

NUTRITION EDUCATION AND PRACTICES  
AMONG PRACTICING CHIROPRACTORS

By

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## Abstract

Few studies have examined chiropractors' educational background and use of nutrition in their practices. Published studies have used surveys with low response rates, and the last study was published seven years ago. The purpose of this study was to determine nutrition assessment and management practices used by chiropractors in the Midwest, and their nutritional education. A survey was mailed to 1400 chiropractors in four Midwest states and inquired about demographics, education, nutritional assessment methods and practices, and supplement use. The response rate was 27.5%. Most respondents were between 31 and 60, had practiced anywhere from five to 30 years, and were from communities with populations of 1,000 to 50,000. Respondents primarily relied on self-study and postgraduate chiropractic seminars for nutritional education. The majority of respondents used nutritional counseling in their practices, primarily for general health maintenance or inflammatory conditions, and recommended supplements to their patients.

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## Nutrition Education and Practices among Practicing Chiropractors

### CHAPTER 1 INTRODUCTION

There have been few studies examining how many chiropractors use nutrition in their practices and what type of education they have had to prepare them for counseling their patients in nutrition. The studies that have been done typically have been surveys with relatively low response rates (23.5% to 34%).

Three previous studies were identified which evaluated the nutrition training of chiropractors. In 1989, Newman, et al, surveyed a small population of chiropractors in the San Francisco Bay area.(1) A study published in 2001 in the *Journal of Chiropractic Humanities* by Smith and Spillman surveyed chiropractors nationwide on their use of nutrition in private practice, with an emphasis on recommendations and education.(2) Walker, et al, in 2000 published an article that not only looked at chiropractors' use of nutritional counseling and sources of nutritional education, but also their referral patterns to registered dietitians.(3) The results of these three studies indicate that the majority of respondents tend to use nutrition counseling in their practices and most rely on chiropractic journals and texts or postgraduate seminars and lectures.

Even though the respondents typically treated musculoskeletal complaints more frequently than anything else (most common diagnoses were arthritis [85/100] and osteoporosis [80/100]) (1) and reported that most of their patients (51%) were treated for pain or symptom relief (2), the overwhelming majority (98%) (1) used

nutrition in their practices with 81% (2) responding yes when asked if they felt it was their “obligation as a health professional to offer nutritional services.”

Most chiropractors using nutrition in their practices base their findings and recommendations on a combination of patient history and clinical symptoms. Even though a large percentage of chiropractors use nutritional services in their practices, many feel they were not adequately trained in their chiropractic curriculum (47% [2]; 60% [3]). Yet chiropractic education has continued to evolve dramatically throughout the 1990s and into the 2000s, and many of the respondents surveyed in previous studies graduated during the 1980s.

In general, chiropractors do not refer to dietitians, but many are open to the idea. According to Walker, 65% of the respondents thought there was an opportunity for increased collaboration between professions.(3) However, in looking at practice characteristics of practitioners who fall under the umbrella of complementary and alternative (CAM), Cherkin in 2002 noted that between 50% and 75% of these providers operate solo practices, compared to “conventional physicians” (26%) who are more likely to rely on a network of other healthcare professionals with more specialized training.(4) Findings also indicate that the frequency of multidisciplinary practices, where providers from a number of different disciplines work together in one practice and treat patients through a team approach, remained steady at only about 4.5% throughout the 1990s.

Chiropractors’ reluctance to refer or lack of referral to healthcare practitioners or professionals considered to be within “mainstream medicine” may stem from a

long-established precedence of not being referred to by those in the medical community. This is highlighted by a survey published in 2000 that indicated 98% of chiropractors refer patients to family physicians, while only 65% of family physicians refer to chiropractors.(5)

Herein lies a disparity in how chiropractors are viewed. They are sometimes seen as spinal specialists or considered to be complementary care, while conversely some view them as primary care practitioners and a portal of entry to the healthcare field for many of their patients. In 1999, Hawk, et al, cited a survey of medical practitioners from 1995 where views were split almost in half. Of respondents, 49% considered chiropractic “a legitimate medical practice,” while 46% considered it to be “alternative medicine.” The National Center for Complementary and Alternative Medicine (NCCAM) typically includes chiropractic within the framework of complementary therapies.(6)

Yet most chiropractors responding to Hawk’s survey (82%) believe that the discipline of chiropractic is a complete healthcare system within itself and that the profession is “trained to deal appropriately (by both treatment and referral) with the entire spectrum of human health through drugless as well as noninvasive therapies.” While Hawk’s survey did not examine the use of nutritional counseling, two of the therapies most commonly cited by respondents included the use of mineral supplements (63%) and herbs (56%). Another survey by Hawk in 2004 showed that 80% of chiropractors incorporate nutritional counseling in their practices.(7)

Patients often have different expectations than chiropractors on not only what the treatment will involve, but also how rapidly results should be seen. Again, the disparity of being seen as spinal specialists and treating bones or joints that are “out of place” collides with the chiropractor’s view of symptoms and treatment as a much more complex process.(8)

Rupert examined the attitudes of both chiropractors and their patients in his studies. In particular, he looked at activities falling into the category of preventive treatment, also termed maintenance care (MC). Maintenance care was defined as “a regimen designed to provide for the patient’s continued well-being or for maintaining the optimum state of health while minimizing recurrences of the clinical status.” (9,10)

Initial speculation that chiropractors treat people only through spinal adjustments was not in accordance with how most chiropractors viewed themselves. Many of the chiropractors relied on a number of treatment interventions, including exercise, nutritional counseling, and lifestyle changes. In Rupert’s survey (9), 92.8% of the respondents saw counseling on “proper eating habits” as important therapeutic components of their treatment regimens, while 83.6% used patient education regarding smoking, alcohol, and drugs, and 67.1% recommended the use of vitamins and supplements.

In another study conducted by Rupert (10) in elderly patients ( $\geq 65$  years) who had received extended chiropractic MC for at least five years, a significant correlation was noted between a reduced use of nonprescription drugs and the number of years of MC. In addition, a large percentage (62%) of these patients used vitamins often or

very often. The MC therapies included not only multiple manual procedures common in chiropractic practice, but also general advice on both diet and the use of vitamins and minerals.

Jamison looked at the practices of chiropractors in Australia, and again found that a large percentage (81%) included dietary recommendations, while a smaller percentage (48%) also made recommendations on nutritional supplements.(11) Some of the chiropractors surveyed did not provide individualized counseling, per se, but offered educational brochures on nutrition topics. A small percentage (10%) indicated they always gave nutritional advice, while most (65%) sometimes provided dietary counseling to patients. This study suggested that the “role of chiropractor as a health-education resource requires clarification and a degree of standardization.”

#### The use of herbal and dietary supplements

While the use of herbal and dietary supplements (H/DS) increased dramatically during the 1990s, it appears that their use has begun to slow during the early years of the 21st century.(12) However, herbs and other dietary supplements are still the most commonly used complementary and alternative (CAM) therapies in the United States. Even 77% of the respondents from a group of medical doctors (MDs), doctors of pharmacy (PharmDs), advanced registered nurses (RNs), and registered dietitians (RDs) reported that they used H/DS more than 4 days per week.(13)

Even with their popularity and widespread usage, there is a paucity of communication and reporting about the use of H/DS between patients and their

healthcare practitioners, whether they are allopathic or alternative practitioners.

While there may be a belief that patients would be more likely to discuss the use of H/DS with alternative practitioners, Jamison reported in 2003 that out of 21 chiropractic clinics in Australia, the highest percentage of patients reporting supplement use to their chiropractor was 17% and that was for the use of vitamin E.(14)

It also appears that, in general, patient use of H/DS is based on patient initiative, rather than the advice of a healthcare professional.(11,12)

## Summary

Chiropractic as a profession has seen steady growth over the past three decades, with 13,000 chiropractors treating approximately 5.5 million patients (3% of the population) in 1970 to approximately 40,000 chiropractors in 1990 treating over 16.5 million patients.(15) This trend is projected to continue, with the number of chiropractors expected to reach 100,000 by the year 2020.(4)

While a large percentage of chiropractors use some form of nutritional counseling in their practices, there has been very little research into what they do and what type of training they've received to qualify them to do this type of counseling. The current study examined what type of training chiropractors have received in the area of nutrition and whether the training was during their formal chiropractic education, as an adjunct through another educational institution, or through postgraduate continuing educational programs. It also explored how in-depth the use of nutritional counseling is and whether it extends beyond diet to recommending

vitamins, minerals, and other nutritional supplements. Finally, it evaluated whether or not chiropractors consult with other healthcare professionals, such as dietitians, nutritionists, or other types of professionals, when making nutritional recommendations.

## Statement of Purpose

The purpose of this study was to determine the nutrition education and nutrition assessment and management practices used by chiropractors.

## Research Questions

1. What formal or informal nutrition training do chiropractors practicing in the Midwest region obtain?
2. What nutrition assessment and/or nutritional management practices do chiropractors in the Midwest engage in within their practices?

## CHAPTER 2

### REVIEW OF LITERATURE

#### Definition of chiropractic

The World Health Organization (WHO) in 2005 defined chiropractic as “a healthcare profession concerned with the diagnosis, treatment and prevention of disorders of the neuromusculoskeletal system and the effects of these disorders on general health. There is an emphasis on manual techniques, including joint adjustment and/or manipulation with a particular focus on subluxations.”(16)

However, the Merck Source, which is affiliated with The Merck Manual and references Dorland’s Illustrated Medical Dictionary, defines chiropractic in slightly more broad terms and includes chiropractic’s focus on overall health and well-being. It recognizes the focus on joint manipulation, but it also includes other modalities used by chiropractors, including “...lifestyle modification, nutritional therapy, and physiotherapy.” (17)

According to the National Board of Chiropractic Examiners (NCBE), chiropractic is currently the nation’s third largest primary healthcare profession, following allopathic medicine and dentistry. The NCBE also indicates that in the United States alone there are approximately 69,000 licensed chiropractors, with many more worldwide. Chiropractors are officially recognized and licensed in all 50 states.(18)

## Educational requirements for chiropractors

The Council on Chiropractic Education (CCE) is the agency recognized by the United States Secretary of Education for accrediting programs that offer a Doctor of Chiropractic degree. The CCE traces its history back to the mid 1930s when the National Chiropractic Association (NCA) established a Committee on Education Standards for chiropractic training. The NCA eventually evolved into the American Chiropractic Association (ACA) in 1964, which continued to support educational advancements and standards in chiropractic.

The ACA is the largest professional organization currently representing the chiropractic profession worldwide with over 18,000 members. In 1971, the current CCE was incorporated and was first listed as a Nationally Recognized Accrediting Agency by the United States Commissioner of Education on August 24, 1974. It has continued to receive recognition in the intervening 30 years, as well as now being recognized by the Council on Higher Education Accreditation (CHEA). The CCE received an additional five-year renewal of recognition when the National Advisory Committee on Institutional Quality and Integrity (NACIQI) met in June of 2006.

(19,20)

Currently, there are 17 accredited chiropractic colleges in the United States (see Table 1).

Table 1. Accredited Chiropractic Colleges in the United States

College	Location
Cleveland Chiropractic College	Kansas City, MO
Cleveland Chiropractic College – Los Angeles	Los Angeles, CA
Life University College of Chiropractic	Marietta, GA
Life Chiropractic College West	Hayward, CA
Logan College of Chiropractic	Chesterfield, MO
Los Angeles College of Chiropractic of the Southern California University of Health Sciences	Whittier, CA
National University of Health Sciences – Doctor of Chiropractic Degree Program	Lombard, IL
New York Chiropractic College	Seneca Falls, NY
Northwestern Health University Sciences – Northwestern College of Chiropractic	Bloomington, MN
Palmer College of Chiropractic	Davenport, IA
Palmer College of Chiropractic West	San Jose, CA
Palmer College of Chiropractic Florida	Port Orange, FL
Parker College of Chiropractic	Dallas, TX
Sherman College of Straight Chiropractic	Spartanburg, SC
Texas Chiropractic College	Pasadena, TX
University of Bridgeport College of Chiropractic	Bridgeport, CT
Western States Chiropractic College	Portland, OR

The Federation of Chiropractic Licensing Boards (FCLB) is the official body that promotes “excellence in chiropractic regulation” and officially became an organization in 1926. It oversees not only the Boards in the United States, but also in Canada, Australia, and the U.S. territories of Puerto Rico and the U.S. Virgin Islands. The FCLB serves as a clearinghouse and forum for the discussion of important political issues. The state the chiropractor chooses to practice in will determine the scope of practice he or she is allowed. All 50 states and the District of Columbia license chiropractors, and each has its own regulations regarding the scope of practice (see Appendix A). Some states specifically include nutritional or dietary counseling

or the use of herbal, vitamin, and mineral supplements in the wording of their scope of practice. Other states offer a more nebulous definition that may be left open to interpretation, such as “adjunctive therapies approved by the board” (Vermont) and “counseling about hygienic and other noninvasive ancillary procedures authorized by rules issued pursuant to this act” (District of Columbia).

