

# Chiropractors and Vaccination: A Historical Perspective

James B. Campbell, PhD\*‡; Jason W. Busse, DC, MSc§; and H. Stephen Injeyan, DC, PhD‡

**ABSTRACT.** Although there is overwhelming evidence to show that vaccination is a highly effective method of controlling infectious diseases, a vocal element of the chiropractic profession maintains a strongly antivaccination bias. Reasons for this are examined. The basis seems to lie in early chiropractic philosophy, which, eschewing both the germ theory of infectious disease and vaccination, considered disease the result of spinal nerve dysfunction caused by misplaced (subluxated) vertebrae. Although rejected by medical science, this concept is still accepted by a minority of chiropractors. Although more progressive, evidence-based chiropractors have embraced the concept of vaccination, the rejection of it by conservative chiropractors continues to have a negative influence on both public acceptance of vaccination and acceptance of the chiropractic profession by orthodox medicine. *Pediatrics* 2000;105(4). URL: <http://www.pediatrics.org/cgi/content/full/105/4/e43>; *chiropractic, chiropractors, history of chiropractic, spinal manipulation, vaccination.*

ABBREVIATIONS. AMA, American Medical Association; ICA, International Chiropractors Association; ACA, American Chiropractic Association; CCA, Canadian Chiropractic Association.

Although public health authorities have repeatedly documented that the benefits of vaccination greatly outweigh the risks both to the individual and to society as a whole,<sup>1,2</sup> many individuals still choose to reject vaccination for themselves and/or their children.<sup>3-5</sup> In a survey of a subpopulation (subscribers to *Mothering* magazine) selected for a high proportion of nonvaccinators (43%), Meszaros et al<sup>3</sup> identified a number of influential factors, including perceived dangers of the vaccines and doubts about the reliability of vaccination information. Important sources of public information on vaccination issues include the media, books and pamphlets, public health authorities, and primary health care providers. Additionally, the Internet is providing ever-increasing access to a great deal of vaccination information, official and unofficial, both for and against. Unfortunately, these sources do not always provide reliable information. In many parts of the world, vaccination opponents

have organized movements whose activities have had a serious negative impact on vaccination programs.<sup>5</sup> Opponents include some religious organizations, citizens' groups, and practitioners and followers of alternative health care systems, including chiropractors.<sup>6</sup>

Chiropractic is the third largest regulated health care profession in North America (after allopathic medicine and dentistry), with ~70 000 practicing chiropractors in the United States, 5000 in Canada, 2500 in Australia, 1300 in the United Kingdom, and smaller numbers in ~50 other countries.<sup>7</sup> The profession is growing rapidly, with over 4000 graduates yearly from 30 educational institutions<sup>7</sup> and is expected to reach 100 000 in the United States alone by 2010.<sup>8,9</sup> Approximately one quarter of all North Americans use chiropractic services.<sup>10,11</sup> Consequently, chiropractors are likely to play an increasingly influential role in the formulation of societal perceptions of public health issues such as vaccination.

From its inception in the late 19th century, elements within chiropractic have maintained a strong antivaccination bias.<sup>6,12</sup> Because this bias originated in early chiropractic history, the present situation is best understood from a historical perspective.

## CHIROPRACTIC HISTORY

In the late 19th century, Daniel David (D. D.) Palmer, a magnetic healer practicing in the midwestern United States, made a pivotal discovery.<sup>13</sup> One of his patients, Harvey Lillard, a janitor who had been deaf ever since an accident 17 years earlier, was not responding to his magnetic healing techniques. During the course of this treatment, Palmer noticed an unusually large bump at the back of Lillard's neck, in the region of the fourth cervical vertebra.<sup>14,15</sup> By his own account:

"An examination showed a vertebra racked from its normal position. I reasoned that if that vertebra was replaced, the man's hearing should be restored. With this object in view, a half-hour's talk persuaded Mr. Lillard to allow me to replace it. I racked it into position by using the spinous process as a lever and soon the man could hear as before."<sup>15</sup>

One might question the physiologic basis for this cure, particularly because the cochlear nerve does not pass through the neck. Nevertheless, this single, possibly apocryphal, observation provided the practical basis for Palmer's future concept of chiropractic, a name derived from the Greek *cheiro* (hand) and *practos* (doing by). Over the next few years, he gradually refined his theories, concluding by 1902 that disease (or dis-ease, as he termed it) was primarily

From the \*Department of Medical Genetics and Microbiology, Faculty of Medicine, University of Toronto; and ‡Divisions of Biological Sciences and §Postgraduate Studies, Canadian Memorial Chiropractic College, Toronto, Ontario, Canada.

