

On Vaccination & Chiropractic: when ideology, history, perception, politics and jurisprudence collide

Brian Gleberzon, DC, MHSc*
Marlee Lameris, BSc, DC
Catherine Schmidt, BSc, DC
Jillian Ogrady, BSc, DC

The Palmers espoused anti-vaccination opinions in the early part of the 20th century, rejecting the germ theory of disease in favor of a worldview that a subluxation-free spine, achieved by spinal adjustments, would result in an unfettered innate intelligence; this, along with other healthful lifestyle choices, would allow a person to thwart disease by marshaling the body's natural recuperative abilities. Some chiropractors continue to staunchly champion the Palmer postulates, while others do not. At the national level, advocacy organizations publish conflicting position statements. We explore how this divisiveness has impacted chiropractic ideology, perceptions among students and practitioners, politics and issues of jurisprudence as reflected by the evolution of a standard of chiropractic practice in at least one Canadian province (Ontario). We opine that the chiropractic profession should champion a health promotion and disease prevention approach to vaccination, which would allow it to align itself with the broader healthcare community while not abandoning its traditional tenets.

Au début du 20^e siècle, les Palmer ont soutenu des opinions anti-vaccination, rejetant la théorie microbienne des maladies en faveur d'une idée répandue mondialement suivant laquelle une colonne vertébrale sans subluxation, résultat d'ajustements vertébraux, se traduirait par une intelligence innée et sans contrainte. Ceci, accompagné d'autres choix sains de mode de vie, permettrait à une personne d'écarter les maladies en faisant appel aux capacités de récupération naturelles de son corps. Certains chiropraticiens continuent de défendre farouchement la thèse de Palmer, alors que d'autres s'y opposent. À l'échelle nationale, divers groupes de défense publient des opinions contradictoires. Nous examinons l'impact de cette divergence d'opinion sur l'idéologie de la chiropratique, les perceptions des étudiants et des praticiens, les politiques et les enjeux de jurisprudence, comme le reflète l'évolution de normes de pratique de la chiropratique dans au moins une province canadienne (Ontario). Nous sommes d'avis que la profession de la chiropratique devrait favoriser une approche de promotion de la santé et de prévention des maladies concernant la vaccination, ce qui lui permettra de s'harmoniser avec le reste de la communauté médicale sans pour autant abandonner ses principes traditionnels.

KEY WORDS: vaccination, chiropractic

MOTS CLÉS : vaccination, chiropratique

*Corresponding author: Professor, Chair of Department of Chiropractic Therapeutics, CMCC, 6100 Leslie St. Toronto, Ontario, M2H 3J1.
E-mail: bgleberzon@cmcc.ca
©JCCA 2013

Introduction

"It is the very height of absurdity to strive to 'protect' any person from smallpox and other malady by inoculating them with a filthy animal poison... No one will ever pollute the blood of any member of my family unless he cares to walk over my dead body..."

D.D. Palmer, c1910¹

With the possible exceptions of the term 'subluxation'^{2,3} and chiropractic's role in the health care delivery system^{4,7}, no other issue has polarized the chiropractic profession as much as vaccination. From the time of its inception in the early part of the 20th century, both Daniel David (commonly referred to as "D.D.") Palmer along with his son Bartlett Joshua (commonly referred to as "B.J.") promulgated anti-vaccination stances, stances that animated much of the profession's opposition to organized medicine.^{1,7,8} It was D.D. Palmer, a magnetic healer, who performed the first chiropractic adjustment in what has become the epochal event of the profession. According to chiropractic lore, D.D. restored the hearing of a deaf janitor named Harvey Lillard by adjusting a vertebrae of his mid thoracic spine that he determined to be 'racked' out of place.^{1,3,9,10} By doing so, by resolving a neurological problem (deafness) with a refined manual method of cure first employed by European bone-setters (spinal manipulation)¹⁰, D.D. and later B.J. came to believe that chiropractic care had far-reaching and more powerful effects on the human body than simply resolving back pain.^{1,3,5,8} Among these far reaching effects was the ability to provide defence against communicable diseases.^{1,3,5}

