

Use of Chiropractic Services from 1985 through 1991 in the United States and Canada

ABSTRACT

Objectives. The purpose of this paper is to describe the demographic and clinical characteristics of chiropractic patients and to document chiropractic visit rates in 6 sites in the United States and Canada.

Methods. Random samples of chiropractors from 5 US sites and 1 Canadian site were selected. A record abstraction system was developed to obtain demographic and clinical data from office charts.

Results. Of the 185 eligible chiropractors sampled, 131 (71%) participated. Sixty-eight percent of the selected charts showed that care was sought for low back pain, while 32% recorded care for other reasons. Spinal manipulative therapy was recorded in 83% of all charts. There was a greater than 2-fold difference in the median number of visits related to low back pain per episode of care across sites. The chiropractic visit rates in the US sites and Ontario are estimated to be 101.2 and 140.9 visits per 100 person-years, respectively.

Conclusions. The chiropractic use rate in these sites is twice that of estimates made 15 years ago. The great majority of patients receive care for musculoskeletal conditions of the back and neck. The number of visits per episode varies appreciably by site. (*Am J Public Health.* 1998; 88:771-776)

Eric L. Hurwitz, DC, PhD, Ian D. Coulter, PhD, Alan H. Adams, DC, Barbara J. Genovese, MA, and Paul G. Shekelle, MD, PhD

Introduction

Chiropractic care represents a small but growing segment of health services in the United States. Chiropractors are members of the third largest group of health care providers after medical doctors and dentists. An estimated \$2.4 billion was spent on chiropractic services in 1988.¹ Seven percent of respondents to a survey of the use of unconventional medicine in the United States reported receiving chiropractic care within the previous year, and 19% of respondents with back pain and 6% of headache sufferers reported receiving care from a chiropractor or other unconventional provider.² Almost two thirds of all visits for low back pain are to chiropractors,³ and chiropractors are the primary health care providers for about 40% of all episodes of care for back pain.⁴

There is a dearth of data on the use of chiropractic services, the best previous data being more than a decade old.³ In a pilot study of the use of chiropractic spinal manipulation in Southern California, we demonstrated that more than 80% of chiropractic patients lived in the same zip code as the office of the chiropractor from whom they sought care; thus, regional estimates of the use of services could be made on the basis of visits to providers.⁵ The purpose of this paper is to describe the demographic and clinical characteristics of patients seeking care from chiropractors and to estimate chiropractic visit rates in a cluster sample of the United States and in one site in Canada.

Methods

Identification of Sample

Five US sites and 1 Canadian site were selected: San Diego, Calif; Portland, Ore; Vancouver, Wash; Minneapolis-St. Paul, Minn; Miami, Fla; and Toronto, Ontario. The US sites were chosen to reflect different geographic regions, a range of chiropractor-to-population ratios, and differences in legislated scope of practice. In addition, distributions of age, race, education, and marital status at the 5 US sites were very similar to the distributions of these variables in the total US population. In a previous analysis of chiropractic use in the RAND Health Insurance Experiment, these 4 variables (plus geographic site) were the only variables from among the many sociodemographic, health status, and patient satisfaction variables measured that were found to be predictive of chiropractic use in this community-based study.³

Eric L. Hurwitz, Ian D. Coulter, Barbara J. Genovese, and Paul G. Shekelle are with RAND, Santa Monica, Calif. Dr Hurwitz and Dr Coulter are also with the Los Angeles College of Chiropractic, Los Angeles, Calif, and Dr Hurwitz is also with the Department of Epidemiology, UCLA School of Public Health. Dr Shekelle is also with the Veterans Affairs Health Services Research and Development Service, Los Angeles, Calif. Alan H. Adams is with the Los Angeles College of Chiropractic.

Requests for reprints should be sent to Eric L. Hurwitz, DC, PhD, UCLA School of Public Health, Department of Epidemiology, Box 951772, Los Angeles, CA 90095-1772.

This paper was accepted October 2, 1997.

Note. The conclusions presented here are those of the authors and do not necessarily represent the views of RAND, the Consortium for Chiropractic Research, or the Foundation for Chiropractic Education and Research.