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Reprint requests to (J.B.C.) Department of Medical Genetics and Microbiology, University of Toronto, Medical Sciences Building, Rm 4388, 1 King's College Circle, Toronto, Ontario M5S 1A8, Canada.

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neurological in origin, with 95% of all illnesses resulting from pinching of spinal nerve roots by misaligned or subluxated<sup>16</sup> vertebrae. Reasoning that a healthy body required a properly aligned backbone, Palmer developed a novel method of spinal adjustment to correct these subluxations.

Palmer's initial theory of chiropractic was more mechanical than spiritual, with the properly adjusted body being considered akin to a machine running smoothly and without friction.<sup>13</sup> As a magnetic healer, however, he believed in the concept of vitalism, a doctrine that ascribes the functioning of a living organism to a vital principle distinct from physico-chemical and other known and accepted forces. Eventually, this concept became integrated within the basic tenets of chiropractic. By using spinal manipulation therapy for the removal of subluxations, he believed he was influencing a life force within the body which he named "innate intelligence," the unimpeded presence of which was essential for good health. When he later equated innate intelligence with a personified part of universal intelligence (God), the religious overtones of chiropractic became manifest.<sup>17</sup>

Even as his concepts were developing, Palmer founded the first school of chiropractic, the Palmer School and Cure, in Davenport, Iowa in 1897.<sup>18</sup> Over the next 5 years, ~15 students, including several medical doctors, graduated from his school with diplomas attesting to their competence to teach and practice chiropractic.<sup>18</sup> Some took the teaching part literally and quickly started their own schools. Given the diversity of their backgrounds and their primitive state of knowledge, it is not surprising that, almost from its origin, chiropractic evolved in several directions.

In 1902, Palmer left the school in the hands of his 20-year-old son, Bartlett Joshua (B. J.), a recent graduate.<sup>14,15</sup> Despite his youth, B. J. (as he was generally called) proved to be an exceptionally able businessman, becoming the dominant, but increasingly controversial, figure in the early growth of the profession. Building on the concepts of his father, B. J. promulgated a form of health care incompatible with that provided by practitioners of orthodox medicine. He emphasized that chiropractic did not cure or heal, but instead removed interference with the normal functioning of the innate intelligence, thereby allowing the body to heal itself. This concept resulted in a conflict with the germ theory of disease, which was gaining acceptance at the time.<sup>19</sup> Although B. J. did not dispute the existence of germs, he rejected the proposition that they were the causes of infectious disease. In his own words:

"Chiropractors have found in every disease that is supposed to be contagious, a *cause in the spine*. In the spinal column we will find a subluxation that corresponds to every type of disease. If we had one hundred cases of small-pox, I can prove to you where, in one, you will find a subluxation and you will find the *same conditions* in the other ninety-nine. I adjust one and return his functions to normal. . . . There is no contagious disease. . . . There is no infection. . . . There is a cause internal to man that makes of his body in a certain spot, more or less a breeding ground [for microbes]. It is a place where they can

multiply, propagate, and then because they become so many they are classed as a cause."<sup>20</sup>

Chiropractic opposition to the germ theory continued well into the 20th century. It reached a peak (indicated by numbers of monographs and journal publications) in the 1940s,<sup>19</sup> at which time the introduction of antibiotics (and expansion of vaccination programs) probably contributed to its decline. Nevertheless, some chiropractors still do not accept that microbes can be the cause of disease.<sup>19</sup> Whether disease is caused and cured from within or without the body still constitutes a very real philosophical distinction between the orthodox medical and historical chiropractic approaches to health care.