States and colleges even vary in their prerequisite educational requirements outside of chiropractic training. One chiropractic college requires a baccalaureate degree for admission, and seven states require a baccalaureate degree before chiropractic licensure will be granted. There is no standardized admission test for chiropractic college as there is for medical school (MCAT®). (21)

Prior to receiving state licensure, chiropractors must pass a series of national boards that are regulated by the National Board of Chiropractic Examiners. Part I covers basic science subjects, including general and spinal anatomy, physiology, chemistry, pathology, microbiology, and public health. Part II tests examinees on clinical sciences, and covers general diagnosis, neuromusculoskeletal diagnosis, diagnostic imaging, principles of chiropractic, chiropractic practice, and associated clinical sciences. Part III is a written competency exam on clinical subjects and encompasses case history, physical examination, neuromusculoskeletal examination, roentgenologic examination, clinical laboratory and special studies, diagnosis or clinical impression, chiropractic technique, supportive techniques, and case management. (22)

## Nutrition curricula

While their curricula vary somewhat, all of the chiropractic colleges under the auspices of the CCE must include a specific number of hours on various topics in their programs. The entire program must have a minimum of 4200 instructional hours, covering subjects in anatomy; biochemistry; physiology; microbiology; pathology; public health; physical, clinical, and laboratory diagnosis; gynecology; obstetrics; pediatrics; geriatrics; dermatology; otolaryngology; diagnostic imaging; psychology; nutrition/dietetics; biomechanics; orthopedics; neurology; first aid and emergency procedures; spinal analysis; principles and practice of chiropractic; clinical decision making; adjustment techniques; research methods and procedures; and professional practice ethics.(23)

The CCE notes that chiropractic programs must include subjects, but not necessarily courses, in biochemistry and nutrition/dietetics, and each college appears to reflect this in their curriculum somewhat differently.

While some of the chiropractic colleges offer the minimum requirement in these subjects, other colleges offer a much more extensive education in the areas of nutrition and biochemistry.

Colleges such as Sherman College of Straight Chiropractic philosophically teach that chiropractors should only treat the spine, and view any deviation beyond that, such as nutritional assessment or counseling, as competing with alternative therapies and outside the scope of the practice of chiropractic.

Other colleges include the minimum or some derivation of that required by the CCE, which includes coursework in nutrition and biochemistry. Still other colleges delve into the intricacies of nutrition, offering advanced courses or even entire programs.

Life Chiropractic College (LCC) in Marietta, Georgia leads the chiropractic colleges in offering not only courses in nutrition, but also two additional Bachelor's of Science programs: one in nutrition and one in dietetics. Their dietetics program is approved through the Commission on Accreditation for Dietetics Education (CADE), the American Dietetic Association's accrediting agency and also offers a CADE-compliant Dietetic Internship Program for its graduates. The chiropractic program at LCC includes two biochemistry courses and classes in both basic nutrition and nutrition in health and disease.

New York Chiropractic College (NYCC) in Seneca Falls, New York is another college with an extensive program in nutrition. One of the educational objectives of their program is for their graduates to be able to use nutritional counseling in practice, and this is reflected in their curriculum. Their biochemistry offering is focused on nutrition and metabolism. In addition, three of NYCC's required courses are Basic Human Nutrition I, Basic Human Nutrition II, and Clinical Nutrition, Diet, and Disease. In addition, the nutrition electives that are offered include: *Applied Clinical Nutrition* (2 credit hours; 30 contact hours) described as encompassing how dietary supplements work at cellular level and using nutrition with common pathologies; *Be Healthy, Buy Healthy, Cook Healthy* (2 credit hours; 30

contact hours), a course in how to use nutrition practically and design a proper nutritional diet, including how exercise affects basal metabolic rate in reference to nutrition; and *Sports Nutrition and Ergogenic Aids* (1 credit hour; 15 contact hours), which covers nutrition and athletic performance, as well as common ergogenic aids.

In addition, NYCC offers a graduate program in acupuncture and Oriental medicine that includes a course in the science and practice of clinical nutrition from both Eastern and Western approaches. A Master's of Science Degree in Applied Clinical Nutrition is also offered through NYCC. This 36-hour graduate program includes basic nutrition classes, as well as coursework in pharmacognosy, clinical nutrition for pain and inflammation, sports nutrition, and drug-induced nutrient depletion and herb/drug interaction.

National University of Health Sciences in Lombard, Illinois has a Department of Nutrition and Biochemical Therapeutics that coordinates all nutrition-related aspects of its academic programs. In addition to Human Biochemistry, it includes a required course in Nutritional Biochemistry, the Science of Diet and Nutrition, Clinical Nutrition, and Botanical Medicine.

Parker College of Chiropractic in Dallas, Texas offers basic coursework in nutrition, but also has a nutrition club on campus for those students interested in expanding their knowledge of nutrition and incorporating it into their practices. The mission of the club is to further the understanding of progressive nutritional concepts and their application to the science and philosophy of contemporary health care.

## CHAPTER 3 METHODS

### Setting

The study took place in the Department of Dietetics and Nutrition at the University of Kansas Medical Center, where survey collection and analysis was completed.

### Sample

The sample consisted of chiropractors practicing in a four-state, Midwest region. Names and addresses were obtained from an Internet search, which produced lists of chiropractors in Kansas (517), Missouri (1530), Iowa (746), and Nebraska (327). The final count of chiropractors totaled 3120, and, for practical reasons, a sample size of 1400 was chosen and 1400 names were selected from the total list using a random number generator.

Each potential participant was mailed a letter informing them of the study and asking them to complete the survey and return it to the Department of Dietetics and Nutrition at the University of Kansas Medical Center. The surveys contained no individual identifying data for the participant, other than gender, age range, state, and size of community. Respondents were asked to return completed surveys within two weeks. A total of 364 (27.5%) surveys were returned and included in the results; 76 surveys were returned as undeliverable.

## Ethical Issues

The study was approved by the Human Subjects Committee at the University of Kansas Medical Center and was given exempt status.

## Procedures

A 22-item survey was developed based on previous literature and personal experiences of the graduate student investigator. It was designed to take no more than 15 minutes to complete. A pilot test was done with five local chiropractors to obtain their opinions of and input to the survey. Based on feedback from the pilot study, no additional changes or clarification were made to the survey.

## Statistics

Descriptive Statistics were used to analyze the results. Frequency distributions and means were calculated to examine each question to identify potential consensus practices.

## CHAPTER 4 RESULTS

Few studies have been done examining how many chiropractors use nutrition and what type of education they have had to prepare them for counseling their patients in nutrition. Three previous studies were identified that evaluated the nutrition training of chiropractors via survey data, and the last study was published seven years ago in 2001.

The purpose of the current study was to determine the nutrition education and nutrition assessment and management practices used by chiropractors.

### Demographics

This study was conducted only in Iowa, Kansas, Missouri, and Nebraska, and 364 chiropractors returned usable surveys (27.5%). A total of 76 surveys were returned as undeliverable and were not included in the study, lowering the total sample size to 1324. One respondent had a practice in both Iowa and Missouri, and five respondents did not answer this question. Table 2 depicts the response rate for each state in the current study.

Table 2. State of Practice

State	Number Responding	% of Respondents*	% of Sample
Iowa	107	29.4	23.9
Kansas	76	20.9	16.6
Missouri	134	36.8	49.0
Nebraska	43	11.8	10.5
No response	5	1.4	--

\*Total >100% because one respondent practiced in two states.

The majority of respondents were from towns with populations of 1,000 to 10,000. Respondents from cities with populations over 100,000 were the next largest group, followed closely by respondents from towns of 10,001 to 50,000. The lowest response rate came from towns with populations of less than 1,000. Four respondents did not answer this question. Table 3 shows the response rate for each community size listed on the survey.

Table 3. Size of Community

Population	Number	% of Respondents
<1,000	12	3.3
1,000 – 10,000	125	34.3
10,001 – 50,000	85	23.4
50,001 – 100,000	48	13.2
>100,000	90	24.7
No response	4	1.1

Three respondents did not answer the question related to gender. Of the remaining 361 respondents, 270 (74.2%) were men and 91 (25.0%) were women.

The majority of respondents were between the ages of 31 and 60. The smallest percent of respondents in the current study were over 70 years of age,

followed by those aged 61 to 70, and those under 30. Two respondents did not answer the question related to age. Table 4 shows the response rate for each age category on the survey.

Table 4. Age of Respondents

Age (years)	Number	% of Respondents
<30	31	8.5
31 – 40	116	31.9
41 – 50	97	26.7
51 – 60	85	23.4
61 – 70	26	7.1
>70	7	1.9
No response	2	0.6

The majority of respondents had practiced between five and 30 years. The smallest percent of respondents had practiced over 40 years, followed by those who had practiced between 31 and 40 years, and those who had practiced less than five years. One respondent did not answer the question related to length of practice in this study. Table 5 depicts the response rate for each practice span on the survey.

Table 5. Years in practice

Years	Number	% of Respondents
0 – 5	54	14.8
5 – 10	77	21.2
11 – 20	103	28.3
21 – 30	91	25.0
31 – 40	28	7.7
>40	10	2.8
No response	1	0.3

The overwhelming majority of respondents were in solo practice. The next largest group of respondents was in group practice, defined as a practice with two or more chiropractors. A small percentage of respondents were either associates, generally working for another chiropractor, or in a multidisciplinary practice that included practitioners other than chiropractors. One respondent did not answer this question. Table 6 shows the response rate for each type of practice.

Table 6. Type of Practice

	Number	% of Respondents
Solo	286	78.6
Associate with Other DC	17	4.7
Group (2 or more DCs)	53	14.6
Multidisciplinary (practitioners other than DCs)	7	1.9
No response	1	0.3

### Nutrition Education

The first research question for the current study was “what formal or informal nutrition training do chiropractors practicing in the Midwest region obtain?” The survey asked which chiropractic college the respondents attended and how many nutrition courses were taken in chiropractic college. The survey also asked about postgraduate nutrition education, including sources of self-study, how many hours were taken toward nutrition training in the past year, if any nutrition education outside of a chiropractic venue was obtained.

Most respondents attended one of three schools: Palmer Chiropractic College (Davenport, Iowa), Cleveland Chiropractic College (Kansas City, Missouri), or Logan Chiropractic College (Chesterfield, Missouri).

All respondents answered this question. Fourteen of the 17 chiropractic colleges in the country were represented by at least one respondent. Table 7 shows the response rate for each college listed by a respondent.

Table 7. Name and Location of Chiropractic College

College Name / Location	Number Attending	% of Respondents
Palmer College of Chiropractic / Davenport, IA	131	36.0
Cleveland Chiropractic College / Kansas City, MO	99	27.2
Logan Chiropractic College / Chesterfield, MO	94	25.8
Northwestern College of Chiropractic / Bloomington, MN	14	3.9
National University of Health Sciences / Lombard, IL	11	3.0
Parker College of Chiropractic / Dallas, TX	3	0.8
Palmer College of Chiropractic– West / San Jose, CA	2	0.6
Los Angeles College of Chiropractic / Whittier, CA	2	0.6
Texas Chiropractic College / Pasadena, TX	2	0.6
Western States Chiropractic College / Portland, OR	2	0.6
Cleveland Chiropractic College – LA / Los Angeles, CA	1	0.3
Life College of Chiropractic / Marietta, GA	1	0.3
Life Chiropractic College – West / San Lorenzo, CA	1	0.3
Palmer College of Chiropractic– Florida / Port Orange, FL	1	0.3
Total Respondents	364	100.00

Most respondents took between two and five nutrition courses during their chiropractic education. Approximately one-fourth of the respondents took one nutrition course in chiropractic college, while a small percent took more than five

nutrition courses. Five respondents did not answer this question. Table 8 shows the response rate for this question in this survey.

Table 8. Number of Nutrition Classes in Chiropractic College

	Number	% of Respondents
1	96	26.4
2 – 5	245	67.3
>5	18	5.0
No response	5	1.4

Most respondents had either done postgraduate coursework or self-study nutrition training. Thirty-four respondents (9.3%) had a certification, which is typically an additional year (approximately 100 hours) of coursework, and 17 respondents (4.7%) had a diplomate, which is a three-year, 300-hour program.

