

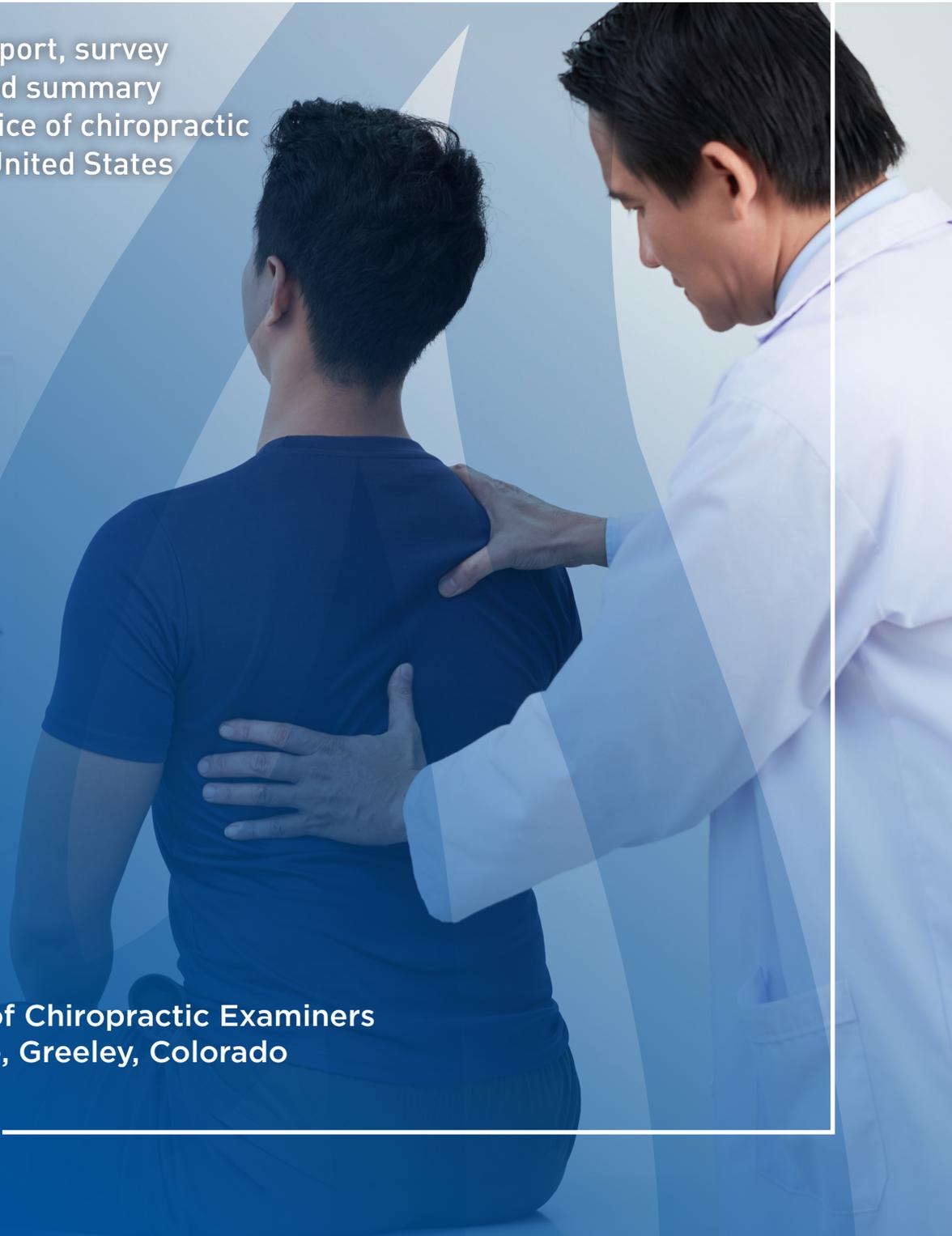
# Practice Analysis



## OF CHIROPRACTIC 2020

A project report, survey analysis, and summary of the practice of chiropractic within the United States

2020



Produced by the  
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# Executive Summary

**The Practice Analysis of Chiropractic 2020 is a project report and analysis of a survey of the chiropractic profession within the United States. This is the sixth survey of U.S. chiropractors conducted by The National Board of Chiropractic Examiners (NBCE). Previous analyses were released in 1993, 2000, 2005, 2010, and 2015.**

A *Practice Analysis* performs a fundamental role in developing valid tools for licensure and certification assessment. This analysis helps to establish test validity by creating a profile of the profession, tracking trends in professional practice, and providing information vital to the development and refinement of professional programs. It also identifies current practice standards while anticipating future changes.

For the first time, this *Practice Analysis of Chiropractic 2020* report contains information about the graduates of chiropractic programs who do not practice in the field and those who practice part time. The study results also provide legislators, insurance companies, educators, and the general public with an overview of the chiropractic profession and its growing importance and effectiveness as a healthcare profession.

The report includes the following contents:

- Introduction
- Overview of the chiropractic profession
- Methods of survey construction, data collection, and data analysis
- Demographic portrait of the chiropractic profession in the United States
- Practice settings and patient characteristics
- Professional functions and treatment procedures
- Research and ethics
- Part-time practitioners and non-practitioners
- Conclusion

The level of gender diversity in the chiropractic profession is increasing steadily. The percentage of female chiropractors in 2019 was 31.8%, compared with 13.3% in 1991, 19.2% in 1998, 18.0% in 2003, 22.4% in 2009, and 27.1% in 2014. The ethnic diversity in the profession is also increasing. Greater percentages of non-White chiropractors are reported among practitioners younger than 30 years of age. The proportion of practicing

chiropractors who have a Bachelor's, Master's, or doctoral degree has increased from 53.7% in 1991 to 82.8% in 2019. The vast majority of practitioners younger than 40 (95.4%) report having at least a Bachelor's degree.

A typical chiropractor works at least 30 hours per week (58.3%) at a chiropractic office (82.4%), which is often located in a city (35%) or a suburb (29%).

Some chiropractors (15.1%) were employed by a multi-disciplinary health care facility. The majority (64%) of chiropractors in the United States are sole proprietors, while 13% worked in partnerships and 17% were employed by other healthcare professionals or organizations. Twenty-eight percent (28.1%) of the respondents (an increase of 4.5 times over 5 years) indicated that they now are providing chiropractic care to the military. The vast majority of chiropractic practitioners (83.9%) focus on general practice. Thirty-nine percent (39.4%) provide care to athletes, 38.8% deliver pediatric care, 39.5% focus on orthopedics and injuries, and 37.9% focus on rehabilitation.

A large majority of chiropractic practices (65%) focus on wellness and maintenance of health, and 33.3% reported a specialty focus on the provision of nutritional recommendations.

Chiropractors spend 64.3% of their time on patient care and treatment, 19% on documentation of care, 11.3% on tasks related to business management, and 6.3% on professional education and research.

On average, 36.3% of chiropractic cases are reimbursed by private pay or cash. Twenty-five percent (25.4%) of cases are paid through health insurance (non-managed care), while only 9.3% of the cases are paid by managed care. On average, Medicare and Medicaid reimburse 14.3% of the cases. Two percent of the cases are handled pro bono. In 2019, 47% of chiropractic practitioners obtained radiographic images in their offices, a slight decrease from 50.1% as reported in 2014.

According to the 2019 survey, a typical chiropractic patient is female (57%) and between the ages of 30 and 64 years (45.9%). Regarding Patient Assessment, survey respondents indicated that they perform cervical, thoracic, lumbopelvic, and/or extremity palpation examinations several times a day ( $M = 5.8$ ,  $SD = .6$ ). This function was associated with

one of the highest importance index values ( $Importance = 20.6$ ).

Regarding Case Management, the two professional functions with the highest frequencies are *developing a differential diagnosis or clinical impression* ( $M = 5.3$ ,  $SD = 1.1$ ,  $Importance = 24$ ) and *assessing the existence of risk factors and contradictions to chiropractic care* ( $M = 5.2$ ,  $SD = 1.3$ ,  $Importance = 23.4$ ). Chiropractors perform these functions several times a day.

Regarding Communication Tasks, on a daily basis, chiropractic practitioners produce documentation ( $M = 5.9$ ,  $SD = .07$ ,  $Importance = 21.5$ ), suggest self-care strategies ( $M = 5.3$ ,  $SD = 1$ ,  $Importance = 16.6$ ), make specific recommendations to patients regarding physical fitness ( $M = 5.3$ ,  $SD = 1.0$ ,  $Importance = 17.5$ ), and make recommendations about ergonomics and posture ( $M = 5.2$ ,  $SD = 1.0$ ,  $Importance = 16.8$ ). Regarding Treatment Tasks, according to the 2019 survey, *a manual chiropractic adjustment of the occiput, spine, and/or pelvis* was the treatment task performed with the highest frequency ( $M = 5.8$ ,  $SD = .7$ ,  $Importance = 22.2$ ).

The overwhelming majority of chiropractic practitioners (96.4%) spend some of their time reading published, peer-reviewed chiropractic, and/or medical research. The vast majority of practicing chiropractors (90.3%) use current chiropractic and/or medical research when making patient treatment decisions. Half of responding practitioners (51.1%) use evidence-based research in their practice at least once a week.

# Chapter One

## Introduction

The *Practice Analysis of Chiropractic 2020* is a project report and analysis of a survey of the chiropractic profession within the United States. This is the sixth survey of U.S. chiropractors conducted by The National Board of Chiropractic Examiners (NBCE). The first survey by the NBCE was conducted in 1991 and published as the *1993 Job Analysis of Chiropractic* (Christensen & Morgan, 1993). Additional surveys of the U.S. chiropractic profession have been performed approximately every 5 years. The most recent survey report was the *Practice Analysis of Chiropractic 2015* (Christensen et al., 2015). The NBCE has conducted and reported on similar surveys of chiropractors in Canada (Christensen et al., 1993), as well as in Australia and New Zealand (Christensen et al., 1994), while other researchers have published practice analyses of Swiss (Humphreys et al., 2009) and South African chiropractors (Johl et al., 2017). Chiropractors who specialize in pediatrics (Pohlman et al., 2010) and clinical nutrition (Shotts et al., 2019) have also been surveyed regarding their practices.

### Licensing of Doctors of Chiropractic

Chiropractic practitioners are regulated by healthcare licensing boards in all 50 states, as well as in the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and other U.S. territories. All U.S. chiropractic regulatory boards require applicants for licensure to have passed the NBCE Board examinations or an equivalent. Parts I through IV of the NBCE exams have emerged as a single path to licensure for U.S. chiropractors.

The NBCE Part I (basic sciences) and Part II (clinical sciences) examinations are based on the curricula of accredited schools that educate and train doctors of chiropractic (DCs) in the U.S. The Council on Chiropractic Education (CCE) is the federally-accepted accrediting body for chiropractic colleges in the United States.

The NBCE Part III (written clinical competency) and Part IV (practical clinical competency) examinations are based on the tasks and functions required of practicing chiropractors. The information necessary for this determination is gathered through periodic surveys of chiropractic practitioners. The survey results are then compared with the current test plans for the Part III and Part IV exams, and the components are re-weighted and/or new topics are introduced to update the content based on current practice.

## Rationale for Performing an Occupational Analysis (Practice Analysis)

### Exam Validity

Assessment is an important component of professional licensing and certification needed to assure public protection. Examinations that lead to professional licensure must produce valid, reliable, and fair scores. An important aspect of the validity of a test is whether the content reflects the knowledge and skills required of a licensed practitioner. For several decades, the recognized authority in the field of testing and credentialing has been the *Standards for Educational and Psychological Testing* (AERA et al., 2014), which states the following:

*Some form of job or practice analysis provides the primary basis for defining the content domain... Although the job analysis techniques may be similar to those used in employment testing, the emphasis for credentialing is limited appropriately to knowledge and skills necessary for effective practice.* (p. 182)

The *Standards* emphasize that the job analysis should be the primary basis for determining the content and assessing the validity of licensure examinations. A practice analysis study, when conducted in conjunction with exam development efforts, should establish the frequency and importance of core professional tasks. Developers of licensing examinations should be able to isolate and focus on the professional core competencies that are important for public protection (AERA et al., 2014).

Kane (2006) notes that measurement is an inferential process in which conclusions about people or organizational units are drawn from a limited number of samples.

*To validate an interpretation or use of measurements is to evaluate the rationale, or argument, for the claims being made, and this in*

*turn requires a clear statement of the proposed interpretations and uses and a critical evaluation of these interpretations and uses.* (p.17)

This *Practice Analysis of Chiropractic 2020* describes the methods and results of the most recent survey of the U.S. chiropractic profession by the NBCE. It also includes data from previous surveys when appropriate for comparison and/or discussion.

## Legal Basis for Practice Analyses

The following sections are cited from Shotts et al. (2019).

### Practice/Job Analysis

A practice analysis performs a fundamental role in the development of valid tools for licensure and certification assessment (Wang et al., 1999). Knapp and Knapp (1995) defined practice analysis as “a systematic collection of data describing the knowledge, skills and/or competencies required to practice a profession.” The practice analysis is conducted to gain information about the work performed by professionals and thus document the tasks essential to practice (AERA et al., 2014; Kane, 1997). This process of obtaining information about professions is the most widely used organizational data collection technique (Morgeson & Campion, 1997). The practice analysis helps to establish test validity by creating a profile of the profession, tracking trends in professional practice, and providing information vital to the development and refinement of professional programs. It also identifies current practice standards while anticipating future changes.

### Legal Standards for Practice Analysis

The legal recognition of a practice/job analysis begins in the area of employee selection. The *Uniform Guidelines on Employee Selection Procedures* guide employee selection

procedures by helping employers to comply with federal laws pertaining to Title VII of the Civil Rights Act (1964). These *Guidelines* frequently refer to practice/job analyses. Specifically, Section 5 provides standards for validity studies and demands that selection procedures establish evidence of criterion-related content and construct validity. This section also requires that the licensing tests used to allow entrance into a profession should be consistent with generally accepted professional standards for the evaluation of standardized tests, and that validity studies should not be conducted by the test user (Federal Register, 1978).

The *Uniform Guidelines* have been adopted by five federal agencies: the Equal Employment Opportunity Commission, the Office of Personnel Management, the Department of Labor, the Department of Justice, and the Department of Treasury (Foster & Condrey, 2005). The leitmotif of the *Guidelines* is the need for a close connection between the selection instrument (test) and the requirements of the profession for which the test is used (Levine, 1983).

Several court cases refer directly to the requirement for occupational analysis. In 1971, the Supreme Court of the United States ruled against a public utility corporation that required a high school diploma for its higher paid jobs. The Court ruled that “tests must be reasonably related” to the job for which the test is required (Griggs v. Duke Power Co., 1971). In 1983, the Court stated in *Kirkland v. New York Department of Correctional Services* that “Identification of the relative importance of the skills and tasks involved in a job and the competency required for the various aspects of a position are essential functions of a job analysis.” Further, “the cornerstone in the construction of a content valid examination is the job analysis” (*Kirkland v. New York Department of Correctional Services*, 1975).

Likewise, in 1975, employees of the Albemarle Paper Co. claimed to have suffered from racially discriminatory hiring and promoting practices. The Court ruled that “Job relatedness cannot be proven through vague and unsubstantiated hearsay,” and that “limiting job analysis to selected jobs, that are unrepresentative of the full range of work performed, is inadequate for test development” (*Albemarle Paper Company v. Moody*, 1975).

### **Professional Standards**

The requirements that pertain to practice analyses include the *Standards for Educational and Psychological Testing* (AERA et al., 2014) and the *Principles for the Validation and Use of Personnel Selection Procedures* (Tippins et al., 2018). Although the *Standards* and *Principles* publications are not legal documents, they have been used frequently by courts to determine the appropriateness of validation procedures (Harvey, 1991). Therefore, many licensing agencies have elected to adhere to the *Standards* during their test development procedures.

In many surveys constructed to collect job-related data, the respondents are asked to report the frequency and the importance of the tasks they perform at work. The collected data are analyzed, and numerical estimates of the frequency of performance, importance to public protection, and need to develop competency in a task at the time of initial licensure are calculated (Wang et al., 1999). This report constitutes an effort to share the results of the practice analysis survey and to provide insights into the frequencies and risks associated with the professional tasks performed by doctors of chiropractic.

## References

- Albemarle Paper Company v. Moody, 422 US 405 (US Supreme Court 1975).
- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing*. AERA, APA, and NCME.
- Christensen, M., & Morgan, D. (1993). *Job analysis of chiropractic*. National Board of Chiropractic Examiners.
- Christensen, M. G., Hyland, J. K., Goertz, C. M., & Kollasch, M. W. (2015). *Practice analysis of chiropractic*. National Board of Chiropractic Examiners.
- Christensen, M. G., Morgan, D., Sieve, Y. D., & Townsend, P. (1993). *Job analysis of chiropractic in Canada*. National Board of Chiropractic Examiners.
- Christensen, M. G., Morgan, D., Feters, S. R., Sieve, Y. D., & Townsend, P. (1994). *Job analysis of chiropractic in Australia and New Zealand*. National Board of Chiropractic Examiners.
- Foster, M. R., & Condrey, S. F. (2005). Effective job analysis methods. In S. E. Condrey (Ed.), *Handbook of human resource management in government* (2nd ed., pp. 528–555). Jossey-Bass.
- Griggs v. Duke Power Co., US 424 (US Supreme Court 1971).
- Harvey, R. J. (1991). Job analysis. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., pp. 71–163). Consulting Psychologists Press.
- Humphreys, B. K., Peterson, C. K., Muehlemann, D., & Haueter P. (2010). Are Swiss chiropractors different than other chiropractors? Results of the job analysis survey 2009. *Journal of Manipulative and Physiological Therapeutics*, 33(7), 519–535.
- Johl, G. L., Yelverton, C. J., & Peterson, C. K. (2017). A survey of the scope of chiropractic in South Africa: 2015. *Journal of Manipulative and Physiological Therapeutics*, 40(7), 517–526.
- Kane, M. (1997). Model-based practice analysis and test specifications. *Applied Measurement in Education*, 10(1), 5–18.
- Kane, M. (2006). Validation. In R. L. Brennan (Ed.), *Educational measurement* (4th ed., pp. 17–64). Praeger Publishers.
- Kirkland v. New York State Department of Correctional Services., 711 F.2d 1117 (2nd Cir. 1983).
- Knapp, J. E., & Knapp, L. G. (1995). Practice analysis: Building the foundation for validity. In J.C. Impara (Ed.), *Licensure testing: Purposes, procedures, and practices* (pp. 93–116). Buros Institute of Mental Measurement and University of Nebraska-Lincoln.
- Morgeson, F. P., & Campion, M. A. (1997). Social and cognitive sources of potential inaccuracy in job analysis. *Journal of Applied Psychology*, 82(5), 627–655.
- Pohlman, K. A., Hondras, M. A., Long, C. R., & Haan, A. G. (2010). Practice patterns of doctors of chiropractic with a pediatric diplomate: a cross-sectional survey. *BMC Complementary and Alternative Medicine*, 10(26).
- Shotts, B., Himelfarb, I., Crawford, G. L., Harding, J., & Gow, A. R. (2019). *Practice analysis and changes to the Chiropractic Board of Clinical Nutrition diplomate exam*. Manuscript submitted for publication.
- Tippins, N., Sackett, P., & Oswald, F. (2018). *Principles for the validation and use of personnel selection procedures* (5th ed.). American Psychological Association.
- Uniform guidelines on employee selection procedures. (1978). Federal Register. (3).
- Wang, N., Wiser, R. F., & Newman, L. S. (1999). *Examining reliability and validity of job analysis survey data*. Paper presented at the National Council on Measurement in Education, Montreal, Canada.

# Chapter Two

## The Chiropractic Profession

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Chiropractic is a licensed and regulated healthcare profession in all 50 states in the U.S., the District of Columbia, and U.S. territories. This conservative form of healthcare is concerned primarily with the diagnosis, treatment, and prevention of disorders of the neurological and musculoskeletal systems and the effects of these disorders on general health. DCs are trained in the assessment and diagnostic procedures needed to care for patients in both health and disease and in the monitoring of bodily functions (Bureau of Labor Statistics, 2019).

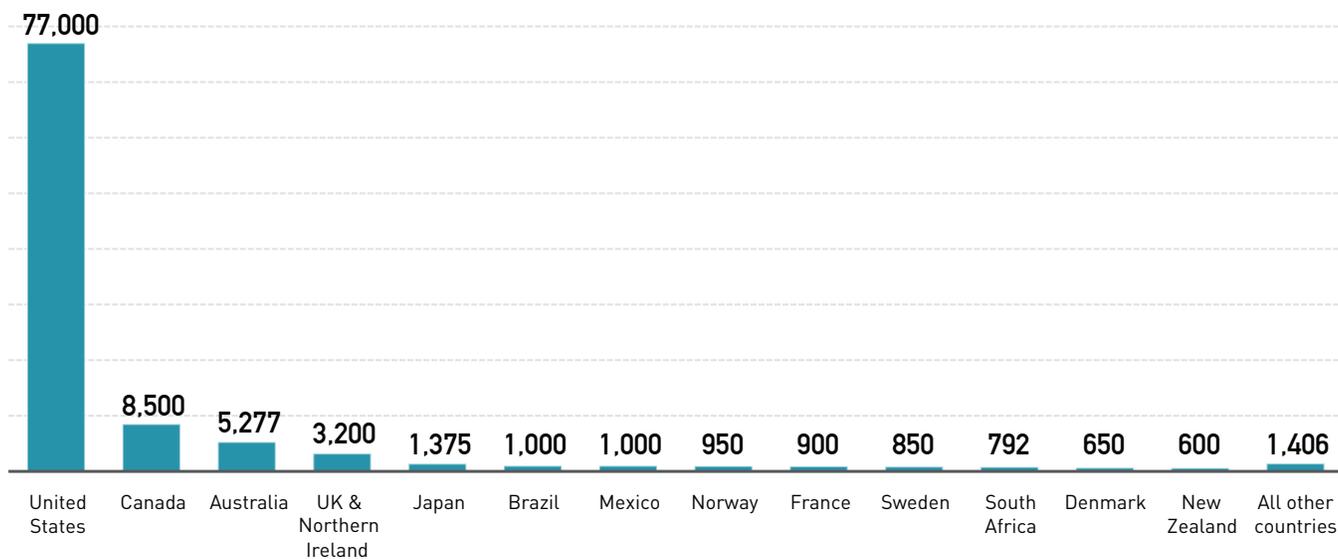
In the U.S., DCs practice as portal-of-entry providers. Chiropractors are qualified to serve as the first point of contact within the healthcare system, without requiring a referral from another health professional. Thus, patients can access chiropractic care directly. Most chiropractors work at the primary care level, although some may work within the secondary or tertiary care levels of the healthcare system. These professionals perform duties associated with health care, including taking a history of the chief complaint, performing examinations, and ordering any necessary diagnostic tests to help determine a diagnosis and management plan. Typical chiropractic procedures include spinal manipulation, joint and soft tissue manipulation and mobilization, rehabilitation and physiotherapeutic techniques, patient education, and lifestyle advice (Green, Johnson, & Dunn, 2012). Chiropractors may work in independent clinical practices or as part of collaborative care teams in group or hospital settings (Branson, 2009; Dunn et al., 2009;

Goldberg et al., 2009; Green et al., 2016; Green et al., 2009; Salsbury et al., 2018).

Chiropractic is a self-regulating profession considered to be “the largest alternate or ‘unorthodox’ health profession in the United States” (Coulehan, 1985). According to the U.S. Bureau of Labor Statistics,

*Chiropractors care for patients with health problems of the neuromusculoskeletal system, which includes nerves, bones, muscles, ligaments, and tendons. They use spinal adjustments and manipulation, as well as other clinical interventions, to manage patients’ health concerns, such as back and neck pain. Chiropractors focus on patients’ overall health. (U.S. Bureau of Labor Statistics, 2019)*

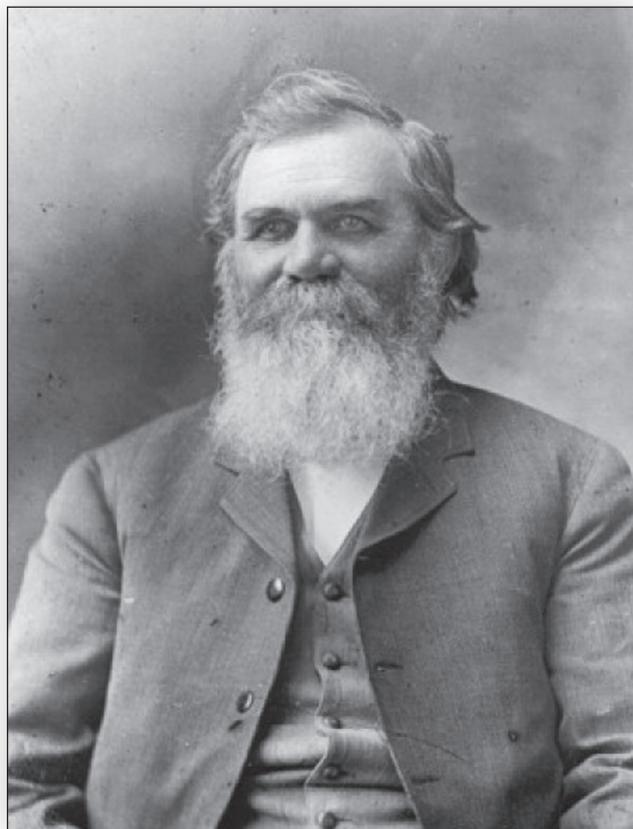
Of the approximately 103,500 chiropractors worldwide, the majority (77,000, 74.4%) are located in the U.S. (see figure 2.1). These DCs hold approximately 96,000 active U.S. chiropractic licenses, as some doctors hold licenses in multiple states (Federation of Chiropractic Licensing Boards, 2019). The second and third highest numbers of chiropractors are located in Canada (8,500, 8.2%) and Australia (5,277, 5.1%). The remainder of chiropractors (12,692, 12.2%) are spread across 87 other countries (Stochkendahl et al., 2019). Therefore, a practice analysis of American chiropractors is a valuable contribution to a better understanding of chiropractic.



**Figure 2.1. The World Federation of Chiropractic (WFC) estimated a global population of 103,469 chiropractors as of 2017. The majority of chiropractors are located in the U.S.**

## Historical Overview

A brief historical overview provides a perspective of the unique traits of the chiropractic profession, its emergence outside of the medical healthcare system, and its transformation to the modern state of the profession in the U.S. During the 1800s, the U.S. healthcare system was in turmoil. Medicine was unregulated, and various types of practitioners engaged in fierce competition for patients. A group that self-described as “regular” medical physicians organized the American Medical Association (AMA) in 1847 to gain control of the healthcare industry and protect the interests of its members (Davis, 1855). These physicians developed a code of ethics for the AMA, which excluded other types of providers and stated that it would be unethical for any member to work with other health care providers who did not practice according to the perception of the AMA regarding health care practices (AMA & NYMA, 1848). Thus, the AMA Code of Ethics forbade medical doctors from referring patients to providers who were not members of their medical association. At this time, organized medicine established science as a primary foundational component.



**Figure 2.2. Daniel David Palmer described himself as the person who “discovered the basic principle of chiropractic, developed its philosophy, originated and founded the science and art of correcting abnormal functions by hand adjusting, using the vertebral processes as levers” (D. D. Palmer & Palmer, 1910).**

In the late 1800s, various types of healers sought alternative methods to those used in conventional medicine (e.g., bleeding, purging, drugs, and surgery). For example, Daniel David Palmer was a healer who sought alternate ways to improve the health of his patients (see figure 2.2). During his practice as a magnetic healer, he discovered that the patients' health improved when force was applied to the spine. After repeating these procedures with various patients and observing positive results, he realized that he had discovered a method of healing that could improve the health of the public. D.D. Palmer declared that the chiropractic profession was founded in 1895 and he opened the first chiropractic school in 1897 in Davenport, Iowa (B. Palmer, 1906; D. D. Palmer, 1905; D. D. Palmer, 1910).

Health professions that overlap in terms of duties and patients often battle for control over the marketplace (Pollard, 1969). This was especially true of organized medicine and chiropractic. The AMA was hostile toward DCs from the beginning of the chiropractic profession. (Smith-Cunnien, 1998). When chiropractic was first introduced in 1895, organized medicine had already established a healthcare monopoly in America. Consequently, chiropractic developed outside of the medical healthcare system. As the number of chiropractors increased, the AMA amplified its efforts to monopolize healthcare and thereby attempted to eliminate other professions, including chiropractic. This environment led to the independent development of the chiropractic profession as a healthcare profession distinct from medicine (i.e., medicine and osteopathy) and other medical allied health professions (e.g., nursing, physical therapy).

Although only a few chiropractic programs were initially available, the number of programs increased (Keating et al., 2004), and new chiropractic graduates began to practice and teach chiropractic in the early 1900s. At that time, chiropractic colleges were proprietary and competing entities, which led to the diversification of approaches and methods

within the profession (Johnson, 2010). In addition to D.D. Palmer and his son, Bartlett Joshua Palmer, early chiropractic leaders such as Willard Carver, Joy Loban, Charles Cale, John Howard, Solon Langworthy, Oakley Smith, Charles Parker, Carl Cleveland, Sr., and T.F. Ratledge influenced the science, art, and philosophy of chiropractic (Keating et al., 2004).

In attempts to protect their medical territories, the AMA and other associated medical professions (e.g., osteopathy) attacked by stating that DCs were practicing medicine or osteopathy without a license (Pollard, 1969). To survive, chiropractic continued to develop its own lexicon and approach to healthcare. This terminology sometimes caused confusion because of its similarity to existing terms (Johnson, 2011). For example, in the medical lexicon, the term *subluxation* refers to a partial joint dislocation caused typically by significant trauma and damage to the surrounding joint structures. In chiropractic, a *chiropractic vertebral subluxation* is “a condition in which the articulating surfaces of a joint are slightly changed though the articulations are still in contact” (Smith et al., 1906). This confusion regarding terminology may have led some people to presume that chiropractors manipulated fractured or dislocated spines, when instead DCs were actually adjusted spines to improve function.

Despite the similar terminology, the legal use of the chiropractic vocabulary helped to establish chiropractic as a unique profession with a distinct approach to healthcare. Defense lawyers argued that chiropractors were not medical physicians and used published chiropractic textbooks to demonstrate that chiropractic was based on a unique art, science, and philosophy and was therefore a separate and distinct profession (Johnson, 2010; Smith et al., 1906). These differences in vocabulary and philosophy were essential components of the legal victories of accused chiropractors (Keating et al., 2004). The arguments helped to establish chiropractic as a distinct profession through legislation, as

well as in the courtroom through the acquittal of chiropractors who had been charged with practicing medicine or osteopathy without a license (Keating et al., 2004) (Table 2.1).

**Table 2.1 Examples of arguments made by chiropractors in the early 1900s to differentiate chiropractic from medicine. These examples present the historical terms and approaches that shaped chiropractic practice and licensure over time in the U.S.**

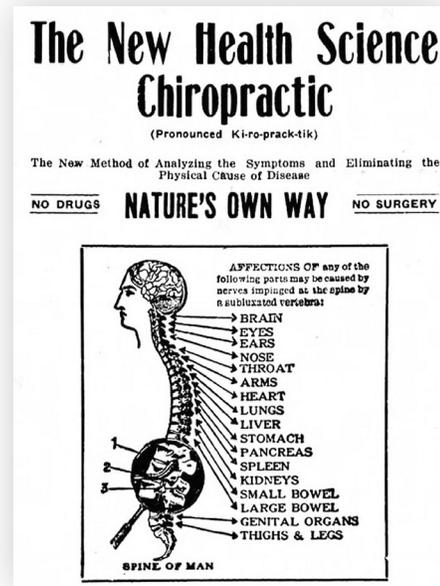
	<b>Medicine</b>	<b>Chiropractic</b>
Model of healthcare	The biomedical model explains health and disease. Diseases are caused by germs or pathophysiology (e.g., cancer).	Health is affected by dysfunction. Chiropractic vertebral subluxations interfere with nerves and result in disease.
Primary approach	Drugs (pharmacotherapeutics) and surgery.	Manual adjustments/manipulation of the spine or other dysfunctional areas. Some chiropractors include additional conservative methods (e.g., exercise, physiotherapy, nutrition).
Terminology comparison showing similarities and differences	Medicine treats symptoms caused by diseases. Disease: “Medical men look to the blood and germs as cause of disease” (B. Palmer, 1906). “The medical man waits for symptoms to fully develop that he may determine the disease of the patient” (B. Palmer, 1906)	Disease: Lack of ease or harmony within the body caused by too much or too little nerve energy (Bergmann & Peterson, 2010). “Chiropractors correct the mechanical displacements which cause derangements, thereby liberating impinged nerves, allowing normal functions” (B. J. Palmer, 1906).
	Treat: “To care for medicinally or surgically; to manage in the use of remedies or appliances; as, to treat a disease, a wound or a patient” (D. D. Palmer, 1905).	Adjust: “To make exact; to fit; to make correspondent or conformable; to bring into proper relation” (D. D. Palmer, 1905). Adjustment: “A term used by Chiropractors to denote the act of replacing luxations that cause disease” (D. D. Palmer, 1905).
	Homeostasis: “The coordinated physiological processes which maintain most of the steady states in the organism...” (Davies, 2016). <sup>a</sup>	Innate Intelligence: “All movements, whether normal or abnormal, of, or in the body (including blood circulation), are but the personification of mental equivalents—mental functions guided by Innate Intelligence, creating physical expression... Innate mental impulses control the vital functions of assimilation, circulation and respiration, asleep or awake” (B. J. Palmer, 1917).

<sup>a</sup> The word *homeostasis* was created by Walter Cannon in 1926 and refers to a concept similar to *Innate Intelligence*. The former term did not yet exist when chiropractors first developed the latter term within the chiropractic lexicon (Cannon, 1926, 1929).

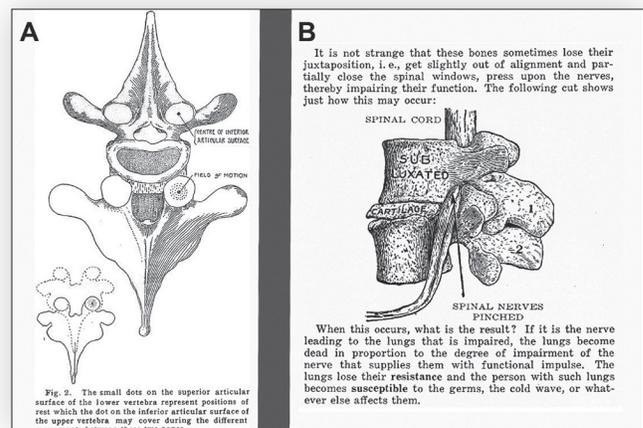
The early tenets of chiropractic included the following principles: that an individual's nervous system is important to overall health, and that interference with this system impairs normal body functions and lowers the body's resistance to disease (World Health Organization, 2005). One chiropractic theory suggested that irritation or impedance of the nervous system would lead to aberrant responses, resulting in disease. Logically, then, chiropractic spinal adjustments would correct the interference thereby restoring health to the tissues innervated by the affected nerves. According to one hypothesis, as each spinal nerve innervates specific tissues, providing treatment to specific areas of the spine would improve the functions of those tissues (B. J. Palmer, 1917).

Chiropractic theories included the component *chiropractic vertebral subluxation*, which was hypothesized to manifest through complex anatomical and physiological relationships, to affect the nervous system, and to cause reduced function, disability, or illness. The signs and symptoms of chiropractic vertebral subluxation may include pain and tenderness; asymmetry of posture, movement, or alignment; range of motion abnormalities; changes in the tone, texture, and/or temperature of the adjacent soft tissues; and/or other signs of dysfunction. To address these signs and symptoms, a chiropractor would perform an analysis using standard physical examination procedures, specific chiropractic assessments, or other special tests (Bergmann & Peterson, 2011).

Another chiropractic premise was that the body can achieve and maintain health through its own natural recuperative powers, provided that the nervous system is functioning properly and receives the necessary health maintenance components (e.g., through the body's Innate Intelligence). One early theory included the impingement of vertebrae on nerves, while another suggested aberrant motion (B. J. Palmer, 1917; Smith et al., 1906).



**Figure 2.3. An early chiropractic advertisement from a 1917 newspaper (*The new health science: Chiropractic*, 1917). The figure of the spine demonstrates a theoretical model of "bone out of place" resulting in nerve impingement that affects the health of the innervated tissues and organs.**



**Figure 2.4. A comparison of two early models of chiropractic vertebral subluxation. Model A represents one chiropractic theory that suggested normal alignment with aberrant motion (C. Johnson, 2006; O. G. Smith et al., 1906). Model B represents a different chiropractic theory of misalignment and bone displacement. Adapted from "Use of the term subluxation in publications during the formative years of the chiropractic profession," *Journal of Chiropractic Humanities*, and "Modernized Chiropractic reconsidered: beyond foot-on-hose and bones-out-of-place," *Journal of Manipulative and Physiological Therapeutics*. Copyright 2006 and 2011 by Elsevier.**

Many other theories have been developed during the last century (Leach, 2004).

The first chiropractors graduated from Palmer's school in 1897 (Keating et al., 2004), and by 1910, there were approximately 500 graduates of chiropractic, compared with approximately 70,000 medical doctors in the U.S. (Moseley III, 2008; Wardwell, 1992). In the same year, Abraham Flexner (1910) published a landmark report that influenced medical schools to increase standards, implement stricter entrance requirements, and become more scientific, and eventually caused a significant reduction in the number of medical schools (Johnson & Green, 2010a).

The U.S. licensing laws favored the established medical profession, and the AMA lobbied strongly to maintain its control over the healthcare marketplace. In states that did not legally recognize chiropractic, chiropractors were accused of practicing medicine without a license, arrested, and incarcerated (Bower & Hynes, 2004; Callender, 2004). For many years, chiropractors fought in the courtroom and continued to lobby for licensure in each of their respective states. Due in part to popularity and support from the public, chiropractors eventually gained licensure in all states (Keating et al., 2004).

In the 1900s, medical hospitals in the U.S. and the associated healthcare infrastructure and organizations were owned or controlled by organized medicine. Therefore, chiropractors practiced apart from medicine in stand-alone businesses. This solo practice model meant that chiropractors did not conduct business within the medical infrastructure and thus did not have access to payment processes or services provided in medical clinics or hospitals, such as radiological or laboratory facilities. Therefore, chiropractors owned their own labs and X-ray units, and thus became skilled at operating and performing these functions (e.g., interpreting X-rays and lab results).

By the late 1950s, chiropractors continued to increase in number, and chiropractic continued to gain a foothold in healthcare. At this time, the AMA organized a focused effort to eliminate the chiropractic profession through various programs. One program included a public propaganda campaign declaring that chiropractors were quacks. The continued campaign of the AMA against the chiropractic profession eventually led to the *Wilk et al. v AMA et al.* trial, which was filed in 1976. In 1980, the AMA revised its Principles of Medical Ethics which allowed medical doctors to collaborate with chiropractors, thus opening an opportunity to interprofessional working relationships. However, many medical providers and the public were unaware of this change in the AMA's Principles (Getzendanner, 1988).

In 1987, the final results of the trial involved the judge's decision to mandate that the AMA clarify this revision to its members and other components that organized medicine controlled (e.g., hospitals) could choose to work with chiropractors. In its journal, the AMA publicized the decision from the trial and thus clarified that it was permissible for chiropractors to work in medical environments (Getzendanner, 1988). However, the trial was not completed until 1990, when the decision was upheld by a higher court. This tension between organized medicine and chiropractic may partly explain why the public expressed uncertainty about chiropractors, why DCs were not previously allowed to work in medical settings such as hospitals, and why chiropractic services were not previously included in some reimbursement programs (e.g., Medicare). Despite the resolution of these early battles, chiropractic associations in the U.S. continue to fight legal battles for parity that will enable chiropractors to better serve the public.

The development of chiropractic outside of the medical and university systems meant that its inclusion in mainstream research and science remained embryonic until the 1990s. Early efforts to evaluate spinal manipulation, a

primary therapeutic modality of the chiropractic profession, resulted in a workshop held at the National Institutes of Health in 1975 (Goldstein et al., 2002). The monograph resulting from this conference represents one of the first interdisciplinary attempts to better understand the biomechanics and principles underlying chiropractic treatments. Subsequently, greater efforts were made to increase research in this area, which later included research at chiropractic institutions (Cramer et al., 2006; Haas et al., 2006; Mootz et al., 2006; Mrozek et al., 2006; Triano et al., 2010). The National Institute for Neurological Diseases and Stroke (NINDS) conference led to a surge of research interest both within and outside of the chiropractic profession. Efforts to increase the body of scientific literature included the establishment of the *Journal of Manipulative and Physiological Therapeutics* in 1978, which was later indexed in Medline. Since then, various studies have explored the practice of chiropractic and its associated modalities, such as spinal manipulation.

Modern chiropractic theories and research focus on a variety of topics, including developments in biomechanics, neurological mechanisms, pain and function, and biopsychosocial factors related to health. Research is ongoing with the aim of better understanding the doctor-patient relationship and the effects of chiropractic treatment on overall health and wellbeing (Coulter et al., 2018; Leach, 2004). Chiropractors are now considered to have a greater level of inclusion in mainstream healthcare (Meeker, 2000).

## Modern Chiropractic

Currently, chiropractors use a wide variety of practice styles and various procedures and modalities to manage patients (Chang, 2014). Chiropractors remain distinct from conventional medical doctors, as they practice under a

separate licensure system and most do not use drugs or surgery. Manual spinal manipulation is the most recognized procedure associated with chiropractic practice.

The U.S. healthcare environment has changed since the 1990s. Chiropractors no longer have to fight for licensure and are free to use the historical and traditional lexicon of the field or commonly used scientific terminology in their professional communications. Some chiropractors follow the same tenets and use the same language as the founding chiropractors, whereas other chiropractors have expanded to explore other paradigms within the chiropractic model of care. Chiropractic is represented in many ways in the American healthcare marketplace because there are multiple associations with varying and sometimes opposing views. Some chiropractors perceive the use of traditional terminology as a barrier to integration, whereas others prefer to retain the unique vocabulary because of the ease of use in patient education and because the public strongly identifies these terms with chiropractic (Budgell et al., 2013; Good, 2016; Hart, 2016; Rosner, 2016; Seaman & Soltys, 2013; Senzon, 2018a, 2018b, 2018c, 2018d, 2018e, 2018f, 2018g, 2018h, 2018i, 2018j; Triano et al., 2010). Regardless of the variance in viewpoints within the chiropractic profession, the public generally tends to associate chiropractic with the spine and a holistic style of healthcare (Weeks et al., 2015).

The public demand for chiropractic services is increasing (Meeker, 2000). Approximately 14% of Americans consult a chiropractor annually (Weeks et al., 2015), and the number of people seeking chiropractic care seems to be increasing over time (Tindle et al., 2005; Barnes et al., 2008; Zodet & Stevans, 2012). Chiropractic patients report high levels of satisfaction with the care provided by chiropractors (Cherkin & MacCornack, 1989; Hertzman-Miller et al., 2002; Kane et al., 1974). A majority of U.S. adults (61.4%) believe that chiropractic care is effective for neck and back pain, and a majority report that chiropractors are trustworthy (Weeks et al.,

2015). Areas with higher numbers of practicing chiropractors demonstrate higher utilization rates and positive perceptions of chiropractic (Weeks et al., 2015).

Patients in the U.S. seek chiropractic care for a variety of conditions, but primarily for neck and back pain (Ndetan et al., 2009). Chiropractic management has been shown to be effective for several conditions, including neck and back pain, that are considered high priority in the burden of disease studies and descriptions in the mainstream medical literature (Bronfort et al., 2008; Cote et al., 2009; Haldeman et al., 2018; Hogg-Johnson et al., 2009). In addition to adult men and women, chiropractors provide care to other populations, including infants and children, older adults, active and retired military, and athletes (Botelho et al., 2017; Dunn et al., 2009; Dunn et al., 2011; Goertz et al., 2017; Green & Johnson, 2010; Green et al., 2012; Green et al., 2018a; Green et al., 2018b; Hawk et al., 2009; Hawk et al., 2017; Hawk et al. 2016; C. Johnson et al., 2008; Johnson & Green, 2009; C. Johnson et al., 2012; Lisi & Brandt, 2016; Lisi et al., 2018; Peng et al., 2018). Chiropractors also serve patients in rural and underserved areas (Barnett et al., 1997;

Hawk & Long, 1999; Hawk et al., 1996; Hurwitz et al., 2018; Leach, 2010; Smith & Carber, 2002, 2007; Whedon & Song, 2012; Zodet & Stevans, 2012).

Most patients who seek out chiropractic care present with neuromusculoskeletal complaints, although some seek assistance with health maintenance or the improvement of other non-neuromusculoskeletal concerns (Ailliet et al., 2010; Rubinstein et al., 2000). For decades, chiropractic care has been perceived as good or better than conventional medicine for the treatment of conditions such as back and neck pain (Kane et al., 1974). Chiropractic guidelines and best practices have been published to describe the breadth and depth of the scientific evidence supporting the management of conditions by chiropractors, as shown in figure 2.5.

Conventional medical recommendations for back pain often include spinal manipulation, which is a mainstay of chiropractic treatment methods (Bigos et al., 1994; Chou, 2017; Chou et al., 2018; Chou et al., 2016). For many musculoskeletal conditions, chiropractic is a

- Adults with headache (Bryans et al., 2011)
- Adults with neck pain (Bryans et al., 2014)
- Chronic spine-related conditions (Farabaugh et al., 2010)
- Fibromyalgia syndrome (Schneider et al., 2009)
- Health promotion, disease prevention, and wellness (Hawk et al., 2012)
- Imaging practice guidelines (Bussieres et al., 2007a, 2007b, 2008a, 2008b)
- Low back pain (Bussieres et al., 2018)
- Lower extremity conditions (Brantingham et al., 2012)
- Myofascial trigger points and myofascial pain syndrome (Vernon & Schneider, 2009)
- Neck pain-associated disorders and whiplash-associated disorders (Bussieres et al., 2016)
- Upper extremity disorders (Brantingham et al., 2013)

**Figure 2.5. Examples of evidence-based guidelines and best practices that document evidence for chiropractic care.**

cost-effective service within the healthcare system (Manga, 2000). Chiropractic care has been found to reduce pain and functional disability in patients with chronic low back pain (Haas et al., 2005). Systems that integrate chiropractic services may observe decreased clinical utilization and cost outcomes and improved health outcomes, compared with conventional medicine approaches (Field & Newell, 2016; Gilkey et al., 2008; Grieves et al., 2009; Houweling et al., 2015; Liliedahl et al., 2010; Sarnat et al., 2007; Stano, 1993; Stano et al., 2002; Stano & Smith, 1996; Weeks et al., 2016).

When performed by a properly trained chiropractor, spinal manipulation is a safe and effective means of providing pain relief and functionally improving biomechanical dysfunction of the spine (Shekelle et al., 1992). As with any health care intervention, complications may arise (World Health Organization, 2005). Although serious neurological complications and vascular accidents have been reported, both adverse effects are very rare, and the causality has been called into question (Cassidy et al., 2008; Cassidy & Cote, 2008; Chung et al., 2015; de Luca et al., 2017; Hebert et al., 2015; Johnson et al., 2012; Paige et al., 2017; Rubinstein, 2008; Rubinstein et al., 2007; Todd et al., 2015; Whedon et al., 2015). In response to the increased awareness of the opioid crisis in the U.S., chiropractors offer support to patients by using non-pharmaceutical methods to manage pain and dysfunction. Thus, other considerations include chiropractic care as an alternative to the use of opioids for back and neck pain management (Busse et al., 2015; Lisi et al., 2018; Maiers et al., 2018; Weeks & Goertz, 2016; Weeks et al., 2018).

Although many chiropractors still practice independently, chiropractic care has been integrated into various mainstream healthcare settings (Aspegren et al., 2009; Branson, 2009; Bronston et al., 2015; Corcoran et al., 2017; Corcoran et al., 2018; Coulter et al., 2005; Dunn et al., 2009; Goldberg et al., 2009; Green et al.,

2016; Johnson, 2009; Lisi et al., 2009; Lisi et al., 2018; Meeker, 2000; Meeker & Haldeman, 2002; Salsbury et al., 2018; Vining et al., 2018; Westrom et al., 2010). Chiropractic care also includes prevention and public and community health interventions (Descarreux et al., 2004; Globe et al., 2009; Green et al., 2018; Green et al., 2018; Hawk et al., 2004; Hawk et al., 2005; Hawk et al., 2012; Johnson & Green, 2009; Johnson et al., 2012; Johnson et al., 2018; Kopansky-Giles et al., 2018). Rural and underserved areas of the U.S. that are affected by health care professional shortages may benefit from the inclusion of chiropractic care (Evans et al., 2008; Leach, 2010; Smith & Carber, 2002; Smith & Carber, 2007; Stevens et al., 2016; Stevens, 2007a, 2007b).

## Chiropractic Education and Licensure in the United States

### Entrance Requirements for Chiropractic Programs

Similar to medical education in the 1890s, the earliest years of chiropractic education included students observing their teachers as apprentices, while they provided care to patients (Johnson & Green, 2010a). The courses evolved and chiropractic programs lengthened as the profession progressed. By the early 1920s, several leaders in chiropractic education pressed for higher entrance requirements and curricula with durations of at least 18 months (Keating, 2003). Chiropractic schools continued to strengthen the entrance requirements and to lengthen and enhance their curricula between the 1940s and early 1960s. By the 1970s, chiropractic programs were substantially more modern, and the entrance requirements continued to increase. The profession also developed its own national board examinations, and the NBCE became responsible for providing the tests to determine whether a candidate met the minimum qualifications for licensure as required by most states (Johnson & Green, 2015). To date, chiropractic educational programs have

continued to evolve to modernize the entrance requirements and enhance the curricula (Cooper & Stoflet, 1996).

