

## Chapter 5

# Administering the Job Analysis Survey in Canada

In preparing to administer the NBCE Survey of Chiropractic Practice, it was necessary to obtain a list of licensed practitioners throughout Canada. The most effective method of acquiring a list of currently licensed practitioners in each province was to contact the licensing boards in each of the ten provinces. Each province responded with a list. The total number of licensed chiropractors from the province lists was 3,261.

In reviewing these lists, it was noted that some chiropractors were licensed to practice in more than one province. To avoid duplication of selection, individuals licensed in provinces other than the one in which they resided were purged from the non-residential province list.

The Northwest and Yukon Territories were not included in the survey. No licensing requirements currently exist for the Northwest Territory and although requirements for licensure are in place for the Yukon Territory, only one chiropractor is licensed to practice there. Responses provided by this individual were not reported to maintain confidentiality.

## Standard Error

Sample sizes were determined on a per-province basis so that the accuracy of the inferences made from the data from each province would be approximately the same. This was accomplished by using the standard error equation, an abbreviation for the standard error of estimate, shown below:

$$SE = (SD/Nft^{1/2}) (1 - Nft/Provft)^{1/2}$$

**SE** = **the standard error of estimate** is the standard deviation divided by the square root of the sample size and adjusted for sampling from a finite population. (With a goal of achieving a 5.0% standard error per province, the standard error for the nation would be approximately 2%.)

**SD** = **the standard deviation** is a measure of variability, spread, or dispersion of a set of scores around their mean value. For questions reported as a percent, the maximum SD is 50, which was used in determining sample sizes for each province.

**Nft = the number of full-time chiropractors returning surveys**

**$1/2$  = the square root**

**Provft = the estimated number of full-time chiropractors in each province**

**$(1-Nft/Provft)^{1/2}$  = the square root of the finite population correction term**

It was estimated that a 50% survey return rate would be obtained. Thus, to achieve the goal of a 5% standard error per province, the sample size for each province (determined by applying the above formula) was doubled to ascertain the actual number of job analysis survey booklets to be mailed.

In some provinces, the actual number of licensed chiropractors was less than the number required to have a 5% standard error. In those provinces, surveys were mailed to all licensed chiropractors to reduce the standard error as much as possible.

## **Selection Process**

The selection of chiropractors to participate in the study was made on a province-by-province basis. As stated, in provinces having relatively few licensed chiropractors, every chiropractor on the list was requested to participate in the study. In provinces with large numbers of licensed chiropractors, a sequential selection process was utilized. The actual sequence depended on the population of chiropractors and the predetermined sample size to be selected from that population.

For example, in British Columbia, the total number of chiropractors on the list provided by the provincial licensing board was 485. Given the desired sample size of 160, the number of licensed chiropractors to be sent surveys was approximately one out of every three. To select the chiropractors to whom surveys would be mailed, the first name was chosen at random; every third person thereafter was also selected.

Utilizing procedures appropriate to selecting the correct number of participants from each province (as described above), 982 were chosen from the province lists containing the total 3,261 names.

## **Pre-Notification**

Pre-notification was considered to be an important step in the administration of the questionnaire. Previous studies on survey techniques have shown that survey response rates are highest when those selected for participation:



- perceive the research to be of value
- are informed that the research is to be conducted by one or more recognized and respected organizations
- receive preliminary notification and request for participation.

Higher response rates reduce the potential for bias in the inferences made from survey data. Previous studies also suggest that preliminary communication with selected participants results in an earlier return of completed surveys.

With the survey, a preliminary survey letter was deemed the most cost-effective method of preliminary notification. The pre-survey letter (Appendix C) was sent to all who were selected. The letter informed those selected of the upcoming survey, emphasized the importance of their participation in a "milestone study of chiropractic practice," and noted an approximate date they could expect to receive the survey form.

The pre-survey letters were marked "Do Not Forward" and "Address Correction Requested" as forwarding could potentially upset the geographic balance and standard error estimates. It was also important to have returned to the CCEB current address information on all those chosen to participate.

A few letters were returned with notations such as "moved," "left no forwarding address," and "unknown." No new chiropractors were selected to replace those individuals who could not be contacted; this factor was expected and accounted for when the initial sample was selected.

## **Survey Distribution and Tracking**

Within three weeks of distributing pre-survey letters which informed individuals of their selection to participate in the survey, selectees were sent a survey (Appendix E) and cover letter (Appendix D). The cover letter again stressed to the individual that the results of the survey would be used to prepare a comprehensive report describing the chiropractic profession and documenting future examination needs for the CCEB. It was also re-emphasized that participation in the survey would be critical to the success of the study. Selectees were asked to return the completed survey to the CCEB within three weeks of receipt. For tracking purposes, each survey was numbered.

## **Increasing the Rate of Response**

As previously stated, one of the biggest challenges in administering surveys of this proportion is gaining cooperation from the selectees. In addition to conveying the importance of the study and of the individual's input, several steps were taken to ensure a high response rate.