Twenty percent of the sampled chiropractors were from rural areas surrounding Portland, Minneapolis–St. Paul, and Toronto. The geographic area in Toronto from which our sample was drawn covered 75% of the population of Ontario. The Portland and Vancouver sites were combined for most of the analyses in this paper. At each site, we constructed our sampling frame from a combination of the telephone book yellow pages, the state board licensing list, and the mailing list of the local chiropractic college, if any. A random sample from this list was drawn. We sent sampled names a letter that explained the study and invited them to participate, along with letters from the national, state, and local chiropractic associations indicating support for the study. We followed up with a telephone call to first determine eligibility and then request participation. Chiropractors who began practicing in the selected geographic area after January 1, 1990, were not eligible. Eligible chiropractors who declined our initial attempt at recruitment were contacted by one or more influential state or local chiropractors and again urged to participate. Participating chiropractors and their staff were given a \$130 honorarium for participation.

Data Collection

A chiropractic record abstraction system was developed to obtain demographic and clinical data from chiropractic office charts. For patients presenting with low back pain, a lengthy research instrument was used to abstract extensive information on the patient's history of back pain, previous back-related treatment, past medical history, physical examination findings, radiologic and other diagnostic studies, diagnoses, type of treatment (if any), length of episode of care, and number of visits. For patients presenting with complaints other than low back pain, we used a shorter instrument to abstract demographic data, reasons for visit, diagnoses, type of treatment (if any), length of episode of care, and number of visits. Reason for visit was coded according to a predetermined list of 437 possible reasons.

We selected patient records by first identifying the locations of all office records and then measuring the total length of the records in inches (as if the records were books on a shelf). A random-number table was used to select a random number of inches from the beginning of the chiropractor's charts. Randomly selected patient records of completed episodes were included in this study if the patient first sought consultation between January 1,

1985, and December 31, 1991, and the date of the last visit for this episode was 30 days or more from the date of abstraction. Every sampled record that met the inclusion criteria was included in the study.

To calculate the average number of visits per chiropractor at each site, we recorded from the office logs the number of new and follow-up patients seen during the previous 7 days. We also recorded the total number of hours the chiropractor worked during the week and the total number of weeks worked per year.

This study was approved by the RAND Human Subjects Protection Committee and complied with all requirements for studies that collect patient-sensitive data.

Analysis

Diagnoses and symptoms were weighted by the inverse of the number of diagnoses and symptoms, respectively, recorded per patient to adjust for the variability in recording between providers. Site-specific chiropractic visit rates were calculated by multiplying the average number of visits per sampled chiropractor at each site by the number of practicing chiropractors at that site, then dividing by the total population (1990 US Census; 1991 Canada Census) at each site.

Comparisons of proportions for categorical variables between all sites and between the US sites and Ontario were tested with chi-square statistics. Comparisons of means for interval variables between sites were tested with analysis of variance. Bonferroni *t* tests were employed to control for multiple comparisons when testing for differences between sites with respect to number of visits and number of days per episode of care. We defined an episode of care as a period of time with no more than 30 days between visits. SAS 6.08 (SAS Institute Inc, Cary, NC) and Stata 3.1 (Stata Corp, College Station, Tex) were used for statistical analysis.

Results

Of the 185 eligible chiropractors sampled, 131 (71%) participated. The participation rate varied across sites: San Diego, 68%; Portland, 70%; Vancouver, 100%; Minneapolis–St. Paul, 76%; Miami, 53%; Ontario, 81%. The participating chiropractors were similar to US and Canadian chiropractors in general with respect to sex, race, type of college degree, and full-time practice status (data presented in detail elsewhere⁶). Data collection yielded a total of

1916 records: 1310 records for patients with low back pain and 606 records for patients with other conditions.

