Technical Report

Comparison of the Management Costs for Complicated and Uncomplicated Neck Pain Among Different Provider Types: Doctors of Chiropractic, Medical Doctors, and Physical Therapists

The North Carolina State Health Plan for Teachers and State Employees, 2000-2009

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Introduction and Methods

This technical report of North Carolina medical claims data analysis focuses on patients with uncomplicated neck pain (UNP) and patients with complicated neck pain (CNP) diagnoses reported during years 2000-2009. Each reporting year represents a benefit year starting in July and ending in June. This was done to use the same benefits in a fiscal year. The initial data extraction for this study included the claims for 664,000 covered lives comprising 62% female and 37% male patients. For uncomplicated neck pain, 2,795,046 claims met the inclusion criteria; for complicated neck pain, 529,318 claims met the inclusion criteria. Medicare and non-North Carolina residents were excluded.

This report is the second installment in an analysis of some of the most common musculoskeletal conditions seen by health care providers. These conditions include complicated and uncomplicated low back pain (covered in the first report), complicated and uncomplicated neck pain (covered in this report), and headaches (covered in the third report, forthcoming). Following this report, headache will be analyzed and each technical report will then be revised and expanded to include all of these conditions.

Diagnoses

Patients with uncomplicated neck pain have primary diagnoses falling in the following ICD-9 categories: Cervical spondylosis w/o myelopathy (721.0), degeneration of cervical intervertebral disc (722.4), postlaminectomy syndrome, cervical region (722.81), other and unspecified disc disorder, cervical region (722.91), cervicalgia (723.1), cervicobrachial syndrome (diffuse) (723.3), torticollis, unspecified (723.5), ossification of posterior longitudinal ligament in cervical region (723.7), other syndromes affecting cervical region (723.8), unspecified musculoskeletal disorders and symptoms referable to neck (723.9), nonallopathic lesions, cervical region (739.1), and sprain of neck (847.0).

If a patient's primary diagnosis falls in the categories of cervical root lesions, not elsewhere classified (353.2), cervical spondylosis with myelopathy (721.1), displacement of cervical intervertebral disc without myelopathy (722.0), intervertebral disc disorder with myelopathy, cervical region (722.71), spinal stenosis in cervical region (723.0), brachial neuritis or radiculitis NOS (723.4), panniculitis specified as affecting neck (723.6), injury to cervical nerve root (953.0), or injury to brachial plexus (953.4), then this patient belongs to the complicated neck pain group.

Health-care providers

The provider type for both uncomplicated and complicated neck pain can be classified into four types: DC, MD, PT, and referral (RE or ref), with each of them defined as DC=Chiropractic; MD=Medical Doctors and Doctors of Osteopathy in General Practice, Internal Medicine, Neurology, Neurosurgery, Obstetrics, Obstetrics-Gynecology, Orthopedic Surgery, Osteopathy, Pediatrics, Physical Medicine Rehab, General Surgery, Family Practice, or Geriatric Medicine; Nurse Practitioner; Podiatry; Public Health; University/College Infirmary; Urgent Care; VA/Military Hospital-Professional Staff; PT=Physical Therapy; and referral=hospitalization, surgery, emergency medicine, diagnostic radiology, durable medical equipment, laboratory, pharmacy, and other specialty referral services and providers.

Claim types

For each fiscal year, drug claim data are combined with the medical claim data based on each patient's unique ID. There are five major claim types based on the service provided to each patient: "Office Visit", "MRI_CT", "DX_RAD", "Physical Therapy", and "Surgical". The five major claim types are defined as follows:

Office Visit: the place of service provided is in office.

MRI_CT: If the service type belongs to CAT scan, magnetic resonance imaging, computerized axial tomography or similar services, then the claim type is MRI_CT.

DX_RAD: If the service type belongs to diagnostic X-ray, arthrography, radiologic examination, or similar services, then the claim type is DX_RAD.

Physical Therapy: the provider specialty is physical therapy or the service type belongs to physical therapy.