Chiropractic program candidates must complete the equivalent of three academic years (90 semester hours) of undergraduate study at an institution accredited by an agency recognized by the U.S. Department of Education or an equivalent foreign agency. Some chiropractic training programs require a Bachelor's degree. Applicants must maintain a cumulative grade point average of at least 3.0 on a 4.0 scale during the 90 hours, which must include a minimum of 24 semester hours in life and physical science courses as determined by the chiropractic training program. These courses must sufficiently prepare the candidate to be successful in the chiropractic program, and half of the science courses must have laboratory components. The entrance criteria also include education in other topics, such as social sciences, humanities, and other coursework deemed relevant by the chiropractic training program for the successful completion of the curriculum (Council on Chiropractic Education, 2018).

### **Doctor of Chiropractic Programs in the United States**

Chiropractic students who are accepted into an accredited program follow a curriculum that comprises either 4 or 5 academic years and includes a minimum of 4,200 instructional hours. This requirement is similar to that of the curricula of other health professions (Coulter et al., 1998). The standard of chiropractic training in the U.S. is equivalent to that of other health professions in the areas of pre-clinical subjects (Coulter et al., 1998). A training program must define a minimum number of curricular topics to be accredited in the United States (Council on Chiropractic Education, 2018).

Clinical training is an important part of education. Many modern chiropractic training programs begin to integrate clinical training early in their curricula. By the time the chiropractic students

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#### **Foundations**

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- Principles
- Practices
- Philosophy
- History of Chiropractic

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#### **Basic Sciences**

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- Anatomy
- Physiology
- Biochemistry
- Microbiology
- Pathology

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#### **Clinical Sciences**

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- Physical, Clinical, and Laboratory Diagnosis
- Diagnostic Imaging
- Spinal Analysis
- Orthopedics
- Biomechanics
- Neurology
- Spinal Adjustment/Manipulation
- Extremities Manipulation
- Rehabilitation and Therapeutic Modalities/Procedures
- Toxicology/Pharmacology
- Patient Management
- Nutrition
- Organ Systems
- Special Populations
- First Aid and Emergency Procedures
- Wellness and Public Health
- Clinical Decision Making

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#### **Professional Practice**

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- Ethics and Integrity
- Jurisprudence
- Business and Practice Management
- Professional Communications

**Figure 2.6. Required curricular topics in a program intended to lead to a doctor of chiropractic degree in the United States (Council on Chiropractic Education, 2018).**

enter the final year of training, they will have experienced clinical training throughout the program. The final year of clinical internship is often focused on the supervised clinical care of patients. Some training programs offer students who are close to graduation the opportunity to spend the final semester off campus at a community practice or integrated care facility.

The World Health Organization, an authority on health matters within the United Nations system, published its *Guidelines on Basic Training and Safety in Chiropractic* (2005) in an attempt to standardize the education and regulation of the profession among member nations. This document describes many of the physical and mental abilities and interpersonal skills required to fulfill the job duties of a chiropractor.

An assessment of student learning and evaluation of the chiropractic training program are important aspects of chiropractic education. Students are assessed regarding specific meta-competencies, and training programs must be able to demonstrate where in the curricula this assessment will occur. In addition to examinations that are routinely given during courses, most training programs apply comprehensive examinations wherein students must demonstrate proficiency in the knowledge and skills necessary to be a DC. When chiropractic students graduate from the training program, they are awarded the DC degree.

There are 16 accredited chiropractic training programs in the U.S. As some of these programs cover more than one campus, 19 campuses provide chiropractic training to students.

Cleveland University – Kansas City  
[www.cleveland.edu](http://www.cleveland.edu)

- Overland Park, KS 66210

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D’Youville College [www.dyc.edu](http://www.dyc.edu)

- Buffalo, NY 14201

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Keiser University [www.keiseruniversity.edu](http://www.keiseruniversity.edu)

- West Palm Beach, FL 33411

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Life University [www.life.edu](http://www.life.edu)

- Marietta, GA 30060

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Life Chiropractic College West [www.lifewest.edu](http://www.lifewest.edu)

- Hayward, CA 94545

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Logan University [www.logan.edu](http://www.logan.edu)

- Chesterfield, MO 63006

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Southern California University of Health Sciences  
[www.scuhs.edu](http://www.scuhs.edu)

- Whittier, CA 90609

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National University of Health Sciences [www.nuhs.edu](http://www.nuhs.edu)

- Lombard, IL 60148
- Seminole, FL 33772

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New York Chiropractic College [www.nycc.edu](http://www.nycc.edu)

- Seneca Falls, NY 13148

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Northwestern Health Sciences University  
[www.nwhealth.edu](http://www.nwhealth.edu)

- Bloomington, MN 55431

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Palmer College of Chiropractic [www.palmer.edu](http://www.palmer.edu)

- Davenport, IA 52803
- San Jose, CA 95134
- Port Orange, FL 32129

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Parker University [www.parker.edu](http://www.parker.edu)

- Dallas, TX 75229-5668

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Sherman College of Chiropractic [www.sherman.edu](http://www.sherman.edu)

- Spartanburg, SC 29304

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Texas Chiropractic College [www.txchiro.edu](http://www.txchiro.edu)

- Pasadena, TX 77505

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University of Bridgeport [www.bridgeport.edu/chiro](http://www.bridgeport.edu/chiro)

- Bridgeport, CT 06601

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University of Western States [www.uws.edu](http://www.uws.edu)

- Portland, OR 97230

**Figure 2.7. A list of institutions with accredited chiropractic programs throughout the United States as of 2019.**

The field of chiropractic education has grown globally, and chiropractic training programs are available in many countries. Because of differences in educational systems, not all chiropractic programs outside the U.S. lead to a professional doctorate degree. Some international chiropractic training programs culminate in a Bachelor's or Master's degree, which may or may not be equivalent to the DC degree earned in North America and some other countries.

### **Accreditation**

In the 1930s, chiropractic leaders realized that the accreditation of chiropractic educational programs was an important milestone required to further the process of professionalization (Blacher, 1992). The U.S. Office of Education granted recognition to agencies that accredited professional programs during a decades-long period devoted by chiropractic leaders to achieving this task. In 1974, this Office recognized the Council on Chiropractic Education (CCE) as the accrediting agency for chiropractic programs (Hidde, 2005; Keating, et al., 1998). The U.S. Office of Education later evolved into the U.S. Department of Education.

Today, the CCE is recognized by the U.S. Department of Education and the Council for Higher Education Accreditation, which accredit chiropractic training programs. The CCE is considered a specialized or professional accrediting agency because it focuses solely on training programs that lead to the DC degree. CCE accreditation is an important part of quality assurance in chiropractic education. Accreditation provides evidence of the quality and integrity of the chiropractic training program to stakeholders, such as licensing bodies, governments, institutions, students, and the public. During the process of achieving and maintaining accreditation, training programs are subject to peer-review evaluations of many key quality indicators also known as standards. These standards include program areas such

as the mission, planning, faculty, student admissions, and support services for training programs (Council on Chiropractic Education, 2018). CCE-accredited training programs are evaluated at regular intervals.

In addition to specialized/professional accreditation by the CCE, chiropractic training programs in the U.S. have achieved regional accreditation (Liewer, 2012), a process that involves the evaluation of institutions. Institutional accreditation applies to an entire institution and indicates that each part of the institution contributes to the achievement of the institution's objectives (United States Department of Education, 2019). However, regional accreditation does not specifically accredit chiropractic training programs. Thus, although an institution offering a chiropractic training program in the U.S. may receive regional accreditation, it must also receive CCE accreditation of the chiropractic program because regional accreditation does not address this issue. It is advantageous for chiropractic training programs to be regionally accredited because this designation serves as a link to federal financial aid funds, as described by Title IV of the Higher Education Act of 1965 (Hegji, 2018).

Chiropractic education programs outside of the U.S. also participate in accreditation processes (Liewer & Keating, 2012). Currently, 20 programs outside of the U.S. are accredited through councils affiliated with the Councils on Chiropractic Education International, which includes the Council on Chiropractic Education Australasia, the European Council on Chiropractic Education, and the Council on Chiropractic Education Canada. The Council on Chiropractic Education Australasia accredits four programs in Australia, and one each in New Zealand, the Republic of Korea, Japan, and Malaysia. The European Council on Chiropractic Education accredits two programs each in the United Kingdom, Spain, and South Africa and one each in Wales, France, Denmark,

and Switzerland. The Council on Chiropractic Education Canada accredits two programs in that country. Additionally, several international chiropractic educational programs are currently pursuing accreditation, and several others, such as those in Brazil and Mexico, operate within locally accredited university systems.

### Specialties, Certifications, and Areas of Interest

During the period of chiropractic educational reform during the 1930s through the 1960s, nearly all specialty topics were removed from the core curricula to ensure that students received adequate hours focused on essential topics. Some topics, such as the interpretation of spinal radiographs, dissection, and physiotherapeutic modalities, were offered as chiropractic specialties beginning in the late 1930s. Shortly thereafter, chiropractic specialties that are common today, such as radiology and orthopedics, began to be offered as lengthy specialty curricula offered after graduation from chiropractic college (Green & Johnson, 2009). Additional specialty programs, such as sports, nutrition, and pediatrics, were introduced later.

Today, accredited U.S. chiropractic programs offer specialty training that usually leads to a postgraduate level of certification, or *diplomate*. Some programs may lead to a Master's degree. These programs are completed through part-time postgraduate education programs or full-time residency programs. Several of the specialty training programs are noted in Figure 2.8.

Some chiropractors have areas of interest outside of those offered as chiropractic specialties and thus enroll in other graduate school curricula. Some common degrees selected by chiropractors include Master's programs in business, sports sciences, traditional Asian medicine, public health, and education.

After graduation, DCs are expected to maintain their skills and knowledge in the practice of chiropractic by meeting continuing education requirements. Each state has a different board that supervises/manages chiropractors and thus has a different set of continuing education requirements. Additionally, chiropractors who have earned postgraduate certifications are required to participate in continuing education for each certification.



**Figure 2.8. Examples of postgraduate chiropractic specialty training programs.**

### Licensure

The first licensed chiropractor was listed as “Other Practitioner” under the Illinois 1899 Medical Practice Act, which contained the first regulatory language permitting the legal practice of chiropractic. Early attempts at licensure specifically for chiropractors began in Minnesota in 1905. However, Kansas was the first state in the United States to license the practice of chiropractic in 1913, and another 60 years of costly legal battles occurred before the chiropractic profession was recognized in all 50 states as well as other regions.

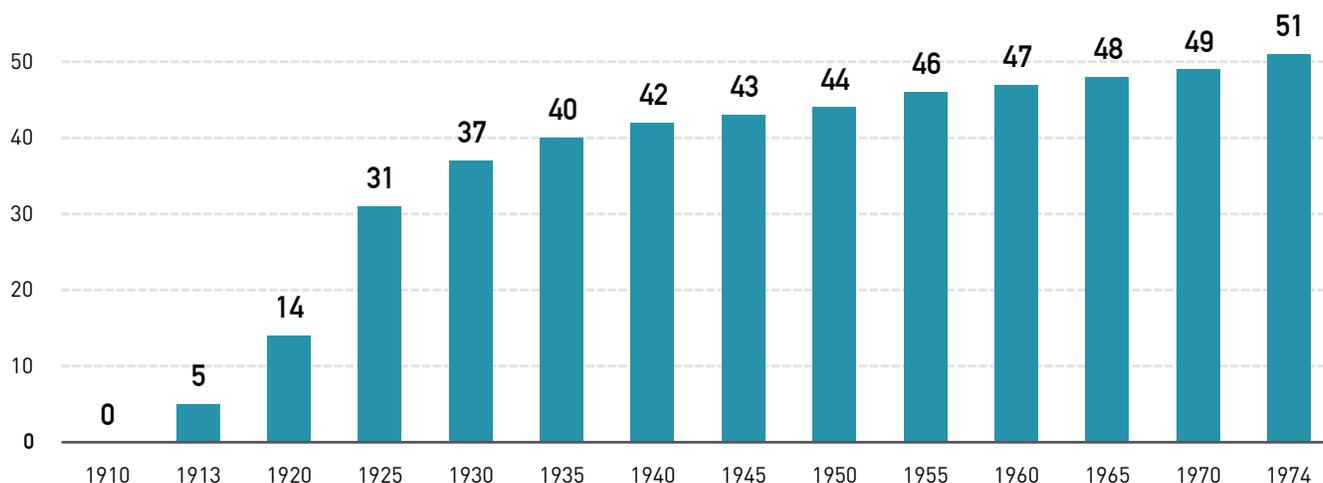
The attitudes toward chiropractic changed over time as the profession developed. The manner in which licensure was secured for each state varied widely. A different set of barriers needed to be overcome in each state, resulting in wide variations in the scope of practice within the U.S. This variation creates a challenge for chiropractors who wish to move across state lines, and adds to the public’s confusion regarding what chiropractors are able or legally allowed to do. Although the scope of practice varies from state to state, there are core practices that are shared by chiropractors in all states (Chang, 2014).

By law, chiropractors licensed in the U.S. are entitled to use various titles. According to the Federation of Chiropractic Licensing Boards, “Chiropractor” is defined as a person licensed under the provisions of this Act who practices Chiropractic. Synonymous terms include “Doctor of Chiropractic”, “DC”, and “Chiropractic Physician” (Federation of Chiropractic Licensing Boards, 2016). Because DCs are engaged in the treatment and prevention of disease, as well as in the promotion of public health and welfare, they must meet stringent educational and

competency standards before being granted a license to practice. In contrast to the global variation, the procedures required to obtain licensure in the U.S. have become standardized. Currently, an individual must complete four major steps to become a practitioner of chiropractic: 1) successful completion of a pre-professional college education, 2) graduation from an accredited chiropractic degree program and completion of a clinical internship through an accredited 4-year chiropractic college program, 3) successful passing of the National Board of Chiropractic examinations and any other examinations required by the state in which they intend to practice, and 4) fulfillment of any state-specific chiropractic licensing requirements (Council on Chiropractic Education, 2018).

Legislation regulates the practice of chiropractic in the U.S. The chiropractic regulatory agency in each state, and in some nations, has a regulatory board comprising DCs, consumer members, and other healing arts professionals. These chiropractic regulatory boards are charged with protecting the public in accordance with the statutory practice acts.

**Number of States Licensing Chiropractic**



**Figure 2.9. Efforts to establish licensure for chiropractic throughout the United States (including District of Columbia) lasted for approximately 60 years. Louisiana was the final state to license chiropractic in 1974.**

This is accomplished through the adoption and application of regulations and policies, including appropriate sanctions of those who have violated the practice act. Outside of the U.S., the processes of licensure regulation are variable (Stochkendahl et al., 2019).

### **Federation of Chiropractic Licensing Boards (FCLB)**

In 1919, the first meeting of chiropractic regulatory agencies occurred as part of a joint session with the Universal Chiropractic Association. Five state boards (Connecticut, Kansas, Nebraska, North Carolina, and North Dakota) met to discuss issues that the Federation of Chiropractic Licensing Boards (FCLB) would eventually oversee. By 1926, the agencies that license and regulate DCs developed the forerunner to the FCLB. The FCLB is a non-profit organization and forum through which licensing board members can address issues regarding chiropractic regulatory law. Services currently provided by the FCLB include the following:

- Chiropractic Information Network/ Board Action Databank (CIN-BAD). This databank provides information about public actions taken by chiropractic regulatory licensing boards and/or exclusions from Medicare/Medicaid reimbursement by the U.S. Department of Health and Human Services regarding individual chiropractors.
- Providers of Approved Continuing Education (PACE) for Chiropractic. This program provides a uniform assessment process for continuing education for re-licensure purposes.
- Directory: FCLB publishes regulatory board information and the requirements to obtain and maintain a licensed status in the U.S., Canada, Australia, New Zealand, and other international locations (e.g., Mexico).

- Chiropractic Passport: This is a credentialing service and database of licensed chiropractic professionals from FCLB member jurisdictions who wish to practice across foreign jurisdictions and unregulated environments.
- Model Documents: FCLB provides model documents, including Guidelines for the Development of a Chiropractic Disciplinary Code, Model Code of Ethics for Members of Regulatory Boards, and a Model Practice Act (Federation of Chiropractic Licensing Boards, 2016).

### **National Board of Chiropractic Examiners**

The NBCE is the testing agency for the chiropractic profession. This organization was established in 1963 to standardize testing in this profession. The NBCE develops, administers, scores, and reports the scores of all pre-licensure chiropractic exams and some optional exams, such as Physiotherapy and Acupuncture.

The Part I exam covers six domains of basic science, including General Anatomy, Spinal Anatomy, Physiology, Chemistry, Pathology, and Microbiology. The Part II exam covers six domains of clinical science, including General Diagnosis, Neuromusculoskeletal Diagnosis, Diagnostic Imaging, Principles of Chiropractic, Chiropractic Practice, and Associated Clinical Sciences. Part III covers advanced clinical science. Finally, Part IV is a practical exam that contains a Chiropractic Objective Structured Clinical Examination (OSCE) component (NBCE, 2019). The NBCE engages in extensive research to support its operational programs. The focus of this research ranges from validity studies to the development and application of the latest scoring technology and psychometric methods.

### **International Board of Chiropractic Examiners**

The International Board of Chiropractic Examiners (IBCE) is a sister-organization to the NBCE and was established to aid chiropractors around the world to gain recognition, establish standards,

and adhere to these standards through testing. “The IBCE is a team of testing experts consisting of content specialists, psychometric experts, and researchers who believe in advancing chiropractic care throughout the world through uncompromised commitment to quality and rigorous research” (IBCE, 2019).

### **Ethics and Boundaries Assessment Services**

The Ethics and Boundaries Assessment Services (EBAS) was established in 2013 to address the post-licensure testing needs of regulated professions concerning ethical and boundary issues (EBAS, 2019). The EBAS exam covers the following domains:

- Boundary Violations
- Fraud
- Professional Standards
- Substance Abuse
- Unprofessional Conduct

The items on the test are constructed responses (i.e., essays). The prompts represent specific domains of the test relevant to the examinee’s profession. Successful completion of the essay exam requires the examinee to compose a response to one prompt from each of the test plan topic areas.

## **Clinical Practice in the United States**

Chiropractors typically manage neuromusculoskeletal disorders, the complaint for which the majority of patients seek chiropractic care (Kaptchuk & Eisenberg, 1998). Chiropractors also encourage their patients and the public to lead healthy lifestyles to prevent diseases, injuries, and other problems. The basic premise of chiropractic is that the body possesses inborn recuperative abilities that may be aided through chiropractic care.

Chiropractic patients in the U.S. are typically adults. However, other population groups include infants and children, (Doyle & Miller, 2019; Hawk et al., 2016; Peng et al., 2018; Pohlman et al., 2016) athletes (Johnson et al., 2013; Nook et al., 2016), active duty and retired military (Green et al., 2016; Green et al., 2009), and other components of the population (Johnson, 2007a; Johnson et al., 2012; Johnson & Green, 2012; Kaeser et al., 2016). Patients of chiropractic physicians report high levels of satisfaction, which may be due in part to manually delivered therapies and personalized, team-based treatment methods (Butler & Johnson, 2008; Gaumer, 2006).

## **Scope of Practice**

Because chiropractic evolved as separate and distinct from medicine, chiropractors act as drugless care providers in a wide variety of areas. Some chiropractors focus solely on addressing chiropractic vertebral subluxations. Others offer care that includes rehabilitation, nutrition, or procedures that help with internal disorders. It is expected that these procedures are taught in a chiropractic program or in postgraduate training. However, legislation dictates the breadth of scope for licensure in each region (Jackson, 1992).

Today, DCs primarily address various physiological and biomechanical aspects of their patients, including structural, spinal, musculoskeletal, neurological, vascular, nutritional, emotional, somatic, and environmental relationships. The scope of practice in the U.S. varies because each state or jurisdiction gained licensure at different times and under different laws. This variation is not applicable only to chiropractic, as most health care professionals in the U.S. do not operate under a unified scope of practice. This has contributed to the fragmentation of healthcare across jurisdictions (Chang, 2014).

Licensed chiropractors in the United States are allowed by law to perform a wide variety of examination and treatment procedures, depending on the jurisdiction in which the chiropractor holds a license. Some chiropractors hold licenses in multiple states. The states with the broadest scope of practice are Missouri, New Mexico, Kansas, Utah, Oklahoma, Illinois, and Alabama. The states with the most restrictive scopes are New Hampshire, Hawaii, Michigan, New Jersey, Mississippi, and Texas (Chang, 2014).

## Chiropractic and Evidence-Based Practice

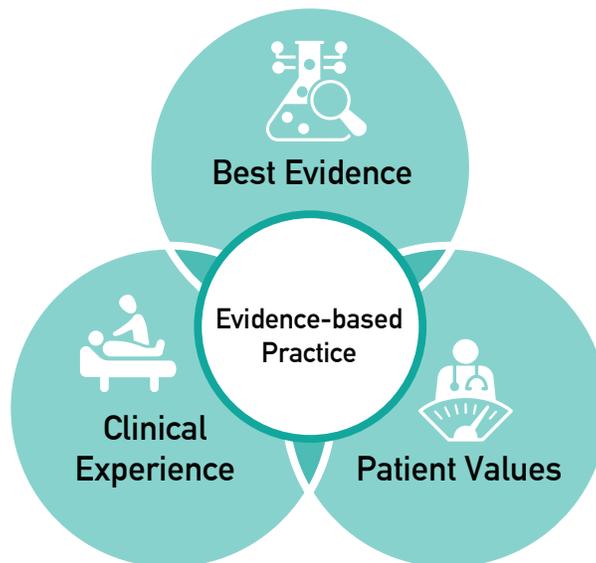
Evidence-based practice was defined by David Sackett, a leading pioneer of the evidence-based movement, as “the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients” (Sackett et al., 1996). Evidence-based practice is the intersection of the best evidence, the patient’s needs, and clinical expertise. All three elements must be present

### Best evidence

- the practitioner finds sound scientific evidence from reputable sources (e.g. peer reviewed journals)
- evidence is evaluated for accuracy and applicability
- evidence relates to the patient in question
- the study design and level of evidence are the best available and most appropriate for the patient

### Clinical experience

- the practitioner has sound and current training
- clinical experience is applied to the given patient
- the practitioner clinically reasons and applies knowledge
- the practitioner critically appraises research
- the practitioner actively participates in the clinical decision-making process with the patient



### Patient values

- the patient’s needs and values (e.g., culture, gender, age, socioeconomic, psychological, religious, spiritual, and other factors) are addressed
- each patient is treated as a unique individual
- the focus is on what is best for the specific patient
- the practitioner puts the patient’s needs first

**Figure 2.10. A visual representation of evidence-based practice, which occurs at the intersection of three components: best evidence, clinical experience, and patient values. Adapted from “Highlights of the basic components of evidence-based practice” by C. Johnson, 2008, *Journal of Manipulative and Physiological Therapeutics*, 31, pp. 91-92. Copyright 2008 by the American Chiropractic Association.**

to be considered evidence-based practice (Johnson, 2008a, 2008b; Sackett, 1995; Sackett et al., 2007). Health care services are provided by a practitioner in response to each patient's expressed health concerns. Critical aspects of this process include the knowledge and experience of the practitioner, the preferences and values of the patient, and the evidence concerning the appropriate care for the patient's health condition (Johnson et al., 2018). Chiropractors develop a set of skills in all three domains to provide evidence-based care.

## Description of Chiropractic Care

A DC initiates care with a new patient in a similar manner to other health care providers. Patients complete documents pertaining to their chief complaint, health status, lifestyle habits, medications, and other general health information. Next, the chiropractor talks with the patient to obtain more detailed information. For new patients, a comprehensive health history is important as it enables the doctor to establish a picture of the patient's overall health status, gain a thorough understanding of the patient's concerns for which they are seeking chiropractic care, and identify any potential reasons that procedures may need to be modified or avoided during the course of care. Chiropractors ask about risk factors that the patient may have, including physical activity, smoking, sleep hygiene, exposure to manual labor, and poor ergonomic environment (Pedersen, 2005).

Next, the chiropractor performs a thorough examination of the region of the patient's chief complaint. The examination focuses on problems that the patient may experience with the bones, joints, nerves, and muscles. While DCs are known for their expertise in spine care, they also frequently assess other neuromusculoskeletal structures. The examination may include assessments of posture, walking gait, ranges of motion,

the nervous system, and other assessment procedures. Sometimes the chiropractor may need to examine other body systems or parts, of which they are qualified by training to perform examination (Haldeman, 2005).

The DC typically conducts an assessment of the patient's spine and other areas of concern regarding health and function. A spinal exam is performed by observing posture and spinal movement, touching (i.e., palpating) the joints, evaluating the segments of the spine, and conducting other assessments and tests. An understanding of the patient's spinal biomechanics is a critical part of chiropractic care, as this helps to identify the most appropriate chiropractic procedures that may be used to care for the patient (Haldeman, 2005).

Following the examination, the chiropractor discusses the findings from the history and examination with the patient, as well as the options for care. If further testing is needed, the doctor may order diagnostic imaging, electrodiagnostic studies, laboratory tests, or other procedures. During the process of informed consent, the chiropractor will discuss with the patient what care is appropriate for their case and explain the benefits and potential risks of care, the timeframe expected for a course of treatment, and the timing of re-examination. Through this process, the patient and chiropractor mutually come to an agreement on the process of care. At the end of the conversation, the patient and the doctor usually sign a form documenting that informed consent was provided. The chiropractor may also recommend that the patient's concern would best be managed by another health care provider or co-managed in partnership with another provider (Haldeman, 2005).

Periodically throughout the treatment process, the chiropractor will perform re-assessments to ascertain what progress has been made and to determine whether the care plan should be continued, modified, or stopped. If the patient

has achieved the therapeutic goals, then he or she may be discharged from care and encouraged to continue the healthy lifestyle behaviors and choices made during the course of care. Some patients may elect to continue receiving ongoing periodic chiropractic care, which improves their quality of life and helps them to maintain good function. The frequency of these visits will vary, based on the patient's needs.

Chiropractors use skillfully controlled force delivered manually to the joints of the spine and extremities. However, this style of adjustment may not be appropriate or safe for all patient situations. Other chiropractic adjustment methods have been developed to provide a wide variety of treatment systems and procedures, thus allowing the chiropractor to adapt to various patient presentations that may require alternative techniques. Some chiropractic techniques use mechanical instruments to assist in performing manipulation. Hand-held instruments, special tables, and other tools are often used as part of chiropractic care. Chiropractors have endeavored for decades to develop these techniques, and more than 100 chiropractic techniques have been created since the profession began (Bergmann & Peterson, 2011). Most chiropractors use several chiropractic techniques in practice to provide the most appropriate care to patients. Chiropractors spend years training in their art and concentrate a great deal of their education on perfecting the delivery of a skillful adjustment. Chiropractors receive the most training in manipulation of any health care provider, and it has been estimated that chiropractors provide more than 90% of manipulative care in the U.S. (Shekelle et al., 1992).

In addition to chiropractic manipulation procedures, chiropractors use other manual techniques such as joint mobilizations (Bergmann & Peterson, 2011). Some patients may benefit from one or more supplemental physiological modalities, such as electrical

stimulation, hot and cold applications, and traction. Many chiropractors also apply different types of bracing and taping. Chiropractors also receive training in many manual techniques that involve specific treatments aimed more directly at the mobility and function of soft tissues (Hammer, 2007). The application of rehabilitation procedures and therapeutic exercise provides an important complement to the effects of joint and soft tissue procedures (Liebenson, 2007). DCs frequently use such procedures in practice and recommend a variety of supportive exercise routines to patients (Christensen et al., 2015).

DCs encourage their patients to assume responsibility for their health and well-being as part of the chiropractic holistic philosophy and model of care. Dietary guidance, health risk avoidance advice, and wellness counseling may be included in the management of patient health concerns. Chiropractors also provide advice and education to patients about many topics, including safe lifting techniques, ergonomics, sleep hygiene, stress management, routine physical activity, and other needs (Christensen et al., 2015).

## **Payment for Services**

Chiropractors may be paid for their services in many ways. Direct payment from the patient to the DC is a common method of remuneration. Most chiropractors accept reimbursement from one or more indirect payers. Chiropractic care fees are reimbursed by Medicare (U.S. Centers for Medicare & Medicaid Services), Medicaid, and private insurance plans (American Chiropractic Association ). Based on a recent study of more than 117,000 cases demonstrating the benefits and cost savings afforded by chiropractic care for low back pain (Carey et al., 2019), one major healthcare benefit administrator of employer-sponsored healthcare plans has allowed direct access to chiropractic care for a defined number

of visits. In other words, patients covered under these plans no longer require a referral from a physician to visit a chiropractor for low back pain (Whitehall & Zaslow, 2019). The Federal Employee Health Benefit Program and the Federal Employee Worker's Compensation Program provide chiropractic care to federal employees, and all 50 states have authorized the provision of chiropractic care under state workers' compensation laws (American Chiropractic Association). Most state workers' compensation systems include chiropractic care. In addition, most automobile insurance policies provide reimbursement for chiropractic care. Reimbursement is also available for services provided to veterans outside of facilities operated by the Veterans Administration (Lisi & Brandt, 2016).

## Practice Environments in the United States

### Solo Practitioner

The majority of DCs practice independently in solo practice or work with associate DCs within the same office. In this environment, chiropractors are self-employed and assume management of the practice, often with the assistance of an office manager. In independent practice, chiropractors establish their own office hours, workflows, and practice styles. Accordingly, they may be flexible and can arrange for appointments to suit their patients and their personal needs. In an independent practice, the chiropractor assumes the financial responsibility to generate a viable business commensurate with their goals for practice growth. Chiropractors in independent practice are also responsible for acquiring and maintaining all of the physical space and equipment needed to practice. Some practitioners may elect to use local radiology, laboratory, and other services instead of managing these processes within the practice.

Independent chiropractic practitioners must also develop working relationships with other health care providers in the community when collaborative or referral-based care is necessary.

### Group Practice

Group practices include several chiropractors who work together in the same clinic or set of clinics. In these clinics, each chiropractor may specialize in a particular type of care or chiropractic specialty, thus providing patients with access to complementary methods. Some group practices include an interprofessional model where chiropractors work together with other health care providers. In these environments, chiropractors may work with medical providers, physical therapists, nurse practitioners, physician assistants, acupuncturists, massage therapists, or others (Bronston et al., 2015; Salsbury et al., 2018).

### Worksite Health Centers

The provision of health care to employees at health centers located in the workplace has been a model of care for many years. The popularity of these health centers has increased with the advent of the Affordable Care Act (Brugh & McCarthy, 2014). Approximately one-third of companies with 5,000 or more employees offer worksite clinics (Mercer LLC, 2018). At these facilities, employees, and sometimes their dependents, have direct access to a number of health care providers and services (Fuld & Company, 2009). The integration of chiropractors into such health centers is a recent trend, as benefit managers at a wide variety of companies have begun to recognize the competitive advantage of offering onsite chiropractic care to employees, who may decide to work for one company over another based upon the offerings at the worksite health center (Lagnado, 2018). The inclusion of worksite chiropractors is further driven by the fact that for many companies, musculoskeletal problems comprise a large proportion of the health concerns of the workforce. Chiropractors

fit nicely into this interprofessional environment by providing conservative musculoskeletal care and enabling employees to return swiftly to full activities. Chiropractic worksite services have been shown to reduce overall healthcare utilization, radiology procedures, and musculoskeletal medication in companies (Kindermann et al., 2014; Krause et al., 2012).

### **Hospital-Based Chiropractic Care**

Although chiropractors have provided care in hospital environments since the 1980s, the inclusion of chiropractors in public, military, and veteran hospitals has increased significantly since the mid-1990s (Pelletier et al., 1999). Studies have shown that these chiropractic services provide an alternative and drugless form of musculoskeletal care that is in demand and widely utilized by beneficiaries (Branson, 2009; Carmichael, 1988; Orlin et al., 2013).

The first major federal hospital inclusion of chiropractic care occurred in 1995, when the U.S. Military Health System began to include DCs in medical staffs in an integrated manner (Birch & Davis Associates, 2000). Military Health Services chiropractic clinics rapidly began to face severe delays in access to care due to the popularity of the chiropractic service among military members. By 2008, more than 100 chiropractors were providing care at 49 military treatment facilities (TRICARE Management Activity, 2008). As the availability of chiropractic care in military hospitals and clinics continues to increase, DCs have been integrated into many different types of service lines, including sports medicine, orthopedics, comprehensive casualty care, and others (Green et al., 2016).

Following the successful inclusion of chiropractic care into the Military Health System, the U.S. Veterans Health Administration began including chiropractic care at veteran hospitals in 2004. DCs are fully integrated into the Veterans Health Administration, where they care for patients in health care teams and serve in leadership

roles (Johnson et al., 2012; Lisi & Brandt, 2016). Chiropractors are in demand at these hospitals and hospital-based clinics, and provide more than 160,000 office visits each year at more than 65 clinics (Lisi & Brandt, 2016). Chiropractors have been successful in this environment and began to produce research, train students, and develop residency programs within a few years after their inclusion (Dunn et al., 2009).

### **Other Careers in Chiropractic**

Although the majority of chiropractors choose to provide full-time professional patient care, they also fill other important roles. Many have devoted their service as faculty members or administrators in chiropractic training programs. These doctors fill a critical role in the profession, and many further their education by obtaining additional graduate degrees. In addition to teaching, running programs, and other roles, these educators produce scholarly papers, present at conferences, write books, and provide continuing education to other chiropractors (Mrozek et al., 2006).

Some DCs choose to become chiropractic researchers, an essential and very important role in the profession. Most chiropractors who conduct research also possess Master's and doctorate degrees in a wide range of topics. The increasing population of researchers provides the bulk of publications used to supply evidence for evidence-based chiropractic practice. These researchers often specialize in specific areas of research, such as epidemiology, clinical trials, public health, healthcare utilization, cost-effectiveness, basic sciences, chiropractic procedures, and various other topics. Researchers and educators have collaborated to organize the most important annual chiropractic academic conference in the U.S., where hundreds of scholarly papers and workshops are given to advance the science, art, and philosophy of chiropractic

(Green et al., 2011; Herrin et al., 2011; Johnson, 2007b; Johnson & Green, 2010b). Chiropractic researchers have also become leaders not only in chiropractic research, but in the general field of spinal and musculoskeletal research. Chiropractors are also involved as organizers and presenters at some of the most important international research conferences on the spine, rehabilitation, musculoskeletal care, and public health (Haldeman & Chapman-Smith, 2014).

Chiropractors also fill many other roles. Some work for federal and state agencies or insurance companies, as benefit plan administrators or university faculty, or are employed by the World Health Organization and other organizations. Finally, some DCs enjoy serving in multiple capacities and may split their professional time between practice and education, education and research, and other combinations thereof.

## Conclusion

The chiropractic profession offers a unique set of principles that guide its philosophical approach to health and wellness. In the U.S., the extensive training required to become a DC includes rigorous education in the skills required to deliver effective care by hand. Following the successful completion of licensure examinations, a chiropractor is allowed to practice a wide range of assessment and treatment procedures based on the scope of practice allowed in the jurisdiction. Modern chiropractic uses evidence-based practice with an emphasis on conservative and non-pharmacologic methods to aid patients in the recovery and maintenance of a state of health. Formerly, solo practices were the most common practice environment. Now, chiropractors also participate in interprofessional health care teams within group practices, hospitals, and hospital-based clinics. Some chiropractors choose a private practice, whereas others choose careers in education, research, and policy. With its modern

approach to musculoskeletal care, contributions to research, and the expansion of utilization and accessibility, the chiropractic profession has made great strides toward improving the health of the public.

## References

- Ailliet, L., Rubinstein, S. M., & de Vet, H. C. (2010). Characteristics of chiropractors and their patients in Belgium. *Journal of Manipulative and Physiological Therapeutics*, 33(8), 618–625. <https://doi.org/10.1016/j.jmpt.2010.08.011>
- American Chiropractic Association. *Insurance coverage of chiropractic: Quick facts*.
- American Medical Association, & New York Association of Medicine. (1848). *Code of medical ethics*: H. Ludwig & Company.
- Aspegren, D., Enebo, B. A., Miller, M., White, L., Akuthota, V., Hyde, T. E., & Cox, J. M. (2009). Functional scores and subjective responses of injured workers with back or neck pain treated with chiropractic care in an integrative program: a retrospective analysis of 100 cases. *Journal of Manipulative and Physiological Therapeutics*, 32(9), 765–771. <https://doi.org/10.1016/j.jmpt.2009.10.002>
- Barnes, P. M., Bloom, B., & Nahin, R. L. (2008). Complementary and alternative medicine use among adults and children: United States, 2007. *National Health Statistics Reports* (12), 1–23.
- Barnett, K., McLachlan, C., Hulbert, J., & Kassak, K. (1997). Working together in rural South Dakota: Integrating medical and chiropractic primary care. *Journal of Manipulative and Physiological Therapeutics*, 20(9), 577–582.
- Bergmann, T. F., & Peterson, D. H. (2010). *Chiropractic technique – E-Book: Principles and procedures*. Elsevier Health Sciences.

- Bergmann, T. F., & Peterson, D. H. (2011). *Chiropractic technique: Principles and procedures* (3rd ed.). Elsevier/Mosby.
- Bigos, S., Bowyer, O., Braen, G., Brown, K., & Deyo, R. (1994). *Acute low back pain in adults: Clinical practice guideline No. 14. AHCPR Publication No. 95-0642*. Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services.
- Birch & Davis Associates. (2000). *Final report: Chiropractic Health Care Demonstration Program*. Birch & Davis Associates.
- Blacher, P. (1992). The evolution of higher education in chiropractic: A survey 1906-74. *Chiropractic History*, 12(1), 37-42.
- Botelho, M. B., Alvarenga, B. A. P., Molina, N., Ribas, M., & Baptista, A. F. (2017). Spinal manipulative therapy and sports performance enhancement: A systematic review. *Journal of Manipulative and Physiological Therapeutics*, 40(7), 535-543. doi:10.1016/j.jmpt.2017.03.014
- Bower, N., & Hynes, R. (2004). Going to jail for chiropractic: A career's defining moment. *Chiropractic History*, 24(2).
- Branson, R. A. (2009). Hospital-based chiropractic integration within a large private hospital system in Minnesota: A 10-year example. *Journal of Manipulative and Physiological Therapeutics*, 32(9), 740-748. https://doi.org/10.1016/j.jmpt.2009.10.014
- Brantingham, J. W., Bonnefin, D., Perle, S. M., Cassa, T. K., Globe, G., Pribicevic, M.,... Korporaal, C. (2012). Manipulative therapy for lower extremity conditions: Update of a literature review. *Journal of Manipulative and Physiological Therapeutics*, 35(2), 127-166. https://doi.org/10.1016/j.jmpt.2012.01.001
- Brantingham, J. W., Cassa, T. K., Bonnefin, D., Pribicevic, M., Robb, A., Pollard, H.,... Korporaal, C. (2013). Manipulative and multimodal therapy for upper extremity and temporomandibular disorders: A systematic review. *Journal of Manipulative and Physiological Therapeutics*, 36(3), 143-201. https://doi.org/10.1016/j.jmpt.2013.04.001
- Bronfort, G., Haas, M., Evans, R., Kawchuk, G., & Dagenais, S. (2008). Evidence-informed management of chronic low back pain with spinal manipulation and mobilization. *The Spine Journal*, 8(1), 213-225. https://doi.org/10.1016/j.spinee.2007.10.023
- Bronston, L. J., Austin-McClellan, L. E., Lisi, A. J., Donovan, K. C., & Engle, W. W. (2015). A survey of American Chiropractic Association members' experiences, attitudes, and perceptions of practice in integrated health care settings. *Journal of Chiropractic Medicine*, 14(4), 227-239. https://doi.org/10.1016/j.jcm.2015.06.004
- Brugh, V. M., & McCarthy, M. (2014). Employer-sponsored medical clinics: Much more than convenience care. *Benefits Quarterly*, 1st Quarter, 19-24.
- Bryans, R., Decina, P., Descarreaux, M., Duranleau, M., Marcoux, H., Potter, B.,... White, E. (2014). Evidence-based guidelines for the chiropractic treatment of adults with neck pain. *Journal of Manipulative and Physiological Therapeutics*, 37(1), 42-63. https://doi.org/10.1016/j.jmpt.2013.08.010
- Bryans, R., Descarreaux, M., Duranleau, M., Marcoux, H., Potter, B., Ruegg, R.,... White, E. (2011). Evidence-based guidelines for the chiropractic treatment of adults with headache. *Journal of Manipulative and Physiological Therapeutics*, 34(5), 274-289. https://doi.org/10.1016/j.jmpt.2011.04.008
- Budgell, B. S., Kwong, A., & Millar, N. (2013). A diachronic study of the language of chiropractic. *Journal of the Canadian Chiropractic Association*, 57(1), 49-55.
- Bureau of Labor Statistics. (2019). *U.S. Department of Labor, Occupational Outlook Handbook, Chiropractors*. Retrieved October 6,

2019 from <https://www.bls.gov/ooh/healthcare/chiropractors.htm>

Busse, J. W., Ebrahim, S., Heels-Ansdell, D., Wang, L., Couban, R., & Walter, S. D. (2015). Association of worker characteristics and early reimbursement for physical therapy, chiropractic and opioid prescriptions with workers' compensation claim duration, for cases of acute low back pain: An observational cohort study. *BMJ Open*, 5(8), e007836. <https://doi.org/10.1136/bmjopen-2015-007836>

Bussieres, A. E., Peterson, C., & Taylor, J. A. (2007a). Diagnostic imaging practice guidelines for musculoskeletal complaints in adults - An evidence-based approach: Introduction. *Journal of Manipulative and Physiological Therapeutics*, 30(9), 617-683. <https://doi:10.1016/j.jmpt.2007.10.003>

Bussieres, A. E., Peterson, C., & Taylor, J. A. (2008a). Diagnostic imaging guideline for musculoskeletal complaints in adults - An evidence-based approach - Part 2: Upper extremity disorders. *Journal of Manipulative and Physiological Therapeutics*, 31(1), 2-32. <https://doi:10.1016/j.jmpt.2007.11.002>

Bussieres, A. E., Stewart, G., Al-Zoubi, F., Decina, P., Descarreaux, M., Haskett, D.,... Ornelas, J. (2018). Spinal manipulative therapy and other conservative treatments for low back pain: A guideline from the Canadian Chiropractic Guideline Initiative. *Journal of Manipulative and Physiological Therapeutics*, 41(4), 265-293. <https://doi.org/10.1016/j.jmpt.2017.12.004>

Bussieres, A. E., Stewart, G., Al-Zoubi, F., Decina, P., Descarreaux, M., Hayden, J.,... Ornelas, J. (2016). The treatment of neck pain-associated disorders and whiplash-associated disorders: A clinical practice guideline. *Journal of Manipulative and Physiological Therapeutics*, 39(8), 523-564.e27. <https://doi.org/10.1016/j.jmpt.2016.08.007>

Bussieres, A. E., Taylor, J. A., & Peterson, C. (2007b). Diagnostic imaging practice guidelines for musculoskeletal complaints in adults - an evidence-based approach. Part 1. Lower extremity disorders. *Journal of Manipulative and Physiological Therapeutics*, 30(9), 684-717. <https://doi.org/10.1016/j.jmpt.2007.10.004>

Bussieres, A. E., Taylor, J. A., & Peterson, C. (2008b). Diagnostic imaging practice guidelines for musculoskeletal complaints in adults - An evidence-based approach - Part 3: Spinal disorders. *Journal of Manipulative and Physiological Therapeutics*, 31(1), 33-88. <https://doi.org/10.1016/j.jmpt.2007.11.003>

Butler, R. J., & Johnson, W. G. (2008). Satisfaction with low back pain care. *The Spine Journal*, 8(3), 510-521. <https://doi.org/10.1016/j.spinee.2007.04.006>

Callender, A. (2004). BJ Palmer, the Universal Chiropractic Association, and Civil Disobedience. *Chiropractic History*, 24(2).

Cannon, W. B. (1926). Physiological regulation of normal states: Some tentative postulates concerning biological homeostatics. *Ses Amis, ses Colleges, ses Eleves*.

Cannon, W. B. (1929). Organization for physiological homeostasis. *Physiological Reviews*, 9(3), 399-431.

Carey, K., Ameli, O., Garrity, B., Rothendler, J., Cabral, H., McDonough, C.,... Kazis, L. (2019). Health insurance design and conservative therapy for low back pain. *American Journal of Managed Care*, 25(6), e182-e187.

Carmichael, J. P. (1988). Chiropractic residency at Lindell Hospital: A program description. *Journal of Manipulative and Physiological Therapeutics*, 11(3), 177-180.

Cassidy, J. D., Boyle, E., Cote, P., He, Y., Hogg-Johnson, S., Silver, F. L., & Bondy, S. J. (2008). Risk of vertebrobasilar stroke and chiropractic care: Results of a population-based case-

control and case-crossover study. *Spine*, 33(4 Suppl), S176-183. <https://doi.org/10.1097/BRS.0b013e3181644600>

Cassidy, J. D., & Cote, P. (2008). Is it time for a population health approach to neck pain? *Journal of Manipulative and Physiological Therapeutics*, 31(6), 442-446. <https://doi.org/10.1016/j.jmpt.2008.06.008>

Chang, M. (2014). The chiropractic scope of practice in the United States: A cross-sectional survey. *Journal of Manipulative and Physiological Therapeutics*, 37(6), 363-376. <https://doi.org/10.1016/j.jmpt.2014.05.003>

Cherkin, D. C., & MacCornack, F. A. (1989). Patient evaluations of low back pain care from family physicians and chiropractors. *Western Journal of Medicine*, 150(3), 351.

Chou, R. (2017). Nonpharmacologic therapies for low back pain. *Annals of Internal Medicine*, 167(8), 606-607. <https://doi.org/10.7326/L17-0395>

Chou, R., Cote, P., Randhawa, K., Torres, P., Yu, H., Nordin, M.,... Cedraschi, C. (2018). The Global Spine Care Initiative: Applying evidence-based guidelines on the non-invasive management of back and neck pain to low- and middle-income communities. *European Spine Journal*, 27(Suppl 6), 851-860. <https://doi.org/10.1007/s00586-017-5433-8>

Christensen, M. G., Hyland, J. K., Goertz, C. M., & Kollasch, M. W. (2015). *Practice analysis of chiropractic 2015: A project report, survey analysis, and summary of chiropractic practice in the United States*. National Board of Chiropractic Examiners.

Chung, C. L. R., Cote, P., Stern, P., & L'Esperance, G. (2015). The association between cervical spine manipulation and carotid artery dissection: A systematic review of the literature. *Journal of Manipulative and Physiological Therapeutics*, 38(9), 672-676. <https://doi.org/10.1016/j.jmpt.2013.09.005>

Cooper, R. A., & Stoflet, S. J. (1996). Trends in the education and practice of alternative medicine clinicians. *Health Affairs*, 15(3), 226-238.

Corcoran, K. L., Dunn, A. S., Formolo, L. R., & Beehler, G. P. (2017). Chiropractic management for US female veterans with low back pain: A retrospective study of clinical outcomes. *Journal of Manipulative and Physiological Therapeutics*, 40(8), 573-579. <https://doi.org/10.1016/j.jmpt.2017.07.001>

Corcoran, K. L., Dunn, A. S., Green, B. N., Formolo, L. R., & Beehler, G. P. (2018). Changes in female veterans' neck pain following chiropractic care at a hospital for veterans. *Complementary Therapies in Clinical Practice*, 30, 91-95. <https://doi.org/10.1016/j.ctcp.2017.12.013>

Cote, P., van der Velde, G., Cassidy, J. D., Carroll, L. J., Hogg-Johnson, S., Holm, L. W.,... Peloso, P. M. (2009). The burden and determinants of neck pain in workers: Results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Journal of Manipulative and Physiological Therapeutics*, 32(2 Suppl), S70-S86. <https://doi.org/10.1016/j.jmpt.2008.11.012>

Coulehan, J. L. (1985). Adjustment, the hands and healing. *Culture, Medicine and Psychiatry*, 9(4), 353-382.

Coulter, I., Adams, A., Coggan, P., Wilkes, M., & Gonyea, M. (1998). A comparative study of chiropractic and medical education. *Alternative Therapies in Health and Medicine*, 4(5), 64-75.

