Chiropractic Care: Is It Substitution Care or Add-on Care in Corporate Medical Plans?

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An analysis of claims data from a managed care health plan was performed to evaluate whether patients use chiropractic care as a substitution for medical care or in addition to medical care. Rates of neuromusculoskeletal complaints in 9e diagnostic categories were compared between groups with and without chiropractic coverage. For the 4-year study period, there were 3,129,752 insured member years in the groups with chiropractic coverage and 5,197,686 insured member years in the groups without chiropractic coverage. Expressed in terms of unique patients with neuromusculoskeletal complaints, the cohort with chiropractic coverage experienced a rate of 162.0 complaints per 1000 member years compared with 171.3 complaints in the cohort without chiropractic coverage. These results indicate that patients use chiropractic care as a direct substitution for medical care. (J Occup Environ Med. *2004;46:847–855*)

After a period of relative stability during the 1990s, the rate of increase in healthcare spending has once again accelerated.[1,2] Annual increases have been between 10% and 15% for the last 3 years (2001–2003). The cost of medical insurance premiums has matched these increases. During the period from 2002 through 2003, the annual rate of increase in insurance premiums averaged 13.9%, and these rates of increase are only expected to increase in the foreseeable future.[3] In response to these increased costs, the employers who fund most private health insurance and the insurance industry are seeking mechanisms to reduce the financial burden of medical care insurance. For the past several decades, the principal mechanism for limiting this financial burden has been the various utilization management tools associated with managed care.

Most agree that although these tools have been relatively effective in controlling costs in the past, there are very few additional savings to be had from utilization management of existing healthcare benefits. This leaves managing the benefit itself, controlling what services are actually covered, and transferring greater financial responsibility to the employees as mechanisms for controlling costs. In this environment, the prospect of providing additional benefits has very little appeal. As health policymakers, employee benefits managers, and insurance company managers decide to what extent chiropractic care should or should not be included in any healthcare benefit package, those decision-makers will be exam-

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ining the net effect of a chiropractic benefit on total premium and medical costs.[4–6] To the extent that the addition of a chiropractic benefit is perceived to add to healthcare costs, there is much less likelihood of adding such a benefit. Similarly, existing chiropractic benefits will come under pressure if it is believed those benefits add costs to the total premium or health plan medical expenses.

In calculating the net cost of a chiropractic benefit, a number of factors must be taken into account. First, the relative unit cost of chiropractic care must be compared with unit cost of medical care. That is, given a comparable patient and severity of condition, what is the cost per episode of chiropractic care versus an episode of medical care? A number of studies have addressed this question but do not arrive at a uniform answer.[7–13,42,43] A study by Carey found that the cost per episode of care under chiropractic care was greater than for primary care medical providers but less than for care by orthopedists.[13] Cherkin found the cost of chiropractic care and that by physical therapists to be nearly identical.[42]

The second factor that will determine the net cost of chiropractic care is the extent to which patients are *substituting* chiropractic care for medical care versus whether patients are using chiropractic care *in addition* to medical care.[16,17] Although chiropractors and physicians undoubtedly treat a similar patient population, their modes of treatment are dissimilar. Because the nature of a chiropractic and medical treatment encounter are different, it might be expected that some patients would use medical care under a certain set of circumstances and chiropractic care under a different set of circumstances.

Finally, to fully measure the economic impact of chiropractic care, it is necessary to evaluate whether chiropractic patient management of back pain, neck pain, and related conditions differs in any way from medical management of these same conditions that affects costs. Specifically, the question arises whether a patient under chiropractic care is more or less likely in the future to seek care for the same or similar health problem than patients treated under medical care. Once again, even if a single episode of care is less costly under chiropractic care, if chiropractors manage patients in a fashion that induces future episodes of care, a chiropractic benefit could increase costs.

This study does not compare the costs of chiropractic versus medical episodes of care. Rather, it analyzes the effect of a chiropractic benefit on the rates of patient complaints for back pain, neck pain, and related conditions and on the number of episodes of care created by chiropractic and medical providers. The investigation takes advantage of a natural experiment in which a set of employers has independently chosen to include or not include a chiropractic benefit in their companies' medical plans. By comparing the rates of patient complaints for a common group of neuromusculoskeletal (NMS) pain diagnoses among those employer groups with and without a chiropractic benefit, it is possible to evaluate the degree to which a chiropractic benefit does or does not create additional demand for medical care services and whether patients are substituting chiropractic care for medical care. The study also measures and compares the frequency of actual episodes of care under chiropractic versus medical care.