Another tenet of early chiropractic was that drugs were poisons that interfered with the natural healing mechanisms of the body. Vaccines were anathema, because chiropractic adjustments were considered to be all that were necessary to correct most disease conditions. B. J. states:

"Vaccine virus, or other poisons which create disease conditions will not permanently affect the patient when the Chiropractor keeps the vertebra in proper position. We have checked the fun of doctors and saved children from being poisoned, by adjusting the vertebra that the pus poisoning was displacing."<sup>22</sup>

Notwithstanding the high anecdotal success rate of the Palmer spinal manipulative therapy (or perhaps because of it), the allopathic medical profession of the time vehemently opposed chiropractic.<sup>22-26</sup> Consequently, and as their numbers grew, chiropractors experienced increasing hostility from physicians, with serious negative economic and social consequences. By the 1920s, hundreds of American (and some Canadian) chiropractors had served jail sentences for practicing their profession.<sup>25,26</sup> Morris Fishbein, secretary of the American Medical Association (AMA) and editor of its journal from 1924 to 1949, was 1 of the most influential of the antichiropractic forces, grouping chiropractic along with antivivisectionism and osteopathy as "nonmedical cults," and referring to the profession as "chiroquactic."<sup>23</sup> In 1963, the AMA formed a Committee on Quackery that worked aggressively, both overtly and covertly, to destroy the chiropractic profession.<sup>27</sup> One of the principal means the AMA used to achieve its goals was to make it unethical for physicians to associate professionally with chiropractors. This essentially resulted in a boycott, preventing chiropractors from obtaining hospital privileges or access to medical diagnostic services, and eliminating any cooperation between the 2 groups in the delivery of health care services. The Committee on Quackery was disbanded in 1975 and some of its activities became publicly known. Several lawsuits were filed by or on behalf of chiropractors, and in 1987, in a landmark US District Court decision (*Wilk v AMA*), which was upheld on appeal, the AMA was found guilty of violating the Sherman Act, which made illegal every combination or conspiracy in restraint of trade.<sup>24,27</sup>

In addition to having to deal with decades of hostility from the orthodox medical profession, chiropractic has been racked by leadership struggles within the profession itself. The result has been the

development of different professional organizations with opposing views on philosophical, legislative, and political issues. Certain ultraconservative members, adherents of straight chiropractic, maintain an unmodified commitment to the original theories of D. D. Palmer. Unable to disregard a century of professional warfare, they see themselves as soldiers in an almost holy war against the allopathic medical profession, with a mission to provide a completely different form of health care.<sup>12</sup> Others, the mixers—originally a term of derision coined by B. J.—are more progressive and change-oriented. They agree with the fundamental premise that chiropractic manipulative therapy has a role in health care but differ in that they do not perceive it as an exclusionary role. Therefore, the mixers attempt to consolidate medical and chiropractic approaches to health care. Indeed, many progressive chiropractors have rejected the historical concept of the chiropractic subluxation in favor of ones that more accurately describe the nature of the complex joint dysfunctions they treat.<sup>16,28</sup>

### CHIROPRACTORS AND VACCINATION

To determine the prevalence of antivaccination attitudes within the chiropractic community, Colley and Haas<sup>29</sup> conducted a mail survey of ~1% of randomly selected US chiropractors. Although the validity of the study is compromised by the low response rate (36%), approximately one third of the 171 respondents believed there is no scientific proof that immunization prevents disease, that immunization has not substantially changed the incidence of any major infectious disease in this century, that immunizations cause more disease than they prevent, and that contracting an infectious disease is safer than immunization. Over two thirds of the respondents concurred that high standards of nutrition and sanitation are more important than immunization in preventing infectious disease. More than half believed that the risks of pertussis vaccination outweigh its benefits. The responses indicated that members of the conservative International Chiropractors Association (ICA; ~2500 dues-paying members) were more likely to have a negative bias toward immunization than members of the larger, and more progressive, American Chiropractic Association (ACA; ~12 000 practicing members; ACA, personal communication).

#### Official Chiropractic Policies on Vaccination

In 1990, the ICA adopted a policy statement on vaccination that began by noting that it “recognizes that the use of vaccines is not without risk, and is aware of the beneficial consequences of some that have proven to be reasonably safe” [italics added]. In 1993, the initial statement of the ACA policy went a step further by observing that “vaccination has been shown to be a cost-effective and clinically practical public health preventative procedure for certain viral and microbial diseases [italics added] as demonstrated by the scientific community.” Later revisions removed the italicized clauses and, as of 1998, the official policy of the ACA regarding vaccination reads as follows (that of the ICA being practically identical):

“Resolved, that the ACA recognize and advise the public that: Since the scientific community acknowledges that the use of vaccines is not without risk, the American Chiropractic Association supports each individual’s right to freedom of choice in his/her own health care based on an informed awareness of the benefits and possible adverse effects of vaccination. The ACA is supportive of a conscience clause or waiver in compulsory vaccination laws thereby maintaining an individual’s right to freedom of choice in health care matters and providing an alternative/elective course of action regarding vaccination.” (Available at: [www.amerchiro.org/shared/pub-poli.htm](http://www.amerchiro.org/shared/pub-poli.htm).)