Recognizing that a significant block of time would be required for completion of the



survey, without benefit of monetary compensation, several steps were taken to keep the text as succinct yet thorough as possible. The final version of the survey was designed to require approximately 30 or 40 minutes to complete. To further facilitate questionnaire completion, a No. 2 pencil and a stamped, self-addressed envelope were supplied with each survey packet.

In lieu of monetary compensation, the NBCE offered to list their names in the project report (Appendix F). Their names were published in this report only if affirmatively indicated by the respondent on the survey form.

## **Identifying Active Full-time Practitioners**

Survey data were captured on a hard drive for analysis by computer. It was then necessary to identify those chiropractors engaged in active, full-time chiropractic practice, since this group was considered to be most appropriate for this study. Moreover, since the lists of licensed chiropractors did not provide this information, it was a question on the first page of the survey.

Survey question #4 asked participants if they were currently in active full-time chiropractic practice. The survey did not specify any hourly requirements that defined full-time practice. Instead, it was left to the individual practitioner as to whether their practice should be considered full-time. Only those surveys on which respondents indicated that they were practicing full-time were included in subsequent analyses. Final data computations were based on 587 respondents.

Individuals who considered their practices to be part-time were instructed not to answer any further questions, but to return the questionnaire in the postage-paid envelope.

## **Reliability of Results**

The initial survey data obtained in the United States were determined to be reliable. The following procedure describes the steps taken in assessing the reliability of the survey data gathered in the United States.

Reliability refers to the extent to which test scores, survey results, or the data obtained from other measurements are accurate. It “concerns the extent to which an experiment, test, or any measuring procedure yields the same results on repeated trials” (Carmines and Zeller 1987).

The score a person obtains on an examination or the response a person gives to survey stimuli may or may not be an accurate representation of that individual’s typical behavior or response. To determine how accurate results are, it is important to administer the test, survey, or other measurement device on more than one occasion. “The more consistent the results given by repeated measurements, the higher the reliability of the measuring procedure” (Carmines and Zeller 1987).



To assess the reliability of the United States survey data, a second questionnaire was sent to a randomly selected chiropractor in each state. This second questionnaire, a scrambled version of the first ("Types of Conditions" and "Activities Performed" were put in reverse order; other information remained in the same order as the original survey), was utilized to determine how consistently individuals would respond to the same questions after a period of time had elapsed (two to four weeks), and to determine how consistent responses were to the same questions when those questions appeared in a different order. The second questionnaire also served to support the reliability and validity of the original survey results:

"Evidence that a job inventory possesses sufficient reliability - that is, provides trustworthy information - usually is obtained by studying the degree of agreement between at least two different views of the same inventory content. If a job inventory is administered twice within a short time period to the same sample, the results obtained should be essentially the same for both administrations" (Gael 1987).

To encourage completion of the second questionnaire, the chosen representatives received a phone call thanking them for their initial participation in the survey and asking them to complete the second questionnaire. (Forty of the 50 who received the second survey form completed and returned it.)

Once the second questionnaire was completed and returned to the NBCE, correlation coefficients and "*t* -tests" were calculated in order to compare the original responses with the repeat responses on the 45 activities and 108 conditions presented in the survey. (A *t*-test is used to determine whether two arithmetic averages differ significantly from each other.)

In the case of the NBCE job analysis survey, the *t*-test was used to determine whether the means obtained from a second administration of the same survey (the scrambled form) were the same as the means obtained from the initial administration (the unscrambled version). There were no significant differences ( $p > .05$ ) in the responses to the 45 activities or the 108 conditions presented in the two surveys. Additionally, correlation coefficients of 0.97 and 0.99, respectively, were obtained between pairs of responses to the 45 activities and the 108 conditions.

## **Validity**

Validity as it pertains to examinations, survey instruments, or other measurement tools, refers to the appropriateness, meaningfulness, and usefulness of inferences about results (APA 1985).

Two separate and distinct validity issues are the concern of this report. The first issue pertains to the validity of the survey data; the second concerns use of survey data to establish the content validity of a national competency exam. Each of these validity issues will be discussed.



Evidence that survey data are an accurate reflection of chiropractors, chiropractic patients, and the practice of chiropractic in Canada is based on the procedures followed in the development of the survey form. Additional evidence of the validity of survey data is the similarity between various survey findings and other published reports addressing the same information. Finally, demonstrated reliability of job analysis findings is accepted as evidence of survey validity.

“Because of the difficulty associated with establishing job inventory validity, validity is often assumed if the inventory data are reliable. While reliability is not a substitute for validity, high agreement between respondents is an indication that the job inventory data are valid” (Gael 1987).

## Survey Response Results

Of the 982 surveys sent to Canadian practitioners, 683 were returned to the National Board. From the information annotated on returned surveys and on pre-survey letters, the following information was obtained concerning the 982 selectees: 587 were in full-time practice and returned the completed survey to the NBCE (survey results were based upon the responses from these individuals); 88 were in part-time practice; 8 were retired; and 11 could not be located through postal delivery.