Surgical: surgical services and ancillary services provided by a neurosurgeon, orthopedic surgeon, or general surgeon for patients diagnosed with one or more of the uncomplicated or complicated neck pain diagnoses listed above.

Patterns of care

Based on the utilization of providers, patients were classified into 15 care patterns:

1. MD_only: Patients who only use MD service
2. DC_only: Patients who only use Chiropractic service
3. PT_only: Patients who only use Physical Therapy
4. RE_only: Patients who only use referred provider or service
5. MD_DC: Patients who use both MD and Chiropractic service
6. MD_PT: Patients who use both MD and Physical Therapy
7. MD_RE: Patients who use both MD and referred provider or service
8. PT_DC: Patients who use both Physical Therapy and Chiropractic
9. DC_RE: Patients who use both Chiropractic and referred provider or service
10. PT_RE: Patients who use both Physical Therapy and referred provider or service
11. MD_DC_PT: Patients who use MD, Chiropractic, and Physical Therapy
12. MD_DC_RE: Patients who use MD, Chiropractic, and referred provider or service
13. RE_DC_PT: Patients who use Chiropractic, Physical Therapy, and referred provider or service

14. MD_PT_RE: Patients who use MD, Physical Therapy, and referred provider or service

15. MD_DC_PT_RE: Patients who use all four provider types

Among these 15 care patterns, the PT_only care pattern was not included in tables due to small sample size. Any negative medical or pharmaceutical charges (allowed amount, member liability, and paid amount) were excluded from the analysis. Note: Episodes of care were not used. Episodes of care would have required arbitrary definitions of (a) episode length, (b) time lapse between visits, and (c) time to recurrence.(e.g., reoccur in 1 week, 1 month or 1 year) that have not been validated.

Statistical analysis

SAS 9.2 (Cary, NC) was used for data management and statistical analyses. The demographic variables analyzed are age and gender. Age is calculated from the patient's birth date as of January 1st of the reporting year. The summary statistics for age were calculated for each care pattern using the *proc means* procedure in SAS. The frequency distributions of gender and age group (>=18 years old or < 18 years old) were calculated by the *proc freq* procedure in SAS. *Proc means* and *proc freq* are the primary procedures in SAS for computing descriptive statistics.

The number of claims for each care pattern was identified by the *proc freq* procedure. The number of claims in each provider group for each care pattern was found by the cross tabulation of care pattern and provider type. Within each of those five claim types, the care pattern and provider type were cross-tabulated to identify the number of claims in each provider group for each care pattern by the *proc freq* procedure.

The total and per claim medical, pharmaceutical, and combined expenses were summarized for each patient using the *proc means* procedure. The patient-based and claim-based mean and median of medical, pharmaceutical, and combined medical and pharmaceutical expenses were then summarized for each care pattern by the proc means procedure. Pharmaceutical data included only categories for skeletal muscle relaxants, analgesics, antipyretics and anti-inflammatory agents. Pharmacy data were included only on patients that met the diagnostic inclusion criteria.

Results

Utilization and charges by pattern of care for each year are reported in diagnosis- and year-specific Tables 1 through 4. Table 5 for each year shows age and gender distributions (by care pattern) of patients with at least one claim in that year. Approximately seventy percent of patients in both groups of neck pain (uncomplicated and complicated) are female. Complicated neck pain patients are five to six years older, on average, than uncomplicated neck pain patients. Although patterns of care vary somewhat by age and gender, there are no consistent or significant differences by provider type.

Year-specific table contents

Table 1: Utilization and charges, by patient (n=) and claim (n=).

Table 2: Overall (medical + pharmaceutical) mean and median charges ($) according to pattern of care, by patient and claim.

Table 3: Charges ($) per patient and claim, by care pattern and claim type.

Table 4: Overall medical and pharmaceutical charges ($) per patient and claim, by care pattern and claim type.

Table 5: Age and gender distributions for patients (n=).