By these noncommittal statements, both associations seem to have recently deliberately distanced themselves from any official recognition of vaccination as an effective public health procedure. Although neither association formally rejects vaccination, each emphasizes the risk aspect.

The Canadian Chiropractic Association (CCA), however, takes a more definitive stance:

“The CCA accepts vaccination as a cost-effective and clinically efficient public health preventive procedure for certain viral and microbial diseases, as demonstrated by the scientific community.” (*Policy Manual*, motion 2139/93.)

#### Chiropractor Antivaccination Arguments

Nelson<sup>30</sup> has identified a number of recurring themes in the arguments presented by chiropractors opposing immunization. The following is based on his observations. Although these arguments are by no means restricted to chiropractors, and although they are unacceptable to many in the profession, numerous illustrations of each can be found in the non-peer-reviewed chiropractic literature. Some examples have been provided, excerpted from sources with a wide distribution such as *Dynamic Chiropractic* (available at: [www.chiro-web.com](http://www.chiro-web.com)), a biweekly trade newspaper available without cost to any student, doctor, or supplier of the chiropractic profession, and with a worldwide distribution of ~75 000 (January 1999).

##### *Argument 1: Immunizations Are Not Effective*

Arguments of this kind can be subdivided into several categories:

##### *A. Cyclical Patterns of Disease*

“The Center for Disease Control statistics make it clear that the majority of diseases that are now routinely vaccinated against were disappearing before either the cause was discovered or the vaccine developed. There was no change in the statistical curve of morbidity after the introduction of the vaccine whatsoever. . . . [T]here are studies which show that other vaccination campaigns were thought to be a cause of polio, which was only seen in industrialized nations. Other data were manipulated to make it appear that polio had disappeared as a result of vaccinations” (*Dynamic Chiropractic*, February 13, 1995. Letter to the editor.)

Because the incidence of many diseases follows a cyclical pattern, a decrease in cases after introduction of a vaccine may simply reflect a natural down turn. Much is made of the fact that mortality from a number of common infections declined during the pre-vaccination period of this century, for reasons that are still not clear.<sup>31</sup> There are, of course, other lines of evidence to show that vaccines played a major role in the continuing and accelerated decrease in mortality.

In the case of polio, for example, none of the down cycles before the introduction of the vaccines resulted in complete disappearance of the disease, which has now been achieved in the majority of countries worldwide.<sup>32</sup> Regardless, claims that diseases targeted by vaccines would have disappeared naturally still persist.

#### *B. Reduction in Disease Incidence Is Attributable to Improved Standards of Living and Environment*

"Simply put, research shows the decline of infectious disease with the advent of vastly improved hygiene, sanitation and nutrition. That is, cleaning up the filth, providing potable water, reducing overcrowding, access to better and more varied food, and other such measures. The introduction of vaccination into a population has been documented to cause the very disease it intended to prevent or give rise to other diseases." (*Dynamic Chiropractic*, September 12, 1996. Letter to the editor.)

Although there is little doubt that malnutrition, low standards of hygiene, and poor sanitation play major roles in morbidity attributable to diseases, such as measles and diarrhea,<sup>1,2</sup> this argument fails to account for such phenomena as the resurgence of poliomyelitis in the 20th century as a disease of affluent countries.

#### *C. Disease Outbreaks Still Occur in Fully Vaccinated Communities*

"In the 1980s, notable measles outbreaks occurred in pre-school and school-aged children throughout various communities. . . . In fact, 60% of the measles cases reported in these schools and cities occurred in young people who had met the vaccination requirements and followed the recommendations of the American medical establishment and government. These 'immunizations' were packaged and sold to the American public as a cure-all, as a panacea. The American consumer paid for these shots—shots that put their children at risk—and now it is evident that even after submitting to laws governing one's body, there is no guarantee that one will be protected."<sup>33</sup>

This argument is frequently used to "prove" that vaccines are ineffective, while ignoring the fact that such outbreaks are usually small and involve a disproportionately large number of nonvaccinees.<sup>34</sup> Vaccination levels are erroneously equated with protection levels. The fact that there are some vaccination failures is used as evidence that vaccines in general are ineffective. What is not considered is that whereas disease transmission can occur in a highly vaccinated population, and although vaccine failures may play some role in the spread of the disease, such transmission is usually not sustained.