One hundred (27.5%) of the respondents checked more than one answer for this question, nine (2.5%) checked three answers, and one (0.3%) checked all four answers. Forty-seven respondents did not answer this question. Table 9 shows the response rate for this question.

Table 9. Postgraduate Nutrition Training

	Number	% of Respondents*
Certification	34	9.3
Diplomate	17	4.7
Coursework	208	57.1
Self-study	179	49.2
No response	47	12.9

\*Total exceeds 100% because of multiple choices in response.

Respondents were asked to list the top three sources used for self-study, and 156 respondents (42.9% of total; 87.2% of those who indicated they use self-study) provided a write-in response for this question. Table 10 presents the responses and response rates for this question.

Table 10. Self-Study Sources of Nutrition Training

	Number	% of Respondents* <sup>+</sup>	% of Total <sup>+</sup>
Internet	45	28.9	12.4
Seminars	44	28.2	12.1
Books	44	28.2	12.1
Company information	37	23.7	10.2
Journals	36	23.1	9.9
Newsletters / Magazines	18	11.5	5.0

\* Percentage of respondents who filled in the blank on Question 3.

<sup>+</sup>Total exceeds 100% because of multiple choices in response.

Much like allopathic medical doctors receive information about prescription medications from pharmaceutical companies, many chiropractors obtain information about nutritional supplements from the companies that produce and sell them. Of the 37 respondents who listed company information as a source of self-study, 17 (46.0%) of those wrote in Standard Process and eight (21.6%) wrote in Nutri-West. Two respondents specifically mentioned the Standard Process Clinical Reference Guide as a source of self-study. No more than two respondents listed any other company.

Several respondents listed specific people they use as resources for self-study. The most commonly mentioned person (by five respondents) was Dr. David Seaman, a chiropractor who is on the faculty at Palmer Chiropractic College and a columnist

for various chiropractic publications. He has also written a book titled Clinical Nutrition for Pain, Inflammation, and Tissue Healing.

Five respondents cited Weston A. Price or the Price-Pottenger Foundation, and another listed Price's book, Nutrition and Physical Degeneration, as a source of self-study. Dr. Price was a dentist who extensively studied nutrition during the early part of the 20<sup>th</sup> century. He worked closely with Dr. Francis Pottenger, a medical doctor who studied the effects of nutrition in cats.

Four respondents mentioned Dr. John Brimhall, a chiropractor who is affiliated with Nutri-West and offers a seminar series covering nutrition and chiropractic issues.

Michael Dobbins and Royal Lee were each mentioned by three respondents. Dr. Lee was a dentist and the founder of Standard Process, a company that sells nutritional supplements. Dr. Dobbins is currently affiliated with Standard Process and offers seminars through the company, based on the teachings and writings of Royal Lee.

Eight respondents listed Prescription for Nutritional Healing, written by James and Phyllis Balch, as a source of self-study.

Specific websites mentioned included Mercola.com, Mayo Clinic, WebMD, USDA, PubMed, and Chiropractic Research Review.

Almost half of respondents had between one and 20 hours of postgraduate nutrition hours in the past year, while slightly over one-third had none. Nine respondents did not answer this question. Table 11 shows the response rate for this question.

Table 11. Postgraduate Hours in the Past Year

Hours	Number	% of Respondents
None	130	35.7
1 – 20	179	49.2
>20	46	12.6
No response	9	2.5

Of the 39 respondents who said they had received training outside of a chiropractic venue, 32 wrote in a specific response. Nine respondents indicated they had a received a Bachelors degree, and six of those specified their degrees were in nutrition. One respondent had a Masters degree from Bridgeport University in Bridgeport, Connecticut, and one respondent had a degree as a naturopathic medical doctor. The remaining respondents indicated they had taken undergraduate or graduate coursework through a university. Table 12 shows responses to this question.

Table 12. Training Outside of a Chiropractic Venue

	Number	% of Respondents
No	318	87.4
Yes	39	10.7
No response	7	1.9

## Nutritional assessment and practices

The second research question for the current study was “what nutrition assessment and/or nutritional management practices do chiropractors in the Midwest engage in within their practices?” The survey asked how frequently the respondent consulted with patients on nutritional issues, on what specific health conditions they counseled, and what type of nutritional counseling was employed.

In addition, the survey asked about referral patterns and if the practitioner had collaborative relationships with other healthcare professionals for nutritional matters. The next set of questions focused on supplement use, types of supplements, and nutritional assessment methods used.

Most respondents indicated they use diet history to assess their patients’ nutritional status. Laboratory measures, anthropomorphic means, and “other” were also commonly selected. Of the 111 respondents who wrote in a response for other, symptom surveys and general health history were most commonly mentioned (24 respondents each).

Twenty respondents listed muscle testing or applied kinesiology. Nine respondents each listed hair analysis or saliva testing. Ten respondents did not answer this question, while 85 respondents checked two selections and 117 respondents answered more than two selections. Table 13 shows the response rate for this question.

Table 13. Nutritional Assessment Methods Used

	Number	% of Respondents
Diet history; food-frequency questionnaires	238	65.4
Laboratory measures (blood, urinalysis)	133	36.5
Anthropomorphic (height, weight)	116	31.9
Other (specify)	113	31.0
BMI; waist circumference	77	21.2
None	66	18.1
No response	10	2.8

\*Total exceeds 100% because of multiple choices in response.

A large number of respondents said they always discuss prescription and over-the-counter medications with their patients. One-fifth of respondents discuss medications only with patients to whom they make supplements recommendations, while a small percentage do not discuss medications with their patients. Nine respondents did not answer this question. Table 14 shows the response rate for this question.

Table 14. Consider / Discuss Prescription and Over-the-Counter Medications

	Number	% of Respondents
No	33	9.1
Yes – only with supplement recommendations	74	20.3
Yes – always	248	68.1
No response	9	2.5

Over half of the respondents consult daily with patients on nutritional matters, and another one-fourth consult at least weekly. Three respondents gave no answer to this question. Table 15 shows the response rate for this question.

Table 15. Frequency of Consultation with Patients on Nutritional Issues

	Number	% of Respondents
Daily	203	55.8
Weekly	91	25.0
Monthly	10	2.8
Only when asked by a patient	57	15.7
No response	3	0.9

Overwhelmingly, respondents indicated they use nutritional counseling to promote general health. Five respondents did not answer this question. Table 16 shows the response rate for this question.

Table 16. Conditions for Nutritional Counseling

	Number	% of Respondents*
General health promotion	335	92.0
Inflammatory	279	76.7
Gastrointestinal	243	66.8
Cardiovascular	242	66.5
Weight loss	214	58.8
Blood sugar (diabetes/hypoglycemia)	207	56.9
Other (specify)	92	25.3
No response	5	1.4

\*Total exceeds 100% because of multiple choices in response.

This question also asked subjects to specify the Other conditions choice, and 90 of 92 subjects (97.8%) who checked this space provided a response. Table 17 shows the top answers ( $\geq 5$  responses) to this question.

Table 17. Other Conditions Specified for Nutritional Counseling

	Number
Hormonal balance	15
Endocrine	12
Allergy; Joint/Degenerative Joint Disease	11
Bone; Musculoskeletal	9
Fibromyalgia; Infection; Sports nutrition	5

Most respondents counsel their patients on proper eating habits or nutrition as it relates to a specific disease. Slightly over half of the respondents counsel on weight loss, and slightly under half counsel on sport nutrition. Over half (214; 58.8%) of the respondents chose more than two answers, and 91 (25.0%) chose two answers. Ten respondents gave no answer. Table 18 shows the response rate for this question.

Table 18. Types of Nutritional Counseling

	Number	% of Respondents*
Proper eating habits	310	85.2
Nutrition as it relates to a disease / medical condition	287	78.9
Weight loss	199	54.7
Athletic training / sports nutrition	171	47.0
Entire meal plans	70	19.2
No response	9	2.5

\*Total exceeds 100% because of multiple choices in response.

Over half of the respondents said they do not consult with or refer to other healthcare professionals on nutritional matters. Of those who did, most referred to other healthcare professionals besides dietitians or certified nutritionists.

Twenty-seven respondents said they referred to other chiropractors, usually indicating those who have advanced or specialized training in nutrition, and 23 respondents said they refer to medical doctors.

Other frequent answers were naturopaths (six respondents), nutrition supplement company consultants (five respondents), acupuncturists, herbalists, and a local nutrition store (three respondents each). All other answers were listed by fewer than two respondents. Five respondents did not answer this question. Table 19 shows the response rate for this question.

Table 19. Consult with / Refer to Other Healthcare Professionals

	Number	% of Respondents*
Registered Dietitian	46	12.6
Certified Nutritionist	38	10.4
Other Healthcare Professional	70	19.2
Do Not Consult / Refer	220	60.4
No response	5	1.4

\*Total exceeds 100% because of multiple choices in response.

A total of 139 respondents answered the question related to referral patterns, and most respondents said they make occasional referrals. Referral patterns and relationships were not examined in previous studies.

One respondent who checked all three responses indicates he refers to three different healthcare professionals in the previous question. All other respondents checked only one answer. Table 20 below shows the response rate for this question.

Table 20. Referral Patterns

	Number	% of Respondents*
Ongoing Collaborative Relationships	43	11.8
Occasional Referrals	86	23.6
One-time Events	10	2.8

\*Total is less than 100% because not all respondents answered this question.

A total of 126 respondents listed the conditions for which they refer to other practitioners. Table 21 below shows the six conditions most commonly mentioned. All other conditions were listed by fewer than 10 respondents.

Table 21. Conditions Referred to Other Practitioners

	Number	% of Respondents
Blood Sugar Regulation	43	11.8
Weight Loss / Obesity	39	10.7
Cardiovascular Conditions	37	10.7
Gastrointestinal Conditions	37	10.7
Hormonal Issues	15	4.1
High Cholesterol	12	3.3

\*Total is less than 100% because not all respondents answered this question.

Almost all respondents said they do recommend some type of nutritional supplements. Table 22 shows the response rate for this question.

Table 22. Recommend Nutritional Supplements

	Number	% of Respondents
Yes	343	94.2
No	21	5.8

Most respondents recommend multivitamins, individual vitamins, and minerals. Slightly over half of the respondents recommend herbs. This question included a write-in blank for other supplements. Fish oil and omega-3 fatty acids were the most common answer given (20 respondents). Other answers most commonly written in were whole-food supplements (15 responses), homeopathic products (13 responses), probiotics (10 responses), and enzymes (9 responses).

Table 23 below shows the response rate for this question.

Table 23. Supplements Recommended

	Number	% of Respondents
Multivitamins	294	80.8
Individual vitamins	250	68.7
Minerals	242	66.5
Herbals	207	56.9
Combination products	172	47.3
Amino acids	130	35.7
Glandulars	118	32.4
Other (specify)	84	23.1
Traditional Chinese medicine	55	15.1
Megavitamins	43	11.8

\*Total exceeds 100% because of multiple choices in response.

Most respondents recommend supplements for maintenance of general health or inflammation. Gastrointestinal and cardiovascular conditions were also listed frequently. Twenty-eight respondents did not answer this question. Table 24 shows the response rate for this question.

Table 24. Conditions for Which Supplements are Recommended

	Number	% of Respondents
General health maintenance	314	86.3
Inflammation	283	77.8
Gastrointestinal	239	65.7
Cardiovascular	226	62.1
Blood sugar management	183	50.3
Other (specify)	65	17.9
No response	28	7.7

\*Total exceeds 100% because of multiple choices in response.

## CHAPTER 5 DISCUSSION

Chiropractic as a profession has seen steady growth over the past three decades and this trend is projected to continue. A large percentage of chiropractors use some form of nutritional counseling in their practices, yet there has been very little research into what they assessment methods and nutritional practices they use and what type of training they've received to qualify them to do these.

Only three previous studies were identified which evaluated the nutrition training and practices of chiropractors, and the most recent study was published seven years ago. This study was conducted to examine and provide updated information on the nutrition education and nutrition assessment and practices of chiropractors.

As with previous studies, most respondents in the current study used some type of nutritional counseling in their practices and relied on either self-study through journals, texts, and articles or postgraduate chiropractic seminars.

The current study supported findings in previous studies that chiropractors primarily use a combination of patient history and clinical symptoms to assess a patient's nutritional status. Chiropractors in the current study tended to use nutrition and supplements to promote general health, although many also use it to address inflammatory, cardiovascular, and gastrointestinal conditions, obesity, and blood sugar imbalances.

