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Do Chiropractic Physician Services for Treatment of Low Back and Neck Pain Improve the Value of Health Benefit Plans?

An Evidence-Based Assessment of Incremental Impact on Population Health and Total Health Care Spending

A report prepared for the Foundation for Chiropractic Progress

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Executive Summary

Low back and neck pain are extremely common conditions that consume large amounts of health care resources. Chiropractic care, including spinal manipulation and mobilization, are used by almost half of US patients with persistent back-pain seeking out this modality of treatment. Does the availability of chiropractic care improve the value of health benefit plans?

The peer-reviewed scientific literature evaluating the effectiveness of US chiropractic treatment for patients with back and neck pain suggests that these treatments are at least as effective as other widely used treatments. However, US cost-effectiveness studies have methodological limitations.

High quality randomized cost-effectiveness studies have to date only been performed in the EU. To model the EU study findings for US populations, we applied US insurer-payable unit price data from a large database of employer-sponsored health plans. Our findings rest on the assumption that the *relative differences* in the cost-effectiveness of low back and neck pain treatment with and without chiropractic services are similar in the US and the EU.

The results of our analysis are as follows:

- Effectiveness: Chiropractic care is *more effective* than other modalities for treating low back and neck pain.

- Total cost of care per year:
  - For low back pain, chiropractic physician care *increases* total annual per patient spending by $75 compared to medical physician care.
  - For neck pain, chiropractic physician care *reduces* total annual per patient spending by $302 compared to medical physician care.

- Cost-effectiveness: When considering effectiveness and cost together, chiropractic physician care for low back and neck pain is *highly cost-*

effective, represents a good value in comparison to medical physician care and to widely accepted cost-effectiveness thresholds. Because we were unable to incorporate savings in drug spending commonly associated with US chiropractic care, our estimate of its comparative cost-effectiveness is likely to be understated.

Our findings in combination with existing US studies published in peer-reviewed scientific journals suggest that chiropractic care for the treatment of low back and neck pain is likely to achieve equal or better health outcomes at a cost that compares very favorably to most therapies that are routinely covered in US health benefit plans. As a result, the addition of chiropractic coverage for the treatment of low back and neck pain at prices typically payable in US employer-sponsored health benefit plans will likely increase value-for-dollar by *improving* clinical outcomes and either reducing total spending (neck pain) or increasing total spending (low back pain) by a smaller percentage than clinical outcomes improve.

Introduction and Purpose

Low back and neck pain are extremely common conditions that consume large amounts of health care resources. Twenty-six percent of U.S. adults surveyed in 2002 reported back pain in the previous 3 months; 14% had experienced neck pain.[1] The lifetime prevalence of back pain is estimated to be 85%. Low back pain alone accounts for 2% of all physician office visits; only routine examinations, hypertension, and diabetes result in more.[2] Annual national spending on spine-related problems is estimated to be $85 billion in the US, an inflation-adjusted increase of 65% compared with 1997.[2]

The treatment options for low back and neck pain are diverse, ranging from rest to surgical reconstruction. Chiropractic care, including spinal manipulation and mobilization, are widely used in the US with almost half of all patients with persistent back-pain seeking out this modality of treatment.[3]

A vast scientific literature has evaluated the effectiveness of chiropractic treatment for patients with common types of back and neck pain and the comparative effectiveness of these modalities with other widely-used treatments.[4-6] While this literature is complex and has methodological limitations, it supports several conclusions:

- chiropractic care is at least as effective as other widely used therapies for low back pain;

- chiropractic care when combined with other modalities, such as exercise, appears to be more effective than other treatments for patients with neck pain.

The cost-effectiveness of chiropractic care is promising but remains incompletely evaluated in the US.

Accordingly, this report was commissioned by the Foundation for Chiropractic Progress to summarize the existing economic studies of chiropractic care published in peer-reviewed scientific literature, and to use the most robust of these studies to estimate the cost-effectiveness of providing chiropractic insurance coverage in the US.

Existing US Economic Studies of Chiropractic Care

A variety of US studies have attempted to evaluate the costs associated with providing chiropractic care for patients with common types of lower back and neck pain. These analyses, which have generally excluded patients with known malignancy or an acute fracture, unfortunately provide conflicting results and have methodological shortcomings that impair their interpretability.

Non-randomized studies have compared patients who sought care from chiropractors or other practitioners. While one of these, which only evaluated outpatient costs, found costs to be higher for patients treated by chiropractors,[7],

three others found total costs to be lower for patients who received treatment (either initially or during the course of their care) from chiropractic physicians as compared with those receiving care exclusively from medical physicians.[8-10]

Two studies evaluating patients who had chiropractic coverage included in their insurance benefits found lower costs[11] and reduced use of imaging studies, inpatient hospitalizations, and surgical procedures[12] as compared to patients with no chiropractic coverage. All of these studies are limited by the fact that patients decided themselves which practitioner to see (giving rise to selection bias), which cannot be fully remedied with advanced statistical techniques.

