of spinal manipulation for low back pain (Shekelle, 1991; Bigos, 1994), manipulation of the cervical spine (Coulter, 1995), and headache (AHCPR, in progress). The credibility of the RAND studies has facilitated improved communication between chiropractors and other health professionals. Interdisciplinary research efforts have begun at several major universities, often in collaboration with chiropractic institutions. One of the most visible efforts in recent years involves a research program administered by the U.S. Health Resources and Services Administration, Bureau of Health Professions. The grants and contracts recently awarded to four chiropractic colleges required medical collaboration (Bureau of Health Professions, 1995)

In 1989, the Agency for Health Care Policy and Research (AHCPR) funded the Back Pain Outcome Assessment Team (BOAT), which included chiropractors on the advisory committee (Deyo, 1990). Chiropractors have also participated in a related project by BOAT investigators comparing chiropractic care with a physical therapy program emphasizing self care for low back pain. AHCPR has also awarded a large grant to UCLA to conduct a comparative study of chiropractic care in an HMO setting, with chiropractors closely involved with the design and conduct of the project. The Armed Forces of the United States recently agreed to conduct a pilot study of the utility of chiropractic care as part of health care provided to active military personnel and their families. Chiropractors have been central to the design and execution of this study.

A small number of chiropractors serve as peer-reviewers and advisers for the National Institutes of Health, the Agency for Health Care Policy and Research, the Health Resources and Services Administration, and the U.S. Department of Defense, where they interact with other health providers and scientists in appropriate scholarly tasks.

4. Health Professional / Scientific Organizations

There has been a Chiropractic Special Primary Interest Group (SPIG) in the American Public Health Association since 1983 with membership ranging between 200 and 700. In 1995, the APHA Board of Governors voted to admit the SPIG into full section status with voting privileges and agency funding. This provided official recognition for chiropractic and cleared the way for full cooperation and collaboration on an equal basis with other health professions represented at APHA. Many chiropractors also work within the Radiological Health, Gerontological Health, and Occupational Health & Safety Sections of the APHA. Eight chiropractic colleges and both national associations are APHA agency members. Since 1985, the Chiropractic SPIG has consistently sponsored multiple scientific paper sessions at the annual meeting. The sessions attract co-sponsorships with other Sections, nonchiropractic paper presentations, and a multidisciplinary audience. Chiropractic members of APHA have served on the Governing Council and on advisory committees and have been active in public health policymaking efforts.

Chiropractors are also members and officers in a wide variety of health profession organizations and groups. For example, about 25 percent of the membership of the American Back Society are chiropractors. Chiropractors have also been active in the North American Spine Society, the American Society of Biomechanics, the International Society for the Study of the Lumbar Spine, the American Academy of Pain Management, the North American Primary Care Research Group, National Association of Medical Minority Educators, the American College of Sports Medicine, Society for Medical Decision Making, the American Public Health Association, and the Silicon Valley Ergonomics Institute.

C. Accountable Delivery Settings and Chiropractic

1. Impact of Practice Accountability on Chiropractors

Changes in Delivery and Reimbursement

The health care delivery system has undergone dramatic changes during the 1980's and 90's (Coile, 1993). Many of the key changes in health care delivery and reimbursement impacting chiropractic practice are outlined in Table 16. Most chiropractic practices have traditionally been set in individual offices operating under a fee-for-service system based on customary prevailing and reasonable reimbursement practices. Political and public sector concern over access to services and the plight of the un- and underinsured has drawn attention to general health care financing and delivery reforms. Although massive federally mandated reforms are not likely in the near future, several revisions have taken place in the reimbursement and delivery of health services that directly affect how all providers function.

Table 16. Changes in Health Care Delivery and Reimbursement

Traditional Practices	New Trends
<ul style="list-style-type: none">• Fees set by individual physicians• Reimbursement levels determined by actuarial review of customary, prevailing, and reasonable billing patterns• Physicians paid on fee-for-service basis• Health insurer accepts all financial risk• Appropriate and necessary care determined by individual physician on case-by-case basis• Individual practice	<ul style="list-style-type: none">• Fees set by health purchasers• Reimbursement levels determined by resource-based relative value analysis of individual procedures• Physicians paid on capitated or contractual basis• Physicians share in financial risk• Clinical decisionmaking increasingly driven by practice guidelines and algorithms developed through expert and evidence-based processes• Group practice and provider networks

Determination of physician reimbursement levels has traditionally been based on actuarial review of customary billing practices. In 1992, the Health Care Financing Administration implemented a resource-based relative value scale system that quantitatively assessed physician work, practice overhead, and malpractice risk for every procedure that physicians perform (Hsiao, 1992a). Prior to 1994, however, no work on valuation of chiropractic services for the purpose of reimbursement had been done along the lines required by the Health Care Financing Administration for other clinical procedures (Kirschner, 1997; Hsiao, 1992b). A few proprietary studies and recommendations for "best-fit" billing practices have existed that were based on informal estimation of which existing billing code might best fit chiropractic procedures (ACA, 1993; Olsen, 1993). Recently, several qualitative and quantitative reports have begun to appear in the chiropractic literature in this area (Mootz, 1995b, 1995c, 1996; Dobson, 1995; Hess, 1997).

Stimulated by concerns about large variations in how health care services are utilized, the Federal government took the lead in attempting to more formally assess what science says about clinical tests and procedures by developing evidence-based guidelines for patients and providers (Hansen, 1994a). In 1989 the U.S. Congress established and charged a new Federal agency, the Agency for Health Care Policy and Research (AHCPR), with the review and synthesis of scientific evidence on specific clinical procedures, which has resulted in the publication of evidence- and consensus-based practice guidelines.

Private sector insurers, faced with increased competition from managed care organizations, have also taken greater interest in the delivery end of health care. Due in part to rapid increases in premium costs, innovative delivery and financial risk-sharing insurance products dramatically increased managed care organization's market share with employer-sponsored health benefits programs (Hirschman, 1994; Coile, 1995a). Changes in reimbursement practices, development of practice guidelines, and the rise of managed care delivery systems have had significant impact on practicing physicians' incomes and practice patterns. The result has placed greater accountability on providers, including chiropractors, and the chiropractic profession has responded to these changes with the development of their own managed care organizations, practice guidelines, and health services research initiatives (Mootz, 1995a).

Practice Inventories, Parameters, Guidelines, and Technology Assessments

Perhaps as a byproduct of chiropractic's long-standing "outsider" status, there has been a great deal of uncertainty and misunderstanding among policymakers, health purchasers, and various providers regarding what chiropractors actually do. In addition, practice variation (as much of a problem in chiropractic as it is in other specialties) may have contributed to inaccurate assumptions regarding its value. These circumstances, in addition to system-wide trends toward increased practitioner accountability, have stimulated the chiropractic profession to begin to inventory practice methods, define practice parameters, and develop some general practice guidelines (Bergmann, 1990; Haldeman, 1993; Hansen, 1994a). In addition, numerous condition-specific critical care pathways have begun to be published in the chiropractic literature (Hansen, 1994a; Hansen, 1994b). Chapter VIII, Section E, "Practice, Guidelines, Clinical Pathways, and Technology Assessments in Chiropractic," provides a more detailed review of key initiatives to date. As in other health care fields, published chiropractic practice guidelines have been met with mixed responses ranging from endorsement and adoption to controversy and rejection.

In response to the increasing interest on the part of health care purchasers and policymakers to better understand and rationalize clinical decisionmaking, chiropractors have developed expert and community-based physician practice guidelines (Hansen, 1994a; Henderson, 1994). Further, chiropractors are increasingly involved in multidisciplinary practices and in managed care organizations. In fact, chiropractors have established their own managed care organizations, mostly in the form of independent practice associations (IPAs) and preferred provider organizations (PPOs) and are gaining market share (Coile, 1995b). Table 17 summarizes several key managed care options that currently exist for chiropractors.

Table 17. Options for Chiropractors in Managed Care

<p><i>Sub-contract reduced fee for service provider:</i> IPA receives capitated contract from purchaser and manages chiropractic care with subcontracts with individual providers. This is the most common type of chiropractic MCO arrangement.</p>
<p><i>Capitated contract provider:</i> Individual DC receives monthly or annual payment adjusted for number of covered lives in contract providing all needed chiropractic services to plan members who present for care.</p>
<p><i>Salaried position in HMO/clinic:</i> DC is hired as salaried employee of clinic providing all care needed. Very few currently in place but popularity with MCOs seems likely to increase as potential cost containment incentive.</p>

McElheran and Sollecito (1994) have offered guidance for providers to identify and revise clinical staffing procedures, and documentation to meet the increased requirements for accountability and efficiency in chiropractic practice (Table 18). One of the aims of managed care is to facilitate appropriate care, which by nature may involve collaborative and multidisciplinary patient management. Strategies and examples of truly integrated interdisciplinary care using explicitly developed evidence and consensus-based protocols are beginning to appear (Triano, 1994).

2. Quality Management Initiatives

Although a focus on quality and customer service has been a central component of business and industry since World War II, quality management initiatives are a relatively recent phenomenon within health care in general and within chiropractic in particular (Hansen, 1995). Attributes of quality in health care include "technical" considerations such as provider credentialing, nature of facilities, ratios of providers to patient populations, and utilization experience. Less technical attributes of health service quality such as patient satisfaction, ease of access to care, and patient involvement in care planning are also viewed as important (Hansen, 1995).

In recent years, discussions of quality in chiropractic care have begun to appear in the chiropractic literature (Hansen, 1995; Vear, 1992; Ianelli, 1995; McElheran, 1994; Nelson, 1994). With increasing inclusion of chiropractic services in managed care settings, chiropractic networks (practice associations and preferred provider organizations) are being required to meet accreditation standards of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and the National Commission on Quality Assurance (NCQA) in order to receive capitated contract dollars. These organizations require adherence to various quality standards even down to the individual clinic and doctors' office settings (JCAHO, 1994; O'Kane, 1993). As a result, individual chiropractors are beginning to be held accountable to multiple, quantifiable measures of quality in order to become or remain affiliated with preferred provider networks.

Table 18. Recommendations for Chiropractic Practice Efficiencies Under Managed Care

Facility: Maintain professional appearance, clean and accessible furnishings, impaired patient access, record storage and retrieval that permits access and confidentiality, documented emergency protocol, equipment certification (e.g., x-ray), etc.

Staff: Training in managed care protocols, interdisciplinary protocols, patient relations, billing procedures, reporting requirements.

Care appropriateness: Emphasis on clinical effectiveness, careful use of treatment resources, timely referral of nonresponders, consideration of available clinical guidelines.

Entrance forms: Legible, understandable paperwork that provides adequate insight into patient's past history, condition chronicity, baseline status, nature of complaints, informed consent, etc.

Outcomes assessment instruments: Regular use of self-report instrument that can document patient progress in a meaningful fashion.

Record keeping: Standardized and legible record keeping formats, which clearly document patient progress, care, and diagnostics provided.

Clinical algorithms: Incorporation of algorithmically driven and evidence-based critical care pathways as a reference point to assess individual patient responses.

Outcomes management: Regular assessment of patient progress compared to baseline with both clinical and self-reporting instruments.

Source: Adapted from McElheran L, Sollecito P. Delivering quality chiropractic care in a managed care setting. *Top Clin Chiropr* 1994;1(4):30-39.

D. Chiropractic Experience in Health Policy and Health Administration Positions

1. Public Sector Positions

There are numerous reports in the chiropractic literature that exemplify efforts of the chiropractic profession to contribute to public health policy (Mootz, 1995d; 1995a; Haas, 1996). However, opportunities for employment in State and Federal agencies within the public health sector have been limited. This in part has been due to past practices by medical and public health trade organizations (e.g., AMA, APHA), which maintained prohibitions against interactions with chiropractors and encouraged that "state legislatures and health agencies not include chiropractors under state health programs" (Haas, 1996; Wardwell, 1992). The past two decades have seen significant changes in chiropractic's status, including a successful anti-trust suit against the AMA (Getzendaner, 1987), along with a revision of the AMA's code of ethics related to working with chiropractors and the reversal of the APHA's stand on chiropractic (Baird, 1996). The World Health Organization also has established official relations with the chiropractic profession through the admission of the World Federation of Chiropractic as an affiliated nongovernmental organization.

Most jurisdictions appoint chiropractors to serve on examining, licensing, quality assurance, and/or disciplinary boards to ensure competency and to regulate practice (Haas, 1996). Positions for chiropractors also exist on industrial insurance boards, health care commissions, and staffs of medical directors, among others (Mootz, 1995a). Additionally, chiropractors have served as reviewers and consultants for the National Institutes of Health, the Agency for Health Care Policy

and Research, the Health Services Resource Administration, the Department of Defense, and the Health Care Financing Administration (Mootz, 1995a; Haas, 1996).

Given the large number of physician visits for musculoskeletal conditions, particularly low back pain (Cunningham, 1984; Deyo, 1987), along with chiropractors' interest and expertise in this area, and the growing evidence for the effectiveness of their treatment, it is reasonable to anticipate greater involvement of chiropractors in the policymaking and public health positions in the future. Chiropractors have pursued postgraduate training in public health (Mootz, 1995a) and proposals have been made to increase training opportunities within chiropractic schools for career options in health services research and public health (Mootz, 1995d). Several such individuals have received appointments at major universities and "think tanks" around the world.

2. Private Sector Positions

Positions for chiropractors as claims consultants, medical directors, and in health administration positions have existed in the private sector for many years, although no formal inventory of such positions has ever been undertaken (Haas, 1996; Mootz, 1995a). Many of the chiropractic practice parameters, guidelines, and technology assessment efforts discussed previously have been stimulated by public policy initiatives, private sector insurers, and managed care organizations' needs (Hansen, 1995; 1994a). As a result, involvement of chiropractors in this area may continue to grow as well.

⁶. Presented as a statement from the American Chiropractic Association Task Force on Primary Care and Chiropractic, June 18-19, 1994.

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CHAPTER VIII

CONTENT OF PRACTICE

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A. Presenting Problems and Diagnoses

Two studies of national scope have tried to describe what chiropractors actually do in practice. The first was a national survey of over 5,000 practicing chiropractors (Christensen, 1993), which asked what conditions patients presented with or had concurrently. The second, using data collected from the office records of a cluster sample of chiropractors, looked at the presenting symptoms the chiropractors recorded in charts and at diagnoses recorded for insurance purposes (Hurwitz, in press). Both studies collected data in the early 1990s. These studies allow for a comparison between what chiropractors indicate they do in response to a survey and what they actually record for specific patients in their office records.

The patient conditions that chiropractors indicated they routinely, often, or sometimes see in their practice are listed in Table 19 (Christensen, 1993). Symptoms for which 1,916 patients sought chiropractic care in the United States and Canada, as recorded in the office record of the initial visit, are listed in Figure 2. About two-thirds of patients were seeking care for low back pain. The diagnoses made by chiropractors (either in the office record or on the claim form) for 477 U.S. patients who sought care for non-low back pain complaints are listed in Table 20. While musculoskeletal conditions dominate all three lists, some obvious discrepancies exist. When asked, chiropractors say they routinely see patients with headaches, often see patients with blood pressure problems, allergies, or obesity, and sometimes see patients with nutritional disorders, menstrual disorders, asthma or emphysema, various infections, diabetes, and a variety of other non-musculoskeletal disorders. Examination of office records for patients' symptoms and diagnoses, however, reveals a near-absence of non-musculoskeletal conditions. No nonmusculoskeletal symptom accounted for more than 1 percent of patients' symptoms, and the three most frequently diagnosed nonmusculoskeletal conditions, asthma, otitis media, and migraine headaches, were noted for only about 1 in 200 patients (Hurwitz, in press).

The different messages conveyed by the two sources of data might be accounted for in a variety of ways, including how the information was collected. The conditions patients presented with, or had concurrently reported, in the Christensen survey (1993) may not be the same as the presenting symptoms the chiropractor recorded in the chart or as the diagnoses the chiropractors recorded for insurance purposes. Given reimbursement policies, coding restrictions, and utilization reviews that may occur, some chiropractors may feel an incentive to only report those symptoms and diagnoses that facilitate reimbursement. Reimbursement incentives may strongly influence the records chiropractors keep and the diagnoses that are reported. In many plans, e.g., Medicare, chiropractors are required to report a musculoskeletal diagnosis (and sometimes the diagnosis of "vertebral subluxation" is mandatory) in order to be paid for services.

