

# Practice patterns of 692 Ontario chiropractors (2000–2001)

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*This study examined a wide range of variables relating to the practice patterns of 692 Ontario chiropractors (approximately 30% of all registrants in the province) who subscribed to the Ontario Chiropractic Association's Patient Management Program. It analyzed the 2000–2001 data of these chiropractors and provided important information on such factors as practitioner and patient demographics, practice profiles, and reimbursement patterns.*

*The mean number of chiropractic treatments per patient for the year was 8.6 (sd = 3.4) and the mean treatment fee (above OHIP) per patient visit was \$17.60 (sd = 5.0). Nearly one third of patient treatments were for lumbar complaints, and more than one-third of the patients were between 35 and 50 years of age.*

*The mean annual gross income of the chiropractors in this study was \$148,824 (sd = \$86,391), with the male practitioners having a statistically significantly higher mean income (\$161,363) than their female counterparts (\$108,126). Practice location was significantly related to income, with postal code 'M' (Toronto) having the lowest mean income level. The overwhelming majority of practitioners (85%) used Diversified Technique as their primary treatment procedure, while 'modalities' was the most commonly selected adjunctive treatment procedure (29%).*

*This study sheds new light on the associations among such factors as practitioner gender, practice location,*

*Cette étude avait comme objectif d'analyser un grand nombre de variables relatives aux tendances de pratique de 692 chiropraticiens ontariens (environ 30 % de tous les chiropraticiens agréés dans la province) inscrits au Programme de gestion des patients de l'Association chiropratique de l'Ontario. L'étude portait sur les données 2000–2001 de ces chiropraticiens et elle a permis de recueillir des renseignements importants sur des facteurs tels que les données démographiques sur les praticiens et les patients, les profils de pratique et les modèles de remboursement.*

*Le nombre moyen de traitements chiropratiques par patient pour l'année visée était de 8,6 (ds = 3,4) et le tarif moyen des traitements (en plus de la Protection-santé de l'Ontario) par visite du patient était de 17,60 \$ (ds = 5,0). Près d'un tiers des traitements portaient sur des problèmes lombaires et plus d'un tiers des patients étaient âgés entre 35 et 50 ans.*

*Le revenu annuel brut moyen des chiropraticiens qui ont participé à cette étude s'élevait à 148 824 \$ (ds = 86 391 \$), les hommes ayant un revenu moyen significativement plus élevé (161 363 \$) que leurs homologues féminins (108 126 \$). L'emplacement de la pratique était relié de façon significative au revenu, le code postal « M » (Toronto) ayant le niveau de revenu moyen le plus bas. La très grande majorité des praticiens (85 %) ont indiqué « Techniques diverses » comme méthode de traitement primaire et « Modalités »*

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and level of income.  
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### Introduction

The use of chiropractic has grown substantially since the late 1980s.<sup>1,2</sup> Kopansky-Giles and Papadopoulos reported that 85% of Canadian chiropractors had their primary practice in an urban location,<sup>3</sup> perhaps suggesting that urban areas are viewed as being more desirable places to practice. However, the ever-increasing number of practitioners in certain urban centers such as Toronto has important implications for both the profession at large, and its individual members. Underscoring this point, a recent study suggested that Toronto chiropractors (i.e., in the 'M' postal code region) had a statistically significantly and relatively lower income level than their colleagues in other postal code areas of Ontario.<sup>4</sup>

A compilation of chiropractic practice-based data also allows comparisons to be made with other health care professions. Several interesting similarities in the practice profiles of chiropractors and medical practitioners have been identified. In a prospective, longitudinal, non-randomized, practice-based observational study, it was reported that recurrence rates of low back pain in patients treated by these two different groups of health care providers were very similar.<sup>5</sup> Furthermore, the percentage of low back pain, presenting as either acute or chronic in nature, was almost identical in both professions.<sup>6</sup>

In the current climate of increased government and public scrutiny of health care expenditures, it is critical for health care professionals as well as the general population to have precise knowledge with respect to the nature and extent of available health care services. It

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constituaient la méthode de traitement d'appoint la plus couramment sélectionnée (29 %).

*Cette étude apporte un éclairage nouveau sur les associations entre des facteurs tels que le sexe du praticien, l'emplacement de la pratique et le niveau de revenu.*

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MOTS-CLÉS : profils de pratique du chiropraticien; caractéristiques du chiropraticien; données démographiques sur le patient; différences entre les sexes; modèles de remboursement.