Methods

Study Design

Study Population. This 4-year descriptive study (April 1997 to March 2001) used administrative claims data from a large regional managed care network in California. These data included inpatient and outpatient claims data for members of the managed care network who were continuously enrolled during the study period. The dataset included demographic and enrollment information in addition to diagnosis and procedure codes as classified under the *International Classification of Diseases*, 9th Revision (ICD-9) and the *Current Procedural Terminology*, 4th Edition (CPT).

Within this managed care network, individual employers had the option of selecting the health plan with or without a benefit for chiropractic care. This chiropractic benefit was separately administered by American Specialty Health Plans, a health plan that provides benefits riders for services such as chiropractic, acupuncture, and massage therapy. For those employers who selected the chiropractic benefit, the administrative claims data from the 2 networks were merged into 1 unique administrative file, therefore creating 2 main comparative cohorts from the same large health plan: one with access to chiropractic care and the other without. The former group had benefits covering direct access to a chiropractor without the need for a physician referral. Under this benefit plan, the patient copay for a chiropractic office visit was the same as it would be in a medical clinic. The benefit allowed for a maximum of 40 office visits to a chiropractor per year. For the purposes of this study, the following 4 cohorts were evaluated:

1. Cohort A: Patients in health plans that cover chiropractic care who received any treatment (chiropractor or physician) for NMS conditions.
2. Cohort B: Patients in health plans that do not cover chiropractic care who received treatment for NMS conditions (by definition, medical care).
3. Cohort C: Patients in health plans that cover chiropractic care who received chiropractic treatment for NMS conditions.
4. Cohort D: Patients in health plans that cover chiropractic care who received medical treatment for NMS conditions.

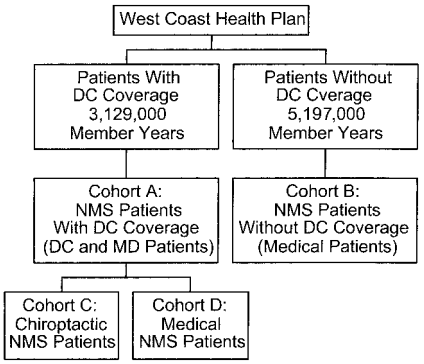

Fig. 1. Overview of study design.

Figure 1 provides an overview of the study design.

There are 2 aspects of this design that need to be emphasized with respect to the study question. First, individual patients do not decide whether they will have chiropractic coverage. That decision is made by benefits managers or others within the particular employer group. Second, the medical physician, hospitals, and clinics that are represented in cohorts B and D are the same group of physicians and institutions. These physicians have patients who both have and do not have chiropractic coverage, and they are unlikely to be systematically aware of this condition. As a result of these 2 design elements, any differences seen between cohorts B and D are most probably the result of the difference in chiropractic coverage and not a confounding factor.

Study Period. The study period covers April 1, 1997, through March 31, 2001.

Identification and Definition of Neuromusculoskeletal Episodes of Care. Identification of NMS pain episodes of care was made by the use of ICD-9 codes that are a part of all administrative claims data. A total of 657 ICD-9 codes were identified as representing this set of conditions. These codes were classified into 8 different diagnostic categories: 1) low back pain, 2) low back pain (complicated), 3) neck pain, 4) neck pain (complicated), 5) thoracic spin pain, 6) headache, 7) myalgias and arthralgias, and 8) other/miscellaneous. The "complicated" designation in the low back and neck pain categories identify those diagnoses suggestive of discopathy and/or radiculopathy. This set of 657 diagnoses represents 96.7% of all chiropractic claims in the health plan. The remaining 3.3% were claims for extremity complaints. Extremity complaints represent a much higher proportion of medical claims. As a result, chiropractic extremity care represented only a very small proportion of total extremity complaints and negligible effects on the total utilization rates. Therefore, these complaints were excluded from the analysis. An expert panel of chiropractors and medical physicians evaluated this diagnostic classification for appropriateness and completeness.

