

Chapter 5

Administering the Job Analysis Survey

Procurement of a list of licensed chiropractic practitioners within the United States was necessary prior to the administration of the NBCE Survey of Chiropractic Practice. The most effective method of acquiring a list of currently licensed practitioners in each geographic area was to contact the licensing boards in each of the 50 states and the District of Columbia. Each area provided a list. The total number of licensed chiropractors from the state lists was 59,820.

State lists do contain inaccuracies including addresses that are not current. In addition, the total number of licensed chiropractors listed in Table 5.1 could be an overstatement of licensed practitioners as some individuals are licensed in more than one state, and their name may appear on the list of licensed chiropractors in each state in which they hold a license to practice.

Obtaining Survey Results

Defining and Calculating Standard Error

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

Standard Error Equation: $SE = (SD / Nft^{1/2}) (1 - Nft / Stateft)$

SE: the **standard error of estimate** is a numeric value indicating the accuracy of the sample mean as an estimator of the population mean. It is calculated by dividing the standard deviation by the square root of the sample size and adjusting for sampling from a finite population. (With a goal of achieving a 5.0% standard error per state, the standard error for the nation would be approximately 0.9%.)

SD: the **standard deviation** is a measure of variability, spread, or dispersion of a set of scores around their mean value. (For SD values associated with the scales used in the survey, see SD definition, page 45 of this chapter.)

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

Stateft: the estimated number of **full-time** chiropractor in each **state**

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

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

The expected rate of return was 50%. Thus, to achieve the goal of a 5% standard error per state, the sample size for each state (determined by applying the above formula) was doubled to ascertain the actual number of job analysis survey booklets to mail.

In some states, the actual number of licensed chiropractors was less than twice the number required to have a 5% standard error. In those states, surveys were mailed to each licensed chiropractor in order to reduce the standard error as much as possible.

In the states with the largest populations of chiropractors, sample sizes were increased to further reduce the standard errors.

Selection Process

The selection of chiropractors to participate in the study was made on a state-by-state basis. In states having relatively few licensed chiropractors, every chiropractor on the supplied state list was requested to participate in the study (to reduce standard errors as previously stated). In states with large numbers of licensed chiropractors, a sequential selection process was utilized. The actual sequence depended on the population of chiropractors and the number to be selected from that population.

For example, in Missouri, the total number of chiropractors on the list provided by the state was 1,463. Given the desired number to mail was 190, the number of licensed chiropractors sent surveys was approximately one out of every eight. To determine the chiropractors to whom surveys would be mailed, the first name was selected at random; thereafter, every eighth person on the Missouri list was selected, for a total of 190.

Utilizing procedures appropriate to selecting the correct number of participants from each state, 9,244 were chosen from the state lists that contained 59,820 names.

Pre-Notification

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

- receive preliminary notification and request 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.

Higher response rates ensure less potential bias in the inferences made from survey data. Previous comparable studies also suggest that preliminary communication with selected participants results in a timely return of completed surveys.

With the NBCE survey, a preliminary survey letter was deemed the most cost-effective method of preliminary notification. The NBCE mailed a pre-survey letter (Appendix A) to all who were selected to participate. The letter informed those selected of the upcoming survey and emphasized the importance of their participation in this “milestone study of chiropractic practice in the United States.”

The pre-survey letters were marked “Address Correction Requested” in order to locate those selected. Forwarding the letters was undesirable because of the potential of upsetting the geographical

balance and standard error estimates. In addition, acquiring current addresses for chosen participants was important.

A number of letters returned with notations such as “deceased,” “moved,” “left no forwarding address,” or “unknown.” No alternative participants were selected to replace those individuals who could not be contacted since this inevitability was anticipated and accounted for in the initial sample selection.

Distributing and Tracking the Survey

Within three weeks of distributing pre-survey letters which informed individuals of their selection to participate in the survey, selectees were sent a cover letter and survey (Appendices B and 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 for the NBCE. The cover letter 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 National Board of Chiropractic Examiners within three weeks of receipt.

For tracking purposes, each survey was numbered. This process enabled the NBCE to determine who had returned a survey and who required a follow-up contact. Two weeks after the survey return deadline, follow-up letters were sent to those individuals who had not returned a survey (Appendix D). The follow-up letter also instructed selectees who had not received a form to call an “800” telephone number and request that a survey be sent to them. The follow-up letter again stressed the importance of participation in the study.

Increasing the Rate of Response

As previously stated, one of the greatest 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, the NBCE took additional steps to ensure a timely and maximal response rate.

Recognizing that a significant block of time would be required for participants to complete the survey and that participants would be doing so without benefit of monetary compensation, the NBCE made every effort to keep the text as succinct yet thorough as possible. The final version of the survey was designed to require approximately 60 to 75 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 furnish participants with a summary of the survey results, to issue news releases (Appendix E) to participants’ local newspapers noting their participation in a significant research project, and to list participants’ names in the resulting project report (Appendix F). The NBCE mailed the news releases and published participants’ names in this report only if affirmatively indicated by the respondent on the survey form. Of the 3,177 respondents, a total of 1202 news releases were distributed (298 of these contained multiple names), and a total of 2700 names were published.