#### *Argument 2: Vaccines Can Be Harmful*

"Biology and health care students need to learn what the Institute of Medicine has determined to be the 'demonstrated' adverse events associated with childhood vaccines: death, encephalopathy, demyelinating diseases, brachial neuritis, Guillain-Barré syndrome, infections generated by vaccine agents, anaphylaxis, subacute sclerosing panencephalitis, seizure disorder, optic neuritis, arthritis, transverse myelitis, thrombocytopenia, diabetes mellitus, aseptic meningitis, deafness, sterility, susceptibility to infection, etc., and a multitude of sequelae still listed as 'theoretical' due to insufficient research and report data." (*Dynamic Chiropractic*, December 29, 1997.)

This is probably the most widely used argument against immunization. Opponents of immunization frequently emphasize or exaggerate the adverse effects of vaccines, while failing to acknowledge the consequences of natural infection occurring as a result of nonvaccination or of compromised vaccination programs.

#### *Argument 3: There Is Disagreement About, and Even Opposition to, Immunizations Among Medical Experts*

Controversies and legitimate disagreements on various aspects of certainty exist among experts, although few medical authorities would subscribe to a blanket condemnation of immunization. The late Dr Robert S. Mendelsohn, a pediatrician and self-proclaimed medical heretic, is frequently cited in the chiropractic literature for his strong antivaccination stance. As Nelson<sup>30</sup> notes, all this need indicate is that there are health care professionals other than chiropractors who are capable of unreason on the subject.

#### *Argument 4: Immunization Policy Is Governed by the Medical-Pharmaceutical Complex and Motivated by Greed*

"Over the years we are being continually told that the 'old' vaccines (which 'eliminated' the world of disease) were 'ineffective and possibly dangerous.' Now we must get reinfected with a 'new and improved' version of the vaccine. It appears that the scientific foundation on which these vaccines have been erected is fragile enough that only compulsory laws, expensive public relation efforts, outrageous propaganda and expensive advertising must ensue for compliance to be maintained."<sup>35</sup>

Inferences have been drawn about conflicts of interest, bribery, and scientific fraud. Suggestions of government conspiracies, distortions of the truth, and cover-ups abound but with little factual evidence provided to support these contentions. From an historical perspective, chiropractors may have good reason to distrust the medical establishment, although conspiracies against the chiropractic profession of a quarter or a half of a century ago cannot be equated with conspiracies to cause major health damage to whole populations.

#### *Argument 5: Any Compulsory Medical Treatment Is Unacceptable*

"Remember it is compulsion! Regardless if you believe in immunization or not. There are many of us that do not wish to have the diseased juice of monkey kidneys injected into the clean blood streams of our children. At least ye who follow the medical paradigm, should stand up for chiropractic's traditional stance of freedom of choice of physician!" (Thots, *Dynamic Chiropractic*, May 6, 1994.)

Because many US states have mandatory vaccination laws, this has become a freedom of choice issue in which the freedom to refuse vaccination is considered to be a fundamental right. However, US courts have addressed the legal issue of whether the government could compel vaccination. In the leading case, *Jacobson v Massachusetts* (197 US 11; 1905), Jacobson appealed to the Supreme Court, challenging the constitutionality of the statute on the ground that the requirement that he submit to vaccination was an unreasonable infringement of his personal liberty. The Supreme Court unanimously rejected this argu-

ment on the basis that it was not prepared to allow a minority in a community to enjoy the general protection afforded by an organized immunization program in that community or to subordinate the safety of an entire community to the belief of a single individual who chooses to remain a part of that community.

#### *Argument 6: Vaccinations Are Unnecessary*

Arguments of this sort depend on testaments and anecdotal evidence. Individuals may claim that neither they nor their families have ever been vaccinated and have suffered no adverse consequences. This may indeed be true but, in countries with extensive vaccination programs, such individuals are undoubtedly benefiting from the herd immunity provided by the vaccinated majority of the community.