Aggregation of claims into discrete episodes of care was made on the basis of both a "clean period" of 45 days with no claims as well as the diagnostic category that defines the type of episode. The clean period of 45 days is consistent with previous studies using administrative data.[8,9] Each episode is initiated by 1 of the NMS pain codes in the diagnostic list. All services using 1 of these codes and with a maximum gap of 45 days between claims were aggregated into 1 episode of care. Thus, a new episode was created if a new diagnostic category is used or encounters are separated by more than 45 days. A claim-free 45-day window was applied to the start and end points of the 4-year study period to identify and include members with nontruncated episodes. For any episode that begins during this period but extends beyond March 31, 2001, all services related to that episode, within the 45-day limit, were treated as if they fell within the 4-year period. Similarly, any episode that begins within 45 days before April 1, 1997, but extends into the 4-year period was considered to have occurred totally outside of the study period and was not be used in the analysis.

Data Preparation and Merging. Data preparation included transfer of all relevant claims data from the 2 different data sources (see subsequently), loading of the data onto a common server, and filtering by health member continuous enrollment to ready the data for analysis. Data relevant to patient enrollment (ie, insurance coverage information) and health service encounters (ie, dates of service, diagnoses, procedures, and so on) were loaded onto the server. Analysis was conducted using SAS version 6.12. Before the analysis, the data were validated as follows:

- Verification of the names, number of files, and number of records contained in each file with each respective data source.
- Validation of the format of the data (character, numeric, and length).
- Identification of key variables in the datasets (age, diagnosis codes, and so on), production of frequency reports of the data, and validation of the variables' contents, again working with each respective data source.
- Running of algorithms (computer programs designed to detect implausible data) to ensure the integrity of key variables (eg, ICD-9 and CPT-4 codes).

For patients with chiropractic coverage, there is an entirely separate and distinct management and storage of claims data for their chiropractic care than for their medical care. For this study, a patient's chiropractic claims were merged with their medical claims producing a single claims file for each covered patient. Merging of the datasets was accomplished using 1 of the following methods: 1) Each health plan member is assigned a unique identification number that is used for both the medical and chiropractic claims. This number was used to link a patient's chiropractic claims with their medical claims; or

TABLE 1
Demographic and Comorbid Conditions of Patients With Neuromusculoskeletal Claims, Both With and Without Chiropractic Benefits (01/2000 to 12/2000)

	Patients With Chiropractic Coverage	Patients Without Chiropractic Coverage
Demographics		
N	707,690	1,001,995
% Female*	51.6%	52.1%
Mean age†	32.9 (SD = 20.9)	35.5 (SD = 21.6)
Age groups		
0–17	31.9%	26.2%
18–21*	5.1%	4.3%
22–35*	14.6%	18.4%
36–55*	33.7%	33.2%
56–65	8.2%	8.2%
>65*	6.5%	9.6%
Comorbid conditions		
Congestive heart failure*	0.6%	0.9%
Cardiac arrhythmia*	1.6%	2.0%
Hypertension*	6.6%	7.3%
Diabetes‡	2.8%	3.0%
Hypothyroidism*	1.5%	1.5%
Nutritional/metabolic disorder*	1.6%	1.7%
Psychosis*	1.1%	0.9%
Depression*	1.9%	1.6%

* P value $\leq$ 0.001.
† P value $\leq$ 0.0001.
‡ P value $<$ 0.05.

2) In the event there was no common, unique member identifier (because of data entry errors), the data were linked using both member social security number and date of birth. Once the data were linked, a unique identifier was created and name, address, and social security number were purged from the dataset to assure patient confidentiality. Any data not linked by these 2 methods were eliminated from the study.

Data Analysis. The primary study question, "Is chiropractic care substitution care or add-on care?" was evaluated by comparing the rates of patient complaints in the 9e diagnostic categories of NMS pain described previously. If patients are substituting chiropractic care for medical care, a reduction in the rates of episodes of NMS pain should be seen in cohort D (medical patients in groups with chiropractic coverage) versus cohort B (medical patients in groups without chiropractic coverage). Conversely, if little or no substitution is taking place, the rates in these 2 cohorts should be roughly equivalent.

We also compared the total rates of complaints between cohort A (chiropractic and medical patients with NMS complaints in the groups with coverage) and cohort B (medical patients with NMS complaints in groups without chiropractic coverage). If substitution is occurring, there should be little difference in these rates. If little substitution is occurring, the combined rates of chiropractic and medical patients in cohort A will be higher than the rates in cohort B. Because many patients have multiple episodes of care, rates will be expressed both in terms of total number of episodes per thousand health plan members and total number of unique NMS patients per thousand health plan members. The data reported are population parameters and as such are not subject to tests of statistical significance.