## Demographics

Most of the chiropractors that responded to this survey were from smaller communities with populations of 1,000 to 50,000 (approx 59%), and about one-fourth were from cities with populations >100,000. Most of the respondents were from Missouri, which reflected Missouri's majority in the sample. The remaining responses came from states in approximate proportion to the distribution seen in the sample.

Most of the respondents were men, and most were from 31 to 60 years of age. The largest percentage of respondents had practiced between five and 30 years and were in solo practice.

One previous study drew its sample of chiropractors strictly from the San Francisco area (1), while the other two studies took nationwide samples.(2,3) One of the nationwide studies did not report the location of the respondent.(3) In the other nationwide study, respondents were primarily from the Midwest (30.4%), the West (27.7%), and the Northeast (23.5%).(2) None of the previous studies, other than the one in San Francisco,(1) indicated the size of community of the respondent.

According to a 1995 survey conducted by the American Chiropractic Association (ACA), the gender mix within the chiropractic profession is 88% men and 12% women.(9) The response rate for the current survey was slightly skewed toward females at 25% of respondents when compared to the ACA's data. However, these results reflect the results of two of the previous studies, which had female respondents of 22% (1) and 23% (2), respectively. In the Walker study,(2) the

respondents were 15% female and 85% male, similar to the gender mix cited by the ACA.

The majority of respondents in the current study were between the ages of 31 and 60. As with gender, these ages correspond to two of the previous similar studies (1,3). However, in the current study, a slightly larger percentage of respondents (32.4%) was over 50 years of age compared to previous studies (12% and 28.3%, respectively).

In the current study, almost 75% of respondents had practiced between five and 30 years, with over 50% having practiced more than 10 years. Smith and Spillman (2) only reported year of graduation, which may not correlate to number of years in practice. In Newman's study from 1989 (1), almost half of respondents had been in practice five years or less, while in Walker's study (3), almost half (42.9%) of the respondents had practiced from nine to 15 years.

Almost 80% of respondents in the current study were in solo practice, which reflects the data from previous studies. One study (3) did not report on the type of practice. Another study (2) showed that 71% of respondents were in solo practice, and another (1) showed that 95% of respondents were in private practice with 61% practicing alone. These data also support Cherkin's study from 2002 (4) that reported between 50% and 75% of practitioners who fall under the umbrella of complementary and alternative operate solo practices.

## Education

Most respondents in the current study attended one of three schools: Palmer Chiropractic College (Davenport, Iowa), Cleveland Chiropractic College (Kansas City, Missouri), or Logan Chiropractic College (Chesterfield, Missouri).

Only one other study (2) looked at which chiropractic college respondents had attended, and the distribution was quite different from the current study. In Smith and Spillman's study, respondents attended in almost equal numbers the following colleges: Life University College of Chiropractic in Marietta, Georgia (15%); Northwestern Health University Sciences in Bloomington, Minnesota (14%); Palmer College of Chiropractic in Davenport, Iowa (14%); and Texas Chiropractic College in Pasadena, Texas (13%). National University of Health Sciences in Lombard, Illinois and Los Angeles College of Chiropractic in Whittier, California were each represented by 10% of the respondents.

In the current study, most of the respondents indicated they had from two to five nutrition classes in chiropractic college. Most had taken some type of postgraduate coursework or relied on self-study for further education in nutrition.

Only Newman's study from 1989 (1) asked specifically about the amount of nutrition education during chiropractic college and reported categories of 0 to 40 hours (23%), 41 to 80 hours (22%), 81 to 100 hours (19%), 101 to 200 hours (7%), and over 200 hours (22%). These hours likely correlate to the classes offered by New York Chiropractic College, where one credit hour by traditional university standards is equivalent to 15 contact hours (see page 15).

In 2000, Walker (3) reported that approximately 60% of respondents believed they were “not adequately trained in nutrition by their chiropractic schools,” with the majority of respondents (54.1%) graduating between 1980 and 1989. Conversely, Smith and Spillman (2) reported in 2001 that 53% of respondents “felt that their chiropractic college provided them with an adequate understanding in nutrition,” with the mean and median year of graduation as 1985 and 1986, respectively. The current study did not query respondents’ opinions on the quality of their nutrition training.

Only a small percent of respondents in the current study indicated they either had certification (9.3%) or a diplomate (4.7%) in nutrition, both of which are structured postgraduate programs usually offered through a chiropractic college that require an additional one to three years of training.

Walker’s survey (3) was the only study that queried specifically on diplomate status of respondents, and eight respondents (2.1%) said they were diplomates of the American Chiropractic Board of Nutrition, which is a slightly lower percent than the current study.

A little over one-third of the respondents in the current study said they had not taken any postgraduate hours in nutrition in the past year, but almost half said they had taken between one and 20 hours and a little over 10% had taken more than 20 hours.

In 1989 study by Newman and colleagues, almost half (45%) of respondents said they had completed no nutrition training in the previous year; 39% of respondents had received between one and 20 hours and 15% received more than

20 hours.(1) The results from the current study indicate that more respondents are receiving some training yearly in nutrition than they were 20 years ago, even though smaller numbers are receiving over 20 hours.

About 10% of respondents in the current study had nutritional training outside of a chiropractic venue, and a very small percentage of those specified they had a Bachelors degree in nutrition. Previous studies did not specifically distinguish between training within or outside of a chiropractic venue, other than to inquire about the sources used. Walker's study (3) did differentiate between chiropractic and nonchiropractic journals as a source of study, with 82.4% and 54.7% response rates for each, respectively. This survey also asked about college courses, but they were grouped with seminars, workshops, and continuing education lectures, and no distinction was made between chiropractic college and other universities.

Other studies also did not distinguish between self-study and formal coursework. However, the data from the current study, where 57% said they had taken coursework, compare to two of the other studies. Smith and Spillman (2) and Newman (1) both reported that respondents attended postgraduate seminars at rates of 59% and 54%, respectively. On the other hand, 73.1% of respondents in Walker's study (3) listed "college courses, seminars, workshops, and continuing education lectures" as a source of nutrition information.

In the current study, most of the respondents citing a specific source for self-study indicated they use seminars, books, and journals, similar to respondents in

previous studies. However, just as many respondents in the current study also noted they use the Internet as a source of self-study.

In previous studies, respondents listed the Internet as a source of information at rates of 35% (2) and 20.3% (3). Newman's study (1) was conducted prior to the advent and common use of the Internet.

Company or vendor information was listed at a much lower rate (10.2%) in the current survey than two of the previous studies. Smith and Spillman (2) and Newman (1) reported using vendors as a source of nutritional information at rates of 57% and 54%, respectively. However, Walker (3) included "information provided by supplement manufacturers" in the Other category, which was reported by 14% of respondents in that study.

Respondents in previous studies listed health food stores as a source of nutrition information at rates of 18.4% (3), 22% (1), and 34% (2). Only one respondent, who indicated his mother was in the health food business, mentioned this as a source of information in the current study. Thus, it appears chiropractors are more frequently seeking nutritional information through postgraduate education and published literature and books, rather than relying on health food stores.

#### Nutritional assessment and practices

Most of the respondents in the current study consulted daily or at least weekly with patients on nutritional matters, and many used nutritional counseling to promote general health. Over three-fourths of the respondents use nutrition for inflammatory problems, which seems appropriate, since chiropractors are specialists in

musculoskeletal conditions. Many respondents use nutritional counseling for gastrointestinal and cardiovascular complaints, blood sugar issues, and weight loss.

This issue was examined differently in previous studies. Walker reported that 59% of respondents spent between one and five hours per week providing nutritional counseling, while 47% provided nutritional counseling to between 1% and 25% of their patients.(3) Smith and Spillman noted that 81% of respondents incorporate nutritional counseling into their practices, with 19% of practice time devoted to nutrition.(2) In Newman's study, 98% of respondents said they provide nutrition information to their patients, with 87% counseling and 74% distributing literature.(1)

Almost all (92%) of respondents in the current study indicated they use nutritional counseling to promote general health. This is higher than results reported by Walker in 2000, where 76.8% of respondents used nutritional counseling for "general healthful eating and nutrition." Over three-fourths of the respondents in the current study provided nutritional counseling for inflammatory conditions, while the next highest category in Walker's study was osteoporosis (70.7%).(3)

Respondents in the current study also used nutrition counseling for cardiovascular and gastrointestinal disorders, weight loss, and problems with blood sugar (diabetes or hypoglycemia). Walker also indicated that respondents used nutritional counseling for cardiovascular disease (58.9%), gastrointestinal disorders (55.2%), and diabetes (38.7%) at slightly lower rates than those seen in the current study.(3)

Almost half of the respondents used nutritional counseling as it relates to sports or athletic training, and about one-fifth said they provide entire meal plans for their patients. Walker also noted that 44.5% of respondents used nutritional counseling for sports.

Most of the respondents said they do not refer patients or consult with other healthcare professionals on nutritional matters, which supports what was found in previous studies. Of those who do, they typically refer patients to other chiropractors with specialized training in nutrition or medical doctors. However, a little over 10% of respondents referred to registered dietitians or certified nutritionists.

Of those respondents who do refer patients for nutritional matters, most indicated these are occasional referrals, and only a small percentage said they have ongoing collaborative relationships with other healthcare professionals.

In Newman's 1989 study, 38% of respondents referred clients to other healthcare professionals, yet only 13% referred to registered dietitians, (1) which parallels the results of the current study.

Walker's study (3) noted that 73% of respondents did not refer to registered dietitians, but did not examine referrals to other types of healthcare professionals. However, other chiropractors (50.9%), naturopaths (26.1%), and medical doctors (13.6%) were all listed as sources used to locate nutrition information in the current study.

The conditions for which respondents most commonly refer patients to others for nutritional counseling include cardiovascular or gastrointestinal conditions, blood

sugar regulation, and weight loss or obesity. Interestingly, these are the same conditions for which respondents most commonly use nutritional counseling.

Almost all of the respondents in the current study recommend nutritional supplements, and commonly use multivitamins, individual vitamins and minerals, and herbal products. About a third of the respondents recommend amino acids and glandular products. The most common write-in answer was fish oil or omega-3 fatty acids. Other products that were most frequently written in included whole-food supplements, homeopathic products, probiotics, and enzymes.

As with nutritional counseling, most respondents recommend supplements for either general health maintenance or inflammation. Gastrointestinal, cardiovascular, and blood sugar management were also selected by more than half of the respondents.

To assess nutritional status, most respondents in the current study indicated they use diet history. General health history and symptom survey were the answers most frequently written in for this question, followed by muscle testing or applied kinesiology. Laboratory and anthropomorphic measures were listed by about one-third of the respondents, and about one-third indicate they use multiple methods to assess a patient's nutritional status.

These results correspond to those found in two previous studies where 72% of respondents used diet record,(1) and 74%, 73%, and 42% of respondents used patient symptoms, history, and food record, respectively, as their basis for nutritional assessment.(2) Laboratory measures were also used in approximately similar numbers seen in previous studies (47% [1] and 36% [2]).

However, hair analysis was only listed by 8% of those who wrote in an answer (2% of all respondents), which was not as frequent as other studies (19% [1] and 27% [2]). In addition, anthropomorphic methods were used by almost 32% in the current study, which is considerably more frequent than previous studies that reported usage rates of only 5% (1) or 14% (2).

The use of applied kinesiology has been reported in disparate numbers. In the current study, 5% of all respondents (18% of those who provided a write-in response) indicated they use applied kinesiology. This percent roughly compares to Newman (1) who reported 9% using this technique, while respondents to the survey conducted by Smith and Spillman reported using applied kinesiology at rates of 39%. (2) In Walker's survey (3), applied kinesiology was included in the Other category, which was reported at 8%.

Almost all respondents said they do recommend some type of nutritional supplements. The rate seen in the current study is considerably higher than either the 54% rate seen in Smith and Spillman's study (2) or the 48% rate seen in a later study by Jamison that looked at chiropractors' use of nutritional supplements in Australia. (11) This may reflect not only an increase in acceptance and use of supplements by the general public, but also more efforts on the part of the supplement industry to offer postgraduate training and educate their customers on the use of their products.

Multivitamins, individual vitamins, minerals, herbs, and combination products were the supplements most frequently used by respondents in the current study.

These results are similar to those reported by Smith and Spillman, where respondents reported using vitamins (78%), minerals (65%), herbs (55%), and nutrient combinations (54%).(2)

Over two-thirds of the respondents said they always consider a patient's use of prescription and over-the-counter medications.

A large number of respondents said they always discuss prescription and over-the-counter medications with their patients. One-fifth of respondents discuss medications only with patients to whom they make supplements recommendations, while a small percentage do not discuss medications with their patients. Nine respondents did not answer this question. This practice was not discussed in previous studies.