Uncomplicated neck pain

Results summary: Mean numbers of claims, charges per claim, and mean overall allowed charges per patient were used to analyze costs. Average numbers of claims per patient are generally higher for care patterns that included chiropractic compared with patterns involving medical care; however, charges per medical claim were much greater on average than chiropractic claims. For all years, care patterns involving multiple types of providers resulted in appreciably greater average charges per patient than care patterns involving single providers. In general, care patterns with MDs and referrals resulted in greater average charges per patient than care patterns with non-referral provider types such as DC and PT providers. When looking at average overall allowed charges (which differs from individual claim charges), MD-only care, DC-only care, and referral-only care are consistently the three least expensive patterns of care for uncomplicated neck pain (mean [median] total allowed charges in 2009 of $1118 [$192], $1407 [$291], and $2202 [$394], respectively).

Medical care with physical therapy is much more expensive than medical care with chiropractic when care involves referral providers. Without referral providers or services, medical care with physical therapy was on average just $28 more expensive than medical care with chiropractic in 2009. However, with referral providers, medical care with physical therapy was on average $1048 (in 2000) to $2473 (in 2009) more expensive than medical care with chiropractic.

Mean difference in total allowed charges for medical care with physical therapy vs. medical care with chiropractic care for uncomplicated neck pain, by referral status and year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
No ref	-$204	-$358	-$668	-$283	-$809	-$261	-$1031	-$705	-$217	+$28
W/ref	+$1048	-$48	+$1555	+$1238	+$347	+$1039	+$1420	+$1331	+$2333	+$2473

The total allowed charges of medical care with referrals are substantially larger on average than the total allowed charges of chiropractic care with referrals, i.e., MD referrals to other providers and services are much more costly than DC referrals to other providers and services. For example in 2009, compared with DC care with referrals, MD care with referrals resulted in an average of $1140 greater total charges (MD referrals added $2440 to total charges, on average, vs. $1300 for DC referrals). Medical care with DC care plus referrals was on average $2445 less expensive than medical care with PT care plus referrals in 2009 (MD-PT referrals added $4311 to total charges, on average, vs. $1866 for MD-DC referrals).

Mean difference in total allowed charges for (a) medical care with referrals vs. chiropractic care with referrals and (b) medical care with PT plus referrals vs. medical care with DC plus referrals for uncomplicated neck pain, by year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
(a)	+$555	+$414	+$953	+$1522	+$1541	+$1628	+$2074	+$901	+$989	+$1140
(b)	+$1252	+$310	+$2223	+$1521	+$1156	+$1300	+$2451	+$2036	+$2550	+$2445

Trends: Number of patients with at least one claim for uncomplicated neck pain increased from 11,383 in 2000 to 20,492 in 2009 (80% increase). Total claims increased from 168,632 in 2000 to 195,757 in 2009 (16% increase). Total allowed charges for the year more than doubled from $23,323,308 in 2000 to $53,039,049 in 2009 (127% increase). Total charges tripled from 2000 to 2006, then declined between 2006 and 2009 (from $70.8 to $53.0 million). Of historical note; on October 1, 2006, a legislative mandate was implemented for the State of North Carolina Employees Health Plan. The mandate required that insurance copays for primary care and chiropractic care be equal. Up until that point, chiropractic copays were equal to higher specialist levels. This mandate was reversed effective October 1, 2007 and chiropractic copays were returned to the higher specialist levels.

Average total charges for all care patterns combined increased from $2094 in 2000 to $3280 in 2006 (57% increase), and declined to $2575 in 2007 (21.5% decrease) before climbing up to $2733 in 2008 and $2642 in 2009. Over the decade, average total allowed charges for uncomplicated neck pain increased by 26%.

Sum and mean of total allowed charges for all care patterns combined for uncomplicated neck pain, by year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sum	$23.3M	$37.3M	$45.7M	$52.2M	$59.7M	$69.0M	$70.8M	$56.4M	$57.3M	$53.0M
Mean	$2094	$2374	$2462	$2776	$3014	$3225	$3280	$2575	$2733	$2642