Demographic characteristics of patients, by site, are shown in Table 1. Overall, chiropractic patients tended to be between 30 and 50 years old, nearly equally female or male, and married. In the US sites, about 40% of the patients had private fee-for-service insurance, 20% were self-pay (cash patients), 20% were workers' compensation or personal injury patients, and 20% had other reimbursement mechanisms (Medicare, private prepaid insurance, and miscellaneous). Sixty-eight percent of the patients sought care for low back pain, while 32% sought care for other reasons.

The proportion of patients seeking care for reasons other than low back pain ranged from 25% in Minneapolis–St. Paul and Ontario to about 33% in Portland–Vancouver and Miami and 40% in San Diego. Forty percent of the patients reported pain, swelling, or injury of the face or neck; about 19% reported pain, swelling, or injury of the mid-back region; and 19% reported symptoms involving the extremities. Headache was reported by 7.5% of the patients. The percentages of patients with specific non-low back symptoms, by site, are shown in Table 2. The most common diagnoses for these patients were musculoskeletal. Non-musculoskeletal conditions such as migraine headache, otitis media, and asthma accounted for fewer than 1% of the diagnoses. Almost 25% of the abstracted charts for patients in this group had no recorded diagnosis.

More than 25% of all diagnoses related to low back pain were sprains or strains of the thoracic or lumbar vertebrae or of the sacroiliac joints. Thoracic or lumbar radiculitis, intervertebral disc problems, and sciatica accounted for fewer than 10% of the diagnoses. Fewer than 3% of the patients with low back pain received cervical diagnoses, and fewer than 1% were given diagnoses that could be considered unrelated to the musculoskeletal system. No diagnosis was recorded in 19.5% of the charts for patients with low back pain.

Table 3 shows the percentages of selected characteristics among patients who sought chiropractic care for low back pain, by site. Overall, more than 40% of the patients had been in pain for less than 3 weeks; about 20% had been in pain for longer than 6 months. About 5% reported sciatica with a positive straight-leg raise test, and 30% reported trauma associated with the onset of the present episode of low back pain. About 2% of the patients had had previous surgery for low back pain.

TABLE 1—Demographic Characteristics of Chiropractic Patients (n=1916), by Site: United States and Canada, 1985 through 1991

	San Diego (n = 438)	Portland– Vancouver (n = 387)	Minneapolis– St. Paul (n = 253)	Miami (n = 319)	Ontario (n = 519)
Mean age, y (SD)	37.0 (15.4)	39.6 (15.7)	37.5 (15.3)	39.4 (17.9)	36.9 (15.9)
Sex, %					
Male	46.1	45.1	43.4	46.8	49.6
Female	53.9	54.9	56.6	53.2	50.4
Marital status, %					
Married	39.0	60.9	55.5	57.0	63.0
Not married	61.0	39.1	44.5	43.0	37.0
Insurance status (US only) ^a , %					
Medicare	4.5	6.0	6.2	13.4	...
Medicaid/Medi-Cal	0.3	2.7	3.7	0.0	...
Private, fee-for-service	35.3	36.1	51.0	50.2	...
Private, prepaid	2.0	5.7	2.1	4.7	...
Workers' compensation	13.2	16.9	9.5	6.5	...
Personal injury	14.0	7.9	5.4	12.7	...
Self-pay	26.0	23.0	19.9	12.4	...
Other	4.9	1.6	2.1	0.0	...

Note. Percentages may not add to 100.0 because of rounding.

^aInsurance in Canada is provided by the provincial health plan in more than 95% of cases.

TABLE 2—Weighted Percentages^a of Reported Symptoms of Patients Seeking Chiropractic Care for Reasons Other than Low Back Pain (n = 606) by Site: United States and Canada, 1985 through 1991

	San Diego (n = 178)	Portland– Vancouver (n = 127)	Minneapolis– St. Paul (n = 63)	Miami (n = 109)	All US Sites (n = 477)	Ontario (n = 129)
Pain, injury—face and neck	45.4	41.6	27.0	48.9	42.8	29.7
Pain, injury—mid-back	15.0	31.6	7.7	21.9	20.0	13.1
Pain, injury—upper extremity	6.5	11.3	8.5	5.7	7.8	10.0
Sprain/strain of extremity	5.8	3.5	8.2	13.3	7.2	12.0
Headache	7.3	7.1	11.9	4.4	7.2	8.7
Pain, injury—lower extremity	1.6	1.7	4.0	1.7	2.0	4.0
Other symptoms referable to musculoskeletal system	0.8	0.0	10.3	0.0	1.7	0.0
Abdominal pain	2.4	0.0	0.0	0.9	1.1	0.8
Other symptoms ^b	10.7	3.2	22.5	3.2	8.5	11.8
No symptoms documented	4.5	0.0	0.0	0.0	1.7	10.1

Note. Percentages may not add to 100.0 because of rounding.