### Limitations

While the current study was slightly larger than some of the previous studies cited, it was still limited by the fact that it only examined a four-state area in the Midwest, and had a similar, fairly low response rate. Most of the respondents were largely from only three of the 17 accredited colleges in the country, all of which are within the Midwest, so might show a more homogenous educational background, compared to other colleges nationwide.

In addition, those chiropractic colleges that appear to have more robust nutrition curricula (National University of Health Sciences, Life College of Chiropractic, and New York Chiropractic College; see pages 15 and 16) were either

poorly represented or not represented at all in the current study. Practices may also vary by region, so the Midwest may not be representative of the entire country.

The sample may also have a potential bias, since only those interested in nutrition may have replied, and over 70% of the sample did not respond.

As with previous studies, the current study supported the evidence that most chiropractors operate solo practices. The large number of respondents from smaller communities may skew the data, since there are some small towns where a chiropractor may be the only healthcare professional practicing.

While this survey questioned whether chiropractors refer to dietitians or nutritionists, it did not ask their opinions on the idea, as some previous studies did. Again, the availability of dietetic professionals may be limited in smaller towns. Chiropractors in larger communities may not know how to access and establish relationships with dietitians or nutritionists.

Some respondents noted that “not applicable” should be made an option on some of the questions, so that shortcoming may have skewed some of the data.

As in previous studies, a distinction between chiropractic, medical, and nutrition journals would have provided more in-depth information about sources of education. In addition, the term “coursework” used in the survey seems somewhat vague in retrospect, and more specificity could have been added to define the term. Conversely, the term “diet history” may have been too specific and limiting for these practitioners, since they tend to do a complete patient history at the initial visit. Also,

history and symptoms were two of the most common write-in answers for methods of assessing a patient's nutritional status.

### Implications

As reported in previous studies, there often appears to be a gulf between those in more medically oriented, allopathic healthcare and those in the complementary and alternative realm. Both sides appear to have a variety of preconceived notions about the other.

While many in medicine and nutrition professions may view the sources of nutrition education that chiropractors use as suspect, chiropractors do not feel integrated into or accepted by the medical system. This is supported by a survey published in 2000 that indicated 98% of chiropractors refer patients to family physicians, while only 65% of family physicians refer to chiropractors.(5)

Medical doctors and registered dietitians often have access to hospitals and medical universities, while chiropractors tend to gravitate toward education offered through chiropractic colleges or state associations. In addition, chiropractors tend to be in private solo practice more frequently and may have limited access to conventional medical and nutrition advances through mainstream venues.

There also appears to be a gap in the understanding of the capabilities and training of various healthcare professionals. In Walker's survey of chiropractors, their awareness of the nutrition education requirements for other practitioners was 44% for medical doctors, 25% for naturopathic doctors, and 19% for registered nurses or registered dietitians.(3)

In addition, the current stress of increasing costs and competition for patients within the healthcare realm does not promote cooperation among professions.

Nutrition professionals who want to work with chiropractors could consider approaching them educationally through chiropractic colleges, state associations, or chiropractic journals to open doors to collaboration. In smaller towns or communities, a one-on-one approach and invitation to work together may be the best approach. In addition, nutrition professionals could work towards increasing their own knowledge of the educational requirements and backgrounds of chiropractors, in order to work more effectively with them.

There not only needs to be increased communication, but a greater willingness to accept and understand the role of each healthcare professional in the care of the patient. The underlying issue is: how can healthcare professionals partner in the best interest of the patient.

#### Future studies

The types of postgraduate education choices on the survey were fairly nonspecific. Future surveys could be expanded to specify what coursework was taken and what institution offered it or what exactly was involved in obtaining certification or diplomate status.

Future studies could also look at a broader population in other regions of the country, as well as possibly correlating how age, length of practice, size of town, and postgraduate training factor into nutritional practices.

As previous studies did, future studies could use more in-depth opinion questions to ask if the respondents feel they are qualified to give nutritional advice.

About half of the respondents indicate they use supplements and nutritional counseling for gastrointestinal or cardiovascular conditions. Future studies could explore further what specific supplements and types of nutrition recommendations or advice are given, which specific conditions are treated, and what type of training the chiropractor has had to use supplements and nutrition therapy.

In addition, ways to increase collaboration between chiropractors and those in the dietetic community could be explored, through more in-depth opinion surveys.

## CHAPTER 6 SUMMARY

The purpose of this study was to determine the nutrition education and nutrition assessment and management practices used by chiropractors in the Midwest. A 22-item survey was developed and mailed to 1400 chiropractors in a four-state area: Kansas, Missouri, Iowa, and Nebraska. The survey included demographic information, educational background, nutritional assessment methods and practices, and the respondents' use of nutritional supplements.

Respondents were typically between the ages of 31 and 60 and had been in practice anywhere from five to 30 years. Most respondents were from communities with populations of 1,000 to 50,000.

Most of the respondents rely on self-study through journals, texts, and articles or postgraduate chiropractic seminars, and did not receive a significant amount of nutrition training in chiropractic college.

As with previous studies, most of the respondents in the current study use some type of nutritional counseling in their practices, even if just for general health maintenance, and the majority of respondents also recommend supplements to their patients.

In conclusion, healthcare professionals in various disciplines, both on the allopathic and the alternative side, would benefit not only themselves, but also the health of their patients by learning the capabilities and educational backgrounds of other healthcare professionals and developing collaborative, working relationships.

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APPENDIX A:  
Summary Of Scope Of Practice for Chiropractic

ST	SUMMARY OF SCOPE OF PRACTICE
AL	(Contact State for precise definition by state law) May examine, analyze and diagnose the human body and its diseases by the use of any physical, clinical, thermal, or radonic method, and the use of X-ray diagnosing, and may use other general methods of examination for diagnosis and analysis taught in any school of chiropractic recognized by this board. May recommend the use of food and concentrates, food extracts, and may apply first aid. Chiropractors are expressly prohibited from prescribing or administering any drugs included in materia medica, except as herein provided, from performing obstetrics, or from giving treatments involving the use of radioactive materials.
AK	(Contact State for precise definition by state law) A person licensed under this chapter may analyze, diagnose, or treat the chiropractic condition of a patient by chiropractic core methodology or by ancillary methodology. Chiropractic core methodology to mean the treatment and prevention of subluxation by chiropractic adjustment as indicated by a chiropractic diagnosis and includes the determination of contraindications to chiropractic adjustment, the normal regimen and rehabilitation of the patient and patient education procedures; chiropractic core methodology does not incorporate the use of prescription drugs, surgery, needle acupuncture, obstetrics, or X-rays used for therapeutic purposes. Ancillary methodology to mean employing within the scope of chiropractic practice, with appropriate training and education, those methods, procedures, modalities, devices, and measures commonly used by trained and licensed healthcare providers.
AZ	A Doctor of Chiropractic is a portal of entry healthcare provider who engages in the practice of healthcare which includes: 1. The practice of healthcare which deals with the diagnosis and correction of subluxations, functional vertebral or articular dysarthrosis or neuromuscular skeletal disorders for the restoration and maintenance of health. 2. The use of physical and clinical examinations, diagnostic X-rays and clinical laboratory procedures that are limited to urine collection, finger pricks, or venipuncture in order to determine the propriety of a regimen of chiropractic care or to form a basis for referral of patients to other licensed healthcare professionals, or both. 3. Treatment by adjustment of the spine or bodily articulations and those procedures preparatory and complementary to such adjustments, including physiotherapy related to the correction of subluxations or orthopedic supports of the spine and acupuncture.
AR	Practice of Chiropractic means the engagement in the diagnosis and analysis of and any interference with normal nerve transmission and expression, the procedure preparatory to and complementary to the correction thereof by an adjustment of the articulations of the vertebral column, its immediate articulations, or by other incidental adjustments for the restoration and maintenance of health and includes therapy, the normal

ST	SUMMARY OF SCOPE OF PRACTICE
	<p>regimen and rehabilitations of the patient for the purpose of removing any injury, deformity, or abnormality of human beings without the use of drugs or surgery. The Practice of Chiropractic shall not include the performance of the duties, of a mid-wife or obstetrician, therapy by the use of ionizing radiation, incisive surgery, prescribing for or administering to any person any drug to be taken internally, or puncturing the skin, except for the purpose of drawing blood for diagnostic purposes.</p>
CA	<p>Practice chiropractic as taught in chiropractic colleges, without drugs or surgery. The California law has changed since previous editions of this directory have been published. For a complete copy of the law, refer to the Board's web site.</p>
CO	<p>Chiropractic means that branch of the Healing Arts which is based on the premise that disease is attributable to the abnormal functioning of the human nervous system. It includes the diagnosing and analyzing of human ailments and seeks the elimination of the abnormal functioning of the human nervous system by the adjustment or manipulation, by hand, of the articulations and adjacent tissue of the human body, particularly the spinal column, and the usage as indicated of procedures which facilitate and make the adjustment or manipulation more effective, and the use of sanitary hygienic, nutritional, and physical remedial measures necessary to such practice. "Chiropractic" does not include colonic irrigation therapy. "Chiropractic" does include the use of venipuncture for diagnostic purposes; and, treatment by acupuncture when performed by an appropriately trained Chiropractor as determined by the Colorado State Board of Chiropractic Examiners. Electrotherapy means the application of any radiant or current energies of high or low frequency, alternating or direct, except surgical cauterization, electrocoagulation, the use of radium in any form, and X-ray therapy, by a trained Doctor of Chiropractic who has fulfilled the educational and licensing requirements of this state board.</p>
CT	<p>The practice of that branch of the healing arts consisting of the science of adjustment, manipulation and treatment of the human body in which vertebral subluxations and other malpositioned articulations and structures that may interfere with the normal generation, transmission and expression of nerve impulses between the brain, organs and tissue cells of the body, which may be a cause of disease, are adjusted, manipulated or treated. Examine, analyze and diagnose the human living body and its diseases, and use for diagnostic purposes, the X-ray or any other general methods of examination for diagnosis and analysis; treat the human body by manual, mechanical, electrical or natural methods including acupuncture, or by use of physical means, including light, heat, water, or exercise in preparation for chiropractic adjustment or manipulation, and by the oral administration of foods, food concentrates, food extracts or vitamins, administer first aid and, incidental to the care of the sick, advise and instruct patients in all matters</p>

ST	SUMMARY OF SCOPE OF PRACTICE
	pertaining to hygiene and sanitary measures as taught and approved by recognized chiropractic schools and colleges approved by the State Board of Chiropractic Examiners.
DE	(a) "Chiropractic" means a drugless system of healthcare based on the principle that interference with the transmission of nerve impulses may cause disease. (b) The practice of chiropractic includes, but is not limited to, the diagnosing and locating of misaligned or displaced vertebrae (subluxation complex), using x-rays and other diagnostic test procedures. Practice of chiropractic includes the treatment through manipulation/adjustment of the spine and other skeletal structures and the use of adjunctive procedures not otherwise prohibited by this chapter. (c) Except as otherwise provided in this chapter, the practice of chiropractic does not include the use of drugs, surgery or obstetrical or gynecological examinations or treatment. (d) All examinations performed by chiropractors shall be in accordance with the protocol and procedures as taught in the majority of accredited chiropractic colleges.
DC	"(3)(A) "Practice of chiropractic" means the detecting and correcting of subluxations that cause vertebral, neuromuscular, or skeletal disorder, by adjustment of the spine or manipulation of bodily articulations for the restoration and maintenance of health; the use of x-rays, physical examination, and examination by noninvasive instrumentation for the detection of subluxations; and the referral of a patient for diagnostic x-rays, tests, and clinical laboratory procedures in order to determine a regimen of chiropractic care or to form a basis of referral of patients to other licensed healthcare professionals. The practice of chiropractic does not include the use of drugs, surgery, or injections, but may include, upon certification by the Board, counseling about hygienic and other noninvasive ancillary procedures authorized by rules issued pursuant to this act."
FL	May examine, analyze and diagnose the human living body and its diseases by the use of any physical, chemical, electrical, or thermal method, and use the X-ray for diagnosing, and may use any other general method of examination for diagnosis and analysis taught in any school of chiropractic recognized and approved by the Florida State Board of Chiropractic Examiners. Chiropractic physicians may adjust, manipulate, or treat the human body by manual, mechanical, electrical or natural methods, or by the use of physical means, physiotherapy (including light, heat, water, or exercise) or by the oral administration of foods and food concentrates, food extracts, and may apply first aid and hygiene, but chiropractic physicians are expressly prohibited from prescribing or administering to any person any legend drug, or from performing any surgery, except as hereinabove stated or from practicing obstetrics.
GA	The term chiropractic as used in the chapter of the Georgia Law means the adjustment of the articulation of the human body, including ilium, sacrum