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therefore behooves regulatory bodies, associations, researchers and practitioners to make a concerted effort to compile, analyze, and disseminate information about the practice characteristics of its members. This information would also be of particular value to potential students contemplating a chiropractic career, as well as new graduates who must make prudent decisions to establish and maintain a successful chiropractic practice.

The purpose of this present study was to describe the practice profiles, treatment procedures, patient characteristics, and reimbursement patterns of the chiropractors enrolled in the Ontario Chiropractic Association's Patient Management Program (PMP) for the 2000–2001 billing period by directly accessing their year-end practice information. Special emphasis was placed on identifying practice profile differences with respect to gender of practitioner, practice location, and years of experience in practice.

### Methods

#### Design

All 1,700 purchasers of the Patient Management Program (PMP) were asked to voluntarily participate in the study by submitting a diskette containing the statistical year-end summary of their practice. They were advised that the results would be used to support third party insurer negotiations, help establish marketing strategies, and plan for the profession's future. Since the billing program contains no means of identifying individual chiropractors,

confidentiality was guaranteed and anonymity was assured. Those practitioners who chose to participate mailed their diskettes to the Ontario Chiropractic Association. If they included a business card, it was removed from the diskette and entered into a participation-incentive "Cruise of a Lifetime" draw. All diskettes were then packaged and shipped to the investigators for data entry and analysis.

Each year-end summary diskette represented the patient activity of a single chiropractor for the fiscal year beginning April 1, 2000 and ending March 31, 2001. It contained information on basic practitioner demographics (e.g., gender, age, year and school of graduation, hours worked, adjustive and adjunctive treatment procedures used); patient characteristics (e.g., patient age and gender, conditions by billing codes, number of visits); and financial data (e.g., fees, types of payments). In all, each PMP summary diskette included over 2,000 variables.

**Table 1**  
**OHIP Billing Codes Grouped by Region of Complaint**

Categories	OHIP Codes
Cervical	C01, C02, C03, C30, C40, C44, C50, C51, C60
Thoracic	C04, C05, C06, C31, C41, C53
Lumbar	C07, C08, C09, C32, C42, C43, C45, C46, C47, C48, C52
Non-spinal	C10, C11, C12, C33
Multiple	C13, C14, C15
Others	C20, C21, C22, C24, C54, C61, C62

**Table 2**  
**OHIP Billing Codes Grouped by Duration of Complaint**

Categories	OHIP Codes
Acute	C01, C04, C07, C10, C13, C45, C50, C51, C60
Chronic and Recurrent	C02, C03, C05, C06, C08, C09, C11, C12, C46

Information from each diskette was converted from a comma-delimited file and was individually read into SPSS, Version 11.5. Variables were coded, labeled and cleaned. A number of variables were collapsed and re-coded to facilitate analysis. Each of the 40 Ontario Health Insurance Plan (OHIP) Chiropractic Diagnostic codes was grouped into the six categories typically used in describing chiropractic care (see Table 1). Headaches were included in the cervical category. Pelvic and sciatica-related problems were grouped in the lumbar category. In a similar manner, the Diagnostic Codes were grouped into two time-based categories (acute, chronic and recurrent). The codes that did not specify either were coded as 'other' and not included in the analysis related to duration of complaint (see Table 2).

Years in practice and total dollars charged were examined for their distribution characteristics and coded into quarters for presentation in contingency tables. Because of their non-normal distributions, arbitrary categories were not used. For similar reasons, age categories of patients were collapsed from the original 5-year groupings to 15-year groupings except at the lower and upper ends of the age distribution.

#### *Study sample*

Approximately 2,400 chiropractors (males = 75%; females = 25%) were registered in Ontario during the study year. Of the 1,700 eligible chiropractors that subscribed to the PMP, 731 (43%) diskettes were received.

Upon examination of the individual submissions, cases were excluded from the analysis if they had missing income data ( $n = 4$ ), represented duplicate data ( $n = 5$ ), had unexplainable total revenue compared to billings ( $n = 8$ ), or had earnings of less than \$15,000 ( $n = 22$ ). The decision to delete cases reporting earnings of less than \$15,000 was made because it was felt that these cases represented only partial billing-year data. Therefore, 692 cases were used in the subsequent analysis.