^aSymptoms were weighted by the inverse of the number of symptoms recorded per patient.

^bOther symptoms reported by at least 0.2% of the patients included vertigo or dizziness, heartburn or upset stomach, fatigue, sinus problems, asthma, constipation, eye pain and irritation, earache, ear infection, nervousness, pain or injury of the chest or thorax, unspecified joint pain, skin irritation, shortness of breath, and nausea and vomiting.

Almost one third of the patients with low back pain had sought previous care for this problem. Not surprisingly, many patients had sought chiropractic care, ranging from a high of almost 20% in Portland–Vancouver to a low of 6% in Ontario ($P < .001$). General practitioners, orthopedists, and physical therapists were the most often mentioned nonchiropractic sources of previous care. The most common previous treatments were nonnarcotic analgesics, spinal manipulation, physical therapy modalities, muscle relaxants,

unspecified analgesics, and nonmanipulative manual therapy (such as massage or mobilization).

Overall, 54% of the chiropractic patients at the US sites received x-rays prior to treatment for their current episode of low back pain, while only about one third of the patients in Ontario received x-rays ($P < .001$) (Table 4). Fewer than 2% of all patients with low back pain received advanced imaging (computed tomography or magnetic resonance imaging) during their course of care. Spinal manipulative therapy

and nonthrust therapy (such as hot packs, physical therapy modalities, massage, and mobilization) were recorded in 84% and 79%, respectively, of the charts of US patients with low back pain.

The mean duration of the current episode of care and the mean number of visits are shown, by reason for seeking care and by site, in Table 5. Overall, patients with low back pain had a mean of 14 visits (median = 7) per episode of care, which lasted a mean of 60 days (median = 29). Patients with other conditions had a mean of

TABLE 3—Frequency (%) of Selected Characteristics of Low Back Pain Reported by Chiropractic Patients (n = 1310), by Site: United States and Canada, 1985 through 1991

	San Diego (n = 260)	Portland– Vancouver (n = 260)	Minneapolis– St. Paul (n = 190)	Miami (n = 210)	All US Sites (n = 920)	Ontario (n = 390)	P
Onset of pain							
<3 wk	39.6	43.9	53.7	47.1	45.4	34.6	< .001
3–6 wk	7.7	6.9	5.8	7.1	7.0	5.4	
6–12 wk	3.9	3.9	4.7	5.2	4.4	3.3	
12–26 wk	2.7	3.5	2.6	5.2	3.5	2.6	
>6 mo	21.2	27.3	13.2	21.0	21.2	20.3	
No data	25.0	14.6	20.0	14.3	18.6	33.9	
Sciatica ^a							
Yes	8.1	5.0	5.8	5.2	6.1	1.0	< .001
No	47.3	66.5	46.3	87.6	61.7	47.7	
No data	44.6	28.5	47.9	7.1	32.2	51.3	
Trauma							
Yes	39.6	30.0	27.4	34.3	33.2	25.6	< .001
No	24.2	42.3	25.3	45.7	34.5	9.0	
No data	36.2	27.7	47.4	20.0	32.4	65.4	
Previous back surgery							
Yes	1.2	4.6	2.6	0.5	2.3	0.8	.002
No	98.9	95.4	97.4	99.5	97.7	99.2	

Note. Percentages may not add to 100.0 because of rounding.

^aSciatica is defined as radiating pain in one or both legs plus a positive straight-leg raise test or other positive sciatic nerve finding.