Table 19. Frequency of Presenting and Concurrent Patient Conditions Chiropractors Indicated They See in Their Practices

ROUTINELY SEEN	Spinal subluxation/joint dysfunction Headaches
OFTEN SEEN	Muscular strain/tear Osteoarthritis/degenerative joint disease Peripheral neuritis or neuralgia Tendonitis/tenosynovitis Radiculitis or radiculopathy Vertebral facet syndrome Intervertebral disc syndrome Sprain or dislocation of any joint Extremity subluxation/joint dysfunction Hyperlordosis of cervical or lumbar spine Scoliosis Bursitis or synovitis High or low blood pressure Allergies Obesity
SOMETIMES SEEN	Kyphosis of thoracic spine Osteoporosis/osteomalacia Carpal or tarsal tunnel syndrome Skeletal congenital/developmental anomaly Articular joint congenital/developmental anomaly TMJ syndrome Thoracic outlet syndrome Systemic rheumatoid arthritis or gout Occupational or environmental disorder Muscular atrophy Nutritional disorders Menstrual disorders Asthma, emphysema, or COPD Upper respiratory or ear infection Pregnancy Respiratory viral or bacterial infection Acne, dermatitis, or psoriasis Loss of equilibrium Diabetes Psychological disorders Eating disorders Ear or hearing disorders Eye or vision disorders Hiatus or inguinal hernia Gastrointestinal bacterial or viral infection Infection of kidney or urinary tract Colitis or diverticulitis Thyroid or parathyroid disorder Hemorrhoids

Source: Christensen M, Morgan D (eds). Job Analysis of Chiropractic: A Project Report, Survey Analysis and Summary of the Practice of Chiropractic within the United States, Greely, CO: NBCE, 1993.

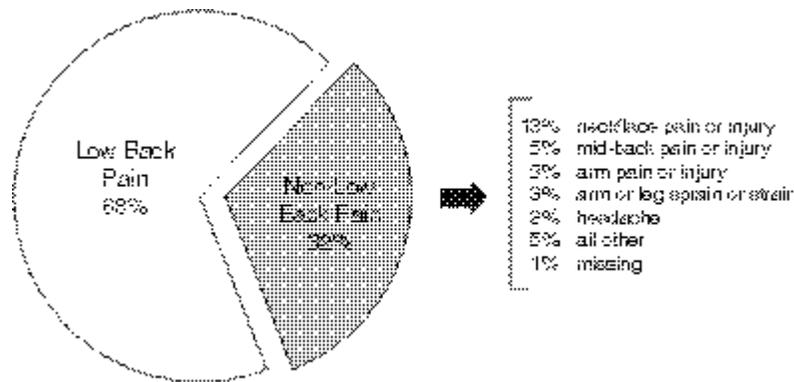


Figure 2.

Secondly, almost a quarter of the non-low back complaint patients had no diagnosis, and this group might contain some of the "missing" nonmusculoskeletal diagnoses. However, given that few patients presented with nonmusculoskeletal complaints, this is probably not an important factor. Finally, this may reflect vagaries of memory and that the large number of "routine" musculoskeletal pain patients the chiropractor sees recedes somewhat compared to the unusual cases, which seem to stand out.

B. Diagnostic Methods

Chiropractic training and literature approach clinical diagnosis in a similar fashion to that of all health care disciplines in that history, physical and regional examination, special studies, and specialty-specific evaluation procedures are routinely incorporated into patient work-ups (Gatterman, 1990; Haldeman, 1993). All accredited chiropractic teaching institutions incorporate history and physical examination into their curricula. Standard history and physical examination methods are basic chiropractic clinical competencies (Council on Chiropractic Education, 1991). Using standard historical, diagnostic, and assessment procedures, chiropractors attempt to differentiate problems of mechanical versus visceral origin (Souza, 1994a). The chiropractic literature is also paying increased attention to the role pain behavior and psychosocial issues play in conditions such as back pain and to evaluation and management strategies in these areas (Milus, 1994; Skogsbergh, 1994).

While chiropractors claim to document case progress in standard SOAP (i.e., Subjective, Objective, Assessment, Plan) notation format (Christensen, 1993), several chart abstraction studies have noted that chiropractors often maintain inadequate patient records (Nyiendo, 1991; Hurwitz, in press). Although quality record keeping may be a problem in all health professions, it appears to be a greater problem for chiropractors, who typically practice outside of group clinic and practice settings. It is expected that the increased emphasis on record keeping in the chiropractic literature and, more importantly, the quality assurance processes associated with participation in accredited managed care organizations will lead to improvements in record keeping over time (Mootz, 1994; McElheran, 1994).

Table 20. Most Frequent and Selected Diagnoses of Patients Seeking Care for Non-Low Back Pain Reasons From Chiropractors in the U.S.

ICD CODE	DESCRIPTION	% of all non-LBP Diagnoses (N=477)
•••	Missing	23.7
847.0	Sprains and strains, neck	13.7
847.1	Sprains and strains, thoracic	5.4
723.1	Cervicalgia	3.7
839.0	Dislocation, cervical vertebra	3.7
729.1	Myalgia and myositis, unspecified	3.4
739.1	Nonallopathic lesion, cervical region	3.2
784.0	Headache	2.7
723.2	Cervicocranial syndrome	2.1
723.3	Cervicobrachial syndrome (diffuse)	1.8
346.0	Migraine	0.5
382.9	Unspecified otitis media	0.3
493.9	Asthma, unspecified	0.2
•••	(130 other diagnoses)	(35.6)
		100%

Adapted from Hurwitz EL, et al. Utilization of chiropractic services in the U.S. and Canada: 1985-91 (In press).

1. History and Physical Examination

Two North American chiropractic practice parameter commissions recently rated history taking as a "necessary" component of a chiropractic patient evaluation (Haldeman, 1993; Henderson, 1994). Exploration of presenting complaint, family history, past health history, psychosocial history, and review of systems were considered necessary components of an adequate history (Haldeman, 1993). Standard procedures have been recommended for history taking that emphasize active listening and directed questioning related to the mechanisms of a problem's onset (Bowers, 1995a). The extent to which practicing chiropractors actually follow these guidelines is unknown. However, a recent survey of more than 6,500 chiropractors by the National Board of Chiropractic Examiners (Christensen, 1993) suggested that case histories are "routinely" performed and that chiropractors place "substantial" importance on the information gleaned from this process.

Performance of a physical examination is considered essential for establishing a diagnosis and determining a treatment plan (Haldeman, 1993; Henderson, 1994; Gatterman, 1990). Chiropractors receive extensive training and appear well prepared to perform orthopedic and neurological assessments (McCarthy, 1994; Evans, 1994) and the Christensen survey (1993) found that chiropractors report that they "routinely" perform these assessments. Assessment of general health status and performance of regional examinations were also considered important by chiropractors but are performed less frequently than physical examinations (Christensen, 1993).

Periodic updating of the physical examination is emphasized in chiropractic education and clinical internships (Gatterman, 1990; Mootz, 1988), and its use is reported by chiropractors to be "frequent" (Christensen, 1993). Reassessment and monitoring of patient progress received special attention by chiropractic practice parameters commissions (Haldeman, 1993; Henderson, 1994). Table 21 lists attributes of chiropractic reassessment considered "necessary" by one of the commissions (Haldeman, 1993). Functional outcomes assessment is increasingly being incorporated into overall clinical strategies for monitoring patient progress (Yeomans, 1996).

Table 21. Necessary Principles of Chiropractic Reassessment

- Reassessments are integral to case management and should be made following an appropriate period of care.
- Necessity and content of reassessments are determined by patient response.
- Reassessment shall be made if the patient's status worsens.
- Reassessment shall be made if a patient manifests signs or symptoms in an area not previously evaluated.
- Reassessment should be performed only after it is reasonably expected that measurable change in a patient's condition would have occurred.
- Reassessment should be made in all areas where there were prior positive clinical findings.

Adapted from Haldeman S, et al. (eds). *Guidelines for Chiropractic Quality Assurance and Practice Parameters*. Gaithersburg, MD: Aspen Publishers, 1993; pp 135-6.

2. Mechanical Assessment Procedures

In addition to the routine clinical evaluation procedures standard to any patient workup (i.e., history, physical and regional examination, and special studies) chiropractors have developed assessment methods for determination of the mechanical status of a patient. Some mechanical assessment strategies are common to physical medicine procedures (Henninger, 1993, 1994; Hammer, 1991) and others are unique to chiropractic (Haas, 1995; Faye, 1992; Youngquist, 1989). Table 22 provides a listing of mechanical assessment procedures that may be used by chiropractors to identify joint dysfunction.

Table 22. Examples of Mechanical Assessment Procedures Used by Chiropractors to Identify Joint Dysfunction

<ul style="list-style-type: none"> • Pain provocation • Static palpation • Motion palpation • Range of motion measurement • Postural symmetry 	<ul style="list-style-type: none"> • Dynamic spinal loading • Tissue compliance • Reactive leg length discrepancy • Gait analysis • Function capacity and physical performance evaluation
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Chiropractors typically approach mechanical assessment in a comprehensive fashion, routinely incorporating a number of hands-on evaluation methods (McMillin, 1995; Henninger, 1994). Osterbauer (1996) reviewed the evidence for reliability and utility of several chiropractic approaches to mechanical assessment procedures for detection of joint dysfunction or subluxation. Procedures with reasonable ("fair to good") reliability included assessments of osseous and soft tissue pain or tenderness (Mootz, 1989; Boline, 1993). Procedures for determining mobility, cutaneous temperature differences, and joint position have not fared well in reliability studies.

3. Special studies

Chiropractic training includes the use of clinical laboratory studies. Details on the application of these tests have long been described in the chiropractic diagnostic literature and in practice parameters (Jaquet, 1971; Adams, 1990; Vear, 1992; Triano, 1992; Haldeman, 1993). However, clinical laboratory testing appears to be only "rarely" or "infrequently" used in chiropractic practice (Hurwitz, in press; Christensen, 1993). For example, blood tests are ordered for fewer than 1 percent of patients (Hurwitz, in press). The infrequent ordering of lab tests may be due to legal restrictions on chiropractors performing phlebotomy in some jurisdictions as well as to the types of patients typically seen by chiropractors.

Radiology and imaging is used with far greater frequency than laboratory studies. In the NBCE survey (Christensen, 1993), chiropractors indicated that radiographs were "frequently" ordered and special imaging studies such as CT or MR were "sometimes" ordered. In the analysis of office records of patients who sought care for low back pain, 54 percent of patients had lumbosacral radiography, about 2 percent of patients had CT, and 2 percent had MR imaging during their "episode of care" (Hurwitz, in press). Thus, except for plain film radiography, special imaging and other special diagnostic tests are rarely used by chiropractors.

Radiology is a significant component of chiropractic education. A specialty society devoted to radiology, The American Chiropractic College of Radiology, serves in an advisory role for radiology residency programs at chiropractic colleges and certifies specialty-level competency in radiology. Yochum and Rowe (1996), chiropractic radiologists, authored a skeletal radiology text that is used in both chiropractic and medical radiology training. In a study comparing the abilities of chiropractic and medical radiologists, orthopedists, general practitioners, and chiropractic students to interpret radiographs, chiropractic and medical skeletal radiologists scored highest followed by chiropractic students, orthopedists, and general medical and chiropractic practitioners (Taylor, 1995).

Other special studies sometimes used or ordered by chiropractors include nerve conduction studies, bone scans, and electromyography. Appropriate use of these procedures is incorporated into the curriculum of chiropractic colleges and is addressed in chiropractic practice parameters (Haldeman, 1993). Chiropractic utilization of advanced diagnostics is quite low. In the past, chiropractors have been excluded from medical referral loops and have been forced either to care for patients without such studies or to obtain their own equipment and perform the tests themselves. Hence, either by design or circumstance, chiropractors often rely on low tech patient assessment procedures of historytaking, physical, regional, mechanical examinations, and plain film radiography while monitoring progress using a "therapeutic trial" approach to patient management.

C. Treatment Methods

Chiropractic treatments, as well as diagnostic practices, vary by geographic region due to differences in State laws governing scope of practice and due to differences in practitioner philosophy. The therapeutic procedure most closely associated with chiropractic is spinal manipulation. However, chiropractic patient management often includes lifestyle counseling, nutritional management, rehabilitation, various physiotherapeutic modalities, and a variety of other interventions (Gatterman, 1990; Haldeman, 1992, 1993). Physiologic therapeutics, taught in all chiropractic schools, are included in the chiropractic scopes of practice in most jurisdictions. Detailed protocols for the use of physiologic therapeutics have been published in the chiropractic literature (Hooper, 1996; Jascoviak, 1986) and are emphasized in the leading chiropractic research publication, the *Journal of Manipulative and Physiologic Therapeutics*.

The NBCE survey (Christensen, 1993) reported that chiropractors "routinely" performed chiropractic adjustive techniques. Overall, 96 percent of chiropractors reported having recommended corrective or therapeutic exercise at least once in the 2 years prior to the survey, and 84 percent of doctors recommended nutritional counseling, supportive techniques, or supplements during the same time period. No data are available in the Christensen survey (1993) about the proportion of individual patients who receive specific types of care. The office record data indicated that of 920 patients who presented with low back pain, 84 percent received spinal manipulation (or adjustment), 79 percent received nonthrust manual therapies such as mobilization, massage, and heat packs, 31 percent received education, and 5 percent received other forms of therapy such as acupuncture (Hurwitz, in press).

1. Manual Methods

The syntax surrounding the mechanical intervention of spinal manipulation is the source of some controversy within the chiropractic profession. Most chiropractors prefer the term chiropractic "adjustment" to manipulation because it is believed to imply a more specific or precise maneuver and distinguishes it from other forms of manipulation. There are at least 100 distinct chiropractic, osteopathic, and physical therapy manipulation techniques, a large array of highly specialized adjusting tables and equipment, and a great deal of variation in the specific techniques used by individual practitioners (Haldeman, 1993; Greenman, 1996; Bergmann, 1993).

There are four terms with distinct definitions that are frequently used to characterize manual manipulative methods (Haldeman, 1993). The general umbrella term of *spinal manipulative therapy* is often used to encompass all types of manual techniques regardless of their precise anatomic and physiologic focus or their discipline of origin. *Mobilization* is defined as passive movement of a joint within its physiologic range of motion. This roughly equates to the range of motion a joint can typically be taken through by its intrinsic musculature. *Manipulation* is passive joint movement, which takes the joint beyond its physiologic range into the parapsysiologic space.

Intrinsic muscle contraction alone does not usually move joints this far. When a joint is moved into this "para-physiologic" range, cavitation can occur, which, in a synovial joint, is typified by an audible release or "pop." A gaseous bubble may appear within the synovial fluid for several minutes after manipulation (Greenman, 1996).

Both mobilization and manipulation are used to facilitate joint motion. When applied in manual medicine and physical therapy, assessment and manipulative treatment tend to focus exclusively on joint pain and restriction. However, even though the execution of high velocity manipulative thrusts by chiropractors and nonchiropractors may appear similar, chiropractic techniques focus on a more global clinical picture to characterize and apply adjustments. Chiropractors typically consider the nature and mode of condition onset, muscle spasm, pain radiation patterns, static and dynamic postures, and/or gaits as well as joint pain in determining whether or not a mechanical intervention should be applied (Mootz, 1995a). For example, the spinal areas manipulated using typical manual medicine and physical therapy assessment approaches are often based on which joints or regions have restricted motion. In contrast, the decision as to which area to manipulate using various chiropractic techniques may be based upon pain radiation patterns, which paraspinal muscle regions are taut and how they are enervated, the biomechanical function of affected joints compared to that of adjacent areas, and the mechanics involved in initial onset (Grice, 1992; Gitelman, 1992). Thus the regions manipulated by chiropractors may not directly correspond to the symptomatic region or to the area that a nonchiropractor may feel is the site of the manipulable lesion.

In addition, there are many unique features associated with chiropractic techniques including patient positioning, equipment, characteristics of prestressing joints, and thrust. Decisions about the frequency and duration of chiropractic manipulative treatment may not be much influenced by its effect on range of motion. Rather, progress indicators such as function, coordination, and endurance often influence when and how chiropractic manipulation is provided. Some of the syntax in chiropractic reflects this with many drawing a distinction between the terms manipulation and adjusting. Table 23 provides definitions for manipulation, mobilization, and adjusting that illustrate these conceptual differences (Haldeman, 1993).

Bartol (1991) categorized chiropractic adjustive techniques according to their mechanical characteristics. Table 24 lists a classification scheme used by American and Canadian chiropractic practice parameter commissions to categorize types of chiropractic manual interventions. Table 25 provides examples of some better known chiropractic adjustive techniques. The Christensen survey (1993) reported that chiropractors "routinely" perform specific chiropractic adjustive techniques, "frequently" employ supportive or other non-adjustive techniques, but only "sometimes" use instruments (e.g., Activator) in the application of adjustments.

Regarding specific forms of manipulation and adjusting used by chiropractors, the job analysis by Christensen (1993) reported that Diversified, Gonstead, Flexion-Distraction, Activator, and Thompson techniques were the most frequently used procedures. All other techniques were used by fewer than 43 percent of practitioners. Over 93 percent of chiropractors reported using such full-spine adjusting procedures as their primary approach to patient care. Fewer than 2 percent indicated a primary emphasis on upper cervical procedures. Although roughly one-third of chiropractors indicated that they used other techniques (such as cranial work), the number reporting them as a primary emphasis was too small to warrant an individual listing in the Christensen job analysis (1993).

2. Exercise and Rehabilitation

According to Christensen (1993), 96 percent of chiropractors reported that they used corrective

and therapeutic exercises. Evidence-based guidelines published by AHCPR stress the importance of early activation of acute low back pain patients in order to optimize recovery (Bigos, 1994). Chiropractors have incorporated patient activation and exercise into their management strategies since the early part of the 20th century (Cook, 1994; Liebenson, 1995). Chiropractors have also become involved in the treatment of athletes, gaining substantial recognition in the sports medicine specialties. The American College of Sports Medicine was one of the first multidisciplinary organizations to allow chiropractors membership status. Chiropractors also have been included by many countries as Olympic team physicians and leading chiropractic colleges have recently sponsored postgraduate certification programs in sports chiropractic and rehabilitation. A clinical journal devoted to sports chiropractic and rehabilitation has been published for the better part of a decade and chiropractic authors have increasingly emphasized rehabilitation and activation strategies (Liebenson, 1995; Cook, 1994; Nelson, 1994; Souza, 1994b).

