

VARIATIONS IN PATTERNS OF UTILIZATION AND CHARGES FOR THE CARE OF NECK 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 provider patterns of care for the treatment of neck pain in North Carolina.

Methods: This was an analysis of neck-pain-related closed claim data from the North Carolina State Health Plan for Teachers and State Employees (NCSHP) from 2000 to 2009. Data were extracted from Blue Cross Blue Shield of North Carolina for the NCSHP using *ICD-9* diagnostic codes for uncomplicated neck pain (UNP) and complicated neck pain (CNP).

Results: Care patterns with single-provider types and no referrals incurred the least average charges for both UNP and CNP. When care did not include referral providers or services, for either UNP or CNP, MD care with PT was generally less expensive than MD care with DC care. However, when care involved referral providers or services, MD and PT care was on average more expensive than MD and DC care for either UNP or CNP. Risk-adjusted charges for patients in the middle quintile of risk (available 2006-2009) were lower for chiropractic patients with or without medical care or referral care to other providers.

Conclusions: Chiropractic care alone or DC with MD care incurred appreciably fewer charges for UNP or CNP compared to MD care with or without PT care, when care included referral providers or services. This finding was reversed when care did not include referral providers or services. Risk-adjusted charges for UNP and CNP patients were lower for DC care patterns. (*J Manipulative Physiol Ther* 2016;39:240-251)

Key Indexing Terms: Neck Pain; Chiropractic; Medical Care; Health Services; Utilization; Healthcare Costs

Neck pain appears to be increasing in the general population and in specific occupations.¹ Neck pain is a common condition, with nearly half of the individuals experiencing at least 1 clinically significant

neck pain episode in their lifetime^{2,3}, resulting in substantial disability and financial burden⁴ for individuals, families, society, and the healthcare system.¹ US national survey data in 2002⁵ had shown that 13.8% of adults

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reported neck pain (lasting at least a whole day or more) in the previous 3 months. Neck pain was among the 5 highest contributors for Years Lived in Disability (YLD) both in 1990 and 2010 in the United States.⁶

In 2006, Fejer et al³ conducted a systematic review of the literature from several countries. The authors collected data from multiple studies and reported lifetime prevalence in adults (aged 18-84) ranging from 14 to 71%, with a mean prevalence of 49% and relatively higher prevalence in the elderly and women. Among 291 other health conditions, neck pain ranked 4th in terms of disability (YLD) and 21st in overall burden of disease in Disability Adjusted Life Years [DALYs] according to the 2010 Global Burden of Disease report.⁷

As the prevalence increases, many people wonder what effect neck pain will have on the healthcare system. Some consider neck pain to be an acute problem that will resolve within days or weeks in about 90% of cases.⁸ Others have reported that most self-reported cases of neck pain are continuous or episodic, with 84% of participants reporting mild or severe, continuous or recurrent pain.⁹ Although numerous conservative and surgical care strategies exist for patients with neck pain, many are not evidence-based and few show clear evidence of effectiveness.^{10,11} Martin et al compared the medical costs of 22 258 participants with and without self-reported spine (including both back and neck) problems from 1997 to 2005, adjusting for age and sex.¹² Patients with spine problems exhibited a 65% higher increase in medical expenditures, with per person costs rising from \$4695 in 1997 to \$6096 in 2005.

The largest proportion of increasing medical expenditures per person, for spine-related problems, were associated with: inpatient hospitalizations (37%); outpatient costs (18%); prescription drugs (139%); and emergency room visits (84%).¹³ Costs for neck pain are rising, with an increasing prevalence and incidence of neck pain coupled with an uncertainty about the effectiveness of various treatment options. For these reasons, investigating the utilization and expenditures of care patterns for neck pain plays an important role in healthcare policy.

Patients with neck pain are most often seen by medical doctors (MD), doctors of chiropractic (DC), physical therapists (PT) and medical specialists to which they are referred. In North Carolina, PTs must treat under the direction of either an MD or DC, therefore either an MD or a DC act as the portal of entry provider for neck pain patients.¹⁴ Currently, the portal of entry provider combinations (patterns) involved in care (utilization), and the role of specialist referrals as cost drivers is unclear in the literature.

The question of clinical efficacy arises as the health insurance industry increases its interest in containing costs by encouraging patients with musculoskeletal conditions to pursue care through the primary care "medical home" portal. Does reducing patient self-selection of providers

reduce the cost of care for these conditions, or does it increase cost? The aim of this study was to assess the utilization and costs of care patterns for patients with complicated (C) and uncomplicated (U) neck pain (NP) in the North Carolina State Health Plan (NCSHP) for Teachers and State Employees from 2000 to 2009. We compared utilization and cost of care patterns in patients who utilized: MDs and DCs alone; in combination with each other (MD-DC); in combination with physical therapy (MD-PT; DC-PT); and/or with additional referred provider care.

METHODS

This study was a retrospective closed-claim analysis of the NCSHP that included claims generated annually by approximately 660 000 covered beneficiaries (state employees, dependents, and retirees) between the years 2000-2009. 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 neck pain analytic cohort was constructed for the analysis by identifying all professional and facility claims for a healthcare event with a primary neck pain diagnosis, using the International Classification of Diseases, 9th Revision (*ICD-9*) diagnosis codes. The *ICD-9* codes used to select the cohort were identified as the most common codes used across all 3 professions (MD, DC, and PT) and were not meant to represent all possible neck pain codes. It was not the intent of this study to include every possible *ICD-9* code used 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 when billing third party payers rarely use subluxation codes. These codes are only required when billing traditional Medicare. In that circumstance, Medicare would be the primary payer and NCSHP would be the secondary payer. All claims in which NCSHP was the secondary payer were excluded from our analysis, therefore we did not analyze any Medicare claims data.

Secondary, tertiary, and quaternary codes were not used to identify neck pain patients because substantial utilization unrelated to the treatment of neck pain came up when they were used in the initial extraction. This would have led to overestimation of neck 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

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