TABLE 4—Frequency (%) of Diagnostic and Treatment Modalities Received by Chiropractic Patients (n = 1310) for Current Episode of Low Back Pain, by Site: United States and Canada, 1985 through 1991

	San Diego (n = 260)	Portland– Vancouver (n = 260)	Minneapolis– St. Paul (n = 190)	Miami (n = 210)	All US Sites (n = 920)	Ontario (n = 390)
Diagnostic modality						
X-rays	56.9	39.6	49.5	70.5	53.6	34.9
Computed tomography	1.9	1.9	4.2	0.0	2.0	0.3
Magnetic resonance imaging	3.1	1.5	1.0	2.9	2.2	0.0
Treatment modality						
Spinal manipulation	78.9	90.0	79.0	87.6	84.0	80.8
Nonthrust therapy ^a	73.1	85.0	78.4	79.5	79.0	53.6
Patient education	38.5	29.6	22.6	32.9	31.4	17.2
Other ^b	6.2	6.1	2.6	3.8	4.9	1.3

^aNonthrust therapy includes physical modalities such as hot packs, physical therapy modalities, massage, and mobilization.

^bOther treatment includes acupuncture, corsets, homeopathy, naturopathy, and vitamins and supplements.

9 visits (median = 4) over an average period of 44 days (median = 14). Across sites, there was a greater than 2-fold difference in the median number of visits related to low back pain. Similarly, the duration of care differed by more than 2-fold across sites. Among patients with conditions other than low back pain, there was a 4-fold difference in the median number of visits and an almost 5-fold difference in the median duration of care.

The chiropractic visit rates at the US sites and in Ontario were 101.2 and 140.9 visits per 100 person-years, respectively. Visit rates among US sites were relatively

similar, ranging from 92.1 visits per 100 person-years in San Diego to 104.9 visits per 100 person-years in Minneapolis–St. Paul.

Discussion

Our results indicate that chiropractic patients are primarily middle-aged and married, with a slight preponderance of women. About two thirds of the patients in this study had low back pain. The other predominant reasons for visiting a chiropractor were for head and neck pain and

extremity problems. Other studies have reported similar findings.^{4,7–9} Nonmusculoskeletal conditions, such as migraine headache, otitis media, and asthma, account for a very small percentage of chiropractors' caseloads as measured either by symptoms or by diagnoses. Annual surveys of chiropractors by the American Chiropractic Association have found that 10% to 15% of conditions treated by respondents are of nonmusculoskeletal etiology,¹⁰ percentages that are somewhat greater than our finding based on symptoms and much greater than our diagnosis-based finding. There is some variability by

TABLE 5—Duration of Current Episode of Care and Number of Visits per Episode, by Reason for Seeking Care and by Site: Chiropractic Patients (n=1916) in the United States and Canada, 1985 through 1991

	Low Back Pain				All Conditions			
	Days' Duration		No. Visits		Days' Duration		No. Visits	
	Mean (SE)	Median	Mean (SE)	Median	Mean (SE)	Median	Mean (SE)	Median
San Diego	79.6 (6.1)	45	21.3 (2.0)	8	62.7 (4.3)	25	16.4 (1.3)	6
Portland-Vancouver	48.3 (4.2)	21	10.5 (1.1)	4	48.9 (3.9)	19	9.9 (0.8)	4
Minneapolis-St. Paul	61.4 (5.5)	26.5	15.9 (1.8)	6	52.8 (4.5)	21	13.2 (1.4)	4.5
Miami	56.3 (4.2)	35.5	14.8 (1.0)	10	55.5 (3.5)	35	14.1 (0.9)	9.5
All US sites	61.7 (2.6)	29	15.6 (0.8)	7	55.4 (2.1)	24	13.5 (0.6)	6
Ontario	57.3 (3.9)	29	10.5 (0.6)	6	54.5 (3.6)	24	9.6 (0.5)	6
	$P = .0001^a$		$P = .0001^b$		$P = .1529^a$		$P = .0001^b$	

^a P value comparing mean days' duration of episodes of care between sites.