Coulter, I. D., Herman, P. M., Ryan, G. W., Hays, R. D., Hilton, L. G., & Whitley, M. D. (2018). Researching the appropriateness of care in the complementary and integrative health professions: Part I. *Journal of Manipulative and Physiological Therapeutics*, 41(9), 800-806. <https://doi.org/10.1016/j.jmpt.2018.11.002>

- Coulter, I. D., Singh, B. B., Riley, D., & Der-Martirosian, C. (2005). Interprofessional referral patterns in an integrated medical system. *Journal of Manipulative and Physiological Therapeutics*, 28(3), 170–174. <https://doi.org/10.1016/j.jmpt.2005.02.016>
- Council on Chiropractic Education. (2018). *CCE Accreditation Standards*. The Council on Chiropractic Education.
- Cramer, G., Budgell, B., Henderson, C., Khalsa, P., & Pickar, J. (2006). Basic science research related to chiropractic spinal adjusting: The state of the art and recommendations revisited. *Journal of Manipulative and Physiological Therapeutics*, 29(9), 726–761. <https://doi.org/10.1016/j.jmpt.2006.09.003>
- Davies, K. J. (2016). Adaptive homeostasis. *Molecular Aspects of Medicine*, 49, 1–7.
- Davis, N. S. (1855). *History of the American Medical Association from its organization up to January, 1855*. Lippincott, Grambo & Company.
- de Luca, K. E., Fang, S. H., Ong, J., Shin, K. S., Woods, S., & Tuchin, P. J. (2017). The effectiveness and safety of manual therapy on pain and disability in older persons with chronic low back pain: A systematic review. *Journal of Manipulative and Physiological Therapeutics*, 40(7), 527–534. <https://doi.org/10.1016/j.jmpt.2017.06.008>
- Descarreaux, M., Blouin, J. S., Drolet, M., Papadimitriou, S., & Teasdale, N. (2004). Efficacy of preventive spinal manipulation for chronic low-back pain and related disabilities: A preliminary study. *Journal of Manipulative and Physiological Therapeutics*, 27(8), 509–514. <https://doi.org/10.1016/j.jmpt.2004.08.003>
- Doyle, M. F., & Miller, J. E. (2019). Demographic profile of chiropractors who treat children: A multinational survey. *Journal of Manipulative and Physiological Therapeutics*, 42(1), 1–11. <https://doi.org/10.1016/j.jmpt.2018.03.007>
- Dunn, A. S., Green, B. N., Formolo, L. R., & Chicoine, D. R. (2011). Chiropractic management for veterans with neck pain: A retrospective study of clinical outcomes. *Journal of Manipulative and Physiological Therapeutics*, 34(8), 533–538. <https://doi.org/10.1016/j.jmpt.2011.08.009>
- Dunn, A. S., Green, B. N., & Gilford, S. (2009). An analysis of the integration of chiropractic services within the United States military and veterans' health care systems. *Journal of Manipulative and Physiological Therapeutics*, 32(9), 749–757. <https://doi.org/10.1016/j.jmpt.2009.10.009>
- Ethics and Boundaries Assessment Services (EBAS). (2019). Retrieved from [www.ebas.org/](http://www.ebas.org/)
- Evans, M. W., Jr., Williams, R. D., & Perko, M. (2008). Public health advocacy and chiropractic: A guide to helping your community reach its health objectives. *Journal of Chiropractic Medicine*, 7(2), 71–77. <https://doi.org/10.1016/j.jcme.2008.02.002>
- Farabaugh, R. J., Dehen, M. D., & Hawk, C. (2010). Management of chronic spine-related conditions: Consensus recommendations of a multidisciplinary panel. *Journal of Manipulative and Physiological Therapeutics*, 33(7), 484–492. <https://doi.org/10.1016/j.jmpt.2010.07.002>
- Federation of Chiropractic Licensing Boards. (2016). *Model Practice Act for Chiropractic Regulation: A Reference Guide for Regulatory Language*. Greeley. <https://www.fclb.org/Portals/7/ModelPracticeAct/FCLB%20MPA-WebResource.pdf>
- Federation of Chiropractic Licensing Boards. (2019). *Licensure Statistics – U.S. 2017-2018*. Retrieved November 18, 2009 from <http://directory.fclb.org/Statistics/LicensureStatistics-US2017-2018.aspx>
- Field, J. R., & Newell, D. (2016). Clinical outcomes in a large cohort of musculoskeletal

patients undergoing chiropractic care in the United Kingdom: A comparison of self- and national health service-referred routes. *Journal of Manipulative and Physiological Therapeutics*, 39(1), 54-62. <https://doi.org/10.1016/j.jmpt.2015.12.003>

Flexner, A. (1910). *Medical education in the United States and Canada: A report to the Carnegie Foundation for the Advancement of Teaching*. Carnegie Foundation for the Advancement of Teaching.

Fuld & Company. (2009). *The growth of on-site health clinics*. Fuld & Company.

Gaumer, G. (2006). Factors associated with patient satisfaction with chiropractic care: Survey and review of the literature. *Journal of Manipulative and Physiological Therapeutics*, 29(6), 455-462. <https://doi.org/10.1016/j.jmpt.2006.06.013>

Getzendanner, S. (1988). Permanent injunction order against AMA. *Journal of the American Medical Association*, 259(1), 81-82.

Gilkey, D., Caddy, L., Keefe, T., Wahl, G., Mobus, R., Enebo, B.,... Griffiths, K. (2008). Colorado workers' compensation: Medical vs chiropractic costs for the treatment of low back pain. *Journal of Chiropractic Medicine*, 7(4), 127-133. <https://doi.org/10.1016/j.jcm.2008.06.002>

Globe, G., Redwood, D., Brantingham, J. W., Hawk, C., Terre, L., Globe, D., & Mayer, S. (2009). Improving preventive health services training in chiropractic colleges part II: Enhancing outcomes through improved training and accountability processes. *Journal of Manipulative and Physiological Therapeutics*, 32(6), 453-462. <https://doi.org/10.1016/j.jmpt.2009.06.005>

Goertz, C. M., Salsbury, S. A., Long, C. R., Vining, R. D., Andresen, A. A., Hondras, M. A.,... Wallace, R. B. (2017). Patient-centered professional practice models for managing low back pain

in older adults: A pilot randomized controlled trial. *BMC Geriatrics*, 17(1), 235. <https://doi.org/10.1186/s12877-017-0624-z>

Goldberg, C. K., Green, B., Moore, J., Wyatt, M., Boulanger, L., Belnap, B.,... Donaldson, D. S. (2009). Integrated musculoskeletal rehabilitation care at a comprehensive combat and complex casualty care program. *Journal of Manipulative and Physiological Therapeutics*, 32(9), 781-791. <https://doi.org/10.1016/j.jmpt.2009.10.010>

Goldstein, M. S., Morgenstern, H., Hurwitz, E. L., & Yu, F. (2002). The impact of treatment confidence on pain and related disability among patients with low-back pain: Results from the University of California, Los Angeles, low-back pain study. *The Spine Journal*, 2(6), 391-399; discussion 399-401.

Good, C. J. (2016). Chiropractic identity in the United States: wisdom, courage, and strength. *Journal of Chiropractic Humanities*, 23(1), 29-34. <https://doi.org/10.1016/j.echu.2016.08.001>

Green, B. N., Jacobs, G. E., Johnson, C. D., & Phillips, R. B. (2011). A history of The Journal of Chiropractic Education: Twenty-five years of service, 1987-2011. *The Journal of Chiropractic Education*, 25(2), 169-181.

Green, B. N., & Johnson, C. (2010). Chiropractic and social justice: A view from the perspective of Beauchamp's principles. *Journal of Manipulative and Physiological Therapeutics*, 33(6), 407-411. <https://doi.org/10.1016/j.jmpt.2010.07.001>

Green, B. N., & Johnson, C. D. (2009). The early years of organized chiropractic orthopedics, 1954-1973: A social history. *Journal of the Canadian Chiropractic Association*, 53(2), 129-143.

Green, B. N., Johnson, C. D., Daniels, C. J., Napuli, J. G., Gliedt, J. A., & Paris, D. J. (2016). Integration of chiropractic services in military and veteran health care facilities: A systematic review of the literature. *Journal of Evidence-*

*Based Integrative Medicine*, 21(2), 115–130. <https://doi.org/10.1177/2156587215621461>

Green, B. N., Johnson, C. D., & Dunn, A. S. (2012). Chiropractic in veterans' healthcare. In T. Miller (Ed.), *Veterans health resource guide* (pp. 135–156). Praeger Publ.

Green, B. N., Johnson, C. D., Haldeman, S., Griffith, E., Clay, M. B., Kane, E. J.,... Nordin, M. (2018a). A scoping review of biopsychosocial risk factors and co-morbidities for common spinal disorders. *PLoS One*, 13(6), e0197987. <https://doi.org/10.1371/journal.pone.0197987>

Green, B. N., Johnson, C. D., Haldeman, S., Kane, E. J., Clay, M. B., Griffith, E. A.,... Yu, H. (2018b). The Global Spine Care Initiative: Public health and prevention interventions for common spine disorders in low- and middle-income communities. *European Spine Journal*, 27(Suppl 6), 838–850. <https://doi.org/10.1007/s00586-018-5635-8>

Green, B. N., Johnson, C. D., & Lisi, A. J. (2009a). Chiropractic in U.S. military and veterans' health care. *Military Medicine*, 174(6), vi–vii. <https://doi.org/10.7205/milmed-d-01-9908>

Green, B. N., Johnson, C. D., Lisi, A. J., & Tucker, J. (2009b). Chiropractic practice in military and veterans health care: The state of the literature. *Journal of the Canadian Chiropractic Association*, 53(3), 194–204.

Grieves, B., Menke, J. M., & Pursel, K. J. (2009). Cost minimization analysis of low back pain claims data for chiropractic vs medicine in a managed care organization. *Journal of Manipulative and Physiological Therapeutics*, 32(9), 734–739. <https://doi.org/10.1016/j.jmpt.2009.10.001>

Haas, M., Bronfort, G., & Evans, R. L. (2006). Chiropractic clinical research: Progress and recommendations. *Journal of Manipulative and Physiological Therapeutics*, 29(9), 695–706. <https://doi.org/10.1016/j.jmpt.2006.09.005>

Haas, M., Sharma, R., & Stano, M. (2005). Cost-effectiveness of medical and chiropractic care for acute and chronic low back pain. *Journal of Manipulative and Physiological Therapeutics*, 28(8), 555–563. <https://doi.org/10.1016/j.jmpt.2005.08.006>

Haldeman, S. (2005). *Principles and practice of chiropractic* (3rd ed.). McGraw-Hill Medical.

Haldeman, S., & Chapman-Smith, D. (2014). Award-winning articles and posters from the World Federation of Chiropractic's 12th Biennial Congress 2013. *Journal of Manipulative and Physiological Therapeutics*, 37(1), 1–6. <https://doi.org/10.1016/j.jmpt.2013.11.001>

Haldeman, S., Nordin, M., Chou, R., Cote, P., Hurwitz, E. L., Johnson, C. D.,... Yuksel, S. (2018). The Global Spine Care Initiative: World Spine Care executive summary on reducing spine-related disability in low- and middle-income communities. *European Spine Journal*, 27(Suppl 6), 776–785. <https://doi.org/10.1007/s00586-018-5722-x>

Hammer, W. I. (2007). *Functional soft-tissue examination and treatment by manual methods* (3rd ed.). Jones and Bartlett.

Hart, J. (2016). Analysis and adjustment of vertebral subluxation as a separate and distinct identity for the chiropractic profession: A commentary. *Journal of Chiropractic Humanities*, 23(1), 46–52. <https://doi.org/10.1016/j.echu.2016.09.002>

Hawk, C., & Long, C. R. (1999). Factors affecting use of chiropractic services in seven midwestern states of the United States. *The Journal of Rural Health*, 15(2), 233–239.

Hawk, C., Long, C. R., Perillo, M., & Boulanger, K. T. (2004). A survey of US chiropractors on clinical preventive services. *Journal of Manipulative and Physiological Therapeutics*, 27(5), 287–298. <https://doi.org/10.1016/j.jmpt.2004.04.002>

- Hawk, C., Nyiendo, J., Lawrence, D., & Killinger, L. (1996). The role of chiropractors in the delivery of interdisciplinary health care in rural areas. *Journal of Manipulative and Physiological Therapeutics*, 19(2), 82-91.
- Hawk, C., Rupert, R. L., Hyland, J. K., & Odhwani, A. (2005). Implementation of a course on wellness concepts into a chiropractic college curriculum. *Journal of Manipulative and Physiological Therapeutics*, 28(6), 423-428. <https://doi.org/10.1016/j.jmpt.2005.06.015>
- Hawk, C., Schneider, M., Evans, M. W., Jr., & Redwood, D. (2012). Consensus process to develop a best-practice document on the role of chiropractic care in health promotion, disease prevention, and wellness. *Journal of Manipulative and Physiological Therapeutics*, 35(7), 556-567. <https://doi.org/10.1016/j.jmpt.2012.05.002>
- Hawk, C., Schneider, M., Ferrance, R. J., Hewitt, E., Van Loon, M., & Tanis, L. (2009). Best practices recommendations for chiropractic care for infants, children, and adolescents: Results of a consensus process. *Journal of Manipulative and Physiological Therapeutics*, 32(8), 639-647. <https://doi.org/10.1016/j.jmpt.2009.08.018>
- Hawk, C., Schneider, M. J., Haas, M., Katz, P., Dougherty, P., Gleberzon, B.,... Weeks, J. (2017). Best practices for chiropractic care for older adults: A systematic review and consensus update. *Journal of Manipulative and Physiological Therapeutics*, 40(4), 217-229. <https://doi.org/10.1016/j.jmpt.2017.02.001>
- Hawk, C., Schneider, M. J., Vallone, S., & Hewitt, E. G. (2016). Best practices for chiropractic care of children: A consensus update. *Journal of Manipulative and Physiological Therapeutics*, 39(3), 158-168. <https://doi.org/10.1016/j.jmpt.2016.02.015>
- Hebert, J. J., Stomski, N. J., French, S. D., & Rubinstein, S. M. (2015). Serious adverse events and spinal manipulative therapy of the low back region: A systematic review of cases. *Journal of Manipulative and Physiological Therapeutics*, 38(9), 677-691. <https://doi.org/10.1016/j.jmpt.2013.05.009>
- Hegji, A. (2018). *The Higher Education Act (HEA): A primer*. Congressional Research Service.
- Herrin, S., Green, B. N., & Johnson, C. D. (2011). 2011 Association of Chiropractic Colleges Educational Conference and Research Agenda Conference. *Journal of Chiropractic Education*, 25(2), 186-192.
- Hertzman-Miller, R. P., Morgenstern, H., Hurwitz, E. L., Yu, F., Adams, A. H., Harber, P., & Kominski, G. F. (2002). Comparing the satisfaction of low back pain patients randomized to receive medical or chiropractic care: results from the UCLA low-back pain study. *American Journal of Public Health*, 92(10), 1628-1633. <https://doi.org/10.2105/ajph.92.10.1628>
- Hidde, O. (2005). Historical perspective: the Council on Chiropractic Education and the Committee on Accreditation, 1961-1980. *Chiropractic History*, 25(1), 49-77.
- Hogg-Johnson, S., van der Velde, G., Carroll, L. J., Holm, L. W., Cassidy, J. D., Guzman, J.,... Peloso, P. (2009). The burden and determinants of neck pain in the general population: Results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Journal of Manipulative and Physiological Therapeutics*, 32(2 Suppl), S46-S60. <https://doi.org/10.1016/j.jmpt.2008.11.010>
- Houweling, T. A., Braga, A. V., Hausheer, T., Vogelsang, M., Peterson, C., & Humphreys, B. K. (2015). First-contact care with a medical vs chiropractic provider after consultation with a Swiss telemedicine provider: Comparison of outcomes, patient satisfaction, and health care costs in spinal, hip, and shoulder pain patients. *Journal of Manipulative and Physiological Therapeutics*, 38(7), 477-483. <https://doi.org/10.1016/j.jmpt.2015.06.015>

- Hurwitz, E. L., Randhawa, K., Torres, P., Yu, H., Verville, L., Hartvigsen, J.,... Haldeman, S. (2018). The Global Spine Care Initiative: A systematic review of individual and community-based burden of spinal disorders in rural populations in low- and middle-income communities. *European Spine Journal*, 27(Suppl 6), 802-815. <https://doi.org/10.1007/s00586-017-5393-z>
- Jackson, R. B. (1992). Legalizing chiropractic by initiative petition and referendum, 1918-1922. *Chiropractic History*, 12(1), 23-28.
- Johnson, C. (2006). Modernized chiropractic reconsidered: Beyond foot-on-hose and bones-out-of-place. *Journal of Manipulative and Physiological Therapeutics*, 29(4), 253-254. <https://doi.org/10.1016/j.jmpt.2006.03.012>
- Johnson, C. (2007a). Poverty and human development: Contributions from and callings to the chiropractic profession. *Journal of Manipulative and Physiological Therapeutics*, 30(8), 551-556. <https://doi.org/10.1016/j.jmpt.2007.10.001>
- Johnson, C. (2007b). What is the Association of Chiropractic Colleges Educational Conference and Research Agenda Conference? *Journal of Manipulative and Physiological Therapeutics*, 30(4), 249-250. <https://doi.org/10.1016/j.jmpt.2007.03.015>
- Johnson, C. (2008a). Evidence-based practice in 5 simple steps. *Journal of Manipulative and Physiological Therapeutics*, 31(3), 169-170. <https://doi.org/10.1016/j.jmpt.2008.03.013>
- Johnson, C. (2008b). Highlights of the basic components of evidence-based practice. *Journal of Manipulative and Physiological Therapeutics*, 31(2), 91-92. <https://doi.org/10.1016/j.jmpt.2008.01.001>
- Johnson, C. (2009). Health care transitions: A review of integrated, integrative, and integration concepts. *Journal of Manipulative and Physiological Therapeutics*, 32(9), 703-713. <https://doi.org/10.1016/j.jmpt.2009.11.001>
- Johnson, C. (2010). Reflecting on 115 years: The chiropractic profession's philosophical path. *Journal of Chiropractic Humanities*, 17(1), 1-5. <https://doi.org/10.1016/j.echu.2010.11.001>
- Johnson, C. (2011). Use of the term subluxation in publications during the formative years of the chiropractic profession. *Journal of Chiropractic Humanities*, 18(1), 1-9. <https://doi.org/10.1016/j.echu.2011.10.004>
- Johnson, C., Baird, R., Dougherty, P. E., Globe, G., Green, B. N., Haneline, M.,... Smith, M. (2008). Chiropractic and public health: Current state and future vision. *Journal of Manipulative and Physiological Therapeutics*, 31(6), 397-410. <https://doi.org/10.1016/j.jmpt.2008.07.001>
- Johnson, C., & Green, B. (2010a). 100 years after the Flexner Report: Reflections on its influence on chiropractic education. *Journal of Chiropractic Education*, 24(2), 145-152.
- Johnson, C., & Green, B. (2010b). The Association of Chiropractic Colleges Educational Conference and Research Agenda Conference: 17 years of scholarship and collaboration. *Journal of Manipulative and Physiological Therapeutics*, 33(3), 165-166. <https://doi.org/10.1016/j.jmpt.2010.02.001>
- Johnson, C., & Green, B. N. (2009). Public health, wellness, prevention, and health promotion: Considering the role of chiropractic and determinants of health. *Journal of Manipulative and Physiological Therapeutics*, 32(6), 405-412. <https://doi.org/10.1016/j.jmpt.2009.07.001>
- Johnson, C., Killinger, L. Z., Christensen, M. G., Hyland, J. K., Mrozek, J. P., Zuker, R. F.,... Oyelowo, T. (2012). Multiple views to address diversity issues: An initial dialog to advance the chiropractic profession. *Journal of Chiropractic Humanities*, 19(1), 1-11. <https://doi.org/10.1016/j.echu.2012.10.003>

- Johnson, C., Rubinstein, S. M., Cote, P., Hestbaek, L., Injeyan, H. S., Puhl, A.,... Kopansky-Giles, D. R. (2012). Chiropractic care and public health: Answering difficult questions about safety, care through the lifespan, and community action. *Journal of Manipulative and Physiological Therapeutics*, 35(7), 493-513. <https://doi.org/10.1016/j.jmpt.2012.09.001>
- Johnson, C. D., & Green, B. N. (2012). Diversity in the chiropractic profession: Preparing for 2050. *Journal of Chiropractic Education*, 26(1), 1-13.
- Johnson, C. D., & Green, B. N. (2015). Chiropractic care. In H. Lavretsky, M. Sajatovic, & C. Reynolds (Eds.), *Complementary, alternative, and integrative interventions in mental health and aging*. Oxford University Press.
- Johnson, C. D., Green, B. N., Nelson, R. C., Moreau, B., & Nabhan, D. (2013). Chiropractic and concussion in sport: A narrative review of the literature. *Journal of Chiropractic Medicine*, 12(4), 216-229. <https://doi.org/10.1016/j.jcm.2013.10.011>
- Johnson, C. D., Haldeman, S., Chou, R., Nordin, M., Green, B. N., Cote, P.,... Yuksel, S. (2018). The Global Spine Care Initiative: Model of care and implementation. *European Spine Journal*, 27(Suppl 6), 925-945. <https://doi.org/10.1007/s00586-018-5720-z>
- International Board of Chiropractic Examiners (IBCE). (2019). *Who we are*. <https://www.ibce.org/who-we-are/>
- Kaesler, M. A., Hawk, C., Anderson, M. L., & Reinhardt, R. (2016). Community-based free clinics: Opportunities for interprofessional collaboration, health promotion, and complex care management. *Journal of Chiropractic Education*, 30(1), 25-29. <https://doi.org/10.7899/JCE-15-2>
- Kane, R., Olsen, D., Leymaster, C., Woolley, F. R., & Fisher, F. D. (1974). Manipulating the patient: A comparison of the effectiveness of physician and chiropractor care. *The Lancet*, 303(7870), 1333-1336.
- Kaptchuk, T. J., & Eisenberg, D. M. (1998). Chiropractic: Origins, controversies, and contributions. *Archives of Internal Medicine*, 158(20), 2215-2224. <https://doi.org/10.1001/archinte.158.20.2215>
- Keating, J. C. (2003). Before Nugent took charge: Early efforts to reform chiropractic education, 1919-1941. *Journal of the Canadian Chiropractic Association*, 47(3), 180-216.
- Keating, J. C., Callender, A. K., Cleveland, C. S., Association for the History of Chiropractic, & Council on Chiropractic Education (U.S.). (1998). *A history of chiropractic education in North America: Report to the Council on Chiropractic Education*. Association for the History of Chiropractic.
- Keating, J. C., Cleveland, C. S., & Menke, M. (2004). *Chiropractic history: A primer*. Association for the History of Chiropractic.
- Kindermann, S. L., Hou, Q., & Miller, R. M. (2014). Impact of chiropractic services at an on-site health center. *Journal of Occupational and Environmental Medicine*, 56(9), 990-992. <https://doi.org/10.1097/JOM.0000000000000215>
- Kopansky-Giles, D., Johnson, C. D., Haldeman, S., Chou, R., Cote, P., Green, B. N.,... Wong, C. C. (2018). The Global Spine Care Initiative: Resources to implement a spine care program. *European Spine Journal*, 27(Suppl 6), 915-924. <https://doi.org/10.1007/s00586-018-5725-7>
- Krause, C. A., Kaspian, L., Gorman, K. M., & Miller, R. M. (2012). Value of chiropractic services at an on-site health center. *Journal of Occupational and Environmental Medicine*, 54(8), 917-921. <https://doi.org/10.1097/JOM.0b013e31825a3507>
- Lagnado, L. (2018, January 8). Walk-in doctor visits at work? Welcome to the office health center. *The Wall Street Journal*. <https://www.wsj.com/articles/walk-in-doctor-visits-at-work-welcome-to-the-office-health-center-1515420543>.

- Leach, R. A. (2004). *The chiropractic theories: A textbook of scientific research*. Lippincott Williams & Wilkins.
- Leach, R. A. (2010). Patients with symptoms and signs of stroke presenting to a rural chiropractic practice. *Journal of Manipulative and Physiological Therapeutics*, 33(1), 62-69. <https://doi.org/10.1016/j.jmpt.2009.11.004>
- Liebenson, C. (2007). *Rehabilitation of the spine: A practitioner's manual* (2nd ed.). Lippincott Williams & Wilkins.
- Liewer, D. M. (2012). Accreditation and education: Front and center for regulators. In D. M. Liewer & J. C. Keating (Eds.), *Protection, regulation and legitimacy: FCLB and the story of licensing chiropractic* (Vol. II, pp. 143-164). Federation of Chiropractic Licensing Boards.
- Liewer, D. M., & Keating, J. C. (2012). Beyond the American borders. In D. M. Liewer & J. C. Keating (Eds.), *Protection, regulation and legitimacy: FCLB and the story of licensing chiropractic* (Vol. II, pp. 165-174). Federation of Chiropractic Licensing Boards.
- Liliedahl, R. L., Finch, M. D., Axene, D. V., & Goertz, C. M. (2010). Cost of care for common back pain conditions initiated with chiropractic doctor vs medical doctor/doctor of osteopathy as first physician: Experience of one Tennessee-based general health insurer. *Journal of Manipulative and Physiological Therapeutics*, 33(9), 640-643. <https://doi.org/10.1016/j.jmpt.2010.08.018>
- Lisi, A. J., & Brandt, C. A. (2016). Trends in the use and characteristics of chiropractic services in the Department of Veterans Affairs. *Journal of Manipulative and Physiological Therapeutics*, 39(5), 381-386. <https://doi.org/10.1016/j.jmpt.2016.04.005>
- Lisi, A. J., Corcoran, K. L., DeRycke, E. C., Bastian, L. A., Becker, W. C., Edmond, S. N.,... Brandt, C. A. (2018). Opioid use among veterans of recent wars receiving Veterans Affairs chiropractic care. *Pain Medicine*, 19(suppl\_1), S54-S60. <https://doi.org/10.1093/pm/pny114>
- Lisi, A. J., Goertz, C., Lawrence, D. J., & Satyanarayana, P. (2009). Characteristics of Veterans Health Administration chiropractors and chiropractic clinics. *Journal of Rehabilitation Research & Development*, 46(8), 997-1002.
- Lisi, A. J., Salsbury, S. A., Hawk, C., Vining, R. D., Wallace, R. B., Branson, R.,... Goertz, C. M. (2018). Chiropractic integrated care pathway for low back pain in veterans: Results of a Delphi consensus process. *Journal of Manipulative and Physiological Therapeutics*, 41(2), 137-148. <https://doi.org/10.1016/j.jmpt.2017.10.001>
- Maiers, M., Agaoglu, M., Brown, R., Cassirer, C., DaSilva, K., Lystad, R. P.,... Wong, J. J. (2018). Chiropractic in global health and wellbeing: A white paper describing the public health agenda of the World Federation of Chiropractic. *Chiropractic & Manual Therapies*, 26, 26. <https://doi.org/10.1186/s12998-018-0194-y>
- Manga, P. (2000). Economic case for the integration of chiropractic services into the health care system. *Journal of Manipulative and Physiological Therapeutics*, 23(2), 118-122.
- Meeker, W. C. (2000). Public demand and the integration of complementary and alternative medicine in the US health care system. *Journal of Manipulative and Physiological Therapeutics*, 23(2), 123-126.
- Meeker, W. C., & Haldeman, S. (2002). Chiropractic: A profession at the crossroads of mainstream and alternative medicine. *Annals of Internal Medicine*, 136(3), 216-227. <https://doi.org/10.7326/0003-4819-136-3-200202050-00010>
- Mercer LLC. (2018). *Worksite Medical Clinics 2018 Survey Report*. Mercer.
- Mootz, R. D., Hansen, D. T., Breen, A., Killinger, L. Z., & Nelson, C. (2006). Health services

- research related to chiropractic: Review and recommendations for research prioritization by the chiropractic profession. *Journal of Manipulative and Physiological Therapeutics*, 29(9), 707-725. <https://doi.org/10.1016/j.jmpt.2006.09.001>
- Moseley III, G. B. (2008). The US health care non-system, 1908-2008. *American Medical Association Journal of Ethics*, 10(5), 324-331.
- Mrozek, J. P., Till, H., Taylor-Vaisey, A. L., & Wickes, D. (2006). Research in chiropractic education: An update. *Journal of Manipulative and Physiological Therapeutics*, 29(9), 762-773. <https://doi.org/10.1016/j.jmpt.2006.09.002>
- National Board of Chiropractic Examiners (NBCE). (2019). *Prepare for NBCE exams*. Retrieved from <https://mynbce.org/prepare/>
- Ndetan, H. T., Bae, S., Evans, M. W., Jr., Rupert, R. L., & Singh, K. P. (2009). Characterization of health status and modifiable risk behavior among United States adults using chiropractic care as compared with general medical care. *Journal of Manipulative and Physiological Therapeutics*, 32(6), 414-422. <https://doi.org/10.1016/j.jmpt.2009.06.012>
- The new health science: Chiropractic. (1917, February 1). *The Weekly Times-Record*.
- Nook, D. D., Nook, E. C., & Nook, B. C. (2016). Utilization of chiropractic care at the World Games 2013. *Journal of Manipulative and Physiological Therapeutics*, 39(9), 693-704. <https://doi.org/10.1016/j.jmpt.2016.09.005>
- Orlin, J. R., Didriksen, A., Hagen, H., & Sørfonden, A. (2013). The collateral benefits of having chiropractic available in a public central hospital. *Journal of Hospital Administration*, 2(4), 138-143.
- Paige, N. M., Miake-Lye, I. M., Booth, M. S., Beroes, J. M., Mardian, A. S., Dougherty, P.,... Shekelle, P. G. (2017). Association of spinal manipulative therapy with clinical benefit and harm for acute low back pain: Systematic review and meta-analysis. *Journal of the American Medical Association*, 317(14), 1451-1460. <https://doi.org/10.1001/jama.2017.3086>
- Palmer, B. J. (1906). The science of chiropractic: Its principles and philosophies, vol. I. *Davenport (Iowa)*, 7, 359.
- Palmer, B. J. (1917). *The science of chiropractic: Its principles and philosophies* (Vol. 1). The Palmer School of Chiropractic.
- Palmer, D. D. (1905). *The chiropractor: A monthly journal devoted to the interests of chiropractic* (Vol. 1). The Palmer School of Chiropractic.
- Palmer, D. D., & Palmer, D. D. (1910). *Text-book of the science, art and philosophy of chiropractic: For students and practitioners:... Founded on tone*. Palmer College of Chiropractic.
- Pedersen, P. (2005). The clinical history. In S. Haldeman & S. Dagenais (Eds.), *Principles and practice of chiropractic* (3rd ed., pp. 487-508). McGraw-Hill.
- Pelletier, K. R., Astin, J. A., & Haskell, W. L. (1999). Current trends in the integration and reimbursement of complementary and alternative medicine by managed care organizations (MCOs) and insurance providers: 1998 update and cohort analysis. *American Journal of Health Promotion*, 14(2), 125-133. <https://doi.org/10.4278/0890-1171-14.2.125>
- Peng, T., Chen, B., & Gabriel, K. P. (2018). Utilization of chiropractic care in US children and adolescents: A cross-sectional study of the 2012 National Health Interview Survey. *Journal of Manipulative and Physiological Therapeutics*, 41(9), 725-733. <https://doi.org/10.1016/j.jmpt.2018.07.003>
- Pohlman, K. A., Carroll, L., Hartling, L., Tsuyuki, R., & Vohra, S. (2016). Attitudes and opinions of doctors of chiropractic specializing in pediatric care toward patient safety: A cross-sectional survey. *Journal of Manipulative and Physiological*

- Therapeutics*, 39(7), 487–493. <https://doi.org/10.1016/j.jmpt.2016.06.003>
- Pollard, H. (1969). The territorial imperative of medicine. *Annals of Internal Medicine*, 71(2), 407–413.
- Rosner, A. L. (2016). Chiropractic identity: A neurological, professional, and political assessment. *Journal of Chiropractic Humanities*, 23(1), 35–45. <https://doi.org/10.1016/j.echu.2016.05.001>
- Rubinstein, S., Pfeifle, C. E., van Tulder, M. W., & Assendelft, W. J. (2000). Chiropractic patients in the Netherlands: A descriptive study. *Journal of Manipulative and Physiological Therapeutics*, 23(8), 557–563. <https://doi.org/10.1067/mmt.2000.109675>
- Rubinstein, S. M. (2008). Adverse events following chiropractic care for subjects with neck or low-back pain: Do the benefits outweigh the risks? *Journal of Manipulative and Physiological Therapeutics*, 31(6), 461–464. <https://doi.org/10.1016/j.jmpt.2008.06.001>
- Rubinstein, S. M., Leboeuf-Yde, C., Knol, D. L., de Koekkoek, T. E., Pfeifle, C. E., & van Tulder, M. W. (2007). The benefits outweigh the risks for patients undergoing chiropractic care for neck pain: A prospective, multicenter, cohort study. *Journal of Manipulative and Physiological Therapeutics*, 30(6), 408–418. <https://doi.org/10.1016/j.jmpt.2007.04.013>
- Sackett, D. (1995). Evidence-based medicine. *The Lancet*, 346(8983), 1171.
- Sackett, D. L., Rosenberg, W. M., Gray, J. A., Haynes, R. B., & Richardson, W. S. (1996). Evidence based medicine: What it is and what it isn't. *BMJ*, 312(7023), 71–72. <https://doi.org/10.1136/bmj.312.7023.71>
- Sackett, D. L., Rosenberg, W. M., Gray, J. A., Haynes, R. B., & Richardson, W. S. (2007). Evidence based medicine: What it is and what it isn't. 1996. *Clinical Orthopaedics and Related Research*, 455, 3–5.
- Salsbury, S. A., Goertz, C. M., Twist, E. J., & Lisi, A. J. (2018). Integration of doctors of chiropractic into private sector health care facilities in the United States: A descriptive survey. *Journal of Manipulative and Physiological Therapeutics*, 41(2), 149–155. <https://doi.org/10.1016/j.jmpt.2017.10.003>
- Sarnat, R. L., Winterstein, J., & Cambron, J. A. (2007). Clinical utilization and cost outcomes from an integrative medicine independent physician association: An additional 3-year update. *Journal of Manipulative and Physiological Therapeutics*, 30(4), 263–269. <https://doi.org/10.1016/j.jmpt.2007.03.004>
- Schneider, M., Vernon, H., Ko, G., Lawson, G., & Perera, J. (2009). Chiropractic management of fibromyalgia syndrome: A systematic review of the literature. *Journal of Manipulative and Physiological Therapeutics*, 32(1), 25–40. <https://doi.org/10.1016/j.jmpt.2008.08.012>
- Seaman, D. R., & Soltys, J. R. (2013). Straight chiropractic philosophy as a barrier to Medicare compliance: A discussion of 5 incongruent issues. *Journal of Chiropractic Humanities*, 20(1), 19–26. <https://doi.org/10.1016/j.echu.2013.09.001>
- Senzon, S. A. (2018a). The chiropractic vertebral subluxation part 1: Introduction. *Journal of Chiropractic Humanities*, 25, 10–21. <https://doi.org/10.1016/j.echu.2018.10.002>
- Senzon, S. A. (2018b). The chiropractic vertebral subluxation part 2: The earliest subluxation theories from 1902 to 1907. *Journal of Chiropractic Humanities*, 25, 22–35. <https://doi.org/10.1016/j.echu.2018.10.009>
- Senzon, S. A. (2018c). The chiropractic vertebral subluxation part 3: Complexity and identity from 1908 to 1915. *Journal of Chiropractic Humanities*, 25, 36–51. <https://doi.org/10.1016/j.echu.2018.10.003>
- Senzon, S. A. (2018d). The chiropractic vertebral subluxation part 4: New perspectives

- and theorists from 1916 to 1927. *Journal of Chiropractic Humanities*, 25, 52-66. <https://doi.org/10.1016/j.echu.2018.05.001>
- Senzon, S. A. (2018e). The chiropractic vertebral subluxation part 5: The first research era from 1928 to 1949. *Journal of Chiropractic Humanities*, 25, 67-85. <https://doi.org/10.1016/j.echu.2018.10.004>
- Senzon, S. A. (2018f). The chiropractic vertebral subluxation part 6: Renaissance of D.D. Palmer's paradigm from 1949 to 1961. *Journal of Chiropractic Humanities*, 25, 86-98. <https://doi.org/10.1016/j.echu.2018.05.002>
- Senzon, S. A. (2018g). The chiropractic vertebral subluxation part 7: Technics and models from 1962 to 1980. *Journal of Chiropractic Humanities*, 25, 99-113. <https://doi.org/10.1016/j.echu.2018.10.005>
- Senzon, S. A. (2018h). The chiropractic vertebral subluxation part 8: Terminology, definitions, and historicity from 1966 to 1980. *Journal of Chiropractic Humanities*, 25, 114-129. <https://doi.org/10.1016/j.echu.2018.10.006>
- Senzon, S. A. (2018i). The chiropractic vertebral subluxation part 9: Complexes, models, and consensus from 1979 to 1995. *Journal of Chiropractic Humanities*, 25, 130-145. <https://doi.org/10.1016/j.echu.2018.10.007>
- Senzon, S. A. (2018j). The chiropractic vertebral subluxation part 10: Integrative and critical literature from 1996 and 1997. *Journal of Chiropractic Humanities*, 25, 146-168. <https://doi.org/10.1016/j.echu.2018.10.008>
- Shekelle, P. G., Adams, A. H., Chassin, M. R., Hurwitz, E. L., & Brook, R. H. (1992). Spinal manipulation for low-back pain. *Annals of Internal Medicine*, 117(7), 590-598. <https://doi.org/10.7326/0003-4819-117-7-590>
- Smith-Cunnien, S. L. (1998). *A profession of one's own: Organized medicine's opposition to chiropractic*. University Press of America.
- Smith, M., & Carber, L. (2002). Chiropractic health care in health professional shortage areas in the United States. *American Journal of Public Health*, 92(12), 2001-2009.
- Smith, M., & Carber, L. A. (2007). Chiropractors as safety net providers: First report of findings and methods from a US survey of chiropractors. *Journal of Manipulative and Physiological Therapeutics*, 30(9), 718-728. <https://doi.org/10.1016/j.jmpt.2007.11.001>
- Smith, O. G., Langworthy, S. M., & Paxson, M. C. (1906). Modernized chiropractic. SM Langworthy.
- Stano, M. (1993). A comparison of health care costs for chiropractic and medical patients. *Journal of Manipulative and Physiological Therapeutics*, 16(5), 291-299.
- Stano, M., Haas, M., Goldberg, B., Traub, P. M., & Nyiendo, J. (2002). Chiropractic and medical care costs of low back care: Results from a practice-based observational study. *American Journal of Managed Care*, 8(9), 802-809.
- Stano, M., & Smith, M. (1996). Chiropractic and medical costs of low back care. *Medical Care*, 191-204.
- Stevens, G., Campeanu, M., Sorrento, A. T., Ryu, J., & Burke, J. (2016). Retrospective demographic analysis of patients seeking care at a free university chiropractic clinic. *Journal of Chiropractic Medicine*, 15(1), 19-26. <https://doi.org/10.1016/j.jcm.2016.02.001>
- Stevens, G. L. (2007a). Behavioral and access barriers to seeking chiropractic care: A study of 3 New York clinics. *Journal of Manipulative and Physiological Therapeutics*, 30(8), 566-572. <https://doi.org/10.1016/j.jmpt.2007.07.015>
- Stevens, G. L. (2007b). Demographic and referral analysis of a free chiropractic clinic servicing ethnic minorities in the Buffalo, NY area. *Journal of Manipulative and Physiological Therapeutics*, 30(8), 573-577. <https://doi.org/10.1016/j.jmpt.2007.07.016>

- Stochkendahl, M. J., Rezai, M., Torres, P., Sutton, D., Tuchin, P., Brown, R., & Cote, P. (2019). The chiropractic workforce: A global review. *Chiropractic & Manual Therapies*, 27, 36. <https://doi.org/10.1186/s12998-019-0255-x>
- Tindle, H. A., Davis, R. B., Phillips, R. S., & Eisenberg, D. M. (2005). Trends in use of complementary and alternative medicine by US adults: 1997–2002. *Alternative Therapies in Health and Medicine*, 11(1), 42.
- Todd, A. J., Carroll, M. T., Robinson, A., & Mitchell, E. K. L. (2015). Adverse events due to chiropractic and other manual therapies for infants and children: A review of the literature. *Journal of Manipulative and Physiological Therapeutics*, 38(9), 699–712. <https://doi.org/10.1016/j.jmpt.2014.09.008>
- Triano, J. J., Goertz, C., Weeks, J., Murphy, D. R., Kranz, K. C., McClelland, G. C.,... Nelson, C. F. (2010). Chiropractic in North America: Toward a strategic plan for professional renewal – Outcomes from the 2006 Chiropractic Strategic Planning Conference. *Journal of Manipulative and Physiological Therapeutics*, 33(5), 395–405. <https://doi:10.1016/j.jmpt.2010.05.002>
- TRICARE Management Activity. (2008). *Designated locations for the Chiropractic Health Care Program*. Military Health System.
- United States Department of Education. (2019). *Accreditation in the United States*. Retrieved November 18, 2019 from <https://www2.ed.gov/admins/finaid/accred/accreditation.html#Overview>
- U.S. Centers for Medicare & Medicaid Services. *Chiropractic services*.
- Vernon, H., & Schneider, M. (2009). Chiropractic management of myofascial trigger points and myofascial pain syndrome: A systematic review of the literature. *Journal of Manipulative and Physiological Therapeutics*, 32(1), 14–24. <https://doi.org/10.1016/j.jmpt.2008.06.012>
- Vining, R. D., Salsbury, S. A., Cooley, W. C., Gosselin, D., Corber, L., & Goertz, C. M. (2018). Patients receiving chiropractic care in a neurorehabilitation hospital: A descriptive study. *Journal of Multidisciplinary Healthcare*, 11, 223–231. <https://doi.org/10.2147/JMDH.S159618>
- Wardwell, W. I. (1992). *Chiropractic: History and evolution of a new profession*: Mosby-Year Book.
- Weeks, W. B., & Goertz, C. M. (2016). Cross-sectional analysis of per capita supply of doctors of chiropractic and opioid use in younger Medicare beneficiaries. *Journal of Manipulative and Physiological Therapeutics*, 39(4), 263–266. <https://doi.org/10.1016/j.jmpt.2016.02.016>
- Weeks, W. B., Goertz, C. M., Long, C. R., Meeker, W. C., & Marchiori, D. M. (2018). Association among opioid use, treatment preferences, and perceptions of physician treatment recommendations in patients with neck and back pain. *Journal of Manipulative and Physiological Therapeutics*, 41(3), 175–180. <https://doi.org/10.1016/j.jmpt.2017.12.003>
- Weeks, W. B., Goertz, C. M., Meeker, W. C., & Marchiori, D. M. (2015). Public perceptions of doctors of chiropractic: Results of a national survey and examination of variation according to respondents' likelihood to use chiropractic, experience with chiropractic, and chiropractic supply in local health care markets. *Journal of Manipulative and Physiological Therapeutics*, 38(8), 533–544. <https://doi.org/10.1016/j.jmpt.2015.08.001>
- Weeks, W. B., Leininger, B., Whedon, J. M., Lurie, J. D., Tosteson, T. D., Swenson, R.,... Goertz, C. M. (2016). The association between use of chiropractic care and costs of care among older Medicare patients with chronic low back pain and multiple comorbidities. *Journal of Manipulative and Physiological Therapeutics*, 39(2), 63–75.e62. <https://doi.org/10.1016/j.jmpt.2016.01.006>

Westrom, K. K., Maiers, M. J., Evans, R. L., & Bronfort, G. (2010). Individualized chiropractic and integrative care for low back pain: The design of a randomized clinical trial using a mixed-methods approach. *Trials*, 11, 24. <https://doi.org/10.1186/1745-6215-11-24>

Whedon, J. M., & Song, Y. (2012). Geographic variations in availability and use of chiropractic under medicare. *Journal of Manipulative and Physiological Therapeutics*, 35(2), 101-109. <https://doi.org/10.1016/j.jmpt.2011.12.004>

Whedon, J. M., Song, Y., Mackenzie, T. A., Phillips, R. B., Lukovits, T. G., & Lurie, J. D. (2015). Risk of stroke after chiropractic spinal manipulation in Medicare B beneficiaries aged 66 to 99 years with neck pain. *Journal of Manipulative and Physiological Therapeutics*, 38(2), 93-101. <https://doi.org/10.1016/j.jmpt.2014.12.001>

Whitehall, M., & Zaslow, J. (2019). *Opportunities for treating low back pain*. Cambridge: OptumLabs. <https://www.optumlabs.com/spotlights/optumlabs-spotlights/back-pain-opportunities.html>

World Health Organization. (2005). *WHO guidelines on basic training and safety in chiropractic*. World Health Organization.

Zodet, M. W., & Stevans, J. M. (2012). The 2008 prevalence of chiropractic use in the US adult population. *Journal of Manipulative and Physiological Therapeutics*, 35(8), 580-588. <https://doi.org/10.1016/j.jmpt.2012.10.001>

# Chapter Three

## Methods

Compliance with the legal requirements for a practice analysis (Uniform Guidelines for Employee Selection Procedures, 1978) requires obtaining current information about the core functions and tasks performed by practitioners in a profession, which thereby ensures the validity and reliability of such data (Dierdorff & Wilson, 2003). When planning and conducting the Survey of Chiropractic Practice 2019, we made an implicit assumption that information about the existing profession may be used for the development and validation of prelicensure chiropractic exams (Schneider & Konz, 1989).

A practice analysis is a process by which a profession is subdivided into elements, such as tasks, through the application of a formalized, systematic data collection and analysis procedure (McCormick, 1976). As the survey questionnaire forms the basis of a practice analysis, the discussion in this section focuses on survey-related methods, including questionnaire construction, survey administration, and post-survey data analysis.

### Questionnaire Construction

When developing the 2019 Survey of Chiropractic Practice, we followed the job inventory approach also known as a Functional Job Analysis (Fine & Wiley, 1971). As suggested by Knapp and Knapp (1995),

*"The first step in conducting a Functional Job analysis is defining the purpose and goals of the occupations. A trained job analyst then identifies what must be done to accomplish the purpose*

*and goals, by determining what the worker does (i.e., processes or procedures used to perform a task) and how it is done (i.e., physical, mental, interpersonal skills required during the process and procedure"* (p. 97).

We followed this approach by incorporating the essential components into various forms and stages of the survey questionnaire.

### Survey Structure

The 2019 survey consisted of seven sections, of which five critical sections assessed the performance frequencies of professional tasks and the risk associated with each when performed improperly. These five sections constituted the core of the survey: Patient Assessment Tasks, Case Management Tasks, Communication Tasks, Treatment Tasks, and Research and Ethics. The two non-core sections were Personal Demographics (demographic characteristics of the respondent chiropractors) and Practice Demographics (practice settings and demographic characteristics of the patients).

The respondents from the chiropractic profession were classified into four subpopulations: those who did not practice in the United States or its territories, U.S. chiropractors who practiced full time, U.S. chiropractors who practiced part time (defined as less than 20 hours per week), and those who did not currently practice chiropractic. Accordingly, skip patterns (branches) were introduced into the questionnaire to obtain survey responses from each of these subpopulations.

The first item of the survey inquired, “Do you currently practice chiropractic?” If the answer was “No,” responses to the core sections were not collected and the participant was sent to a demographic section, which was followed by several items that collected attitudes regarding the profession. Those who answered “Yes” to this question were subjected to another skip pattern, which inquired about the “Hours per week that you practice chiropractic.” Respondents who indicated that they practiced 20 or more hours per week were directed to the core sections. Those who practiced less than 20 hours (but not zero) were considered part-time practitioners and were then directed to questions that collected information about their demographics and attitudes towards the profession.

An additional skip pattern was introduced by the question regarding whether a practitioner conducted imaging studies in the office: “Do you take radiographs in your office?” If the response was “Yes,” the respondents were probed to determine which type of imaging equipment they used and the percentage of patients on which they performed radiography. Those who provided a “No” response were probed to determine the percentage of patients they referred for imaging studies and the type of imaging facility (medical vs. chiropractic) they used.

The responses of participants who indicated they practiced outside of the U.S. and its territories were removed from the analysis samples, regardless whether they had completed the entire survey or provided only partial responses.

## Measures and Scales

Several objectives guided the development of the items and supported content validity (Crano et al., 2014) in the core sections. First, items were created to assess the frequency of performance of various professional functions on an annual basis. Secondary items inquired about the perceived risk to the patient associated with the nonperformance or subpar performance of each of the functions. To construct the questionnaire, items included in practice analysis questionnaires previously administered by the NBCE in 2014 and 2009 were reviewed for relevance. Items deemed relevant were included in the 2019 survey. Additional items were developed by a team of chiropractors and survey specialists. A Practice Analysis Committee formed of NBCE employees and content experts oversaw the process of questionnaire construction. The NBCE then reached out to several experienced researchers

in the chiropractic profession for their input and review of the resulting survey questionnaire.

The Patient Assessment domain consisted of 22 frequency items, and every frequency item was accompanied by an item that assessed risk (see Table 3.1). The Case Management domain was represented by 16 survey items, with an additional 16 items that assessed risk (see Table 3.2). The Communication Tasks domain incorporated 15 frequency and 15 risk items (see Table 3.3). The Treatment Task domain was represented by 16 frequency and 16 risk items (see Table 3.4). Finally, the Research and Ethics domain was captured by 9 frequency items (see Table 3.5).

Items intended to collect the demographic information of responding DCs are presented in Table 3.6. Items intended to detail the practice settings and patient characteristics are presented in Table 3.7.

**Table 3.1** Variables Representing the Patient Assessment

ITEM
How frequently during the past 12 months did you obtain a problem-focused case history (i.e. limited to chief complaint)?
How frequently during the past 12 months did you obtain a detailed/comprehensive case history (i.e. including past health history, family health history, biopsychosocial history, and review of systems)?
How frequently during the past 12 months did you perform a comprehensive physical examination (i.e. including vital signs, EENT, cardiopulmonary, and abdominal exams)?
How frequently during the past 12 months did you perform a focused EENT examination?
How frequently during the past 12 months did you perform a focused cardiopulmonary examination?
How frequently during the past 12 months did you perform a focused abdominal examination?
How frequently during the past 12 months did you perform a focused orthopedic/neurologic examination (i.e., limited to the area of complaint)?
How frequently during the past 12 months did you perform a comprehensive orthopedic/neurologic examination (i.e., <b>not</b> limited to the area of complaint, and including cranial nerves, DTRs, dermatomes, myotomes, spinal ROM, pathologic reflexes, etc.)?
How frequently during the past 12 months did you perform a postural and gait analysis?
How frequently during the past 12 months did you perform a cervical, thoracic, lumbopelvic, and/or extremity palpation examination?
How frequently during the past 12 months did you obtain patient-reported outcome measures (e.g. pain scale ratings and/or disability questionnaires)?
How frequently during the past 12 months did you draw blood, collect urine, and/or perform other laboratory tests in your office?
How frequently during the past 12 months did you order blood, urine, or other laboratory tests from an outside facility?
How frequently during the past 12 months did you obtain and review the results of previously performed laboratory tests?
How frequently during the past 12 months did you obtain and read radiographs that you did not take or order?
How frequently during the past 12 months did you order a nerve conduction velocity (NCV) and/or needle electromyography (EMG) study?