ST	SUMMARY OF SCOPE OF PRACTICE
	and coccyx, and in the use of electric, X-ray photography for diagnostic purposes. Doctors of Chiropractic shall have the right to adjust patients according to specific chiropractic methods and shall observe public health regulations, sign health certificates, reporting to the proper health officers the same as other practitioners. Doctors of Chiropractic shall not prescribe or administer medicine to patients, perform surgery, nor practice obstetrics or osteopathy.
HI	Chiropractic is defined to be the science of palpating and adjusting the articulations of the human spinal column by hand; provided that the practice of chiropractic as contemplated and set forth in this chapter may include the use of necessary patient evaluation and management procedures of the human spinal column, hot or cold packs, whirlpool, therapeutic and rehabilitative exercise, traction, electrical and electromechanical stimulation, therapeutic ultrasound, myofascial release, diathermy, infrared, and chiropractic spinal manipulative treatment and extraspinal evaluations for the diagnosis and treatment of neuromusculoskeletal conditions related to the human spinal column, subject to the restrictions contained in this chapter; and provided further that the practice of chiropractic as contemplated and set forth in this chapter shall not include the practice of lomilomi or massage. For the purposes of this section, spinal refers to the five spinal regions: cervical region (includes atlanto-occipital joint); thoracic region (includes costovertebral and costotransverse joint); lumbar region; sacral region; and pelvic (sacro-iliac joint) region.
ID	The system of specific adjustment or manipulation of the articulations and tissues of the body; the investigation, examination and clinical diagnosis of conditions of the human body and the treatment of the human body by the application of manipulative, manual, mechanical, physiotherapeutic or clinical nutritional methods and may include the use of diagnostic X-rays. Nothing herein contained shall allow any physician to perform surgical operations or practice obstetrics, or direct or suggest to the patient that such patient shall use products required by law to be dispensed on prescription only.
IL	The treatment of human ailments without the use of drugs and without operative surgery, as per the Illinois Medical Practice Act.
IN	The diagnosis and analysis of any interference with normal nerve transmission and expression, the procedure preparatory to and complementary to the correction thereof by an adjustment of the articulations of the vertebral column, its immediate articulation and includes other incidental means of adjustment of the spinal column and the practice of drugless therapeutics. Chiropractic does not include prescription or administration of legend drugs or other controlled substances; performing incisive surgery or internal or external cauterization; penetration of the skin with a needle or other instrument for any purpose except the purpose of

ST	SUMMARY OF SCOPE OF PRACTICE
	blood analysis; use of colonic irrigations, plasmatics, ionizing radiation therapy, or radionics; conducting invasive diagnostic tests or analysis of body fluids except for urinalysis; the taking of X-rays of any organ other than the vertebral column and extremities; and the treatment or attempt to treat infectious diseases, endocrine disorders or atypical or abnormal histology.
IA	Persons who treat human ailments by the adjustment of the neuromusculoskeletal structures, primarily, by hand or instrument, through spinal care. Persons utilizing differential diagnosis and procedures related thereto, withdrawing or ordering the withdrawal of the patient's blood for diagnostic purposes, performing or utilizing routine laboratory tests, performing physical examinations, rendering nutritional advice, utilizing chiropractic physiotherapy procedures.
KS	For the purpose of this Act, the following persons shall be deemed to be engaged in the practice of chiropractic: (1) Persons who examine, analyze and diagnose the human living body, and its diseases by the use of any physical, thermal, or manual method and use the X-ray diagnosis and analysis taught in any recognized chiropractic school; and (2) Persons who adjust any misplaced tissue of any kind, or nature, manipulate, or treat the human body by manual, mechanical, electrical or natural methods or by the use of physical means, physiotherapy (including light, heat, water or exercise), or by the use of foods, food concentrates, or food extracts, or who apply first aid and hygiene. Doctors of Chiropractic are expressly prohibited from prescribing or administering to any person medicine, or drugs in materia medica, or from performing any surgery, as hereinabove stated or from practicing obstetrics.
KY	Doctor of Chiropractic means one qualified by experience and training and licensed by the Board to diagnose his patients and to treat those of his patients diagnosed as having diseases or disorders relating to subluxations of the articulations of the human spine and its adjacent tissues by indicated adjustments or manipulation of those subluxations and by applying methods of treatments designed to augment those adjustments or manipulation. Any person licensed under this chapter may sign death certificates, and sign and execute all legal documents and certificates with the same authority as members of other schools or systems of treatment.
LA	"Practice of Chiropractic" means holding one's self out to the public as a chiropractor and as being engaged in the business of, or the actual engagement in, the diagnosing of conditions associated with the functional integrity of the spine and treating by adjustment, manipulation, and the use of the physical and other properties of heat, light, water, electricity, sound massage, therapeutic exercise, mobilization, mechanical devices, and other physical rehabilitation measures for the purpose of correcting interference with normal nerve transmission and expression. A chiropractor may also

ST	SUMMARY OF SCOPE OF PRACTICE
	<p>make recommendations relative to personal hygiene and proper nutritional practices for the rehabilitation of the patient. A chiropractor may also order such diagnostic tests as are necessary for determining conditions associated with the functional integrity of the spine. While chiropractors may not directly perform or administer computerized axial tomography, nuclear magnetic resonance, and nuclear magnetic imaging, nothing shall be construed to prohibit a chiropractor from ordering such diagnostic procedures when deemed necessary by the practitioner. However, the authority to order such diagnostic tests shall not be construed so as to mandate the coverage for such tests ordered by a chiropractor under any healthcare plan or policy of insurance, to require such coverage under any such plan or policy, or to circumvent any requirement or preauthorization for covered services by a primary care physician or pre-certification by an insurer or administrator of a plan or policy in accordance with the terms of a healthcare plan or policy.</p>
ME	<p>"Chiropractic" means the art and science of identification and correction of subluxation and the accompanying physiological or mechanical abnormalities. The term subluxation, as utilized within the chiropractic healthcare system, means a structural or functional impairment of an intact articular unit. Chiropractic recognizes the inherent recuperative capability of the human body as it relates to the spinal column, musculoskeletal and nervous system. Doctors of Chiropractic are healthcare providers functioning within their scope of practice as provided by this chapter. Chiropractic methodologies utilized for the identification or correction of subluxation and the accompanying physiological or mechanical abnormalities include diagnostic, therapeutic, adjustive or manipulative techniques utilized within the chiropractic profession, excluding prescriptive medication or surgery. See new board rules for precise description of "Chiropractic Adjustive/Manipulative Technique".</p>
MD	<p>A drugless system of healthcare based on the principle that interference with the transmission of nerve impulses may cause disease. The Practice of Chiropractic includes the diagnosing and locating of misaligned or displaced vertebrae and, through manual manipulation and adjustment of the spine and other skeletal structures, treating disorders of the human body. Except as otherwise provided in this title, practice of chiropractic does not include the use of drugs or surgery, or the practice of osteopathy, obstetrics, or any other branch of medicine. The definition of the practice of chiropractic does not prohibit a Doctor of Chiropractic from selecting diet and hygiene measures for an individual.</p>
MA	<p>Chiropractic, the science of locating and removing interference with the transmission or expression of nerve force in the human body, by the correction of misalignments or subluxations of the body articulations and adjacent structures, more especially those of the vertebral column and</p>

ST	SUMMARY OF SCOPE OF PRACTICE
	pelvis, for the purpose of restoring and maintaining health. It shall exclude operative surgery, prescription or use of drugs or medicines, the practice of obstetrics, the treatment of infectious diseases, and internal examinations, whether or not diagnostic instruments are used, except that the X-ray and analytical instruments may be used solely for the purpose of chiropractic examinations. Nothing in this definition shall exclude the use of supportive procedures and therapy, including braces, traction, heat, cold, sound, electricity, and dietary and nutritional advice, as treatment supplementary to a chiropractic adjustment.
MI	That discipline within the healing arts which deals with the nervous system and its relationship to the spinal column and its interrelationship with other body systems. Practice of Chiropractic includes diagnosis, including spinal analysis, to determine the existence of spinal subluxations or misalignments that produce nerve interference, indicating the necessity for chiropractic care. The adjustment of spinal subluxations or misalignments and related bones and tissues for the establishment of neural integrity utilizing the inherent recuperative powers of the body for restoration and maintenance of health. The use of analytical instruments, nutritional advice, rehabilitative exercise and adjustment apparatus regulated by rules promulgated by the Board pursuant to Section 16423, and the use of X-ray machines in the examination of patients for the purpose of locating spinal subluxations or misaligned vertebrae of the human spine.
MN	The science of adjusting any abnormal articulations of the human body, especially those of the spinal column, for the purpose of giving freedom of action to impinged nerves that may cause pain or deranged function. The practice of chiropractic is hereby declared not to be the practice of medicine, surgery, or osteopathy. Chiropractic practice includes those non-invasive means of clinical, physical, and laboratory measures and analytical X-ray of the bones of the skeleton which are necessary to make a determination of the presence or absence of a chiropractic condition. The practice of chiropractic may include procedures that are used to prepare the patient for chiropractic adjustment or to complement the chiropractic adjustment.
MS	(1) The definition of chiropractic involves the analysis of any interference with normal nerve transmission and expression, and the procedure preparatory to and complementary to the correction thereof, by an adjustment and/or manipulation of the articulations of the vertebral column and its immediate articulations for the restoration and maintenance of health without the use of drugs or surgery. (2) The chiropractic adjustment and/or manipulation of the articulations of the human body may include manual adjustments and/or manipulations and adjustments and/or manipulations by means of electrical and mechanical devices which produce traction or vibration. Chiropractors licensed under this (regulatory)

ST	SUMMARY OF SCOPE OF PRACTICE
	<p>chapter may also use in conjunction with adjustments and/or manipulations of the spinal structures electrical therapeutic modalities which induce heat or electrical current beneath the skin, including therapeutic ultrasound, galvanism, diathermy and electromuscular stimulation. (3) Chiropractors licensed under this (regulatory) chapter may utilize those electric therapeutic modalities described in subsection (2) of this section only after the chiropractor has completed a course of study maintaining a minimum of one hundred twenty (120) hours of instruction in the proper utilization of those procedures in accordance with the guidelines set forth by the Council on Chiropractic Education, or its successor, and is qualified and so certified in that proper utilization. (4) Chiropractors shall not prescribe or administer medicine to patients, perform surgery, practice obstetrics or osteopathy, chiropractors shall be authorized to recommend, dispense or sell vitamins or food supplements. (5) Chiropractors shall not use venipuncture, capillary puncture, acupuncture or any other technique which is invasive of the human body either by penetrating the skin or through any of the orifices of the body or through the use of colonics.</p>
MO	<p>The science and art of examination, diagnosis, adjustment, manipulation and treatment of malpositioned articulations, and structures of the body, both in inpatient and outpatient settings. The adjustment, manipulation, or treatment shall be directed toward restoring and maintaining the normal neuromuscular and musculoskeletal function and health. It shall not include the use of operative surgery, obstetrics, osteopathy, podiatry, nor the administration or prescribing of any drug or medicine nor the practice of medicine, within the meaning of Chapter 334, RSMo, and not subject to the provisions of the Chapter. A licensed Doctor of Chiropractic may practice chiropractic as defined in subsection 1 of this section by those methods commonly taught in any chiropractic college recognized and approved by the Board. Doctors of Chiropractic may advise and instruct patients in all matters pertaining to hygiene, nutrition, and sanitary measures as taught in any chiropractic college recognized and approved by the Board.</p>
MT	<p>Chiropractic is the system of specific adjustment or manipulation of the articulations and tissues of the body, particularly of the spinal column, for the correction of nerve interference and includes the use of recognized diagnostic and treatment methods as taught in chiropractic colleges, but does not include surgery or the prescription or use of drugs. Licensed Doctors of Chiropractic may diagnose, palpate, and treat the human body by the application of manipulative, manual, mechanical, and dietetic methods, including chiropractic physiotherapy, the use of supportive appliances, analytical instruments, and diagnostic X-ray in accordance with guidelines promulgated or approved by the State or Federal Health Regulatory Agencies.</p>
NE	<p>The practice of chiropractic is defined as being one or a combination of the</p>