Numbers of patients and claims in most care patterns increased over the 10-year period; however, gains were greatest among care patterns involving MDs, PTs, and referral providers or services. Numbers of patients in DC-care patterns increased the least amount or decreased. Numbers of patients in care patterns with MDs (with or without referral to PT or other providers but without DC care) increased from 4,125 in 2000 to 11,772 in 2009, a gain of 7,647 patients (185% increase), whereas numbers of patients in care patterns with DCs (with or without MDs or referral care but without PT care) decreased from 5331 in 2000 to 4472 in 2009, a loss of 859 patients (16% decrease). Concomitant medical claims increased from 29,128 in 2000 to 84,224 in 2009, a gain of 55,096 claims (189% increase), whereas concomitant chiropractic claims decreased from 123,160 in 2000 to 80,829, a loss of 42,331 claims (34% decrease). Numbers of patients in care patterns with PTs increased from 810 in 2000 to 2193 in 2009, a gain of 1383 patients (171% increase); numbers of claims in patterns of care with PTs increased from 19,830 in 2000 to 40,644 in 2009 (20,814 gain; 105% increase).

In office allowed and other charges per patient generally increased for most care patterns up to 2006, then declined between 2006 and 2009. With the exception of MD-only care, total allowed charges per patient generally increased up to 2006 and decreased thereafter. Comparing total allowed charges for uncomplicated neck pain in 2000 and 2009, care patterns showing significant increases in means are MD_DC_PT_RE [from

$6847 to $7478], MD_RE_PT [from $5374 to $6598], MD_RE [from $2717 to $3558], MD_only [from $762 to $1118], PT_RE [from $4394 to $6285], RE_only [from $1265 to $2202], RE_DC_PT [from $3779 to $4660], and MD_DC_PT [from $3230 to $3979]. Mean total allowed charges for MD_PT care and the other care patterns that include DCs decreased from 2000 to 2009 [MD_PT: $2672 to $2287; MD_DC: $2876 to $2259; DC_only: $1566 to $1407].

Complicated neck pain

Results summary: Patterns of care involving chiropractic had on average three- to fourfold higher numbers of claims per patient compared to that of medical care; however, chiropractic claims were on average 60-80% less costly than medical claims. For all years, care patterns involving multiple types of providers resulted in greater average charges than care patterns involving single providers. In general, care patterns with MDs resulted in greater average charges than care patterns with non-referral provider types. As with uncomplicated neck pain, charges are generally greatest when referral providers or services are involved. MD-only care is consistently the least expensive pattern of care (mean [median] total allowed charges in 2009 of $1318 [$224].

When care does not include referral providers or services, throughout most of the decade medical care with physical therapy was generally less expensive than medical care with chiropractic; however, when referral care is involved, the combination of medical and chiropractic care is much less expensive than the combination of medical and physical therapy care. With referral providers, medical care with physical therapy was on average $2255 (in 2000) to $4119 (in 2009) more expensive than medical care with chiropractic.

Mean difference in total allowed charges for medical care with physical therapy vs. medical care with chiropractic care for complicated neck pain, by referral status and year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
No ref	-$1542	-$21	-$783	-$896	-$1584	-$1700	-$1806	-$2539	-$845	+$127
W/ref	+$2255	+$1222	+$2123	+$1687	-$478	-$232	+$5191	+$2270	+$1315	+$4119

As with uncomplicated neck pain, total allowed charges of medical care with referrals for complicated neck pain are substantially larger on average than the total allowed charges of chiropractic care with referrals. Compared to DC care with referrals in 2009, MD care with referrals resulted in an average of $6116 greater total charges (MD referrals added $8033 to total charges, on average, vs. $1917 for DC referrals). Medical care with DC care plus referrals for complicated neck pain in 2009 was on average $3992 less expensive than medical care with PT care plus referrals (MD-PT referrals added $8461 to total charges, on average, vs. $4469 for MD-DC referrals).