There is also a concept stemming from a belief entrenched in early chiropractic philosophy, and still held by some chiropractors, that common childhood infectious diseases are inconsequential and, rather than being something to be avoided, should be welcomed. According to the chiropractor author of a recent Hamilton, Ontario, newspaper column entitled "Kids First":

"Most parents do not realize that childhood diseases such as measles, etc. are actually of great benefit for they 'prime' and mature a child's immune system. In other words, they actually teach a child's nervous system to fight off an infection on its own. In this way, the body will be able to better defend itself when something serious comes along later. This is a good thing! Vaccination does not exercise the immune system in this manner and may leave a child susceptible to a more serious complication later in life." (*The Hamilton Spectator*, March 14, 1998.)

Of course, the reality is that while the majority of childhood infections are inconsequential, many can and do cause serious morbidity and even death. Approximately 2.4 million children worldwide under 5 years old still die every year from 6 vaccine-preventable illnesses: diphtheria, measles, pertussis, polio, tuberculosis, and tetanus (United Nations Children's Fund figures). In developing countries, the case-fatality rate after measles infection can be as high as 25, and even in the United States, death occurs in 1 to 2 of every 1000 reported cases.<sup>36</sup>

#### *Argument 7: Acceptance of Vaccination Is to Repudiate Chiropractic Philosophy*

"Chiropractic, in the past, walked to a different drummer. We are (were) not part of the medical team, we opposed vaccination, fluoridation, drug therapy, and excessive and needless surgery. Chiropractic was generally antithetical to the entire medical regimen. We stood for something and a goodly number of us still do today. We continue to march to our own unique drummer. But alas, many of us not only do not oppose the medical regimen, they want to be part of the team."<sup>37</sup>

Nelson concurs with Anderson<sup>12</sup> in concluding that "if you peel away all the arguments about the safety and effectiveness of immunizations, you will find at the core of this debate, chiropractic philosophy."<sup>30</sup> Anderson, a medical doctor, doctor of philosophy, and doctor of chiropractic, describes this attitude as an example of schismogenesis, a cultural

mechanism whereby opposing factions enhance differences of ethos and behavior so that these serve more effectively as symbols of the entities that are socially, politically, and economically in competition.<sup>12</sup> Many chiropractors, however, do not march to the same drummer as the author quoted above.<sup>37</sup> For example:

"I have no quarrel with the philosophy propounded by Palmer for the time in which it was presented. I would have no quarrel even now, if chiropractic were part of a religious belief system. I do have a problem with trying to continue to promote a dogmatic view that, in its pure form as promoted by some chiropractors, enjoys no scientific support whatsoever."<sup>38</sup>

#### **Chiropractic Antivaccination Advocacy**

In many countries, there are highly vocal and influential citizens' groups that continue to propagate the view that vaccination is an ineffective and/or dangerous method for combating infectious disease. Lay antivaccination organizations tend to be dominated by individuals who have had a personal or family experience of adverse vaccine sequelae, either perceived or real, thereby providing an intensely emotional component. Such individuals generally do not have the scientific training and impartiality necessary to differentiate between temporal relationships and causality<sup>5,39</sup> or to appreciate the biases confounding studies of adverse reactions.<sup>40</sup> Indeed, by raising false alarms or alarms disproportionate to the magnitude of the real risks and by helping to undermine confidence in vaccines (resulting in reduced vaccine coverage and resurgence of disease), they may unwittingly have done more harm than good.

In the antivaccination chiropractic literature, several names recur frequently as citations for "the other side of the immunization story." Although the individuals themselves are not chiropractors, they seem to have been accorded the status of vaccination experts by some members of the chiropractic community and have been provided with a forum for their opinions by certain chiropractic publications and organizations.<sup>41-44</sup> Prominent among these are Viera Scheibner, a retired micropaleontologist and author of a highly inaccurate book purporting to show that vaccines represent a "medical assault on the immune system,"<sup>45</sup> Harris Coulter, a writer/historian with a particular interest in homeopathy, and Barbara Loe Fisher, the lay co-founder and president of the National Vaccine Information Center, Vienna, Virginia. Coulter and Harris are authors of 1 of the earliest of the lay press antivaccine publications.<sup>46</sup> An in-depth analysis of the arguments of the writings of these individuals is beyond the scope of this article. It is important, however, to emphasize the extent to which their opinions permeate the chiropractic literature.<sup>47</sup>

There is a small number of chiropractor authors who continue to disseminate their antivaccination views in widely-read printed media. Although the right of such authors to express concerns about vaccination issues is not being challenged, their frequent misinterpretation of facts and citation of dubious sources to support their arguments raise questions

about either their own critical abilities or their ulterior motives.