Several randomized studies, which overcome issues of selection bias and ensure the comparability of patients in different treatment groups, have compared chiropractic and other care for patients with various spine problems in the United States.

- A study conducted by Group Health Cooperative of Puget Sound randomized patients with acute back pain to receive physical therapy, chiropractic manipulation or an exercise booklet.[13] Chiropractic care achieved equivalent clinical outcomes at slightly reduced cost compared to physical therapy. Both of these modalities were more effective, but also more costly, than the use of an informational booklet. However, this study was performed in a staff model HMO in a US market known for its highly conservative medical utilization patterns.

- The UCLA back pain study randomized patients with low back pain (regardless of duration) to receive medical care (with or without physical therapy) or chiropractic care (with and without physical therapy).[14] While the trial found no meaningful differences in clinical outcomes,[15] outpatient spending after 18 months was substantially higher in the patients receiving chiropractic care. The study excluded important costs, including those associated with surgery, which makes it a problematic candidate for estimating the cost impact of chiropractic services.

- A trial conducted at a large multi-specialty group practice in Boston enrolled patients presenting with an initial complaint of back pain to receive usual medical care or medical care plus a choice of complementary therapies.[16] Symptom relief and functional status did not differ between the treatment groups, although patients receiving complementary therapy reported substantially higher rates of satisfaction. Net costs for patients in the usual care plus complementary care treatment arms were also higher. However, only a quarter of patients in the complementary care arm chose chiropractic care (the others received massage or acupuncture), thereby limiting the ability to generalize these results to chiropractic treatment.

In summary, numerous studies have attempted to evaluate the economic implications of providing chiropractic care for US patients with low back and neck pain. On balance, these studies suggest that choosing chiropractic care or having access to it may be cost-effective, but they have methodological limitations. As a result, in the next section we constructed an economic model, based in part on higher quality EU studies, in order to estimate the likely impact on health care spending from extending chiropractic coverage for these two conditions in US health benefit plans.

Evaluating the Cost-effectiveness of Covering Chiropractic Care in the US

We constructed a model to derive contemporary US-based estimates of the cost-effectiveness of insurance coverage for chiropractic physician services versus coverage only for medical physician services (MD, DO, PT and others) for low back and neck pain for causes other than known fracture or malignancy.

Analytic Method

We estimated the costs and clinical outcomes achieved by different treatment modalities for low back and neck pain, and compared them by calculating incremental cost-effectiveness ratios. Such rates incorporate differences in both the

effectiveness and the costs of different treatments into one measure and is the standard method for estimating the cost-effectiveness of health care interventions.

Incremental cost-effectiveness ratios are calculated by dividing the differences in total cost of care per episode of care between chiropractic and other modalities of care (i.e. the incremental cost) by differences in their effectiveness (i.e. incremental effectiveness). Effectiveness was measured using quality-adjusted life years (QALYs), which are a standard means of assessing both the length and quality of a patient's life, the latter of which is particularly relevant for patients with back and neck pain.

The estimates produced in this manner (in dollars per QALY units) are a common currency for assessing the value of health care interventions and thus facilitate the comparison of chiropractic care for spinal disorders with other treatments for these conditions as well as unrelated disorders. Interventions with cost-effectiveness ratios below $50,000 to $100,000 per QALY are generally considered to be cost-effective.

Data Sources

We obtained estimates of the clinical and resource utilization implications of chiropractic physician care and other treatment modalities for low back and neck pain, from two high-quality randomized trials conducted in Europe:

- Korthals-de Bos conducted a trial in the Netherlands that studied patients with neck pain of at least 2 weeks' duration. Patients were randomized to receive 6 weeks of manual therapy, physiotherapy and general practitioner care and then outcomes were assessed over a 1-year period.[17] Patients could receive treatments other than those to which they were randomized after the 6-week intervention period. Economic data was collected prospectively (i.e. as a pre-planned primary study outcome).

- The UK BEAM study randomized patients presenting with low back pain to receive medical care alone or medical care plus exercise, spinal manipulation or a combination of manipulation and exercise. [18] Patients in

the manipulation and exercise arms received their randomized treatments for 12 weeks. Patients in the combination arm underwent 6 weeks of manipulation then 6 weeks of exercise. As with the Dutch study, the economic evaluation was performed prospectively.