Identifying Active Full-time Practitioners

Identifying those chiropractors engaged in active, full-time chiropractic practice was then necessary since this group was the target population for this study. Moreover, since the lists of licensed chiropractors did not provide this information, one of the initial questions of the survey addressed the current occupational status of participants.

Question #3 on the survey asked participants if they were currently involved in active full-time chiropractic practice. The survey did not specify any hourly requirements that defined full-time practice. Instead, individual practitioners determined if their practices were full-time. Only those surveys that indicated full-time practice status 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.

Confirming Reliability of Results (1991 Survey)

After the NBCE received the completed surveys, one full-time practitioner from each state was randomly selected to receive a second questionnaire. 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 lapsed (two to four weeks), and to determine the consistency of responses 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, 23)

To encourage completion of the second questionnaire, the chosen representatives received a phone call thanking them for their initial participation and requesting that they complete the second questionnaire. (Forty 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. (T-tests are 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 ($p > .05$) between the two forms on responses to the 45 activities or on responses to the 108 conditions. Additionally, correlation coefficients of 0.97 and 0.99, respectively, were obtained between pairs of responses to the 45 activities and the 108 conditions. For job inventories, Gael described the significance of “high agreement between respondents”:

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)

Conducting the Survey of Non-Respondents (1998 Survey)

To assess whether those who were randomly selected but did not complete the survey would have similar demographics to those who did complete the survey, telephone calls were made to five randomly selected non-respondents from each state. (The telephone numbers for individuals randomly selected among the non-respondents in each state were obtained from long distance directory assistance, the Internet, and state chiropractic directories.) Calls were made until the practitioner either agreed to complete the survey, made a refusal, or did not return repeated phone calls. Of the contacted non-respondents, 58 were full-time and completed a survey after they were contacted via telephone, 98 declined participation, 32 did not complete the questionnaire after agreeing to do so and 62 did not return repeated phone calls.

Comparison of the demographic characteristics of the 58 who completed surveys revealed no statistical difference in demographic characteristics, with the exception of gender. The telephone survey sample contained more males than the proportion of males from the actual sample of 3,177 full-time respondents (93% vs. 83% unweighted, respectively). All other demographic characteristics were consistent with the 3000+ individuals who completed the survey without any follow-up. It was concluded that the non-respondents had the same demographic characteristics as the respondents.

Survey Response Results

Of the 9,244 pre-survey letters and surveys originally sent, the following information was obtained: 3,177 were in full-time practice and returned the completed survey to the NBCE (survey results were based upon the responses from these individuals); 415 indicated that they were either in part-time practice or not full-time (out of practice for maternity, etc.); 43 were retired; 17 were identified as deceased; 62 declined to participate; and 103 could not be located through postal delivery. Of the contacted non-respondents (as reported above), 58 were full-time and completed a survey after they were contacted via telephone, 98 declined participation. Thus, of the 9,244 selectees, 3,973 (43.0%) were accounted for.

Determining Percentages from Responses on 5- to 11-point Scales

To determine percentages from responses on the five- to eleven-point scales, the midpoints of the percentage ranges were utilized. For example, in the five-point scale, if a respondent marked the “1-25%” choice, this was converted to 13%. In like manner, the “26-50%” answer choice was converted to a midpoint value of 38%; “51-75%” to 63%; and “76-100%” to 88%. Means were then scaled within each question so that they totaled 100%. This procedure resulted in the percentage data as indicated for the following sections of the survey instrument: Workers’ Compensation, Managed care and Insurance; Time Spent in Professional Functions; Types of Patients; Chief Complaint and Etiology; and Treatment Procedures.

The Weighting Factor

Tables 5.1a to 5.1c contain tabulation information detailing the survey responses. These tables of figures represent counts of surveys mailed to states based upon original mailing addresses; in some cases surveys were forwarded if a person had moved and had a forwarding address out-of-state.

Of particular interest is the *weighting* given to each response. For example, in the state of Alabama, there were an estimated 436 full-time licensed chiropractors. Of those 436, 62 chiropractors completed and returned the survey. The weighting given to Alabama is 7.03 because 62 times 7.03 equals 436, the estimated total number of full-time chiropractors¹. The weighting factor was necessary in order to have the combined (individual states and District of Columbia) data represent the national population. (Except where otherwise noted, all of the summary information in this document was based upon weighted data.)