But do chiropractors espouse these anti-vaccine world-views today? As the third largest primary health profession in North America this question may have serious implications to public health initiatives.¹¹ With roughly 60,000 chiropractors in the United States^{11,12} and close to 8,000 in Canada¹³, chiropractic's cultural authority tends to lie in the area of 'spinal care' with roughly 80% of a chiropractor's patient portfolio consisting of headache, low back and neck pain conditions^{6,14,15}, and a number of well-designed systematic reviews are investigating the effectiveness of the types of manual therapies chiropractors most often use for patient care¹⁶⁻¹⁹. Many chiropractors emphasize a 'wellness' or a health promotion and disease

prevention paradigm, advising patients to exercise, not to smoke, to maintain good nutritional practices, employ proper ergonomics and to practice safe sex and safe sun²⁰⁻²³ – all healthful strategies around which no controversies exist. However, since chiropractors interact with a significant number of patients throughout their professional careers, it stands to reason that if a segment of chiropractors also advise their patients to eschew vaccinations, this could imperil the success of large-scale immunization programs championed by the World Health Organization (WHO)²⁴, the Centre of Disease Control and Prevention (CDCP)²⁵ and the Public Health Agency of Canada²⁶.

This paper explores the issue of chiropractic and vaccination in terms of: (i) historical perspective; (ii) attitudes among chiropractic students; (iii) attitudes among chiropractors; (iv) political perspectives and; (v) issues of jurisprudence. We discuss how these issues impact the relationship between chiropractic and medicine and we recommend a path forward, one that will more firmly entrench chiropractic into the larger healthcare community, while not necessarily abandoning its core ideological tenets.

(i) Historical perspective

At the beginning of the previous century, the Palmers rejected the germ theory of disease, despite the fact it was gaining wide acceptance at the time.^{3,8} B.J., who assumed the mantle of the profession's leadership in 1906 after purchasing the Palmer School of Cure (PSC) from his father (who was jailed for a time for practicing medicine without a license), asserted that: "*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, in one, you will find a subluxation and you will find the same condition in the other ninety-nine. I adjust one and return his function 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]*"⁸. It was B.J.'s opinion that "*the idea of poisoning healthy people with vaccine virus... is irrational. People make a great ado if exposed to a contagious disease, but they submit to being inoculated with rotten pus, which if it takes, is warranted to give them a disease*"²⁴. The curriculum at the PSC was

based on the central tenet that adjusting spinal segments assessed as being subluxated [i.e. operating in an aberrant manner in terms of their structure, function or neurology, depending on the prominent model at the time^{10,28}] would marshal the natural recuperative abilities of the body, relying on what the Palmers labelled *innate intelligence*²⁹. It was reasoned that removing the nerve interference caused by subluxated spinal segments would, in the parlance of B.J., “*emancipate the rivulets of entrapped life force*”²⁷. By removing subluxation and marshalling the innate intelligence of the person (removing them from a state of *dis-ease*) the patient’s neurological system could function unfettered, ultimately thwarting disease. This ideology, often described as a core tenet of chiropractic philosophy, continues to be embraced by a significant portion of the profession, a portion who label themselves as ‘straight’ or ‘principled’.³⁰ Although estimates vary, one epidemiological study conducted in Canada reported roughly 30% of chiropractors identify themselves as having this traditional or orthodox worldview.³⁰

(ii) *Attitudes Among Chiropractic Students*

Busse and his colleagues³¹ surveyed a cohort of Canadian chiropractic students during the 1999/2000 academic year in order to ascertain their attitudes toward vaccination. Busse writes that, as a chiropractic student at the time, as the program progressed, an increasingly anti-vaccination sentiment was noted among the students³² and, since over 80% of all chiropractors practicing in Canada were educated at the Canadian Memorial Chiropractic College (CMCC), the only English-speaking chiropractic college in Canada, it was reasonable to posit that attitudes toward vaccinations identified among CMCC students may predict their attitudes upon graduation. Upon surveying his classmates, Busse *et al*³² found that, although 72.3% of first year students were in favour of vaccination, this number fell to 58.2% of students in their final year of study. The investigators also found that students who had a negative attitude toward vaccination were more likely to have relied on informal sources of information, such as non-peer reviewed chiropractic literature and informal social club talks.³² This study did not go unnoticed by the medical community, especially paediatricians, and a commentary appearing contemporaneously with the published Busse *et al* study described these results as ‘disturbing’, although it did suggest there be more inter-professional

collaboration and that this may be an ideal opportunity for medical and chiropractic students to work together and learn from each other.³³ Notwithstanding how it may appear, since theirs was one-time cross-sectional ‘snap-shot’ study of a cohort and not a longitudinal one, it cannot be said with certainty whether students’ attitudes became more negative as they progressed throughout the 4-year academic program or if the attitudes identified in each year were a reflection of some other unidentified factor unique to each specific class.