### Chiropractic Publications

Chiropractic publications are not generally available in mainstream science and medical libraries and, with few exceptions (eg, *Journal of Manipulative and Physiological Therapeutics*) are not indexed in most bibliographic databases.<sup>48,49</sup> Consequently, although some chiropractic articles have been appearing in allopathic medico-scientific journals, many high quality chiropractic studies published in peer-reviewed chiropractic journals remain unseen by members of the medical community. Even so, scientifically oriented chiropractors have long decried the low editorial standards of many chiropractic publications.<sup>50,51</sup> Nelson<sup>51</sup> has characterized some chiropractic journals as offering “egregious... chirobabble” and accuses some practitioners of being so animated by 19th century pseudo-science that they are unlikely to abandon their beliefs in the face of scientific evidence.

One problem is that the essential distinctions among chiropractic trade magazines, newspapers, and scholarly journals tend to be blurred. Chiropractic newspapers and magazines may have much larger subscription bases than chiropractic research journals, particularly if distributed free (eg, *Dynamic Chiropractic* and *The American Chiropractor*) but are less well equipped to provide adequate peer review of their contents. Nevertheless, newspapers and magazines may include reviews and original data reports.<sup>35,52,53</sup> Consequently, along with useful professional news and information, articles that may contain misinformation and unsubstantiated theories presented as facts are published more rapidly and reach a much larger chiropractic audience than articles in good research journals. As a result, chiropractor readers continue to be exposed to erroneous and irrational antivaccination information.

### Chiropractic Education

The curricula of most chiropractic colleges are as intensive as those of many medical schools.<sup>54</sup> The amount of basic research conducted within chiropractic institutions, however, is small compared with their allopathic medical counterparts, in part, because the sources of research funding for chiropractic institutions are very limited.<sup>54–56</sup> Consequently, chiropractic students in general do not receive training within a research-intensive environment. This is probably a factor contributing to the lack of critical ability evident in many chiropractic publications. However, chiropractic educational institutions also vary considerably in their approach to teaching the philosophy of the profession.

Colley and Haas<sup>57</sup> surveyed the level of instruction and course content of immunology and immunization taught at North American chiropractic colleges. Their conclusion was that most of the 19 colleges surveyed had faculty who attempted to instill a responsible attitude in their students regarding the risks and benefits of, and the scientific evidence for, vaccination. Nevertheless, several colleges had fac-

ulty who seemed to stress a predominantly negative view of the role of immunization in public health.

### Chiropractic and the Immune System

Is there any experimental support for the premise that chiropractic manipulations can stimulate the immune system? Tissues of the immune system have long been known to contain autonomic nerve endings, and there is clear evidence that immune function is reflexly influenced by autonomic efferent nerve activity after somatic afferent nerve stimulation.<sup>58–60</sup> Limited studies have suggested that spinal manipulation enhances immunoglobulin levels,<sup>61</sup> B cell numbers,<sup>62</sup> and CD4<sup>+</sup> cell counts in human immunodeficiency virus-positive patients,<sup>63</sup> but the experimental design and/or statistical reliability of these studies are inadequate and the conclusions, in the absence of confirmation, should be regarded as equivocal. Other studies have indicated that patients with chronic low back pain had reduced levels of natural killer cells, although spinal therapy (7 treatments over 14 days) had no clinically significant effect on either the absolute number or percentage of any lymphocyte subpopulation (including natural killer cells) examined.<sup>64</sup>