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How frequently during the past 12 months did you obtain and review the results of a previously performed NCV or EMG study?

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How frequently during the past 12 months did you order an MRI, CT, or bone scan imaging study?

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How frequently during the past 12 months did you obtain and review the results of a previously performed MRI, CT, or bone scan imaging study?

---

How frequently during the past 12 months did you perform other special studies (e.g., ECG, diagnostic or Doppler ultrasound, bone density, etc.) in your office?

---

How frequently during the past 12 months did you order other special studies (e.g., ECG, diagnostic or Doppler ultrasound, bone density, etc.) from an outside facility?

---

How frequently during the past 12 months did you obtain and review the results of other previous special studies?

**Note 1.** Every frequency item (represented in the table) was followed by a risk item: “What is the risk to the patient’s health or safety when a chiropractor poorly performs or misinterprets this assessment task?”

**Note 2.** Frequency items were measured using a six-point Likert scale: 1 = Never, 2 = 1–6 times

per year, 3 = About once per month, 4 = About once per week, 5 = About once per day, and 6 = Several times per day.

**Note 3.** Risk items were measured using a six-point Likert scale: 1 = No risk, 2 = Minimal risk, 3 = Some risk, 4 = Moderate risk, 5 = Significant risk, and 6 = Severe risk.

**Table 3.2** Variables Representing Case Management

ITEM
How frequently during the past 12 months did you review radiographic images to identify or rule out fracture, dislocation, and other pathology?
How frequently during the past 12 months did you review MRI, CT, or bone scan images to identify or rule out pathology?
How frequently during the past 12 months did you review laboratory studies and interpret the results?
How frequently during the past 12 months did you review special studies such as NCV, EMG, ECG, etc. and interpret the results?
How frequently during the past 12 months did you review radiographic images to determine the possible presence of a spinal listing and/or subluxation?

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How frequently during the past 12 months did you assess the existence of risk factors and contraindications to chiropractic care?

---

How frequently during the past 12 months did you develop a differential diagnosis or clinical impression?

---

How frequently during the past 12 months did you search online databases for evidence to assist in patient management plans?

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How frequently during the past 12 months did you develop a case management plan?

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How frequently during the past 12 months did you develop a prognosis?

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How frequently during the past 12 months did you refer a patient to a specialist for consultation or co-management?

---

How frequently during the past 12 months did you collaborate with other professionals and/or participate as a member of an interdisciplinary team?

---

How frequently during the past 12 months did you reexamine a patient with orthopedic/neurologic examination procedures, either periodically or when the patient's condition materially changed?

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How frequently during the past 12 months did you reexamine a patient with physical examination procedures, either periodically or when the patient's condition materially changed?

---

How frequently during the past 12 months did you obtain repeat/follow-up radiographic examinations to monitor a patient's progress or response to care?

---

How frequently during the past 12 months did you release a patient from active care?

---

**Note 1.** Every frequency item (represented in the table) was followed by a risk item: "What is the risk to the patient's health or safety when a chiropractor poorly performs or misinterprets this case management task?"

**Note 2.** Frequency items were measured using a six-point Likert scale: 1 = Never, 2 = 1-6 times

per year, 3 = About once per month, 4 = About once per week, 5 = About once per day, and 6 = Several times per day.

**Note 3.** Risk items were measured using a six-point Likert scale: 1 = No risk, 2 = Minimal risk, 3 = Some risk, 4 = Moderate risk, 5 = Significant risk, and 6 = Severe risk.

**Table 3.3** Variables Representing Communication Tasks

ITEM
How frequently during the past 12 months did you create complete, readable documentation of a patient's case history and examination findings, the diagnosis and prognosis, and the case management plan?
How frequently during the past 12 months did you review with a patient his or her relevant case history and examination findings, diagnosis, prognosis, and case management options?
How frequently during the past 12 months did you obtain written, informed consent for treatment?
How frequently during the past 12 months did you completely and legibly document each patient visit in the SOAP note format?
How frequently during the past 12 months did you completely and legibly document, on each visit, the patient's presentation in the PART format ( <b>p</b> ain/tenderness, <b>a</b> symmetry, <b>r</b> ange of motion, and <b>t</b> issue tone) as required for Medicare reimbursement?
How frequently during the past 12 months did you write a physical restriction order?
How frequently during the past 12 months did you make specific recommendations to a patient regarding changing risky or unhealthy behaviors?
How frequently during the past 12 months did you make specific recommendations to a patient regarding disease prevention and early screening advice?
How frequently during the past 12 months did you make specific recommendations to a patient regarding ergonomic or postural advice?
How frequently during the past 12 months did you make specific recommendations to a patient regarding nutritional and dietary changes?
How frequently during the past 12 months did you make specific recommendations to a patient regarding physical fitness and exercise promotion?
How frequently during the past 12 months did you make specific recommendations to a patient regarding relaxation or stress reduction?
How frequently during the past 12 months did you make specific recommendations to a patient regarding self-care strategies?
How frequently during the past 12 months did you make specific recommendations to a patient regarding smoking cessation?
How frequently during the past 12 months did you write a narrative report ( <b>not</b> daily notes)?

**Note 1.** Every frequency item (represented in the table) was followed by a risk item: “What is the risk to the patient’s health or safety when a chiropractor poorly performs or misinterprets this communication task?”

**Note 2.** Frequency items were measured using a six-point Likert scale: 1 = Never,

2 = 1–6 times per year, 3 = About once per month, 4 = About once per week, 5 = About once per day, and 6 = Several times per day.

**Note 3.** Risk items were measured using a six-point Likert scale: 1 = No risk, 2 = Minimal risk, 3 = Some risk, 4 = Moderate risk, 5 = Significant risk, and 6 = Severe risk.

**Table 3.4** Variables Representing Treatment Tasks

ITEM
How frequently during the past 12 months did you perform an objective assessment of the involved joints’ function immediately prior to your chiropractic adjustment?
How frequently during the past 12 months did you perform a manual chiropractic adjustment of the occiput, spine, and/or pelvis?
How frequently during the past 12 months did you perform an instrument-assisted chiropractic adjustment (e.g., Activator, drop-section, flexion-distraction, etc.) of the occiput, spine, and/or pelvis?
How frequently during the past 12 months did you perform a manual chiropractic adjustment of an extra-spinal articulation?
How frequently during the past 12 months did you perform an instrument-assisted (e.g., Activator, etc.) chiropractic adjustment of an extra-spinal articulation?
How frequently during the past 12 months did you perform an objective assessment of the involved joints’ function immediately following your chiropractic adjustment?
How frequently during the past 12 months did you use an attended physiotherapeutic modality (e.g., cold laser, ultrasound, etc.)?
How frequently during the past 12 months did you use an unattended physiotherapeutic modality (e.g., motorized traction, vibration, diathermy, heat/cold packs, etc.)?
How frequently during the past 12 months did you use in-office active rehab exercises?
How frequently during the past 12 months did you use acupuncture (with needles)?
How frequently during the past 12 months did you use dry needling?
How frequently during the past 12 months did you use orthotics, bracing, and/or taping as an adjunctive treatment?
How frequently during the past 12 months did you use myofascial/soft tissue release techniques?

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How frequently during the past 12 months did you supply nutritional supplements, herbs, enzymes, or homeopathic remedies as an adjunctive treatment?

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How frequently during the past 12 months did you engage in pediatric chiropractic?

---

How frequently during the past 12 months did you engage in animal chiropractic?

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**Note 1.** Every frequency item (represented in the table) was followed by a risk item: “What is the risk to the patient’s health or safety when a chiropractor poorly performs or omits this treatment task?”

**Note 2.** Frequency items were measured using a six-point Likert scale: 1 = Never, 2 = 1–6 times

per year, 3 = About once per month, 4 = About once per week, 5 = About once per day, and 6 = Several times per day.

**Note 3.** Risk items were measured using a six-point Likert scale: 1 = No risk, 2 = Minimal risk, 3 = Some risk, 4 = Moderate risk, 5 = Significant risk, and 6 = Severe risk.

**Table 3.5** Variables Representing Research and Ethics

ITEM	SCALE
How frequently during the past 12 months did you read peer-reviewed published chiropractic or medical research?	1 = Never 2 = 1–6 times per year 3 = About once per month 4 = About once per week 5 = About once per day 6 = Several times per day
How often in your career have you published an article in a peer-reviewed chiropractic (or other clinical or educational) journal?	1 = Never 2 = Once 3 = Two to five times 4 = More than five times
How frequently in the past 12 months did you base your treatment decision on current chiropractic/healthcare research?	1 = Never 2 = 1–6 times per year 3 = About once per month 4 = About once per week 5 = About once per day 6 = Several times per day
How frequently during the past 12 months did you make practice decisions using evidence-based research and/or published professional guidelines?	1 = Never 2 = 1–6 times per year 3 = About once per month 4 = About once per week 5 = About once per day 6 = Several times per day

ITEM	SCALE
How frequently in the past 12 months did you review best practices documents in chiropractic?	1 = Never 2 = 1-6 times per year 3 = About once per month 4 = About once per week 5 = About once per day 6 = Several times per day
How frequently during the past 12 months did you make practice decisions to ensure the confidentiality of your patients' health information being collected, stored, and/or transmitted?	1 = Never 2 = 1-6 times per year 3 = About once per month 4 = About once per week 5 = About once per day 6 = Several times per day
How many annual hours of professional continuing education (CE hours) have you averaged per year over the past five years?	1 = None 2 = 1-7 hours per year 3 = 8-14 hours per year 4 = 15-24 hours per year 5 = 25-35 hours per year 6 = More than 35 hours per year
How many hours of professional continuing education (CE hours) are required by your state to maintain chiropractic licensure?	1 = None 2 = 5-9 hours per year 3 = 10-14 hours per year 4 = 15-24 hours per year 5 = 25-35 hours per year
How frequently during the past 12 months did you identify and report possible professional abuse and/or impairment regarding chiropractic regulations and ethical guidelines?	1 = Never 2 = 1-6 times per year 3 = About once per month 4 = About once per week

**Table 3.6** Variables Representing Demographics of Chiropractors

Note. Items marked with “\*” were dummy-coded for the analysis.

ITEM	SCALE/RESPONSE
Do you currently practice chiropractic?	1 = Yes 2 = No
Hours per week that you practice chiropractic	1 = Fewer than 9 2 = 10-19 3 = 20-29 4 = 30-39 5 = 40-49 6 = 50-59 7 = 60 or more
Please indicate your age	1 = Under 30 years 2 = 30-39 years 3 = 40-49 years 4 = 50-59 years 5 = 60 years or over
Best description of your gender*	1 = Male 2 = Female 3 = Transgender 4 = Other 5 = I prefer not to respond
Please indicate your ethnic origin*	1 = Asian/Pacific Islander 2 = Black/African American 3 = White/Caucasian 4 = Hispanic/Latino 5 = Native American 6 = Other
Years since you received your DC degree	1 = Fewer than 2 years 2 = 2-4 years 3 = 5-15 years 4 = 16-25 years 5 = More than 25 years
Highest level of <b>non-chiropractic</b> academic education attained	1 = High school diploma 2 = Associate’s degree 3 = Bachelor’s degree 4 = Master’s degree 5 = Doctoral degree 6 = Other
Institution that conferred your Doctor of Chiropractic degree	List of Chiropractic Colleges
In what state/jurisdiction is your primary practice currently located?	List of U.S. states and territories; Other

1. Dummy coding refers to the process of coding a categorical variable into dichotomous variables. For example, in the case of gender, *male* category is recoded into a dichotomous variable: 1 = male; 2 = otherwise; female category is recoded into a dichotomous variable: 1 = female; 2 = otherwise, etc.

**Table 3.7** Variables Representing Practice Settings and Patient Characteristics

Note. Items marked with “\*” were dummy-coded for the analysis.

ITEM	SCALE/RESPONSE
What is your principal practice <b>setting</b> ?*	1 = Chiropractic office 2 = Multidisciplinary healthcare facility 3 = Spine surgical center 4 = Community health center 5 = Other
Which description best characterizes your role in the primary office where you <b>work</b> ?*	1 = Sole proprietor 2 = Business partner 3 = Associate/Employee 4 = Other
What is the population density of the community in which your practice is <b>located</b> ?*	1 = City/Urban 2 = Suburb 3 = Small city or town 4 = Rural
Do you use Electronic Health Record software (EHR) to document the majority of your patient interactions (e.g. histories, exams, plans, treatments)?	1 = Yes 2 = No
During the past year, what percent of your patient cases were devoted to the following <b>categories</b> ?*	Personal injury Worker’s comp Health insurance/Not managed care Managed care/Contracted panel Private pay/Cash Medicare Medicaid Pro bono/Write-offs
Are you currently employed or contracted to provide chiropractic care to active or retired military personnel?	1 = Yes 2 = No
Do you have hospital privileges?	1 = Yes 2 = No
What is the focus of your practice?	List of foci
Do you take radiographs in your office?	1 = Yes 2 = No

ITEM	SCALE/RESPONSE
Do you have post-graduate diplomate status (or equivalent) through a specialty board, council, academy, college, or <b>association</b> ?*	1 = None/does not apply 2 = Have worked toward diplomate status (or equivalent) but not completed 3 = Awarded diplomate status (or equivalent) by a specialty board, council, academy, college, or association 4 = Have worked toward Master's degree in a clinical specialty but not completed 5 = Achieved a Master's degree in a clinical specialty
Approximate amount of time you spend on the following practice functions during a typical week*	Patient care and treatment; Documentation of care; Business management (personnel, marketing, etc.); Professional education and research
Over the past 12 months, the percent of patients you treated that were*	Male Female
Over the past 12 months, the percent of patients you treated that were*	1 = 5 years of age or younger 2 = 6-17 years 3 = 18-30 years 4 = 31-64 years 5 = 65 years or older

## Sampling Design

A survey is a systematic method of gathering information from a sample of individuals for the purpose of describing the attributes of the larger population to which the individuals belong (Groves et al., 2009). Population parameters cannot be measured directly, but can be estimated from a sample (Freedman et al., 2007). A degree of sample validity and representability must be established to enable the generation of appropriate inferences about a population. Every statistic calculated based on the sample data becomes a population parameter estimate. Therefore, researchers aim to minimize the deviation between the

estimate and the parameter (Crano et al., 2014; Kerlinger & Lee, 2000). The factors contributing to this difference are coverage error (all units of a population not having a known probability greater than zero of inclusion in the sample drawn to represent the population), sampling error (survey of only a portion of a population, rather than all of its members), measurement error (inaccurate answers to survey items that stem from poorly worded questions, errors in data collection, administration mode effects, and social desirability bias), and nonresponse error (not convincing some people in the sample to respond to the survey request) (Dillman et al., 1999).

## Sampling Frame

When designing the sampling frame, our objective was to estimate the population parameters associated with the chiropractic profession. We defined our population as all chiropractors in the U.S.. Therefore, we were required to control for two major issues: representation of all states in the sample, and an error of estimation within acceptable boundaries. Specifically, we calculated the error of estimation using Equation 1:

$$\text{Error of Estimation} = |\theta - \hat{\theta}| < B \quad (1)$$

where  $\theta$  is the value of the parameter,  $\hat{\theta}$  is the estimate, and  $B$  is a predetermined value. We would then be required to set a probability that specifies the fraction of times in repeated sampling in which we would require the error of estimation to be less than  $B$ . Stated formulaically as Equation 2,

$$P [\text{Error of Estimation} < B] = 1 - \alpha \quad (2)$$

where  $\alpha$  is the probability of a Type I error. In survey research,  $\alpha$  is usually set at .05, which provides 95% confidence for normally distributed responses (Scheaffer et al., 2006). For this survey, we set the  $\alpha$  value at .05.

The Practice Analysis of Chiropractic survey conducted in 2014 identified practicing chiropractors on a state-by-state basis. In states with relatively few licensed chiropractors, every chiropractor on the supplied state list was contacted and encouraged to participate in the survey. In states with larger numbers of chiropractors, a sequential selection process was utilized. This procedure proved to be very inefficient and expensive. Therefore, in 2019, we decided to use *representative sampling*, a method of selecting a sample considered to be representative of a population (Groves et al., 2009). Neither procedure provides a simple random sample, the golden standard in statistical sampling (Scheaffer et al., 2006). In fact, we believe that it would not be possible to pre-specify an equal probability for inclusion in the sample of every practicing chiropractor in the United States. Further, neither sampling procedure is immune to investigator bias and nonresponse bias. However, the representative sampling process implemented in 2019 proved to be more efficient and less expensive. To ensure a broad sample, we maximized the reach of the 2019 survey by contacting various chiropractic entities and, with their agreement, providing survey links to be distributed among their members and alumni. Table 3.8 lists the chiropractic organizations that agreed to distribute survey links to their members.

**Table 3.8** Chiropractic Organizations That Distributed Survey Links

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**Organization**

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- American Chiropractic Association (ACA)
- American Chiropractic Board of Sports Physicians (ACBSP)
- American Chiropractor Magazine
- American Veterinary Chiropractic Association (AVCA)
- American Public Health Association (APHA-CHC)
- California Chiropractic Association (CCA)
- Chiropractic Board of Clinical Nutrition (CBCN)
- Cleveland University
- Dynamic Chiropractic
- Evidence-Based Chiropractic Group
- Foundation for Chiropractic Progress
- International Chiropractors Association (ICA)
- Life University, College of Chiropractic
- Life Chiropractic College West
- Logan College of Chiropractic
- NBCE's Part IV Examiners
- National University of Health Sciences
- New York Chiropractic College
- Northwestern Health Sciences University
- Palmer College of Chiropractic, California Campus
- Palmer College of Chiropractic, Florida Campus
- Palmer College of Chiropractic, Iowa Campus
- Parker University, College of Chiropractic
- Sherman College of Chiropractic
- Southern California University of Health Sciences
- Texas Chiropractic Association (TCA)
- Texas Chiropractic College
- University of Western States

## Survey Administration

### Planning and Administration

Planning for the survey began in early 2018 with the construction of the survey questionnaire. The target population was identified to be chiropractors practicing in the U.S. We decided not to exclude responses from nonpracticing chiropractors or chiropractors who practiced part time, but rather to treat them as subsamples.

Various chiropractic organizations were contacted in late 2018 and early 2019 to inform them of the survey and to obtain permission to send survey links for distribution among their members. Additionally, we purchased a business e-mail list of chiropractors in the U.S. from a commercial company.

In 2019, the survey was administered electronically. Researchers have found that benefits such as more rapid response times and decreased costs are associated with electronically administered surveys (Jansen et al., 2007). The survey opened on April 8 and closed on August 14, 2019.

Participation in the survey was voluntary. The respondents could skip any questions that they did not want to answer and could withdraw from the survey at any time. The NBCE Information Technology department developed an algorithm to recognize duplicate responses. In the case of duplicates, the response that contained more information was stored while the response with less information was deleted. The response rate for the survey was 48%.

### Ethics

On February 26, 2019, the NBCE Institutional Review Board (IRB) committee performed a review of the Practice Analysis of Chiropractic 2020 survey. The committee unanimously granted an exemption from a full review based on the privacy and anonymizing features built into the survey process. The NBCE developed a mechanism by which the responses could not be traced back to the participants. Further, all identifying records (e.g., e-mail addresses) were removed from the data before the files were released for analyses.

### Sample

A total of 3,956 completed surveys were received. Of these, 146 were submitted from DCs who were practicing outside of the United States and its territories (primarily in Canada,  $n = 72$ ). Only responses from U.S.-based chiropractors are included in this report. The sample size was determined at the national level and represented all 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. The numbers of responses received from individual states were proportional to the approximate number of chiropractors in those states. Table 3.9 lists the sample sizes obtained by state.

**Table 3.9** Survey Respondents by State (Original Sample)

State/Territory	Sample Size	State/Territory	Sample Size
Alabama	25	Nebraska	35
Alaska	13	Nevada	19
Arizona	64	New Hampshire	18
Arkansas	18	New Jersey	100
California	343	New Mexico	16
Colorado	91	New York	152
Connecticut	30	North Carolina	84
Delaware	8	North Dakota	22
District of Columbia	11	Ohio	91
Florida	251	Oklahoma	35
Georgia	183	Oregon	86
Hawaii	9	Pennsylvania	134
Idaho	23	Rhode Island	11
Illinois	211	South Carolina	69
Indiana	55	South Dakota	26
Iowa	145	Tennessee	58
Kansas	47	Texas	393
Kentucky	24	Utah	22
Louisiana	30	Vermont	4
Maine	20	Virginia	56
Maryland	37	Washington	101
Massachusetts	57	West Virginia	10
Michigan	116	Wisconsin	104
Minnesota	181	Wyoming	3
Mississippi	10	Puerto Rico	8
Missouri	131	U.S. Virgin Islands	3
Montana	17		

### Consideration for Sample Size

A sample size of 1,000 is considered adequate for most survey research (Scheaffer, Mendenhall, & Ott, 2006). To explain why, let us consider an average of responses to a survey item to be an estimate of the population parameter. However, sampling surveys involve chance error (Freedman, Pisani, & Purves, 2007). In other words, as the sample is limited in size, a degree of deviation from the real parameter is expected in estimates calculated from the sample. The relationship between the sample-

based estimate and the population parameter can be formulated as Equation 3:

$$\text{Sample percentage} = \text{Population percentage} + \text{Error} \quad (3)$$

When determining the appropriate sample size, the goal is to minimize the chance error reasonably. To achieve this, we can build an interval around the sample-based estimate wherein the real parameter would be located with some probability. This is called the

confidence interval (Neyman, 1937). The probability of confidence is  $1-\alpha=1-.05=.95$  or 95%.

Assuming a normal distribution of the survey responses, we can specify the 95% confidence interval (95% CI) using Equation 4:

$$95\% CI = \left( \hat{\mu} - z \frac{\hat{\sigma}}{\sqrt{n}}; \hat{\mu} + z \frac{\hat{\sigma}}{\sqrt{n}} \right) \quad (4)$$

where  $z$  is the standard normal variable,  $\hat{\mu}$  is the average of responses to a survey item,  $\hat{\sigma}$  is the standard deviation associated with  $\hat{\mu}$ , and  $n$  is the sample size.

Let us assume that  $\hat{\mu}=4$  and  $\hat{\sigma}=.5$ . Therefore, the 95% CI for a sample size ( $n$ ) of 10 can be calculated as:

$$95\% CI = 4 \pm 1.96 \frac{.5}{10} = (3.9, 4.1)$$

Thus, the real parameter value is located somewhere between 3.9 and 4.1. Let us now increase the sample size to  $n = 100$ . The 95% CI for a sample size ( $n$ ) of 100 can be calculated as:

$$95\% CI = 4 \pm 1.96 \frac{.5}{100} = (3.99, 4.01)$$

Finally, the 95% CI for the sample size ( $n$ ) of 1,000 can be calculated as:

$$95\% CI = 4 \pm 1.96 \frac{.5}{1000} = (3.999, 4.001)$$

Clearly, increasing the sample size above 1,000 is not considered worth the effort or cost in terms of reducing error. However, our second goal was to obtain a representative sample. Therefore, we aimed for an analysis sample size ( $n$ ) of 2,000.

## Analysis Samples

Prior to each statistical analysis, we examined the data for missing values. We determined that after accounting for the survey skip patterns, any missing data in the analysis samples had occurred at random. Therefore, *listwise deletion*, a method that excludes an entire record from analysis if any single value is missing, was implemented (Allison, 2001) prior to the analyses. The exclusion of cases with missing data on key variables resulted in analysis samples of  $n = 3,810$  for overall demographics (presented in Chapter 4),  $n = 2,309$  for practice and patient characteristics (presented in Chapter 5),  $n = 1,752$  for professional functions of patient assessment,  $n = 1,935$  for professional functions of case management,  $n = 1,975$  for professional functions of communication tasks,  $n = 1,813$  for professional functions of treatment tasks, and  $n = 2,194$  for research and ethics (all presented in Chapter 6). There were no systematic differences between the original sample and the analysis samples. Table 3.10 presents the distributions by state of the analysis samples for Patient Assessment, Case Management, Communication Tasks, Treatment Tasks, and Research and Ethics.

**Table 3.9** Survey Respondents by State (Original Sample)

State/Territory	Patient Assessment (n = 1,752)	Case Management (n = 1,935)	Communication Tasks (n = 1,975)	Treatment Tasks (n = 1,813)	Research and Ethics (n = 2,194)
Alabama	12	13	13	11	17
Alaska	7	8	7	9	9
Arizona	27	27	30	26	31
Arkansas	11	10	11	10	14
California	147	168	189	175	177
Colorado	35	40	45	40	45
Connecticut	16	21	23	17	21
Delaware	3	4	5	4	6
District of Columbia	5	6	5	7	5
Florida	95	100	102	101	117
Georgia	61	76	78	69	82
Hawaii	6	5	6	5	7
Idaho	12	9	12	11	12
Illinois	87	102	100	89	108
Indiana	30	34	27	27	38
Iowa	70	74	76	69	93
Kansas	28	31	30	30	32
Kentucky	10	12	7	11	14
Louisiana	14	16	14	12	20
Maine	11	11	14	10	15
Maryland	17	20	19	18	21
Massachusetts	21	23	28	22	32
Michigan	59	65	65	55	71
Minnesota	70	85	87	78	101
Mississippi	5	5	5	5	7
Missouri	57	62	64	56	73
Montana	10	10	13	11	13
Nebraska	17	18	21	19	24
Nevada	10	11	14	11	15
New Hampshire	10	12	12	11	11
New Jersey	38	42	40	42	53
New Mexico	6	6	5	5	6
New York	72	82	77	81	95
North Carolina	45	50	53	45	58
North Dakota	12	13	14	13	19
Ohio	42	50	52	50	59
Oklahoma	21	22	24	20	28
Oregon	34	41	42	41	48
Pennsylvania	65	72	76	69	83

State/Territory	Patient Assessment (n = 1,752)	Case Management (n = 1,935)	Communication Tasks (n = 1,975)	Treatment Tasks (n = 1,813)	Research and Ethics (n = 2,194)
Rhode Island	5	6	8	6	8
South Carolina	31	32	32	28	37
South Dakota	14	15	15	12	1
Tennessee	27	29	30	30	31
Texas	224	227	215	194	236
Utah	12	13	11	10	14
Vermont	3	2	2	1	1
Virginia	22	29	30	29	35
Washington	44	50	50	50	62
West Virginia	5	6	7	6	8
Wisconsin	62	65	64	56	75
Wyoming	1	1	2	2	2
Puerto Rico	2	2	2	2	2
U.S. Virgin Islands	2	2	2	2	2

## Importance Index

After the frequency and risk values for each item were recorded, a value for importance was calculated by multiplying the frequency responses on a Likert scale (range: 1-6) by the risk responses on a Likert scale (range: 1-6). This calculation yielded importance values ranging from 1 = Slight importance to 36 = Extreme importance. The Importance Index reflects the fact that some professional tasks may be done frequently and have a low risk, while other tasks may be performed rarely but carry a high risk to the public. This information then provides guidance to test developers as they construct an accurate competency assessment prior to licensure by producing a more meaningful interpretation of professional tasks (Christensen et al., 2015). Table 3.11 presents the ranges and interpretations of the Importance Index.

## Data Analysis

Descriptive statistical methods were used to analyze the data, which included both numerical and graphical representations of the data. The numerical methods included the calculation of averages, standard deviations, ranges, and percentages, while the graphical methods encompassed the construction of histograms, bar/pie charts, and plots. Occasionally, correlation coefficients were estimated when deemed appropriate. Reliabilities were calculated for the domains presented in Chapter 6. Table 3.12 presents the statistical formulas used to calculate and present the results.

**Table 3.11** Ranges and Interpretations for the Importance Index

Importance
1-6 = Slight importance
7-12 = Weak importance
13-18 = Moderate importance
19-24 = Strong importance
25-30 = Very strong importance
31-36 = Extreme importance

**Table 3.12** Definition of the Key Statistics Used in the Analysis

Statistic	Symbol	Formula
Mean/Average <sup>a</sup>	$\mu, \hat{\mu}, \bar{x}, M$	$\hat{\mu} = \frac{1}{n} \sum_{i=1}^n X_i$
Standard Deviation	$\sigma, \hat{\sigma}, s, SD$	$\hat{\sigma} = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (X_i - \hat{\mu})^2}$
Variance	$\sigma^2, \hat{\sigma}^2, s^2$	$\hat{\sigma}^2 = \frac{1}{n-1} \sum_{i=1}^n (X_i - \hat{\mu})^2$
Correlation <sup>b</sup>	$\rho, \hat{\rho}, r$ $\hat{\rho}$	$= \frac{\frac{1}{n-1} \sum_{i=1}^n (X_i - \hat{\mu}_X)(Y_i - \hat{\mu}_Y)}{\sqrt{\frac{1}{n-1} \sum_{i=1}^n (X_i - \hat{\mu}_X)^2} \sqrt{\frac{1}{n-1} \sum_{i=1}^n (Y_i - \hat{\mu}_Y)^2}}$
Standard Error	$SE$	$SE = \frac{\hat{\sigma}}{\sqrt{n}}$
Reliability/Cronbach's alpha <sup>c</sup>	$alpha, \alpha$	$\alpha = \frac{k}{k-1} \left( 1 - \frac{\sum_{i=1}^k \sigma_i^2}{\sigma_T^2} \right)$

<sup>a</sup>  $X_i$  is a score, where  $i = 1, 2, \dots, n$ ; and  $n$  is a sample size.

<sup>b</sup>  $Y_i$  is a score, where  $i = 1, 2, \dots, n$ ; and  $n$  is a sample size.

<sup>c</sup>  $\alpha$  is the estimate of the instrument's internal consistency reliability;  $k$  is the number of items on the instrument;  $i$  is the item indicator;  $i = 1, 2, \dots, k$ ;  $\sigma_i^2$  is the variance of item  $i$ ; and  $\sigma_T^2$  is the total variance of the scale.

## References

- Allison, P. D. (2001). *Missing data*. Thousand Oaks, CA.
- Crano, W. D., Brewer, M. B., & Lac, A. (2014). *Principles and methods of social research* (3rd ed.). Routledge.
- Dierdorff, E. C., & Wison, M. A. (2003). A meta-analysis of job analysis reliability. *Journal of Applied Psychology*, 88(4), 635-646.
- Dillman, D., Tortora, R. D., & Bowker, D. (1999). *Principles for constructing web surveys*. [https://www.researchgate.net/profile/Don\\_Dillman/publication/2465935\\_Principles\\_for\\_Constructing\\_Web\\_Surveys/links/549813cb0cf2519f5a1db6de.pdf](https://www.researchgate.net/profile/Don_Dillman/publication/2465935_Principles_for_Constructing_Web_Surveys/links/549813cb0cf2519f5a1db6de.pdf)
- Fine, S., & Wiley, W. (1971). *An introduction to functional job analysis: Methods for manpower analysis*. Upjohn Institute for Employment Research.
- Freedman, D. R., Pisani, R., & Purves, R. (2007). *Statistics* (4th ed.). W.W. Norton & Company.
- Groves, R. M., Flower, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). *Survey methodology* (2nd ed.). John Wiley & Sons.
- Jansen, K. J., Corley, K. G., & Jansen, B. J. (2007). E-survey methodology. In R. A. Reynolds, R. Woods, & J. D. Baker (Eds.), *Handbook of research on electronic surveys and measurements*. Idea Group Inc.
- Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research* (4th ed.). Harcourt Brace Jovanovich College Publishers.
- Knapp, J. E., & Knapp, L. G. (1995). Practice analysis: Building the foundation for validity. In J. C. Impara (Ed.), *Licensure testing: Purposes, procedures, and practices* (pp. 93-116). Buros Institute of Mental Measurement and University of Nebraska-Lincoln.
- McCormick, E. (1976). Job and task analysis. In M. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (Vol. 1, pp. 651-695).
- Neyman, J. (1937). Outline of a theory of statistical estimation on the classical theory of probability. *Philosophical Transactions of the Royal Society A*, 236(767), 333-380.
- Scheaffer, R. L., Mendenhall III, W., & Ott, R. L. (2006). *Elementary survey sampling* (6th ed.). Thomson.
- Schneider, B., & Konz, A. M. (1989). Strategic job analysis. *Human Resource Management*, 28(1), 51-63.
- Uniform Guidelines on Employee Selection Procedures*. (1978). Federal Register. (3).

# Chapter Four

## Demographic Portrait of the Chiropractic Profession in the U.S.

Chiropractic is the nation's third largest primary healthcare profession, surpassed only by medicine and dentistry (Christensen et al., 2015). According to a recent Gallup report, 53% of Americans with neck or back pain preferred to receive care from chiropractors. Adults in the U.S. who experience significant neck or back pain are more likely to state that chiropractic care is safer than prescription pain medication (31%) than to state the reverse view (17%) (Gallup 2018, p. 9).

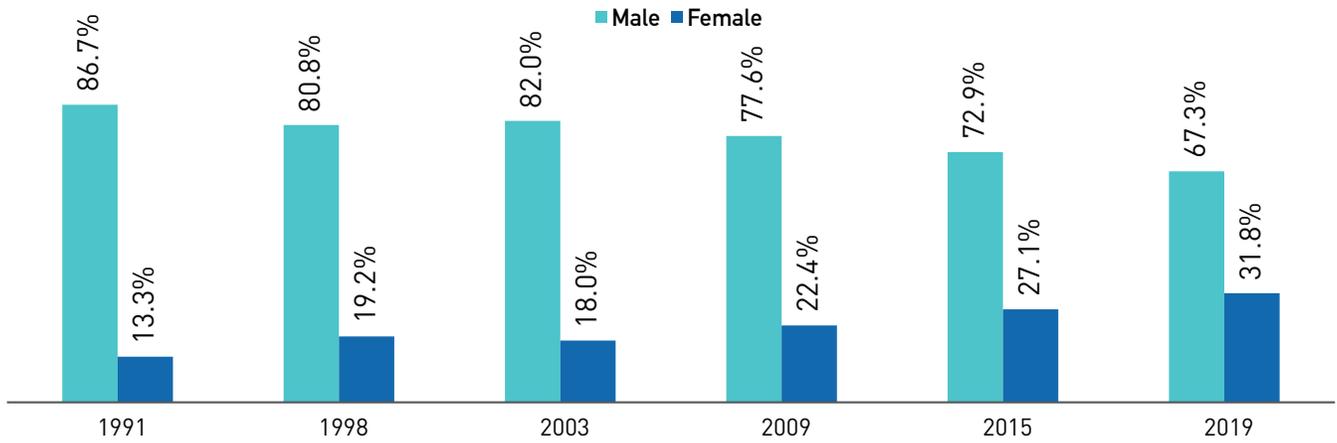
The 2019 Survey of Chiropractic Practice was conducted using an updated process to solicit internet-based responses. This differed from the previous surveys conducted by the NBCE regarding the profession, which were based on survey questionnaires mailed to chiropractic licensees' postal addresses (Christensen et al., 2015). For this survey, the participating organizations sent invitations to the email addresses of chiropractors in their contact lists. The organizations that assisted the NBCE in this project included chiropractic college alumni associations, national and some state associations, and several other professional affiliation organizations. A total of 3,956 completed surveys were received as a result of

this widespread effort to obtain input from the profession. Of these, 146 were submitted by DCs who were practicing outside of the United States and its territories (primarily in Canada,  $n = 72$ ). Only responses from U.S.-based chiropractors are included in this report.

### Demographic Composition of Survey Respondents

The chiropractic profession in the U.S. is becoming increasingly diverse with the inclusion of more female practitioners. The trend is clear—the proportion of women in the profession has more than doubled relative to that in 1991. However, men still constitute the majority (67.3% vs. 31.8% women). For the first time, the NBCE presented respondents to this survey with more than two gender categories. In addition to “male” and “female,” the respondents could select one of the following options: “transgender,” “prefer not to respond,” and “other.” Five respondents (0.1%) self-identified as “transgender,” 24 (0.6%) preferred not to respond, and 5 (0.1%) self-identified as “other.”

## Practitioner Gender



**Figure 4.1. Gender composition of the sample by survey year.**

## Ethnicity

In 2019, the majority (90.8%) of chiropractic practitioners were of a Caucasian/White ethnic origin. The next largest group self-identified as Hispanic/Latino (3%). Chiropractors of Asian/Pacific Islander origin comprised 2% of the overall sample, while 1.6% of the respondents self-identified as Black or African American. Approximately 1% of respondents self-identified as Native American, and 1.7% responded as “other.”

The chiropractic profession is becoming more inclusive in terms of gender and ethnicity. Although the profession has yet to achieve diversity levels reflective of the U.S. population (Brisco et al., 2019), these longitudinal trends demonstrate that individuals of non-White ethnic origin are choosing to enter the chiropractic profession at higher rates. This is especially true among chiropractors under 30 years of age; in this age group, the representation of all non-White ethnicities has significantly increased, with the exception of those of Asian/Pacific Islander origin (see Table 4.2).

## Age

The majority of chiropractic professionals responding to the 2019 survey were between the ages of 30 and 59 (65%). Chiropractors over 60 constituted 30% of the sample, while 5% were under 30.

**Table 4.1 Ethnic Composition of the Sample by Year**

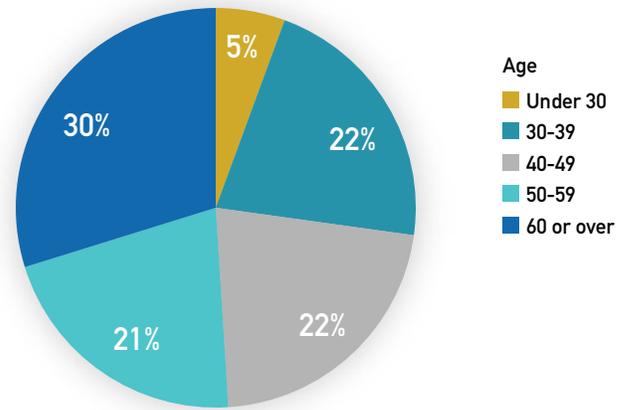
Ethnicity	1991	1998	2003	2009	2014	2019
Asian/Pacific Islander	0.8%	1.8%	2.7%	2.6%	2.8%	2.0%
Black or African American	0.5%	0.6%	0.8%	0.9%	1.2%	1.6%
White	95.5%	93.5%	91.5%	84.9%	89.4%	90.8%
Hispanic/Latino	1.6%	1.7%	2.2%	1.0%	2.0%	3.0%
Native American	0.2%	0.8%	0.6%	0.4%	0.3%	0.9%
Other	1.2%	1.6%	1.5%	1.2%	0.2%	1.7%
Multi-Ethnic	—	—	0.7%	9.0%	4.1%	—

*Note. Due to rounding errors, the percentages may not add up to 100%.*

**Table 4.2** Ethnic Composition of the Sample among Chiropractors under 30 Years of Age

Ethnicity	%
Asian/Pacific Islander	1.4%
Black or African American	4.6%
White	85.2%
Hispanic/Latino	5.1%
Native American	2.3%
Other	1.4%

*Note.* Due to rounding errors, the percentages may not add up to 100%.



**Figure 4.2.** Age composition of the sample.

## Chiropractic Degree

Prospective chiropractors are required to obtain a Doctor of Chiropractic degree, a post-graduate professional degree that typically takes 4 years to complete (Bureau of Labor Statistics, 2019). The respondents were asked to indicate the college from which they obtained their DC degree. One-quarter (25.1%) of the sample collected in 2019 had received their DC degrees from one of the Palmer colleges, while 14.2% of the respondents reported that they received their degrees from Life University; 12.3% received their degrees from Logan College of Chiropractic, and 8.1% received their degrees from the National University of Health Sciences.

## Post-Graduate Diplomate Status

Specialty Councils and Specialty Certification Boards have been established within the chiropractic profession to promote the quality of chiropractic care. These organizations also provide continuous education and training to DCs who wish to develop expertise within a particular area of health care. In 2019, the respondents were asked whether they held post-graduate diplomate status through a specialty board, council, academy, college, or association. The majority of chiropractors surveyed (62.6%) did not hold a diplomate status. Eighteen percent of the respondents (17.9%) had been awarded a diplomate status (or equivalent) by a specialty board, council, academy, college, or association. Three percent (3.3%) reported having a Master’s degree in a clinical specialty, while 16.2% had worked toward but not completed a diplomate status (or equivalent) or a Master’s degree in a clinical specialty (see Table 4.4).

**Table 4.3** Chiropractic Colleges Represented in the 2019 Survey

College	1991	1998	2003	2009	2014	2019
Anglo-European College of Chiropractic	—	—	—	—	—	0.1%
Canadian Memorial Chiropractic College	0.1%	0.2%	0.1%	0.1%	0.2%	0.2%
Cleveland Chiropractic College, Kansas City	3.9%	3.5%	4.3%	4.1%	4.8%	2.4%
Cleveland Chiropractic College, Los Angeles	3.5%	2.9%	1.8%	1.2%	2.8%	1.4%
D'Youville College	—	—	—	—	—	0.1%
Life University, College of Chiropractic	9.0%	12.3%	11.1%	11.7%	10.2%	14.2%
Life Chiropractic College West	1.3%	2.6%	3.7%	3.6%	2.7%	2.1%
Lincoln College of Chiropractic	—	0.6%	0.9%	0.5%	0.1%	0.2%
Logan College of Chiropractic	8.0%	8.4%	7.7%	9.4%	6.9%	12.3%
National University of Health Sciences	11.6%	9.2%	10.4%	7.6%	9.6%	8.1%
New York Chiropractic College	7.4%	7.3%	6.7%	7.9%	6.8%	6.5%
Northwestern Health Sciences University	4.5%	4.5%	5.9%	5.5%	5.9%	6.6%
Palmer College of Chiropractic, Davenport	27.7%	22.3%	21.3%	21.6%	20.2%	19.8%
Palmer College of Chiropractic, Florida	—	—	—	0.5%	0.6%	2.0%
Palmer College of Chiropractic, West	2.2%	3.7%	3.5%	4.5%	3.2%	3.3%
Parker University, College of Chiropractic	0.7%	3.1%	4.3%	6.4%	4.4%	5.6%
Pennsylvania College of Straight Chiropractic	0.8%	0.7%	0.4%	0.1%	0.7%	0.1%
Sherman College of Chiropractic	2.9%	1.7%	2.4%	2.3%	3.6%	2.2%
Southern California University of Health Sciences	6.6%	7.5%	7.2%	4.7%	5.8%	3.4%
Texas Chiropractic College	3.5%	4.3%	3.4%	3.5%	5.1%	4.2%
University of Bridgeport	—	0.2%	0.5%	0.6%	0.4%	0.2%
University of Western States	3.2%	3.7%	3.0%	3.9%	4.5%	4.5%
Other	2.8%	0.5%	1.0%	0.1%	0.1%	0.3%

Note. Due to rounding errors, the percentages may not add up to 100%.

**Table 4.4** Post-Graduate Diplomate Statuses of Respondents

Status	%
Awarded diplomate status (or equivalent) by a specialty board, council, academy, college, or association	17.9%
Achieved a Master’s degree in a clinical specialty	3.3%
None/does not apply	62.6%
Have worked toward diplomate status (or equivalent), but not completed	15.6%
Have worked toward Master’s degree in a clinical specialty, but not completed	0.6%

### Level of Non-Chiropractic Education

Admission to a DC program requires at least 90 semester hours of undergraduate education, including 24 semester hours in life and physical science courses (CCE, 2018, p. 20). Generally, however, a Bachelor’s degree is not required for admission to a Doctor of Chiropractic program (Bureau of Labor Statistics, 2019). Nevertheless, the level of pre-chiropractic education has steadily increased since 1991. In 2014, 65.9% of chiropractors held Bachelor’s degrees, 5.9% held Master’s degrees, and 7.0% held doctoral degrees in non-chiropractic fields (Christensen et al., 2015).

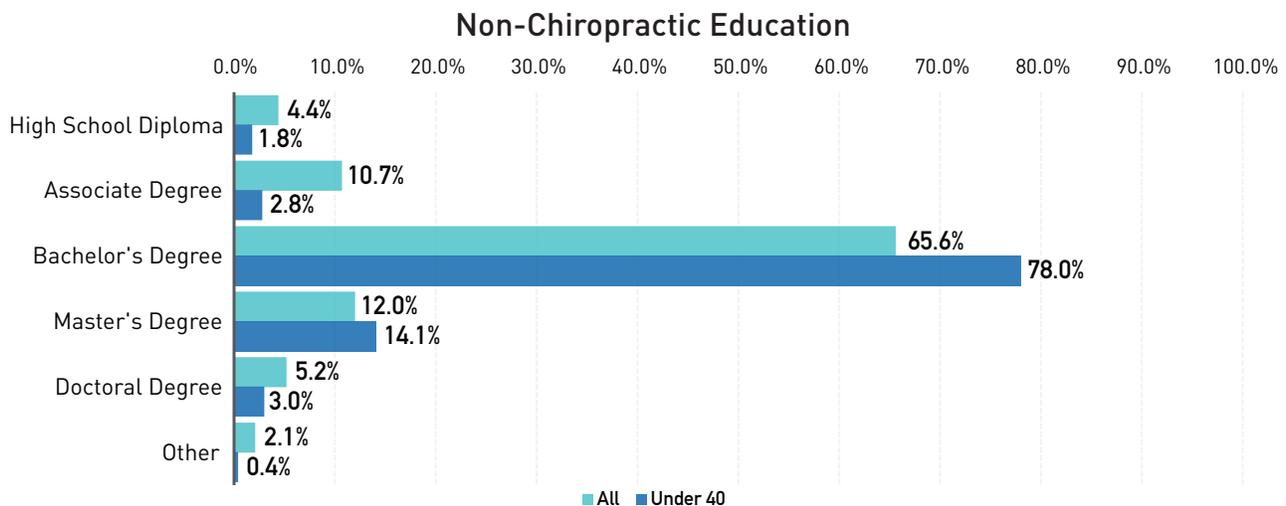
In 2019, the overall proportion of chiropractors with a Bachelor’s degree did not change significantly (65.6%); however, the percentage with Bachelor’s degrees was 78% among chiropractors younger than 40 years. Twelve percent of the overall respondents and 14.1% of those under 40 reported having obtained a Master’s degree, while 5.2% of the overall respondents and 3.0% of those under 40 had obtained a doctoral degree in addition to their DC degree.

### Years in Practice

In comparison with the 2014 survey, the percentage of chiropractors who had been in practice for more than 25 years did not increase significantly (38.9%). However, the proportion of practitioners who self-reported that they had been in practice for fewer than 2 years was the second highest since the 1991 survey (5.1%). The percentages of respondents who had practiced for 2–4, 5–15, and 16–25 years in 2019 are comparable to the estimates obtained in 2014.

### Geographical Representativeness of the Survey

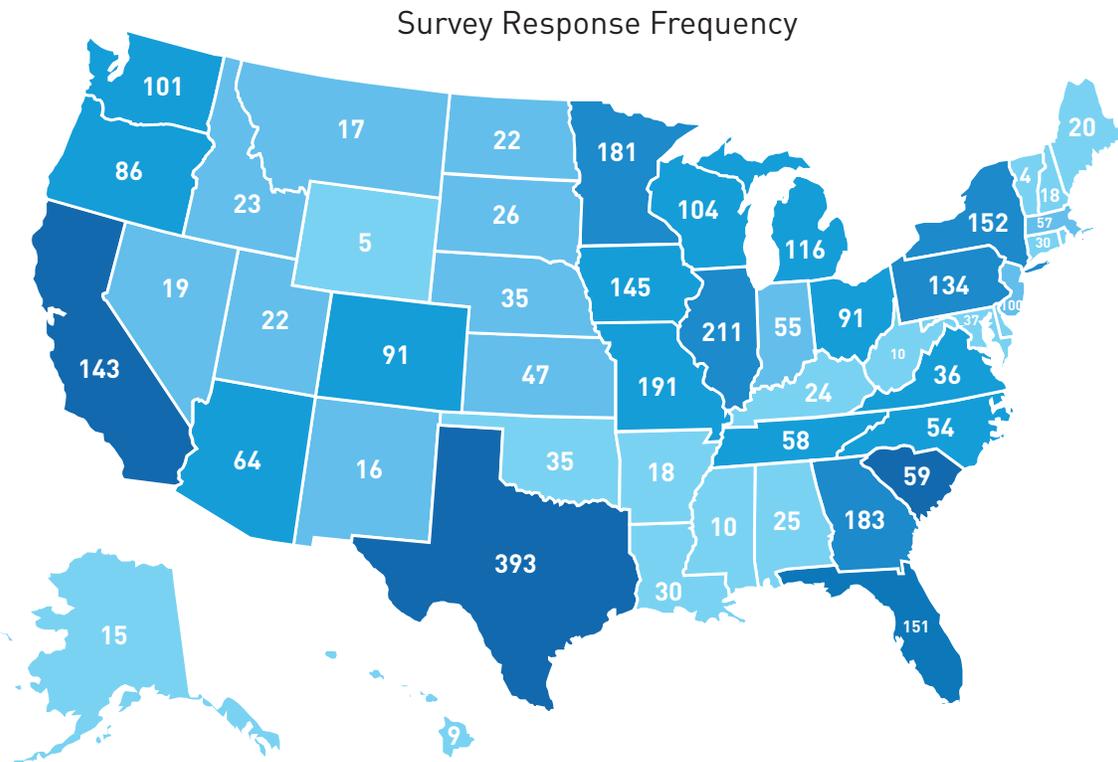
All 50 states and the District of Columbia were represented in the Practice Analysis Survey. Texas ( $n = 393$ ) and California ( $n = 343$ ) were the states with the highest number of responses, while Wyoming ( $n = 3$ ) and Vermont ( $n = 4$ ) were the states with the lowest number of responses. Puerto Rico ( $n = 8$ ) and the U.S. Virgin Islands ( $n = 3$ ) also provided input to this survey.