When Busse *et al*³¹ published their article in the Canadian Medical Association Journal in 2002, the lead author of this manuscript (BJG) posited that the anti-vaccine attitudes held by senior students may be a reflection of the influence of some charismatic students enrolled in the college c1999. Their advocacy of traditional chiropractic ideologies, which included a rejection of the benefits of vaccination, was spread by the student groups they organized. If correct, it would be reasonable to expect that 12 years later these results would vary greatly due to changes in the academic program, current student population, accrued scientific knowledge between the two time intervals, advances in scientific research and the adoption of the doctrines of evidence-based medicine that have been inculcated into the college milieu.

In order to learn if attitudes toward vaccination has indeed changed, we surveyed the class of 2011/12 at CMCC using the same survey instrument used in 1999/2000. In addition to using the identical 11 survey questions used by Busse *et al*³¹ (with the exception of substituting H1N1 for Pertussis in one of the questions) students were also asked whether or not they had been vaccinated, if they believed they had been adequately educated on the topic of vaccination, if they believed they could discuss the topic of vaccination with their patients and if they believed they should have the legal right to be allowed to do so. Unlike the Busse *et al*³¹ study, however, we did not seek to learn what sources of information students relied upon in order to develop their attitudes toward vaccination.

As predicted, our results³⁴ were fundamentally different than the results reported by Busse *et al*³¹. Specifically, a minimum of 83% of chiropractic students in all years in the 2011/12 academic year held a favorable attitude towards vaccination. The highest favorable rate was reported by second year students (89.9%), followed by students in their final year of study (87.75%). When asked

'are you in favor of vaccination and immunization in general?' between 80.7% and 91.9% of students in our study responded 'yes'. We used a Welsh t-test for two samples having possible unequal variances and found a statistical difference between the two surveys, with current academic year having a more positive attitude towards vaccination. It must be noted, however, that our study did suffer from a non-response bias disproportionately affecting later years of study.^{see 34}

(iii) Doctor Perspectives

There exists one large survey of the attitudes of chiropractors towards vaccination. Colley and Haas³⁵ conducted a mail survey of randomly selected American chiropractors. Despite the fact the validity of the study suffered from a very low response rate (36%), and the sample size represented less than 1% of all chiropractors in the United States, the researchers reported roughly one-third of the 171 respondents believed there was no scientific proof that immunization prevents disease, that immunization has substantially changed the incidence of infectious diseases that immunization causes more disease than it prevents and that contacting a disease is in fact safer than being immunized against it.³⁵

A study by Evans et al³⁶ surveyed a random sample of chiropractors' website that purportedly discussed 'wellness'. Sixteen of these websites (34%) contained anti-vaccination information, and these same websites were the ones to most often mention 'innate', 'subluxation' and 'spinal pain' as well. This led the authors to conclude that many of these websites contained 'useless' information that would not help a person maintain good health.

Page and colleagues³⁷ explored how chiropractors in Alberta brought up the topic of immunization with their patients using a set of interview questions. They reported the discussion typically was initiated after a media report of some kind, as the result of reading material left in the chiropractor's waiting room or after a patient's perceived adverse reaction to a vaccine. The discussion could also be initiated by chiropractors if they were seeing the children of patients. The researchers reported some chiropractors used this as an opportunity to provide anti-vaccination information and material, and that much of the waiting room material had an anti-immunization slant. The same group of researchers then asked whether these Albertan chiropractors felt prepared to discuss immunization

with their patients.³⁸ Of the 503 Albertan chiropractors surveyed, only 45% felt their chiropractic education adequately prepared them to counsel patients on the topic of immunization. Despite this, 72% of respondents indicated they felt adequately prepared to counsel their patients on immunization.

Medd and Russell³⁹ conducted a secondary analysis of the study by Injeyan *et al*³⁸ cited above. Medd and Russell³⁹ reported that, while over 90% of the chiropractors interviewed were themselves immunized, only 35.7% of them would accept to be immunized in the future. Furthermore, only 66% of respondents had immunized their children and only 21% would refer patients for possible immunization. Russell *et al*⁴⁰ reported that 41% of chiropractors felt immunizations were safe, that 60% felt immunization should never be given to children under the age of 1, that 30% felt they should never be provided to the elderly and 27% of them advised their patients "against having themselves/ their children immunized". Finally, a recent study by Downey et al⁴¹ reported that children were significantly less likely to receive all four recommended vaccinations if they saw a naturopathic doctor and significantly less likely to receive three of the four recommended vaccinations if they saw a chiropractor.