^b P value comparing mean number of visits per episode of care between sites.

site; however, it cannot be ascertained whether patients actually differ by site or whether practitioners in different sites tend to give different diagnoses.

More than 40% of the patients with low back pain had acute (<3 weeks) episodes, while about 20% had chronic (>6 months) episodes. This finding is in contrast to those of other studies, which have shown a greater proportion of chronic pain among patients with low back pain.^{7,11} Patients in Ontario were less likely than US patients to report having sought previous care for their low back pain and less likely to have received x-rays. By far the dominant therapeutic intervention delivered was spinal manipulative therapy, received by 80% of patients with low back pain.

The median length of an episode of care for low back pain was more than twice the median length for other episodes of care (29 days vs 14 days), and there were almost twice as many visits during episodes of care for low back pain (a median of 7 visits vs 4 visits). The mean number of visits for all episodes of care (12.4) is on the high end of previous estimates, which have ranged from 5 to 13.^{2,3,7,8,12,13} The large differences between the mean and median number of visits and the mean and median episode length indicate that there are long tails to the right, suggesting that a small proportion of patients who are frequent or long-term users of chiropractic services cause the distributions of visits and episode length to be skewed to the right. The optimal intensity and duration of treatment for any condition is not known.

There was appreciable variability between sites in the amount of care delivered. The median number of visits related to low back pain and the median duration of care differed across sites by more than 2-fold. These differences seem to be larger

than would be expected on the basis of differences between sites in patient characteristics. The reasons for the differences are unknown, but the differences fit into a larger body of regional variations in the medical literature.

The overall chiropractic visit rate at the US sites of 101.2 visits per 100 person-years is higher than the rates of 41 per 100 person-years³ and 62 per 100 person-years¹³ reported in previous studies. In comparison, the visit rate for physicians in the United States in 1994 was estimated to be 262.5 per 100 person-years.¹⁴ In the absence of data collected from a national random sampling, we believe the values reported here represent the best available estimate of the US chiropractic visit rate. We believe this because our study population was similar to the US population in the only sociodemographic characteristics known to predict chiropractic use and because of the relatively small variation in estimated visit rate across geographically diverse sites. Since the number of chiropractors and the percentage of the population using chiropractors have approximately doubled during the past 20 years,^{2,3} we conclude that there has been about a 2-fold increase in use of chiropractic services.

Although previous studies have shown significant geographic variation in the rate of chiropractic use, the chiropractic visit rates among the US sites in the present study were not appreciably different from each other. The small differences in rates between sites are unrelated to differences in chiropractor-to-population ratios.

These findings should be considered with the following limitations in mind. This study is limited somewhat by its dependence on retrospective review of patient records. Diagnostic data and length of low back pain

episode were missing for almost 25% of the patients. It is likely that many chiropractors did not record all of their patients' conditions, symptoms, previous care, and specific diagnostic and treatment modalities. They may have been more or less likely to fail to record these data on patients with specific symptoms or with conditions of a particular length. Since we cannot assess the extent to which this differential recording may have occurred, we cannot determine the magnitude of the resulting bias, if any.

Furthermore, although the sociodemographic variables at our sampled sites closely match those of the United States as a whole, the sites that were selected may not be representative of other sites in the United States. In Canada, Ontario may not be representative of other Canadian provinces. In the United States, we may be able to generalize our site-specific results more confidently where there is limited variation among sites. Although patients presented with similar clinical (musculoskeletal) conditions across sites, differences were detected between sites with respect to the use of previous health care and specific treatment modalities, as well as the duration of episodes of care and the number of visits recorded per episode. These differences indicate that there may be site-specific patterns of treatment, which may be due to differences in patients, providers, or health care systems.

We found that the chiropractic visit rate in the United States is twice that reported 15 to 20 years ago and mirrors the increase in the number of chiropractors. Contrary to previous reports, patients presenting with nonmusculoskeletal symptoms represented less than 10% of all patients in our sample. Although the overall chiropractic visit rate varied little among US sites, the number of visits per episode of care varied among sites by about 2-fold. □

Acknowledgments

This work was supported in part by grants from the Consortium for Chiropractic Research and the Foundation for Chiropractic Education and Research (C34674).