#### *Statistical analysis*

Descriptive statistics, including means ( $m$ ) and standard deviations ( $sd$ ), were used to delineate the distribution of summary data for the key study variables. Chi square ( $\chi^2$ ) and unpaired Student's  $t$ -tests ( $t$ ) were used to compare differences between groups, an analysis of variance ( $F$  ratio) was used to assess any between subject or between

factor effects, and Eta was used to examine curvilinearity.<sup>7</sup> The level of significance (alpha) for these statistical evaluations was set at 0.05.

## Results

### *Practitioner profile*

Our sample included 692 chiropractors who treated 453,909 patients between April 1, 2000 and March 31, 2001. Approximately 76% of the practitioners were male and 83% had graduated from the Canadian Memorial Chiropractic College (CMCC). The mean number of years in practice was 13.4 (sd = 10.2), although the number of years in practice varied by gender. Males had been in practice approximately 7 years longer (m = 15, sd = 10) than their female colleagues (m = 8, sd = 6), and this difference was statistically significant ( $t = 7.65$ ,  $p < 0.0001$ ).

The practitioners in the sample worked a mean of 35 hours per week (sd = 14), although the female chiropractors worked significantly fewer hours than the male chiropractors ( $t = 7.564$ ,  $p < 0.0001$ ). Female chiropractors worked a mean of 33 hours per week (sd = 15), while males worked 36 hours per week (sd = 13). Most of the practitioners (85%) conducted their practices in urban locations. However, 90% of the female chiropractors practiced in urban locations versus 83% of the male chiropractors ( $\chi^2 = 3.99$ , 1 df,  $p = 0.047$ ). Some 26% of the practitioners in our sample had x-ray equipment in their offices and there was a statistically significant difference between male (30%) and female (14%) practitioners with respect to this practice variable ( $\chi^2 = 17.35$ , 1 df,  $p < 0.0001$ ).

### *Patient demographics*

As presented in Table 3, about one third (34%) of the patients treated were between 35 and 49.9 years of age regardless of patient gender. The smallest percentages of patients by age were those 65 years of age and over (males = 11%; females = 12%).

Identifying the area of patient complaint (see Table 4) was complicated by the OHIP billing code associated with the treatment of 'multiple sites', since more than one unspecified location was involved. This 'multiple sites' billing code was used for 26% of the male patients and 30% of the female patients. The lumbar area account-

ed for 34% of the treatment sites for male patients and 26% for female patients, while 17% of the male patients and 23% of the female patients were treated in the cervical area. The thoracic area accounted for 9% of the treatment sites in both male and female patients and slightly smaller percentages (males = 8%; females = 7%) were treated in non-spinal areas.

For those conditions described as either acute or chronic/recurrent there were small differences by patient gender (see Table 5). Both male and female patients were found to have a chronic/recurrent to acute ratio of approximately 2:1.

The PMP database does not have patient visit codes linked to type of complaint so variation in treatment frequency or cost by complaint could not be calculated. We were however able to calculate that the patients in our study had a mean of 8.6 (sd = 3.4) visits and a mean patient out of pocket cost per visit of \$17.60 (sd = 5.0) for the 2000–2001 billing year.

### *Treatment procedures employed and type of equipment used*

The practitioners in our sample overwhelmingly (85%) selected Diversified as their primary treatment technique when asked to choose from a list of eleven adjustive procedures. Activator® was identified as the primary adjustive treatment procedure by 7% of the practitioners. The other selections were Thompson (2.7%), Gonstead (2.4%), and Applied Kinesiology (2%). The remaining five choices were less than 1% each.

The chiropractors in our study were also asked to identify the adjunctive treatment procedure (from a list of 12) which they most frequently used in their practice. Six percent of the practitioners reported that they did not use adjunctive procedures. The remaining practitioners selected 'modalities' (29%), 'acupressure/trigger point therapy' (17%), 'exercise – corrective therapeutics' (17%), 'massage therapy' (13%), 'acupuncture with needles' (9%), and 'mobilization therapy' (4%). The remaining five choices were less than 2% each.