Table 23. Distinctions Between Adjustment, Manipulation, and Mobilization

<p>Chiropractic Adjustment: This term refers to a wide variety of manual and mechanical interventions that may be high or low velocity; short or long lever; high or low amplitude; with or without recoil. Procedures are usually directed at specific joints or anatomic regions. An adjustment may or may not involve the cavitation or gapping of a joint (opening of a joint within its parapsybiologic zone usually producing a characteristic audible "click" or "pop"). The common denominator for the various adjustive interventions is the concept of removing structural dysfunctions of joints and muscles that are associated with neurologic alterations. The chiropractic profession refers to this concept as a "subluxation." This use of the word subluxation should not be confused with the term's precise anatomic usage, which considers only the anatomical relationships.</p>
<p>Manipulation and Mobilization: During joint motion, three barriers or end ranges to movement can be identified. The first is the active end range, which occurs when the patient has maximally contracted muscles controlling a joint in a particular directional vector. At this point, the clinician can passively move the joint toward a second barrier called the passive end range. Movement up to this barrier is termed physiologic joint space. Beyond this point, the practitioner can move the joint into its parapsybiologic space. The third barrier encountered is the anatomic end range. Movement beyond this will result in rupture of the joint's ligaments.</p> <p><i>Manipulation:</i> Passive movement of short amplitude and high velocity, which moves the joint into the parapsybiologic range. This is accompanied by cavitation or gapping of the joint, which results in an intrasynovial, vacuum phenomenon thought to involve gas separating from fluid. Usually accompanied by an audible pop or click, manipulation has been shown to result in increased joint motion compared to mobilization alone. This increase in motion lasts for a 20 to 30 minute refractory period during which an additional cavitation of the same joint will not occur. Manipulation is a passive dynamic thrust that causes cavitation and attempts to increase the manipulated joint's range of motion.</p> <p><i>Mobilization:</i> Passive movement within the physiologic joint space administered by a clinician for the purpose of increasing overall range of joint motion.</p>

Source: Haldeman S, Chapman-Smith D, Petersen D (eds). *Guidelines for Chiropractic Quality Assurance and Practice Parameters*. Gaithersburg, MD: Aspen Publishers, 1993.

Chiropractic rehabilitation protocols appear very similar to standard rehabilitation practices (Nelson, 1994; Cook, 1994; Liebenson, 1996). With the increased popularity of fitness and conditioning in recent decades, exercise and rehabilitation have developed their own sub-specialty identity within medicine and physical therapy as well as in chiropractic. Chiropractic approaches to exercise range from the low-tech in-office conditioning and stabilization programs (Cook, 1994; Nelson, 1994; Liebenson, 1996) to more extravagant high-tech conditioning equipment (Christiensen, 1992). The Chiropractic Rehabilitation Association (CRA) publishes rehabilitation guidelines for chiropractic (CRA, 1992). Exercise and rehabilitation have been classified as "promising" to "established" for increasing functional capacity in chiropractic practice parameters (Haldeman, 1993; Henderson, 1994).

Table 24. Generic Chiropractic Manipulative and Adjustive Categorization System

<p>A. Manual, Articular Manipulative, and Adjustive Procedures</p> <ol style="list-style-type: none"> 1. Specific Contact Thrust Procedures <ol style="list-style-type: none"> a. high velocity thrust b. high velocity thrust with recoil c. low velocity thrust 2. Nonspecific Contact Thrust Procedures 3. Manual Force, Mechanically Assisted Procedures <ol style="list-style-type: none"> a. drop-tables and terminal point adjustive thrust b. flexion-distraction table adjustment c. pelvic block adjusting 4. Mechanical Force, Manually Assisted Procedures <ol style="list-style-type: none"> a. fixed stylus, compression wave adjustment b. moving stylus instrument adjustment
<p>B. Manual, Nonarticular Manipulative, and Adjustive Procedures</p> <ol style="list-style-type: none"> 1. Manual Reflex and Muscle Relaxation Procedures <ol style="list-style-type: none"> a. muscle energy techniques b. neurologic reflex techniques c. myofascial ischemic compression procedures d. miscellaneous soft tissue techniques 2. Miscellaneous Procedures <ol style="list-style-type: none"> a. neural retraining techniques b. conceptual approaches

Adapted from Haldeman S, et al. (eds). *Guidelines for Chiropractic Quality Assurance and Practice Parameters*. Gaithersburg, MD: Aspen Publishers, 1993.

Table 25. Examples of Specific Chiropractic Techniques

<p>Full-spine high velocity techniques</p> <p>Diversified Gonstead Thompson Terminal Point Pierce-Stillwagon Pettibon Chiropractic Biophysics</p>	<p>Lumbo pelvic techniques</p> <p>Cox Flexion-distraction Logan Basic</p>
<p>Upper cervical techniques</p> <p>Upper Cervical Specific NUCCA Grostick Orthogonal</p>	<p>Miscellaneous/Instrument Adjusting</p> <p>Sacro-Occipital Technique Applied Kinesiology Activator Toftness</p>

3. Lifestyle and Activities of Daily Living

Promotion of wellness and lifestyle strategies is also a significant, if underexplored, aspect of chiropractic practice. More than two-thirds of chiropractors report using nutritional and exercise counseling in practice (Christensen, 1993), and chiropractic college curricula include courses on the subject. Health promotion strategies for chiropractors exist in the literature (Jameson, 1991; Hawk, 1995; Bowers, 1995b); however, data on application in practice is scant.

4. Ancillary and Complementary Procedures

Chiropractors also use a variety of complementary and ancillary procedures. The most frequently used procedures include cryotherapy, bracing, and nutritional counseling (Christensen, 1993). The majority of practitioners also use rest, heat, orthotics, traction, and physiotherapeutic modalities. Acupressure and meridian therapy are used by about 65 percent of practitioners with fewer than 12 percent reporting that they use acupuncture (Christensen, 1993).

D. Chiropractic Management of Specific Health Care Problems

1. Considerations in Management of Neuromusculoskeletal Problems

In recent years manipulation has been the subject of substantial scientific inquiry (Bronfort, 1992; Shekelle, 1991a, 1991b, 1992a, 1992b, 1995) and its role in the management of at least some musculoskeletal conditions appears promising (see Chapter XI for more details on evidence for efficacy of manipulation). However, more study is needed, especially given the current emphasis on cost containment in health care. As previously indicated, the majority of conditions for which patients seek chiropractic are musculoskeletal problems (Hurwitz, in press; Goertz, 1996; Christensen, 1993) with low back pain and head/neck pain accounting for the great majority.

Low Back Pain

Chiropractic management of low back pain depends on the characteristics of the patient and the condition. Management of acute low back pain usually entails initial pain and inflammation control, with emphasis on return to normal activity (Mootz, 1991, 1993a; Cox, 1996). Depending

on the clinical presentation, manual interventions such as manipulation and adjusting may be directed at restoring joint motion and stretching tight musculature. Other manual procedures including soft tissue work, passive and active movements, and therapeutic exercise may be used based on severity of condition, patient tolerance, and demands of activities of daily living (Cox, 1996; Nelson, 1994). Additionally some chiropractors may use supportive modalities (e.g., thermal or electric physiotherapeutics) to enhance muscle relaxation and tissue metabolism. Treatment frequency and duration depends on the nature and extent of the condition (Hansen, 1994a). Back pain that appears to be associated only with uncomplicated simple joint dysfunction generally resolves within a few days or weeks (Hansen, 1994a; Mootz, 1993a). Acute low back conditions with more substantial soft tissue injury and/or radicular involvement typically involve more intensive and prolonged management (on the order of a few months) (Mootz, 1993a; Cox, 1996).

Chronic and recurrent low back conditions often require greater emphasis on modification of daily activities and conditioning (Liebenson, 1996; Skogsbergh, 1994). Manipulation may be combined with rehabilitation protocols for such cases (Mootz, 1993a). Somatization and other types of pain behavior are also frequently considered in treating chronic pain patients as are the impact of the condition on the patient's lifestyle and the extent of the patient's motivation. Collaborative care and/or referral for counseling may be sought in such cases.

Cervical and Thoracic Spine Conditions

As with low back pain, chiropractic management of cervical and thoracic conditions is based on the nature and extent of the problem as well as on the patient's psychological, social, and physical circumstances. Two of the more common cervical spine complaints seen by chiropractors are neck pain and cervicogenic headache (Hurwitz, in press). Uncomplicated neck pain that may be related to simple joint dysfunction can be cared for with a combination of manipulation and myofascial work, and should respond quickly to such interventions. Neck pain involving discogenic or radicular complications is also something chiropractors feel comfortable managing (Coulter, 1995). However, this requires careful monitoring that demonstrates improvement under care and manipulative treatment may need to be modified from that used on patients without radiculopathy to avoid possible compression of inflamed tissues within the cervical foramen (Mootz, 1996).

Post-traumatic cervical sprain and strain, often associated with whiplash type injury, is another condition frequently managed by chiropractors (Foreman, 1995). This is usually treated with pain control (e.g., cryotherapy, rest, compression, elevation), bracing, rehabilitation, and manual interventions (including manipulation) during the course of care as patient response and tolerance permit (Mootz, 1996). Soft tissue injuries, especially some of the more extensive ones, can heal slowly and develop fibrosis which may prolong response time and increase treatment duration (Foreman, 1995).

Extremity Conditions

Sports injuries and extremity conditions are also addressed by chiropractors (Souza, 1994b, 1994c; Turchin, 1995) and have been the subject of preliminary chiropractic practice guideline efforts (Chiropractic Rehabilitation Association, 1992). Management methods may include typical nonpharmaceutical pain control, exercise and extremity manipulation or mobilization.

2. Management of Other Conditions

Little is known about how frequently chiropractors diagnose and treat non-neuromusculoskeletal problems and no studies have described how such problems are actually managed. A 1995 survey by the American Chiropractic Association (ACA) found that chiropractors estimated that, on

average, 16 percent of their practices were devoted to the treatment of nonneuromusculoskeletal conditions (Goertz, 1996). However, as noted earlier, a study using data from chiropractors' office records found that fewer than 5 percent of patients were seen for nonneuromusculoskeletal conditions (Hurwitz, in press).

Chiropractors may often see patients who smoke, are overweight, or who have previously undiagnosed conditions such as hypertension or rheumatoid arthritis. Depending on the extent of the problem, the chiropractor's training and experience, and the scope of practice for which the chiropractor is licensed, specific monitoring strategies and lifestyle modifications may be recommended (Jameson, 1991; Milus, 1994; Bowers, 1995a; Frischer, 1995; Evans, 1995). Disease screening, nutritional counseling, and lifestyle modification are part of chiropractic training (Jameson, 1991, Bowers, 1995a).

Since the profession's inception, many chiropractors have believed that chiropractic adjusting techniques enhance general health and wellness, and facilitate healing in patients with nonmusculoskeletal disorders. Although some chiropractors promote these beliefs, others are cautious about making such claims for which there is little scientific support. Thus, at this time, these beliefs are based on conceptual biologic models and anecdotal clinical experience but not on scientific evidence.

The most controversy surrounding chiropractic management of non-NMS conditions derives from vestiges of early chiropractic and osteopathic models regarding how spinal manipulation might impact a disease process. There are a number of models regarding the physiological effects of manipulation and an overview of research on the topic can be found in Chapter X. The most sophisticated models speculate on the reflex effects spinal manipulation might have on autonomic function (Gatterman, 1995). However, autonomic nervous system function remains poorly understood and specific responses to stimuli are dependent on so many confounding factors as to make predictable and workable models a significant challenge.

Many practitioners have anecdotally reported remissions of diagnosed systemic or visceral disease while a patient is under chiropractic care. Although a cause-effect relationship may be apparent to those affected, other explanations must be considered. For example, chest and arm pain may result from cardiac ischemia or mechanical dysfunction in the chest wall or rib cage. Manual methods may relieve a patient with the latter cause, leading to an inaccurate assumption that manipulation influenced heart disease. Natural progression, concurrent interventions, and placebo responses may also provide rival explanations to a direct neurologically mediated response. More research is needed in this area.

E. Practice Guidelines, Clinical Pathways, and Technology Assessments in Chiropractic

The first evidence- and consensus-based practice parameters on chiropractic in the U.S. were developed through a large-scale professionwide effort (Haldeman, 1993). This effort, called the "Mercy Conference" (after the conference center where the formal nominal group consensus meeting was held) used a formal consensus approach, with input from a broad cross-section of the profession. The recommendations, developed using a standardized and evidence-based approach, address the broad range of chiropractic practices. After a 3-year process, final recommendations were agreed upon (Haldeman, 1993). The guidelines delineate general clinical parameters and lack specificity for approaches to the management of patients with specific conditions. An infrastructure to evaluate and oversee future revisions has been established by the Congress of Chiropractic State Associations.

One other chiropractic practice inventory has been developed in the United States (WCA, 1993). It was a narrow scope ("straight") practice parameter project, which lacked an explicit process and involvement of different viewpoints. The recommendations promoted lengthy periods of treatment and did not consider evidence contrary to the sponsor's beliefs. The proceedings quickly went out of print and have not been reissued although a second effort has been undertaken.

Two more recent efforts have occurred in Canada and Australia (Henderson, 1994; Ebrall, in press). Like Mercy, both used explicit processes to evaluate the literature and synthesize expert opinion on which the recommendations are based. These efforts update Mercy by incorporating new information. Their recommendations were generally similar to those of Mercy.

In addition to the efforts to produce practice parameters, a number of condition-specific guidelines and critical care pathways (Table 26) have recently appeared in the chiropractic literature (Hansen, 1994b). Chiropractors also participated in a multidisciplinary panel that produced national guidelines for the management of acute low back pain in adults (Bigos, 1994).

Finally, chiropractors have undertaken a number of technology assessments (Hansen, 1996; Mannello, 1996) such as those listed in Table 26. In addition, formal efforts to examine approaches to evaluating and validating chiropractic methods have been undertaken (Kaminski, 1987; Hansen, 1996; Osterbauer, 1996). These efforts have relied on explicit processes to evaluate the literature and expert clinical opinion on individual procedures.

Table 26. Examples of Recent Chiropractic Practice Parameters, Clinical Pathways, Algorithms, and Technology Assessments

Chiropractic Practice Parameters Using Explicit Processes
• Guidelines for Chiropractic Quality Assurance and Practice Parameters (Haldeman, 1993).
• Clinical Guidelines for Chiropractic Practice in Canada (Henderson, 1994).
• Clinical Parameters of Australian Chiropractic Practice (Ebrall, in press).
Clinical Pathways and Algorithms
• A consensus on the assessment and treatment of headache (Nelson, 1991).
• Fatigue: narrowing the differential (Bowers, 1994).
• Improving the clinician's use of orthopedic testing: application to low back pain (McCarthy, 1994).
• Fever in the adult patient (Evans, 1995).
• Conservative management of hypertension (Mootz, 1995b).
• Clinical considerations in the mechanical assessment of the cervical spine (McMillan, 1995).
• Evaluation and management of an adult patient presenting with cough (Frischer, 1995).
• Determining how much care to give and reporting patient progress (Hansen, 1994a).

<ul style="list-style-type: none"> • Low back pain pathogenesis, diagnosis, and management (Aker, 1990).
<ul style="list-style-type: none"> • Psychological considerations in chiropractic practice (Milus, 1994).
<ul style="list-style-type: none"> • Chiropractic care parameters for common industrial low back conditions (Mootz, 1993a).
<p>Technology Assessments</p>
<ul style="list-style-type: none"> • Proceedings of the First Consensus Conference on Validation of Chiropractic Methods (Bergmann, 1990).
<ul style="list-style-type: none"> • Focus on Health Policy and Technology Assessment in Chiropractic: Proceedings of the 7th Annual Conference on Research and Education (Hansen, 1992).
<ul style="list-style-type: none"> • The value of leg length inequality and specific contact short lever adjusting in chiropractic: results of a consensus process by chiropractic expert panels (Mootz, 1993b).

F. Quality Management and Medicolegal Issues

1. Quality Management Efforts in Chiropractic

Although chiropractic was not included in early attempts to address quality in health care delivery, quality management and quality assurance are now being addressed in the chiropractic literature (Hansen, 1997; Iannelli, 1995; McElheran, 1994). Chiropractic involvement in managed care programs has served as a catalyst for this interest due to credentialing requirements, accreditation of preferred provider organizations, and an increasing need for competitive advantages in the marketplace. Although a number of different definitions of "quality" have been proposed, several consistently mentioned dimensions of chiropractic quality include effectiveness of care, appropriateness of care, availability of providers, access, patient satisfaction, adequacy and completeness of medical information and record keeping systems, office environment, and continuity of care (McElheran, 1994; Iannelli, 1995).