The following abbreviations were used in the tables presented:

Norig:	Number of chiropractors listed on the original list provided to the NBCE by state licensing boards (names appearing on two or more state lists were only included on the list for the participant's state of residence; duplicate names were deleted from all other lists)
Nmail:	Number of pre-survey letters and surveys mailed
Npt:	Number of part-time chiropractors who returned pre-survey letters and surveys
Nret:	Number of retired chiropractors who returned pre-survey letters and surveys
Ndec:	Responses indicating selected chiropractor was deceased
Nndel:	Number of non-deliverable pre-survey letters and surveys
Ndcl_1:	Number who declined participation in initial survey via mail
Ndcl_2:	Number who declined participation after follow-up via telephone
NnonR:	Number of chiropractors returning post-deadline surveys after telephone contact. (These were "Non-respondents" whose demographic characteristics were similar to respondents'.)
Nft:	Number of full-time chiropractors who returned surveys

¹ To save space, values in Table 5.1a, 5.1b, and 5.1c include only one or two decimal places. In actuality, all values were computed to several decimal places.

%acc:	Percentage accounted for ^a $\% = [(Npt + Nret + Ndec + Nndel + Ndcl_1 + Ndcl_2 + NonR + Nft) / Nmail] * 100$
Stateft:	Estimated number of full-time chiropractors in each state ^b $Stateft = Nft / (Npt + Nret + Ndec + Nndel + Ndcl_1 + Nft) * Norig$
wt:	Weight (or emphasis) given to each survey within a state when computing national summary statistics $(wt = Stateft / Nft)$
%ft:	Nft as percent of Stateft $\%ft = (Nft / Stateft * 100)$
SE:	The standard error of estimate is a numeric value indicating the accuracy of the sample mean as an estimator of the population mean. It is calculated by dividing the standard deviation by the square root of the sample size and adjusting for sampling from a finite population. (With a goal of achieving a 5.0% standard error per state, the standard error for the nation would be approximately 0.9%.) $SE = (SD/Nft^{1/2}) * (1 - Nft/Stateft)^{1/2}$
SD:	The standard deviation of responses to a survey question. For questions reported in the study as a percent, the maximum SD is 50 (This value is the largest standard deviation of any obtained from the Job Analysis survey. Thus, this is an upper bound of the standard deviation.) For questions reported on a 0-4 scale (Frequency and Risk), the maximum SD is 6.1; for questions reported on a 0-16 scale (Importance = Frequency x Risk), the maximum SD is 22.3; for the question in which the response could range from 0-16 (Number of adjustive techniques utilized), the maximum SD is 2.9 for techniques utilized; for the question in which responses could range from 0-25 (Number of passive adjunctive care procedures utilized), the maximum SD is 4.3 for procedures utilized; for the question in which responses could range from 0-6 (Number of active adjunctive care procedures utilized), the maximum SD is 1.4 for procedures utilized; for the 0-5 scale (Knowledge areas), the maximum SD is 7.1. (1-Nft/Stateft)^{1/2}: The square root of the finite population correction term

^a 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. In formulas, an asterisk (*) denotes multiplication.

^b 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, retired, and deceased chiropractors was not returned to the NBCE.

Sampling Design and Response Rate by State (Continued)

State	Chiropractors on original list provided by state										Norig	Surveys mailed		Npt	Nret	Ndec	Nndel	Ndel_1	Ndel_2	NnonR	Nft	%acc	Stateft	wt	Nt as % of Stateft	Estimated maximum error
	Retired		Deceased		Non-deliverable		Declined participation via mail		Declined participation via telephone			Nonrespondents who later responded														
Kentucky	587	183	6	5	0	3	3	4	1	59	44.3	456	7.73	13	6.1											
Louisiana	448	176	8	0	0	1	0	0	0	59	38.6	389	6.59	15	6.0											
Maine	228	144	7	0	0	0	0	4	1	58	48.6	203	3.50	29	5.5											
Maryland	577	170	2	0	2	5	1	1	1	49	35.9	479	9.78	10	6.8											
Massachusetts	1,153	196	13	0	0	2	0	0	1	52	34.7	895	17.21	6	6.7											
Michigan	1,768	205	10	1	1	1	1	2	2	61	38.5	1,438	23.57	4	6.3											
Minnesota	1,649	207	24	1	0	3	0	1	1	67	46.9	1,163	17.36	6	5.9											
Mississippi	234	144	2	1	0	2	3	2	0	38	33.3	193	5.08	20	7.3											
Missouri	1,463	190	12	0	1	4	1	2	0	68	46.3	1,157	17.01	6	5.9											
Montana	232	149	6	1	0	0	1	2	2	62	49.7	205	3.31	30	5.3											
Nebraska	289	149	5	0	0	2	1	2	2	55	45.0	252	4.58	22	6.0											
Nevada	362	169	4	0	1	3	1	0	2	61	42.6	315	5.16	19	5.7											
New Hampshire	258	155	8	0	0	0	0	0	1	63	46.5	229	3.63	28	5.4											
New Jersey	2,541	261	7	1	0	2	1	1	2	85	37.9	2,250	26.47	4	5.3											
New Mexico	371	164	12	1	0	3	2	2	1	45	40.2	265	5.89	17	6.8											
New York	4,402	296	12	0	0	4	4	2	2	77	34.1	3,494	45.38	2	5.6											
North Carolina	971	197	3	0	0	3	1	0	0	86	47.2	898	10.44	10	5.1											

Table 5.1b. Sampling Design and Response Rate by State