### *Practice profiles*

*Sources of practice revenue.* The total gross income for the 692 practitioners in our sample was about \$107 million. Of this total, direct patient payments for treatment

**Table 3**  
**Age of Patients by Gender (n = 452,063)**

Age in years	Male Patients (n = 211,761)	Female Patients (n = 240,302)
Less than 20	14% (30,330)	12% (29,271)
20 to 34.9	19% (40,474)	21% (49,431)
35 to 49.9	34% (71,807)	34% (80,551)
50 to 64.9	22% (45,469)	21% (51,548)
65 and over	11% (23,681)	12% (29,501)
Total	100%	100%

**Table 4**  
**Location of Patient Treatment Area by Patient Gender (n = 448,621)**

Area	Male Patients (n = 210,010)	Female Patients (n = 238,611)
Cervical	17% (37,345)	23% (53,857)
Thoracic	9% (19,494)	9% (22,292)
Lumbar	34% (70,382)	26% (61,758)
Non-spinal	8% (15,753)	7% (15,822)
Multiple sites	26% (55,286)	30% (72,160)
Other codes	6% (11,750)	5% (12,722)
Total	100%	100%

**Table 5**  
**Type of Complaint by Patient Gender (n = 362,058)**

Type	Male Patients (n = 167,780)	Female Patients (n = 194,278)
Acute	37% (62,415)	35% (67,761)
Chronic/Recurrent	63% (105,365)	65% (126,517)
Total	100%	100%

amounted to \$70 million. Selling health care products (e.g., vitamins, orthotics, supports) accounted for \$6.1 million in total gross revenue. OHIP payments consisted of \$28.7 million, and WSIB payments totaled \$2.3 million. There were modest differences in percentages by practitioner gender (see Table 6). Revenue from patient payments accounted for 69% of female practitioners' incomes versus 65% of the income for male practitioners.

This difference was due to a lower percentage of OHIP and inventory billings for female practitioners.

The mean total dollars charged (annual gross income) by the practitioners in our study was \$148,824 (sd = \$86,391). The mean gross income difference between male and female chiropractors was found to be rather substantial, amounting to an annual mean difference of \$53,000 favouring male chiropractors (t = 7.122, 690 df,

**Table 6**  
Sources of Practice Revenue by Practitioner Gender

Sources of Revenue	Male Practitioners (n = 529)	Female Practitioners (n = 163)
Patient payments	(65%) \$58,177,067	(69%) \$12,545,047
OHIP received	(27%) \$24,095,051	(25%) \$ 4,568,232
Inventory	(6%) \$ 5,212,197	(4%) \$ 789,405
WSIB <sup>1</sup> received	(2%) \$ 1,923,158	(2%) \$ 383,340
Total	(100%) \$89,407,473	(100%) \$18,286,024

<sup>1</sup>WSIB: Workplace Safety and Insurance Board of Ontario.

**Table 7**  
The Relationship between Gender, Region, and Years in Practice

Source of Variation	df	F Ratio	Significance
Gender	1	32.315	<.0001
Region	4	5.191	<.0001
Years in Practice	3	10.350	<.0001
Gender*Region	4	.545	.7031
Gender*Years in Practice	3	.910	.436
Region*Years in Practice	12	.928	.518
Gender*Region*Years in Practice	10	1.106	.355

$p < 0.0001$ ), regardless of years of experience or practice location. In the analysis of variance, the between subject effects demonstrated that the mean difference in gender was significant, and that there was at least one significant mean difference in region of practice, and in years in practice, but the three factors did not interact with each other (see Table 7).

*Practice characteristics.* The mean number of years in practice for the chiropractors in our sample was 13.4 (sd = 10.2). There was a modest curvilinear relationship ( $\eta^2 = 0.435$ ,  $p = \text{NA}$ ) between gross income (as the dependent variable) and years in practice (as the independent variable). As Table 8 illustrates, 37% of those in practice for five years or less earned less than \$70,000 per year compared to those in practice for more than 20 years (11%). Conversely, 10% of those in practice for less than five years earned more than \$210,000 compared to the

other three practice categories (28%, 31% and 24% respectively). Differences in the two middle income categories were less striking.

Income was also significantly related to the location of the practice in the province ( $\chi^2 = 35.95$ , 12 df,  $p = 0.001$ ). As Table 9 illustrates, 28% of those practicing in the 'M' postal code region (Metropolitan Toronto) earned less than \$70,000 per year, compared to smaller percentages in this lowest income category for those practicing in the other four postal code regions (for example, 15% of the chiropractors in the 'K' region – Eastern Ontario - earned less than \$70,000). At the opposite end of the income scale, 13% of those practitioners in 'M' region earned more than \$210,000 versus practitioners in the other regions who had larger percentages in this category (for example, 38% of the chiropractors in 'K' region earned more than \$210,000).