That all having been said, Russell *et al*⁴² subsequently reported 60% of Albertan chiropractors would be interested in participating in community immunization awareness programs. Lastly, in contrast to aforementioned studies, studies by Davis and Smith⁴³ and Smith and David⁴⁴ reported that chiropractic patients were *no less likely* to be vaccinated for the seasonal influenza flu than were non-chiropractic patients, although they also reported that chiropractic users were significantly less likely than non-users to use the pneumococcal vaccine. A study by Stokley et al⁴⁵ described vaccination coverage among patients according to their use of Complementary and Alternative Medicine (CAM) and found vaccination coverage levels were actually higher among recent CAM users compared to non-CAM users.

(iv) Political Perspective

It requires minimal effort to gather position statements from prominent chiropractic organizations, newsletters and non-peer reviewed articles that assert an attitude towards vaccination that ranges from cautionary to sceptical.

tical to alarmist. Many of these documents and concerns have been catalogued by Campbell et al⁴⁶, essentially advancing on an article by Nelson⁴⁷ a decade earlier and expanded on by Ferrance⁴⁸ a few years after that. For example, the position statement from the International Chiropractic Association (ICA) states:

The International Chiropractors Association recognizes that the use of vaccines is not without risk. The ICA supports each individual's right to select his or her own health care and to be made aware of the possible adverse effects of vaccines upon a human body. In accordance with such principles and based upon the individual's right to freedom of choice, the ICA is opposed to compulsory programs which infringe upon such rights. The International Chiropractors Association is supportive of a conscience clause or waiver in compulsory vaccination laws, providing an elective course of action for all regarding immunization, thereby allowing patients freedom of choice in matters affecting their bodies and health.⁴⁹

Rather than debate the effectiveness of vaccines per se, the ICA position statement focuses on issue of safety and civil liberties. The policy statement on vaccination from the American Chiropractic Association⁵⁰, an organization that could be characterized as the more progressive of the American chiropractic organizations^(see 11), is essentially identical.

At the other end of the ideological spectrum is the position statement from the largest national chiropractic advocacy organization in Canada, the Canadian Chiropractic Associations (CCA).⁵¹ The CCA which represents upwards of 80% of all Canadian chiropractors, issued the following position statement:

Vaccination is a well-established and widely mandated public health policy and the CCA supports public health promotion and prevention strategies that encourage physical and mental health and well-being. The CCA accepts vaccination as a cost-effective and clinically efficient public health preventative procedure for certain viral and microbial diseases, as demonstrated by the scientific community. The public responsibility for vaccination

and immunization is neither within the chiropractic scope of practice, nor a chiropractic specific issue. Public health programming and literature provide appropriate sources of information for patient education regarding vaccination and immunization.⁵¹

Another topic that provides a great deal of animation to the opposition to vaccination among some chiropractors is the purported relationship between immunizations and autism.^{52,53} Autism is the most commonly diagnosed neurological pediatric condition among many countries (including Canada, the United States, and the United Kingdom), with current estimates that 1 in 88 children, and as many as 1 in 54 boys, are autistic.⁵⁴ Although there is evidence that some of these increased diagnoses can be attributed to *diagnostic substitution*⁵⁵, whereby children previously labeled as 'mentally retarded' are now classifiable as autistic, that cannot account for the exponential rise in the number of diagnosed cases. Since a definitive cause of autism has eluded modern-day science and, given the fact that autistic symptoms often appeared concurrently with vaccination schedules, a causal relationship suspected from a temporal one was understandable.

The main research evidence for this relationship was derived by a study by Wakefield *et al*⁵⁶ published in the *Lancet* in 1998. In that article, Wakefield and his colleagues reported that 8 of 12 children with a disease of the digestive tract who had received the MMR vaccination subsequently developed autism.⁵⁶ However, not only have no scientific studies been able to replicate Wakefield's findings or confirm his assertion^{57,58}, but an investigative report by journalist Brian Deer⁵⁹ raises suspicions that the Wakefield study was fraudulently conducted altogether.