These components of quality can be roughly categorized into those that focus on clinical services, and those that focus on the delivery of care. The technology assessment and practice guidelines efforts undertaken by the chiropractic profession have served as a springboard for documenting clinical attributes of quality. Table 26 listed several of these efforts. For example, the "Mercy" Guidelines for Chiropractic Quality Assurance and Practice Parameters described more than 300 recommended attributes of chiropractic practice in performing history and examination, special studies, diagnostic considerations, modes of care, clinical documentation, and continuing education (Haldeman, 1993). Relatively few recommendations involved condition- and patient-specific issues. Many clinical issues were dealt with in generalities and were given "equivocal" ratings, reflecting the current state of uncertainty in the scientific literature. On the delivery and administrative side, however, more specific guidelines were stated concerning such issues as record keeping and patient confidentiality.

An example of a practitioner performance audit form used at the National College of Chiropractic Clinics to monitor quality attributes through chart audits is included as Figure 3 (Iannelli, 1995). An example of chart record content guideline currently used by a chiropractic IPA as a guideline for minimum chart requirements for its network members (McElheran, 1994) is included as Figure 4.

Standardized systems for quality assurance and management have been successfully implemented in chiropractic settings. Iannelli (1995) reported that the National College of Chiropractic was able to implement the AmbuQual system charting the Program Quality Index (PQI) of facilities. Over a 3-year period, parameters including staff performance, continuity of care, record keeping, patient risk minimization, satisfaction, compliance, and accessibility were tracked. Iannelli concluded that tracking such data and using them in organizational decisionmaking led to increased PQI scores.

As chiropractors become more involved in interdisciplinary settings and networks, pressures for and experience with quality assurance and quality management efforts will increase. In addition, wider use of these technologies in teaching clinics should help establish practice habits that incorporate patient- and consumer-oriented performance measures making chiropractic services more accountable and appealing to consumers.

2. Malpractice Experience

Chiropractors have among the lowest malpractice insurance premiums of all physician specialties and the percentage of chiropractic physicians who have been sued for malpractice is lower than the percentages of medical and legal professionals (Brady, 1994; Medical Liability Monitor, 1996). Based on premium rate data provided by the National Chiropractic Mutual Insurance Company (the largest chiropractic malpractice carrier in the U.S.), average annual premium costs for chiropractic malpractice coverage in 1996 ranged from a low of \$611 in Indiana to a high of \$4,107 in Connecticut with a national average of \$2,177. This compares to average annual internal medicine premium costs ranging from a low of \$1,308 in Arkansas to over \$20,000 in Florida, Illinois, and New York (Medical Liability Monitor, 1996).

Although malpractice premiums do not provide an accurate measure of risk, they do reflect the relative number and severity of complications and problems arising from care. Overall, chiropractic procedures appear to be comparatively safe, although potential side effects, complications, and contraindications to adjusting have been identified (Haldeman, 1993; McGregor, 1995). Claims data

National College Chiropractic Clinics Practitioner Performance Audit

Center _____ Chart # _____ Date of Visit _____ Practitioner _____

ACUTE / CHRONIC PROBLEM CARE	Yes	No	N/A	Comments
Problem/#Title _____				
1. Was the subjective data adequate?	—	—	—	_____
	—	—	—	_____
	—	—	—	
	—	—	—	
2. Was the objective data adequate?	—	—	—	_____
	—	—	—	_____

	-	-	-	
	-	-	-	
3. Was the assessment adequate?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
4. Were the diagnostic procedures adequate?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
5. Was recommended therapy indicated and appropriate for the stated condition?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
6. Does the plan contain appropriate initial short and long term goals?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
7. Are treatment goals reviewed/revised according to their expiration dates?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
8. Was a consultation requested if indicated?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
9. Was the patient referred to the nutritionist if indicated?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
10. Was the patient referred to rehabilitation if indicated?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
11. Was the patient referred to electrodiagnosis if indicated?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
12. Was the patient referred to ergonomics if indicated?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
13. Was the patient referred to orthopedics if indicated?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
14. Was the patient referred to family practice if indicated?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	

CONTINUITY OF CARE

26. If ordered, was consultation/referral carried out?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
27. Are all abnormal laboratory, imaging, and specialty procedure results adequately followed up?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
28. Are test results available for tests ordered on previous visit? (NA if 1 wk since last visit)	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	
29. Was the patient seen by the same provider/group on 8 out of the 10 most recent visits (within 6 months)?	-	-	-	_____
	-	-	-	_____
	-	-	-	
	-	-	-	

Figure 3. Practitioner performance audit form

Source: Iannelli GC. Principles of quality management in chiropractic practice. In Lawrence D, et al. (eds). *Advances in Chiropractic, Vol. 2*. St. Louis, MO: Mosby, 1995. Reprinted with permission.

from Canada revealed that between January 1986 and December 1990, there were a total of 159 claims made against chiropractors with the most common complaints being for lumbar spine injury, rib fracture, soft tissue injury, and cervical spine injury. Cerebrovascular accidents accounted for 8 percent of the claims (Henderson, 1994). According to claims data from the National Chiropractic Mutual Insurance Company for 1990, the most common causes of malpractice claims were for disc problems, failure to diagnose, fracture, and soft tissue injury. Cerebrovascular accidents accounted for 6 percent of claims made (Haldeman, 1993). Estimates of the risk of specific complications from lumbar and cervical spine manipulation are presented in Chapter XI.

In part due to concerns about the risk of adverse events and malpractice claims, guidelines for clinical management, minimization of risks, and informed consent have been published in the chiropractic literature (Haldeman, 1993; Henderson, 1994). Table 27 lists some conditions identified in the Guidelines for Chiropractic Quality Assurance and Practice Parameters that may require modification of high velocity thrust procedures due to possible risks of complications (Haldeman, 1993). Because of the limitations in data quality and availability, the type of evidence available for making these ratings was primarily expert opinion of participating panelists and/or case reports.

GUIDELINES FOR CHART RECORD CONTENT

Chiropractors have the legal and ethical responsibility to maintain complete and accurate records for each patient. Patient files should be stored neatly and organized to facilitate tracking and retrieval, with a system in
--

place to maintain patient confidentiality. The following guidelines are adapted from the 1994 NCQA [Guidelines for Medical Record Review](#).

To be considered complete, chiropractic chart records should include the following features:

Medical Record Overview

- 1. Chart documentation is organized.
- 2. The record is legible.
- 3. If any non-standard abbreviations, codes, or scales are used, a key should be included to allow easy interpretation by any reviewing person.
- 4. The patient name is prominent on each and every page.
- 5. The date is noted for each provider contact / office visit / phone call / record review.
- 6. Entries contain author identification when anyone other than the primary treating doctor makes any entry in the chart record.
- 7. When there is significant risk of injury from a procedure, there is documentation of informed consent by the patient.

Exam / Intake Records

- 8. The patient's name / address / age / family status are noted.
- 9. Past medical / health history are recorded.
- 10. The list of patient's major problems / diagnosis is prominent, and revised as the patient's condition warrants.
- 11. Documented examination findings include adequate and appropriate testing for the patient problem.

Daily Chart Records

- 12. Relevant history / subjective findings of the presenting problem noted for each visit.
- 13. Pertinent objective findings noted when there is significant change.
- 14. Assessment / diagnosis noted in encounter entries, corresponding to subjective / objective findings.
- 15. Treatment plan / recommendations noted, corresponding to the patient problem / diagnosis. Return time is noted as weeks, months, or PRN.
- 16. Notation of care prescribed or provided, corresponding to the problem being treated.
- 17. The care provided appears to be "medically" appropriate.
- 18. Reports (lab, imaging, second opinion, etc) and correspondence are signed or initialed as reviewed by the provider, significant findings are noted in the record.
- 19. Notation of patient's response to care.
- 20. Notation of home exercises /activities / ADLs given.

- 21. Appropriate diagnostic testing or referral is noted.
- 22. Notation of review / discussion of specialist findings and further recommendations.
- 23. All S.O.A.P. areas are updated for each PRN follow-up visit.

Figure 4. Chart record content guideline

Source: McElheran L, Sollecito P. Delivering quality chiropractic care in a managed care setting. *Top Clin Chiropr* 1994;1(4):78.

Table 27. Examples of Conditions (or Concurrent Conditions) That May Necessitate Modification of High Velocity Thrust Procedures on a Patient

<p><i>Absolute contraindication to high velocity thrust procedures</i></p> <ul style="list-style-type: none"> • region with acute episode of rheumatoid arthropathy • acute fracture/dislocation • osodontoideum • active juvenile avascular necrosis • area with malignancy • bone or joint infection • acute myelopathy or cauda equina syndrome
<p><i>Relative to absolute contraindication to high-velocity thrust procedures</i></p> <ul style="list-style-type: none"> • joint instability • benign bone tumors • clinical manifestations of vertebrobasilar arteriole insufficiency (to cervical manipulation) • congenital or acquired skeletal deformities
<p><i>Relative contraindication to high-velocity thrust procedures</i></p> <ul style="list-style-type: none"> • spondylolisthesis with progressive slippage • articular hypermobility • bone demineralization • patient with bleeding disorders
<p><i>No contraindication</i></p> <ul style="list-style-type: none"> • uncomplicated degenerative joint disease • subacute or chronic ankylosing spondylitis • nonprogressive spondylolysis or spondylolisthesis • scoliosis • acute soft tissue injury

Source: Haldeman S, et al. (eds). *Guidelines for Chiropractic Quality Assurance and Practice Parameters*. Gaithersburg, MD: Aspen Publishers, 1993.

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CHAPTER IX

CHIROPRACTIC RESEARCH

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A. History and Development of Research

1. Early Investigations and Research

"Legitimate, sustained, scientific research in chiropractic is a rather recent phenomenon. However, throughout chiropractic's 100-year history, the terms 'research' and 'science' have been among the most popular in the literature of chiropractic and have often been used in ways that are unfamiliar to most scientists" (Keating, 1995). In those early years, the term "science" was found in numerous publications in the professions such as *The Science of Chiropractic* and *The Philosophy, Science and Art of Chiropractic Nerve Tracing*, two books written by B.J. Palmer, the son of D.D. Palmer, the founder of the chiropractic profession. "Research" was also popular as evidenced by Willard Carver's Chiropractic Research University in Washington, D.C., and Hugh B. Logan's International Chiropractic Research Foundation established in 1934 (Keating, 1995).

During the first half of the 20th century, D.D. Palmer and B.J. Palmer were noted for their theoretical explanations of their therapeutic success. The B.J. Palmer Research Clinic, located at the Palmer School of Chiropractic, accepted difficult cases and sought diligently to document patient care and progress as a means of investigating chiropractic. Chiropractors were anxious to develop methods and means to document clinical findings and patient response to care. X-ray became a useful tool for chiropractors to visualize the spine and to document changes attributed to their adjustive procedures. Chiropractors were the early developers of weight-bearing x-rays and full spine x-rays as a means of visualizing the entire spine when subjected to the effects of gravity (Keating, 1992).

Technological wizardry expanded beyond x-ray. A variety of instruments designed to detect spinal subluxations (misalignments) and the resulting physiological manifestations of the associated neurological disturbance began to appear. The neurocalometer was the most recognized of these paraspinal, heat-sensing instruments. Consistent with general trends during the first 50 years of the 20th century, instrumentation of all types was designed to provide a more thorough diagnosis, and to improve body functions in the hope of instilling longevity by wiping out disease and dysfunction. Such instruments were widely used by many professions and were not limited to chiropractic (Keating, 1995).

More specific to chiropractic was the development of adjustive techniques. With over 300 named techniques, it seemed like every practitioner who turned to teaching introduced a new way to treat a patient. Many of these systems included their own distinctive approach to defining what was wrong with the patient so that the patient's condition would be consistent with the therapeutic procedure to be administered. Many of these early techniques have survived and are still practiced in the profession today (Haldeman, 1992).

2. Establishment of the Foundation for Chiropractic Education and Research (FCER)

The need for research, organized at a national level, was stressed by C.O. Watkins as early as 1938 and later (1943) by C.W. Weiant, who had obtained a doctorate in anthropology from Columbia University in addition to his DC degree (Schierholz, 1986). In 1944, the National Chiropractic Association (NCA) created the Chiropractic Research Foundation (CRF) with the objective of acquiring funding for and promoting the development of research for the chiropractic profession (Schierholz, 1986). While research was important to the profession, the CRF focused its efforts on consolidating many small for-profit educational institutions into larger nonprofit professionally-controlled colleges (Keating, 1993).

During the 1960s, chiropractic educators realized the importance of upgrading educational standards to achieve nationally recognized accreditation. The NCA became the American Chiropractic Association (ACA) and the CRF became the Foundation for Accredited Chiropractic Education. What was originally conceived as an organization to support research became an organization to support the efforts of educational institutions wishing to become accredited. This goal was accomplished in 1974 when the United States Department of Health Education and Welfare (DHEW) recognized the Council on Chiropractic Education (CCE). In 1967, the Foundation for Accredited Chiropractic Education was reorganized as the Foundation for Chiropractic Education and Research (FCER). However, the emphasis was to remain on education rather than research for several more years (Keating, 1992). In the early 1970s, the ACA pressured FCER to fund research training for selected doctors of chiropractic. This was the genesis of an emerging research infrastructure within the profession. The Foundation also released funds to support research outside the profession.

In 1975, the U.S. DHEW sponsored a research conference on spinal manipulation. This conference heightened awareness of the need for research on spinal manipulation, given the absence of meaningful data. The next year, the DHEW insisted that the CCE stress the importance of research as part of the accreditation process. Soon thereafter (1977), FCER organized the Chiropractic Research Council (CRC) in an effort to bring together the research directors of all the chiropractic colleges. Such a group continues to meet under the auspices of the Chiropractic Research Consortium (also known by the acronym CRC), which is a separate entity from FCER's Chiropractic Research Council.

In 1979, FCER hired a director of research who expanded the research fellowship program and established a competitive scientific review process for submitted proposals. The Foundation also implemented an annual research conference for paper presentations, research training, and interprofessional dialogue. This meeting has grown to become the International Conference on Spinal Manipulation (ICSM), which attracts researchers from multiple disciplines from around the world.

While the bulk of the financial support for the FCER has come from the ACA (approximately \$350,000 per year) (Keating, 1992), corporate vendors and FCER's own informational center have also enhanced FCER's financial base. An individual chiropractor, Dr. William Harris, and the National Chiropractic Mutual Insurance Company have also provided substantial support. Federal research dollars have not passed through FCER. The Foundation continues to serve the profession through its support for the research fellowship programs, international conferences, and individual research projects within and outside the profession.

B. The Infrastructure and Research Capacity of the Chiropractic Profession

Other organizations have also contributed to the growth of a chiropractic research infrastructure. The National Institute for Chiropractic Research has supported research on chiropractic history and on specialized techniques. In 1986-87, the California Chiropractic Association (CCA) supported the development of the Pacific Consortium for Chiropractic Research (PCCR). The research directors from the chiropractic colleges in California and Oregon and the CCA joined as charter members. As membership expanded beyond the West Coast, the Pacific portion of the name was dropped so that the organization became known as the Consortium for Chiropractic Research (CCR). Research directors from all but one chiropractic college have maintained membership in this organization. The CCR has sponsored the annual Conference on Research and Education (CORE) held in conjunction with the annual meeting of the California Chiropractic Association. In 1996, the CCR altered their organizational structure to become more focused on fund raising to support research and is now called the American Spinal Research Foundation (ASRF).

In addition to benefiting from FCER or CCR funding, many of the individual chiropractic colleges have made their own commitments to research. A recent survey of the 17 colleges in North America (16 in the United States and 1 in Canada) found that the number of full-time faculty in each college assigned to research as their principal appointment ranged from 0-14 (median = 3). Internal research budgets for the 1994-95 fiscal year totaled \$4.8 million and ranged from \$8,000 to \$861,000 (median = \$205,000) at the 17 colleges. This represented between 0.6% and 4.1% of their total institutional expenses. In the 1994-95 fiscal year chiropractic faculty published 210 papers and submitted a total of 114 grant proposals to external funding agencies. Twenty-three (20%) of these proposals were funded. A total of \$4.5 million was awarded with grants ranging from \$20,000 to \$1 million (mean = \$194,130) (Meeker, 1996).

C. Sources of Funding

1. Chiropractic-Related Funding Sources

Research in chiropractic has been funded largely from within the profession, a significant portion coming from chiropractic college tuition dollars. National professional organizations (the American Chiropractic Association and the International Chiropractic Association) and State chiropractic associations have also given financial support to chiropractic research. For example, the California Chiropractic Foundation (CCF), the educational body of the California Chiropractic Association, has donated 6.5% of its annual budget to the Consortium for Chiropractic Research (CCR) since the 1980s (CCR, 1995), and the Florida Chiropractic Association is currently supporting activities of the Consortium. Other funding has come from philanthropic chiropractic practitioners, the National Chiropractic Mutual Insurance Company (NCMIC), and Foot Levelers, Inc., an orthotics supplier.

Until recently, Federal funding has been almost nonexistent. In 1991, a federally-commissioned study conducted by the Corporate Health Policy Group reported that there was an "inherent bias" in favor of medical researchers when competing with chiropractors for Federal grants because of the superior research track record of medical researchers (Keating, 1992). Nonetheless, a small number of Federal grants recently have been awarded to projects involving chiropractic.