ST	SUMMARY OF SCOPE OF PRACTICE
	<p>following, without the use of drugs or surgery: 1) The diagnosis and analysis of the living human body for the purpose of detecting ailments, disorders, and disease by the use of diagnostic X-ray, physical and clinical examination, and routine procedures including urine analysis; or 2) The science and art of treating human ailments, disorders, and disease by locating and removing any interference with the transmission and expression of nerve energy in the human body by chiropractic adjustment, chiropractic physiotherapy, and the use of exercise, nutrition, dietary guidance, and colonic irrigation. The use of X-rays beyond the axial skeleton shall be solely for diagnostic purposes and shall not expand the practice of chiropractic to include the treatment of human ailments, disorders and disease not permitted when the use of X-rays was limited to the axial skeleton.</p>
NV	<p>The science, art and practice of palpating and adjusting the articulations of the human body by hand, the use of physiotherapy, hygienic, nutritive and sanitary measures and all methods of diagnosis. A Doctor of Chiropractic shall not pierce or sever any body tissue, except to perform venipuncture for diagnostic purposes.</p>
NH	<p>Any Doctor of Chiropractic who has received and holds a Certificate of Registration and license issued by said Board may adjust by hand any articulations of the vertebral column and its immediate articulations for the restoration and maintenance of health; including the normal regimen and rehabilitation of the patient without the use of drugs or surgery. To also include physical examination, the use of X-ray and other analytical instruments generally used in the practice of chiropractic. Physiological therapeutics can be used preparatory to or complimentary to spinal manipulation.</p>
NJ	<p>( a ) The practice of chiropractic is that patient healthcare discipline whose methodology is the adjustment and/or manipulation of the articulations of the spine and related structures. During the initial consultation and before commencing chiropractic care, a licensee shall identify a clinical condition warranting chiropractic treatment. Nothing herein contained shall be deemed to prohibit a licensee from caring for chiropractic subluxation as determined by chiropractic analytical procedures. Chiropractic analysis which identifies the existence of a subluxation may be the basis for chiropractic care even in the absence of a subjective complaint or other objective findings. ( b ) A chiropractic diagnosis or analysis shall be based upon a chiropractic examination appropriate to the presenting patient. Should the evaluation indicate abnormality not generally recognized as amenable to chiropractic treatment, a licensee shall refer the patient to an appropriate healthcare provider. Nothing herein contained shall preclude a licensee from rendering concurrent and/or supportive chiropractic care to any patient so referred. ( c ) The following diagnostic and analytical</p>

ST	SUMMARY OF SCOPE OF PRACTICE
	<p>procedures are within the scope of practice of a licensee: 1. The taking and ordering of X-rays limited to the osseous system; 2. The ordering, but not performing, of bioanalytical laboratory tests consistent with chiropractic practice; 3. The ordering or performing of reagent strip tests (dipstick urinalysis); 4. The ordering, but not performing of such other diagnostic or analytical tests consistent with chiropractic practice including, by way of example and not by way of limitation, computerized axial tomography (CO), magnetic resonance imaging (MRI), bone scan and invasive electromyography (EMG); and 5. The ordering or performing of such other diagnostic or analytical tests consistent with chiropractic practice including, by way of example and not by way of limitation, neurocalometer, thermography, and noninvasive muscle testing. ( d ) A licensee may offer general nutritional advice to a patient when such advice is incidental to the chiropractic care being provided. A licensee shall not offer nutritional advice as treatment for a specific disease, defect, or deformity. A licensee shall not, incidental to chiropractic care, sell, dispense or derive any financial benefit from the sale of vitamins, food products or nutritional supplements. A licensee shall not represent himself or herself as a nutritional consultant. ( e ) A licensee may order and/or administer physical modalities, where indicated, in conjunction with a spinal adjustment. ( f ) New regulations on diagnostic testing. (Contact Board office)</p>
NM	<p>"Chiropractic" means the science, art and philosophy of things natural, the science of locating and removing interference with the transmissions or expression of nerve forces and adjacent structures, more especially those of the vertebral column and pelvis, for the purpose of restoring and maintaining health for treatment of human disease primarily by, but not limited to, adjustment and manipulation of the human structure. It shall include, but not be limited to, the use of all natural agencies to assist in the healing act, such as food, water, heat, cold, electricity, mechanical appliances, herbs, nutritional supplements, homeopathic remedies and any necessary diagnostic procedure, excluding invasive procedures, except as provided by the board by rule and regulation. It shall exclude operative surgery and prescription or use of controlled or dangerous drugs.</p>
NY	<p>The practice of the profession of chiropractic is defined as detecting and correcting by manual or mechanical means structural imbalance, distortion or subluxations in the human body for the purpose of removing nerve interference and the effects thereof, where such interference is the result of or related to distortion, misalignment or subluxation of or in the vertebral column. A Doctor of Chiropractic may use X-ray for the detection of structural imbalance, distortion, or subluxations in the human body. A Doctor of Chiropractic may not treat for any infectious diseases such as pneumonia, any communicable diseases listed in the sanitary code of the State of New York, any of the cardio-vascular-renal or cardio-pulmonary</p>

ST	SUMMARY OF SCOPE OF PRACTICE
	<p>diseases, any surgical condition of the abdomen such as acute appendicitis, or diabetes, or any benign or malignant neoplasms; to operate; to reduce fractures or dislocations; to prescribe, administer, dispense or use in his practice drugs or medicines; or to use diagnostic or therapeutic methods involving chemical or biological means except diagnostic services performed by clinical laboratories which services shall be approved by the Board as being appropriate to the practice of Chiropractic; or to utilize electrical devices except those devices approved by the Board as being appropriate to the practice of chiropractic. Nothing herein shall be construed to prohibit a licensed chiropractor who has successfully completed a registered doctoral program in chiropractic, which contains courses of study in nutrition satisfactory to the department, from using nutritional counseling, including the dispensing of food concentrates, food extracts, vitamins, minerals, and other nutritional supplements approved by the board as being appropriate to, and as a part of, his or her practice of chiropractic. Nothing herein shall be construed to prohibit an individual who is not subject to regulation in this state as a licensed chiropractor from engaging in nutritional counseling.</p>
NC	<p>The science of adjusting the cause of disease by realigning the spine, releasing pressure on nerves radiating from the spine to all parts of the body, and allowing the nerves to carry their full quota of health current (nerve energy) from the brain to all parts of the body. Any person obtaining a license from the Board of Chiropractic Examiners shall have the right to practice the science known as Chiropractic, in accordance with the method, thought and practice of Doctors of Chiropractic, as taught in recognized chiropractic schools and colleges, but shall not prescribe for or administer to any person any medicine or drugs, nor practice osteopathy or surgery. Licensed Doctors of Chiropractic may practice in public hospitals. A licensed Doctor of Chiropractic may have access to and practice chiropractic in any hospital or sanitarium in this state that receives aid or support from the public, and shall have access to diagnostic x-ray records and laboratory records relating to the Doctor of Chiropractic's patients. Free choice by the patient is guaranteed. No agency of the State, County, or Municipality, nor any commission or clinic, nor any Board administering relief, social security, health insurance or health service under the laws of the State of North Carolina shall deny to the recipients or beneficiaries of their aid or services the freedom to choose a duly licensed Doctor of Chiropractic as a provider of care or services which are within the scope of practice of the profession of Chiropractic as defined in this chapter. A Doctor of Chiropractic, for all legal purposes, shall be considered an expert in his field and when properly qualified, may testify in a court of law as to etiology, diagnosis, prognosis, and disability, including anatomical, neurological, physiological, and pathological considerations within the</p>

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	scope of Chiropractic.
ND	<p>The practice of chiropractic means the examination, evaluation, and diagnosis, by means including X-ray, other appropriate diagnostic imaging, clinical laboratory procedures, or pertinent examinations taught by chiropractic colleges accredited by the Council on Chiropractic Education or its successor, the treatment of patients by means of the adjustment or manipulation of the spinal column, the vertebral articulations, the appendicular skeleton not excluding the skull, and of any displaced tissue of any kind or nature, and includes the practice of physiotherapy, electrotherapy, hydrotherapy, and all other procedures taught by chiropractic colleges, accredited by the Council on Chiropractic Education or its successor, the rating and reporting of any permanent impairment function and the providing of professional opinions regarding any matter included in this definition of practice of chiropractic; but does not include prescribing for or administering to any person any medicine or drug to be taken internally which is now or hereafter included in materia medica, nor performing any surgery, except as is provided in this section, nor practicing obstetrics.</p>
OH	<p>The practice of chiropractic is the utilization of the relationship between the musculoskeletal structures of the body, the spinal column and the nervous system, in the restoration and maintenance of health, in connection with which patient care is conducted with due regard for first aid, hygienic, nutritional, and rehabilitative procedures and the specific vertebral adjustment and manipulation of the articulations and adjacent tissues of the body. The use of X-ray for diagnostic purposes is permitted. The use of acceptable clinical and laboratory diagnostic procedures is permitted.</p>
OK	<p>Chiropractic is the science and art that teaches health in anatomic relation and disease or abnormality in anatomic disrelation, and includes hygienic, sanitary and therapeutic measures incident thereto. The scope of practice of chiropractic shall include those diagnostic and treatment services and procedures which have been taught by an accredited chiropractic college and have been approved by the Board of Chiropractic Examiners.</p>
OR	<p>"Chiropractic" is defined as that system of adjusting with the hands the articulations of the bony framework, and the employment and practice of physiotherapy, electrotherapy, hydrotherapy and minor surgery. Includes, chiropractic diagnosis, treatment and prevention of body dysfunctions, correction, maintenance of the structural and functional integrity of the neuromusculoskeletal system and the effects thereof or interferences therewith by the utilization of all recognized and accepted chiropractic diagnostic procedures and the employment of all rational therapeutic measures as taught in approved chiropractic colleges. "Drugs" means all medicines and preparations and all substances, except over-the-counter nonprescription substances, food, water and nutritional supplements taken</p>

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	orally, used or intended to be used for the diagnosis, cure, treatment, mitigation or prevention of diseases or abnormalities of humans, which are recognized in the latest editions of the official United State Pharmacopoeia, official Homeopathic Pharmacopoeia, official National Formulary, or any supplement to any of them or otherwise established as drugs. No person practicing under this Chapter shall administer or write prescriptions for, or dispense drugs, practice optometry or naturopathy or do major surgery. "Minor surgery" means the use of electrical or other methods for the surgical repair and care incident thereto of superficial lacerations and abrasions, benign superficial lesions, and the removal of foreign bodies located in the superficial structures; and the use of antiseptics and local anesthetics in connection therewith.
PA	A branch of the healing arts dealing with the relationship between the articulations of the vertebral column, as well as other articulations, and the neuro-musculoskeletal system and the roll of these relationships in the restoration and maintenance of health. The term shall include systems of locating misaligned or displaced vertebrae of the human spine and other articulations; the examination preparatory to the adjustment or manipulation of such misaligned or displaced vertebrae and other articulations; the adjustment or manipulation of such misaligned or displaced vertebrae and other articulations; the furnishing of necessary patient care for the restoration and maintenance of health; and the use of Board approved scientific instruments of analysis, including X-ray. The term shall also include diagnosis, provided that such diagnosis is necessary to determine the nature and appropriateness of chiropractic treatment; the use of adjunctive procedures in treating misaligned or dislocated vertebrae or articulations and related conditions of the nervous system, provided that after January 1, 1988, the licensee must be certified in accordance with this Act to use adjunctive procedures; and nutritional counseling, provided that nothing herein shall be construed to require licensure as a chiropractor in order to engage in nutritional counseling. The term does not include the practice of obstetrics or gynecology, the reduction of fractures of major dislocations, or the use of drugs or surgery.
RI	The science and art of mechanical and material healing as follows: the employment of a system of palpating and adjusting the articulations of the human spinal column and its appendages, by hand and electro-mechanical appliances, and the employment of corrective orthopedics and dietetics for the elimination of the cause of disease.
SC	(1) Limitation of Practice. Committing any act outside the limitation of practice in this State defined as follows: Persons licensed by the Board shall be limited in their practice to the care a performance of therapeutic or hygienic treatment of patients, the performance of such procedures as are normally followed in giving chiropractic physical examinations, the x-ray of