This led the licensing board (the Medical Council)⁶⁰ in the United Kingdom to refer the matter to the Fitness to Practice Committee (FPC). The FPC found Wakefield guilty of a number of acts of professional misconduct including unethical conduct, breach of scholarship ethics, performing diagnostic procedures he was not trained to perform, not divulging conflicts of interest and abusing his power as a physician.⁶⁰ At the same time, the *Lancet* retracted the Wakefield study from the journal.⁶¹

Concerns shifted away from the vaccines themselves and instead focused on the ethyl mercury preservative thimerosal.⁶² However, studies have equally failed to demonstrate any causal relationship between thimerosal

and the development of autism.^{63,64} Despite these studies, some chiropractors continue to believe that Wakefield was the victim of a 'witch-hunt' and that the entire thing is a cover up by "Big Pharm".^{46-48,53}

The anti-vaccine opinions espoused by a small but vocal segment of the chiropractic profession has not gone unnoticed by allopathic medicine. The Canadian Paediatric Society (CPS)⁶⁵ published a position statement on chiropractic in general and on the subject of chiropractic and vaccination in particular. The statement, published in 2002 and reaffirmed in 2012, referenced a survey of American chiropractors that reported one-third of respondents believed there was no scientific proof that immunization prevents disease, that immunization has not substantially changed the incidence of any major disease and that immunization causes more disease than it prevents. The CPS statement concluded:

Chiropractic treatment for children and adolescents is not uncommon. Open and honest discussions with families using or planning to use chiropractic for their children will, hopefully, bring about a rational use of this treatment in selected musculoskeletal conditions for which there is proof of efficacy, and enable parents to make informed choices about this form of therapy.⁶⁵

(v) Jurisprudence

The year 2004 was something of a watershed moment for chiropractic in Ontario, and it represented a perfect storm of challenges to the profession. In that year, the provincial government of Ontario announced that chiropractic services would be delisted from the Ontario Health Insurance Plan (OHIP), the socialized healthcare payment plan that paid for most medical services in that province.⁶⁶ This followed a failed university affiliation between York University and CMCC⁶⁷, as well as a decision from the Lewis Inquest that concluded the death of a patient under chiropractic care was 'accidental'⁶⁸, a decision that baffled many chiropractors based on the testimony of content experts provided at the time⁶⁹. Lastly, as previously mentioned, the CPS issued its' position statement on chiropractic⁶⁵ around that time and a few years earlier the Busse et al study³¹ was published.

It was within this political backdrop that the licensing

body of chiropractors in Ontario, the College of Chiropractors of Ontario (CCO) enacted *Standard of Practice S-015: Vaccination/Immunization* that essentially made it an act of professional misconduct to discuss vaccinations/immunizations with chiropractic patients. It was thought by some members of the CCO at the time (c2004) that this action would avert impending deregulation of chiropractic in Ontario. (This was no idle concern. Self-regulation is a *privilege* and not a *right* and in Ontario a Minister of Health can intervene and remove a regulatory body's privilege of self-regulation if s/he believes it is not acting within its mandate to protect the public interest, something that recently happened to the College of Denturists).

SP-015 spawned considerable backlash from many rank and file chiropractors. Even more moderate chiropractors found the 'gag order' distasteful; given their education including courses on microbiology, immunology and public health and, as primary contact portal of entry healthcare providers, it was thought that a chiropractor ought to be able to render his or her own informed opinion on the issue of vaccination.

Council members of CCO change every year, and are subject to elections held throughout various districts in the province, in accordance to CCO by-laws and the *Regulated Health Professions Act (RHPA)*⁷⁰, the omnibus regulations that governs all regulated healthcare professionals in Ontario. With a new Council constituency, the passage of time, a turnover of provincial governments (including the appointment of Ministers of Health who were seemingly much more favorably inclined towards chiropractic since 2004), and an overall change in the political milieu in the province, the CCO approved a new Standard of Practice, S-001: *Scope of Practice* in February 2011⁷¹. This new Standard subsumed Standards of Practice S-010 (techniques, technologies, devices and procedures) and S-015, both of which were rescinded. Among other changes, the new Scope of Practice Standard permits chiropractors to discuss vaccination/immunization with their patients. Essentially, the Standard calls for a three-step process: (i) the patient must be informed that immunizations and vaccinations are outside the scope of chiropractic practice; (ii) if providing an opinion, the response provided must be 'accurate, professional and balanced' and; (iii) the chiropractor must then advise the patient to consult a healthcare practitioner who has vaccination/immunization within their scope of practice.