**Figure 4.3.** Distribution of the levels of non-chiropractic education.

**Table 4.5** Years in Practice

Years in Practice	1991	1998	2003	2009	2014	2019
Fewer than 2	4.1%	7.0%	1.9%	2.2%	1.7%	5.1%
2-4	14.2%	11.3%	8.3%	8.4%	7.8%	6.3%
5-15	57.1%	46.6%	42.4%	38.3%	26.7%	26.8%
16-25	24.6%	25.2%	32.1%	26.4%	25.5%	23.0%
More than 25	—	9.9%	15.4%	24.7%	38.3%	38.9%



**Figure 4.4.** Numeric representation of the survey responses by state.

## References

Brisco, Q. M., Welsh, S. P., Carhee, W., & Clay, B. (2019). *Advancing diversity as we advance the chiropractic profession: A joint report from the American Black Chiropractic Association and the International Chiropractors Association* [Joint Report]. American Black Chiropractic Association and International Chiropractic Association.

Bureau of Labor Statistics, U.S. Department of Labor (2019). *Occupational outlook handbook, chiropractors*. <https://www.bls.gov/ooh/healthcare/chiropractors.htm#tab-1>

*CCE Accreditation Standards. Principles, processes & requirements for accreditation.* (2018, January). [http://www.cceusa.org/uploads/1/0/6/5/106500339/2018\\_cce\\_accreditation\\_standards.pdf](http://www.cceusa.org/uploads/1/0/6/5/106500339/2018_cce_accreditation_standards.pdf)

Christensen, M. G., Hyland, J. K., Goertz, C. M., & Kollasch, M. W. (2015). *Practice analysis of chiropractic*. National Board of Chiropractic Educators.

Gallup-Palmer College of Chiropractic. (2018). *Gallup-Palmer College of Chiropractic annual report: Managing neck and back pain in America* [Annual Report]. Gallup.

# Chapter Five

## Practice Settings and Patient Characteristics

Chiropractors treat patients with health problems of the neuromusculoskeletal system, which includes the nerves, muscles, ligaments, and tendons but may also affect other body functions. Most chiropractors work in a solo or group chiropractic practice (Chapman-Smith & Cleveland, 2005).

According to an American Chiropractic Colleges survey conducted by the NBCE in 2017, 84% of surveyed chiropractors owned their own practice. The majority of these practices (65%) were located in urban or suburban areas, although 18% were located in small towns and 16% were in rural areas. Sixty-six percent of chiropractic practice owners reported being sole proprietors, whereas 30% employed two or three associate employees, 3% employed four or five associates, and only 1% reported employing more than five associates (NBCE, 2018).

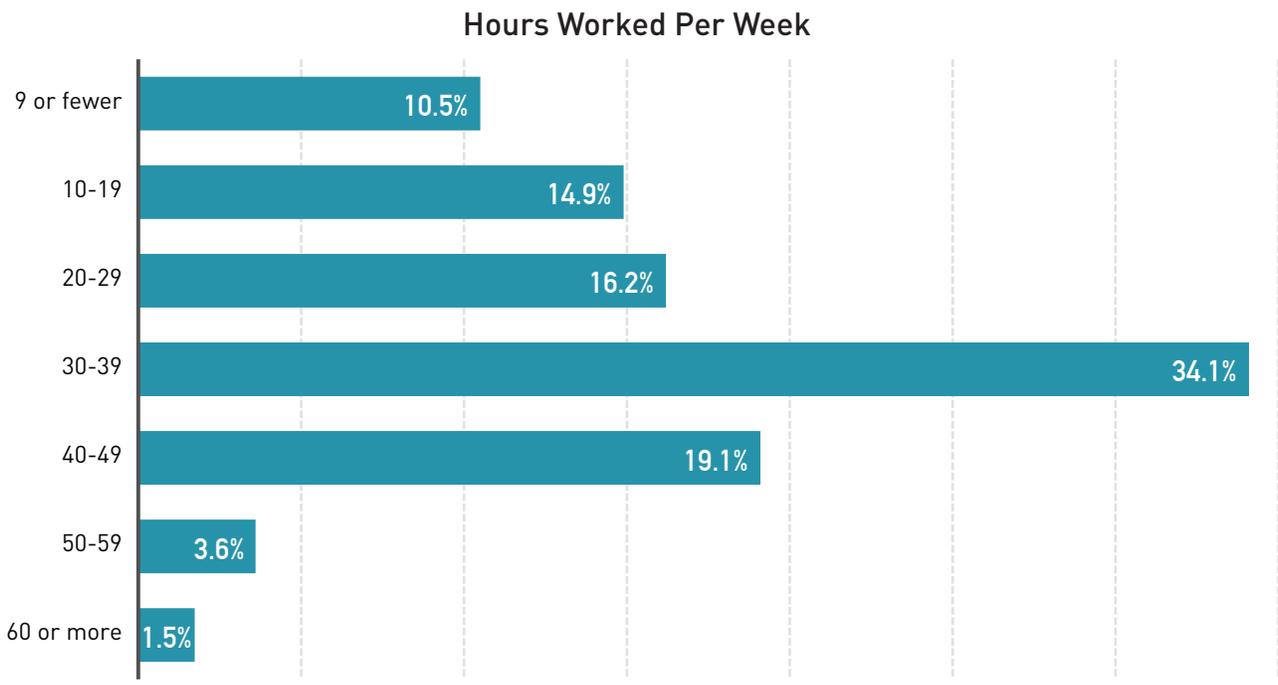
### Data

This chapter presents the responses from U.S. chiropractors who reported that they practice for at least 20 hours per week. Respondents who indicated that they do not practice chiropractic ( $n = 711$ ) and those who indicated that they practice less than 20 hours ( $n = 827$ ) per week were excluded from these analyses. The subsample of those who practice at least 20 hours a week included missing values for some of the variables presented in this section. Therefore, listwise deletion, a method that excludes an entire record from analysis if any single value is missing, was implemented (Allison, 2001). The final sample comprised 2,309 respondents.

### Hours Practiced per Week

Most chiropractic practitioners work full time. Chiropractors may work in the evenings or on weekends to accommodate patients.

Some chiropractors travel to patients' homes to provide treatment. According to the results collected in 2019, 34.1% of practicing chiropractors worked 30–39 hours per week, while 24.2% worked 40 hours or more. Only 16% of the respondents (16.2%) practiced for 20–29 hours per week, while 25.4% practiced for less than 20 hours. In 2018, the U.S. Bureau of Labor Statistics found that chiropractors held approximately 50,000 employment positions. The most frequent types of employers of chiropractors were chiropractors' offices, self-employment, and physicians' offices (Bureau of Labor Statistics, 2019).



**Figure 5.1. Distribution of hours practiced per week.**

## Practice Setting

### Office Type

In 2019, 82.4% of chiropractors practiced in a chiropractic office, 15.1% worked at a multi-disciplinary healthcare facility, and 0.3% and 0.1% worked at a community health center or a spine surgical center, respectively. Additionally, 2.2% of the respondents selected “other” as their practice setting. Those who chose “other” were asked to elaborate. Their responses included “hospital,” “business center (not health related),” “chiropractic wellness center,” “chiropractic exercise facility,” “functional medicine center,” “gym/fitness center,” “house calls,” “medical school,” “osteopathic medical center,” “trauma hospital,” and “veterinary clinic.”

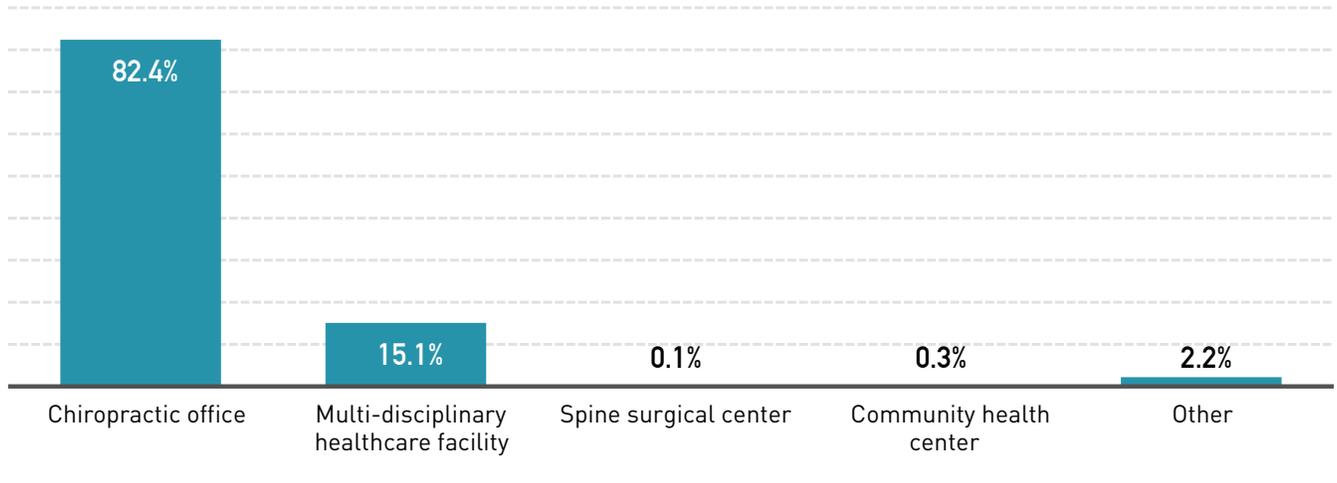
### Role in the Office

The proportion of chiropractors who reported being a sole proprietor in 2019 (64.5%) was considerably smaller than that estimated from the 2014 survey (74.7%). Appropriately, the proportion who reported having a business partner in 2019 (12.7%) represented a significant increase in comparison to the 2014 result (8.3%). Seventeen percent of respondents reported that they were employed as an associate in a chiropractic office in 2019, a slight increase in comparison with the estimate in 2014 (13.5%). Moreover, 5.9% of respondents selected the “other” response and provided the following elaborations: “CEO,” “Clinic Director,” “Contract Chiropractor for U.S. Navy,” “Contractor,” “Executive,” “Independent Chiropractor,” “Locum Tenens,” “Medical Provider,” “Owner of a Clinic,” and “Physician.”

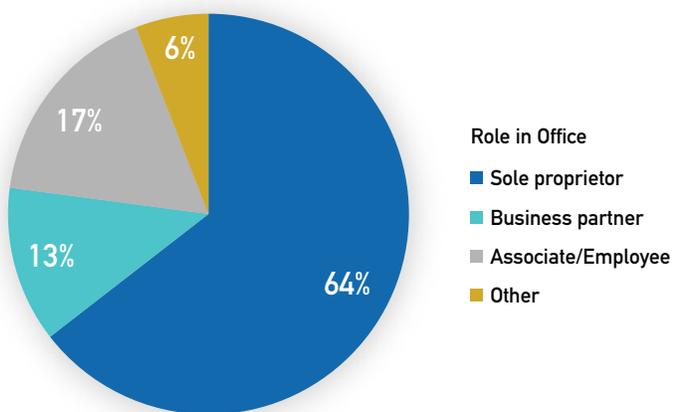
### Urbanicity

According to the 2019 data, the vast majority of chiropractic practices are located in cities and their suburbs (63.4%). Approximately one-third (31.2%) of the surveyed chiropractors practiced in small cities or towns, and 5.4% had established their practices in rural areas.

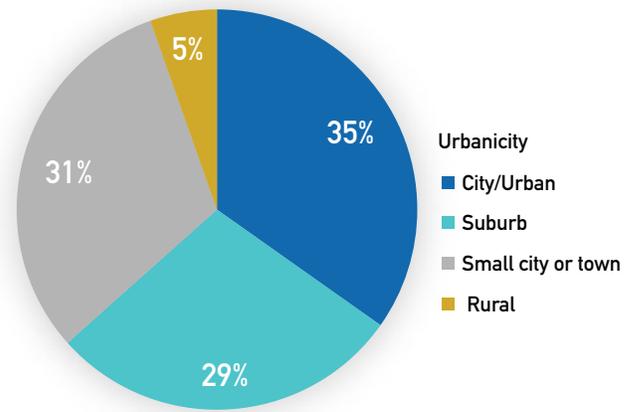
## Office Type



**Figure 5.2. Distribution of office types reported by practicing chiropractors.**



**Figure 5.3. Roles of practicing chiropractors in the primary office.**



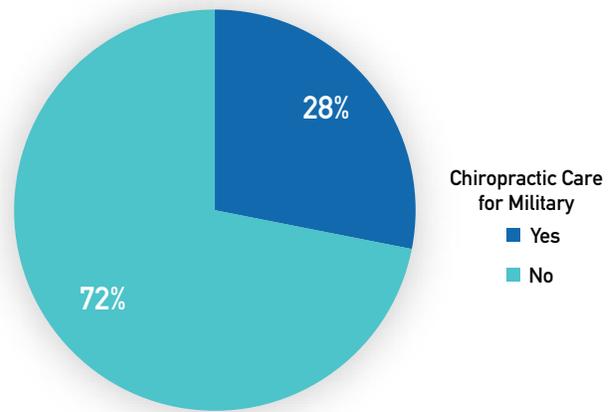
**Figure 5.4. Urbanicity of the reported office locations.**

## Military Care and Hospital Privileges

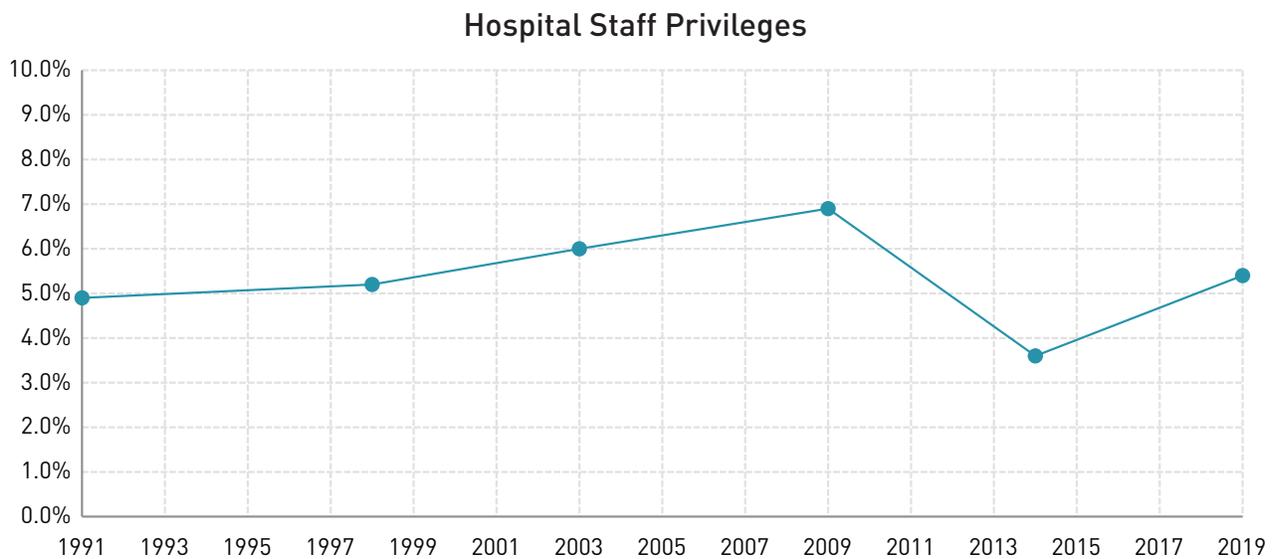
The use of complementary and integrative medicine, including chiropractic care, by the U.S. military continues to increase. Previous research revealed that one-third of U.S. Navy and Marine Corps personnel utilized some form of alternative medicine (Green et al., 2009). Subsequent research reported that “Doctors of chiropractic are fully integrated into both the MHS and VA health care settings located in various geographic regions within the United States and in 3 MHS locations outside of the United States” (Green et al., 2016). The surveys

in both 2014 and 2019 asked the responding chiropractors to report whether they were currently employed or contracted to provide chiropractic care to active or retired military personnel. In 2014, 6.7% of respondents reported that they were currently employed to provide chiropractic care to active and retired military. In 2019, 28.1% indicated that they are currently providing chiropractic care to the military, an increase of over four times over the course of five years, whereas 71.9% stated that they do not.

Only a small proportion of chiropractors (3.6%) reported that they held staff privileges at a hospital in 2014. Although this subpopulation had been growing steadily since 1991, with proportions of 4.9% in 1991, 5.2% in 1998, 6.0% in 2003, and 6.9% in 2009, the percentage had decreased in 2014. In 2019, 5.4% of the respondents reported that they held privileges to admit or treat patients in hospitals, suggesting that the trend appears to be recovering from the apparent decrease in the previous survey year.



**Figure 5.5. Provision of chiropractic care to active and retired military.**



**Figure 5.6. Frequency of hospital privileges held by chiropractors over time.**

## Practice Focus, Practitioner Functions, and Reimbursement Categories

### What Chiropractors Do

According to the U.S. Bureau of Labor Statistics, chiropractors typically do the following:

- Assess a patient’s medical condition by reviewing the medical history and concerns, and by performing a physical examination;
- Analyze the patient’s posture, spine, and reflexes;
- Conduct tests, including evaluating a patient’s posture and taking X-rays;
- Provide neuromusculoskeletal therapy, which often involves adjusting a patient’s spinal column and other joints;
- Administer additional treatments, such as applying heat or cold to a patient’s injured areas;
- Advise patients on health and lifestyle issues, such as exercise, nutrition, and sleep habits; and
- Refer patients to other healthcare professionals if needed (Bureau of Labor Statistics, 2019).

## Practice Focus

According to data collected in 2019, the vast majority of chiropractic practitioners (83.9%) focus on general practice. Thirty-nine percent (39.4%) provide care to athletes; 38.8% deliver pediatric care; 39.5% focus on orthopedics and injuries; and 37.9% focus on rehabilitation. A large majority of chiropractic practices (65%) focus on wellness and the maintenance of health, while 33.3% reported a specialty focus on providing nutritional recommendations (see Table 5.1).

## Practitioner Functions

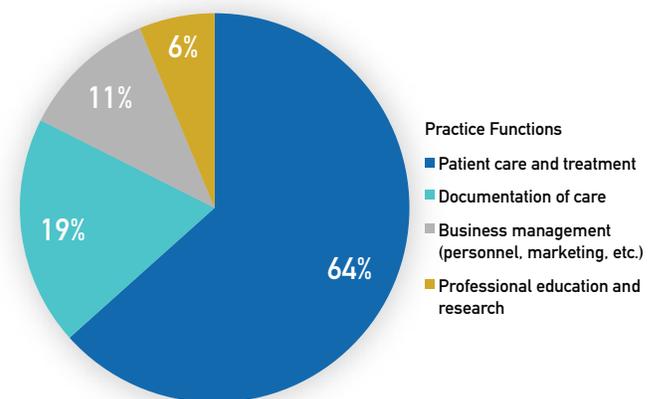
The survey asked participants to estimate what percentage of time in a typical week they would spend on patient care, the documentation of care, business management, and professional education and research. According to the data collected in 2019, on average, chiropractors spend 64.3% of their time on patient care and treatment, while 19% of their time is focused on documentation of care, 11.3% is spent on tasks related to business management, and 6.3% is devoted to professional education and research (see Figure 5.7). The amount of time spent in patient care increased in 2019 relative to 2014 (56.4%) and 2009 (57.4%). However, the time spent documenting care decreased in 2019 relative to previous years (26.3% in 2014 and 25.2% in 2009). This may be related to the high prevalence of electronic health records (see Figure 5.9).

## Reimbursement Categories

The 2019 survey assessed the annual percentage of cases that were classified into particular reimbursement categories. The results revealed that on average, 36.3% of chiropractic cases are reimbursed by private pay or cash. Additionally, 25.4% of cases are paid by health insurance (not managed care), while only 9.3% of the cases are paid by managed care. Medicare and Medicaid, on average, reimburse 14.3% of the cases. Two percent of the cases are handled pro bono.

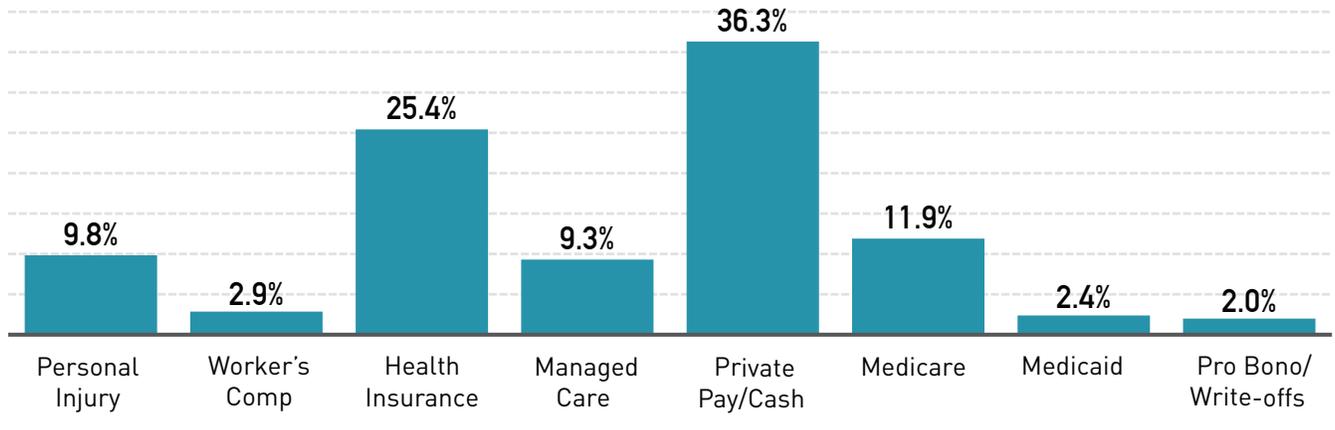
**Table 5.1** Focus of Chiropractic Practices

Focus	Yes %	No %
General Practice	83.9%	16.1%
Care of Athletes	39.4%	60.6%
Pediatrics	38.8%	61.2%
Orthopedics/Injuries	39.5%	60.5%
Rehabilitation	37.9%	62.1%
Wellness/Maintenance	65.0%	35.0%
Radiology/Diagnostic Imaging	17.3%	82.7%
Community Health	12.7%	87.3%
Neurological Diagnosis and Care	18.1%	81.9%
Women's Health	16.5%	83.5%
Internal Disorders	7.5%	92.5%
Nutritional Recommendations	33.3%	66.7%
Acupuncture	12.7%	87.3%
Occupational Health	9.7%	90.3%



**Figure 5.7.** Weekly percentages of time spent on various practice functions.

## Reimbursement Categories



**Figure 5.8. Percentages of cases classified into various reimbursement categories.**

## Electronic Health Care Record (EHR) Systems and Radiographs

### EHR

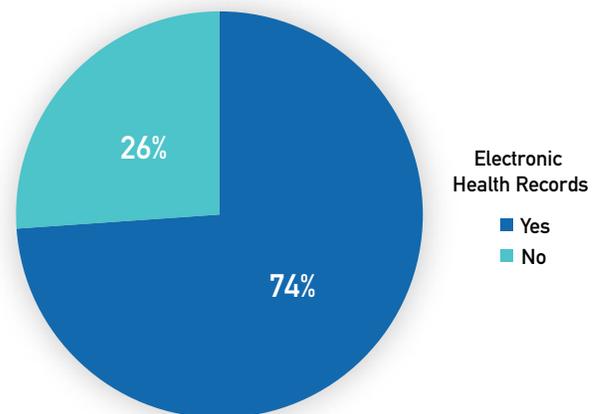
An EHR system is a digital version of a patient's paper chart. EHR systems are real-time, patient-centered records that make information available instantly and securely to chiropractors, physicians, and other authorized users. The adoption of EHR systems is supported by the U.S. Federal Government, and this technology is becoming more widespread throughout the U.S. healthcare system (Menachemi & Collum, 2011). According to the 2019 survey data, 73.9% of chiropractors use some form of EHR, while 26.1% still use paper and pencil.

### Use of Radiography

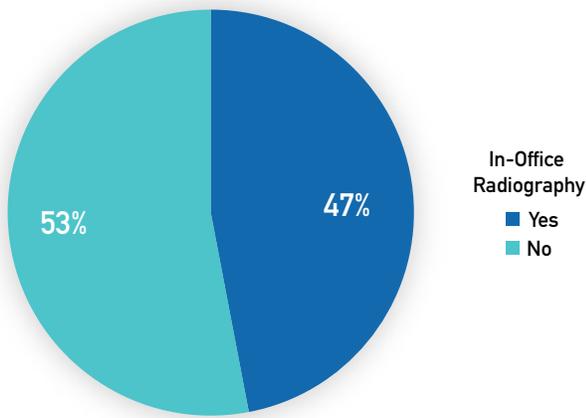
In 2014, 50.1% of chiropractic practitioners reported taking radiographs in their offices, and almost one-third (14.1%) used digital imaging equipment (Christensen et al., 2014). In 2019, 47% of respondents reported having the ability to take radiographs in their offices, a slight decrease relative to 2014. However, more than two-thirds used digital imaging equipment, which represented a doubling of this proportion over the past 5 years. These results are in line with the findings of a recently published study that reported the increased implementation of

digital radiography in chiropractic education and practice (Himelfarb et al., 2019).

For chiropractors with in-office imaging capabilities, an average of 56.2% of their patients are radiographed in the practice, while 15.6% of the resulting imaging studies are sent for outside reports. Chiropractic practitioners without in-office radiography refer 21.9% of their patients for imaging studies, which are generally performed at a medical facility (91.3%) (see Table 5.2).



**Figure 5.9. Prevalence of the use of EHR systems in chiropractic practices.**



**Figure 5.10. Prevalence of radiography availability in chiropractic offices.**

**Table 5.2** Percentages of Patients Radiographed in Practice or Referred for Imaging

Function	%
Patients radiographed in practice	56.2%
Patient images referred for outside reports	15.6%
Patients referred for outside radiography	21.9%

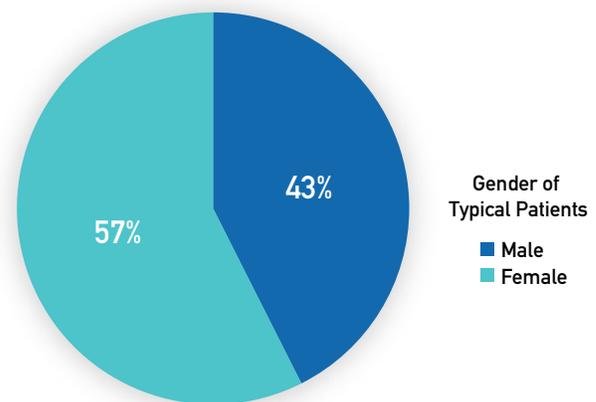
## Demographic Characteristics of the Patients

### Gender

Based on the analysis of 2019 data, female patients constituted 57.4% of all patients seen in the past 12 months. Male patients accounted for 42.5% of the sample (see Figure 5.11). This distribution has remained essentially unchanged since the 1991 NBCE survey.

### Age

The rank order of patient age categories has remained roughly the same over the past 28 years. Because of this consistency, in the 2019 survey, the two most common ranges (31–50 and 51–64 years) were combined into one category: 31–64 years. Forty-six percent (45.9%) of all patients were in this category. The second-largest age category (22.6%) included patients between 18 and 30. Patients aged 65 or older constituted 18.6% of chiropractic practice cases, and this increase may be secondary to recent gains in health and activity in this group. The proportions of pediatric cases decreased slightly in comparison with previous years; 8.6% involved children and adolescents (6–17 years old) and 4.4% involved children aged 5 or younger (see Figure 5.12).



**Figure 5.11. Gender distribution of typical patients.**

## Patient Age

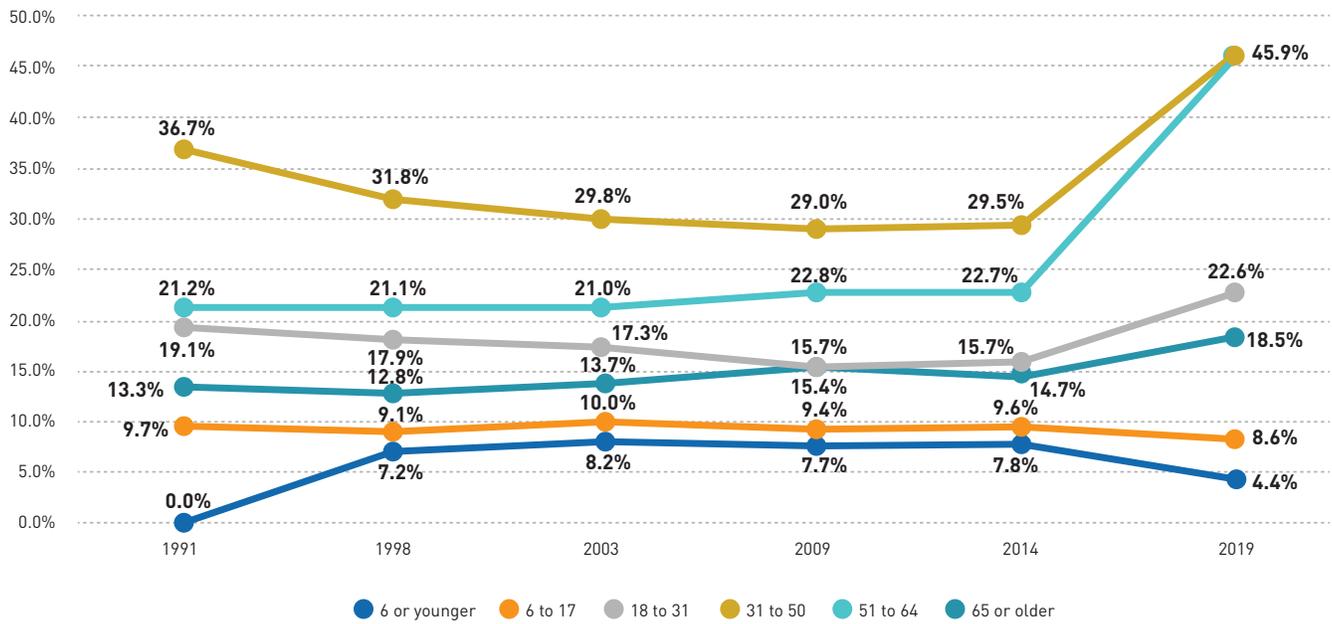


Figure 5.12. Distributions of patient age categories over time.

## References

Allison, P. D. (2001). Missing data. Thousand Oaks, CA.

Bureau of Labor Statistics. (2019). *Occupational outlook handbook, chiropractors*. <https://www.bls.gov/ooh/healthcare/chiropractors.htm#tab-1>

Chapman-Smith, D. A., Cleveland, C.S. III (2005). International status, standards, and education of the chiropractic profession. In S. Haldeman, S. Dagenais, B. Budgell, et al. (eds.). *Principles and practice of chiropractic* (3rd ed.). McGraw-Hill. pp. 111-34.

Christensen, M. G., Hyland, J. K., Goertz, C. M., & Kollasch, M. W. (2015). *Practice analysis of chiropractic*. National Board of Chiropractic Educators.

Green, B. N., Johnson, C. D., Lisi, A. J., & Tucker, J. (2009). Chiropractic practice in military and veterans health care: The state of the literature. *Journal of the Canadian Chiropractic Association*, 53(3), 194-204.

Green, B. N., Johnson, C. D., Daniels, C. J., Napuli, J. G., Gliedt, J. A., & Paris, D. J. (2016). Integration of chiropractic services in military and veteran health care facilities: A systematic review of the literature. *Journal of Evidence-Based Complementary and Alternative Medicine*, 21(2), 115-130.

Himelfarb, I., Seron, M. A., Hyland, J. K., Gow, A. R., Tang, N.-E., Dukes, M., ... Fisher, M. (to appear). Exploring the effects of transition to digital of the diagnostic imaging domain on the Part IV Exam. *Journal of Chiropractic Education*.

Menachemi, N., & Collum, T. H. (2011). Benefits and drawbacks of electronic health record systems. *Risk Management Healthcare Policy*, 4, 47-55.

National Board of Chiropractic Examiners. (2018). *The Association of Chiropractic Colleges Survey*. National Board of Chiropractic Examiners.

# Chapter Six

## Professional Functions and Treatment Procedures

The primary objective of this study was to document the professional role of a chiropractor and to provide evidence for the content validity of the written and practical competency examinations developed by The National Board of Chiropractic Examiners, which are used for licensing decisions. The basic function of a test is to classify examinees into categories according to the intended users' objectives for the scores. This classification is based on the responses provided to the items on the tests (Himelfarb, 2019). Therefore, a core concern when validating licensing exams is the extent to which the test content reflects the knowledge, skills, and judgment needed for competency (Kane et al., 2017). In methodological literature, this concern is formally known as content *validity*.

The concept of content validity concerns the extent to which the contents of the items in a scale adequately represent the complete range or breadth of the construct under consideration (Kerlinger and Lee, 2000). Reliability is a prerequisite for validity (Crano et al., 2014). Therefore, an important part of a validation process involves an estimation of the reliability of survey responses. Here, we report Cronbach's alpha coefficients (Cronbach, 1951), which we used for a reliability estimation at the beginning of each subsection.

The professional functions of chiropractors, along with frequencies, associated risks, and importance ratings, are presented in this

section. The results in this section are divided into four subsections: Patient Assessment, Case Management, Communication Tasks, and Treatment Tasks. This has been done to mirror the flow of the questions in the survey.

### Measures and Scales

The survey administered in 2019 instructed respondents to indicate the *frequency* at which they perform various professional functions, and then to estimate the level of *risk* to a patient's health or safety if the professional function or care were omitted or poorly performed. The *importance* value of each professional function was subsequently derived by multiplying the frequency and risk of that function. Table 6.1 presents the rating scales used for frequency, risk, and importance.

#### Patient Assessment

In healthcare, patient assessment is the term used to describe the process of identifying the possible conditions, needs, abilities, and preferences of a patient. The assessment is a systematic, often sequential search to identify the cause of patient symptoms (Souza, 2016, p.3). A thorough physical examination and quality history taking process lay the foundation for patient assessment and care (Bickley & Szilagyi, 2017).

The procedure followed by chiropractors when evaluating and managing a patient is similar to that followed by any physician. The chiropractic physical examination, however, tends to focus more on the spinal examination, compared with the general physical examination performed by a primary care medical physician (Dagenais & Haldeman, 2002). The analysis sample for this subsection was  $n = 1,752$ . The average estimates of frequency were  $M = 3.3$ ,  $SD = 1.2$  for patient assessment;  $M = 3.5$ ,  $SD = 1.3$  for risk; and that of importance was 11.7. The reliability was indicated by alpha values of .95, .88, and .96 for the frequency estimation, risk, and importance, respectively. These coefficients indicate very good internal consistency in this section of the survey.

Chiropractors perform various specific examinations as often as several times a day or as infrequently as a few times per year. Survey respondents indicated that they perform cervical, thoracic, lumbopelvic, and/or extremity palpation examination several times a day ( $M = 5.8$ ,  $SD = .6$ ). The importance index associated with this function was among the highest ( $Importance = 20.6$ ). The performance of special studies (e.g., ECG, diagnostic or Doppler ultrasound, bone density) was the function with the lowest frequency ( $M = 1.4$ ,  $SD = .8$ ). The importance index associated with this function was among the lowest ( $Importance = 4.3$ ). The results for Patient Assessment are presented in Tables 6.2 and 6.3.

**Table 6.1** Rating Scores for Frequency, Risk, and Importance of Chiropractic Functions

Frequency	Risk	Importance
1 = Never	1 = No risk	1-6 = Slight importance
2 = 1-6 times per year	2 = Minimal risk	7-12 = Weak importance
3 = About once per month	3 = Some risk	13-18 = Moderate importance
4 = About once per week	4 = Moderate risk	19-24 = Strong importance
5 = About once per day	5 = Significant risk	25-30 = Very strong importance
6 = Several times per day	6 = Severe risk	31-36 = Extreme importance

**Table 6.2** Patient Assessment – Frequency and Risk

<b>Professional Function</b>	<b>Frequency</b>	<b>%</b>	<b>Risk</b>	<b>%</b>
<b>Problem-focused case history (i.e., limited to chief complaint)</b>	Never	5.6%	No risk	0.6%
	1-6 times per year	5.3%	Minimal risk	10.4%
	About once per month	7.6%	Some risk	21.4%
	About once per week	13.0%	Moderate risk	27.4%
	About once per day	20.3%	Significant risk	30.9%
	Several times a day	48.2%	Severe risk	9.3%
<b>Detailed/comprehensive case history (i.e., including: past health history, family health history, biopsychosocial history, and review of systems)</b>	Never	2.4%	No risk	0.7%
	1-6 times per year	3.5%	Minimal risk	9.6%
	About once per month	4.6%	Some risk	19.4%
	About once per week	19.5%	Moderate risk	26.1%
	About once per day	32.5%	Significant risk	32.3%
	Several times a day	37.6%	Severe risk	11.9%
<b>Comprehensive physical examination (i.e., including: vital signs, EENT, cardiopulmonary, and abdominal exams)</b>	Never	18.2%	No risk	2.7%
	1-6 times per year	18.4%	Minimal risk	15.2%
	About once per month	15.5%	Some risk	20.7%
	About once per week	16.2%	Moderate risk	23.3%
	About once per day	15.0%	Significant risk	27.6%
	Several times a day	16.7%	Severe risk	10.4%
<b>Focused EENT examination</b>	Never	36.4%	No risk	10.2%
	1-6 times per year	26.8%	Minimal risk	24.8%
	About once per month	14.2%	Some risk	27.7%
	About once per week	12.5%	Moderate risk	18.9%
	About once per day	6.3%	Significant risk	14.4%
	Several times a day	3.8%	Severe risk	3.9%
<b>Focused cardiopulmonary examination</b>	Never	44.1%	No risk	8.4%
	1-6 times per year	26.4%	Minimal risk	18.6%
	About once per month	12.1%	Some risk	20.1%
	About once per week	10.1%	Moderate risk	18.8%
	About once per day	4.5%	Significant risk	23.5%
	Several times a day	2.8%	Severe risk	10.6%

<b>Professional Function</b>	<b>Frequency</b>	<b>%</b>	<b>Risk</b>	<b>%</b>
<b>Focused abdominal examination</b>	Never	32.0%	No risk	6.7%
	1-6 times per year	37.4%	Minimal risk	20.9%
	About once per month	14.9%	Some risk	24.8%
	About once per week	9.0%	Moderate risk	21.6%
	About once per day	3.9%	Significant risk	19.2%
	Several times a day	2.9%	Severe risk	6.7%
<b>Focused orthopedic/ neurologic examination (i.e., limited to the area of complaint)</b>	Never	1.2%	No risk	0.8%
	1-6 times per year	3.1%	Minimal risk	8.7%
	About once per month	5.7%	Some risk	22.1%
	About once per week	16.3%	Moderate risk	30.9%
	About once per day	24.4%	Significant risk	30.1%
	Several times a day	49.3%	Severe risk	7.3%
<b>Comprehensive orthopedic/ neurologic examination (i.e., not limited to the area of complaint and including: cranial nerves, DTRs, dermatomes, myotomes, spinal ROM, pathologic reflexes, etc.)</b>	Never	6.9%	No risk	1.5%
	1-6 times per year	10.5%	Minimal risk	10.0%
	About once per month	10.7%	Some risk	22.8%
	About once per week	20.0%	Moderate risk	28.8%
	About once per day	23.1%	Significant risk	28.7%
	Several times a day	28.8%	Severe risk	8.1%
<b>Postural and gait analysis</b>	Never	3.3%	No risk	7.2%
	1-6 times per year	5.0%	Minimal risk	37.5%
	About once per month	7.2%	Some risk	28.3%
	About once per week	15.1%	Moderate risk	16.3%
	About once per day	22.9%	Significant risk	8.2%
	Several times a day	46.6%	Severe risk	2.5%
<b>Cervical, thoracic, lumbopelvic, and/ or extremity palpation examination</b>	Never	0.2%	No risk	2.1%
	1-6 times per year	0.5%	Minimal risk	20.3%
	About once per month	0.9%	Some risk	27.7%
	About once per week	3.1%	Moderate risk	26.0%
	About once per day	7.0%	Significant risk	18.8%
	Several times a day	88.4%	Severe risk	5.1%

Professional Function	Frequency	%	Risk	%
<b>Obtain patient-reported outcome measures (e.g., pain scale ratings and/or disability questionnaires)</b>	Never	4.9%	No risk	9.5%
	1-6 times per year	3.8%	Minimal risk	33.2%
	About once per month	5.0%	Some risk	29.6%
	About once per week	11.2%	Moderate risk	16.5%
	About once per day	14.8%	Significant risk	9.0%
	Several times a day	60.3%	Severe risk	2.2%
<b>Draw blood, collect urine, and/or perform other laboratory tests in your office</b>	Never	81.2%	No risk	23.7%
	1-6 times per year	5.3%	Minimal risk	15.6%
	About once per month	3.8%	Some risk	17.8%
	About once per week	4.2%	Moderate risk	17.9%
	About once per day	3.2%	Significant risk	18.0%
	Several times a day	2.4%	Severe risk	7.0%
<b>Order blood, urine, or other laboratory tests from an outside facility</b>	Never	49.1%	No risk	16.2%
	1-6 times per year	25.9%	Minimal risk	17.9%
	About once per month	13.4%	Some risk	23.5%
	About once per week	7.0%	Moderate risk	19.2%
	About once per day	3.1%	Significant risk	17.5%
	Several times a day	1.4%	Severe risk	5.7%
<b>Obtain and review the results of previously performed laboratory tests</b>	Never	16.6%	No risk	9.4%
	1-6 times per year	29.5%	Minimal risk	21.2%
	About once per month	23.3%	Some risk	27.1%
	About once per week	18.9%	Moderate risk	22.1%
	About once per day	6.4%	Significant risk	17.0%
	Several times a day	5.2%	Severe risk	4.4%
<b>Obtain and read radiographs that you did not take or order</b>	Never	5.0%	No risk	3.0%
	1-6 times per year	20.6%	Minimal risk	15.9%
	About once per month	28.5%	Some risk	24.7%
	About once per week	29.0%	Moderate risk	26.6%
	About once per day	10.5%	Significant risk	22.5%
	Several times a day	6.3%	Severe risk	7.2%

<b>Professional Function</b>	<b>Frequency</b>	<b>%</b>	<b>Risk</b>	<b>%</b>
<b>Order a nerve conduction velocity (NCV) and/or needle electromyography (EMG) study</b>	Never	64.4%	No risk	17.1%
	1-6 times per year	25.2%	Minimal risk	22.0%
	About once per month	6.8%	Some risk	25.5%
	About once per week	2.4%	Moderate risk	18.8%
	About once per day	0.6%	Significant risk	12.4%
	Several times a day	0.4%	Severe risk	4.2%
<b>Obtain and review the results of a previously performed NCV or EMG study</b>	Never	40.0%	No risk	14.8%
	1-6 times per year	41.0%	Minimal risk	26.7%
	About once per month	12.8%	Some risk	27.3%
	About once per week	4.4%	Moderate risk	16.4%
	About once per day	1.2%	Significant risk	11.6%
	Several times a day	0.6%	Severe risk	3.2%
<b>Order an MRI, CT, or bone scan imaging study</b>	Never	13.9%	No risk	3.8%
	1-6 times per year	28.6%	Minimal risk	10.7%
	About once per month	32.2%	Some risk	21.0%
	About once per week	18.2%	Moderate risk	27.7%
	About once per day	5.3%	Significant risk	27.9%
	Several times a day	1.8%	Severe risk	8.8%
<b>Obtain and review the results of a previously performed MRI, CT, or bone scan imaging study</b>	Never	3.3%	No risk	3.0%
	1-6 times per year	19.4%	Minimal risk	14.1%
	About once per month	34.9%	Some risk	26.2%
	About once per week	30.0%	Moderate risk	27.1%
	About once per day	7.8%	Significant risk	22.5%
	Several times a day	4.6%	Severe risk	7.1%
<b>Perform other special studies (e.g., ECG, diagnostic or Doppler ultrasound, bone density, etc.) in your office</b>	Never	78.1%	No risk	19.1%
	1-6 times per year	13.6%	Minimal risk	16.8%
	About once per month	5.0%	Some risk	22.3%
	About once per week	1.8%	Moderate risk	18.8%
	About once per day	1.0%	Significant risk	16.4%
	Several times a day	0.4%	Severe risk	6.6%

Professional Function	Frequency	%	Risk	%
<b>Order other special studies (e.g., ECG, diagnostic or Doppler ultrasound, bone density, etc.) from an outside facility</b>	Never	56.1%	No risk	15.2%
	1-6 times per year	30.6%	Minimal risk	18.7%
	About once per month	9.4%	Some risk	24.5%
	About once per week	3.1%	Moderate risk	19.7%
	About once per day	0.7%	Significant risk	16.3%
	Several times a day	0.1%	Severe risk	5.7%
<b>Obtain and review the results of other previous special studies</b>	Never	21.5%	No risk	9.7%
	1-6 times per year	39.1%	Minimal risk	21.5%
	About once per month	23.7%	Some risk	28.3%
	About once per week	10.8%	Moderate risk	20.9%
	About once per day	3.7%	Significant risk	15.0%
	Several times a day	1.3%	Severe risk	4.6%

*Note. Due to rounding errors, the percentages may not add up to 100%.*

**Table 6.3** Patient Assessment – Averages of Frequency and Risk, with Importance Ratings

Professional Function	Frequency	Risk		Importance	
	M	SD	M		SD
Problem-focused case history (i.e., limited to chief complaint)	4.8	1.5	4.1	1.2	<b>19.7</b>
Detailed/comprehensive case history (i.e., including: past health history, family health history, biopsychosocial history, and review of systems)	4.9	1.2	4.2	1.2	<b>20.6</b>
Comprehensive physical examination (i.e., including: vital signs, EENT, cardiopulmonary, and abdominal exams)	3.4	1.7	3.9	1.3	13.3
Focused EENT examination	2.4	1.4	3.1	1.3	7.4
Focused cardiopulmonary examination	2.1	1.3	2.6	1.5	5.5
Focused abdominal examination	2.2	1.3	3.5	1.4	7.7
Focused orthopedic/neurologic examination (i.e., limited to the area of complaint)	5.1	1.2	4.0	1.1	<b>20.4</b>
Comprehensive orthopedic/neurologic examination (i.e. not limited to the area of complaint and including: cranial nerves, DTRs, dermatomes, myotomes, spinal ROM, pathologic reflexes, etc.)	2.3	1.6	4.0	1.2	9.1
Postural and gait analysis	4.9	1.4	2.9	1.2	14.1
Cervical, thoracic, lumbopelvic, and/or extremity palpation examination	5.8	0.6	3.6	1.2	<b>20.6</b>
Obtain patient-reported outcome measures (e.g., pain scale ratings and/or disability questionnaires)	5.1	1.4	2.9	1.2	14.7
Draw blood, collect urine, and/or perform other laboratory tests in your office	1.5	1.2	3.1	1.6	4.7
Order blood, urine, or other laboratory tests from an outside facility	1.9	1.2	3.2	1.5	6.2
Obtain and review the results of previously performed laboratory tests	2.9	1.4	3.3	1.3	9.3

Professional Function	Frequency	Risk		Importance	
	M	SD	M	SD	
Obtain and read radiographs that you did not take or order	3.4	1.2	3.7	1.3	12.6
Order a nerve conduction velocity (NCV) and/or needle electromyography (EMG) study	1.5	0.8	3.0	1.4	4.5
Obtain and review the results of a previously performed NCV or EMG study	1.9	0.9	2.9	1.3	5.5
Order an MRI, CT, or bone scan imaging study	2.8	1.2	3.9	1.3	10.9
Obtain and review the results of a previously performed MRI, CT, or bone scan imaging study	3.3	1.1	3.7	1.2	12.4
Perform other special studies (e.g., ECG, diagnostic or Doppler ultrasound, bone density, etc.) in your office	1.4	0.8	3.2	1.5	4.3
Order other special studies (e.g., ECG, diagnostic or Doppler ultrasound, bone density, etc.) from an outside facility	1.6	0.8	3.2	1.5	5.2
Obtain and review the results of other previous special studies	2.4	1.1	3.2	1.3	7.8

Note 1. *M* = mean; *SD* = standard deviation

Note 2. Estimates indicating strong, very strong, and extreme importance are in **bold**.

## Case Management

Case management refers to the tasks and services required to implement the clinical treatment plan, including connecting patients with healthcare, psychological, and other services. Further, case management is a method of determining an individualized treatment plan for each patient and monitoring the effectiveness of the plan (Summers, 2016). The analysis sample for this subsection was  $n = 1,935$ . The average estimate of frequency was  $M = 4.0$ ,  $SD = 1.3$  for Case Management;  $M = 3.6$ ,  $SD = 1.2$  for risk; and 14.6 for importance. The corresponding reliability of frequency estimations yielded alpha values of .92, .83 and .95, respectively.