There were some employer groups (and thus, some patients) who, during the study period, either picked up or dropped chiropractic coverage. As these changes took place, the patients and their associated healthcare episodes were shifted into the appropriate study cohort. Thus, in calculating the rates of diagnoses in the various cohorts, the total number of patients in each cohort (the denominator in the rate calculation) was expressed in terms of "insured member years."

Results

Data Preparation

Of the chiropractic claims data files from April 1, 1987, through March 31, 2001, 98.3% were successfully merged with the MCO claims files. For the 4-year study period, there were 3,129,752 insured member years in the groups with chiropractic coverage and 5,197, 686 insured member years in the groups without chiropractic coverage.

Study Population Characteristics

An analysis was conducted on a subset of patients who did not change their chiropractic coverage status during calendar year 2000. (The 4-year data contains a slightly greater number of total patients because it also includes those who did change their chiropractic coverage status at some point during the study.) There were small differences in demographic characteristics and rates of comorbid conditions in the study populations. The group with coverage was slightly younger and had fewer comorbid conditions in most of the categories studied. A summary of the study populations is shown in Table 1.

Comparison of Study Cohorts

A total of 1,394,070 unique patients were identified with NMS complaints during the observation period. Of these, 174,209 were chiropractic patients, 332,548 were medical patients with chiropractic coverage, and 887,313 were medical patients without chiropractic coverage. A breakdown of these patients

TABLE 2
Total Number of Unique Patients With NMS Pain Complaints in Study Cohorts

Diagnostic Category	Cohort A Patients With Chiropractic Coverage (Total of C+D)	Cohort B Patients Without Chiropractic Coverage	Cohort C Chiropractic Patients	Cohort D Medical Patients
Low back pain (uncomplicated)	112,420	198,197	42,095	70,325
Low back pain (complicated)	12,307	22,752	4,612	7,695
Low back pain (total)	124,727	220,949	46,707	78,020
Neck pain (uncomplicated)	80,276	117,703	40,144	40,132
Neck pain (complicated)	1,557	3,346	195	1,362
Neck pain (total)	81,833	121,049	40,339	41,494
Thoracic spine/rib pain	37,429	42,372	25,049	12,380
Headache	56,459	122,496	9,313	47,146
Nonspecific myalgias, arthralgias	68,155	124,920	22,264	45,891
Other (misc. undifferentiated pain diagnoses)	138,154	255,527	30,537	107,617
Total	506,757	887,313	174,209	332,548

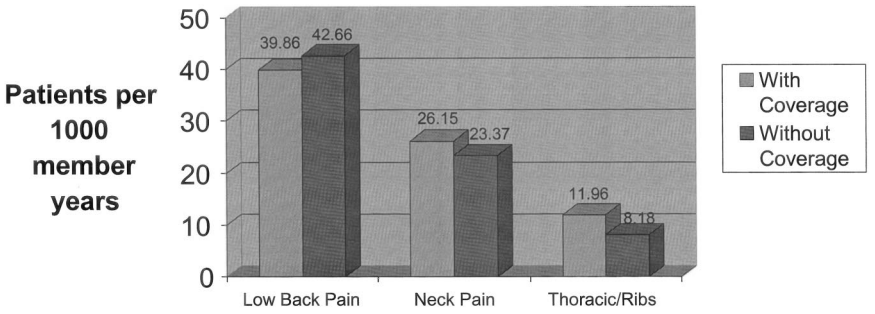

Fig. 2. Rates of patient complaints in groups with and without chiropractic coverage for low back pain, neck pain, and thoracic spine and rib pain.