Summary

The interface between vaccination and chiropractic history, ideology, attitudes among chiropractic students, attitudes among practitioners, politics and jurisprudence has been a complex and mercurial boundary. Internecine fighting has not gone unnoticed by external stakeholders and observers.³³ If the issue were one that was only of primary interest to chiropractors themselves (such as the 'subluxation' question) it is doubtful that outside observers would take notice. But because a significant portion of the chiropractic profession has aligned itself against one of the most successful health care initiatives of the past 100 years, the issue of chiropractic and vaccination will continue to be a source of contention, scrutiny and perhaps even animosity between chiropractic and medicine.

Perhaps recent commentaries by Lawrence¹¹, Page^{sec 22}, and a series of 'Best Practice' documents by Hawk et al⁷²⁻⁷⁴ provide a conceptual platform that will allow the profession to move forward on this issue. Rather than focus on the issue of an individual's rights of autonomy to opt out of immunization programs, thus framing the issue as an ethical privilege, the profession should harken to its core emphasis of health promotion and disease prevention achieved by healthful lifestyle choices. While certainly not risk-free, there does exist an over-abundance of evidence proving that vaccines are both safe and effective. By recommending their use as clinically indicated the chiropractic profession would promote the public good and, by doing so, would be in a better position to be embraced by the broader healthcare community while not abandoning its traditional tenets.

References

- Palmer DD. In: *The Chiropractor's Adjustor*. Portland (OR): Portland Printing House Company; 1910
- Keating JC Jr, Chalton KH, Grod JP et al. Subluxation: dogma or science? *Chiropractic & Osteopathy*. 2005;13(17):1-23. (Accessed Feb 10/06)
- Owens EF. Chiropractic subluxation assessment: What the research tells us. *J Can Chiro Assoc*. 2002;46(4):215-220.
- Meeke WC, Haldeman S. Chiropractic: A profession at the crossroads of mainstream and alternative medicine. *Ann Intern Med*. 2002;136:216-227.
- Nelson CF, Lawrence DJ, Triano JJ et al. Chiropractic as spine care: a model for the profession. *Chiropractic and Osteopathy*. 2005;13:9.
- Villanueva-Russell Y. Caught in the crosshairs: Identity and cultural authority within chiropractic. *Soc Sci & Med*. 2011;1-12.
- Brown R. A health care system in transformation: making the case for chiropractic (commentary). *Chiropractic and Manual Therapies*. 2012;20:37. doi 10.1186/2045-709X-20-37.
- Palmer BJ. *The Philosophy of Chiropractic*. V. Davenport, IA: Palmer School of Chiropractic; 1909.
- Harvey Lillard c1897. As quoted by Keating JC Jr et al. *Chiropractic History: A Primer*. 2004.
- Keating JC Jr. Several pathways in the evolution of chiropractic manipulation. *J Manipulative Physio Ther*. 2003;26(5):300-321.
- Lawrence D. Anti-vaccination attitudes within the chiropractic profession: Implications for public health ethics (commentary). *Topics in Integrative Health Care*. 2012;3(4):1-8.
- <http://www.chiropractic.org/?p=chiroinfo/main> (Accessed July 25, 2012)
- <http://www.chiropracticcanada.ca/en-us/FactsFAQs.aspx> (Accessed July 25, 2012)
- Cherkin DC, Deyo RA, Sherman KJ et al. Characteristics of visits to licensed acupuncturists, chiropractors, massage therapists and naturopathic physicians. *J Am Board Fam Pract*. 2002;15:463-72.
- National Board of Chiropractic Examiners. *Job Analysis of Chiropractic: a project report, survey analysis and summary of the practice of chiropractic within the United States*. Greeley, Colorado, USA. National Board of Chiropractic Examiners; 2005
- Bronfort G, Haas M, Evans R et al. Effectiveness of manual therapies: The UK evidence report. *Chiropractic & Osteopathy*. 2010;18:3.
- Rubinstein SM, Terwee CB, Assendelft WJ, de Boer MR, van Tulder MW. Spinal manipulative therapy for acute low-back pain. *Cochrane Database Syst Rev*. 2012 Sep 12;9:CD008880.
- Rubinstein SM, van Middelkoop M, Assendelft WJ, de Boer MR, van Tulder MW. Spinal manipulative therapy for chronic low-back pain. *Cochrane Database Syst Rev*. 2011 Feb 16;(2):CD008112.
- Gross A, Miller J, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, Haines T, Brønfort G, Hoving JL. Manipulation or mobilisation for neck pain. *Cochrane Database Syst Rev*. 2010 Jan 20;(1):CD004249.
- Stainsby BE, Poor JTC, Kim P et al. A survey of wellness management strategies used by Canadian doctors of chiropractic. *J Manip Physiol Ther*. 2011;34:388-393.
- Gleberzon BJ. Geriatric chiropractic care as a health promotion and disease prevention initiative: Focus on fall prevention. *Topics in Integrative Health Care*. 2010;1(2):1-15.
- Johnson C, Rubinstein SM, Cote P et al. Chiropractic care and public health: Answering difficult questions about safety, care through the lifespan, and community action (editorial). *J Manip Physiol Ther*. 2012; 35:493-513.