The authors wish to acknowledge Robert Bell, PhD, for help with certain statistical issues.

References

1. Shekelle PG. *The Use and Costs of Chiropractic Care in the Health Insurance Experiment*. Santa Monica, Calif: RAND; 1994. MR-401-CCR/AHCPR.
2. Eisenberg DM, Kessler RC, Foster C, Norlock FE, Calkins DR, Delbanco TL. Unconventional medicine in the United States: prevalence, costs, and patterns of use. *N Engl J Med*. 1993;328:246-252.
3. Shekelle PG, Brook RH. A community-based study of the use of chiropractic services. *Am J Public Health*. 1991;81:439-442.
4. Shekelle PG, Markovich M, Louie R. Factors associated with choosing a chiropractor for episodes of back pain care. *Med Care*. 1995;33:842-850.
5. Shekelle PG, Hurwitz EL, Coulter I, Adams AH, Genovese B, Brook RH. The appropriateness of chiropractic spinal manipulation for low back pain: a pilot study. *J Manipulative Physiol Ther*. 1995;18:265-270.
6. Shekelle PG, Coulter I, Hurwitz EL, et al. The appropriateness of chiropractic spinal manipulation for low back pain in North America. *Ann Intern Med*. In press.
7. Phillips RB. A survey of Utah chiropractic patients. *ACA J Chiropractic*. 1981;18:S-113.
8. Nyiendo J, Haldeman S. A prospective study of 2000 patients attending a chiropractic college teaching clinic. *Med Care*. 1987;25:516-527.
9. Mugge RH. Persons receiving care from selected health care practitioners, United States, 1980. *National Medical Care Utilization and Expenditure Survey*. Series B, Descriptive Report No. 6. Hyattsville, Md: National Center for Health Statistics; September 1984. DHHS publication 84-20206.
10. Plamondon RL. Summary of 1994 ACA Annual Statistical Study. *J Am Chiropractic Assoc*. 1995;32:57-63.
11. Nyiendo J, Phillips RB, Meeker WC, et al. A comparison of patients and patients' complaints at six chiropractic college teaching clinics. *J Manipulative Physiol Ther*. 1989;12:79-85.
12. Phillips RB, Butler R. Survey of chiropractic in Dade County, Florida. *J Manipulative Physiol Ther*. 1982;5:83-89.
13. Von Kuster T. *Chiropractic Health Care: A National Study of Cost of Education, Service Utilization, Number of Practicing Doctors of Chiropractic and Other Key Policy Issues*. Washington, DC: Foundation for the Advancement of Chiropractic Tenets and Science; 1980.
14. Schappert SM. National Ambulatory Medical Care Survey: 1994 summary. *Adv Data Vital Health Stat*. 1996;No. 273.



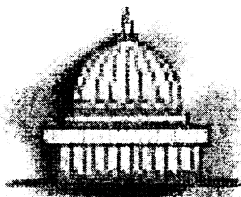
Welcome to the American Public Health Association

<http://www.apha.org>

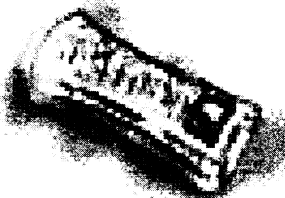
APHA's Home Page has a NEW LOOK! Check out the site for:

- American Journal of Public Health abstracts
- Legislative Action Alerts and other hot issues
- Links to public health sites worldwide

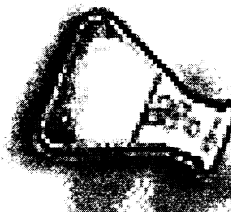
Tell us what you think: comments@apha.org



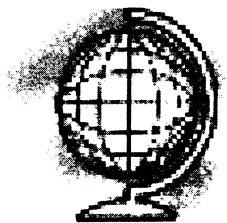
**Legislative Affairs
& Advocacy**



**News
& Publications**



**Science, Practice
& Policy**



**Public Health
Resources**