While these studies were conducted in Europe, they are methodologically rigorous and should provide reasonable estimates of health outcomes (presented in QALYs). In the US, different payers pay different prices for health care services and products. Accordingly, the impact of adding chiropractic services to US health insurance plans was calculated by multiplying the amount of resources used by patients in each arm of the two EU trials (e.g. number of physician visits, chiropractic visits, hospitalization days) by US-based average unit prices per service payable by US commercial insurers. This analytic strategy assumes that the *relative* effectiveness and resource utilization in the US is comparable to those observed in the 2 European trials. "Relative" means the difference between chiropractic and medical physician treatment. The validity of our findings depends on this assumption.

Unit prices payable by US insurers for neck and lower back pain care were calculated from Mercer HealthOnline, which contains billing data from more than 80 large employer-sponsored health benefit plans covering almost 3 million member lives. Separate models were created for back and neck pain. The specific model parameters used are summarized in the tables below.

Because of a lack of sufficiently detailed drug information in the EU studies, prescription drug expenditures were not included in our analysis. Based on data from two randomized controlled trials, inclusion of prescription drug costs is very likely to have increased costs in the medical physician services only arm relative to the chiropractic physician services arm. In the Dutch neck pain study, prescription drug use was 9% higher in patients treated by medical physician services only than patients treated by chiropractic physician services.[17] The UCLA back pain study, reported prescription drug use rates of 64% in the medical physician arm versus 37% in the chiropractic physician arm and 39% in the physiotherapy arm.[15] Thus, had our

analysis included prescription drug costs it likely would have increased our estimate of the relative cost-effectiveness of chiropractic care.

TABLE 1: Resource use and US-based unit prices for low back pain analysis

Resource Item	Payable Unit Prices	Resource Use by Treatment Arm			
		Medical	Exercise	Manipulation	Exercise + Manipulation
Medical physician care	$ 74.87	4.6	3.8	5.4	4.0
Chiropractic physician care	$21.78	…	…	11.1	8.5
Exercise sessions	$54.82	…	4.6	0	3.7
Hospital inpatient days	$8,334	0.2	0.2	0.2	0.2
Outpatient visits to specialist	$74.87	1.0	1.3	0.9	0.6
Outpatient visits to PT	$54.82	3.6	9.6	4.3	6.2

TABLE 2: Resource use and US-based unit prices for neck-pain analysis

Resource Item	Payable Unit Prices	Resource Use by Treatment Arm		
		Medical	Exercise	Manipulation
Medical physician care	$74.87	3	0.7	0.5
Chiropractic physician care	$21.78	7.2	1.5	7.3
Exercise sessions	$54.82	3	14.7	1.2
Outpatient appointment	$74.87	0.4	0.7	0.2
Professional home care, hours	$29.00	0.1	0.3	0
Interventional procedures	$439.79	…	…	…

Findings: Back Pain

The results of the cost-effectiveness models for back pain are presented in Table 3. Medical physician-only care was least costly but also least effective (as measured in QALYs).

TABLE 3: Cost-effectiveness of treatments for low back pain

Treatment arm	1-Year Values		Difference Relative to Medical Physician Care		Incremental Cost Effectiveness Ratio versus Medical Physician Care*
	Cost	Efficacy (QALYs)	Cost	Efficacy (QALY)	
Medical physician care	$2,355	0.618			--
Chiropractic physician care	$2,431	0.659	$75	0.04	$1,837
Physiotherapy-led exercise	$3,192	0.635	$837	0.02	$49,210
Manipulation and physiotherapy-led exercise	$2,507	0.651	$152	0.03	$4,591

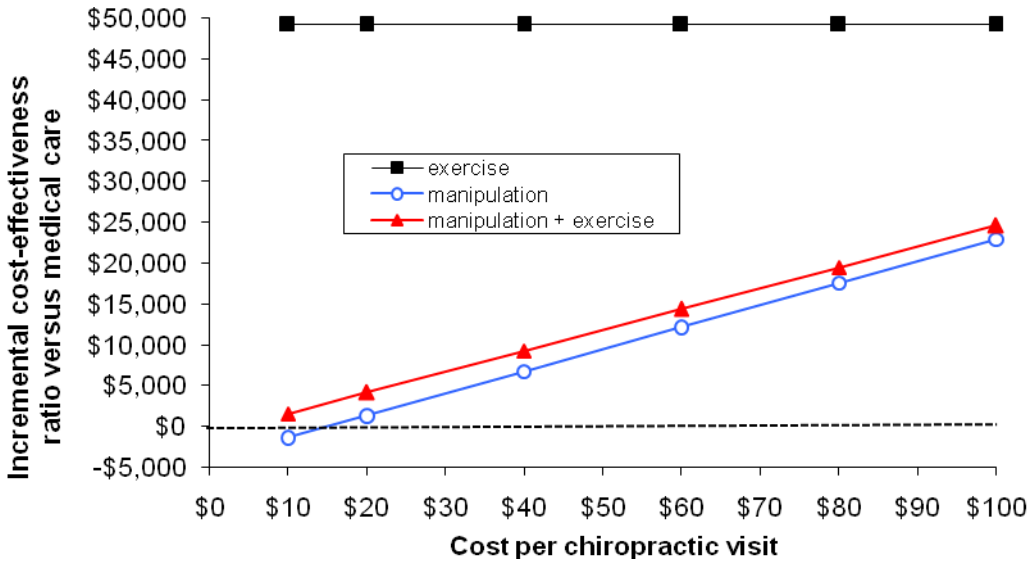
*lower is better; QALY = quality-adjusted life year