23. Hawk C, Schneider M, Evans MW, Redwood D. Consensus process to develop a best practices document on the role of chiropractic care in health promotion, disease prevention and wellness. *J Manip Physiol Ther.* 2012;35:556-567.
24. Immunization safety. http://www.who.int/immunization_safety/en/
25. Immunization and vaccines <http://www.phac-aspc.gc.ca/im/index-eng.php>
26. Vaccines and immunization <http://www.cdc.gov/vaccines/>
27. Palmer BJ. *The Science of Chiropractic. Its Principles & Adjustments.* Davenport IA: The Palmer School of Chiropractic, 1906:17.
28. Cooperstein R, Gleberzon BJ. Towards a taxonomy of subluxation-equivalents. *TICC.* 2000;8(1):49-60.
29. Keating JC Jr. The meaning of innate (commentary). *J Can Chiro Assoc.* 2002;46(1):4-10.
30. Biggs L, Mierau D, Hay D. Measuring philosophy- a philosophy index. *J Can Chiro Assoc.* 2002;46(3):173-184.
31. Busse JW, Kulkarni AV, Campbell JB et al. Attitudes towards vaccination: a survey of Canadian chiropractic students. *CMAJ.* 2002; 166(12):1531-1534.
32. Busse JW, Wilson K, Campbell JB. Attitudes towards vaccination among chiropractic and naturopathic students. *Vaccine.* 2008;26:6237-43.
33. Pless R, Hibbs B. Chiropractic student's attitudes towards vaccination: A cause for concern? *JAMC.* 2002;166(12):1544-1545.
34. Larmeris M, Schmidt C, Gleberzon BJ, Ogrady J. Attitudes towards vaccination: a follow up survey of Students at the Canadian Memorial Chiropractic College. *J Can Chiro Assoc.* 2013;57(3):214-220.
35. Colley F, Haas M. Attitudes on immunization: a survey of American chiropractors. *J Manip Physiol Ther.* 1994;41:145-154.
36. Evans MW, Perle SM, Ndetan H. Chiropractic wellness on the web: The content and quality of information related to wellness and primary prevention on the Internet. *Chiro & Manual Therapies.* 2011;19:4.
37. Page SA, Russel ML, Verhoef MJ, Injeyan HS. Immunization and the chiropractor-patient interaction: a Western Canadian injury. *J Manip Physiol Ther.* 2006;29:156-161.
38. Injeyan HS, Russell ML, Verhoef MJ et al. Canadian chiropractor's perception of educational preparation to counsel patient on immunization. *J Manip Physiol Ther.* 2006;29:643-650.
39. Medd A, Russell ML. Personal and professional immunization behavior among Alberta chiropractors: a secondary analysis of cross-sectional survey data. *J Manip Physiol Ther.* 2009;32:448-452.
40. Russell ML, Injeyan HS, Verhoef MJ, Eliasziw M. Beliefs and behaviours: understanding chiropractors and immunizations. *Vaccine.* 2004;23(3):372-9.
41. Downey L, Tyree PT, Huebner CE, Lafferty WE. Pediatric vaccination and vaccine-preventable disease acquisition: association with care by complementary and alternative medicine providers. *Matern Child Health J.* 2010;6:922-930.
42. Russel MS, Vehoeft MJ, Injeyan HS. Are chiropractors interested in participating in immunization awareness and promotion activities. *Can J Public Health.* 2005;96:194-6.
43. Davis MA, Smith M, Weeks WB. Influenza vaccination among chiropractic patients and other users of complementary and alternative medicine: are chiropractic patients really different? *Prev Med.* 2012;54:5-8.
44. Smith M, Davis MA. Immunization status of adult chiropractic patients in analyses of national health interview study. *J Manip Physiol Ther.* 2011;34:602-8.
45. Stokley S, Cullen KA, Kennedy A et al. Adult vaccination coverage levels among users of complementary/ alternative medicine- results from the 2002 National Health Interview Survey (NHIS). *BMC Complementary and Alternative Medicine.* 2008;8(6).
46. Campbell JB, Busse JW, Injeyan HS. Chiropractors and vaccination: a historical perspective. *Pediatrics.* 2000;105(4):e43.
47. Nelson CF. Why chiropractors should embrace immunization. *J Chiropractic.* 1993;30:85-88.
48. Ferrance RJ. Vaccinations: how about some facts for a change? *Commentary. JCCA.* 2002;46(3):167-172.
49. ICA Policy statement. <http://www.chiropractic.org/?p=ica/policies#immunization>
50. ACA Policy statement on vaccination. http://www.acatoday.org/level2_css.cfm?T1ID=10&T2ID=117 Accessed Jan 24, 2013
51. Vaccination and immunization. <http://www.chiropracticcanada.ca/en-us/AboutUs/TheCCA/PositionStatements/VaccinationandImmunization.aspx>
52. Gleberzon BJ. Chiropractic and the management of children with autism. *Clin Chiropr.* 2006;
53. Ferrance RJ. Autism-another topic often lacking facts when discussed within the chiropractic profession. *Commentary. JCCA.* 2003;47(1):4-6.
54. CDC – Data and Statistics, **Autism** Spectrum Disorders – NCBDDD www.cdc.gov/ncbddd/autism/data.html. March 29, 2012 (Accessed Nov 15, 2012)
55. Shattuck PT. The contribution of diagnostic substitution to the growing administrative prevalence of autism in US special Education. *Pediatrics.* 2006;117(4):1028-37.
56. Wakefield AJ et al. Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorders in children. *The Lancet.* 1998;351:637-641.
57. Taylor B et al. Autism and measles, mumps and rubella vaccine: no epidemiological evidence of causal association. *Lancet.* 1999;353:2026-28.