Further, a one-way analysis of variance revealed at

**Table 8**  
**Total Dollars Charged by Number of Years in Practice (n = 692)**

Total \$ Charged	Number of Years in Practice			
	5 or less	6 to 10	11 to 20	More than 20
Less than \$70,000	37% (73)	14% (22)	13% (20)	11% (21)
\$70,000 to \$139,000	35% (68)	34% (53)	23% (36)	35% (66)
\$139,001 to \$210,000	18% (36)	23% (36)	33% (51)	30% (56)
More than \$210,000	10% (19)	28% (44)	31% (47)	24% (44)
Total	100% (196)	99% <sup>1</sup> (155)	100% (154)	100% (187)

<sup>1</sup>due to rounding.

**Table 9**  
**Total Dollars Charged by Postal-Code Region (n = 690)**

Total Dollars Charged	“K” Region	“L” Region	“M” Region	“N” Region	“P” Region
Less than \$70,000	15% (12)	21% (45)	28% (25)	17% (37)	19% (16)
\$70,000 to \$139,000	21% (17)	38% (82)	40% (35)	28% (61)	33% (28)
\$139,001 to \$210,000	26% (21)	24% (51)	19% (17)	30% (67)	27% (23)
More than \$210,000	38% (31)	18% (38)	13% (11)	25% (56)	20% (17)
Total	100% (81)	101% <sup>1</sup> (216)	100% (88)	100% (221)	99% <sup>1</sup> (84)

<sup>1</sup>due to rounding.

least one mean difference in the mean dollars charged (F ratio = 7.37, 4, 685 df,  $p < 0.0001$ ). The Tukey HSD test revealed that postal code ‘M’ region (mean income = \$120,871) was significantly lower than K and N (corridor around Toronto) regions (\$179,660; \$161,322 respectively) and lower than P (Northern Ontario) and L (Southwestern Ontario) regions (\$146,590; \$136,869 respectively). Clearly, location of practice is related to level of income.

## Discussion

### *Practitioner demographics*

Canadian and American chiropractors have been found to be predominantly Caucasian, male, and 40 years old.<sup>8</sup> In our study the typical chiropractor was male, was a graduate of the Canadian Memorial Chiropractic College, and had been in practice for about 13 years. We also found

that practitioners worked 35 hours per week (although males worked more hours than females), which was consistent with previous reports of chiropractors working between 33 to 41 hours per week.<sup>3,4</sup>

### *Patient demographics*

Surveys used to identify the chiropractic-patient demographics have found that the majority of patients are between 30 and 50 years of age, are slightly more likely to be female, and are married.<sup>1,2</sup> In a recent population-based study examining factors associated with health care use among neck and low back pain sufferers, chiropractic patients were reported to be: younger, more likely to be male, have a higher socioeconomic status, and be urban dwellers, as compared to those patients visiting other health care providers.<sup>9</sup> Shekelle, Markovich, and Louie also reported that being male, Caucasian and having completed high school were all predictors of chiropractic use.<sup>10</sup>

In a study of complementary and alternative medicine (CAM) providers in the United States, Cherkin et al. reported that a very small percentage of their practice was dedicated to children or those over the age of 65 years.<sup>6</sup> Our research found similar results with patients under 20 years of age representing approximately 13% of the patients in our study, and about 12% of the patients being 65 years of age and over. This pattern of age distribution observed in our and other studies has not significantly changed in the last 30 years despite the aging of the baby-boom generation.<sup>8,11–14</sup> It will be interesting to monitor and assess relevant shifts in the age distribution of patients over the next 5 to 10 years as this may have an important impact on patient utilization rates and the demand for chiropractic practitioners.

### Practice profile

*Conditions treated.* Similar to previous studies, our findings suggest that chiropractic practice has a relatively narrow clinical focus, treating primarily musculoskeletal conditions.<sup>3,6,9,11,14</sup> Furthermore, low back and neck complaints were the most common conditions reported to be diagnosed by chiropractors in our study. This finding is supported by other research,<sup>8</sup> which reports that over 70% of the chiropractic-patient respondents surveyed sought care for neck and low back complaints. In a community-based study of the use of health services, Shekelle et al. reported that chiropractors see approximately one third of all individuals seeking care for low back pain in the United States.<sup>10</sup> Several other studies reported that low back pain was the most common complaint seen in chiropractic offices, varying between 24% and 68% of visits.<sup>1,2,14</sup> In our study, cervical and lumbar complaints were not as commonly reported as in other studies, but this may be due to the use of the vague OHIP billing code 'multiple site', which fails to identify the location of the main presenting complaint.