The chiropractic professional functions with the highest frequencies were developing a differential diagnosis or clinical impression ( $M = 5.3$ ,  $SD = 1.1$ , *Importance* = 24) and assessing the existence of risk factors and contradictions to chiropractic care ( $M = 5.2$ ,  $SD = 1.3$ , *Importance* = 23.4). Chiropractors perform these functions several times a day. The function with the lowest frequency involved the review of special studies (e.g., NCV, EMG, ECG) and interpretation of the results ( $M = 1.7$ ,  $SD = 1$ , *Importance* = 5.4). On average, this function was performed only a few times per year. The results for Case Management are presented in Tables 6.4 and 6.5.

**Table 6.4** Case Management – Frequency and Risk

<b>Professional Function</b>	<b>Frequency</b>	<b>%</b>	<b>Risk</b>	<b>%</b>
<b>Review radiographic images to identify or rule out fracture, dislocation, and other pathology</b>	Never	5.8%	No risk	1.8%
	1-6 times per year	18.3%	Minimal risk	6.8%
	About once per month	25.8%	Some risk	16.9%
	About once per week	24.6%	Moderate risk	24.9%
	About once per day	13.9%	Significant risk	35.2%
	Several times a day	11.5%	Severe risk	14.4%
<b>Review MRI, CT, or bone scan images to identify or rule out pathology</b>	Never	14.1%	No risk	4.0%
	1-6 times per year	24.0%	Minimal risk	9.0%
	About once per month	29.5%	Some risk	18.3%
	About once per week	21.8%	Moderate risk	25.3%
	About once per day	6.4%	Significant risk	30.7%
	Several times a day	4.1%	Severe risk	12.8%
<b>Review laboratory studies and interpret the results</b>	Never	29.0%	No risk	9.1%
	1-6 times per year	34.3%	Minimal risk	17.7%
	About once per month	20.8%	Some risk	26.6%
	About once per week	10.3%	Moderate risk	22.8%
	About once per day	3.7%	Significant risk	18.3%
	Several times a day	1.9%	Severe risk	5.4%
<b>Review special studies such as NCV, EMG, ECG, etc. and interpret the results</b>	Never	53.5%	No risk	15.6%
	1-6 times per year	29.0%	Minimal risk	18.9%
	About once per month	11.4%	Some risk	25.1%
	About once per week	4.3%	Moderate risk	19.8%
	About once per day	1.0%	Significant risk	15.7%
	Several times a day	0.7%	Severe risk	5.0%
<b>Review radiographic images to determine the possible presence of a spinal listing and/or subluxation</b>	Never	33.3%	No risk	19.9%
	1-6 times per year	9.0%	Minimal risk	23.1%
	About once per month	11.1%	Some risk	21.4%
	About once per week	13.1%	Moderate risk	18.1%
	About once per day	13.4%	Significant risk	13.4%
	Several times a day	20.2%	Severe risk	4.1%

Professional Function	Frequency	%	Risk	%
<b>Assess the existence of risk factors and contraindications to chiropractic care</b>	Never	1.3%	No risk	1.0%
	1-6 times per year	6.6%	Minimal risk	6.3%
	About once per month	5.6%	Some risk	13.4%
	About once per week	9.8%	Moderate risk	20.1%
	About once per day	15.9%	Significant risk	36.1%
	Several times a day	60.8%	Severe risk	23.3%
<b>Develop a differential diagnosis or clinical impression</b>	Never	1.5%	No risk	1.6%
	1-6 times per year	2.2%	Minimal risk	7.5%
	About once per month	4.3%	Some risk	20.2%
	About once per week	11.6%	Moderate risk	26.6%
	About once per day	19.9%	Significant risk	32.2%
	Several times a day	60.5%	Severe risk	11.9%
<b>Search online databases for evidence to assist in patient management plans</b>	Never	15.1%	No risk	9.5%
	1-6 times per year	19.6%	Minimal risk	20.9%
	About once per month	22.7%	Some risk	32.0%
	About once per week	27.2%	Moderate risk	21.8%
	About once per day	10.2%	Significant risk	12.1%
	Several times a day	5.2%	Severe risk	3.7%
<b>Develop a case management plan</b>	Never	3.1%	No risk	4.6%
	1-6 times per year	2.5%	Minimal risk	19.2%
	About once per month	5.4%	Some risk	32.0%
	About once per week	16.5%	Moderate risk	24.8%
	About once per day	28.0%	Significant risk	15.1%
	Several times a day	44.5%	Severe risk	4.5%
<b>Develop a prognosis</b>	Never	2.7%	No risk	5.3%
	1-6 times per year	2.2%	Minimal risk	23.2%
	About once per month	4.8%	Some risk	32.8%
	About once per week	14.9%	Moderate risk	22.7%
	About once per day	23.7%	Significant risk	11.9%
	Several times a day	51.7%	Severe risk	4.0%

<b>Professional Function</b>	<b>Frequency</b>	<b>%</b>	<b>Risk</b>	<b>%</b>
<b>Refer a patient to a specialist for consultation or co-management</b>	Never	2.0%	No risk	3.0%
	1-6 times per year	22.4%	Minimal risk	12.2%
	About once per month	40.5%	Some risk	26.6%
	About once per week	26.1%	Moderate risk	28.2%
	About once per day	6.6%	Significant risk	22.5%
	Several times a day	2.4%	Severe risk	7.5%
<b>Collaborate with other professionals and/or participate as a member of an interdisciplinary team</b>	Never	16.0%	No risk	8.7%
	1-6 times per year	25.1%	Minimal risk	19.0%
	About once per month	22.5%	Some risk	31.5%
	About once per week	19.3%	Moderate risk	22.6%
	About once per day	6.8%	Significant risk	13.7%
	Several times a day	10.4%	Severe risk	4.5%
<b>Reexamine a patient with orthopedic/neurologic examination procedures, either periodically or when the patient's condition materially changed</b>	Never	1.9%	No risk	2.6%
	1-6 times per year	5.5%	Minimal risk	14.0%
	About once per month	15.4%	Some risk	29.8%
	About once per week	26.7%	Moderate risk	28.6%
	About once per day	23.7%	Significant risk	18.8%
	Several times a day	26.9%	Severe risk	6.3%
<b>Reexamine a patient with physical examination procedures, either periodically or when the patient's condition materially changed</b>	Never	1.6%	No risk	2.7%
	1-6 times per year	5.6%	Minimal risk	15.5%
	About once per month	16.0%	Some risk	30.9%
	About once per week	26.0%	Moderate risk	27.6%
	About once per day	22.5%	Significant risk	18.1%
	Several times a day	28.3%	Severe risk	5.2%
<b>Obtain repeat/follow-up radiographic examinations to monitor a patient's progress or response to care</b>	Never	38.7%	No risk	14.1%
	1-6 times per year	35.7%	Minimal risk	29.8%
	About once per month	12.0%	Some risk	27.7%
	About once per week	6.8%	Moderate risk	15.7%
	About once per day	3.7%	Significant risk	9.4%
	Several times a day	3.1%	Severe risk	3.4%

Professional Function	Frequency	%	Risk	%
<b>Release a patient from active care</b>	Never	3.8%	No risk	14.2%
	1-6 times per year	7.3%	Minimal risk	36.8%
	About once per month	20.5%	Some risk	26.7%
	About once per week	37.9%	Moderate risk	12.6%
	About once per day	19.5%	Significant risk	6.7%
	Several times a day	11.0%	Severe risk	2.9%

Note. Due to rounding errors, percentages may not add to 100%

**Table 6.5** Case Management – Averages of Frequency and Risk, with Importance Ratings

Professional Function	Frequency		Risk		Importance
	M	SD	M	SD	
Review radiographic images to identify or rule out fracture, dislocation, and other pathology	3.6	1.4	4.3	1.2	15.3
Review MRI, CT, or bone scan images to identify or rule out pathology	3.0	1.3	4.1	1.3	12.0
Review laboratory studies and interpret the results	2.3	1.2	3.4	1.4	7.9
Review special studies such as NCV, EMG, ECG, etc. and interpret the results	1.7	1.0	3.2	1.4	5.4
Review radiographic images to determine the possible presence of a spinal listing and/or subluxation	3.3	2.0	3.0	1.5	9.6
Assess the existence of risk factors and contraindications to chiropractic care	5.2	1.3	4.5	1.2	<b>23.4</b>
Develop a differential diagnosis or clinical impression	5.3	1.1	4.2	1.2	<b>22.0</b>
Search online databases for evidence to assist in patient management plans	3.1	1.4	3.2	1.3	9.9
Develop a case management plan	5.0	1.2	3.4	1.2	16.9
Develop a prognosis	5.1	1.2	3.3	1.2	16.6
Refer a patient to a specialist for consultation or co-management	3.2	1.0	3.8	1.2	12.1

Professional Function	Frequency	Risk		Importance	
	M	SD	M		SD
Collaborate with other professionals and/or participate as a member of an interdisciplinary team	3.1	1.5	3.3	1.3	10.0
Reexamine a patient with orthopedic/neurologic examination procedures, either periodically or when the patient's condition materially changed	4.5	1.3	3.7	1.2	16.3
Reexamine a patient with physical examination procedures, either periodically or when the patient's condition materially changed	4.5	1.3	3.6	1.2	16.0
Obtain repeat/follow-up radiographic examinations to monitor a patient's progress or response to care	2.1	1.3	2.9	1.3	6.0
Release a patient from active care	3.6	1.2	2.7	1.2	9.7

Note 1. *M* = mean; *SD* = standard deviation

Note 2. Estimates indicating strong, very strong, and extreme importance are in **bold**.

## Communication Tasks

The delivery of excellent primary care demands that healthcare providers have the necessary information when administering care (Bates et al., 2003). Practitioners in all healthcare professions keep patient records. Usually, these records include personal patient data, insurance and billing information, appropriate assignments and consent forms, case history, examination findings, imaging and laboratory findings, diagnoses, a work chart for ongoing patient data obtained on each visit, services rendered, the health care plan, reports, and case identification (Sportelli & Tarola, 2005).

The analysis sample for this subsection was  $n = 1,975$ . The average estimates of frequency were  $M = 4.6$ ,  $SD = 1.2$  for Communication Tasks;  $M = 3.4$ ,  $SD = 1.3$  for risk; and 15.6 for

importance. The reliability of the frequency estimation, risk, and importance were indicated by alpha values of .92, .83, and .95, respectively. From the survey, it is evident that chiropractors produce documentation ( $M = 5.9$ ,  $SD = .07$ , Importance = 21.5), suggest self-care strategies ( $M = 5.3$ ,  $SD = 1$ , Importance = 16.6), make specific recommendations to patients regarding physical fitness ( $M = 5.3$ ,  $SD = 1.0$ , Importance = 17.5), and make recommendations about ergonomics and postural advice ( $M = 5.2$ ,  $SD = 1.0$ , Importance = 16.8) on a daily basis. In contrast, full narrative reports (not daily notes) are produced only several times per year ( $M = 2.7$ ,  $SD = 1.3$ , Importance = 7.3). The results for Communication Tasks are presented in Tables 6.6 and 6.7.

**Table 6.6** Communication Tasks – Frequency and Risk

<b>Professional Function</b>	<b>Frequency</b>	<b>%</b>	<b>Risk</b>	<b>%</b>
<b>Create complete, readable documentation of a patient's case history and examination findings, the diagnosis and prognosis, and the case management plan</b>	Never	3.1%	No risk	6.5%
	1-6 times per year	6.9%	Minimal risk	23.2%
	About once per month	7.2%	Some risk	29.7%
	About once per week	14.5%	Moderate risk	20.3%
	About once per day	19.5%	Significant risk	14.8%
	Several times a day	48.7%	Severe risk	5.5%
<b>Review with a patient his or her relevant case history and examination findings, diagnosis, prognosis, and case management options</b>	Never	0.9%	No risk	3.7%
	1-6 times per year	3.6%	Minimal risk	22.8%
	About once per month	8.5%	Some risk	31.2%
	About once per week	18.3%	Moderate risk	22.6%
	About once per day	29.9%	Significant risk	14.7%
	Several times a day	38.8%	Severe risk	4.8%
<b>Obtain written, informed consent for treatment</b>	Never	5.4%	No risk	5.6%
	1-6 times per year	2.3%	Minimal risk	16.7%
	About once per month	2.3%	Some risk	20.3%
	About once per week	10.2%	Moderate risk	16.6%
	About once per day	25.1%	Significant risk	23.5%
	Several times a day	54.3%	Severe risk	17.4%
<b>Completely and legibly document each patient visit in the SOAP note format</b>	Never	1.5%	No risk	5.7%
	1-6 times per year	0.3%	Minimal risk	20.2%
	About once per month	0.6%	Some risk	22.2%
	About once per week	1.4%	Moderate risk	17.7%
	About once per day	2.2%	Significant risk	20.8%
	Several times a day	94.0%	Severe risk	13.5%
<b>Completely and legibly document, on each visit, the patient's presentation in the PART format (pain/tenderness, asymmetry, range of motion, and tissue tone) as required for Medicare reimbursement</b>	Never	9.7%	No risk	9.9%
	1-6 times per year	1.7%	Minimal risk	24.5%
	About once per month	2.7%	Some risk	23.4%
	About once per week	4.5%	Moderate risk	16.5%
	About once per day	8.7%	Significant risk	15.9%
	Several times a day	72.7%	Severe risk	9.8%

<b>Professional Function</b>	<b>Frequency</b>	<b>%</b>	<b>Risk</b>	<b>%</b>
<b>Write a physical restriction order</b>	Never	5.3%	No risk	4.2%
	1-6 times per year	20.9%	Minimal risk	19.2%
	About once per month	33.8%	Some risk	29.3%
	About once per week	29.5%	Moderate risk	27.0%
	About once per day	7.9%	Significant risk	15.6%
	Several times a day	2.5%	Severe risk	4.6%
<b>Make specific recommendations to a patient regarding changing risky or unhealthy behaviors</b>	Never	1.2%	No risk	2.7%
	1-6 times per year	5.4%	Minimal risk	15.1%
	About once per month	10.6%	Some risk	27.7%
	About once per week	22.4%	Moderate risk	29.4%
	About once per day	25.3%	Significant risk	19.0%
	Several times a day	35.1%	Severe risk	6.0%
<b>Make specific recommendations to a patient regarding disease prevention and early screening advice</b>	Never	5.3%	No risk	3.8%
	1-6 times per year	12.2%	Minimal risk	17.1%
	About once per month	19.5%	Some risk	30.6%
	About once per week	25.9%	Moderate risk	25.9%
	About once per day	19.5%	Significant risk	17.0%
	Several times a day	17.7%	Severe risk	5.6%
<b>Make specific recommendations to a patient regarding ergonomic or postural advice</b>	Never	0.6%	No risk	4.4%
	1-6 times per year	1.5%	Minimal risk	27.4%
	About once per month	4.6%	Some risk	30.6%
	About once per week	14.7%	Moderate risk	21.1%
	About once per day	25.1%	Significant risk	12.9%
	Several times a day	53.6%	Severe risk	3.6%
<b>Make specific recommendations to a patient regarding nutritional and dietary changes</b>	Never	2.5%	No risk	4.6%
	1-6 times per year	4.9%	Minimal risk	26.9%
	About once per month	9.9%	Some risk	30.7%
	About once per week	20.6%	Moderate risk	21.6%
	About once per day	25.1%	Significant risk	12.5%
	Several times a day	37.0%	Severe risk	3.7%

Professional Function	Frequency	%	Risk	%
<b>Make specific recommendations to a patient regarding physical fitness and exercise promotion</b>	Never	0.5%	No risk	4.1%
	1-6 times per year	1.4%	Minimal risk	24.5%
	About once per month	4.2%	Some risk	31.1%
	About once per week	13.5%	Moderate risk	21.6%
	About once per day	24.1%	Significant risk	15.0%
	Several times a day	56.5%	Severe risk	3.8%
<b>Make specific recommendations to a patient regarding relaxation or stress reduction</b>	Never	1.5%	No risk	7.5%
	1-6 times per year	2.9%	Minimal risk	29.2%
	About once per month	8.3%	Some risk	27.2%
	About once per week	19.5%	Moderate risk	18.7%
	About once per day	26.6%	Significant risk	13.8%
	Several times a day	41.2%	Severe risk	3.6%
<b>Make specific recommendations to a patient regarding self-care strategies</b>	Never	1.3%	No risk	6.3%
	1-6 times per year	1.6%	Minimal risk	27.8%
	About once per month	3.4%	Some risk	30.8%
	About once per week	12.8%	Moderate risk	18.9%
	About once per day	22.2%	Significant risk	12.4%
	Several times a day	58.8%	Severe risk	3.7%
<b>Make specific recommendations to a patient regarding smoking cessation</b>	Never	9.0%	No risk	9.3%
	1-6 times per year	23.4%	Minimal risk	19.1%
	About once per month	27.0%	Some risk	22.1%
	About once per week	23.4%	Moderate risk	18.5%
	About once per day	10.7%	Significant risk	19.9%
	Several times a day	6.5%	Severe risk	11.1%
<b>Write a narrative report (not daily notes)</b>	Never	16.3%	No risk	18.2%
	1-6 times per year	36.9%	Minimal risk	31.5%
	About once per month	21.5%	Some risk	25.3%
	About once per week	14.9%	Moderate risk	14.3%
	About once per day	6.0%	Significant risk	8.1%
	Several times a day	4.4%	Severe risk	2.6%

Note. Due to rounding errors, percentages may not add to 100%

**Table 6.7** Communication Tasks – Averages of Frequency and Risk, with Importance Ratings

Professional Function	Frequency		Risk		Importance
	M	SD	M	SD	
Create complete, readable documentation of a patient's case history and examination findings, the diagnosis and prognosis, and the case management plan	4.9	1.4	3.3	1.3	16.1
Review with a patient his or her relevant case history and examination findings, diagnosis, prognosis, and case management options	4.9	1.2	3.4	1.2	16.4
Obtain written, informed consent for treatment	5.1	1.4	3.9	1.5	<b>19.8</b>
Completely and legibly document each patient visit in the SOAP note format	5.9	0.7	3.7	1.5	<b>21.5</b>
Completely and legibly document, on each visit, the patient's presentation in the PART format (pain/tenderness, asymmetry, range of motion, and tissue tone) as required for Medicare reimbursement	5.2	1.6	3.3	1.5	17.3
Write a physical restriction order	3.2	1.1	3.4	1.2	11.1
Make specific recommendations to a patient regarding changing risky or unhealthy behaviors	4.7	1.3	3.7	1.2	17.2
Make specific recommendations to a patient regarding disease prevention and early screening advice	4.0	1.4	3.5	1.2	13.9
Make specific recommendations to a patient regarding ergonomic or postural advice	5.2	1.0	3.2	1.2	16.8
Make specific recommendations to a patient regarding nutritional and dietary changes	4.7	1.3	3.2	1.2	15.2
Make specific recommendations to a patient regarding physical fitness and exercise promotion	5.3	1.0	3.3	1.2	17.5
Make specific recommendations to a patient regarding relaxation or stress reduction	4.9	1.2	3.1	1.3	15.4
Make specific recommendations to a patient regarding self-care strategies	5.3	1.1	3.1	1.2	16.6
Make specific recommendations to a patient regarding smoking cessation	3.2	1.3	3.5	1.5	11.4
Write a narrative report (not daily notes)	2.7	1.3	2.7	1.3	7.3

Note 1. M = mean; SD = standard deviation

Note 2. Estimates indicating strong, very strong, and extreme importance are in **bold**.

## Treatment Tasks

Manual manipulation is the primary treatment approach of DCs. Chiropractors utilize a number of specialized manipulative techniques that have been developed within the profession (Lombardi, 2000). However, spinal manipulation is not the only tool used by chiropractors. Many chiropractors use various physical modalities in their practice, and most have long relied on the benefits of good nutrition, exercise, and a positive outlook on life (Haldeman, 2005).

The analysis sample for this subsection was  $n = 1,813$ . The average estimate of frequency for Treatment Tasks was  $M = 4.0$ ,  $SD = 1.6$ ; that of risk was  $M = 3.2$ ,  $SD = 1.3$ ; and that of importance was 14.6. The reliability of frequency estimation was an  $\alpha = .87$ ; that of risk was an  $\alpha = .72$ ; and that of importance was an  $\alpha = .95$ .

According to the 2019 survey, the treatment task performed at the highest frequency was a manual chiropractic adjustment of occiput, spine, and/or pelvis ( $M = 5.8$ ,  $SD = .7$ ,  $Importance = 22.2$ ). Other treatment tasks performed on a daily basis included an objective assessment of the involved joints' function before adjustment ( $M = 5.5$ ,  $SD = 1.2$ ,  $Importance = 19.4$ ) and after the adjustment ( $M = 5.4$ ,  $SD = 1.3$ ,  $Importance = 15.9$ ); performance of a manual chiropractic adjustment of extra-spinal articulation ( $M = 5.3$ ,  $SD = 1.2$ ,  $Importance = 17.8$ ); instrument-assisted adjustment ( $M = 5.2$ ,  $SD = 1.5$ ,  $Importance = 16.9$ ); and the use of myofascial/soft tissue release techniques ( $M = 5.0$ ,  $SD = 1.6$ ,  $Importance = 14.8$ ). Performing animal chiropractic care emerged as the treatment task with the lowest frequency ( $M = 1.2$ ,  $SD = .7$ ,  $Importance = 3.4$ ). The results for Treatment Tasks are presented in Tables 6.8 and 6.9.

**Table 6.8** Treatment Tasks – Frequency and Risk

Professional Function	Frequency	%	Risk	%
<b>Perform an objective assessment of the involved joints' function immediately prior to your chiropractic adjustment</b>	Never	2.8%	No risk	3.9%
	1-6 times per year	2.4%	Minimal risk	18.1%
	About once per month	3.1%	Some risk	28.3%
	About once per week	5.0%	Moderate risk	25.3%
	About once per day	9.0%	Significant risk	18.4%
	Several times a day	77.7%	Severe risk	6.0%
<b>Perform a manual chiropractic adjustment of the occiput, spine, and/or pelvis</b>	Never	1.4%	No risk	1.8%
	1-6 times per year	0.4%	Minimal risk	19.4%
	About once per month	1.0%	Some risk	22.5%
	About once per week	1.1%	Moderate risk	21.6%
	About once per day	2.0%	Significant risk	22.9%
	Several times a day	94.0%	Severe risk	11.7%

Professional Function	Frequency	%	Risk	%
<b>Perform an instrument-assisted chiropractic adjustment (e.g., Activator, drop-section, flexion-distraction, etc.) of the occiput, spine, and/or pelvis</b>	Never	8.5%	No risk	6.2%
	1-6 times per year	2.2%	Minimal risk	30.1%
	About once per month	2.4%	Some risk	25.1%
	About once per week	5.4%	Moderate risk	17.0%
	About once per day	9.6%	Significant risk	14.7%
	Several times a day	71.9%	Severe risk	6.8%
<b>Perform a manual chiropractic adjustment of an extra-spinal articulation</b>	Never	2.5%	No risk	3.1%
	1-6 times per year	2.5%	Minimal risk	26.8%
	About once per month	3.8%	Some risk	28.1%
	About once per week	8.6%	Moderate risk	21.7%
	About once per day	16.2%	Significant risk	14.3%
	Several times a day	66.3%	Severe risk	6.0%
<b>Perform an instrument-assisted (e.g., Activator, etc.) chiropractic adjustment of an extra-spinal articulation</b>	Never	18.5%	No risk	12.4%
	1-6 times per year	7.2%	Minimal risk	36.8%
	About once per month	7.2%	Some risk	23.6%
	About once per week	10.9%	Moderate risk	13.5%
	About once per day	17.3%	Significant risk	9.4%
	Several times a day	38.9%	Severe risk	4.4%
<b>Perform an objective assessment of the involved joints' function immediately following your chiropractic adjustment</b>	Never	3.9%	No risk	9.0%
	1-6 times per year	2.2%	Minimal risk	35.6%
	About once per month	3.5%	Some risk	26.4%
	About once per week	5.5%	Moderate risk	14.7%
	About once per day	10.5%	Significant risk	10.0%
	Several times a day	74.4%	Severe risk	4.2%
<b>Use an attended physiotherapeutic modality (e.g., cold laser, ultrasound, etc.)</b>	Never	28.1%	No risk	10.1%
	1-6 times per year	4.0%	Minimal risk	26.0%
	About once per month	4.9%	Some risk	28.4%
	About once per week	7.6%	Moderate risk	18.8%
	About once per day	10.4%	Significant risk	12.3%
	Several times a day	45.1%	Severe risk	4.5%

Professional Function	Frequency	%	Risk	%
<b>Use an unattended physiotherapeutic modality (e.g., motorized traction, vibration, diathermy, heat/cold packs, etc.)</b>	Never	25.9%	No risk	9.4%
	1-6 times per year	3.3%	Minimal risk	29.7%
	About once per month	2.6%	Some risk	29.2%
	About once per week	5.5%	Moderate risk	16.7%
	About once per day	8.4%	Significant risk	10.2%
	Several times a day	54.3%	Severe risk	4.8%
<b>Use in-office active rehab exercises</b>	Never	22.3%	No risk	8.9%
	1-6 times per year	5.1%	Minimal risk	29.4%
	About once per month	5.2%	Some risk	30.3%
	About once per week	8.9%	Moderate risk	18.6%
	About once per day	13.2%	Significant risk	9.0%
	Several times a day	45.2%	Severe risk	3.7%
<b>Use acupuncture (with needles)</b>	Never	84.7%	No risk	24.0%
	1-6 times per year	1.2%	Minimal risk	15.0%
	About once per month	1.0%	Some risk	21.5%
	About once per week	2.6%	Moderate risk	17.1%
	About once per day	2.9%	Significant risk	14.6%
	Several times a day	7.6%	Severe risk	7.8%
<b>Use dry needling</b>	Never	89.9%	No risk	24.3%
	1-6 times per year	0.9%	Minimal risk	13.5%
	About once per month	1.1%	Some risk	22.0%
	About once per week	2.3%	Moderate risk	17.0%
	About once per day	2.2%	Significant risk	15.0%
	Several times a day	3.7%	Severe risk	8.2%
<b>Use orthotics, bracing, and/or taping as an adjunctive treatment</b>	Never	18.5%	No risk	10.8%
	1-6 times per year	14.5%	Minimal risk	38.7%
	About once per month	18.6%	Some risk	28.5%
	About once per week	21.6%	Moderate risk	13.7%
	About once per day	14.4%	Significant risk	5.8%
	Several times a day	12.5%	Severe risk	2.5%

<b>Professional Function</b>	<b>Frequency</b>	<b>%</b>	<b>Risk</b>	<b>%</b>
<b>Use myofascial/soft tissue release techniques</b>	Never	9.6%	No risk	5.8%
	1-6 times per year	3.5%	Minimal risk	34.3%
	About once per month	3.4%	Some risk	31.8%
	About once per week	6.9%	Moderate risk	17.2%
	About once per day	13.6%	Significant risk	7.6%
	Several times a day	63.0%	Severe risk	3.3%
<b>Supply nutritional supplements, herbs, enzymes, or homeopathic remedies as an adjunctive treatment</b>	Never	29.7%	No risk	10.0%
	1-6 times per year	7.7%	Minimal risk	30.1%
	About once per month	10.8%	Some risk	28.7%
	About once per week	15.2%	Moderate risk	18.0%
	About once per day	14.8%	Significant risk	9.1%
	Several times a day	21.8%	Severe risk	4.1%
<b>Engage in pediatric chiropractic</b>	Never	10.4%	No risk	4.2%
	1-6 times per year	15.5%	Minimal risk	26.5%
	About once per month	19.1%	Some risk	22.9%
	About once per week	21.2%	Moderate risk	19.6%
	About once per day	17.4%	Significant risk	19.3%
	Several times a day	16.3%	Severe risk	7.4%
<b>Engage in animal chiropractic</b>	Never	87.1%	No risk	27.5%
	1-6 times per year	7.4%	Minimal risk	20.2%
	About once per month	3.0%	Some risk	21.6%
	About once per week	1.3%	Moderate risk	14.9%
	About once per day	0.3%	Significant risk	10.1%
	Several times a day	0.9%	Severe risk	5.7%

**Table 6.9** Treatment Tasks – Averages of Frequency and Risk, with Importance Ratings

Professional Function	Frequency		Risk		Importance
	M	SD	M	SD	
Perform an objective assessment of the involved joints' function immediately prior to your chiropractic adjustment	5.5	1.2	3.5	1.3	<b>19.4</b>
Perform a manual chiropractic adjustment of the occiput, spine, and/or pelvis	5.8	0.7	3.8	1.4	<b>22.2</b>
Perform an instrument-assisted chiropractic adjustment (e.g., Activator, drop-section, flexion-distraction, etc.) of the occiput, spine, and/or pelvis	5.2	1.5	3.3	1.4	16.9
Perform a manual chiropractic adjustment of an extra-spinal articulation	5.3	1.2	3.4	1.3	17.8
Perform an instrument-assisted (e.g., Activator, etc.) chiropractic adjustment of an extra-spinal articulation	4.2	1.9	2.8	1.3	11.9
Perform an objective assessment of the involved joints' function immediately following your chiropractic adjustment	5.4	1.3	2.9	1.3	15.9
Use an attended physiotherapeutic modality (e.g., cold laser, ultrasound, etc.)	4.0	2.2	3.1	1.3	12.5
Use an unattended physiotherapeutic modality (e.g., motorized traction, vibration, diathermy, heat/cold packs, etc.)	4.3	2.2	3.0	1.3	13.0
Use in-office active rehab exercises	4.2	2.0	3.0	1.2	12.6
Use acupuncture (with needles)	1.6	1.5	3.1	1.6	4.9
Use dry needling	1.4	1.2	3.1	1.6	4.2
Use orthotics, bracing, and/or taping as an adjunctive treatment	3.4	1.6	2.7	1.2	9.2
Use myofascial/soft tissue release techniques	5.0	1.6	3.0	1.2	14.8
Supply nutritional supplements, herbs, enzymes, or homeopathic remedies as an adjunctive treatment	3.4	1.9	3.0	1.3	10.2
Engage in pediatric chiropractic	3.7	1.6	3.5	1.4	12.8
Engage in animal chiropractic	1.2	0.7	2.8	1.5	3.4

Note 1. M = mean; SD = standard deviation

Note 2. Estimates indicating strong, very strong, and extreme importance are in **bold**.

## References

- Bates, D. W., Ebell, M., Gotlieb, E., Zapp, J., & Mullins, H. C. (2003). A proposal for electronic medical records in U.S. primary care. *Journal of the American Medical Informatics Association*, 10(1), 1-10.
- Bickley, L. S., & Szilagyi, P. G. (2017). *Bates' guide to physical examination and history taking* (12th ed.). Wolters Kluwer.
- Crano, W. D., Brewer, M. B., & Lac, A. (2014). *Principles and methods of social research* (3rd ed.). Routledge.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-334.
- Dagenais, S., & Haldeman, S. (2002). Chiropractic. *Primary Care Clinical Office Practice*, 29, 419-437.
- Haldeman, S. (2005). *Principles and practice of chiropractic* (3rd ed.). McGraw-Hill.
- Himelfarb, I. (2019). A primer on standardized testing: History, measurement, classical test theory, item response theory, and equating. *Journal of Chiropractic Education*, 33(2), 151-163.
- Kane, M. T., Clauser, B. E., & Kane, J. (2017). A validation framework for credentialing tests. In S. Davis-Becker & C. W. Buckendahl (Eds.), *Testing in the professions* (pp. 21-40). Taylor and Francis Group, LLC.
- Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research* (4th ed.). Harcourt Brace Jovanovich College Publishers.
- Summers, N. (2016). *Fundamentals of case management practice* (5th ed.). Cengage Learning.
- Souza, T. A. (2016). *Differential diagnosis and management for the chiropractor: Protocol and algorithms* (5th ed.). Jones & Bartlett Learning.
- Sportelli, L. S., & Tarola, G. (2005). Documentation and record keeping. In S. Haldeman (Ed.), *Principles and practice of chiropractic* (3rd ed., pp. 725-744). McGraw-Hill.

# Chapter Seven

## Research And Ethics

### Research

#### Introduction

Scientific research is the systematic, controlled, empirical, public, and critical investigation of a phenomenon using the scientific method. Research is guided by theories and hypotheses about the presumed relations among variables that represent the phenomenon. Hypotheses are rooted in previous research and are testable. The scientific method is a special, systematic form of all reflective objective thinking and inquiry (Kerlinger & Lee, 2000).

The definitions of research and science in the chiropractic profession are aligned with the definitions in traditional healthcare (Keating et al., 1995). The attitude toward research has changed within the chiropractic profession, as more practitioners have embraced empirical research.

More than 15 years ago, a study found that 75% of chiropractic students considered chiropractic research to be necessary. Additionally, students in later years of the program felt able to conduct or understand research (Newell & Cunliffe, 2003).

The scope of chiropractic research parallels the research performed in all healthcare fields. Specifically, chiropractic researchers have been actively involved in basic science, education, health services, health outcomes, and clinical research (Phillips et al., 1997). The relevant section of the 2019 survey contains many questions that were not included in previous practice surveys by the NBCE, but which have become more important in the past decade.

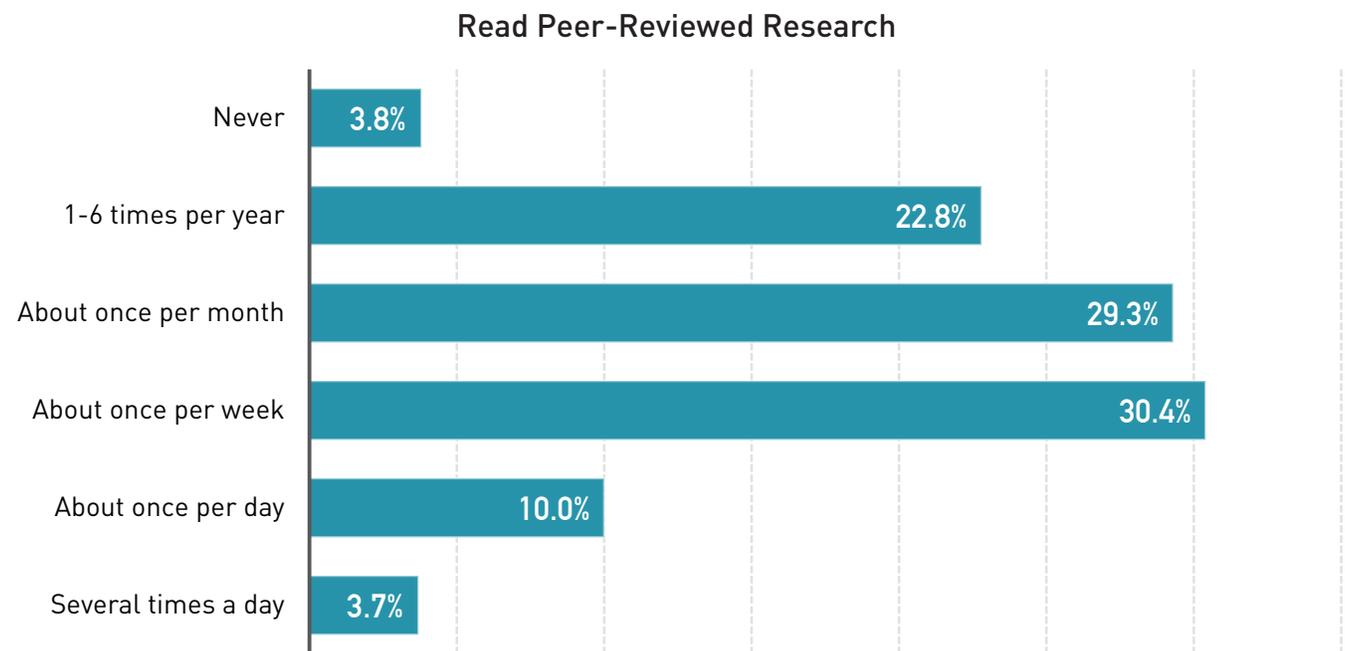


Figure 7.1. Distribution of the frequency at which peer-reviewed research is read.

## Reading the Research Literature

According to the 2019 survey, the overwhelming majority of chiropractic practitioners (96.4%) spent some time reading published, peer-reviewed chiropractic and/or medical research. Of them, 13.7% read research articles at least once a day; 30.4% read research weekly; 29.3% read research once a month; and 22.8% read a research article once a year (see Figure 7.1).

## Research-Based Treatment

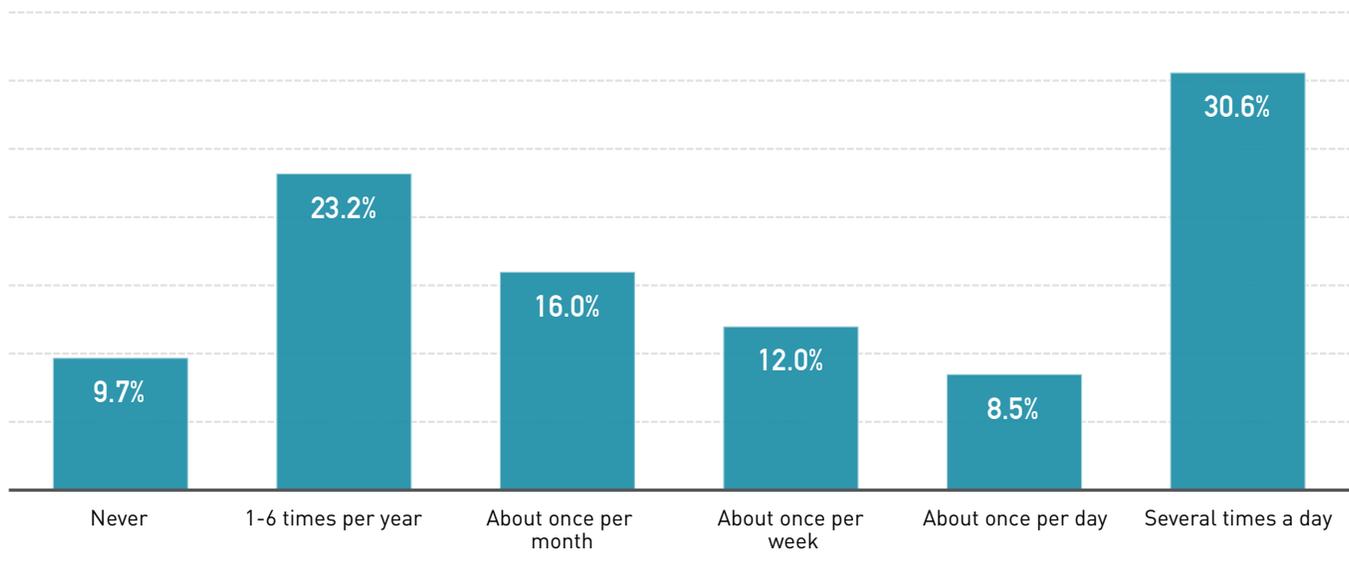
The provision of patient treatment based on empirical research is important to DCs. When applying evidence-based practice principles, chiropractors rely in part on published research when making decisions regarding the care of their patients. Evidence that can inform chiropractic practice ranges from systematic literature reviews and meta-analytic studies to randomized clinical trials with experimental and control groups (Christensen et al., 2015).

According to the 2019 survey, the vast majority of practicing chiropractors (90.3%) use current chiropractic and/or medical research when making patient treatment decisions. Half of practitioners (51.1%) use evidence-based research in their practice at least once a week

(see Figure 7.2). Similarly, 89.2% of the surveyed practicing chiropractors use evidence-based research and published professional guidelines (e.g., Globe, et al., 2016) when making practice decisions (see Figure 7.3).

Best-practices reviews are commonly available to chiropractic practitioners (e.g., Hawk et al., 2009). The majority of respondents (77.8%) indicated that they review documents related to best practices in chiropractic at least once a year. Two-fifths of respondents (40.2%) reviewed best-practices publications at least once a month, and 18.2% reviewed these documents at least once a week (see Figure 7.4). The estimated correlation coefficient between a chiropractor's age and the review of best practices was  $r = -.06, p < .05$ , whereas the corresponding coefficient between the number of years in practice and best-practices reviews was  $r = -.07, p < .05$ . In other words, as the age and number of years in practice increase, the frequency of reviewing current best practices decreases. It is not surprising that older generations of chiropractors would review these types of documents less frequently than their younger generations and those who have entered practice more recently.

## Research-Based Treatment



**Figure 7.2. Distribution of the frequency of research-based treatment.**

### Research/Guidance-Based Treatment

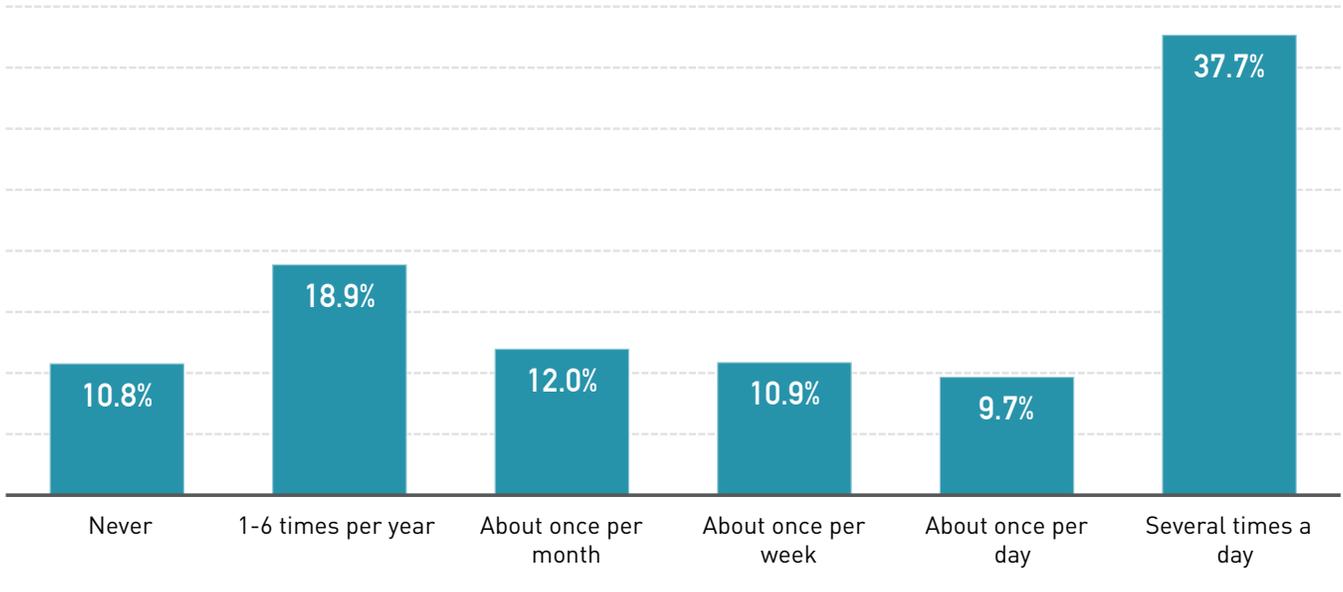


Figure 7.3. Distribution of the frequency of evidence-based/guidance-based treatment.

### Best Practices Review

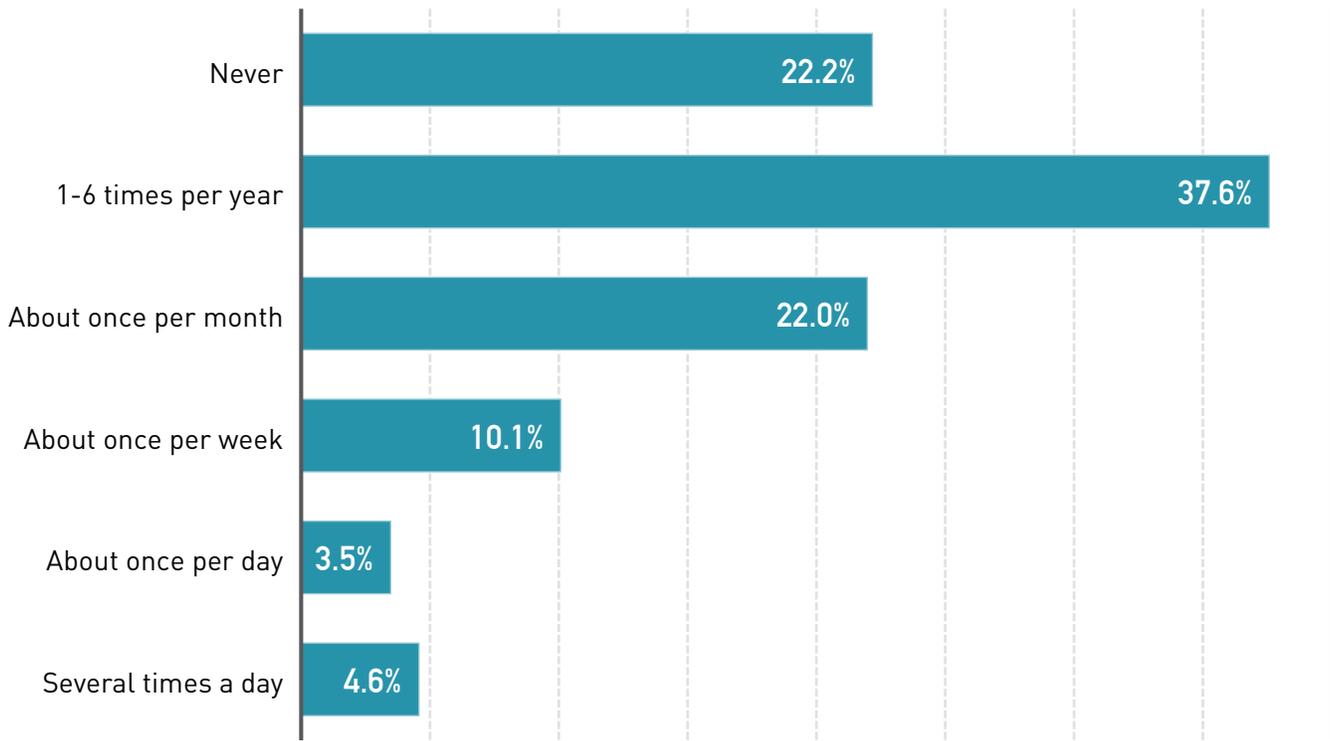


Figure 7.4. Distribution of the frequency of reviewing best-practices documents in chiropractic.

## Continuing Education

Health care professionals are expected to remain current with recent developments in their fields (Zeiger, 2004). Continuing education for chiropractors is mandatory, and the requirements from state to state vary from 12 hours per year to 150 hours per 3 years. Furthermore, the attitudes held by chiropractors regarding continuing education are positive and the satisfaction with the courses is generally high (Stuber et al., 2005).

The 2019 survey asked practicing chiropractors to report on the average number of annual hours of professional continuing education they had completed in the last 5 years. Virtually all survey respondents (98.7%) reported that they had completed some hours of continuing education. An overwhelming majority (90.2%) reported spending more than 15 hours per annum obtaining continuing education, while 8% reported to have averaged 8–14 hours of continuing education and only 1.9% averaged fewer than 7 hours per year (see Figure 7.5). The survey also solicited information about the state requirements for continuing chiropractic education. According to the respondents, 64.3% were required to complete 15–24 hours of continuing education per year, while 15.9% reported a requirement of 8–14 hours and 18.5% required 25–35 hours per year.

## Patient Confidentiality and Reporting Abuse

Figure 7.7 presents the percentages of chiropractors who perform activities to ensure patient confidentiality and the frequencies of these activities. Almost all chiropractors (97.8%) reported that they had made practice decisions to ensure patient confidentiality in the past 12 months. This is an important patient-centered concern that was first addressed by the Federal HIPAA legislation (Health Insurance Portability and Accountability Act, 1996). Since the publication of the final Privacy Rule (HIPAA Privacy Rule, 2002), all U.S. healthcare providers are required to ensure that the information and data they collect from patients remain secure and private.

In all professions, ethics standards require the reporting of professional abuse and/or impairment to regulatory authorities (e.g., *ABA Model Rules of Professional Conduct*). This is, however, not a common phenomenon in most professions (Biaggio, Duffy, & Staffelbach, 1998). The vast majority of chiropractors surveyed (91.1%) did not identify and/or report possible professional abuse and/or impairment regarding chiropractic regulations and ethical guidelines. Although their patients, the public, and the professional licensing boards would prefer practitioners to report evidence of possible professional abuse and/or impairment when they witness it, most professionals do not do so and state that they would rather discuss their concerns with their colleagues directly (Raniga et al., 2005). In this area, chiropractic practitioners appear to be similar to other healthcare professionals.