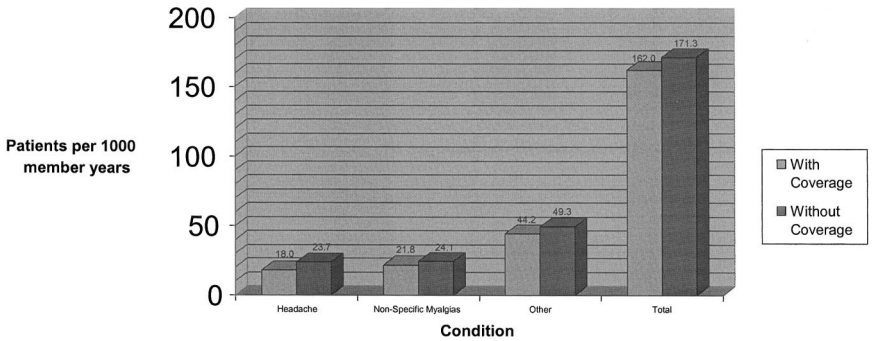

Fig. 3. Rates of patient complaints in groups with and without chiropractic coverage for headache, nonspecific myalgias, and other complaints. Also shown is the total rate of all conditions in the 2 study groups.

by cohort and diagnostic category is shown in Table 2.

Converting these raw counts to rates per 1000 member years allows a direct comparison of the utilization of care in the cohorts with and without chiropractic coverage. In 2 of the diagnostic categories, thoracic spine pain and neck pain, rates were slightly higher in the groups with coverage. In the other 4 categories, low back pain, headache, nonspecific myalgias, and other rates were higher in the groups without coverage. In total, the groups with chiropractic coverage experienced a rate of 162.0 NMS complaints per 1000 member years compared with 171.3 NMS complaints in the groups without coverage. Figures 2 and 3 compare the rates of patient complaints per 1000 member years. The group with coverage includes both chiropractic and medical patients.

Treatment of these patients resulted in 1,997,356 episodes of care for NMS complaints. Of these, chiropractic care resulted in 357,697 episodes; medical care to patients with a chiropractic benefit resulted in 450,221 episodes; and medical care to patients without a chiropractic benefit resulted in 1,189,438 episodes. Table 3 shows a breakdown of these episodes by cohort and diagnostic category.

Expressing the care in terms of episodes per 1000 member years produces a different finding than expressing it in terms of patients per 1000 member years. In 5 of the 6 diagnostic categories, with the exception being headache, rates were higher in the group with chiropractic coverage. They were markedly higher in the spine categories and only slightly higher in the nonspecific and other categories. Including all diagnostic categories, the group with coverage experienced 258.2 episodes per 1000 member years versus 229.6 episodes in the group without coverage. Figures 4 and 5 compare the rates of episodes in per 1000 member years. As stated previously, the group with coverage includes both chiropractic and medical patients.

TABLE 3
Total Number of Episodes of Care for NMS Complaints in Study Cohorts

Diagnostic Category	Cohort A Patients With Chiropractic Coverage (Total of C+D)	Cohort B Patients Without Chiropractic Coverage	Cohort C Chiropractic Patients	Cohort D Medical Patients
Low back pain (uncomplicated)	183,356	154,960	87,958	95,398
Low back pain (complicated)	18,223	4,041	7,350	10,873
Low back pain (total)	201,579	159,001	95,308	106,271
Neck pain (uncomplicated)	137,989	268,143	86,574	51,415
Neck pain (complicated)	1,884	31,391	281	1,603
Neck pain (total)	139,873	299,534	86,855	53,018
Thoracic spine/rib pain	62,044	52,061	47,973	14,071
Headache	82,953	163,410	17,669	65,284
Nonspecific myalgias, arthralgias	114,982	180,193	47,923	67,059
Other (misc. undifferentiated pain diagnoses)	206,307	335,239	61,789	144,518
Total	807,738	1,189,438	357,517	450,221

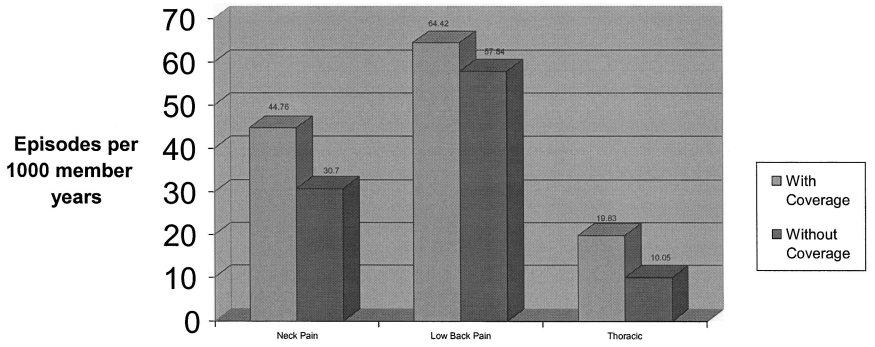

Fig. 4. Rates of episodes of care in groups with and without chiropractic coverage for neck pain, low back pain, and thoracic spine and rib pain.