Adding chiropractic physician care is associated with better health outcomes at an increased cost of $75 per patient. This is equivalent to an incremental cost-effectiveness ratio of $1,837 per QALY. This compares extremely favorably to the cost-effectiveness of most widely-used therapies and suggests that offering chiropractic care for low back pain is a very good value relative to widely-accepted thresholds ($50,000 to $100,000 per QALY) for assessing whether a health care intervention is cost-effective.

When combined with exercise, chiropractic physician care is also very cost-effective as compared to exercise alone. The combined approach would achieve improved health outcomes at a cost of $152 per patient, which is equivalent to an incremental cost-effectiveness ratio of $4,591 per QALY.

The impact of altering insurer-payable fees for spinal manipulation on the cost-effectiveness of these interventions is shown in Figure 1. As expected, if the payable spinal manipulation fees were to increase, the cost-effectiveness of chiropractic care for low back pain becomes less favorable, although even at a significantly increased fee (e.g. $100 per visit or approximately 5 times the fee assumed in our base case analysis), chiropractic care (with or without exercise) is substantially more cost-effective than exercise alone. This observation is important because the average insurer-payable fees per chiropractic visit create substantial cost-sharing by US patients.

FIGURE 1: Impact of the insurer-payable fee per visit of spinal manipulation on the cost-effectiveness of chiropractic care for low back pain



Findings: Neck Pain

The results of the neck pain cost-effectiveness model are presented in Table 4.

TABLE 4: Cost-effectiveness of treatments for neck pain

Treatment arm	1-Year Values		Difference Relative to Medical Physician Treatment		Incremental Cost Effectiveness Ratio versus Medical Physician Treatment*
	Cost	Efficacy (QALY)	Cost	Efficacy (QALY)	
Medical physician care	$579	0.77	--	--	--
Chiropractic physician care	$277	0.82	-$302	0.05	Cost-saving
Exercise	$952	0.79	$373	0.02	$18,665
*lower is better; QALY = quality-adjusted life year					

Using the parameters defined in Table 2, patients who receive chiropractic physician care for their neck pain achieved better clinical outcomes (measured in QALYs) at a lower cost (on average $302 per patient) than medical physician care. Overall, neck pain by chiropractic physicians is estimated to save $6035 per QALY.

Chiropractic care for neck pain would remain economically attractive across a wide-range of insurer-payable per visit manipulation fees and utilization practices. For example, as shown in Table 5, chiropractic care saves money relative to medical care regardless of the fee for each chiropractic visit. This, in part, reflects the fact that after the 6-week intervention period in the Dutch Neck Pain Trial,[17] many patients treated by medical physicians subsequently were referred or self-referred for manipulation. Information does not exist to confidently model the impact on service volume associated with varying the payable amount per visit.

TABLE 5: Impact of fees for spinal manipulation on the cost-effectiveness of chiropractic care for neck pain at various payable fees per chiropractic physician visit

Fees per chiropractic visit	Difference in 1 year costs for chiropractic v. medical physician care*	Incremental cost-effectiveness ratio ($ per QALY)**
$20	-$302	-$6,035
$40	-$300	-$5,995
$60	-$298	-$5,955
$80	-$296	-$5,915
$100	-$294	-$5,875

*negative values mean that chiropractic care is cost-saving
**negative values mean that chiropractic care is associated with lower cost and increased quality
QALY = quality-adjusted life years

If exercise therapy were provided by chiropractors instead of physical therapists, 1-year costs would fall to $464, resulting in savings of $114 per beneficiary.

Conclusion

Using data from high-quality randomized controlled EU trials and contemporary US based average unit prices payable by commercial insurers, we project that insurance coverage for chiropractic physician care for low back and neck pain for conditions other than fracture and malignancy is likely to drive improved cost-effectiveness of US care. For neck pain it is also likely to reduce total US health care spending. These favorable results would likely occur within a 12-month timeframe. The validity of our estimates depends on the equivalence between the US and EU of relative differences in the cost-effectiveness of chiropractic and medical physician services. In combination with the existing US-based literature, our findings support the value of health insurance coverage of chiropractic care for low back and neck pain at average fees currently payable by US commercial insurers.

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