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	<p>patient and such other procedures as are generally used in the practice of chiropractic. Such other procedures as are generally used in the practice of chiropractic shall be limited, however, to the use of diagnostic and therapeutic procedures, the adjustment and manipulation of articulations and treatment of inter-segmental disorders for alleviation of related neurological, muscular, and osseous joint complex aberrations. Patient care shall be conducted with due regard for environmental, hygiene, sanitation, rehabilitation, and physiological therapeutic procedures designed to assist in the restoration and maintenance of neurological and osseous integrity. None of these diagnostic or therapeutic procedures shall include the use of drugs, surgery, cauterization, desiccation, or coagulation of tissues, rectal examinations, gynecological examinations, obstetrics, catheterization with a needle, injection of dyes for radiological procedures, lumbar puncture to obtain spinal fluid, treatment of cancer or x-ray therapy.</p>
SD	<p>The science of locating and removing the cause of any abnormal transmission of nerve energy including diagnostic and externally applied mechanical measures incident thereto. Doctors of Chiropractic shall not be entitled to practice obstetrics or treat communicable diseases.</p>
TN	<p>The practice and procedures shall include procedures or palpation, examination of the spine and chiropractic clinical findings accepted by the Tennessee Board of Chiropractic Examiners as a basis for the adjustment of the spinal column and adjacent tissues for the correction of nerve interference and articular dysfunction. Patient care shall be conducted with due regard for nutrition, environment, hygiene, sanitation and rehabilitation designed to assist in the restoration and maintenance of neurological integrity and homeostatic balance.</p>
TX	<p>Any person shall be regarded as practicing chiropractic within the meaning of this Act who shall employ objective or subjective means without the use of drugs, surgery, X-ray therapy, or radium therapy, to analyze, examine or evaluate the biomechanical condition of the spine and musculoskeletal system of the human body, and uses adjustment, manipulation or other procedures in order to improve subluxations or the biomechanics of the musculoskeletal system, and charge therefore, directly or indirectly, money or other compensation; or who shall hold himself out to the public as a Chiropractic Doctor, or shall use either the term Chiropractor, Chiropractic, Doctor of Chiropractic, or any derivative of any of the above in connection with his name.</p>
UT	<p>A practice of the healing arts, the purpose of which is to restore or maintain human health, in which patient-care, or first aid, hygienic, nutritional, or rehabilitative procedures are administered, and which places emphasis upon specific vertebral adjustment, manipulation and treatment of the articulation and adjacent tissues of the spinal column and musculoskeletal structure of the body and nervous system. A chiropractor may examine,</p>

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	diagnose and treat only within this scope, and may not perform "incisive" surgery, prescribe or administer drugs, or medicines for which an authorized prescription is required by law, treat cancer, practice obstetrics, or prescribe or administer X-ray therapy. A chiropractor may use Xray for diagnostic purposes only.
VT	The practice of chiropractic means the diagnosis of human ailments and diseases related to subluxations, joint dysfunctions, neuro- muscular and skeletal disorders for the purpose of their detection, correction or referral in order to restore and maintain health, without providing drugs or performing surgery; the use of physical and clinical examinations, conventional radiologic procedures and interpretation, as well as the use of diagnostic imaging read and interpreted by a person so licensed and clinical laboratory procedures to determine the propriety of a regimen of chiropractic care; adjunctive therapies approved by the board, by rule, to be used in conjunction with chiropractic treatment; and treatment by adjustment or manipulation of the spine or other joints and connected neuromusculoskeletal tissues and bodily articulations.
VA	Practice of Chiropractic means the adjustment of the twenty-four movable vertebrae of the spinal column, and assisting nature for the purpose of normalizing the transmission of nerve energy. It does not include the use of surgery, obstetrics, osteopathy, nor the administration of any drugs, medicines, serums or vaccines.
WA	(1) Chiropractic is the practice of healthcare that deals with the diagnosis or analysis and care or treatment of the vertebral subluxation complex and its effects, articular dysfunction, and musculoskeletal disorders, all for the restoration and maintenance of health and recognizing the recuperative powers of the body. (2) Chiropractic treatment or care includes the use of procedures involving spinal adjustments, and extremity manipulation. Chiropractic treatment also includes the use of heat, cold, water, exercise, massage, trigger point therapy, dietary advice, recommendation of nutritional supplementation, the normal regimen and rehabilitation of the patient, first aid, and counseling on hygiene, sanitation, and preventive measures. Chiropractic care also includes such physiological therapeutic procedures as traction and light, but does not include procedures involving the application of sound, diathermy, or electricity. (3) As part of a chiropractic differential diagnosis, a chiropractor shall perform a physical examination, which may include diagnostic x-rays, to determine the appropriateness of chiropractic care or the need for referral to other healthcare providers. The chiropractic Quality Assurance Commission shall provide by rule for the type and use of diagnostic and analytical devices and procedures consistent with this chapter. (4) Chiropractic care shall not include the prescription or dispensing of any medicine or drug, the practice of obstetrics or surgery, the use of x-rays or any other form of radiation for

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	therapeutic purposes, colonic irrigation, or any form of venipuncture. (5) Nothing in this chapter prohibits or restricts any other practitioner of a 'health profession' defined in RCW 18.120.020(4) from performing any functions or procedures the practitioner is licensed or permitted to perform, and the term 'chiropractic' as defined in this chapter shall not prohibit a practitioner licensed under chapter 18.71 RCW from performing medical procedures, except such procedures shall not include the adjustment by hand of any articulation of the spine.
WV	The practices and procedures which may be employed by Doctors of Chiropractic are based on the academic and clinical training received in and through accredited chiropractic colleges. These shall include the use of diagnostic, analytical and therapeutic procedures specifically including the adjustment and manipulation of the articulations and adjacent tissues of the human body, particularly of the spinal column; included is the treatment of intersegmental disorders for alleviation of related neurological aberrations. Patient care and management is conducted with due regard for environment and nutritional factors, as well as first aid, hygiene, sanitation, rehabilitation and physiological therapeutic procedures designed to assist in the restoration and maintenance of neurological integrity and homeostatic balance.
WI	The practice of chiropractic is the application of chiropractic science in the adjustment of the spinal column, skeletal, articulations and adjacent tissue which includes diagnosis and analysis to determine the existence of spinal subluxations and associated nerve energy expression and the use of procedures and instruments preparatory and complimentary to treatment of the spinal column, skeletal articulations and adjacent tissue. Diagnosis and analysis may include physical examination, specimen analysis, drawing of blood, blood analysis and the use of X-ray and other instruments. Treatment with or prescribing of drugs, surgery or invasive procedures, acupuncture, prohibited.
WY	Chiropractic is the system of specific adjustment or manipulation of the joints and tissues of the body and the treatment of the human body by the application of manipulative, manual mechanical, physiotherapeutic or clinical nutritional methods for which those persons licensed under this chapter are trained and may include the use of diagnostic x-rays. A chiropractor may examine, diagnose and treat patients provided, however, chiropractors shall not perform surgery, direct the use of or administer drugs required by law to be dispensed on prescription only, practice obstetrics or prescribe or administer x-ray therapy.

<http://www.fclb.org/directory/index.htm>

**APPENDIX B:**  
**Letter**

# The University of Kansas Medical Center

Department of Dietetics and Nutrition

School of Allied Health

Date

Name

Address

City, State postal code

Dear Chiropractor:

As a practicing chiropractor you are being invited to participate in a research study being conducted through the University of Kansas Medical Center with Debra Sullivan, Ph.D., R.D. as the principal investigator. This study is also being used to partially fulfill the thesis requirements for Donna Werner, D.C. This research study is about the nutrition education and practices of chiropractors. The purpose of this project is to determine the nutrition education and nutrition assessment and management practices used by chiropractors. Participation in this study is strictly voluntary.

Enclosed you will find a 22-item survey. If you choose to participate in this study, please complete and return the enclosed survey. We are requesting that the survey be returned in two weeks. A self-addressed and stamped envelope is included so that you can return the survey.

Thank you for considering participation in this research study. Please feel free to make additional comments on the survey form if you wish, however, please do not include any identifiable information in order to keep this survey anonymous and prevent any possible breach of confidentiality. If you have any questions, please contact Donna Werner at 913-588-5357 or [dwerner@kumc.edu](mailto:dwerner@kumc.edu).

Thank you,

Donna Werner, DC  
Graduate Student

Debra K. Sullivan, Ph.D. RD.  
Mentor

Enclosures

APPENDIX C:  
Survey

NUTRITION EDUCATION AND PRACTICES AMONG PRACTICING CHIROPRACTORS

1. Chiropractic college from which you graduated: \_\_\_\_\_
2. Number of nutrition courses in chiropractic college  
 1                                       2 – 5                                       >5
3. Post-graduate nutrition education:  
 Certification (1-year program; ~120 hours classroom instruction)  
 Diplomate (3-year program; ~360 hours classroom instruction)  
 Coursework (not part of a program)  
 Self-study (List top 3 sources used for self-study): \_\_\_\_\_  
\_\_\_\_\_
4. Post-graduate nutrition hours completed in past year (total; formal coursework)  
 0                                       1-20                                       >20
5. Nutrition training outside of chiropractic venues (i.e., 4-year university; advanced degree program through a university):  No  
 Yes (specify) \_\_\_\_\_
6. How frequently do you consult with patients on nutritional issues?  
 Daily                                       Monthly  
 Weekly                                       Only when asked by a patient
7. For what conditions do you use nutritional counseling?  
 Inflammatory condition                       Weight loss  
 Gastrointestinal conditions                       General health promotion  
 Cardiovascular conditions                       Blood sugar  
(e.g. blood pressure or cholesterol)                      (diabetes/hypoglycemia)  
 Other (specify)
8. What types of nutritional counseling do you employ (check all that apply)?  
 Proper eating habits                       Weight loss  
 Entire meal plans                       Athletic training / sports nutrition  
 Nutrition as it relates to a disease state/medical condition  
 Other (specify)
9. Do you consult with/refer to any other healthcare professionals on nutritional matters regarding your patients?  
 Yes: Registered Dietitian  Certified Nutritionist  Other (specify) \_\_\_\_\_  
\_\_\_\_\_  
 No (skip to Question 12)
10. If you answered yes to the previous question, describe your referral patterns: Ongoing, collaborative relationships ; Occasional referrals ; One-time events
11. If you answered yes to Question 10, list the top 3 conditions for which you refer to other healthcare providers? \_\_\_\_\_  
\_\_\_\_\_
12. Do you recommend nutritional supplements?  
 Yes                                       No (skip to question 15)

13. Which supplements do you recommend?
- |  |   |
|--|---|
| <input type="checkbox"/> Multivitamins   | <input type="checkbox"/> Glandulars                   |
| <input type="checkbox"/> Individual vitamins   | <input type="checkbox"/> Amino acids                  |
| <input type="checkbox"/> Minerals  | <input type="checkbox"/> Megavitamins                 |
| <input type="checkbox"/> Herbal  | <input type="checkbox"/> Traditional Chinese medicine |
| <input type="checkbox"/> Combination products (herb-nutrient blends for specific conditions) |   |
| <input type="checkbox"/> Other (specify) _____   |   |
14. For which conditions do you recommend supplements?
- Inflammation, including sprains/strains, arthritic conditions
  - Gastrointestinal (e.g., indigestion or aids to improve digestion)
  - Cardiovascular (e.g., lower blood pressure or cholesterol)
  - Blood sugar management (e.g., hypoglycemia, diabetes)
  - General health maintenance (e.g., multivitamin / mineral)
  - Other (specify) \_\_\_\_\_
15. Which nutritional assessment methods do you use?
- Anthropomorphic (height, weight)
  - Laboratory measures (blood, urinalysis)
  - BMI; waist circumference
  - Diet history; food-frequency questionnaires
  - None
  - Other (specify) \_\_\_\_\_
16. Do you consider and discuss your patients' use of prescription and OTC medications?
- No  Yes (always)
- Yes (only those to whom I give supplement recommendations)
17. Your gender:  Male  Female
18. Your age:
- |                                    |                                |                                |
|------------------------------------|--------------------------------|--------------------------------|
| <input type="checkbox"/> <30 years | <input type="checkbox"/> 41-50 | <input type="checkbox"/> 61-70 |
| <input type="checkbox"/> 31-40     | <input type="checkbox"/> 51-60 | <input type="checkbox"/> >70   |
19. Number of years in practice
- |                               |                                |                                |
|-------------------------------|--------------------------------|--------------------------------|
| <input type="checkbox"/> 0-5  | <input type="checkbox"/> 11-20 | <input type="checkbox"/> 31-40 |
| <input type="checkbox"/> 5-10 | <input type="checkbox"/> 21-30 | <input type="checkbox"/> >40   |
20. Type of practice
- |  |  |
|--|--|
| <input type="checkbox"/> Solo                      | <input type="checkbox"/> Group (2 or more DCs)             |
| <input type="checkbox"/> Associate (with other DC) | <input type="checkbox"/> Multidisciplinary (other than DC) |
21. In which state do you practice? \_\_\_\_\_
22. Approximate size of your community:  <1000  1000-10,000
- 10,001-50,000  50,001-100,000  >100,000