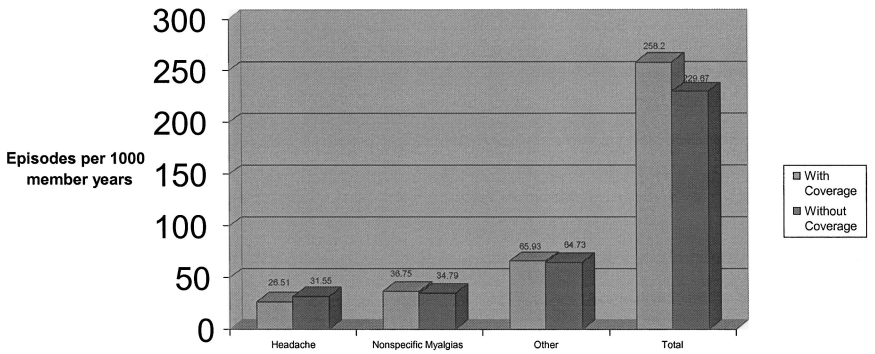

Fig. 5. Rates of episodes of care in groups with and without chiropractic coverage for headache, nonspecific myalgias, and other complaints. Also shown is the total rate of episodes of care for all conditions in the 2 study groups.

Discussion

Table 1 shows that there are statistically significant differences in demographic and comorbid characteristics between the 2 main study groups. However, it should be emphasized that the statistical significance is largely the result of the extremely large sample size and not of large group differences. Overall, the study populations are quite comparable and the small population differences are unlikely to have affected the study results.

Two distinct patterns emerge from this study. First, the presence of a chiropractic benefit does not appear to increase the number of patients who seek care for NMS pain complaints. With some relatively minor exceptions, for instance, thoracic spine pain, patients who seek chiropractic care for NMS conditions appear to substitute that care for medical care on a one-to-one basis for the particular region of complaint. In all of the diagnostic categories, the rates of NMS patient complaints in the cohort with chiropractic coverage (both medical and chiropractic patients) was very similar to the rates in the cohort without coverage. The overall rate of all NMS complaints in the 2 cohorts was within 5% of each other, with the lower rate being in the group with chiropractic coverage.

From the point of view of an insurer or an employer who is considering the impact of adding a chiropractic benefit, these results suggest that a chiropractic benefit is quite different than, for example, a dental benefit. When an employer adds a dental benefit, they are not replacing care from preexisting providers covered by a standard medical benefit. All services provided under a standalone dental benefit represent new costs. A more accurate characterization of the addition of a chiropractic benefit would be that it is the equivalent of expanding the network of available providers for care of NMS conditions. Patients with back pain, neck pain, and related com-

plaints can choose either chiropractic care or medical care, and this expanded choice does not seem to result in more patients seeking care.

The second pattern to emerge is that patients who come under chiropractic care experience more episodes of care than patients under medical care. In most diagnostic categories, chiropractic patients experienced approximately 2 episodes of care, whereas medical patients experienced just over 1 episode. This pattern is most pronounced in the 3 back pain categories. The overall rate of episodes per patient in the chiropractic cohort was 2.05 versus 1.35 among medical patients in the group with coverage.

There are 2 possible interpretations of this second finding. It could be that the treatment effects of chiropractic are not as longlasting as medical care and that chiropractic patients are returning for care as their symptoms return. However, this supposition is not supported in the clinical literature. The evidence that does exist suggests that spinal manipulation, which is the primary treatment modality used by chiropractic providers, is at least as robust as medical interventions relative to long-term effects.[18–23]

A more plausible explanation is that chiropractic management styles encourage patients to return for care. It is possible that the attitude toward back pain among chiropractors and medical physicians is quite different. For chiropractors, the set of NMS complaints considered in this study comprises virtually the whole of chiropractic practice.[24–27] Chiropractors' attitudes toward these complaints undoubtedly reflect this fact. By contrast, NMS pain complaints, at least for nonspecialist physicians, represent a small subset of their total patient population. Medical physicians are known to regard back pain as a frustrating complaint to treat and could communicate this attitude to patients, which could discourage future care.[28–30] Additionally, there is ample evidence that patient satisfaction with chiropractic care for back pain is substantially higher than patient satisfaction with medical care for back pain.[31–37] Patients who have had a generally more positive experience with chiropractic care could be more likely to return for subsequent care.