In 1994-95, half of all grant funding to chiropractic researchers was from the U.S. Health Resources and Services Administration (7 grants totaling \$2.3 million) and most of the remainder was from the FCER (11 grants totaling \$881,000) and the CCR (4 grants totaling \$519,000). The following paragraphs describe the major chiropractic sources of funds for chiropractic research

since 1990 and the types of studies that have been funded.

The Consortium for Chiropractic Research

The Consortium for Chiropractic Research (CCR), established in 1989, is an organization composed of the 16 U.S. chiropractic colleges accredited by the Council on Chiropractic Education (CCE), and associate members who conduct or fund research. It is the largest single organized body of institutions dedicated to chiropractic research (CCR, 1995). Since 1990, CCR has awarded more than \$660,000 to support four projects: the appropriateness of spinal manipulation of the cervical spine, the role of chiropractic in meeting rural health care needs, and randomized trials of the effect of chiropractic on chronic neck pain and childhood asthma.

The Foundation for the Advancement of Chiropractic Education

In 1981, Dr. William Harris, a chiropractor in private practice, established the Foundation for the Advancement of Chiropractic Education (FACE), a not-for-profit organization that has contributed more than \$3 million to chiropractic research. In addition to funding research projects, FACE has provided funds to build research infrastructure at several chiropractic colleges and has contributed large sums to support research through the Foundation for Chiropractic Education and Research and the National Institute of Chiropractic Research.

Foundation for Chiropractic Education and Research

The Foundation for Chiropractic Education and Research (FCER), established in 1967, had become the largest organization funding chiropractic research by 1992 (Keating, 1992). In 1990 the annual budget of FCER was about \$2 million (Keating, 1990). Between 1990 and 1995, FCER has independently or jointly awarded approximately \$3.7 million to more than 25 projects. During this time period, FCER has also awarded educational grants totaling \$277,000 to 34 individuals, fulfilling one part of its mission (Peterson, 1995). The projects funded by FCER include a national study of the use of chiropractic services and evaluations of the effect of chiropractic care on back and neck problems, headaches, idiopathic scoliosis, asthma, dysmenorrhea, hypertension, and colic.

National Chiropractic Mutual Insurance Company

The National Chiropractic Mutual Insurance Company (NCMIC) and FCER have co-funded more than 14 studies of the effect of chiropractic care on clinical problems such as dysmenorrhea, carpal tunnel syndrome, hypertension, and otitis media. Other jointly funded projects include studies of the role of chiropractors as primary care gatekeepers and analysis of referral patterns. They have also funded an effort to develop plans for an infrastructure to support a multidisciplinary practice-based research network. In total, FCER and NCMIC have jointly awarded almost \$2 million in grants. On its own, NCMIC has awarded a grant to study the complications of chiropractic care.

Lincoln College Education and Research Fund, Inc.

A non-profit corporation dedicated to the advancement of chiropractic science, the Lincoln College Education and Research Fund, Inc. (LCERF), was established in 1979. Funding research and educational pursuits, it has donated more than \$250,000 toward establishing an eminent scholar chair at Florida State University in the College of Human Sciences. The LCERF has also funded various scholarships.

National Institute of Chiropractic Research

The National Institute of Chiropractic Research (NICR) was established in 1987 as a non-profit corporation that conducts and supports chiropractic research (CCR, 1995). Founded by Dr. Arlan Fuhr, a chiropractor in private practice, the NICR is the only organization with an ongoing grant mechanism to fund chiropractic historical research. The NICR has awarded more than \$325,000 to projects studying kinematic assessments of vertebral subluxation adjustments and leg length inequalities, cervical function measures, and others. The NICR has also supported research education and has jointly funded three studies with the FACE. Totaling almost \$400,000, these studies have addressed kinematic methods to assess neck injury, biomechanics of the human spine, and outcome measures for cervical spine patients.

2. Federal Agencies

The Agency for Health Care Policy and Research

In 1993, the Federal Agency for Health Care Policy and Research (AHCPR) awarded \$980,000 to Group Health Cooperative of Puget Sound for a randomized trial comparing chiropractic, McKenzie physical therapy, and an educational booklet for low back problems. More recently, the AHCPR awarded UCLA \$1.8 million to compare chiropractic, physical therapy, and usual medical care for low back pain. This project has involved collaboration with the Los Angeles College of Chiropractic. AHCPR also awarded a grant to the University of North Carolina to compare the costs and outcomes of the care for low back pain provided by primary care physicians, orthopedic surgeons, and chiropractors (Carey, 1995).

Other Federal Agencies

The Health Resource and Services Agency (HRSA) funded three projects studying biomechanics of flexion-distraction therapy, manual therapy in the management of low back pain syndromes with myofascial and articular dysfunction, and low back pain practice activities and patient outcomes. These projects totaled more than \$2 million. The Veterans Administration (VA) awarded a contract for the study of the biomechanics of cervical diagnostic maneuvers.

D. Chiropractic Journals

There are currently 14 peer-reviewed chiropractic journals in English (Table 28). All are indexed in the Index to Chiropractic Literature (ICL). Only the *Journal of Manipulative and Physiological Therapeutics* is indexed in Index Medicus. The *Chiropractic Journal of Australia* is indexed in the Australian version of Index Medicus. Several chiropractic journals including *Topics in Clinical Chiropractic* and the *Journal of Chiropractic Humanities* are indexed in the *Cumulative Index to Nursing and Allied Health Literature* (CINAHL). There are also a number of chiropractic publications that are not peer-reviewed. These include State and national association journals and various magazines, which emphasize the economic and political aspects of the chiropractic profession.

In addition to publishing in chiropractic journals, chiropractic scholars have published in journals such as the *Annals of Internal Medicine*, *Pain*, *The American Journal of Public Health*, *Spine*, *Clinical Biomechanics* and *Health Services Research*. However, chiropractic researchers recognize that relatively little of their work is published in journals read by scientists outside the profession and have identified steps that can be taken to reduce their scientific isolation (Brennan, 1997).

Table 28. Peer-Reviewed Chiropractic Journals Published in English

Journal Name	Annual Cost*	Editor and Editorial Address	Publisher and Subscription Address
The Journal of Chiropractic Research and Clinical Investigation	\$80	Paul Jascoviak, DC 300 East Irving Blvd. Irving, TX 75060	Busch Publishing Company 5005 Riviera Court Fort Wayne, IN 46825
Chiropractic History	\$50‡ (\$20)	Russell W. Gibbons 207 Grand View Dr. So. Pittsburgh, PA 15215	Association for the History of Chiropractic 1000 Brady St. Davenport, IA 52803
Journal of Sports Chiropractic and Rehabilitation	\$71 (\$46)	Dana Lawrence, DC 444 Montrose Elmhurst, IL 60126	Williams and Wilkins, Inc. 351 W. Camden St. Baltimore, MD 21201-2436
Chiropractic Technique	\$69 (\$49)	Dana Lawrence, DC 200 E. Roosevelt Rd. Lombard, IL 60148	Williams and Wilkins, Inc. 351 W. Camden St. Baltimore, MD 21201-2436
European Journal of Chiropractic	£35.00	Simon M. Leyson, DC 16 Uplande Crescent Swansea SA1 0PB United Kingdom	Blackwell Scientific Publication Ltd. Oxford at Osney Mead Oxford OX2 OEL United Kingdom
Journal of Chiropractic Education	\$28	Grace E. Jacobs, D.A. (see Publisher Address)	All Correspondence to the Editor 2045 Christensen Ave. #144 West St. Paul, MN 55118
Chiropractic Journal of Australia	US \$63	Mary Ann Chance, DC Rolf Peters, DC PO Box 748 Wagga Wagga 2650 NSW	Australian Chiropractor's Assoc. Subscriptions to Editor's Address
Journal of the Canadian Chiropractic Association	\$57†	Alan Gotlib, DC (see Publisher Address)	Canadian Chiropractic Association 1396 Eglinton Ave. West Toronto, Ontario M6C 2E4
Journal of Manipulative and Physiological Therapeutics	\$92 (\$52)	Dana Lawrence, DC 200 E. Roosevelt Rd. Lombard, IL 60148	Williams and Wilkins, Inc. 351 W. Camden St. Baltimore, MD 21201-2436
Journal of the Neuromusculoskeletal System	\$58 (\$35)	Rand S. Swensen, DC	Data Trace Chiropractic Publishers PO Box 1239 Baltimore, MD 21022
Topics in Clinical Chiropractic	\$69.75 (\$39.75)	Robert D. Mootz, DC Department of Labor and Industry PO Box 44321 Olympia, WA 98504	Aspen Publishers, Inc. 7201 McKinney Circle PO Box 990 Frederick, MD 21701
Chiropractic Research Journal	\$40	Ed Owens, DC	Chiropractic Research Journal 1269 Barclay Circle, Marietta, GA 30060
Journal of Chiropractic	Free	Dana Lawrence, DC	Send to Editor's Address

Humanities		200 E. Roosevelt Rd. Lombard, IL 60148	
Topics in Diagnostic Radiology and Advanced Imaging	\$75	John Stites, DC	ACA Council on Diagnostic Imaging PO Box 25 Palatine, IL 60078
*1995-96 costs; numbers in parentheses indicate student rates; †in Canadian dollars; ‡subscription included in annual member dues.			

E. Scope of Research and Efforts To Develop a Chiropractic Research Agenda

Although there are relatively few chiropractors actively engaged in research and their resources for conducting research have been very limited (Meeker, 1996), the scope of chiropractic research parallels that of medical research. Specifically, chiropractic researchers are actively involved in research in each of the following areas: basic science (Brennan, 1997), education (Adams, 1997), health services research (Mootz, 1997), outcomes research (Nyiendo, 1997), and clinical research (Sawyer, 1997). Chiropractic researchers with recognized expertise in each of these areas were recently invited to prepare annotated bibliographies and position papers on the current status and recommendations for future chiropractic research in their area. These papers were circulated to 35 key individuals invited to participate in the National Workshop to Develop the Chiropractic Research Agenda, held July 12-14, 1996, in Washington, D.C. (Mulrouney, 1996; Hawk, 1997). This conference, funded by the U.S. Health Resources and Services Administration's Bureau of Health Professions, had the goal of developing a research agenda for the chiropractic profession (Hawk, 1997). Although considerable progress was made and specific research topics were delineated in some areas (e.g., health services research), many of the recommendations emerging from the conference focused on issues of infrastructure development rather than prioritization of research questions. In order to facilitate the implementation of the recommendations, HRSA has sponsored a second workshop in 1997 to develop more specific research plans and to identify resources and personnel to pursue grant and project development.

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CHAPTER X

BIOLOGICAL RATIONALE FOR POSSIBLE BENEFITS OF SPINAL MANIPULATION

Howard T. Vernon, DC

Manipulation is a form of treatment that dates to antiquity and has been practiced in some form in most cultures since that time (Lomax, 1997; Anderson, 1992). One of the first theories related to manipulation might be the statement attributed to Hippocrates: "Look to the spine as the cause of disease." The theories of the early pioneers of chiropractic were firmly grounded in notions that had been widely held in the 1800s, particularly the idea of "spinal irritability" and its correlation with disease (Lomax, 1997; Terrett, 1987). Theories on the nature of the primary spinal disorder amenable to manipulation and on the mechanisms of action of spinal manipulation abound within chiropractic, osteopathy, physiotherapy, and manual medicine. The original chiropractic theory suggested that misaligned spinal vertebrae interfered with nerve function, ultimately resulting in altered physiology that could contribute to pain and disease. In recent decades, chiropractic theories about how mechanical spinal joint dysfunction might influence neurophysiology have undergone significant modification and reflect more contemporary views of physiology (Gatterman, 1995).

Spinal manipulative procedures produce a short-lasting (100-300 milliseconds), high velocity impulse into the body (Herzog, 1996; Triano, 1992). Herzog (1996, p.271) has summarized the work done on manipulative forces in his laboratory (Conway, 1993; Gal, 1995; Kawchuk, 1992; Kawchuk, 1993; Herzog, 1991; Herzog, 1993a; Herzog, 1993b; Herzog, 1995; Hessel, 1990; Suter, 1994) as follows:

1. "The peak and preload forces achieved in CSMT (chiropractic spinal manipulative therapy) were lowest for (manipulations) in the cervical spine" while being similar in the thoracic and lumbo-pelvic regions.
2. "The peak forces achieved using a (mechanical assistive adjusting device) were considerably smaller than any of the peak forces resulting from CSMT."

Triano and colleagues (Triano, 1992; Brennan, 1992) have quantified the applied forces of a manipulation and correlated them with physiologic responses (changes in leukocyte function) such that a threshold of approximately 500 N distinguishes potentially effective from "noneffective" procedures.

When joint structures are rapidly stretched in this manner, cavitation occurs internally and an audible "pop" may be heard. Brodeur (1995) reviewed the historical literature on joint cavitation, particularly the work of Sandoz (1976) in defining the "paraphysiologic space" and Mierau, (1988) in identifying the vacuum phenomenon created by rapid joint distraction with cavitation. The work of Mierau (1988) also provided the first experimental evidence of increased range of motion after cavitation.

Herzog's group has addressed the issue of whether vertebrae actually move. Gal, (1995) provide evidence of absolute and relative intervertebral movements resulting from CSMT (see review by

Herzog, 1996).

The hypothesized effects of manipulation common to most modern schools of thought can be categorized as either mechanical or neurological. In fact, manipulation has been described "as mechanical treatment with reflex effects" (Arkuszewski, 1988).

In terms of mechanical issues, the manipulable spinal disorder (traditionally termed "subluxation" in chiropractic, "somatic dysfunction" in osteopathy, and "fixation" or "functional blockage" in manual medicine) is characterized as a spinal joint strain/sprain with associated local and referred pain and muscle spasm. The function of the spinal joint is deranged by virtue of static misalignment and/or reduction of motion (i.e., "fixation," "blockage," or the more generic term "hypomobility"). Mechanisms that have been proposed for this dysfunction, particularly the hypomobility, include:

1. Entrapment of a zygapophyseal joint inclusion or meniscoid (which have been shown to be heavily innervated by nociceptors) (Giles, 1987; Bogduk, 1985).
2. Entrapment of a fragment of posterior annular material from the intervertebral disc (again, innervated by nociceptors) (Bogduk, 1981, 1985).
3. Stiffness induced by adhesions and scar tissue from previous injury and/or degenerative changes and adaptive shortening of myofascial tissues (Arkuszewski, 1988; Lantz, 1995).
4. Excessive activity (spasm, hypertonicity) of the deep intrinsic spinal musculature, particularly in unilateral, asymmetric patterns (Blunt, 1995; Buerger, 1983).

Mechanisms of action of manipulation, which have been proposed to affect these mechanical issues, include: (1) release of entrapped synovial or disc tissues, thus reducing pain and restoring mobility; (2) stretching and breaking of adhesions; (3) the dynamic stretching of musculature and myofascial tissues. Korr (1975), Grice (1974), and Buerger (1983) proposed that manipulation might exert its effect by dynamic stretching of the muscle spindles and Golgi Tendon Organs (copiously located in the deep spinal muscles) thereby resetting the length/tension ratio in these muscles.

Herzog, (1995), Suter, (1994), and Triano (1992) have studied reflex muscular responses to CSMT and have reported brief but substantial reflex contractions which appear to be contingent on the speed of impulse (high-velocity) rather than the presence or absence of cavitation. Whether these brief bursts of spinal EMG activity represent a prerequisite to subsequent relaxation or "resetting of muscle spindle gain" remains to be demonstrated conclusively, although preliminary clinical studies have demonstrated attenuation of spinal EMG activity post-manipulation (Thabe, 1982; Shambaugh, 1987).

The second category of hypothesized mechanisms involves "neurological" issues. The classical theory of "pinched nerve" has given way to a model that includes both direct and indirect effects on the function of the peripheral and central nervous system resulting from spinal dysfunction. Direct effects (or what Korr (1975) calls "non-impulse"-based mechanisms) involve compression/irritation of the neural structures in and around the intervertebral foramen. This area is a fertile zone for entrapment of neural structures responsible for pain, sensation, motor, and autonomic function. Effects of partial occlusion of the nerve bed, such as those that might occur with disc herniation, foraminal stenosis, or spinal instability, have been investigated (Triano, 1982). Dynamic perturbations of the nerve rubbing across a partial obstruction give rise to inflammatory responses. The putative effects of such neural compressions are currently better understood in "orthopedic" terms as neurogenic pain, and reduced sensation and motor power (i.e.,

as a radiculopathy). The effects of compression on autonomic structures (nerves, rami, and ganglia), however, are only just beginning to be understood, although chiropractors have theorized that these effects may extend to visceral function (Lantz, 1995).

The indirect effect of spinal dysfunction (what Korr (1975) called "impulse-based" mechanisms) involves the effects of persistent spinal pain and hypomobility on the reflex activities of the associated spinal cord levels (or "neuromere"). Korr (1975) proposed a model of "central facilitation." Many mechanisms have been elucidated suggesting that spinal cord sensorimotor processing leads to "activity-dependent changes" or "neuroplasticity," which results in long-lasting firing patterns that reinforce pain perception (Woolf, 1989; Mense, 1993; Gillette, 1995). The current term for such changes at the spinal cord level is "central sensitization" (Coderre, 1993). This model is now used to explain the clinical features of chronic pain, persistent motor changes, and autonomic dysfunction resulting from neuropathic and somatic pain. There is evidence that axial or spinal structures have particularly strong capacities to induce central sensitization (Gillette, 1995; Patterson, 1986; Hu, 1993) and thereby produce the clinical features described above, most predominantly back and neck pain.