### Annual Continuing Education Hours

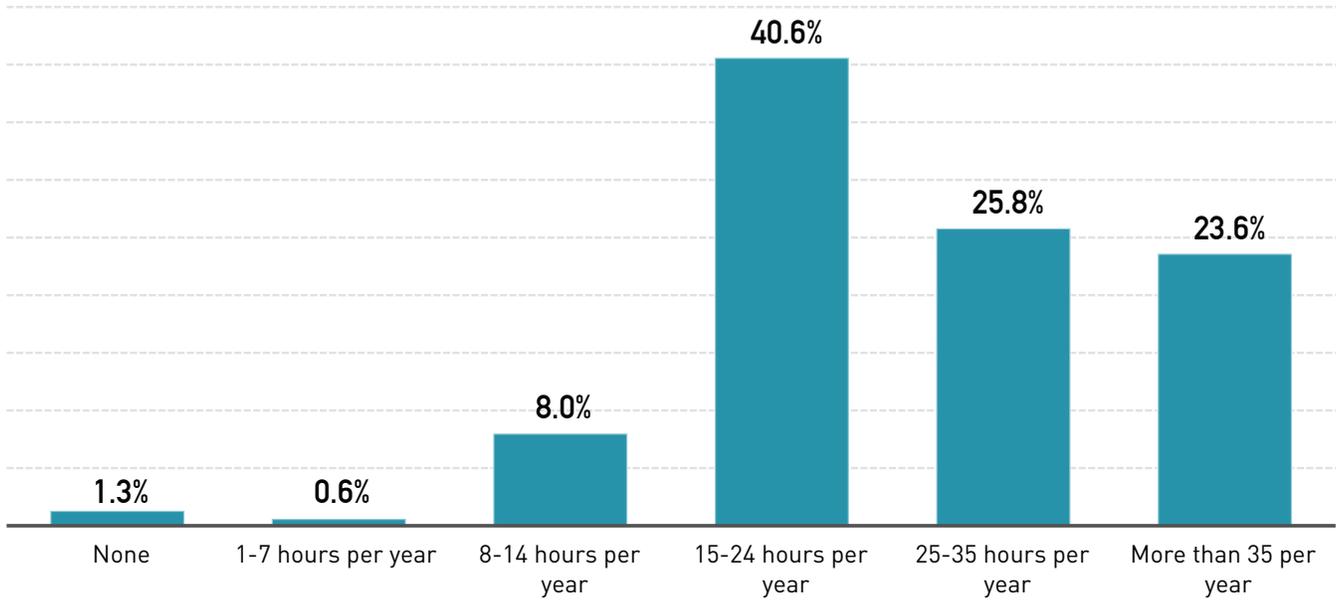


Figure 7.5. Distribution of the annual hours of completed continuing education.

### Continuing Education State Requirement

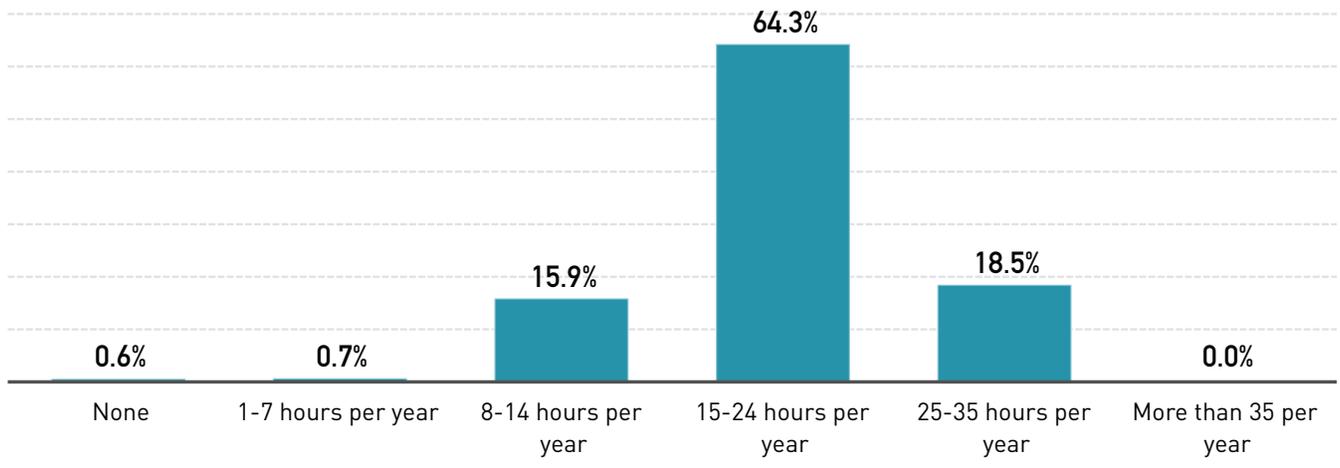
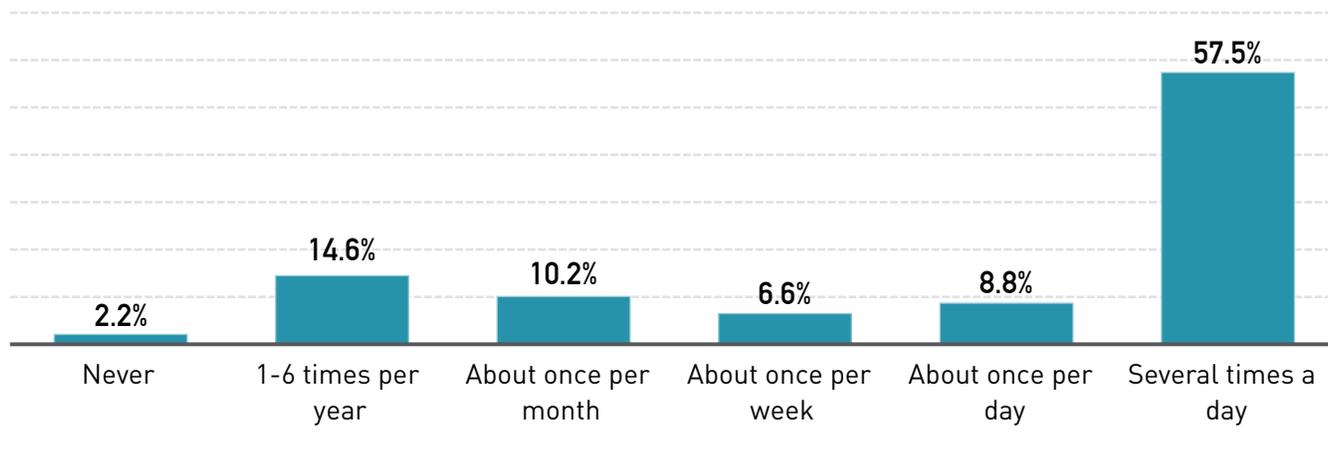
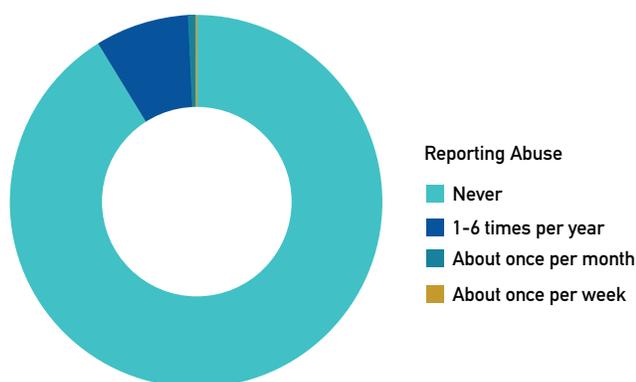


Figure 7.6. Distribution of the hours of continuing education required by the state.

## Patient Confidentiality



**Figure 7.7. Distribution and frequency of decisions made to ensure patient confidentiality.**



**Figure 7.8. Frequency at which respondents reported possible professional abuse and/or impairment regarding chiropractic regulations and ethical guidelines.**

## References

ABA *Model Rules of Professional Conduct* (1983). Rule 8.3: Reporting Professional Misconduct. American Bar Association.

Biaggio, M., Duffy, R., & Staffelbach, D. F. (1998). Obstacles to addressing professional misconduct. *Clinical Psychology Review* 18(3), 273–285.

Cherkin, D. C., & Mootz, R. D. (1997). *Chiropractic in the United States: Training, practice, and research*. Seattle, WA.

Christensen, M. G., Hyland, J. K., Goertz, C. M., & Kollasch, M. W. (2015). *Practice analysis of chiropractic*. National Board of Chiropractic Educators.

Globe G., Farabaugh, R. J., Hawk, C., Morris, D. E., Baker, G., Whalen, W. M., . . . Augat, T. (2016). Clinical practice guideline: Chiropractic care for low back pain. *Journal of Manipulative and Physiological Therapeutics*, 39, 1–22.

Hawk, C., Schneider, M., Ferrance, R. J., Hewitt, E., Van Loon, M., & Tanis, L. (2009). Best practices recommendations for chiropractic

care for infants, children, and adolescents: Results of a consensus process. *Journal of Manipulative and Physiological Therapeutics*, 36, 639-647.

Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191.

HIPAA Privacy Rule, August 14, 2002, 67 FR 45 CFR Parts 160 and 164.

Keating, J. C., Green, B. N., & Johnson, C. D. (1995). "Research" and "science" in the first half of the chiropractic century. *Journal of Manipulative and Physiological Therapeutics*, 18(6), 357-378.

Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research* (4th ed.). Harcourt Brace Jovanovich College Publishers.

Newell, D., & Cunliffe, C. (2003). Attitudes toward research in undergraduate chiropractic students. *Clinical Chiropractic*, 6(3-4), 109-119.

Phillips, R. B., Adams, A. H., & Sandefur, R. (1997). Chiropractic research. In D. C. Cherkin & R. D. Mootz (Eds.), *Chiropractic in the United States: Training, practice, and research*. Seattle, WA.

Raniga, S., Hider, P., Spriggs, D., & Ardagh, M. (2005). Attitudes of hospital medical practitioners to the mandatory reporting of professional misconduct. *New Zealand Medical Journal* 118, 1227-1242.

Stuber, K. J., Grod, J. P., Smith, D. L., & Powers, P. (2005). An online survey of chiropractors' opinions of continuing education. *Chiropractic & Osteopathy*, 13(1), 22.

Zeiger, R. F. (2004). Toward continuous medical education. *Journal of General Internal Medicine*, 20, 91-94.

# Chapter Eight

## Part-Time Practitioners and Those Who Do Not Practice

This chapter provides information about chiropractors who have completed a DC degree but have decided not to practice ( $n = 711$ ), as well as those who currently practice only part time (less than 20 hours per week;  $n = 820$ ). In previous surveys, information was discarded from respondents who indicated that they did not practice full time. For the first time, this Practice Analysis of Chiropractic report contains information about the graduates of chiropractic programs who do not practice chiropractic and those who practice part time. We believe that a portrait of the profession would be incomplete if we did not include the information from these segments of the chiropractic community.

An expanding body of research suggests an increase in malaise among healthcare professionals (Zuger, 2004). Stress, burnout, and job dissatisfaction have been suggested as reasons why healthcare workers may exit their professions or reduce their involvement to part-time status (Rossler, 2012). Moreover, after obtaining a DC degree, some graduates may pursue additional education to expand their employment opportunities. In addition, physicians often prefer nontraditional or part-time schedules. Two segments of the practitioner population are particularly known for their preference of flexible schedules: younger doctors who start families and doctors nearing retirement (NEJM Career Center, 2011). Teaching physicians, members of regulatory boards, and those who combine clinical work with research are also among those who practice only part time.

### Demographics

#### Gender

According to the 2019 survey, nonpracticing chiropractors demonstrated a similar gender breakdown as that of the total U.S. respondents (63.8% and 67.3% male, respectively). However, female chiropractors (45.7%) surpassed their male counterparts (35%) among those who worked part time (see Figure 8.1).

#### Age

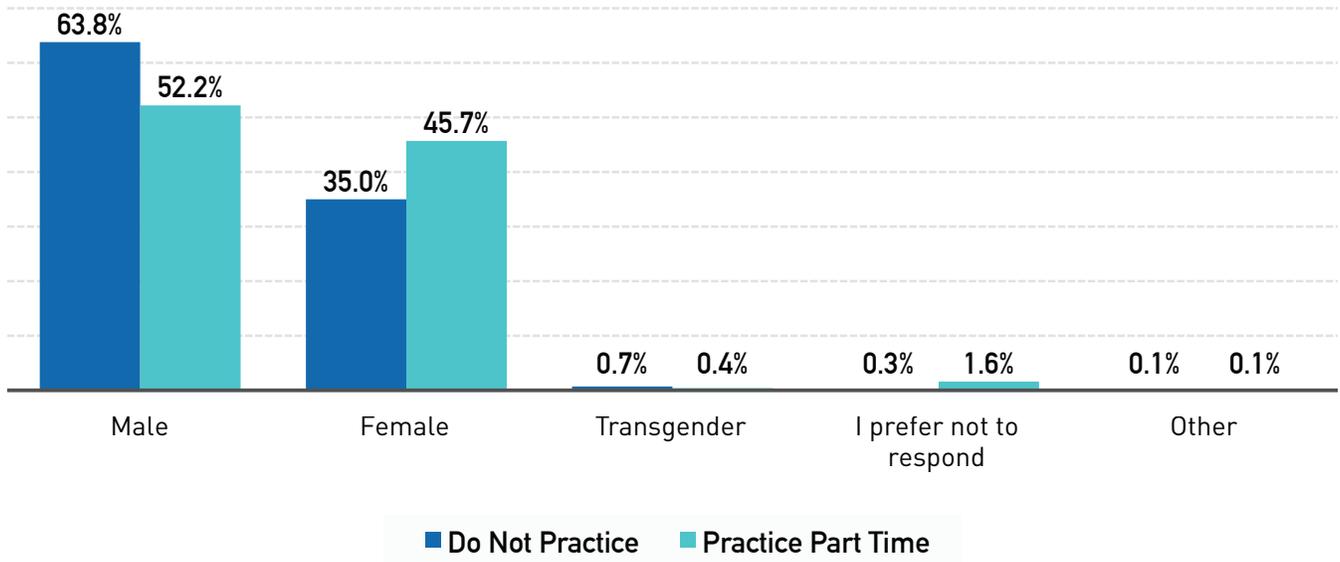
The 2019 survey confirmed that among nonpractitioners, individuals aged 60 years or older represented the largest age category (46%). It is safe to speculate that a large portion of these individuals have retired from practice. However, half of the respondents (50%) who indicated that they were not practicing were in their prime career years (ages 30–59). Only 4% of nonpracticing chiropractors were under 30 (see Figure 8.2).

Similarly, among those who practiced part time, individuals aged 60 and older formed the largest age category (37%), while the categories of 40–49 and 50–59 each accounted for 20%. The respondents in these categories have likely combined their chiropractic practice with another related career such as academia or research. Respondents aged 30–39 constituted 19% of part timers, while those under 30 accounted for 4% (see Figure 8.3).

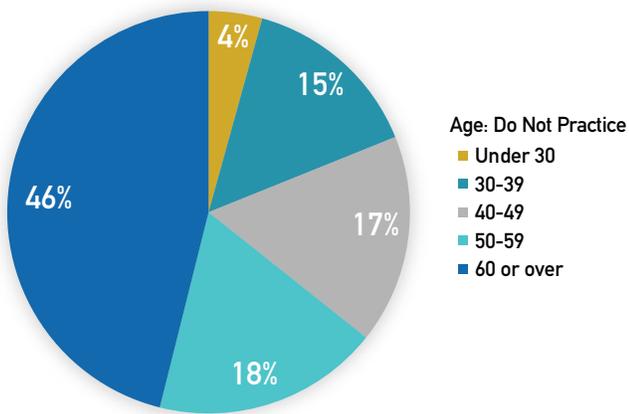
#### Ethnicity

The ethnicity distributions of nonpractitioners and part-time practicing chiropractors were similar and mimicked the ethnic distribution of the overall sample (see Table 8.1 and Table 3.1).

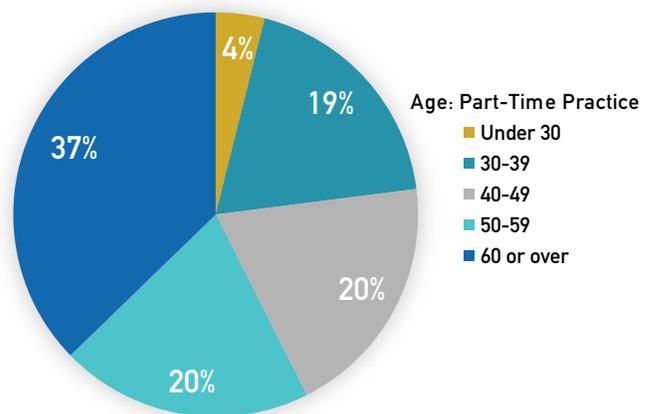
## Gender



**Figure 8.1. Gender distributions of nonpracticing and part-time chiropractors.**



**Figure 8.2. Age distribution (in ranges of years) of nonpracticing chiropractors.**



**Figure 8.3. Age distribution (in ranges of years) of chiropractors who practice part time.**

**Table 8.1** Ethnicity Distributions of Nonpracticing and Part-Time Chiropractors

Ethnicity	Do Not Practice	Practice Part Time
Asian/Pacific Islander	1.6%	3.3%
Black or African American	3.0%	1.9%
White	89.0%	88.1%
Hispanic/Latino	3.2%	3.5%
Native American	1.3%	0.7%
Other	2.0%	2.5%

### Chiropractic Degree

The 2019 survey found no evidence of a relationship between graduation from a specific chiropractic college and the rates of nonpracticing chiropractors or those who practice part time. The percentage distributions with respect to the colleges where the respondents obtained their doctor of chiropractic degrees were quite similar between the nonpracticing and part-time chiropractors. Moreover, both distributions resembled that observed in the overall sample (see Table 8.2 and Table 3.3).

### Level of Nonchiropractic Education

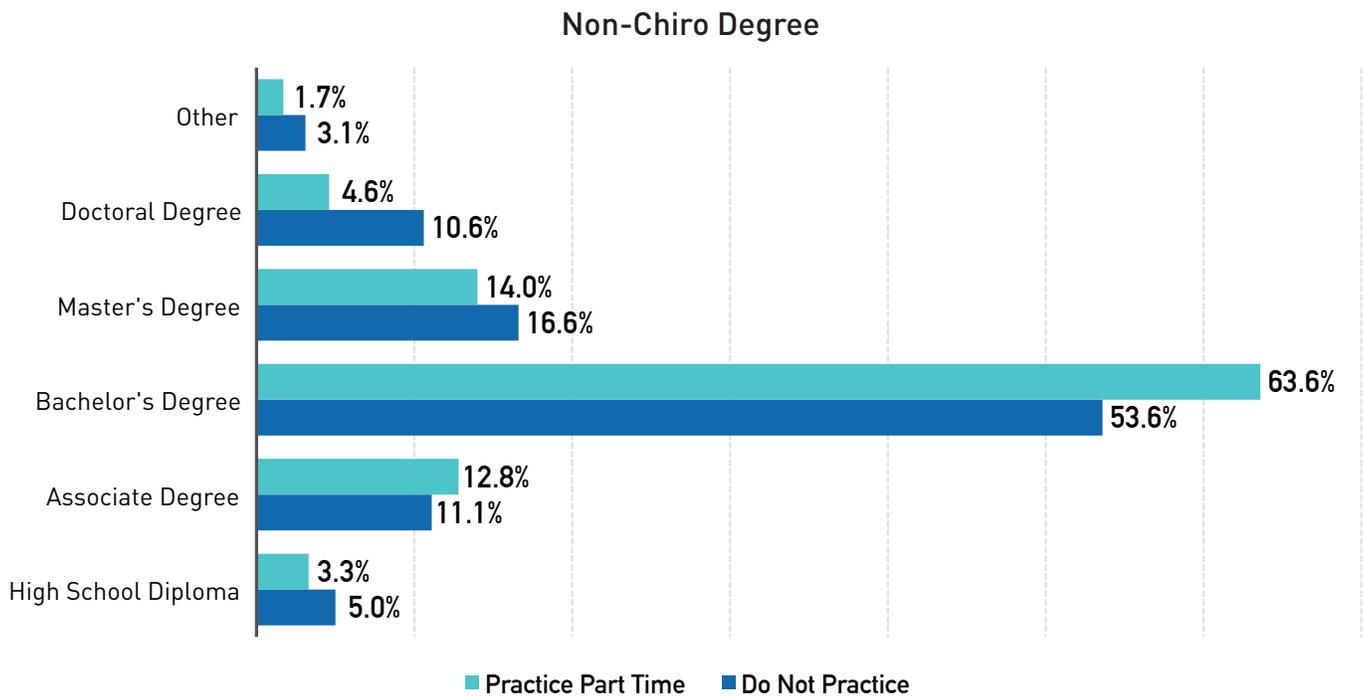
Based on the 2019 data, the majority of nonpracticing chiropractors (53.6%) and chiropractors who practiced part time (63.6%) held a Bachelor's degree. These statistics are comparable to the results from the overall sample (65.6%; see Figure 3.3). However, the prevalence of a Master's degree was higher among those who did not practice (16.6%) or practiced part time (14%) than in the overall sample (12%). The frequency of a nonchiropractic doctoral degree was much higher among nonpractitioners (10.6%) than among those who practiced part time (4.6%) or the overall sample (5.2%). Chiropractors who complete a DC degree and pursue further academic training appear to be more likely to become involved in nonpracticing (e.g., teaching and research) occupations.

### Years Since Degree

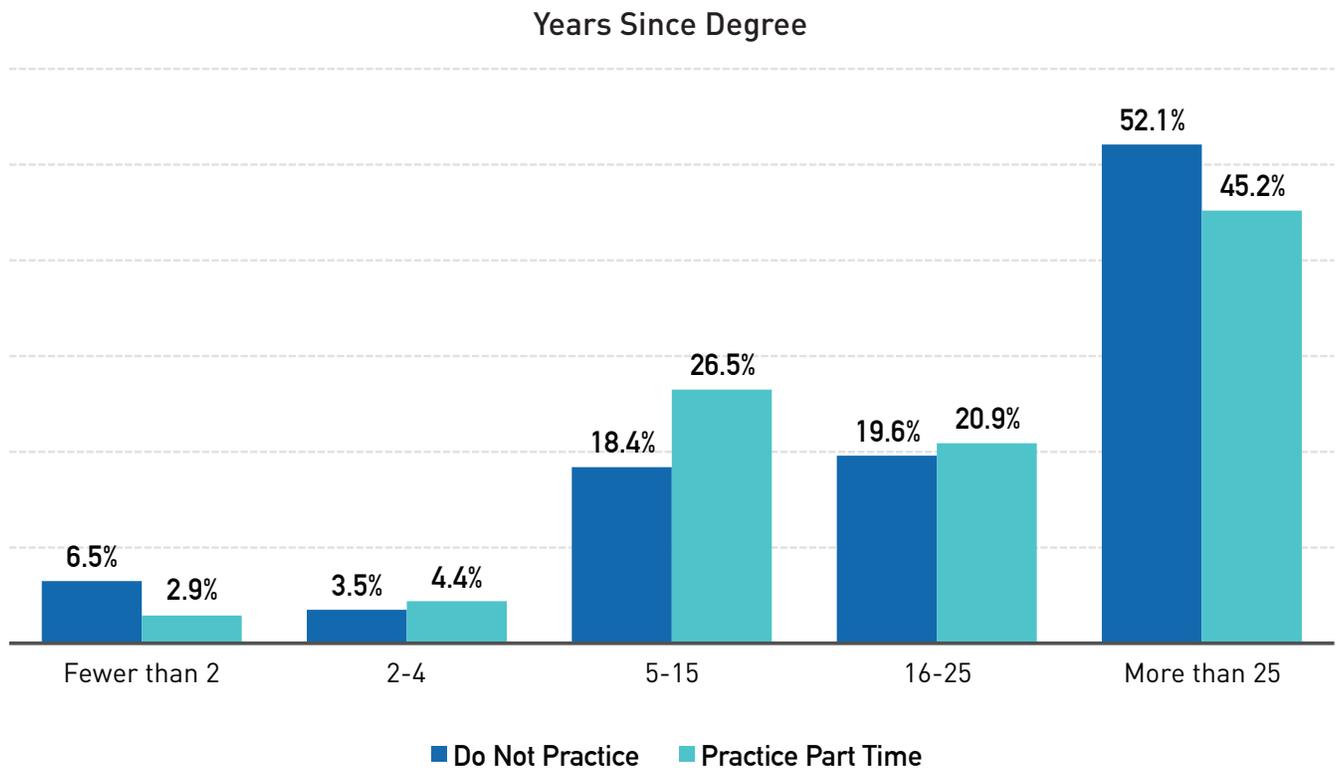
Figure 8.5 presents the results of an analysis of the years since obtaining a DC degree. The distribution of this variable resembles the distribution of age (see Figure 8.2 and Figure 8.3). In fact, the correlation estimates between Age and Years Since Degree were  $r = .84, p < .001$  for non-practitioners and  $r = .85, p < .001$  for chiropractors who practice part time. Both correlation estimates are positive, indicating that as one variable increases, the other is also likely to increase.

**Table 8.2** Chiropractic Colleges Represented in the Sample

College	Do Not Practice	Practice Part Time
Anglo-European College of Chiropractic	0.1%	0.0%
Canadian Memorial Chiropractic College	0.4%	0.2%
Cleveland Chiropractic College, Kansas City	1.1%	2.1%
Cleveland Chiropractic College, Los Angeles	1.3%	1.6%
Life University, College of Chiropractic (Life College)	15.8%	17.7%
Life Chiropractic College West	1.3%	2.3%
Lincoln College of Chiropractic	0.4%	0.1%
Logan College of Chiropractic	12.9%	10.5%
National University of Health Sciences (National College of Chiropractic)	10.2%	8.0%
New York Chiropractic College	5.6%	6.8%
Northwestern Health Sciences University (Northwestern College of Chiropractic)	6.7%	6.7%
Palmer College of Chiropractic, Davenport	21.1%	15.8%
Palmer College of Chiropractic, Florida	1.6%	1.8%
Palmer College of Chiropractic, West	2.6%	4.2%
Parker University, College of Chiropractic	4.3%	5.5%
Sherman College of Chiropractic	1.7%	2.3%
Southern California University of Health Sciences (Los Angeles College of Chiropractic)	3.7%	3.8%
Texas Chiropractic College	3.4%	4.8%
University of Bridgeport	0.1%	0.0%
Université du Québec à Trois-Rivières	0.1%	0.0%
University of Western States	4.7%	4.6%
Other	0.6%	1.1%



**Figure 8.4. Levels of nonchiropractic education among nonpracticing and part-time chiropractors.**



**Figure 8.5. Distributions of years since obtaining a chiropractic degree among nonpracticing and part-time chiropractors.**

## Alternative Occupations and Attitudes Towards the Doctor of Chiropractic Degree

According to a recent news article that focused on physicians who made other career choices after obtaining doctoral degrees, “Becoming a doctor... requires extensive (and expensive) schooling followed by intensive residencies” (Spector, 2018). However, the financial rewards are disproportional to the investment made toward the degree and subsequent job demands, which may result in a lack of job satisfaction and work-life balance (Spector, 2018).

According to the ACC/NBCE survey conducted in 2017, chiropractors report high levels of

satisfaction with the profession. Eighty-five percent of the respondents said they were proud of their DC degree. Ninety-one percent indicated that they felt appreciated when their health knowledge was recognized. Sixty-nine percent stated that as DCs, they were able to provide for their families (NBCE, 2018).

We investigated the alternative career choices made by nonpracticing chiropractors, as well as the occupations assumed by part-time chiropractors in addition to their practices.

According to the 2019 survey, 36.7% of nonpracticing chiropractors have retired from chiropractic practice. Further, 14.9% of those who do not practice and 16.7% of part-time practitioners work as faculty members at chiropractic or nonchiropractic institutions. Approximately one-fifth (18.9%) of part-time practitioners reported that they were homemakers. Less than one-third (32.2%) of those who do not practice left the profession and chose a different occupation (see Table 8.3). These “other” occupations ranged from becoming a medical doctor or osteopath to becoming an actor and owning a hair salon.

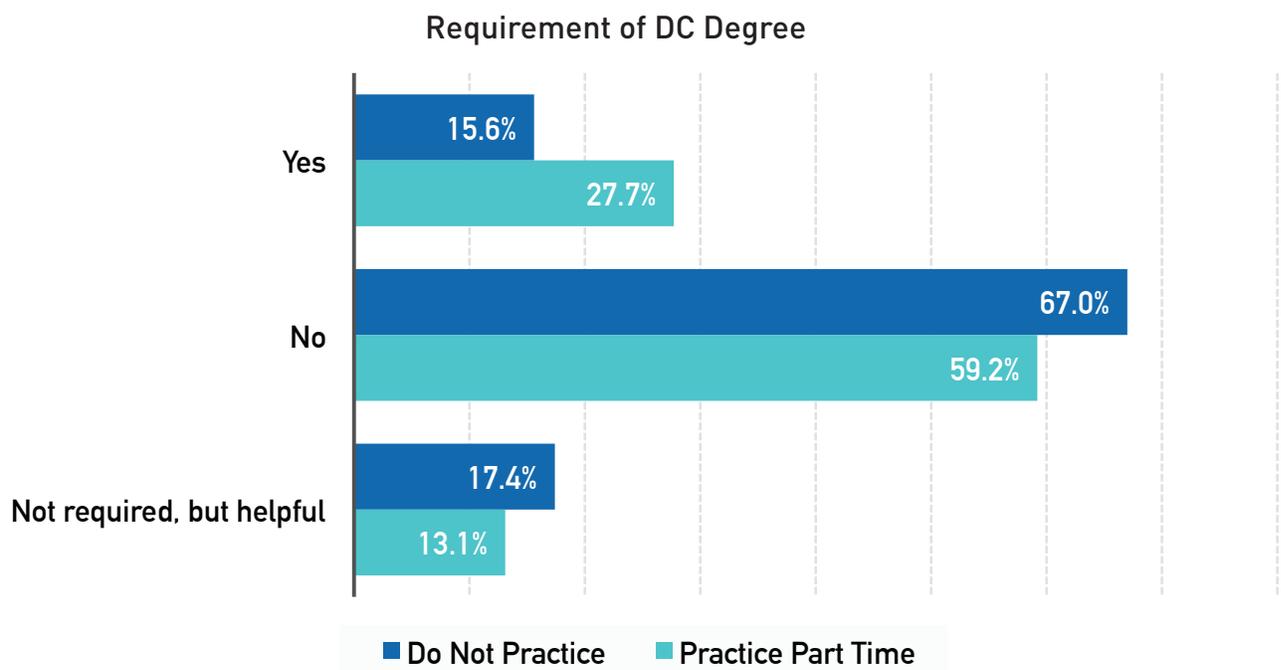
## Attitudes Towards the Doctor of Chiropractic Degree

The 2019 survey probed the attitudes of nonpracticing chiropractors and those who practice part time towards their DC degrees. Fifteen percent (15.6%) of nonpracticing chiropractors indicated that a DC degree was required for their current occupation (see Figure 8.6). The majority of nonpracticing (50.1%) and part-time (61.2%) chiropractors declared

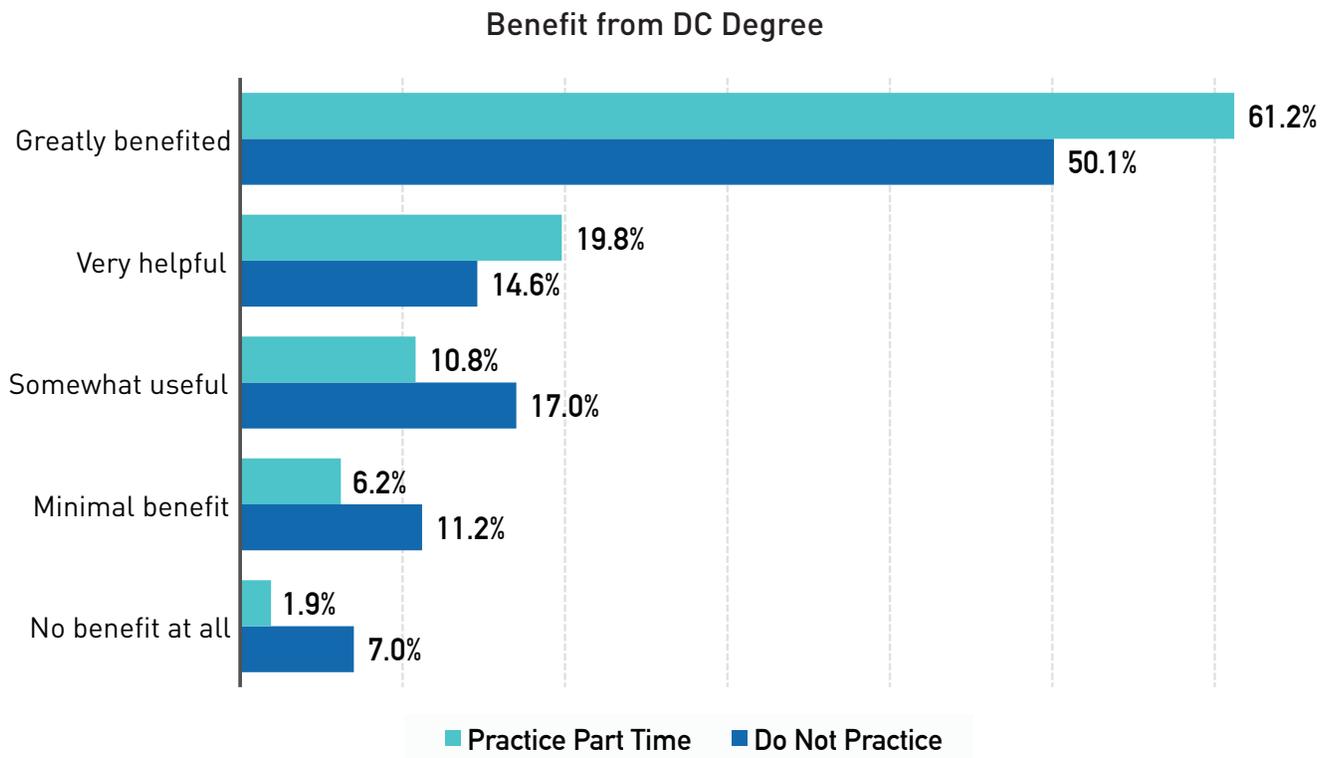
that they had greatly benefitted from their DC degrees. One-fifth (19.8%) of part-time practitioners and 14.6% of nonpractitioners stated that the degree was very helpful. Finally, only 7% of nonpractitioners and 1.9% of part-time practitioners indicated that they did not receive any benefit from their DC degrees (see Figure 8.7).

**Table 8.3** Career Choices and Additional Occupations of Nonpracticing and Part-Time Chiropractors

Occupation	Do Not Practice	Practice Part Time
Working for a DC	3.1%	5.8%
Working for a private health delivery organization	2.9%	3.9%
Working for a public health delivery organization (VHA/DoD/Community Health Center)	1.9%	0.4%
Faculty/administration in a chiropractic institution	8.8%	12.2%
Faculty/administration in a nonchiropractic institution	6.1%	4.5%
Chiropractic research	1.8%	0.7%
Home keeper	5.7%	18.9%
Nonchiropractic research	0.7%	0.9%
Retired from chiropractic practice	36.7%	7.3%
Other	32.2%	45.5%



**Figure 8.6.** Requirement of a DC degree as reported by nonpracticing and part-time chiropractors.



**Figure 8.7. Attitudes regarding a DC degree held by nonpracticing and part-time chiropractors.**

## References

New England Journal of Medicine Career Center. (2011, October 29). Part-time physician practice on the rise. Retrieved October 11, 2019 from <https://www.nejmcareercenter.org/article/part-time-physician-practice-on-the-rise/>

National Board of Chiropractic Examiners. (2018). *The Association of Chiropractic Colleges Survey*.

Rosler, W. (2012). Stress, burnout, and job dissatisfaction in mental health workers. *European Archives of Psychiatry and Clinical Neuroscience*, 262(S2), 65–69.

Spector, N. (2018, August 18). The doctor is out? Why physicians are leaving their practices to pursue other careers. *NBC News*. <https://www.nbcnews.com/business/business-news/doctor-out-why-physicians-are-leaving-their-practices-pursue-other-n900921>

Zuger, A. (2004). Dissatisfaction with medical practice. *New England Journal of Medicine*, 350, 69–75.

# Chapter Nine

## Conclusion

The chiropractic profession is recognized, licensed, and regulated in all 50 states and the District of Columbia (Christensen et al., 2015). Licensure has helped the profession to develop its scope of practice, and regulation comes with the privilege of recognition (Sandefur and Coulter, 1997). There is a need for competency assessments to ensure public safety. The examinations administered by the NBCE verify an applicant's ability to practice independently and safely, without supervision. The *Practice Analysis of Chiropractic* is a process by which we subdivide the universe of chiropractic practice into elements such as tasks, develop a systematic procedure for data collection, collect and analyze relevant data, and report the results (Levine et al., 1983). The main objective of a Practice Analysis study is to provide evidence of content validity (Crano et al., 2014, p. 66) for the NBCE exams. However, this type of study is also performed to study and update the activities and scope of the profession. This report presents the chiropractic community, state licensing boards, insurance companies, and the general public with an updated snapshot of the chiropractic profession.

### Methods

In 2019, we administered the survey only in an online format. The previous survey in 2014 used a multi-mode survey administration that combined mail-in and electronic responses. The response rate for the nonelectronic reach was not very high, and it was quite expensive to mail the printed materials. Therefore, a decision

was made to administer the 2019 Survey of the Chiropractic Profession in a single mode. The data were collected using representative sampling. To ensure a broad sample, we worked to maximize the reach of the 2019 survey by contacting various chiropractic organizations and, with their agreement, sending survey links to be distributed among their members and alumni. This procedure yielded a demographically diverse and geographically representative sample.

### Typical Chiropractor

There are approximately 10,000 chiropractic students in 18 nationally accredited chiropractic doctoral programs across the U.S. (ACC, 2019; CCE, 2019). Approximately 2,500 new chiropractors enter the profession every year (ACC, 2019).

Although the gender and ethnic diversity of the profession continues to increase steadily, in 2019, a typical chiropractor in the U.S. was a White male in the age range between 30 and 59. In an editorial published in the *Journal of Chiropractic Education*, researchers stated that:

*According to the 2019 census, the racial diversity of the U.S. population is 72.4% White, 12.6% Black, 6.2% Hispanic, 5% Asian, and 0.9% Native American. These percentages are expected to change drastically in 2050, when it is predicted that racial minorities will account for more than half of the U.S. population (Johnson & Green, 2012, pp. 1-2).*

Considering this prediction, the authors asked, “Is the chiropractic profession prepared to meet these emerging demographic and cultural changes? Does the profession have a diverse workforce that is providing culturally competent care?” (Johnson & Green, 2012, pp. 1–2).

The topic of diversity within the chiropractic profession has been addressed by several papers published early in this decade (Johnson et al., 2012; Johnson & Green, 2012; Nelson et al., 2000), and was the theme of the Annual Conference of Chiropractic Educators in 2012. To increase diversity in the profession, suggestions were made to diversify the portrayal of chiropractors and to increase positive value judgments on diversity by the media and politicians (Young, 2015).

Based on the trends from the 2019 survey, the percentage of female practitioners (53%) surpassed that of their male counterparts

(45.7%) among those aged under 30. The percentages of female (43.6%) and male practitioners (55.3%) did not differ widely among those aged under 40. The gap between female (33%) and male practitioners (65.9%) only began to increase significantly among chiropractors aged 40–49 (see Table 9.1). Moreover, the increasing ethnic diversity of the chiropractic profession is also evident. The younger populations of DCs are somewhat more diverse than their older counterparts (see Table 9.2).

In 2019, a typical chiropractor had obtained a Bachelor’s degree prior to admission into a doctoral program, and increasing numbers of DCs had subsequently obtained advanced academic degrees. Moreover, most DCs worked full time (more than 20 hours per week). Some chiropractors worked as many as 40–49 (19.1%) or more than 50 hours per week (5.1%).

**Table 9.1** Gender Distribution by Age

Gender	Ages (Years)				
	Under 30	30–39	40–49	50–59	60 or over
Male	45.9%	55.3%	65.9%	70.2%	79.2%
Female	53.2%	43.6%	33.0%	29.2%	20.0%
Transgender	0.0%	0.1%	0.4%	0.1%	0.0%
Prefer not to respond	0.9%	0.7%	0.5%	0.5%	0.7%
Other	0.0%	0.2%	0.2%	0.0%	0.1%

**Table 9.2** Ethnic Distribution by Age

Ethnicity	Ages (Years)				
	Under 30	30–39	40–49	50–59	60 or over
Asian	1.4%	2.6%	5.3%	0.8%	0.3%
Black or African American	4.6%	2.5%	1.9%	0.8%	0.6%
White	85.2%	88.4%	87.9%	92.6%	94.3%
Hispanic/Latino	5.1%	4.7%	2.7%	2.8%	1.7%
Native American	2.3%	0.5%	0.6%	1.3%	1.0%
Other	1.4%	1.3%	1.6%	1.6%	2.1%

## Typical Office Settings

In 2019, the vast majority of chiropractors worked in a chiropractic office (82.4%). Some (15.1%) were employed by a multi-disciplinary health care facility. The majority (64%) of chiropractors were sole proprietors in their own chiropractic offices, 13% worked in partnerships, and 17% were employed by other health care professionals.

The typical chiropractic office was located in an urban (34.8%) or suburban (28.1%) geographic area. While many chiropractors practiced in small cities or towns (31.6%), only a few of our respondents practiced in rural areas (5.4%). The typical office focused on general practice (83.9%), while 39.4% also focused on providing care for athletes, 38.8% also focused on delivering pediatric care, 39.5% focused on orthopedics and injuries, and 37.9% focused on rehabilitation. Slightly less than half (47%) of chiropractic offices had radiographic equipment, of which two-thirds provided digital images.

## Typical Patient

According to a recent Gallup poll, half (53%) of American adults who saw a healthcare professional for neck or back pain in the previous 12 months reported seeking care from a chiropractor (Gallup, 2018). Based on our 2019 survey, the typical chiropractic patient is female (57%) and between the ages of 30 and 64 (45.9%).

## Limitations

The results of this study should be considered in light of several possible limitations. First, our study design involved a non-experimental approach to the evaluation of cross-sectional variables. Therefore, we could not establish causal relationships among variables. Second, the study design did not assign a priori

probabilities for all population units to be selected in the sample. Although we attempted to minimize subjectivity, the inference of the findings to the target population may be susceptible to bias (Groves et al., 2009). Third, the sampling procedures were disturbed further by the necessary exclusion of chiropractors who do not currently practice or who practice part time from the analytical samples. We believe it is important to analyze these samples separately.

Additionally, the survey was conducted online using self-reported measures. A major strength of self-reported data is that the responses are supplied directly by the participants. However, some responses may have suffered from response bias. These response biases originate in the survey participants and can introduce inaccuracies that threaten the validity and reliability of the data (Kerlinger and Lee, 2000; Saris & Gallhofer, 2014). One possible source of bias may involve the respondents' desire to provide socially appropriate responses. This phenomenon is called the social desirability bias and is known to affect the validity of survey responses (Edwards, 1957). In fact, research has documented a recognizable pattern in the responses from respondents who consistently select more socially desirable responses when completing assessment instruments (Jackson & Messick, 1962).

Many questions on the survey asked the respondents to provide the frequencies of their professional functions, as well as the risks associated with the omission or poor performance of these functions. These survey questions may trigger socially desirable responses. However, our protocol ensured the anonymity of the responses, which should have helped to reduce the likelihood of socially desirable responses.

In addition, the Importance variable was created as a multiplicative composite of the frequency and risk. Although this practice is acceptable and was implemented previously in similar research (Christensen et al., 2015; Shotts et al., 2019), the composite is somewhat artificial and,

due to multiplication, is measured on a different scale than the original variables. Therefore, the information provided by the Importance index should be interpreted with caution.

Despite these limitations, which are common to all survey research, we are confident that this Practice Analysis of Chiropractic 2020 study report provides valuable information to the chiropractic profession, state licensing boards, legislators, insurance companies, and the general public.

## References

- Association of Chiropractic Colleges. (2019). *Chiropractic by the numbers*. <http://www.chirocolleges.org/prospective-students/chiropractic-by-the-numbers/>
- CCE Accreditation Standards. Principles, processes & requirements for accreditation*. (2018, January). [http://www.cce-usa.org/uploads/1/0/6/5/106500339/2018\\_cce\\_accreditation\\_standards.pdf](http://www.cce-usa.org/uploads/1/0/6/5/106500339/2018_cce_accreditation_standards.pdf)
- Christensen, M. G., Hyland, J. K., Goertz, C. M., & Kollasch, M. W. (2015). *Practice analysis of chiropractic 2015*. National Board of Chiropractic Examiners.
- Crano, W. D., Brewer, M. B., & Lac, A. (2014). *Principles and methods of social research* (3rd ed.). Routledge.
- Damarin, F., & Messick, S. (1965). *Response styles as personality variables: A theoretical integration of multivariate research* (Research Report No. 65-10). Educational Testing Service.
- Edwards, A. (1957). *The social desirability variable in personality assessment and research*. The Dryden Press.
- Gallup-Palmer College of Chiropractic Annual Report. (2018). *Managing neck and back pain in America*.
- Groves, R. M., Flower, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). *Survey methodology* (2nd ed.). John Wiley & Sons.
- Johnson, C. D., & Green, B. N. (2012). Diversity in the chiropractic profession: Preparing for 2050. *Journal of Chiropractic Education*, 26(1), 1-13.
- Johnson, C. D., Killinger, L. Z., Christensen, M., Hyland, J. K., Mrozek, J. P., Zuker, R. F., ... Oyelowo, T. (2012). Multiple views to address diversity issues: An initial dialog to advance the chiropractic profession. *Journal of Chiropractic Humanities*, 19(1), 1-11.
- Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research* (4th ed.). Harcourt Brace Jovanovich College Publishers.
- Levine, E. L., Ash, R. A., Hall, H., & Sistrunk, F. (1983). Evaluation of job analysis methods by experienced job analysts. *Academy of Management Journal*, 26(2), 339-348.
- Nelson, C. D., Redwood, D., McMillin, D. L., Richards, D., & Mein, E. A. (2000). Manual healing diversity and other challenges to chiropractic integration. *Journal of Manipulative and Physiological Therapeutics*, 23(3), 202-207.
- Sandefur, R., & Coulter, I. D. (1997). Licensure and legal scope of practice. In D. C. Cherkin & R. D. Mootz (Eds.), *Chiropractic in the United States: Training, practice, and research* (pp. 33-38). Agency for Health Care Policy and Research.
- Saris, W. E., & Gallhofer, I. N. (n.d.). *Design, evaluation, and analysis of questionnaires for survey research* (2nd ed.). John Wiley & Sons.
- Shotts, B., Himelfarb, I., Crawford, G. L., Harding, J., & Gow, A. R. (2019). Practice analysis and changes to the Chiropractic Board of Clinical Nutrition Diplomate Exam. Manuscript submitted for publication.
- Young, K. J. (2015). Overcoming barriers to diversity in chiropractic patient and practitioner population: A commentary. *Journal of Cultural Diversity*, 22(3), 82-87.

# Appendix A

## Patient Conditions

The following section presents questions regarding the health conditions evaluated and treated by doctors of chiropractic in their practices. The data and results in this section were derived from the 2014 Survey of Chiropractic Practice. Previously, we noted that the conditions and frequencies reported in 2014 were very similar to the responses to the 1998 and 2003 surveys (NBCE, 2015). Therefore, to keep the survey reasonably short and avoid exhausting the respondents, we decided not to include these questions again in 2019. However, we plan to re-assess the conditions in 2024.

The following tables (A1–A14) present responses to the following questions:

- Frequency:** How often had the practitioner seen a particular condition during the previous 12 months? If the practitioner had not seen the condition, the instruction was to not answer subsequent questions regarding the condition. The response scale for frequency was: 0 = Never, 1 = 1–6 times per year, 2 = About once per month, 3 = About once per week, 4 = About once per day, and 5 = Several times per day.
- Diagnosis:** Did the practitioner make the diagnosis of this condition in the majority (> 50%) of cases? The response scale was: 1 = Yes, 2 = No.
- Management:** What was the usual method of clinical management for the majority (> 50%) of the cases seen? The response scale was: 1 = Not treated by me, 2 = Treated solely by me, 3 = Co-managed. When percentages were calculated, the omitted responses were added to *Not treated by me* category.