58. Madsen KRM, Hviid A, Vestergaard M et al. A population-based study of measles, mumps and rubella vaccination and autism. *N Engl J Med*. 2002;347(19):1477-1482.
59. Deer B. How the case against the MMR vaccine was fixed. *BMJ*. 2011;342:77-82
60. http://www.gmc-uk.org/static/documents/content/Wakefield__Smith_Murch.pdf
61. Lancet retracts Wakefield MMR paper. <http://www.bmj.com/content/340/bmj.c696.full>
62. Geier MR, Geier DA. Thimerosal in childhood vaccines, neurodevelopmental disorders and heart disease in the United States. *J Am Physicians Surg*. 2003;8:6-11.
63. Hviid A et al. Association between thimerosal-containing vaccine and autism. *JAMA*. 2003;290:1763-6.
64. Buescher JJ. Vaccinations containing thimerosal do not increase rates of autism. *J Fam Pract*. 2004;53(2):94-96.
65. Canadian Paediatric Society. Position Statement. Chiropractic care for children: Controversies and issues. *Paediatr Child Health*. 2002;7(2):85-88. <http://www.cps.ca/en/documents/position/chiropractic-care-children>
66. Longo M, Grabowski M, Gleberzon BJ et al. The perceived effects of the delisting of chiropractic services from the Ontario Health Insurance Plan on practice activities. *J Can Chiro Assoc*. 2011;53(3):193-202.
67. Grayson JP. The academic legitimization of chiropractic: the case of CMCC and York University. *J Can Chiro Assoc*. 2002;46(40):265-279.
68. http://www.mcscs.jus.gov.on.ca/english/DeathInvestigations/office_coroner/VerdictsRecommendations/AlphabeticalList/OCC_verdicts_alpha.html
69. Dunn G. Jury Decision Stuns Profession- Leadership determined to rise to the occasion. *Canadian Chiropractic*. 2004;9(1):5, 18-19.
70. Regulated Health Professions Act. http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_91r18_e.htm
71. Standard of Practice- Scope of Practice (S-001) http://www.cco.on.ca/site_documents/S-001.pdf
72. Hawk C, Schneider M, Evans MW, Redwood D. Consensus process to develop a best practices document on the role of chiropractic care for older adults: results of a consensus process. *J Manip Physiol Ther*. 2012;35:556-567.
73. Hawk C, Schneider M, Dougherty P, Gleberzon BJ, Killinger LZ. Best practices recommendations for chiropractic care for older adults: results of a consensus process. *J Manip Physiol Ther*. 2010;33(6):464-473.
74. Hawk C, Schneider M, Ferrance R, Hewitt E et al. Best practices recommendations for chiropractic care for children: results of a consensus process. *J Manip Physiol Ther*. 2009;32:649-647.