Proposed mechanisms of action of manipulation on these "neurological" phenomena can be divided into two categories: reduction of compressive insult to neural tissues, and the creation of stimulus-induced reflex changes. The former mechanism is relatively straightforward in that manipulation is hypothesized to relieve the compressive insult on nerve roots and autonomic fibers within the intervertebral foraminae, or affect disc/facet arthropathy (and inflammatory or noninflammatory mechanisms). In the latter mechanism it is proposed that the dynamic stretching produced by manipulation (particularly when the "crack" of cavitation occurs) induces a barrage of activity in joint and muscular mechanoreceptors that is transmitted along "large-fibre" afferents and which produces inhibitory effects within the nervous system. These effects are proposed to be both local (i.e., at the spinal level) and "central," in that they may involve so-called descending inhibitory pathways (Gillette, 1995; Le Bars, 1992; Vernon, 1986). These same mechanisms have been proposed to explain the therapeutic effects of acupuncture and TENS, and are generically known as "stimulus-produced analgesia" (Pressman, 1984). In other words, it is hypothesized that the deleterious effects of excitation in the pain and sensorimotor pathways are "turned down" (clinically = "relieved") by precise, therapeutic somatic stimulation. The spinal tissues appear to be particularly amenable to this process, probably because of their unique patterns of afferent input into the central nervous system, with a high level of convergence existing with other somatic and visceral inputs onto the same spinal tract projection cells (Gillette, 1995; Patterson, 1986; Hu, 1993).

Although of great interest to many neuropathologists and chiropractors, these theories described remain largely speculative. A recent review of the limited basic science research in chiropractic noted that nearly all of the theories of the effects and mechanisms of action of spinal manipulation still lack adequate research and that no definitive anatomic or biomechanical studies have yet identified the lesion manipulated (Brennan, 1997). The few animal studies performed to date have failed to provide conclusive support for or against the existence of a spinal lesion. Human studies have also been inconclusive. For example, of three studies of the effect of spinal manipulation on plasma beta-endorphin levels (which could be involved in relief of pain), one found a slight but statistically significant increase (Vernon, 1986) while the other two failed to confirm this (Christian, 1988; Sanders, 1990). Other studies of the effect of spinal manipulation on the immune system has shown strong consistency of the mechanistic action on chemiluminescence, but its clinical importance is not known (Brennan, 1997). The review by Brennan, concluded with recommendations for specific lines of investigation that are likely to produce more definitive conclusions regarding the potential physiological and anatomic mechanisms underlying the effects

of spinal manipulation. The effect of spinal manipulation on patients with co-morbid metabolic and neurogenic complications, structural anomalies, injury, and aging continues to be fertile ground for further investigation. Models of biomechanical and physiological effects of these complications and natural events and discussions of manipulation effects are now emerging in the literature (Triano, in press).

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CHAPTER XI

BENEFITS AND RISKS OF SPINAL MANIPULATION

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Daniel C. Cherkin, PhD; William C. Meeker, DC, MPH**

This chapter summarizes what has been learned from clinical trials about the benefits of spinal manipulation for specific problems and from case reports about the risks of spinal manipulation. In addition, findings of studies examining the ability of spinal manipulation to increase patient satisfaction, decrease cost, or increase cost-effectiveness of care are summarized.

A. Evidence for Benefits of Spinal Manipulation from Clinical Trials

For any health care intervention, it is hoped that the expected benefits exceed the expected risks. The most rigorous method for establishing efficacy of a treatment is the randomized controlled trial (RCT). There have been many RCTs of spinal manipulation for a variety of different patient presentations, as well as many reviews of these RCTs (Assendelft, 1995). This section summarizes both primary data and reviews of studies of the impact of spinal manipulation on patient outcomes, particularly symptoms and function.

1. Musculoskeletal Conditions

Low Back Pain

There have been at least 36 randomized clinical trials of spinal manipulation for patients with low back pain (Koes, 1996). These studies have been of variable quality, as assessed both explicitly and implicitly by several independent investigators. The two highest quality reviews of spinal manipulation for low back pain reached somewhat different conclusions (Koes, 1991, 1996; Shekelle, 1992). The first review, conducted in 1991 and updated in 1996, noted the heterogeneity in study quality and treatments, and did not attempt statistical combinations of individual studies (Koes, 1991,1996). These reviews concluded that it is not conclusively proven that spinal manipulation is beneficial for any low back pain clinical syndrome.

A 1992 meta-analysis concluded that in some patient presentations spinal manipulation is more efficacious than both sham manipulation and the medical therapies to which it has been compared (Shekelle, 1992). This meta-analysis included nine studies of manipulation for patients with acute or subacute (less than a few weeks' duration) low-back pain uncomplicated by sciatica. The two best quality studies found a clinically and statistically significant benefit of manipulation in terms of functional status in patients whose pain had persisted between 2 and 4 weeks prior to treatment (Hadler, 1987; MacDonald, 1990). These studies used sophisticated composite measures of functional status, and the authors of the meta-analysis did not feel it valid to combine these two studies with the other studies, which used different outcome measures. The results of the remaining seven studies, along with the meta-analytic statistical combination of their results, are shown in Figure 5. The combined results of these studies indicated that spinal manipulation is more efficacious than the comparison treatments (Shekelle, 1992). Specifically, the probability of recovery 3 weeks after initiation of treatment was an average of 0.17 higher in the groups receiving manipulation, representing a 34 percent improvement in recovery.

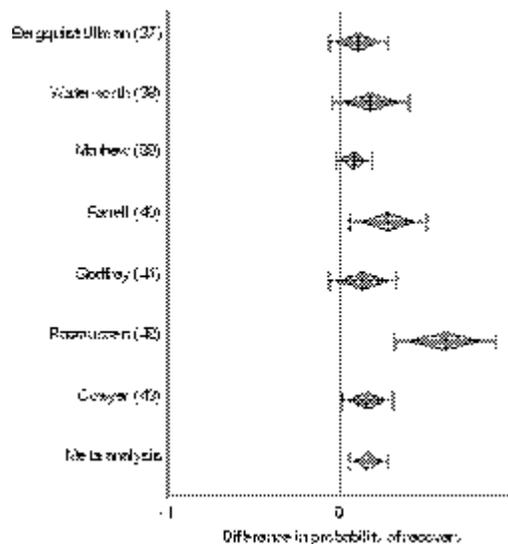


Figure 5. Difference of probability of recovery in seven trials of manipulation. A difference in probability of greater than zero represents a beneficial effect of manipulation. For individual studies, the 95 percent confidence intervals are shown, and for the meta-analysis, the 95 percent probability limits are shown.

Source: Shekelle PG, et al. Spinal manipulation for low back pain. *Ann Intern Med* 1992;117(7):p 594. Reprinted with permission.

The Shekelle study (1992) also reported that there are insufficient data to reach a conclusion for patients with chronic low back pain or sciatica. The three trials of manipulation for sciatica were all of mediocre quality and their statistical combination favored manipulation but did not quite reach conventional levels of statistical significance. The controlled trials of spinal manipulation for chronic low back pain included in the 1992 review reached conflicting conclusions and their heterogeneity precluded statistical combination.

Since the Shekelle and Koes reviews were completed, at least eight additional clinical trials have been published that compare treatments including spinal manipulation with various other treatments for patients with low back pain (Herzog, 1991; Koes, 1992; Wreje, 1992; Blomberg, 1994; Erhard, 1994; Pope, 1994; Triano, 1995; Meade, 1995). The results of these trials are mixed. Of the four studies including patients with acute low back pain, one study of patients felt to have sacroiliac joint dysfunction did not show a benefit for spinal manipulation in relief of pain (Herzog, 1991), another study demonstrated that the addition of spinal manipulation to exercise therapy improved functional and pain outcomes measured at one month (Erhard, 1994), and two "pragmatic" studies found manipulation combined with other treatments to be superior to conventional nonmanipulative therapy (Koes, 1992; Blomberg, 1994). Another study of patients with subacute low back pain showed a nonsignificant trend toward improvement in pain in the group receiving manipulation (Pope, 1994).

For patients with chronic back pain, the one new study that specifically compared spinal manipulation to an artfully conducted sham showed, as other studies have, a benefit in terms of pain relief (but not improved function) after 2 weeks of manipulation (Triano, 1995). Two other studies recently reported long-term followup of patients treated with manipulation by either physiotherapists or chiropractors compared to other forms of care. Both studies reported somewhat better outcomes after one or more years for the patients who received manipulation (Koes, 1992; Meade, 1995). The addition of these new trials would not seem to alter the conclusions of the prior review and meta-analysis. Based on the available evidence, convincing conclusions cannot be made regarding net benefits of spinal manipulation for patients with chronic low back pain or sciatica. Depending upon whether one accepts or rejects the validity of statistical combinations of

studies, there either is or is not conclusive evidence that spinal manipulation is of benefit to patients with uncomplicated acute low back pain. These evidence-based conclusions are in general accordance with those of a multidisciplinary expert panel convened to rate the appropriateness of spinal manipulation for low back pain syndromes (Shekelle, 1991).

A recent systematic review of the literature assessed the evidence for the effectiveness of *chiropractic* treatment for patients with low back pain (Assendelft, 1996a). An exhaustive search of the literature identified eight randomized clinical trials. Four of these studies were restricted to patients with chronic pain while the remainder included both acute and chronic pain. All of the studies had serious design flaws and because they used a wide variety of outcome measures and followup intervals the results were not statistically combined. The findings of the eight studies were mixed. The authors concluded that their review failed to find convincing evidence for the effectiveness of chiropractic for acute or chronic low back pain and that higher quality studies would be needed before firm conclusions for or against the effectiveness of chiropractic could be reached (Assendelft, 1996a).

It should be noted that, in the back pain literature, seriously flawed studies that reach inconsistent conclusions are not unique to studies of spinal manipulation. In fact, a recent evidence-based review of conservative and surgical interventions for acute back pain failed to identify any interventions supported by multiple high-quality scientific studies (Bigos, 1994). Thus, despite the poor quality of many of the studies evaluating its effectiveness, there is as much or more evidence for the effectiveness of spinal manipulation as for other non-surgical treatments for back pain.

Neck Pain

After low back pain, neck pain is the most common symptom for which patients seek chiropractic care. Only five randomized clinical trials have examined the efficacy of spinal manipulation for neck pain (Koes, 1992; Cassidy, 1992; Howe, 1983; Sloop, 1982; Vernon, 1990). Like those for low back pain, the clinical trials of manipulation for neck pain varied widely in terms of quality. Most study results favored the group treated with manipulation, although conventional levels of statistical significance were reached for only some of the outcomes. The best quality study compared physical therapist-provided manipulation to nonmanipulative physical therapy (Koes, 1992), detuned diathermy, and usual general practitioner care for patients with nonspecific low back pain and neck pain syndromes. Overall, this study concluded that both of the physical therapist-treated groups had better outcomes than the other two groups, and that the group receiving manipulation did slightly but statistically significantly better at one year than the group receiving nonmanipulative physical therapy. Results of analysis restricted to the 64 persons with neck pain alone favored the manipulated group but did not reach statistical significance, possibly due to the small sample size (less than 20 persons per group).

A recent meta-analysis reviewed studies of patients with several neck pain clinical syndromes who had received a variety of "manual therapies" including manipulation and mobilization (Aker, 1996). This analysis found a benefit for the manual therapy-treated group. However, because of the heterogeneity among patient types and treatments, one cannot directly attribute this benefit to manipulation or to any particular patient presentation.

Headache

For patients with muscle tension type headache, the best quality clinical trial showed statistically significant improvements for the manipulated group, compared to a group treated with amitriptyline, in terms of headache intensity assessed 4 weeks after concluding 6 weeks of therapy (Boline, 1995). Two studies of lesser quality also reported short-term benefits for the group treated

with manipulation (Hoyt, 1979; Jentsen, 1987). The only clinical trial of manipulation for patients with migraine headache compared it to mobilization and reported decreases in pain intensity in the patients treated with manipulation but no differences with respect to mean frequency or duration of attacks, or mean disability (Parker, 1978).

Other Musculoskeletal Conditions

The potential benefits of manipulative therapy for other musculoskeletal conditions are largely unknown and limited to case series reports. There is a clear need for research in this area.

2. Nonmusculoskeletal Conditions

Based on personal experience, some chiropractors believe that manipulation can beneficially influence the body's overall healing capacity. However, there is little evidence to support this and it is possible that some of the more dramatic reports of recovery from nonmusculoskeletal conditions resulted from original misdiagnoses, the effect of concurrent treatments, or from remissions that would have occurred regardless of treatment.

Many of the nonmusculoskeletal conditions believed by some to respond to manipulative therapy may be conditions of a functional nature that lack a well-defined medical treatment regimen (e.g., somatization). These conditions are often caused or exacerbated by psychological stress and therefore may be responsive to attention from a caring healer who conveys to the patient a sense that he or she can help. While it is also possible that manual (hands-on) therapy causes a neurological response that leads to reductions in stress-related symptoms and improvements in the functional disorder, this remains speculative. The interrelationship among functional disorders, stress, and the status of the neuromusculoskeletal system is in need of additional research.

There is now a small body of published studies examining the effect of chiropractic manipulative care on nonmusculoskeletal health conditions. The conditions studied include, but are not limited to hypertension (Vernon, 1986; McNight, 1988; Christian, 1988; Nansel, 1991; Yates, 1988); asthma (Hviid, 1978; Nilsson, 1988; Jamison, 1986; Neilson, 1995); dysmenorrhea (Kokjohn, 1992; Liebl, 1990; Arnold-Frochot, 1981; Thomason, 1979), infantile colic (Klougart, 1989); otitis media (Hobbs, 1991); childhood enuresis (Reed, 1994); dizziness/vertigo (Jirout, 1985; Droz, 1985; Gorman, 1993); and chronic pelvic pain (Browning, 1989; Hawk, 1997).

A recent systematic review of the literature concerning the efficacy of spinal manipulative therapy (SMT) for nonmusculoskeletal conditions concluded that "SMT seems to be nonefficacious in the treatment of hypertension and chronic moderately severe asthma in adults" but that the evidence was not strong enough to proscribe the use of SMT for these conditions (Bronfort, 1996). The review further concluded that, because of the small number and poor quality of the available studies, "there is insufficient evidence to advise for or against the use of SMT in the treatment of vertigo, nocturnal childhood enuresis, dysmenorrhea, chronic obstructive pulmonary disease, duodenal ulcer, and infantile colic."

Chiropractic researchers are currently planning or undertaking (as of 1997) randomized trials or cohort studies of the effectiveness of manual treatment procedures for childhood asthma, chronic pelvic pain, otitis media, vascular lability in migraine headache patients, dysmenorrhea, mild hypertension, and migraine headache.

B. Risks of Spinal Manipulation

Until recently, there have been no systematic reports of the complications or risks of spinal manipulation, and all that was known came from case reports and clinical trials (Assendelft, 1996b). Recently, however, data from a prospective study of side effects of spinal manipulation performed by 102 Norwegian chiropractors on 1,058 new patients have become available (Senstad, 1997). After an average of about 4.5 visits, 55 percent of the patients reported at least one reaction to the manipulation. The most commonly reported reactions were: local discomfort (53 percent), headache (12 percent), tiredness, (11 percent) and radiating discomfort (10 percent). Only 15 percent of reactions were considered "severe" and no serious complications were reported. Most reactions appeared within 4 hours of treatment and had disappeared within 24 hours. Reactions were more likely to be reported by women, following the first treatment, when multiple spinal regions were treated and when only the thoracic spine was treated (Senstad, 1996). A cause-and-effect relationship between the manipulation and the reactions has not been established and it is likely that some of the reactions attributed to manipulation were, in fact, coincidental.

No systematic reports of the rate of serious complications of spinal manipulation have been conducted in the United States. Case reports may underestimate the true number of adverse events, including serious ones, or be so poorly documented that a true cause-and-effect relationship is not established. Furthermore, the total number of persons who have received spinal manipulation, and their clinical presentation, is unknown. Nevertheless, using data from case reports on the number of complications and epidemiologic estimates of the number of lumbar spinal manipulations received during the time period covered by the case reports, it was possible to roughly estimate the rate of occurrence of the most serious complication of lumbar manipulation, the cauda equina syndrome, as about 1 case per 100 million manipulations (Shekelle, 1992). It is probably higher in patients with a herniated nucleus pulposus, and lower in patients without this anatomic abnormality. As there are no systematic data about the rate of serious complications due to spinal manipulation, it is not known if the rate varies by provider type. In the best documented study published to date, Haldeman (1992) describes the outcomes of 10 patients with cauda equina syndrome believed to have been caused by spinal manipulation (without anesthesia). Most of these patients subsequently underwent surgical decompression and were left with residual neurologic deficits that ranged from paresis to mild constipation.

