Chapter 5
Administering The Job Analysis Survey

In preparing to administer the NBCE Survey of Chiropractic Practice, it was necessary to obtain a list of licensed practitioners within the United States. 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 responded with a list. The total number of licensed chiropractors from the state lists was 46,196.

In reviewing these lists, it was noted that there were chiropractors who were licensed to practice in more than one state. To avoid duplication of selection, those licensed in states other than where they resided were purged from the lists in the states in which they did not reside.

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:

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

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, 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 questions reported as a percent, the maximum SD is 50, which was used in determining sample sizes for each state.

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

½ = **the square root**

$$Stateft \quad = \quad \text{the estimated number of full-time chiropractors in each state}$$

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

It was estimated that a 50% survey return rate would be obtained. Thus, to achieve the goal of a 5% standard error per state, 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 be mailed.

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

In the three states with the largest populations of chiropractors (California, New York, and Florida), 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 1,401. Given the desired sample size of 214, the number of licensed chiropractors sent surveys was approximately one out of every six. To determine the chiropractors to whom surveys would be mailed, the first name was selected at random; thereafter, every sixth person on the Missouri list was selected, for a total of 214.

Utilizing procedures appropriate to selecting the correct number of participants from each state, 9,210 were chosen from state lists containing 46,196 names.

Pre-Notification

Pre-notification was considered to be an important step in the administration of the questionnaire. Previous studies on survey techniques show 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 ensure less potential 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 NBCE 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 this "milestone study of chiropractic practice in the United States," 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." It was undesirable for letters to be forwarded because this could upset the geographic balance and standard error estimates. It was also important to have returned to the NBCE current address information on all those chosen to participate.

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

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 survey 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 NBCE. 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 National Board of Chiropractic Examiners within three weeks of receipt.

For tracking purposes, each survey was numbered. This enabled the NBCE to know who had returned a survey and who required a follow-up contact. Two weeks after the survey return deadline, postcards were sent to those individuals whose surveys had not been returned (Appendix F). The follow-up postcard instructed selectees who had not received a form to call an 800 telephone number and request that a survey be sent to them. The postcard also stressed the importance of participation in the study.

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 timely and maximum response rate.

Recognizing that a significant block of time would be required for completion of the survey, without benefit of monetary compensation, every effort was made 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 respondents a summary of the survey results, along with a news release (Appendix G) to their local newspapers noting their participation in a significant research project, and the listing of their names in the resulting project report (Appendix H). The news releases were sent and their names were published in this report only if affirmatively indicated by the respondent on the survey form. Of the 5,514 respondents, a total of approximately 2,843 news releases were distributed, and a total of approximately 4,261 names were published.

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 an initial question on the first page of the survey.

Question #4 on the survey 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 individual practitioners to decide if they considered their practices to be 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

After the NBCE received the completed surveys, one representative 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 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 and asking them to complete the second questionnaire. (Forty of the 50 who received a second survey returned their completed survey.)

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 ($p > .05$) 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.

> "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 9,210 surveys originally sent, 5,514 were returned to the National Board and an additional 1,085 pre-survey letters were returned.

From the information annotated on returned surveys and on pre-survey letters, the following information was obtained concerning the 9,210 selectees: 4,835 were in full-time

practice and returned the completed survey to the NBCE (survey results were based upon the responses from these individuals); 1,095 indicated they were in part-time practice; 75 were retired; 201 were identified as deceased; and 393 could not be located through postal delivery.

Thus, of the 9,210 selectees, 6,599 (71.7%) were accounted for. Consideration was given to obtaining responses from the 28.3% who were not accounted for; however, since these individuals had been sent pre-survey letters, surveys, and post-cards, it was considered too expensive and too time-consuming to further attempt to obtain responses. Moreover, 28.3% may be a sizeable overestimate of the percentage of full-time non-respondents as it does not take into consideration that a large percentage of individuals in this group may be part-time, retired or deceased.

The Weighting Factor

The following pages 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. The return rates in the tables were based upon returns as of January 31, 1992.

Of particular interest is the *weighting* given to each response. For example, in the state of Alabama, there were an estimated 314 full-time licensed chiropractors. Of those 314, 104 chiropractors completed and returned the survey. The weighting given to Alabama is 3.02[1] because 104 times 3.02 equals 314, the estimated total number of full-time chiropractors. The weighting factor was necessary in order to have the combined (individual states and District of Columbia) data represent the national population. (Except where noted, all of the information in this document was based upon weighting.)

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

Nmail: Number of postcards and surveys **mailed**

Nrtnd: Number of postcards and surveys **returned**

Npt: Number of **part-time** chiropractors returning postcards and surveys

Nret: Number of **retired** chiropractors returning postcards and surveys

Ndec: Responses indicating selected chiropractor was **deceased**

Nndel: Number of **non-deliverable** postcards and surveys

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

Stateft[2]: Estimated number of **full-time** chiropractors in each state
Stateft = Nft/ (Npt + Nret + Ndec + Nndel + Nft) *Norig

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

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

%iden[3]: **% = [(Npt + Nret + Ndec + Nndel + 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, the standard error for the nation would be approximately 0.9%. (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 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 adjustive techniques utilized) the SD is 4.4 for the number of techniques utilized.

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

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

[2] 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.

[3] 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

The tables below indicate information on a state-by-state basis regarding survey respondents. Please note that a more complete and accurate explanation of category headings and data precedes these tables.