**Table A.1** Neurological Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Headaches	3.9	76.3%	6.3%	70.1%	23.6%
Radiculitis or radiculopathy	3.5	74.0%	7.2%	65.5%	27.3%
Peripheral neuritis, neuralgia, or neuropathy	3.1	61.8%	6.4%	38.8%	54.8%
Spinal stenosis/neurogenic claudication	2.4	50.8%	8.6%	25.9%	65.5%
Vertigo/loss of equilibrium	1.9	56.4%	8.0%	31.3%	60.7%
Concussion/head injury	1.1	51.6%	15.2%	14.8%	70.0%
ALS, multiple sclerosis, or parkinsonism	0.9	21.5%	26.7%	3.3%	70.0%
Cranial nerve disorder	0.9	46.3%	13.7%	23.1%	63.2%
Stroke or cerebrovascular condition	0.5	15.6%	48.3%	2.0%	49.7%

**Table A.2** Articular Joint Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Spinal subluxation/joint dysfunction	4.6	80.3%	6.7%	88.9%	4.4%
Osteoarthritis/degenerative joint disease	3.9	68.0%	6.4%	52.7%	40.9%
Sprain of any joint	3.7	74.3%	6.5%	78.5%	15.0%
Extremity subluxation/joint dysfunction	3.6	77.0%	7.3%	83.0%	9.7%
Hypolordosis of cervical or lumbar spine	3.6	73.4%	9.8%	83.2%	7.0%
Intervertebral disc syndrome	3.5	74.3%	7.1%	61.4%	31.5%
Hyperlordosis of cervical or lumbar spine	3.1	76.0%	7.0%	86.5%	6.5%
Kyphosis of the thoracic spine	2.8	71.4%	7.1%	80.9%	12.0%
Bursitis or synovitis	2.3	69.6%	7.2%	54.2%	38.6%
Functional scoliosis	2.2	65.6%	7.1%	63.9%	29.0%
TMJ syndrome	2.2	63.6%	6.8%	54.8%	38.4%
Carpal or tarsal tunnel syndrome	2.1	64.8%	7.1%	55.9%	37.0%
Structural scoliosis	2.1	59.2%	8.0%	52.3%	39.7%
Thoracic outlet syndrome	1.8	65.6%	8.2%	62.3%	29.5%
Rheumatoid/inflammatory arthritis or gout	1.7	31.6%	13.9%	7.6%	78.5%
Dislocation of any joint	0.8	53.6%	28.2%	25.4%	46.4%
Avascular necrosis	0.3	36.6%	50.4%	5.3%	44.3%

**Table A.3** Muscular Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Muscle strain/tear	3.6	74.7%	7.1%	69.7%	23.2%
Myofasciitis	3.4	69.7%	7.9%	69.8%	22.3%
Muscle weakness/atrophy	2.6	64.2%	8.2%	45.3%	46.5%
Tendinopathy	2.3	60.4%	7.8%	58.6%	33.6%
Fibromyalgia	2.3	42.0%	6.3%	23.2%	70.5%

**Table A.4** Skeletal Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Osteoporosis or osteomalacia	2.3	37.1%	15.2%	13.0%	71.8%
Congenital/developmental anomaly	0.9	45.7%	17.4%	29.2%	53.4%
Fracture	0.8	50.9%	51.9%	2.5%	45.6%
Bone tumor/metastasis	0.4	31.0%	71.6%	1.7%	26.7%
Infection of joint/disc/bone	0.4	35.2%	58.3%	4.6%	37.1%

**Table A.5** Respiratory Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Asthma, emphysema, or COPD	1.3	24.4%	22.9%	5.7%	71.4%
Respiratory infection	1	26.2%	37.7%	9.3%	53.0%
Occupational/environmental lung disorder	0.3	15.7%	52.3%	2.6%	45.1%
Tumor of lung or respiratory passages	0.2	11.0%	72.4%	1.0%	26.6%
Atelectasis or pneumothorax	0.1	21.0%	66.9%	0.5%	32.6%

**Table A.6** Gastrointestinal Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Hiatal hernia/esophageal reflux	1.2	39.7%	17.1%	20.3%	62.6%
Colitis or diverticulitis	0.8	25.2%	28.5%	10.7%	60.8%
Gastrointestinal infection	0.6	25.3%	38.0%	16.3%	45.7%
Ulcer of stomach, small intestine, or colon	0.6	15.5%	45.7%	6.9%	47.4%
Inguinal hernia	0.5	32.1%	66.6%	1.6%	31.8%
Hemorrhoid	0.5	19.9%	43.6%	16.1%	40.3%
Cholecystitis or pancreatitis	0.4	25.2%	48.2%	9.1%	42.7%
Appendicitis	0.2	35.4%	73.5%	5.3%	21.2%

**Table A.7** Dermatological Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Acne, dermatitis, or psoriasis	0.8	31.1%	44.6%	11.1%	44.3%
Herpes simplex or herpes zoster	0.6	33.0%	26.9%	16.1%	57.0%
Skin cancer	0.5	20.0%	77.3%	0.8%	21.9%

**Table A.8** Renal/Urological Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Incontinence	0.9	25.9%	27.6%	16.4%	56.0%
Kidney or urinary tract infection	0.8	33.5%	38.4%	9.2%	52.4%
Kidney stones	0.7	24.7%	51.8%	4.3%	43.9%
Kidney or bladder tumor	0.2	18.8%	68.8%	4.3%	26.9%

**Table A.9** Cardiovascular Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Hypertension/hypotension	2.1	36.3%	26.2%	6.4%	67.4%
Peripheral artery or vein disorder	0.7	17.8%	56.7%	3.1%	40.2%
Heart murmur or rhythm irregularity	0.6	20.3%	57.8%	4.2%	38.0%
Angina or myocardial infarction	0.4	22.5%	55.3%	5.2%	39.5%
Abdominal aortic aneurysm	0.4	52.7%	76.0%	0.6%	23.4%

**Table A.10** Endocrine/Metabolic Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Obesity	2.3	37.0%	23.0%	19.4%	57.6%
Diabetes/metabolic syndrome	1.7	27.5%	26.4%	7.3%	66.3%
Immune system dysfunction	1.3	27.8%	22.7%	19.4%	57.9%
Thyroid disorder	1.2	23.1%	38.1%	6.6%	55.3%
Adrenal disorder	1	44.8%	27.7%	30.8%	41.5%
Anemia	0.7	30.7%	41.3%	14.1%	44.6%

**Table A.11** Reproductive Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Pregnancy-related condition	1.7	39.3%	9.3%	19.9%	70.8%
Menstrual disorder/PMS	1.5	30.2%	20.6%	23.1%	56.3%
Menopause	1.4	23.4%	27.0%	13.1%	59.9%
Infertility female/male	0.6	19.5%	24.9%	10.7%	64.4%
Benign prostatic hypertrophy	0.6	16.7%	47.2%	5.2%	47.6%
Fibrocystic breast or polycystic ovary	0.4	17.5%	47.4%	9.7%	42.9%
Prostatic carcinoma	0.3	8.2%	72.6%	1.5%	25.9%
Sexually transmitted diseases	0.2	11.9%	71.6%	1.0%	27.4%

**Table A.12** Eye, Ear, Nose, and Throat Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Sinus condition	2.2	45.0%	13.8%	31.0%	55.2%
Eye, ear, nose, or throat condition	1.3	38.6%	24.4%	16.8%	58.8%

**Table A.13** Childhood Disorders

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Childhood respiratory/ear infection	1.1	46.9%	12.4%	28.2%	59.4%
Infantile colic	0.9	46.4%	7.0%	45.3%	47.7%

**Table A.14** Miscellaneous Conditions

Condition	Frequency	Initial Diagnosis	Not Treated	Treated Solely	Co-managed
Nutritional disorder	1.8	44.6%	14.0%	34.5%	51.5%
Food/environmental allergies	1.7	41.4%	15.2%	25.1%	59.7%
Sleep disorder	1.4	29.9%	24.5%	17.5%	58.0%
Psychological disorder	0.9	13.9%	52.9%	2.9%	44.2%
Eating disorder	0.6	24.8%	34.8%	10.4%	54.8%

## References

Christensen, M. G., Hyland, J. K., Goertz, C. M., & Kollasch, M. W. (2015). *Practice analysis of chiropractic*. National Board of Chiropractic Examiners.

# Appendix B

## The Association of Chiropractic Colleges Chiropractic Paradigm

### THE ACC CHIROPRACTIC PARADIGM

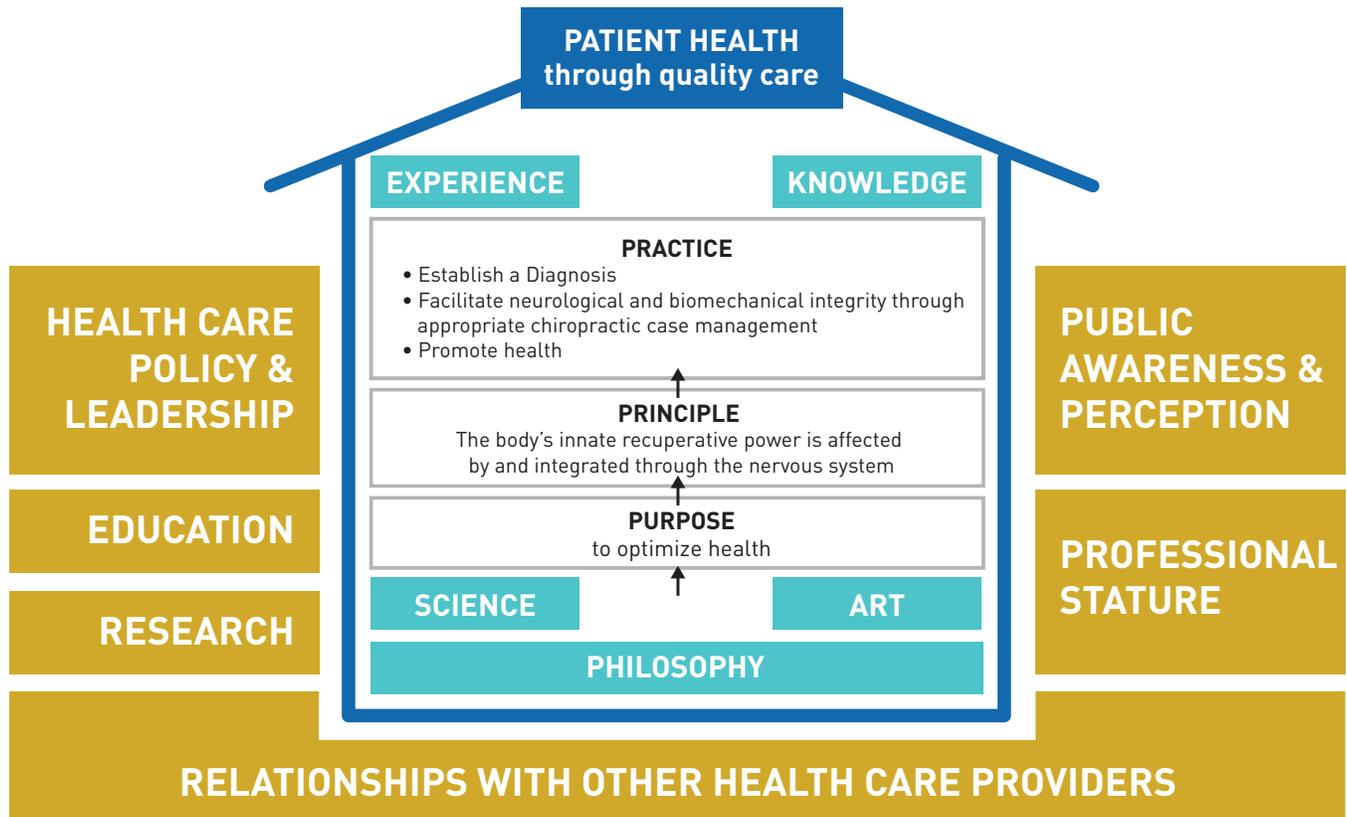


Figure B.1. The ACC Chiropractic Paradigm.

#### Preamble

The Association of Chiropractic Colleges (ACC) is committed to affirming the profession of chiropractic by addressing the issues facing chiropractic education. The ACC coalesces a wide range of perspectives on chiropractic and is uniquely positioned to help define the role of chiropractic medicine within health care.

The ACC is committed to greater public service through the achievement of consensus on the following issues considered important to the chiropractic profession:

- continued enhancement of educational curricula
- strengthening chiropractic research
- participating and providing leadership in the development of health care policy
- fostering relationships with other health care providers
- affirming professional confidence and conduct
- increasing public awareness regarding the benefits of chiropractic care

The member colleges of the ACC represent a broad diversity of institutional missions. The presidents have drafted a consensus statement that includes the following:

- the ACC position on chiropractic
- a representation of the chiropractic paradigm
- clarification regarding the definition and clinical management of subluxation

Additional statements will be forthcoming as the ACC continues to provide meaning and substance regarding the curricula taught in chiropractic colleges and the influences of this information on the present and future state of the profession.

## ACC Position on Chiropractic

Chiropractic is a health care discipline that emphasizes the inherent recuperative power of the body to heal itself without the use of drugs or surgery. The practice of chiropractic focuses on the relationship between structure (primarily the spine) and function (as coordinated by the nervous system) and the effects of that relationship on the preservation and restoration of health. In addition, doctors of chiropractic recognize the value and responsibility of working in cooperation with other healthcare practitioners when in the best interest of the patient.

The Association of Chiropractic Colleges continues to foster a unique, distinct chiropractic profession that serves as a health care discipline for all. The ACC advocates a profession that generates, develops, and utilizes the highest level of evidence possible in the provision of effective, prudent, and cost-conscious patient evaluation and care.

## Chiropractic Paradigm

### Purpose

The purpose of chiropractic is to optimize health.

### Principle

The body's innate recuperative power is affected by and integrated through the nervous system.

### Practice

The practice of chiropractic includes:

- establishing a diagnosis
- facilitating neurological and biomechanical integrity through appropriate chiropractic case management
- promoting health

### Foundation

The foundation of chiropractic includes philosophy, science, art, knowledge, and clinical experience.

### Impacts

The chiropractic paradigm directly influences the following:

- education
- research
- health care policy and leadership
- relationships with other health care providers
- professional stature
- public awareness and perceptions
- patient health through quality care

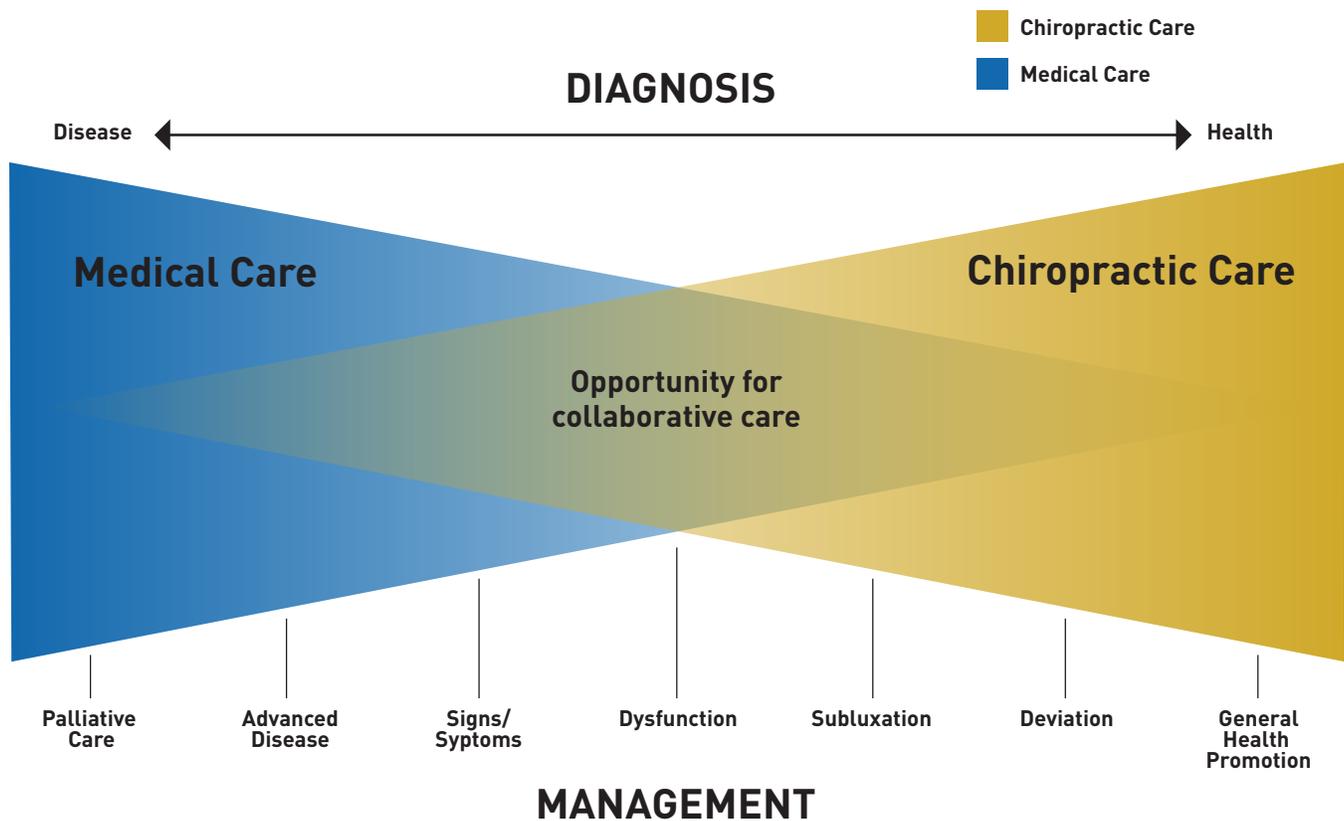
## The Subluxation

Chiropractic is concerned with the preservation and restoration of health, and focuses particular attention on the subluxation. A subluxation is a complex of functional and/or structural and/or pathological articular changes that compromise neural integrity and may influence organ system function and general health. A subluxation is evaluated, diagnosed, and managed through the use of chiropractic procedures based on the best available rational and empirical evidence.

# Appendix C

## Chiropractic Scope and Practice

### ACC CHIROPRACTIC SCOPE AND PRACTICE



**Figure C.1. ACC Chiropractic Scope of Practice.**

The Association of Chiropractic Colleges (ACC) coalesces a wide range of perspectives on chiropractic and is uniquely positioned to help define the chiropractic role within health care. In Position Paper #1 (July 1996), the ACC presidents described the practice of chiropractic within the chiropractic paradigm to include:

- establishing a diagnosis
- facilitating neurological and biomechanical integrity through appropriate chiropractic case management
- promoting health

As part of its on-going commitment to affirming the profession by addressing the issues facing chiropractic education, the ACC presidents have drafted a consensus statement on chiropractic scope and practice.

ACC member colleges educate students in the competent practice of chiropractic. These academic institutions have a direct interest in the definition of the chiropractic scope and practice. Clarity on the scope and practice of chiropractic will:

- enhance the consistency and excellence of educational outcomes
- contribute to a better understanding of chiropractic education and practice, both within the profession and by the public
- provide direction to the profession for the advancement of chiropractic

This second position paper includes:

- definition of the chiropractic scope
- a description of the practice of chiropractic with respect to diagnosis, case management, and health promotion

## Defining the Chiropractic Scope

Since human function is neurologically integrated, doctors of chiropractic evaluate and facilitate biomechanical and neurobiological functions and integrity through the use of appropriate conservative, diagnostic and chiropractic care procedures. Therefore, direct-access chiropractic care is integral to the health care regimens of all people.

## Defining Chiropractic Practice

### Diagnostic

Doctors of chiropractic, as primary contact health care providers, use the education, knowledge, diagnostic skill, and clinical judgment necessary to determine the appropriate chiropractic care and management. Doctors of chiropractic have access to diagnostic procedures and/or referral resources as required.

### Case Management

Doctors of chiropractic establish a doctor/patient relationship and utilize adjustive and other clinical procedures unique to the chiropractic discipline. Doctors of chiropractic may also use other conservative patient care procedures and, when appropriate, collaborate with and/or refer to other health care providers.

### Health Promotion

Doctors of chiropractic advise and educate patients and communities in structural and spinal hygiene and healthful living practices.

# Appendix D

## Glossary

### **abdominal aortic aneurysm**

An enlargement of the aorta, the main blood vessel that delivers blood to the body, at the level of the abdomen. Rupture can be life-threatening.

### **Activator**

A small, hand-held instrument used to deliver a gentle impulse force to the spine with the goal of restoring motion to the targeted spinal vertebra or joint.

### **acupuncture**

The practice of inserting needles into specific sites on the skin to relieve pain, induce surgical anesthesia, and affect distant functional mechanisms of the body. This therapy is based on the belief that these sites are organized along meridians that carry the life force.

### **adjunctive treatment**

Therapies or procedures provided in support of and in addition to the primary therapy.

- active adjunctive care: an adjunctive procedure performed by the patient (e.g., exercises, dietary changes).
- passive adjunctive care: an adjunctive procedure performed by the doctor or a supervised assistant (e.g., cold or hot packs, electrical stimulation).

### **adjustment**

A therapeutic maneuver that is intended to wholly or partly correct a subluxation and is carefully controlled in terms of its force, velocity, amplitude, and direction.

### **alternative medicine**

See complementary and alternative medicine (CAM).

### **amyotrophic lateral sclerosis (ALS or Lou Gehrig's disease)**

A neurodegenerative disease that affects nerve cells in the brain and spinal cord and consequently weakens muscles and impacts physical function.

### **anemia**

A condition in which the blood does not contain enough healthy erythrocytes.

### **angina**

A type of chest pain caused by reduced blood flow to the heart.

**APA**

American Psychological Association.

**appendicitis**

An inflammation, swelling, or infection of the appendix.

**a priori**

Based from theoretical deduction rather than observation or experience.

**associate's degree**

A degree conferred by a junior or community college after the successful completion of two years of study in a particular field.

**Association of Chiropractic Colleges (ACC)**

The ACC represents accredited chiropractic colleges in North America and seeks to advance chiropractic education, research, and services.

**atelectasis**

A partial or complete collapse of a lung or a section (i.e., lobe) of a lung.

**atrophy**

Gradual decline in the effectiveness of body tissues and organs due to underuse or neglect.

**avascular necrosis**

The death of bone tissue due to a lack of blood supply. Also called osteonecrosis.

**Bachelor's degree**

A degree conferred by a college or university after the successful completion of undergraduate studies.

**biopsychosocial history**

A model that investigates the interconnections between biology, psychology, and socio-environmental factors. The model specifically examines the roles of these aspects in topics ranging from health and disease models to human development.

**bone scan**

An image of the concentrations of radioactivity after the internal administration of a radioisotope. The radioisotope concentrates in areas of increased metabolism, such as that caused by an infection or neoplasm.

**bracing**

Use of an orthopedic appliance to hold body parts in a normal or more normal alignment.

## **Bureau of Labor Statistics**

A unit of the United States Department of Labor. This is the principal fact-finding agency for the U.S. government in the broad field of labor economics and statistics, and serves as a principal agency of the U.S. Federal Statistical System.

## **bursitis or synovitis**

Inflammation of a bursa or synovial membrane.

## **cardiopulmonary**

Relating to the heart and lungs.

## **carpal or tarsal tunnel syndrome**

Peripheral nerve compression syndromes. Carpal tunnel syndrome affects the median nerve in the carpal tunnel of the wrist; tarsal tunnel syndrome affects the posterior tibial nerve or plantar nerves in the tarsal tunnel of the foot.

## **case history**

The sum total of pertinent data gathered through an interview of a patient. These data typically include the patient's personal information, a description of the chief complaint and present illness, and relevant historical information.

## **case management plan**

Coordination of diagnostic and treatment procedures to help meet a patient's healthcare needs.

## **certification**

Official recognition that a practitioner has attained a standard through education and training that is beyond the basic level of competency necessary to practice in a profession.

## **cervical spine**

The uppermost seven vertebrae that constitute the bony structure of the neck.

## **chief complaint**

The primary symptom a patient states as the reason for seeking health care. Also termed the "presenting complaint" or "presenting problem."

## **chiropractic**

A term created from two Greek words: "cheir" (hand) and "praktos" (done). When combined, the word translates literally as "done by hand." This word may be used as an adjective (e.g., chiropractic table) or as a noun when referring to the profession (e.g., in the professions of medicine and chiropractic).

## **chiropractic adjustment, chiropractic manipulation, or chiropractic manipulative therapy**

The action taken by a chiropractor to address an area of dysfunction, such as a chiropractic vertebral subluxation or other body dysfunction. The chiropractic adjustment/manipulation typically includes

the force applied by the doctor of chiropractic to the patient, which may vary in intensity and speed and may be done by hand or with assistance from an instrument.

### **chiropractic procedures and modalities**

The occasional mistaken reference to chiropractic as a modality in the medical literature has led to some confusion. Chiropractic spinal manipulation is used most frequently by doctors of chiropractic, but is only one of many modalities or procedures that chiropractors use when providing patient care. Chiropractic care is not the same as chiropractic spinal manipulation, as chiropractic care includes the entire patient encounter and other procedures.

### **cholecystitis**

Inflammation of the gallbladder.

### **claudication, neurogenic**

Leg and low back pain and paresthesia caused by mechanical pressure on the cauda equina and/or ischemia of the cauda equina, frequently from spinal canal stenosis.

### **colic**

Acute abdominal pain; in infants, recurrent abdominal pain causing inconsolable bouts of crying.

### **colitis**

An inflammation of the inner lining of the colon.

### **co-management**

The sharing of responsibility for a patient's health care among two or more practitioners.

### **complementary and alternative medicine (CAM)**

Those healthcare practices and interventions, including chiropractic, that are not routinely taught in traditional Western medical schools. However, because chiropractic represents the third largest primary health care profession, the chiropractic community and those served by the profession do not generally describe chiropractic care as alternative health care.

### **concussion**

A mild traumatic brain injury caused by a blow to the head or violent shaking.

### **congenital/developmental anomaly**

An abnormality that is present at birth or appears in later development.

### **consultation**

An opinion or treatment recommendation from another healthcare provider, usually a specialist in another field.

**content validity**

Evidence that shows the extent to which the content domain of a test is appropriate relative to its intended purpose. Such evidence is used to establish that the test includes a representative or critical sample of the relevant content domain and that it excludes content outside that domain.

**contraindication**

A condition or factor that serves as a reason to withhold a certain medical treatment due to the harm that it would cause the patient.

**COPD**

Chronic obstructive pulmonary disease.

**correlation coefficient**

An index that indicates the extent to which two variables are related and can range from -1.00 through 0 to +1.00.

**Council on Chiropractic Education (CCE)**

The Council on Chiropractic Education is an American agency recognized by the U.S. Department of Education for the accreditation of programs and institutions offering the Doctor of Chiropractic degree.

**cranial nerves**

Twelve pairs of nerves that can be seen on the ventral (bottom) surface of the brain.

**credentialing**

Granting rights and privileges.

**Cronbach's alpha**

A ratio of two variances that illustrates how well a test measures its intended target.

**CT (computed tomography) scan**

Use of computer and X-ray technology to produce images of the body.

**DC**

Doctor of Chiropractic.

**demographics**

Statistical information about a certain population.

**dermatome**

The area of the skin in human anatomy that is mainly supplied by the branches of a single spinal sensory nerve root.

**diagnosis**

The determination of the presence and nature of a disease process.

**diagnostic imaging**

Any of the methods used to produce images of the human body for the purpose of diagnosing a health concern or disease process.

**diathermy**

Therapeutic use of a high-frequency electric current to produce a thermal effect (heat) in the deep tissues of the body.

**diplomate**

A professional who has been certified as a clinical specialist by an appropriate board.

**diverticulitis**

An inflammation or infection in one or more small pouches in the digestive tract.

**doctor of chiropractic, chiropractor**

Those who have earned a chiropractic degree at a doctorate level may use the title “doctor of chiropractic.” Some countries offer Bachelor’s or Master’s level programs, but only the designation “doctor of chiropractic” or “DC” may be used for chiropractic doctors. The more generic term “chiropractor” may be used for anyone with a chiropractic degree.

**doctoral/doctorate degree**

The highest degree conferred by a college or university recognizing the recipient as a specialist in a particular field.

**documentation**

The recording of patient examination and treatment information, including case management decisions.

**Doppler ultrasound**

Utilization of very high-frequency sound waves and their reflections for the visualization of moving objects within the body, such as blood flow.

**drop-section adjustment**

A patient lies on a drop table, which is a special table with sections that lift several inches and drop down when the adjustment is made. The chiropractor applies a quick thrust at the same time the section drops.

**dry needling**

An alternative medicine technique similar to acupuncture wherein needles that do not inject fluid into the body are inserted into areas of knotted or hard muscle to ease pain. The process is sometimes referred to as intramuscular stimulation or myofascial trigger point dry needling.

### **DTR (Deep Tendon Reflexes) Exam**

A test used to determine the integrity of the spinal cord and peripheral nervous system, as well as the presence of a neuromuscular disease.

### **dummy coded**

The process of coding a categorical variable into dichotomous variables. For example, in the case of gender, male category is recoded into a dichotomous variable: 1 = male; 2 = otherwise; female category is recoded into a dichotomous variable: 1 = female; 2 = otherwise, etc.

### **ECG or EKG (electrocardiogram)**

The recording of the electrical activity of the heart over time.

### **EENT examination**

An examination focusing on the eyes, ears, nose, and throat.

### **electromyography (EMG)**

The recording of the electrical activity of skeletal muscle over time while at rest, during voluntary contraction, or during electrical stimulation.

### **Electronic Health Care Record (EHR) systems**

Real-time, patient-centered records that make information available instantly and securely to chiropractors, physicians, and other authorized users.

### **empirical research**

An approach gaining knowledge via systematic observation or experimentation.

### **endocrine**

Pertaining to hormones or to structures that release their products into the blood or lymph.

### **enzyme**

A substance produced by a living organism that acts as a catalyst of a specific biochemical reaction.

### **equilibrium**

A state of postural balance.

### **ergonomics**

The science of creating an efficient human work environment. It typically addresses anatomical, biomechanical, psychological, and physiological factors.

### **esophageal reflux**

A digestive disease in which stomach acid or bile irritates the esophageal lining.

**ethnicity**

Membership in a social group that shares a common national or cultural tradition.

**evidence-based practice**

A term originally developed in the medical profession and later popularized by Sackett. Evidence-based practice not only refers the application of scientific evidence, but also requires the simultaneous inclusion and combination of clinical expertise and patient values. This approach also considers how to best help the patient when little or no evidence is available, or when the scientific evidence is inconclusive.

**extra-spinal articulation**

Adjustment of a joint not involving the spinal column (e.g., ankle, knee, shoulder, fingers).

**extremity palpation examination**

A physical examination conducted by a medical practitioner that involves touching nerves and nodes on a patient's appendages.

**extremity subluxation/joint dysfunction**

Alteration of the normal biomechanical or physiological dynamics of extra-spinal articular structures. Extremity subluxation may involve static properties (malposition) and/or dynamic properties (joint fixation), both of which result in joint dysfunction.

**fibromyalgia**

A chronic condition characterized by achiness, tenderness, and stiffness of the muscles and adjacent soft tissues.

**flexion-distraction therapy**

A method involving a special table that uses an automated and gentle rhythmic motion to resolve disc herniation or bulges.

**Fountain Head**

Chiropractors use this term to refer to either school founded by D.D. Palmer (Palmer College of Chiropractic) or to the founder.

**frequency**

The estimated number of times the practitioner completing the survey performed the specified activity.

**Gallup**

Gallup, Inc. is an American analytics and advisory company based in Washington, D.C. that was founded by George Gallup in 1935. The company became known for its public opinion polls conducted worldwide.

**gout**

An inflammatory arthritis that develops in people with high concentrations of uric acid. The acid can form needle-like crystals in a joint, which cause severe pain, redness, tenderness, and swelling.

**Health Insurance Portability and Accountability Act (HIPAA)**

A federal law requiring the creation of national standards to protect sensitive patient health information from being disclosed without the patient's consent or knowledge.

**heat/cold packs**

Packs that can be heated or chilled to relax muscles, improve blood flow, reduce swelling, and alleviate pain.

**hemorrhoid**

Swollen and inflamed veins in the rectum and anus that cause discomfort and bleeding.

**hiatal hernia**

A condition in which the upper part of the stomach bulges through an opening in the diaphragm (the thin muscle separating the chest from the abdomen).

**homeopathy**

An alternative medical system based on the belief that the body can cure itself through the use of tiny amounts of natural substances, like plants and minerals, to stimulate the healing process.

**hyperlordosis of cervical or lumbar spine**

Increased anterior convexity of the cervical or lumbar spine.

**hypertension**

Abnormally high blood pressure.

**hypolordosis of cervical or lumbar spine**

Decreased anterior convexity of the cervical or lumbar spine.

**hypotension**

Abnormally low blood pressure.

**ICA**

International Chiropractic Association.

**imaging studies**

The results of diagnostic imaging procedures, displayed on films or in digital formats.

**importance value**

The product of the frequency with which a professional function is performed, multiplied by the risk to a patient's health or safety due to omission or poor performance of the activity. The importance value is used commonly in role delineation studies.

**incontinence**

Loss of bladder control.

**informed consent**

The process of providing a patient the knowledge to understand the risks, benefits, alternatives to, and consequences of a treatment or lack thereof, and obtaining approval from the patient to proceed with the treatment as described.

**inguinal hernia**

The bulging of soft tissue through a weak point in the abdominal muscles. Also called groin hernia.

**insurance**

A contract in which one party agrees to reimburse another in case of loss. In the case of health insurance, the loss is in the form of money paid for healthcare services.

**integrative medicine**

A healthcare approach that combines conventional and complementary approaches in a coordinated manner.

**interdisciplinary team**

A group of health care professionals with various areas of expertise who work together toward the goals of their clients.

**intervertebral disc syndrome**

Various signs and symptoms caused by a pathological condition of a spinal disc. This syndrome typically presents as episodic low back pain with possible sciatic pain and progressive buttock, thigh, calf, and/or heel pain. Weakness, numbness, and decreased reflexes may also be present in the involved extremity.

**job analysis**

Any of several methods used to identify the tasks performed on a job or the knowledge, skills, and abilities required to perform a job. A job analysis performed for a profession is often called a practice analysis.

**job inventory**

A list of tasks and functions performed on a job. This serves as the basis for forming a job analysis.

**joint dysfunction**

The condition in which an articulation does not allow normal movement to occur between two or more bones of the skeleton. The movement may be insufficient, excessive, or in an abnormal pattern.

**kyphosis of the thoracic spine**

Increased posterior convexity of the thoracic spine.

**licensure**

The process of granting a license that is required by law to practice a profession. This is the most restrictive form of occupational regulation because it prohibits anyone from engaging in the activities covered by the scope of practice without permission from a government agency.

**Likert scale**

A rating scale used in psychometrics to measure how people feel about a subject. This scale was invented by psychologist Rensis Likert, and the answers include strongly disagree, disagree, neutral, agree, and strongly agree.

**literature review**

An extensive search of the scientific information available on a particular topic. The results are then critically appraised to determine the current state of knowledge on the topic.

**locum tenens**

A person who temporarily fulfills the duties of another, particularly those of a physician or clergyman.

**lumbar spine**

The lowermost five vertebrae of the spine.

**lumbopelvic**

Related to the lumbar region consisting of the dorsal lower spine and pelvis.

**managed care**

Any organized system that uses a variety of incentives to control and limit the delivery of health care services.

**management plan**

The development of specific strategies and actions intended to bring about a desired treatment outcome.

**manipulation**

The therapeutic application of manual forces that move a joint quickly beyond its elastic barrier of resistance but not beyond its limit of anatomic integrity. See Glossary Figure 1 at range of motion.

**manual chiropractic adjustment**

Procedures by which the hands directly contact the body to treat the articulations and/or soft tissues.

**Master's degree**

A degree conferred by a graduate school, usually requiring at least 1 year of study after a Bachelor's degree.

**mean**

The arithmetic average obtained by adding up all the values and then dividing the resulting total by the number of values.

**Medicaid**

A state and federal healthcare service reimbursement program for people with limited income and resources.

**Medicare**

A federal program that reimburses the costs of necessary healthcare services for the disabled and elderly.

**meta-analysis**

A statistical analysis of several separate quantitative studies that address a common topic.

**metastasis**

The transfer of disease, especially cancer, from one body part to another.

**methodology**

The design of a scientific research study or the procedures utilized in the study.

**MHS (Military Health System)**

The enterprise within the U.S. Department of Defense that provides health care to active duty and retired U.S. Military personnel and their dependents.

**MRI (magnetic resonance imaging)**

A diagnostic imaging modality that utilizes a magnetic field and radiofrequency transmission and reception to produce images of the body. It is especially valuable for soft tissue visualization.

**multidisciplinary**

Pertaining to the availability of several health care disciplines at a single facility or the utilization of several health care disciplines in the treatment of a patient.

**multiple sclerosis**

A disabling disease of the brain and spinal cord wherein the immune system attacks the protective sheath that covers the nerve fibers, leading to communication problems between the brain and the rest of the body.

**myocardial infarction**

Another term for heart attack.

**myofascial tissue**

Thin, strong, fibrous connective tissue that extends throughout the body to provide support and protection to muscles and bones.

**myofasciitis**

Inflammation of the muscles and fascia.

**myotomes**

A set of muscles innervated by a specific, single spinal nerve.

**National Board of Chiropractic Examiners (NBCE)**

The organization that prepares and administers standardized examinations to qualified applicants. The legal agencies that govern the practice of chiropractic within each jurisdiction may accept, at their discretion, those individuals who have successfully completed any or several of these examinations. In addition, the NBCE provides test and measurement services to the chiropractic profession.

**nerve conduction velocity (NCV)**

The recording of the electrical activity of peripheral nerves over time while at rest or during electrical stimulation.

**needle electromyography**

See electromyography (EMG).

**neuralgia**

Pain that extends along the course of one or more nerves.

**neurologic examination**

Examination of the nervous system and its functions.

**neuromusculoskeletal (NMS) system**

A term encompassing three bodily systems: neurological, muscular, and skeletal systems. This term emphasizes the neurological component and its relationship with the musculoskeletal system. It is often used to describe the target of chiropractic therapy.

**neuropathy**

Refers to general diseases and dysfunction of the nervous system.

**nutritional recommendations**

Used to promote healthier eating and/or to recommend specific dietary supplements.

**occiput**

The back of the head or skull.

**orthopedics**

The branch of health care specializing in the prevention and treatment of injuries or diseases of the skeletal system, joints, and associated structures.

**orthotic**

An orthopedic appliance or apparatus used to support, align, prevent, or correct deformities or to improve the functions of parts of the body.

**osteoarthritis/degenerative joint disease**

A condition characterized by degeneration of the cartilage and hypertrophy of the bone, which is generally accompanied by pain and stiffness. This condition is more common in older individuals and in joints previously exposed to trauma.

**osteopathy**

A healthcare profession that emphasizes the physical manipulation of muscle tissue and bones.

**osteoporosis/osteomalacia**

Conditions marked by a softening or decrease of the bone mass, which are sometimes accompanied by pain, tenderness, and muscular weakness and lead to bone fractures with minimal trauma.

**Palmer, DC, Daniel David**

The founder of chiropractic.

**palpation**

An examination in which the hand, and especially the fingers, is used for the purpose of identifying and diagnosing health conditions.

**pain scale ratings**

A self-reporting instrument for rating pain on a common quantitative scale.

**pancreatitis**

An inflammation of the pancreas.

**PART Format**

The documentation method that incorporates a patient's Pain/tenderness, Asymmetry, Range of motion, and Tissue tone. This is required for Medicare reimbursement of chiropractic services.

**Part I, Part II, Part III, Part IV**

The four components that comprise the NBCE examinations. Parts I-III are written/computerized assessments, while Part IV is a practical examination.

**parkinsonism**

A condition that movement abnormalities, such as tremors, due to the loss of dopamine-containing neurons.

**pathologic reflexes**

Reversions to primitive responses that indicate a loss of cortical inhibition.

**pathology**

1. Structural and functional changes, especially in tissues, that lead to or result from disease.
2. Any deviation from health.
3. The study or treatment of the essential nature or cause of disease.

**patient assessment**

The process of identifying the possible conditions, needs, abilities, and preferences of a patient. This assessment of the cause of a patient's symptoms is systematic and often sequential.

**patient-centered**

The inclusion of the patient's perspective about the overall treatment or care.

**pediatrics**

The branch of medicine involving the care of infants, children, and adolescents.

**peripheral neuritis**

Inflammation, pain, and tenderness of a peripheral nerve.

**personal injury**

An injury to the body, mind, or emotions caused by the negligence of another.

**physical examination**

Examination of the body involving inspection, palpation, auscultation, and percussion for the identification and diagnosis of health conditions.

**physical modality**

A device or application that delivers a physical agent to the body for therapeutic purposes.

**physiological therapeutics**

The application of a physical agent for therapeutic purposes.

**physiotherapeutic modality**

See physical modality.

**pneumothorax**

A collapsed lung.

**practice analysis**

see job analysis.

**primary care**

The level of care that encompasses the routine care of individuals with common health problems and chronic conditions that can be managed on an outpatient basis.

**problem-focused case history**

An interview of a patient that is concerned primarily with the chief complaint and present illness; this does not usually include a review of all the body systems or family health histories.

**professional functions**

The various work activities that practitioners may perform in their practices.

**prognosis**

A forecast of the probable outcome of a health condition. The prospect of recovery as indicated by the nature and symptoms of the case.

**psoriasis**

A condition in which skin cells build up and form itchy, dry patches of scales.

**psychologist**

A specialist who deals with the prevention and treatment of psychological disorders, usually without the use of pharmaceuticals.

**psychometrics**

The science and technology that focus on the development of mental and physical assessments and the analysis of the outcomes of such measures.

**radiculitis or radiculopathy**

Inflammation, irritation, or injury of the root of a spinal nerve.

**radiograph**

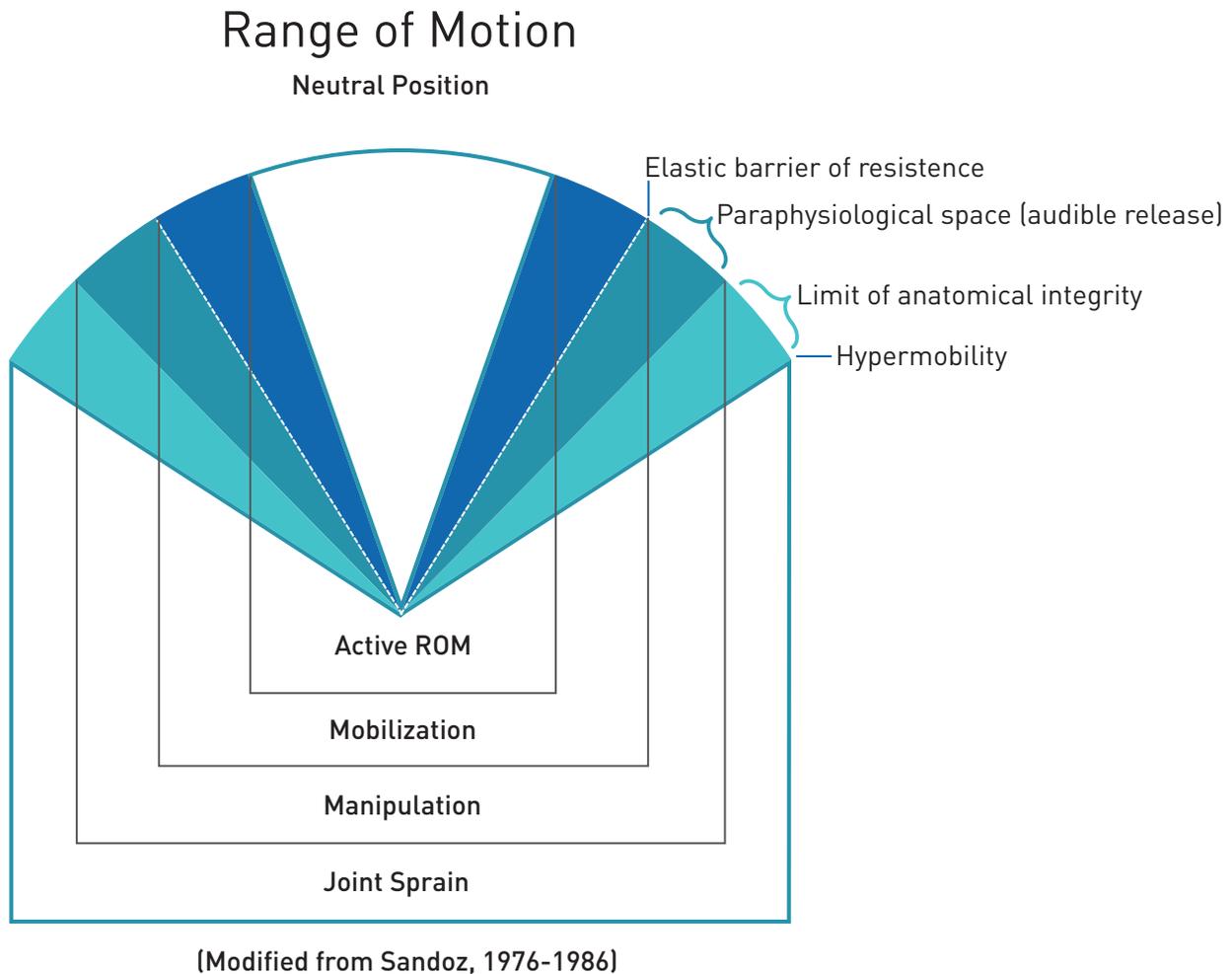
An X-ray. A visualization of body structures obtained by the passage of radiation through those structures and subsequent capture on sensitized film.

**randomized clinical trials**

A clinical study in which subjects are randomly assigned to either a treatment group, which receives the intervention being evaluated, or to a control group, which does not receive the intervention.

## range of motion (ROM)

The gross active and passive motion to which a joint can be subjected without causing injury. See Glossary Figure 1.



**Figure 1 Range of Motion**

## rating scale

A mechanism used to obtain appraisals and/or opinions from survey respondents and to express these on a common quantitative scale.

## regulation

U.S. states and other jurisdictions individually determine which occupations require regulation and which qualifications are necessary to participate in each occupation.

## rehabilitation

Active adjunctive care, primarily involving exercises designed to return a patient to all daily and sports activities after an injury.

**reliability**

The degree to which test scores are free of errors of measurement.

**response bias**

The tendency of a person to answer questions inaccurately. See social desirability bias.

**response rate**

Percentage of practitioners selected to complete the Survey of Chiropractic Practice who either completed the survey or who were accounted for by other means.

**rheumatoid arthritis**

A chronic inflammatory disorder affecting the joints, primarily in the hands and feet.

**risk factor**

The degree of risk to public health or patient safety as perceived by survey respondents relative to the omission or poor performance of activities listed in the Survey of Chiropractic Practice.

**ROM**

See range of motion.

**sampling design**

The specified method by which individuals are selected to be surveyed.

**scoliosis**

A lateral curvature of the spine.

**scope of practice**

The procedures that a healthcare practitioner is allowed to perform under the terms of their professional license. Because each state in the U.S. began to issue chiropractic licenses at different times and under different circumstances, the scope of practice (i.e., what chiropractors are allowed to do) differs between states.

**self-care strategies**

Specific actions that patients can take to accelerate their healing, prevent recurrences, and enhance their health.

**skip patterns**

A series of questions associated with conditional responses in which questions that do not pertain to the test taker are “skipped.”

**SOAP notes**

A healthcare practitioner’s daily notes describing a patient’s Subjective and Objective findings and the practitioner’s Assessment and Plan for immediate and future management.

**soft tissue release**

A treatment that relaxes contracted muscles, improves blood and lymphatic circulation, and stimulates the stretch reflex in muscles.

**social desirability bias**

The tendency of survey respondents to answer questions in a manner that will be viewed favorably by others.

**specialty board/council**

A recognized authority that grants certification in a specific field of study.

**spinal articulation**

Exercises to stack the spinal vertebrae one on top of another from the coccyx (tailbone) through the spine to the crown of the head and vice versa.

**spinal listing**

The mechanical description of the subluxation, which typically uses letters of the alphabet to represent the direction in which a vertebra has misaligned. For example, P = posterior, L = left, and S = superior.

**spinal manipulation**

Moving and jolting of joints to relieve pressure, reduce inflammation, and improve nerve function.

**spinal stenosis**

Abnormal narrowing of the spinal column and associated compression of the spinal cord.

**sprain**

An injury to a ligament in which some of the fibers are ruptured or torn.

**standard deviation**

The measure of the variability, spread, or dispersal of a set of scores around their mean value. A low standard deviation indicates that the values tend to be close to the mean, while a high standard deviation indicates that the values are spread out over a wider range.

**standard error**

An abbreviation of the standard error of estimate, which indicates the accuracy of a score. The standard error of estimate is the standard deviation divided by the square root of the sample size, and is corrected for sampling from a finite population.

**Standards for Educational and Psychological Testing**

A set of criteria for the development and evaluation of tests and testing practices, which also provides guidelines for assessing the validity of interpretations of test scores. Produced by the American Education Research Association, the American Psychological Association, and the National Council on Measurement in Education.

**straights and mixers**

Archaic terms used by divisional sects within the chiropractic profession. These terms were originally developed by B. J. Palmer. “Straight” was a complimentary term used to describe his faithful followers who only used hands to adjust the spine. “Mixers” was a term used to insult those whom he considered not to be true chiropractors, as they combined other treatment methods (e.g., exercise, nutrition, rehabilitative therapies) with hand adjusting in their chiropractic practices.

**strain**

An overuse or traumatic injury to a muscle in which some of the muscle fibers may be torn.

**stroke or cerebrovascular condition**

A vascular lesion of the brain that can result in the death of brain cells and permanent neurologic damage.

**subluxation**

The alteration of the normal biomechanical or physiological dynamics of contiguous articular structures. This is essentially a functional entity.

**syndrome**

A set of symptoms that occur together; a symptom complex.

**systematic review**

A critical assessment and evaluation of all research studies that address a particular clinical issue.

**taping**

The application of adhesive tape to body parts to prevent or support injuries.

**tendinopathy**

Inflammation or chronic irritation of a tendon alone or together with its enveloping sheath. Also known as tendinitis.

**test validity**

Evidence supporting the appropriateness of the use of test scores.

**thoracic outlet syndrome**

Compression of the brachial plexus or subclavian artery by anatomical structures in the region of the lower neck, first rib, and clavicle.

**thoracic spine**

The twelve vertebrae located between the cervical and lumbar spine. The ribs articulate with the thoracic vertebrae.

**TMJ (temporomandibular joint) syndrome**

Pain and compromised movement of the jaw joint and the surrounding muscles.

**traction**

A therapeutic technique utilizing the application of axial tension to a body segment.

**type I error**

The rejection of a true null hypothesis (also known as a “false positive”). A type II error is the non-rejection of a false null hypothesis (also known as a “false negative”).

**ulcer**

A sore that develops on the lining of the esophagus, stomach, or small intestine.

**ultrasound**

A therapeutic modality that utilizes high-frequency sound waves to produce micromassage and deep heating effects in the body.

**VA healthcare**

Health care services provided to veterans of the U.S. military.

**validity**

The degree to which inferences from test scores are appropriate, meaningful, or useful.

**variable**

An element, feature, or factor that is liable to vary or change.

**vertigo**

The sensation that either one’s body or the environment is rotating.

**Veterans’ Health Administration (VHA)**

The component of the U.S. Department of Veterans Affairs that provides health services to veterans through the country’s largest integrated healthcare system.

**wellness**

A state of optimal physical, mental, and emotional health; not merely the absence of disease or infirmity.

**X-ray**

See radiograph.