Several reports provide indirect support for induction of at least short-term neuroimmunomodulatory activity by spinal manipulation. In healthy subjects given a single thoracic spine manipulation, compared with a similar cohort given a sham adjustment, Brennan et al<sup>65,66</sup> observed a significant increase of phagocytic activity in peripheral leukocytes (polymorphonuclear neutrophils and monocytes), together with elevated levels of a neurotransmitter, substance P, peaking around 15 minutes posttreatment. Similar experiments also demonstrated a priming effect in mononuclear cells for enhanced endotoxin-stimulated tumor necrosis factor production.<sup>66</sup> In the absence of rigorous placebo controls, however, the possibility that such effects were attributable to a general nonspecific stress-type response cannot be excluded.<sup>66–68</sup> Indeed, although there is evidence for consistent responses to chiropractic adjustment in many areas of physiology,<sup>69</sup> the claim that detection and removal of vertebral subluxation has a significant effect on the immune system—or in protection against infectious disease by any mechanism—still remains to be tested in an objective manner.<sup>69–71</sup>

### DISCUSSION

Early chiropractic dogma completely rejected the concept of vaccination. Today, this antivaccination sentiment continues to be espoused by what seems to be a minority of chiropractors including a small but vocal group whose opinions continue to appear in chiropractic newspapers, magazines, and the lay press. Although the precise numbers of these vocal antivaccinationists remain uncertain, it is apparent that their views do not represent those of practising chiropractors in general. Several chiropractors, possibly members of the quiet majority, have felt compelled to contribute scholarly works that clearly demonstrate a provaccination stance.<sup>12,29,30,47</sup>

Can chiropractic—and in particular the antivacci-

nation proponents—offer any viable alternative to vaccination for the prevention and control of infectious disease? The historical concept that a properly adjusted spine is all that is required for protection against infectious disease is clearly inadequate and would be rejected by all but extreme practitioners. As an illustration of the impracticality of this concept, Anderson<sup>12</sup> cites a news item from the *San Francisco Chronicle* (December 15, 1998) that a Livermore boy whose chiropractor father did not believe in immunization was the first fatal case of childhood diphtheria in the nation that year. Many chiropractors, however, emphasize the importance of reduction of stress and of a healthy lifestyle with good nutritional habits. Stress is well recognized as a potent factor enhancing susceptibility to infection.<sup>73,74</sup> Indeed, although not the sole province of chiropractic, stress reduction techniques are likely to contribute to the enhancement of nonspecific resistance. Adequate nutrition is important in maintaining a healthy immune system.<sup>75</sup> Unstressed and well-nourished individuals are more likely to resist infection and possibly even to respond more effectively to vaccination. Even completely healthy persons, however, remain susceptible to infection by many pathogenic organisms. Despite the claim that “nothing appears to offer as great a benefit to the immune system as chiropractic care,”<sup>76</sup> there is no convincing evidence to show that chiropractic treatment of any kind is as effective a preventive measure against infectious disease as vaccination.

In the first decade of its second century, chiropractic stands as a house divided or, perhaps more accurately, as a spectrum of beliefs from rationalism to fundamentalism.<sup>72</sup> At one end of the spectrum are the progressive practitioners who are willing to subject chiropractic principles to experimental verification.<sup>28,30,47,67,78,79</sup> At the other end, there are the ultra-conservatives whose professional activities are confined to a single purpose: to eliminate subluxations.<sup>80</sup> The fact that there is little scientific evidence for the original concept of vertebral subluxation is irrelevant to the latter because this is taken as a matter of faith that is not open to scientific scrutiny.

“It is not so much who is a “straight’ or a “mixer’ as to who is a “believer’ or a “questioner’.... The Major Premise is believed to be true and all observations are interpreted to bring support to this unquestionable premise. If the observations question the Major Premise, then the observations are wrong for the Major Premise cannot be questioned. This faith-based approach negates the need for inductive reasoning with its dependence on probability because absolute truth is already known and only needs personal confirmation through individual observations.”<sup>77</sup>

With the above distinction between rational and faith-based philosophies, the rejection of vaccination by faith-based chiropractors is more easily understood. Because early chiropractic dogma eschews both the germ theory of disease and vaccines, adherents can reject the overwhelming scientific evidence that vaccination is a highly effective method of controlling infectious disease because this does not confirm the “major premise.” However, not all antivaccination chiropractors fit into this category. Some may have been unduly

influenced by the antivaccination literature, while others may have rejected it for less than altruistic reasons: for example, there may be financial advantages in maintaining a health care practice that is totally distinct from a medical one. Whatever their reasons, antivaccination chiropractors and the methods by which some disseminate their views are a continuing source of embarrassment to their more evidence-based colleagues.<sup>30,47,53</sup>

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