STATE	Chiropractors on original list provided by licensing agency in indicated state — Norig	Surveys mailed — Nmail	Part-time — Npt	Retired — Nret	De-ceased — Ndec	Non-deliver-able — Nndel	Full-time respondents — Nft	Estimated full-time in each state — Stateft	Weight given a state — wt	Nft as % of Stateft — %ft	Number identified as % of Nmailed — %iden	Estimated maximum standard error — SE
Alabama	420	181	23	3	2	7	104	314	3.0	33	77	4.0
Alaska	114	112	12	0	1	23	52	67	1.3	77	79	3.3
Arizona	1043	207	31	1	5	15	103	693	6.7	15	75	4.5
Arkansas	342	169	12	0	5	9	91	266	2.9	34	69	4.3
California	8527	549	90	6	12	47	229	5085	22.2	5	70	3.2
Colorado	838	203	22	3	10	11	112	594	5.3	19	78	4.3
Connecticut	493	188	13	1	7	12	106	376	3.5	28	74	4.1
Delaware	60	52	0	1	3	1	33	52	1.6	63	73	5.3
Dist. Col.	20	17	1	0	2	2	8	12	1.5	67	76	10.2
Florida	3079	313	47	1	10	14	145	2057	14.2	7	69	4.0
Georgia	1264	212	26	0	10	22	86	755	8.8	11	68	5.1
Hawaii	196	147	17	0	0	1	71	156	2.2	45	61	4.4
Idaho	177	140	13	0	4	2	90	146	1.6	62	78	3.3
Illinois	1869	217	24	2	7	6	112	1386	12.4	8	70	4.5
Indiana	641	195	31	1	3	2	112	482	4.3	23	76	4.1
Iowa	1230	204	27	2	21	14	71	647	9.1	11	66	5.6
Kansas	658	196	28	2	14	10	98	424	4.3	23	78	4.4

TABLE 5.1
Sampling Design and Response Rate by State

The tables below indicate information on a state-by-state basis regarding survey respondents. Please note that a more complete and accurate explanation of category headings and data precedes these tables.

STATE	Chiropractors on original list provided by licensing agency in indicated state	Surveys mailed	Part-time	Retired	De-ceased	Non-deliver-able	Full-time respondents	Estimated full-time in each state	Weight given a state	Nft as % of Stateft	Number identified as % of Nmailed	Estimated maximum standard error
	Norig	Nmail	Npt	Nret	Ndec	Nndel	Nft	Stateft	wt	%ft	%iden	SE
Kentucky	462	184	21	1	2	7	86	340	3.9	25	64	4.7
Louisiana	469	186	12	4	3	5	91	371	4.1	25	62	4.6
Maine	170	138	14	2	3	5	61	122	2.0	50	62	4.5
Maryland	304	170	19	0	2	8	92	231	2.5	40	71	4.0
Massachusetts	851	206	11	1	0	8	129	737	5.7	18	72	4.0
Michigan	1620	212	37	1	3	13	115	1102	9.6	10	80	4.4
Minnesota	1344	213	43	2	2	4	125	955	7.6	13	83	4.2
Mississippi	222	151	20	1	3	7	73	156	2.1	47	69	4.3
Missouri	1401	214	47	0	1	9	104	905	8.7	12	75	4.6
Montana	134	123	30	1	1	2	78	93	1.2	84	91	2.3
Nebraska	202	146	13	1	0	0	102	178	1.7	57	80	3.2
Nevada	226	153	10	2	0	8	82	182	2.2	45	67	4.1
N. Hampshire	207	152	25	2	3	2	78	147	1.9	53	72	3.9
New Jersey	1899	217	9	1	1	6	121	1665	13.8	7	64	4.4
New Mexico	267	162	17	0	1	8	92	208	2.3	44	73	3.9
New York	3408	285	32	1	6	9	144	2556	17.8	6	67	4.0
N. Carolina	598	193	22	2	3	2	117	479	4.1	24	76	4.0

TABLE 5.1 (Continued)
Sampling Design and Response Rate by State

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The tables below indicate information on a state-by-state basis regarding survey respondents. Please note that a more complete and accurate explanation of category headings and data precedes these tables.

STATE	Chiropractors on original list provided by licensing agency in indicated state	Surveys mailed	Part-time	Retired	De-ceased	Non-deliver-able	Full-time respondents	Estimated full-time in each state	Weight given a state	Nft as % of Stateft	Number identified as % of Nmailed	Estimated maximum standard error
	Norig	Nmail	Npt	Nret	Ndec	Nndel	Nft	Stateft	wt	%ft	%iden	SE
North Dakota	130	121	13	1	0	1	80	109	1.4	73	79	2.9
Ohio	1207	212	19	0	1	5	121	1000	8.3	12	69	4.3
Oklahoma	435	191	28	7	6	10	76	260	3.4	29	67	4.8
Oregon	822	203	29	2	4	10	108	580	5.4	19	75	4.3
Pennsylvania	2641	221	16	3	7	5	102	2025	19.9	5	60	4.8
Rhode Island	89	87	11	0	1	5	50	66	1.3	75	77	3.5
S. Carolina	430	182	16	3	2	5	89	333	3.7	27	63	4.5
South Dakota	168	137	14	0	3	0	95	143	1.5	67	82	3.0
Tennessee	461	184	12	1	3	7	120	387	3.2	31	78	3.8
Texas	1863	218	33	4	5	17	104	1189	11.4	9	75	4.7
Utah	267	160	22	2	5	4	73	184	2.5	40	66	4.5
Vermont	96	88	8	1	0	1	42	78	1.8	54	59	5.2
Virginia	406	180	6	1	0	9	113	356	3.1	32	72	3.9
Washington	1206	211	27	2	1	3	117	941	8.0	12	71	4.3
West Virginia	132	121	6	1	3	3	66	110	1.7	60	65	3.9
Wisconsin	1005	208	18	1	8	7	122	786	6.4	16	75	4.2
Wyoming	83	79	18	1	2	0	44	56	1.3	78	82	3.5

TABLE 5.1 (Continued)
Sampling Design and Response Rate by State