Thus, of the 982 selectees, 683 (69.6%) were accounted for. Consideration was given to obtaining responses from the 30.4% who were not accounted for; however, since these individuals had been sent pre-survey letters and surveys, it was considered too expensive and too time-consuming to further attempt to obtain responses.

## The Weighting Factor

Of particular interest is the *weighting* given to each response. For example, in the province of Alberta, there were an estimated 359 full-time licensed chiropractors. Of those 359, 116 chiropractors completed and returned the survey. The weight given to Alberta is 3.1\* because 116 times 3.1 equals 359, the estimated total number of full-time chiropractors. The weighting factor was necessary in order to have the combined (individual provinces) data represent the national population. (Except where noted, all of the information in this document was weighted.)

Page 49 contains tabulated information detailing the survey responses. This table of figures represents the number of surveys mailed to provinces based upon original mailing

\* To save space, values in the table include only one decimal place. In actuality, all values were computed to several decimal places.

addresses; in some cases, surveys were forwarded if a person had moved and had a forwarding address. The return rate in the table was based upon returns as of August 31, 1992.

The following abbreviations were used in the table.

**Norig** = Number of chiropractors listed on the **original list** provided to the NBCE by provincial licensing boards

**Nmail** = Number of surveys **mailed**

**Npt** = Number of **part-time** chiropractors returning surveys

**Nret** = Number of **retired** chiropractors returning surveys

**Nft** = Number of **full-time** chiropractors returning surveys

**Provft<sup>1</sup>** = Estimated number of **full-time** chiropractors in each province  
**Provft = Nft / (Npt + Nret + Nft) \* Norig**

**wt** = **Weight** (or emphasis) given to each survey within a province when computing national summary statistics: (**wt = Provft / Nft**)

**%ft** = Nft as **percent** of Provft (**%ft = Nft / Provft \* 100**)

**%iden<sup>2</sup>** = **[(Npt + Nret + Nft) / Nmail] \* 100**

**SE** = **The standard error of estimate** is the standard deviation divided by the square root of the sample size and adjusted for sampling from a finite population. With a goal of achieving a 5.0% standard error per province, the standard error for the nation would be approximately 2.0%. (This was calculated for percentage responses where the maximum standard deviation would be 50.)

$$SE = (SD / Nft^{1/2}) (1 - Nft / Provft)^{1/2}$$

**SD** = **The standard deviation of responses to a survey question.** For questions reported in the study as a percent, the maximum SD is 50; for questions reported on a 0-4 scale (Conditions, Frequency, Risk) the maximum SD is 1.5; for questions reported on a 0-16 scale (Importance) the maximum SD is 5.6; the question for which the response could range

---

<sup>1</sup> This may be an over-estimate of the number of full-time practitioners. It is probable that a high proportion of the survey forms and other correspondence sent to part-time and retired chiropractors was not returned to the NBCE.

<sup>2</sup> As indicated in the formula for calculating this percentage, this includes any type of response in which the status of the selected individual was identified.

\* Denotes multiplication

from 0-20 (number of adjustive techniques utilized) the SD is 2.6 for the number of techniques utilized; the question for which responses could range from 0-25 (number of non-adjustive techniques utilized) the SD is 4.2 for the number of techniques utilized.

**$(1 - N_{ft}/P_{roft})^{1/2}$  = The square root of the finite population correction term**



The table below indicates information on a province-by-province basis regarding survey respondents. Please note that a more complete and accurate explanation of category headings and data precedes this table.

Chiropractors on original list provided by licensing agency in indicated province	Total number of licensed chiropractors	Surveys mailed	Part-time* Retired*	Full-time respondents	Estimated full- time in each province	Weight given a province	Nft as % of Provft	Number identified as % of Nmailed	Estimated maximum standard error	
CANADIAN PROVINCE	Norig	Nmail	Npt	Nret	Nft	Provft	wt	%iden	SE	
Alberta	381	156	7	0	116	359	3.1	32	79	3.8
British Columbia	485	160	15	2	107	419	3.9	26	78	4.2
Manitoba	132	132	6	0	73	122	1.7	60	60	3.7
New Brunswick	31	31	3	0	16	26	1.6	62	61	**
Newfoundland	11	11	0	0	8	11	1.4	73	73	**
Nova Scotia	22	22	8	1	6	9	1.5	67	68	**
Ontario	1299	180	23	3	99	1029	10.4	10	69	4.8
Prince Edward Island	3	3	0	0	1	3	3.0	33	33	**
Quebec	773	166	18	1	87	634	7.3	14	64	5.0
Saskatchewan	124	121	8	1	74	111	1.5	67	69	3.3
NATIONAL TOTAL	3261	982	88	8	587	2723	NA	NA	70	2.0

\* These individuals received and returned uncompleted surveys due to their non-qualifying status, ie. not in full-time chiropractic practice.

\*\* For the analysis, data from the Maritime provinces were combined. The standard error for the four provinces combined was 5.4.

TABLE 5.1  
Sample and Response Data by Province