In contrast, in a study examining the demographic and clinical aspects of patients treated at a Canadian chiropractic college, Waalen and Waalen reported that chief complaints were most commonly reported in the cervical area (32%), followed by lumbar complaints (24%).<sup>15</sup> A study of patients in a US-college teaching clinic, however, reported a greater percentage of low back complaints.<sup>11</sup> A possible explanation for the results in the

former research is that low back complaints were separated into two categories (lumbar and sacroiliac regions) rather than combined in a single 'low back' category.

Our discovery of gender differences with respect to the treatment rate of cervical and lumbar complaints supports earlier studies that showed women were treated more often for cervical complaints than men.<sup>15</sup> We found that the gender difference was most pronounced in the 21–40 year age group, with 49% of male patients seeking treatment for cervical complaints versus 67% of females.

Hurwitz, Coulter, Adams, Genovese, and Shekelle reported that the mean number of visits for all conditions among Ontario chiropractors was 9.6 (median = 6) and for low back pain 10.5 (median = 6) visits per illness episode.<sup>1</sup> Other investigators have reported lower means varying from 6.6 to 6.7 visits.<sup>5,14</sup> It has also been noted that the number of treatments appears to be dictated more by the duration of the complaint rather than its location, although lumbar complaints have been identified as requiring more treatments than cervical complaints.<sup>1,14</sup> This present study found the mean number of patient visits to be about nine; unfortunately we were unable to sort frequency of treatment by condition location or severity.

*Treatment procedures.* Chiropractors are seen as holistic health care professionals, concerned with several aspects of patient care. Lifestyle and exercise, nutrition, and stress management are all considered to be important components of patient health. However, the primary form of treatment in our study was found to be high velocity, low amplitude manipulation (Diversified Technique). Earlier research similarly revealed that Diversified Technique was used in 76% to 92% of chiropractic patient treatments.<sup>16</sup> Diversified Technique has been identified as being used by over 77% of Canadian practitioners and by over 87% of chiropractors in Ontario. Among other treatment procedures, Activator® and Gonstead methods have been found to be two of the other most frequently used treatment techniques.<sup>3,4</sup> Our study likewise revealed that Diversified Technique was the primary form of treatment and was employed by 85% of the practitioners, with considerably smaller percentages for other techniques (Activator® 7%, Thompson 2.7%, and Gonstead 2.4%).

The use of adjunctive treatment procedures during office visits has previously been reported as being relatively common in chiropractic practice. Studies have shown that



ultrasound (22%–39%), massage and heat (22%–42%), electrotherapy (43%–47%), cryotherapy, traction and mobilization (5%–10%), were identified as being among the most commonly used modalities.<sup>5</sup> Our research found similar results: 29% of practitioners used ultrasound or other electrotherapy modalities, while other adjunctive procedures were employed less commonly.

There does appear to be conflicting evidence with respect to the role chiropractors play in providing general health and lifestyle information. A Canadian survey reported that chiropractors offer a substantial amount of exercise planning (57%–86%), health education (50%–83%), and postural advice (10%).<sup>3</sup> However, other studies using data directly from clinical records have reported that giving exercise advice varied from about 8% for adolescents presenting for low back care<sup>17</sup> to 15% in patients of a college teaching clinic.<sup>11</sup> In yet another study, the variation was between 17.2% and 38.5% in patients presenting to chiropractic practices across the United States and Canada, with the lowest reported for practices surveyed in Ontario, Canada.<sup>1</sup> Although these findings reflect documentation of such advice in clinical records, they may not be a true representation of what occurs during a doctor-patient encounter. During such encounters, relevant, detailed health care information is often shared with patients that does not necessarily appear in the clinical record.<sup>12</sup> Since our study relied on OHIP billing codes which do not identify health and lifestyle advice or any other such forms of treatment, we were not able to capture this important type of information.