Serious complications of cervical spine manipulation are also rare (none having been reported in any of the clinical trials), but appear to be more common and severe than complications of lumbar manipulation. The most serious complication of cervical spine manipulation is related to compromise of the vertebralbasilar artery, leading to stroke or death. As with lumbar manipulations, limited data preclude an exact estimate of the frequency of this complication, or identification of risk factors for its occurrence. Anecdotal evidence suggests that the risk is higher for manipulation involving rotation plus extension of the cervical spine than for other types of manipulation, and that persons who have suffered manipulation-related vertebralbasilar artery compromise do not have the same clinical characteristics as patients who suffer vertebralbasilar artery compromise due to atherosclerotic disease. The best estimate of the incidence of vertebralbasilar artery compromise related to cervical spine manipulation is that it occurs once in 1 million manipulations (Hurwitz, 1996; McGregor, 1995).

It should be kept in mind that, while spinal manipulation has its risks and benefits, so do other treatments for back and neck pain. For example, medications commonly used for back pain can cause significant complications (Anker, 1994; Bjarnason, 1993) as can lumbar surgery (Hoffman, 1993; McGregor, 1995). However, most randomized clinical trials directly comparing spinal

manipulation with other types of nonoperative treatment have reported no complications in either group, suggesting that the risks of these nonoperative treatments are low. The risks and benefits of spinal manipulation have not been compared to those for surgery. Optimal care of back pain patients will require balancing the risks and benefits of alternative treatments. At present, however, comparative data for these largely low-risk therapies are not available.

C. Patient Satisfaction with Chiropractic Care

Observational studies have consistently found that low back pain patients receiving chiropractic care, which typically includes (but is not restricted to) spinal manipulation, are more satisfied than those receiving medical care (Cherkin, 1989; Carey, 1995; Kane, 1974). How much of this enhanced satisfaction is a specific result of the spinal manipulation per se is not known. There are other reasons why one might expect chiropractic care to be more satisfying than medical care. For example, chiropractors have more frequent and closer contact with their patients, they are more comfortable and confident dealing with back pain, they provide patients with a clearer explanation of the cause of their problem (often documented on an x-ray), and they do not need to refer the patient for physical treatment (Cherkin, 1988; Coulehan, 1985). In addition, persons who choose to see chiropractors may differ in some way from those who see medical doctors.

D. Cost and Cost-Effectiveness of Chiropractic Care

The annual cost of chiropractic care in the United States is not known with certainty, but has been estimated at \$3.5 billion in 1987 (Nichols, 1996). In the United States, in 1990, an estimated \$13.7 billion was spent on all types of unconventional medicine and chiropractors were by far the unconventional practitioner most often seen (Eisenberg, 1993). The relative cost-effectiveness of chiropractic care and medical care has not been convincingly established (Assendelft, 1993; Manga, 1994). Most studies have failed to compare equivalent patients, measure clinically useful outcomes, and include both direct and indirect costs in the comparison.

To date, no randomized clinical trials including explicit measures of direct and indirect costs have been published. What is available are many case-control studies of costs (but not patient outcomes) using Worker's Compensation data (Assendelft, 1993), a few studies of only cost based on claims data analyses (Blue Cross/Blue Shield, 1986; Stano, 1993; Mushinski, 1995; Stano, 1996), a randomized controlled trial of effectiveness that imputed (but did not explicitly measure) total costs (Meade, 1995), and a recent prospective observational study of patients with acute low back pain which reported outcomes as well as calculated direct costs (Carey, 1995).

Although the majority of these studies have found that chiropractic care was less expensive than medical care (Assendelft, 1993), some have found the opposite to be true (Nyiendo, 1991; Greenwood, 1985). The main limitation of all these studies is their inability to adequately control for differences in the types of patients served by chiropractors and medical doctors. It is possible that persons choosing treatment from a chiropractor differ substantially from those seeking medical care in ways that cannot be adequately controlled for using the limited data that are usually available from databases designed for billing purposes. In the one observational study that prospectively measured both clinically relevant outcomes and calculated direct medical costs, clinical outcomes were no different between medically (primary care or orthopedist) and chiropractically treated patients, but chiropractic care and orthopedic care cost more (Carey, 1995). Chiropractic patients, however, were more satisfied with their care. This study involved only a single State (North Carolina) that had had virtually no managed care experience with chiropractic services. Ultimately, randomized clinical trials that include cost measures will be needed to satisfactorily answer this question.

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CHAPTER XII

SYNOPSIS, RESEARCH PRIORITIES, AND POLICY ISSUES

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A. Synopsis of Monograph

In the past several decades, chiropractic has undergone a remarkable transformation. Labeled an "unscientific cult" by organized medicine as little as 20 years ago (Getzendaner, 1987), chiropractic is now recognized as the principal source of one of the few treatments recommended by national evidence-based guidelines for the treatment of low back pain, spinal manipulation (Bigos, 1994). In the areas of training, practice, and research, chiropractic has emerged from the periphery of the health care system and is playing an increasingly important role in discussions of health care policy.

This monograph documents the dramatic growth of the chiropractic profession, which now represents the third largest group of doctoral-level health professionals in the United States after medical doctors and dentists. By the year 2010, it is expected that there will be more than 100,000 practicing chiropractors, about 1 chiropractor for every 6 medical doctors (Cooper, 1996). Recent studies have found that about 7 percent of Americans had visited a chiropractor in the prior year (Eisenberg, 1993) and that chiropractic is one of the most popular sources of care for chronic back pain (Murt, 1986). Although most chiropractors practice in metropolitan areas, a substantial fraction practice in small towns and rural areas (Goertz, 1996).

All 16 chiropractic colleges in the United States are now accredited and monitored by the federally recognized Council on Chiropractic Education. Chiropractic students receive about the same number of total hours of education as medical students, although the former obtain less than half as many hours of education in clinical settings (Coulter, submitted). Chiropractors have been licensed to practice in all 50 States and the District of Columbia for more than 20 years. Licensing boards in all States require successful completion of the National Board of Chiropractic Examiners' basic science examination and almost all States also require passing scores on clinical sciences and clinical competency examinations. All but 5 States require at least minimal continuing education to maintain or renew a license. Although the scope of practice for chiropractic varies by State and most States administer their own examination, expanded and enhanced competency assessment by the National Board of Chiropractic Examiners is bringing more standardization to chiropractic licensure.

More than 80 percent of American workers in conventional insurance plans, preferred provider organizations, and point-of-service plans now have health insurance that covers at least part of the cost of chiropractic care (Jensen, in press). It is only in health maintenance organizations that a majority of enrollees still lack chiropractic coverage. Even though most employer plans are no longer mandated to cover chiropractic (as they had been in the early 1980s), most plans have chosen to continue to include chiropractic benefits. In addition, nearly all workers' compensation systems, personal injury protection insurance, and Medicare cover chiropractic services.

Chiropractors are beginning to be integrated into mainstream activities of the health care system. There is a small, but growing number of chiropractors practicing in collaboration with medical doctors and other health professionals, and medical referrals to chiropractors are becoming more common. As chiropractic services have moved into the mainstream of health services, it has been

necessary for the profession to develop measures to ensure accountability. Chiropractic has responded by developing a variety of practice guidelines, parameters, and technologies to improve practice and permit evaluation of its quality.

Chiropractors have also begun to participate in policy and research roles. For many years, chiropractors have served as claims consultants and health administrators. Some now hold positions on industrial insurance boards, health care commissions, and on the staffs of medical directors. A small but growing number of chiropractors have pursued postgraduate training in public health, some entering careers in research. Recent major studies of the appropriateness and effectiveness of spinal manipulation have included chiropractors as co-investigators or advisers. Although hampered by a lack of research training and research infrastructure, some in the profession have recognized the importance of evidence-based research and are currently undertaking a major effort to identify an agenda for chiropractic research in the areas of basic science, clinical research, education, health services, and outcomes research (Hawk, 1997).

There is growing evidence for the safety and effectiveness of chiropractic's primary treatment technique, spinal manipulation, at least for low back pain. The risk of a serious complication following manipulation of the lower back appears to be very low (Shekelle, 1992). Complications associated with neck manipulation are also extremely rare, but may be more common and severe than lower back complications (Hurwitz, 1996). Recent syntheses of the literature have concluded that spinal manipulation appears to be effective for at least some types of low back pain (Koes, 1996; Shekelle, 1992), although it is not known which, if any, of the numerous manipulative techniques employed by chiropractors, osteopaths, physical therapists, and allopathic physicians are superior. In addition, patients seeking care for back pain from chiropractors tend to be more satisfied than patients treated by medical doctors (Cherkin, 1989; Carey, 1995; Kane, 1974). However, studies have yet to adequately determine if chiropractic care is more cost effective than medical care for back pain. Furthermore, the value of spinal manipulation for neck pain and headache or for other neuromusculoskeletal problems is not as clear, as fewer scientifically rigorous studies have been published on these topics.

Recent guidelines published by the Federal Agency for Health Care Policy and Research (AHCPR) concluded that spinal manipulation was one of only three treatments for acute low back pain for which there was at least moderate research-based evidence of effectiveness (Bigos, 1994). Commonly used back pain treatments such as muscle relaxants and various forms of physical therapy lacked even moderate amounts of evidence, largely due to the absence of research. The AHCPR guidelines, in conjunction with appropriateness criteria for the use of spinal manipulation for low back pain (as well as neck pain and headache) developed by multidisciplinary expert panels, have legitimized the use of spinal manipulation as a relatively safe and effective treatment for back pain (Bigos, 1994; Shekelle, 1991; Coulter, 1995).

Through persistent efforts at self-improvement and successful legal and legislative initiatives challenging organized medicine's antichiropractic stance, the chiropractic profession has begun to resemble the more mainstream health care professions in many respects. The metamorphosis from fringe to mainstream is not quite complete but appears inevitable. The main question is no longer, "Will chiropractors enter the mainstream of healthcare?" but "What role will chiropractors play in the health care system of tomorrow?" The answer to this question will be determined by the complex interplay of decisions and actions made by policymakers and by the chiropractic profession itself.

Because the information necessary to make informed decisions about many important issues is often unavailable, there is a clear need for focused research. Priorities for policy-relevant research concerning the role of chiropractic are discussed in the following section.

B. Research Priorities

Before policymakers can make informed decisions about the most appropriate role for chiropractic within the system of health care, there is a need for research that more completely answers questions about effectiveness, cost, and safety. These issues are interrelated and all are likely to be affected by the way in which chiropractic is integrated into the broader health care system. Important priorities for research are listed in Table 29 and discussed below.

Table 29. Priorities for Research on Chiropractic

<p>Utilization and delivery options</p> <ul style="list-style-type: none">▪ Comparisons of access, patient outcomes, and costs under different delivery models (e.g., direct access vs. medical referral to chiropractic care)▪ Determination of how the availability of chiropractic services affects the use of other medical care resources (e.g., radiology, physical therapy)
<p>Effectiveness</p> <ul style="list-style-type: none">▪ Randomized controlled trials (RCTs) comparing different manipulative techniques for specific clinical problems (e.g., short-lever, high velocity manipulation vs. flexion-distraction manipulation for low back pain patients with radiculopathy)▪ RCTs comparing spinal manipulation with other physical medicine approaches (e.g., specific exercise protocols, mobilization procedures) for common musculoskeletal problems▪ Evaluation of the long-term effects of spinal manipulation on the prevention of musculoskeletal problems▪ Comparison of costs and outcomes associated with different frequencies and durations of manipulative treatment (e.g., 5 visits vs. 10 visits for low back pain)▪ Inclusion of economic outcomes in studies of effectiveness of chiropractic care▪ Determining if spinal manipulation affects nonmusculoskeletal conditions

1. Effectiveness

Despite the large number of randomized trials evaluating spinal manipulation for low back pain, critical reviews have generally lamented the poor quality of most of these studies and the inability to generalize the findings to current manipulative practice (Koes, 1991 and 1996; Shekelle, 1992). Although the most thorough reviews have concluded that there is evidence that spinal manipulation is effective for some patients with low back pain, it remains unclear which subsets of patients are most or least likely to benefit or which forms of manipulative care are most useful. As with many other interventions for low back pain, there remains a need for high quality studies to evaluate the effectiveness of spinal manipulation for specific patient populations, defined in terms

of their history, presenting complaints, age (e.g., children or the elderly), and neurological findings. Studies of spinal manipulation for patients with sciatica and with chronic and recurrent back problems would be especially useful. Future studies will be particularly valuable if they compare different types of spinal manipulation with physical treatments that are already in common use, such as McKenzie physical therapy and massage. Direct comparisons of chiropractic with other conservative approaches such as encouraging return to normal activity and nonsteroidal anti-inflammatory drugs would also be helpful.

Research on the effectiveness of spinal manipulation for other musculoskeletal problems such as neck pain and headache is even more limited and inconclusive than that for low back pain. Because chiropractors commonly treat patients with these conditions, research in this area should be considered a high priority. Although the evidence suggests that chiropractors rarely treat nonmusculoskeletal conditions (e.g., otitis media, hypertension, dysmenorrhea) (Hurwitz, in press), these conditions fall within the scope of chiropractic practice in many States and are believed by some chiropractors to respond to spinal manipulation, other manual methods, or other drugless approaches within a chiropractor's practice scope. There is a clear need for research to determine if chiropractic methods are effective for these problems.

In addition to treating patients with specific problems, some chiropractors attempt to prevent recurrences of a problem (e.g., low back pain), to prevent the development of other illnesses, or to enhance general health. It is not known if such prevention-oriented activities are in common use. Because they are not covered by health insurance, preventive care, health enhancement, or "maintenance" visits may represent only a small fraction of most chiropractors' practices. However, if chiropractors are to function in primary care roles, as has been suggested by some observers inside and outside of the profession, it will be important for research to determine if chiropractic approaches can in fact prevent recurrences of musculoskeletal problems, prevent illness, or enhance health.

2. Cost and Cost-Effectiveness

In addition to the evidence indicating that spinal manipulation is effective for some patients with low back pain, there is ample evidence that patients who choose chiropractic care find it very satisfying (Cherkin, 1989; Carey, 1995; Kane, 1974). However, these benefits come at a cost and it is not yet clear if chiropractic care is more cost-effective than the various forms of conventional medical care (e.g., medications, physical therapy, exercise programs) or alternative care (e.g., massage or acupuncture) used to treat back pain. It is also not known how many manipulative treatments are necessary to achieve satisfactory outcomes. For example, it may be that a regimen of 5 chiropractic treatments per episode of back pain is as effective as a regimen of 10 treatments, and therefore twice as cost-effective. Determining the relative cost-effectiveness of chiropractic care compared with other commonly used treatments for low back pain and the number of chiropractic treatments necessary to achieve satisfactory outcomes should be considered high priorities for future research.

Finally, whether chiropractic care is used in addition to or in place of medical care is still not clear. The answer to this question will depend in part on if and how chiropractic services are integrated into a particular system of health care. For example, if access to chiropractic services requires an initial evaluation and referral by a medical doctor, this might increase the number of physician visits over the number that would have occurred had direct access to chiropractic been an option. If patients were granted equal access to chiropractic and physical therapy, however, one might expect that increased use of chiropractic would be accompanied by decreased use of physical therapy.

3. Safety

Although available evidence suggests that the risk of a serious complication following spinal manipulation is very low, this information is based on collections of published case reports (Assendelft, 1996; Shekelle, 1992). Because many complications attributable to spinal manipulation might never be reported, estimates of complication rates based on case reports will inevitably underestimate the true incidence. However, the estimated risk of complications following lumbar manipulation is so low that even if there were 100 times as many serious complications as reported, the true risk would still be very small. Because the risks of cervical manipulation appear to be higher and more devastating, however, it would be helpful if future research could identify subsets of patients at risk of complications from cervical manipulation and determine if there are specific manipulative techniques that should be avoided or modified.

Another safety issue derives from concerns that chiropractors might fail to diagnose patients who have a serious condition that requires urgent medical attention. Although the incidence of this problem is unknown, it appears to be more common in the United States than in Canada (Henderson, 1994). Where chiropractors serve in portal of entry roles into the health care system, it will be important for research to determine the extent to which delayed access to urgent medical treatment occurs.

C. Key Issues Affecting the Future Role of Chiropractic in the United States

A fundamental question confronting both the chiropractic profession and public and private sector health care policy planners centers around how chiropractic should fit into the evolving American health care system. Over the past few decades, the profession has enhanced its image by strengthening its education programs, increasing the quality and quantity of its research, and collaborating with other disciplines in clinical settings (Mootz, 1995a). The profession has also effectively used political, legislative, and legal measures to secure a broader and more integrated role in the health care system (Getzendaner, 1987; Mootz, 1995b; Wardwell, 1992).

However, concerns about the ability of chiropractors to play a larger role remain. Although chiropractic and medical students receive a similar number of hours of didactic education, chiropractors still lack the opportunities available to medical doctors in clinical training through clerkship, residencies, and fellowships. Furthermore, the lack of interdisciplinary clinical experiences has impaired the abilities of both chiropractic and medical physicians to learn about what the other has to offer.

