Chapter 5
Administering the Job Analysis Survey in Australia and New Zealand

In preparing to administer the NBCE Survey of Chiropractic Practice, it was necessary to obtain lists of registered practitioners throughout Australia and New Zealand. Chiropractic officials in Australia and New Zealand sent the NBCE lists containing the names of members of the Chiropractors' Associations in Australia and New Zealand. The total number of registered chiropractors on the Australian list was 1281. The total number of registered chiropractors on the New Zealand list was 105.

Standard Error

Sample sizes were determined on a per-state/territory basis in Australia, and nationwide in New Zealand so that the accuracy of the inferences made from the data from each area would be approximately the same. This was accomplished by using the standard error equation, an abbreviation for the standard error of estimate, shown below:

$$SE=(SD/Nft^{\frac{1}{2}}) \ (1-Nft/Stateft)^{\frac{1}{2}}$$

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 state/territory, the standard error for the nation would be approximately 1.8%.)

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 state/territory in Australia, and nationwide in New Zealand.

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

1/2 =   **the square root**

Stateft   =   **the estimated number of full-time chiropractors (Association members) in each state/territory in Australia or nationwide in New Zealand**

$(1\text{-Nft/Provft})^{\frac{1}{2}}$ =   **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 state/territory, the sample size for each state/territory (determined by applying the above formula) was doubled to ascertain the actual number of job analysis survey booklets to be mailed.

In some areas, the actual number of registered chiropractors (Association members) was less than the number required to have a 5% standard error. In those areas, surveys were mailed to all registered chiropractors on the lists provided to NBCE to reduce the standard error as much as possible.

Selection Process

The selection of chiropractors to participate in the study was made on a state/territory basis in Australia, and nationwide basis in New Zealand. As stated, in areas having relatively few registered chiropractors, every chiropractor on the list was requested to participate in the study. In areas with large numbers of registered 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 New South Wales, the total number of chiropractors on the list that was provided by the Chiropractors Association of Australia was 440. Given the desired sample size of 209, the number of registered chiropractors to be sent surveys was approximately one out of every two. To select the chiropractors to whom surveys would be mailed, the first individual was chosen at random; every other individual thereafter was also selected.

Utilizing procedures appropriate to selecting the correct number of participants from each area (as described above), 843 were chosen from the state/territory lists of Australia, and all 105 registered chiropractors were chosen from New Zealand.

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 A) was sent to all who were selected. The letter informed those selected of the upcoming survey, emphasized the importance of their participation in a significant study of chiropractic practice in Australia and New Zealand, and noted an approximate date they could expect to receive the survey form.

Survey Distribution and Tracking

Within two weeks of distributing pre-survey letters which informed individuals of their selection to participate in the survey, selectees were sent a cover letter (Appendix B) and a survey (Appendix C). 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. It was also reemphasized that participation in the survey would be critical to the success of the study. Selectees were asked to return the completed survey to a central location in Australia within two 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.

The NBCE offered participants the opportunity to have their names included in the final report. Only the names of individuals who affirmatively indicated they wanted their names listed are included in the appendix.

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 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 and final data computations.

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 was 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 individuals 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 randomly selected chiropractors 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. (40 of the 50 who received a second survey returned their completed surveys.)

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 Australia and New Zealand 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 843 surveys sent to Australian practitioners and the 105 surveys sent to New Zealand practitioners, 547 from Australia and 79 from New Zealand 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 843 Australian and 105 New Zealand selectees: in Australia, 469 were in full-time practice; in New Zealand, 70 were in full-time practice and returned the completed survey (survey results were based upon the responses from these individuals in full-time practice); 78 were in part-time practice in Australia and 9 were in part-time practice in New Zealand.

Thus, of the 843 Australian selectees, 547 (65.1%) were accounted for, and of the 105 New Zealand selectees 79 (75.2%) were accounted for. Consideration was given to obtaining responses from the Australian 34.9% and the New Zealand 24.8% 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 state of Victoria, there were an estimated 302 full-time registered chiropractors (Association members). Of those 302, 123 chiropractors completed and returned the survey. The weight given to Victoria is 2.5* because 302 divided by 123 equals 2.5, the estimated total number of full-time chiropractors. The weighting factor was necessary in order to have the combined (individual states/territories) data represent the national population. (Except where noted, all of the information in this document pertaining to Australia was weighted; New Zealand data were not weighted.)

Page 49 contains tabulated information detailing the survey responses. This table of

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

figures represents the number of surveys mailed to states/territories based upon original mailing addresses.

The following abbreviations were used in the table:

Norig = Number of chiropractors listed on the **original list** provided to the NBCE.

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(Association members) returning surveys

Stateft[1] = Estimated number of **full-time** chiropractors in each state/territory
Stateft = Nft/ (Npt + Nret + Nft) *Norig

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

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

%iden[2] = **[(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 state/territory, the standard error for the nation would be approxi - mately 1.8%. (This was calculated for percentage responses where the maximum standard deviation would be 50.)

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

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

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[1] This is likely an over-estimate of the number of full-time practitioners since it is probable that a high proportion of the survey forms and other correspondence sent to part-time and retired chiropractors was not returned.

[2] 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

maximum SD is 1.3; for questions reported on a 0-16 scale (Importance) the maximum SD is 5.5; for the question where the response could range from 0-20 (Number of adjustive techniques utilized) the SD is 2.8 for the number of techniques utilized; for the question where responses could range from 0-25 (Number of non-adjustive techniques utilized) the SD is 4.4 for the number of techniques utilized.

(1-Nft/Stateft)$^{\frac{1}{2}}$ = The square root of the finite population correction term

The table below indicates information on a state/territory 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 association for indicated state/territory | Total number of registered chiropractors | Surveys mailed | Part-time** | Retired | Full-time respondents | Estimated full-time in each state/terr. | Weight given a state/terr. | Nft as % of Stateft | Number identified as % of Nmailed | Estimated maximum standard error |
	Norig	Nmail	Npt	Nret	Nft	Stateft	wt	%ft	%iden	SE
Australian States/Territories										
Australian Capital Territory	21	21	1	0	13	20	1.5	65	67	8.0
New South Wales	440	209	24	0	113	363	3.2	31	66	3.9
Northern Territory	8	8	0	0	5	8	1.6	63	63	13.7
Queensland	177	155	10	0	87	159	1.8	55	63	3.6
South Australia	178	155	15	0	74	148	2.0	50	57	4.0
Tasmania	12	12	1	0	10	11	1.1	91	92	4.6
Victoria	361	199	24	0	123	302	2.5	41	74	3.5
West Australia	84	84	3	0	44	79	1.8	56	56	5.0
Australian National Total	+1281	843	78	0	469	++1093	N/A	43	65	1.8

	Norig	Nmail	Npt	Nret	Nft	Stateft	wt	%ft	%iden	SE
New Zealand National Total	+105	105	9	0	70	++93	1.3	75	75	3.0

* To save space, values in the table include only one decimal place. In actuality, all values were computed to several decimal places; as such, some values in the table cannot be represented exactly due to the fact that the table has a maximum of one decimal place.

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

+ This study was based on 1281 members of the Chiropractors' Association of Australia, and 105 members of the Chiropractors' Association of New Zealand in 1992.

++ These are estimates of chiropractors in full-time practice who are also members of the Chiropractors' Association's in Australia and New Zealand.

TABLE 5.1

Sample and Response Data for Australian States and Territories, and for the country of New Zealand