### Reimbursement

According to our data, Ontario chiropractors' mean gross annual income in 2000–2001 was found to be about \$149,000 with a median income of about \$135,000. If one assumes 50% overhead cost, then the mean net income would be about \$75,000, with a median income of about \$68,000, which is somewhat higher than the Statistics Canada reported annual net income for chiropractors of about \$58,000 for the same period.<sup>18</sup> Our data suggest that a number of variables influence chiropractors' annual income, such as revenue source, years in practice, gender, and practice location.

Sources of practice revenue can be divided into four distinct categories: patient co-payments, provincial government health-care coverage, insurance and third party

payers, and workers' compensation boards. Although there is some variation by province, in general the percentages of income for these categories have previously been found to be approximately 45%, 40%, 10%, and 5%, respectively.<sup>3</sup> In our study, 27% of the practitioners' income came from OHIP, which is similar to the 25 to 35% of practice income from provincial health plan payments reported in other provinces.<sup>3</sup> However, there was a large variation from the previous study with regard to the percentage of practice revenue derived from patient payments. That prior study of Ontario chiropractors found that 66% of practitioners' revenue came from patient co-payments, versus 45% reported in the 1997 study of the provinces with public insurance. Provincial variations in compensation practices may account for this discrepancy.

As one might expect, the number of years in practice plays an important role in determining income. Kopansky-Giles and Papadopoulos reported that the largest percentage (24%) of full-time Canadian chiropractors earned somewhere between \$100,000 and \$150,000 per year.<sup>3</sup> We found that about 80% of chiropractors earning the median annual income or more have been in practice for more than six years. Given this finding, relatively few recent graduates can be expected to earn the mean annual income in their first five years of practice. This is an important consideration for practitioners' financial planning, especially in consideration of the educational loans and practice related expenses they often incur.

Gender also has an impact on income. In medicine, depending on specialty, male physicians bill 25% to 43% more than their female colleagues.<sup>19</sup> Previous research with dentists has found that the annual net income of male dentists is about \$26,000 (or 22%) more than their female counterparts.<sup>20</sup> Our study found an even larger difference among chiropractors: in 2000–2001, male practitioners made about \$53,000 (or 49%) more than their female counterparts.

Location also seems to play an important role in determining chiropractors' annual income. Practicing in large urban centers such as Toronto appears to have had a negative effect on the annual income of the chiropractors in our survey group. This may be due to a variety of factors such as: a lower ratio of chiropractor to patient, increased access to and competition among other health care providers, affordability, community acceptance, and regional chiropractor and patient demographics. Further study is

required to assess the relative impact of these and other variables on a chiropractor's annual income. The use of ongoing practice-based data analysis may shed more light on these reported patterns and assist in addressing any possible deleterious effects of these imbalances.

### Limitations

There may be some concerns about the generalizability of the results reported in this study since there is no way to compare the information presented in this paper to those chiropractors who do not subscribe to the PMP or to those PMP subscribers who did not submit their diskettes. What we do know is that the percentage of male chiropractors in the study was 76%, which is similar to the percentage reported by the provincial licensing body (75%). Moreover, a comparison of PMP data with the distribution of chiropractors by postal code area as reported by the licensing body has been previously found to be similar.<sup>4</sup> However, in this current study, the 'M' and 'N' postal code regions had a lower and higher representation, respectively. For example, approximately 26% of the actual practice locations in Ontario are in the 'M' postal code area, while 13% of the study sample was from this area. Conversely, 32% of the study sample was in the 'N' postal code region but this area accounts for 19% of the actual locations listed by the provincial licensing body. This disproportionate distribution might have inflated overall annual income levels because fewer urban chiropractors, who presumably have lower incomes, were represented in the study.

In addition, the data revealed practitioner-summary activity rather than patient-specific activity. As a consequence, except for annual billing data and chiropractor demographics, the values represent the mean of mean values. This limitation prevented us from making detailed comparisons of patient specific data. A change to the reporting protocol in the PMP database is currently underway to rectify this deficiency.

### Summary

The information about practitioner and patient demographics, treatment procedures, and practice profiles gained from this study can help inform current practitioners about important variables affecting their practices and livelihoods. In particular, our research sheds new light on the associations among such factors as: practitioner gen-

der, practice location, and income variations; links between patient gender and conditions for which treatment is sought; and the prevalence of different treatment techniques and adjunctive procedures. Potential students contemplating a chiropractic career, as well as new graduates who must make important decisions to ensure the sustainability of their chiropractic practice, might also benefit from this information.

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