The personnel, institutional, and financial resources available for chiropractic research are sparse and will need to be enhanced if chiropractic research is to gain credibility in the medical community. Recent access to small but significant amounts of Federal funding has allowed several university-based clinical trials involving chiropractors to be initiated (Mootz, 1995a) and has demonstrated the feasibility of collaborative research. The recent effort by the chiropractic profession to identify research priorities and to address the inadequacies of the research infrastructure has the potential to lead to actions that significantly improve the productivity of chiropractic research (Sawyer 1997; Brennan 1997; Nyiendo 1997; Mootz 1997; Adams 1997).

There are a variety of perceptions both inside and outside the chiropractic profession regarding chiropractic clinical competency, appropriate scope of practice, determination of appropriateness of care, identity regarding "primary care" delivery relationships, operational definitions and models of the "chiropractic lesion," and how to work within and outside of typical medical delivery settings. Chiropractic's future role will be determined by decisions made within the profession, as well as by policy-planning efforts by health care administrators, public and private

sector policymakers, and other health care professionals. Key policy issues are summarized in Table 30 and discussed below.

1. Issues Within the Chiropractic Profession

Professional Clinical Identity

For both philosophical and economic reasons, chiropractors have desired to maintain a direct access, "portal of entry" role for patients coming into the health care system. Most patients appear to seek chiropractic services for musculoskeletal problems, primarily low back pain (Hurwitz, in press). However, partly because the profession has evolved outside of mainstream medicine, chiropractic has positioned itself not only as an alternative source of health care, but also as a separate profession with a distinct health care philosophy. This has created an identity crisis within chiropractic. The profession is unclear about whether it is a comprehensive, holistic alternative to medicine or a clearly defined musculoskeletal subspecialty. This philosophical quandary is complicated by the advice of external health care observers who have emphasized the need for chiropractors to enhance and maintain an identity as primary care providers in order to remain competitive (Coile, 1995).

In fact, chiropractors' practices include several characteristics considered to be consistent with a primary care role. They are directly accessed by patients, frequently coordinate care

Table 30. Key Policy Issues

<p>General Health Care Questions Policy Makers Must Address</p> <ul style="list-style-type: none"> ▪ Are side effects of a given intervention acceptable? ▪ What is the cost of an intervention compared to readily available alternatives? ▪ Does the intervention improve meaningful health outcomes? ▪ What are the demands from various constituencies (e.g., patients, providers) for an intervention?
<p>Specific Issues Internal to the Chiropractic Profession</p> <ul style="list-style-type: none"> ▪ Resolution of professional clinical identity: musculoskeletal specialist vs. primary care provider ▪ Resolution of professional social identity: special interest vs. community resource ▪ Clarification of existence and clinical significance of the "manipulable spinal lesion" (vertebral subluxation)* ▪ Nature and extent of integration of chiropractic into mainstream health care training, practice, and research ▪ Increased attention to quality and cost-effectiveness of chiropractic services
<p>Specific Issues External to the Chiropractic Profession</p> <ul style="list-style-type: none"> ▪ Determination of which chiropractic services (if any) will be covered by insurance and for which patient populations ▪ Determination of rational methods for integrating chiropractors into the health care system ▪ Methods for assuring quality and accountability of chiropractic services ▪ Identification of mechanisms for controlling costs of chiropractic care ▪ Consideration of support for research examining risks and benefits of spinal manipulation

*This is a *policy* issue because various statutes, rules, and policies explicitly require documentation of such lesions before spinal manipulation can be performed or covered by insurance.

with other providers, may obtain special studies, develop continuing relationships with patients, and emphasize prevention strategies, especially related to injury prevention (Jamison, 1991; Bowers, 1995). However, because chiropractors do not offer a comprehensive array of medical treatment strategies, advocacy of primary care provider status for chiropractors has been a controversial topic (Nelson, 1993; Bowers, 1995). Some within the profession believe that many chiropractors can function in "community-oriented" primary care roles (Bowers, 1995) consistent with the recent Institute of Medicine's updated definition of primary care: "the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of health care needs, developing a sustained partnership with patients, and practicing in the context of community" (Donaldson, 1994).

There are a number of reasons why some chiropractors feel capable of filling such community-oriented "primary care" roles, including their training in examination and diagnosis, chiropractic's strong record in risk management and professional liability, and their history of routinely referring patients to medical doctors (Bowers, 1995; Mootz, 1994). Additionally, historic obstacles such as organized medicine's policies that prohibited medical doctors from accepting patients from a chiropractor (Getzendaner, 1987) have caused chiropractors to view themselves as the primary source of care for many of their patients. Still, limitations regarding clinical training in multidisciplinary settings, scope of practice, and comprehensiveness of services provided by chiropractors will need to be overcome before those outside the profession will be comfortable with the idea of chiropractors as primary care physicians (Bowers, 1995).

Regardless of one's views about whether or not chiropractors should be considered primary care physicians, it is clear that they possess many of the characteristics of medical specialists. They have a clientele presenting with a narrow range of musculoskeletal health problems and most of their care focuses on mechanical musculoskeletal interventions. This musculoskeletal specialist view of chiropractors poses a hazard for the profession. Specifically, because treatment of musculoskeletal problems often is provided by physical and occupational therapists following referral by a medical doctor, there is a concern that chiropractors may be viewed by some policymakers as a duplication of existing medical management options. However, given that more than 90 percent of billable manipulation services have been provided by chiropractors (Shekelle, 1992), an argument can be made that chiropractors provide a unique service. Because of the fundamental nature of these "clinical identity" issues, the chiropractic profession needs to clarify its role and strive to ensure that both training and practice are consistent with that vision.

Professional Social Identity

Due to their historical exclusion from participation in the mainstream of health care delivery, chiropractors have functioned outside of medical referral networks, institutional settings, and multidisciplinary group practices. As a result, they have had to rely on individual patient referrals and marketing efforts to attract patients. Although advertising and marketing are now also commonplace in medicine, medical marketing strategies tend to have an institutional focus on issues of perceived importance to patients (e.g., availability, clinical competence, location) while many chiropractic promotional efforts often seem aimed at vindicating and reinforcing professional philosophies. Some of chiropractic's promotional strategies have misrepresented the evidence, thereby alienating opinion leaders outside the profession and undermining the profession's efforts to improve its credibility and acceptance.

The profession is also likely to confront a credibility challenge if its colleges and research foundations, as well as its trade associations, are perceived to be little more than "special interests." In order to be perceived as a community resource rather than a special interest (Mootz, 1996), the profession needs to establish a credible and supportable clinical identity. Marketing and

patient education should focus on prevention, wellness, rapid resolution of disorders, and self-reliance for common health problems, perhaps like dentistry has done with dental caries.

The profession also needs to improve the quality, effectiveness, and efficiency of its care. Cost of care is of primary concern to policy planners and the community at large. Efforts need to be undertaken to determine the types, amounts, and durations of chiropractic care that are most cost-efficient and appropriate for different clinical circumstances. This will require the chiropractic profession to pay increased attention to practice variation. Gaining a better understanding of the causes of variations in practice, determining which of these variations are inappropriate, and finding ways to minimize undesirable variations should become professional priorities.

The Effect of Spinal Structure on Health

Chiropractors have long emphasized the importance of the effect spinal structure can have on human physiology (particularly the nervous system) and the beneficial effects of spinal manipulation (Gatterman, 1995). The idea of a manipulable "spinal lesion" is not unique to chiropractic; lay practitioners, osteopathic physicians, and others also advanced a variety of spinal lesion models near the turn of the 20th century (Gatterman, 1995). Historically, chiropractic terminology has characterized a spinal lesion as a "vertebral subluxation," although other terms have become more popular in recent years (e.g., spinal dysfunction, vertebral subluxation complex). Regardless of the syntax used to characterize it, the condition remains poorly defined and is inadequately supported by current research.

There has been abundant conceptualization about subluxation in the chiropractic literature, but no professional consensus on a particular model and little hard data regarding the reliability and validity of its clinical identification and pathophysiologic impact (Gatterman, 1995; Osterbauer, 1996). Although chiropractic has functioned successfully without more clarity about the existence and nature of the manipulable lesion, a better understanding of this issue would enhance full acceptance by other health care professionals. In particular, chiropractic researchers should focus on the following aspects of the vertebral subluxation: reliability of its identification as a clinical entity, its prevalence and incidence within healthy and unhealthy populations, its relationships to recovery and function, and refining the pathophysiologic and psychosocial models used to characterize it.

Resource Development and Allocation

In the past, many chiropractors developed strong collaborative alliances with patients, sympathetic legislators, and key individuals within the legal and labor communities (Mootz, 1996). More recently, chiropractic scientists have begun to collaborate with others in the greater academic and research communities. However, although interdisciplinary clinical relationships are evolving (Triano, 1994), it is still rare for chiropractors to function in medical group settings. Furthermore, unlike medicine, dentistry, and other professions, very little public funding exists for chiropractic research.

For the most part, chiropractors have had limited influence with several key health care constituencies, including public- and private-sector health policymakers and planners and health care administrators. Their ability to influence actions by health care purchasers and the business community has resulted more from litigation and political pressure than from voluntary policies of these groups. In order for chiropractic to significantly improve its educational and research missions, greater educational and research funding from Government and the private sector will need to be obtained.⁷ This will require the profession to initiate and develop strategic alliances with organizations and institutions outside the profession. Continued and expanded collaborative

research between chiropractic schools and universities will be important as will establishment of corporate and community partnerships to create endowments and expanded educational and research infrastructures. Finally, because the number of chiropractic researchers is still small (Meeker, 1996), there is an urgent need for more chiropractors to be trained in fields such as public health, epidemiology, health services research, the evaluative clinical sciences, and health administration. Opportunities for both dual degree tracks (e.g., DC-MPH) and post-DC degree training should be expanded.

Gaining full acceptance and credibility within the greater academic and research communities may pose some difficulties for chiropractic researchers who have trained in a profession that has, until recently, relied on political advocacy and litigation to accomplish its goals. To maximize their credibility, and therefore their impact on future policies, chiropractic researchers will need to eliminate prior belief and conviction from influencing the results or their reporting. Although investigator bias is a problem in all professions, it presents a particular challenge to the newly emerging group of chiropractic researchers at this point in their profession's evolution.

Responding to "Customer" Needs

There is a need within the chiropractic profession for a greater appreciation and routine incorporation of accepted, systematic processes for professional prioritization and decisionmaking. Systematic appraisals and syntheses of "customer" needs (stakeholding) could help chiropractic institutions and centers improve their internal and external relationships. Systematic incorporation of scientifically derived information into clinical practice remains a particular challenge. Many within the profession have developed strong beliefs about chiropractic's value from anecdotal personal experience alone (Keating, 1987). In some instances, this has led the profession's leadership to assume a naïve attitude toward research, i.e., "Because we already know its value, the role of research is to prove it to others." Although such attitudes are not unique to chiropractic physicians (Tanenbaum, 1994), initial efforts to develop evidence-based chiropractic care guidelines and clinical consensus should be expanded. Greater incorporation of quality improvement strategies in chiropractic settings would also be of value.

2. Policy Considerations External to the Chiropractic Profession

Only a fraction of commonly used health care procedures (including those used by chiropractors) have clear and consistent scientific evidence to support their use. Even when well-designed research studies are available for a given procedure, or a specific application of a procedure, probabilistic findings as typically reported in studies are fundamentally ambiguous as they relate to policy actions (Tanenbaum, 1996). These limitations complicate the efforts of government and private-sector policymakers in making coverage decisions, prioritizing the use of scarce health care resources, and allocating research dollars among many competing demands. Examples of questions policymakers generally must answer to address these issues are listed in Table 30 and discussed below.

Several specific policy questions concern insurance coverage. A fundamental issue is whether or not insurers and managed care plans should cover chiropractic services. The chiropractic profession has demonstrated an ability to successfully influence legislation and use the court system to pass and enforce insurance equality laws guaranteeing coverage of a given service without regard to who performs the service. In recent years, managed care plans have restricted access to chiropractic services (as well as to some medical services) through a variety of controversial mechanisms. These approaches seem likely to be met with further legislative and litigation activity on the part of the profession. Market forces (e.g., consumer demand for chiropractic services) are also likely to continue to influence plans' coverage decisions.

Individual health plans face a variety of complex decisions concerning which chiropractic services to cover and for which subsets of patients. For example, coverage decisions for some types of conditions and services (e.g., spinal manipulation for low back pain or whiplash injuries) may be more readily amenable to policy actions than coverage decisions involving other services (e.g., preventive services). The populations for which chiropractic care is already commonly provided will also influence demand and appropriateness concerns. For example, the use of chiropractic services for children remains controversial and will likely require better research data and practice guidelines for making future coverage decisions. In addition, although Medicare covers spinal manipulation as long as a physical examination and x-ray precede it, Medicare has not reimbursed chiropractors for physical examinations or x-rays. Congress recently mandated elimination of the x-ray requirement beginning in the year 2000 but issues remain concerning which chiropractic services Medicare will reimburse. How chiropractic services are documented and reported for reimbursement, utilization review, and auditing purposes will also require greater clarification. On the surface, some issues may be quite straightforward, but because scope of practice can vary by jurisdiction, individual States may need to respond differently.

In dealing with policy issues relating to chiropractic, policymakers may be tempted to defer decisions until such time as definitive research becomes available. In the past, excluding chiropractic was frequently justified by citing an absence of supporting evidence. In fact, the effectiveness of the primary intervention used by chiropractors, spinal manipulation, has been well studied and found to be effective for some subsets of patients with low back pain. Thus, if policymakers apply the same standards of evidence to evaluate the value of medical and chiropractic services, there will be no justification for dismissing spinal manipulation as an unsubstantiated treatment for back pain. However, because physical therapists, osteopaths, and allopathic physicians also use spinal manipulation and it is not known which forms of manipulation are most effective, there is no rationale for restricting manipulative care to any single profession.⁸

Access to chiropractic services is another major concern. Chiropractors receive extensive training and have demonstrated competencies in clinical assessment and management through government-accredited higher education programs. They are licensed and regulated in all 50 States, typically maintain professional liability coverage, and have evolved as a direct-access profession, in part because they have been outside traditional medical referral loops. Given that medical practitioners have little exposure to chiropractic training or practice, a case can be made for not requiring medical referral. This problem is analogous to the issue of requiring a primary care physician to authorize referrals for specialty care within the medical profession. In any event, the referral issue has significant economic and organizational implications and will likely require more cost data and market experience before it can be intelligently addressed.

The question of how the utilization of chiropractic services is controlled also has important economic considerations. Typical insurance benefit limits include actuarial caps (e.g., a limit on the number of visits that will be covered or on the number of dollars per year for services). Risk-sharing options are also likely to evolve as the chiropractic managed care marketplace matures. A number of chiropractic managed care organizations (MCOs) currently use capitated rates, allowing more flexibility in determining which procedures are reimbursable.

Finally, policymakers in Government and planners within the chiropractic community will need to consider how to best achieve infrastructure development and needed enhancement of chiropractic training, particularly as it relates to practical training through residencies and clerkships. In order to succeed, infrastructure and facility development at chiropractic colleges will need to occur through vehicles such as educational grants and indirect cost support, rather than exclusively

through student tuition, as is currently the case at all chiropractic colleges.

* * *

Despite nearly a century of adversity that included multiple efforts by organized medicine to eliminate the profession, chiropractic has thrived and attracted a large patient following. In recent years, increasing numbers of other health professionals have become supportive of chiropractic treatment. As a health care resource, chiropractors have established a presence that appears to have filled a void left by the limited success of the more traditional approaches to musculoskeletal problems.

In contrast to medical treatment of musculoskeletal problems by primary care physicians, a chiropractic encounter often includes more time listening to patients' concerns, extensive hands-on evaluation, clear and concrete explanations that make sense to patients, hands-on treatment that often feels good and is sometimes associated with an immediate improvement in symptoms, and repeated follow-up with the doctor (Mootz, 1995b). It is not surprising that such an approach is viewed as more satisfying than standard medical treatment (Cherkin, 1989; Carey, 1995; Coulehan, 1985). Chiropractors infrequently use high-cost diagnostics, specialist referral, and hospitalization. Further, chiropractic's principal intervention, spinal manipulation, has at least as much evidence for effectiveness as any other conservative treatment for back and neck pain. Thus, there is a clear rationale for policy planners to identify efficient strategies for incorporating chiropractic services into the health care system.

Given the chiropractic profession's history of survival and growth, its consistent political and legislative successes in adversarial situations, and its dedicated effort in recent decades to upgrade its education, research, and practice activities, both the profession and policymakers should pursue greater incorporation of quality improvement strategies in care delivery, dedication of appropriate resources for research, enhanced exposure to appropriate residencies and fellowships (e.g., in radiology, rehabilitation), and greater efforts to facilitate multidisciplinary practice. These actions will help policymakers determine the most appropriate roles for chiropractors in the health care system and will ensure that chiropractors are well prepared to serve in these roles.

7. The chiropractic profession itself has already devoted extensive resources to training and research and does not appear capable of providing significantly more.

8. Although the best available evidence suggests that over 90 percent of spinal manipulative treatments in the United States have been performed by chiropractors (Shekelle, 1992), there has been growing interest among allopathic and osteopathic physicians and among physical therapists in learning and using these techniques. It is therefore likely that the availability of nonchiropractic sources of spinal manipulative care will increase in the future.

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