

# VARIATIONS IN PATTERNS OF UTILIZATION AND CHARGES FOR THE CARE OF LOW BACK PAIN IN NORTH CAROLINA, 2000 TO 2009: A STATEWIDE CLAIMS' DATA ANALYSIS

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## ABSTRACT

**Objectives:** The purpose of the study was to compare utilization and charges generated by medical doctors (MD), doctors of chiropractic (DC) and physical therapists (PT) by patterns of care for the treatment of low back pain in North Carolina.

**Methods:** This was an analysis of low-back-pain-related closed claim data from the North Carolina State Health Plan for Teachers and State Employees from 2000 to 2009. Data were extracted from Blue Cross Blue Shield of North Carolina for the North Carolina State Health Plan using *International Classification of Diseases, 9th Revision* diagnostic codes for uncomplicated low back pain (ULBP) and complicated low back pain (CLBP).

**Results:** Care patterns with single-provider types and no referrals incurred the least charges on average for both ULBP and CLBP. When care did not include referral providers or services, for ULBP, MD and DC care was on average \$465 less than MD and PT care. For CLBP, MD and DC care averaged \$965 more than MD and PT care. However, when care involved referral providers or services, MD and DC care was on average \$1600 less when compared to MD and PT care for ULBP and \$1885 less for CLBP. Risk-adjusted charges (available 2006-2009) for patients in the middle quintile of risk were significantly less for DC care patterns.

**Conclusions:** Chiropractic care alone or DC with MD care incurred appreciably fewer charges for ULBP than MD care with or without PT care. This finding was reversed for CLBP. Adjusted charges for both ULBP and CLBP patients were significantly lower for DC patients. (*J Manipulative Physiol Ther* 2016;39:252-262)

**Key Indexing Terms:** *Low Back Pain; Chiropractic; Medical Care; Health Services; Utilization; Healthcare Costs*

The numbers of reported cases of neck and back problems have increased dramatically. Martin et al<sup>1</sup> reported 14.8 million cases in 1997 and 21.9 million in 2006, a 67.6% increase in 6 years. The Centers for Disease Control and Prevention reported that back or spine problems are the second most common cause of disability in the United States, and noted a 7.7% increase in

disability cases due to an aging population.<sup>2,3</sup> Overall, 1% to 2% of adults in the United States are disabled due to back pain.<sup>4</sup> With spine-related disability increasing, the implications on healthcare policy, spending, and identification of cost effective treatment strategies are enormous.

The rise in prevalence of back pain and increased utilization of healthcare services are driving the costs of the

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back pain epidemic upward. Martin et al<sup>5</sup> compared the medical costs of 22 258 participants with and without spine problems from 1997 to 2005, adjusting for age and gender. Those with spine problems exhibited a 65% higher increase in medical expenditures from \$4695 in 1997 to \$6096 in 2005 per person. Martin et al also reported that the largest proportion of increasing per user medical expenditures for spine-related problems were for inpatient hospitalizations (37%), outpatient costs (18%), prescription drugs (139%), and emergency room visits (84%).<sup>1</sup>

Patients with back pain are most often seen by medical doctors (MD), doctors of chiropractic (DC), physical therapists (PT) and medical specialists to which they are referred.<sup>6</sup> Annual expenditures for MD, DC, and PT care combined have been estimated to range from \$84.1 billion to \$624.8 billion for low back problems in the United States.<sup>7</sup> Increased costs can be attributed to inflation, an increase in the numbers of office visits to each of these providers, and increases in annual per user expenditures as a result of the mix of services (imaging, specialty interventions, etc). From 1999 to 2008, yearly average inflation-adjusted medical expenditures for patients with primary diagnoses of back or neck conditions rose from \$487 to \$950 (a 95% increase), mostly due to the steeply rising costs associated with medical specialists and physical therapy services.<sup>8</sup> Chiropractic care experienced a 57% increase in patient visits from 2000 to 2003 in the US, while the mean costs per patient and per chiropractic office visit have remained stable over time.<sup>9</sup>

The aim of this study was to assess the utilization and cost of care patterns for low back pain among patients in the North Carolina State Health Plan (NCSHP) for Teachers and State Employees from 2000 to 2009. We compared the cost of care of these patterns of care: patients who utilized MDs and DCs alone, MD and DC care in combination with each other, MD or DC care in combination with PT, and/or with additional referred provider care.

## METHODS

This study is a retrospective closed-claim analysis of the NCSHP. These data include claims generated annually by approximately 660 000 covered beneficiaries (state employees, dependents, and retirees), between the years 2000 and 2009. Data were extracted from Blue Cross Blue Shield of North Carolina using an extraction model developed with clinical healthcare analysts from the NCSHP.

### Cohort Identification and Stratification

The low back pain analytic cohort identified all professional and facility claims for a healthcare event with a primary low back pain diagnosis as identified by *International Classification of Diseases, 9th Revision (ICD-9)* diagnosis codes. The *ICD-9* codes used to select the cohort were the most common codes used across all 3 professions (MD, DC, and PT). It was not the intent of this study to include every possible *ICD-9*

**Table 1.** Primary Diagnoses (*ICD-9* codes) Defining Each Type of Low Back Pain

ULBP	CLBP
Facet joint fixation (718.48)	Lumbar spondylosis with myelopathy (721.42)
Facet joint swelling (719.08)	Degeneration of intervertebral disc (722.52)
Lumbar spondylosis (721.3)	Disorder of intervertebral disc with myelopathy (722.73)
Lumbago (724.2)	Lumbar stenosis (724.02)
Facet syndrome (724.8)	Sciatica (724.3)
Muscle spasm (728.85)	Neuritis or radiculitis (724.4)
Spondylolisthesis (756.12)	Compression of spinal nerve root (724.9)
Sprain/strain (847.2)	Numbness or tingling (782.0)

CLBP, complicated low back pain; ULBP, uncomplicated low back pain

code utilized by each of the 3 provider types or their specialist referral destinations. It was instead to include the most common codes used by all of the provider types. The codes used by DCs, "Subluxation" *ICD-9* codes, were excluded for a number of reasons. Medical and PT offices rarely use subluxation codes when billing third party payers. These codes are only required when billing traditional Medicare. In these circumstances, Medicare is the primary payer and NCSHP would be secondary. All claims in which NCSHP was the secondary payer were excluded from the analysis.

Secondary, tertiary, and quaternary codes were not used because substantial utilization unrelated to the treatment of low back pain came up in the initial extraction. This would have led to overestimation of low back pain charges in our cohort. Therefore, we chose to use the primary diagnosis to identify cases and subsequent claims. According to *ICD-9* coding guidelines, the primary diagnosis listed on a claim form should reflect the principal reason for the patient's visit on that date of service. By only using the primary diagnosis to identify claims of interest, our analysis provides estimates that are more conservative by eliminating the scatter of cases where low back pain was only a secondary or tertiary complaint.

The low back pain cohort was then stratified into 2 broad categories of low back pain: (1) uncomplicated low back pain (ULBP), and (2) complicated low back pain (CLBP). Table 1 shows the primary diagnoses (*ICD-9* codes) used to distinguish between ULBP and CLBP. Our clinical rationale for this stratification was that patients with diagnoses included in the ULBP category were less likely to have radicular complaints than those in the CLBP category and would require fewer healthcare services. Although the reliability of using *ICD-9* codes to distinguish between these categories could be argued, all provider patterns were evaluated relative to them under the same assignment.

### "Claim" Defined

Each claim represents a unique clinical service as defined by an individual allowed Current Procedural

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