A study by Stano also reported more episodes of care among chiropractic patients.[38] It was hypothesized that this could reflect a tendency of patients with more chronic NMS conditions to migrate to chiropractic management. Most studies have found chiropractic and medical back pain patients to have a similar level of severity, but there are no data on the relative chronicity of these patients with which to evaluate this hypothesis.

The net effect of this higher rate of episodes among chiropractic patients is relatively modest. The overall rate (all diagnostic categories) of episodes of care among the group with chiropractic coverage is only 12% higher than the group without coverage.

This study demonstrates that in evaluating the relative cost of chiropractic care, it is necessary to evaluate costs at both the episode level and at the patient level. Existing studies that have compared an *episode* of chiropractic care with an *episode* of medical care could have underestimated the chiropractic costs.

Most of the data that describe the utilization of chiropractic care is derived from surveys rather than from claims data or from other sources that directly measure care.[39–41] In this study, the rate of utilization of chiropractic care by NMS patients with a chiropractic benefit was quite high. Overall, patients with NMS complaints with chiropractic coverage used chiropractic care 34.4% of the time. It is of particular interest to note that among the patients in the 3 back pain categories, chiropractors saw 45.9% of all patients in the group with chiropractic coverage. This figure is considerably higher than is usually reported. These findings suggest that when patients are offered the choice of chiropractic care, through a chiropractic benefit, versus medical care for back pain, nearly half the patients will choose chiropractic care.

Limitations

There are no data available from the national health plan to determine any potential differences in the types of employers with and without chiropractic coverage. It is not known if the 2 sets of employers, those with and without a chiropractic benefit, examined in this study varied significantly in the industry and job type represented by those employers. Thus, it might be possible that these results are skewed by differences in the makeup of employers in the comparative groups. However, our analysis of the demographic and comorbid status of the 2 groups demonstrated only very minor differences among the employee populations. It is very unlikely that the overall effects seen in this study are systematic artifacts of different patient populations.

It might be argued that the finding of more episodes of care under chiropractic management is simply an artifact of the arbitrary definition of episodes of care and is mostly a reflection of the different styles of chiropractic and medical practice. In this regard, the average duration of an episode of care for uncomplicated low back pain under chiropractic management was 35 days, compared with 10 days under medical care. Results from this study and others indicate that it is clearly a characteristic of chiropractors to provide more services per episode for back pain than medical physicians. If the definition of episode of care were changed to lengthen the "clean period," the rates of chiropractic and medical episodes would be much more similar. In any case, it remains true that the most valid comparison of the cost of chiropractic versus medical management is on a per-

patient basis, thereby aggregating all episodes into 1.

Results of this study might not be generalizable to other medical care settings and financing arrangements. If a different set of economic incentives and management procedures were in place, these could result in different rates of utilization of healthcare services. In this study, the medical providers were reimbursed under a capitated arrangement, which did not provide economic incentives to increase care. Under a more traditional fee-for-service financial arrangement, it might be possible that the medical providers would adjust their behavior to attract and retain more NMS pain patients and thus create provider-induced demand. It should be noted, however, that the chiropractic providers in this study were operating in a fee-for-service environment and their actions did not seem to result in a net effect of increased demand.

In calculating the cost of chiropractic care, it must be observed that chiropractors often manage patients outside of the context of treating a discrete episode of pain. Chiropractors could dispense a variety of nutritional or herbal supplements. Chiropractors could also administer so-called "maintenance care" to asymptomatic patients. These practices were not considered within the parameters of the covered chiropractic benefit that was analyzed in this study, but such practices could well be the norm in other circumstances.

Conclusion

Within a managed care setting, the inclusion of a chiropractic benefit does not increase the overall rates of patient complaints for low back pain, neck pain, and related NMS pain disorders. Patients appear to be directly substituting chiropractic care for medical care. At the same time, those patients who use chiropractic care experience more subsequent episodes of care than patients who use medical care. Thus, the economic effects of a chiropractic benefit in this setting are best evaluated on the basis of a per-patient comparison rather than on a per-episode comparison.

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