Mean difference in total allowed charges for (a) medical care with referrals vs. chiropractic care with referrals and (b) medical care with PT plus referrals vs. medical care with DC plus referrals for complicated neck pain, by year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
(a)	+$6578	+$5635	+$4966	+$5538	+$6007	+$7788	+$6803	+$5705	+$7997	+$6116
(b)	+$3797	+$1243	+$2906	+$2583	+$1106	+$1468	+$6997	+$4809	+$2160	+$3992

Trends: Number of patients with at least one claim for complicated neck pain increased from 2,431 in 2000 to 5,345 in 2009 (120% increase). Total claims increased from 28,076 in 2000 to 62,064 in 2009 (121% increase). Total allowed charges more than tripled from $10,966,365 in 2000 to $33,040,953 in 2009 (201% increase). There was an almost 3-fold increase in total charges from 2000 to 2005 ($31.2 million) and a decline to $28.6 million in 2006 and $25.7 million in 2007. Total charges rose in the last two years, however, to $31.3 million in 2008 and $33,040,953 in 2009 (28.4% increase from 2007 to 2009). Average total charges for all care patterns combined increased from $4562 in 2000 to $6948 in 2005 (52% increase), and declined to $6194 in 2006 and $5337 in 2007 before escalating to $6184 in 2008 and $6242 in 2009. Over the decade, average total allowed charges for complicated neck pain increased by 37%.

Sum and mean of total allowed charges for all care patterns combined for complicated neck pain, by year.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sum	$11.0M	$17.8M	$20.5M	$22.5M	$26.0M	$31.2M	$28.6M	$25.7M	$31.3M	$33.0M
Mean	$4562	$5194	$5115	$5581	$6193	$6948	$6194	$5337	$6184	$6242

As with uncomplicated neck pain, numbers of patients and claims in most care patterns increased over the 10-year period; however, gains were greatest among care patterns involving MDs, PTs, and referral providers or services. Numbers of patients in DC-care patterns increased the least amount. Numbers of patients in care patterns with MDs (with or without referral to PT or other providers but without DC care) increased from 1309 in 2000 to 3382 in 2009, a gain of 2,073 patients (158% increase), whereas numbers of patients in care patterns with DCs (with or without MDs or referral care but without PT care) increased from 892 in 2000 to 1360 in 2009, a gain of 468 patients (52% increase). Concomitant medical claims increased from 9,608 in 2000 to 28,479 in 2009, a gain of 26,908 claims (196% increase), whereas concomitant chiropractic claims increased from 16,433 in 2000 to 27,532, a gain of 11,099 patients (68% increase). Numbers of patients in care patterns with PTs increased from 299 in 2000 to 840 in 2009, a gain of 541 patients (181% increase); numbers of claims in patterns of care with PTs increased from 4331 in 2000 to 11,729 in 2009 (7,398 gain; 171% increase).

On average, in office allowed and other non-pharmaceutical charges per patient increased from 2000 to 2006, and then declined thereafter for most patterns of care. Pharmaceutical charges tended to increase, on average, over the 10-year reporting period. Total allowed charges associated with MD-only care or MD care with referrals tended to increase, on average, whereas charges associated with other care patterns decreased over time. Comparing total allowed charges for complicated neck pain in 2000 and 2009, care patterns showing significant increases in means are MD_DC_PT_RE [from $8253 to $9913], MD_DC_PT [from $1152 to $7947], MD_RE_PT [from $8217 to $10,533], MD_RE [from $7513 to $9351], MD_only [from $1118 to $1318], MD_DC_RE [from $5962 to $6414], MD_PT [from $1504 to $2072], DC_RE [from 41410 to $3485], PT_RE [from $1966 to $2570], and RE_only [from $2381 to $3410]; total allowed charges decreased significantly in the MD_DC [from $3046 to $1945] and PT_DC [from $3632 to $1406] care patterns. DC_only mean charges did not increase or decrease, but remained stable [$1593 in 2000; $1568 in 2009].

Discussion and Conclusions

Utilization (numbers of patients and claims) are greater for uncomplicated neck pain; however, charges are substantially greater for care of complicated neck pain. Mean and median per-patient and per-claim charges associated with both uncomplicated and complicated neck pain varied significantly by pattern of care during the 2000-2009 decade. In general, patterns of care involving multiple providers and referral providers and services incurred the largest charges, while patterns of care involving single or non-referral providers incurred the least charges. Mean charges are substantially higher than median charges for all care patterns, indicating the presence of extremely high-cost cases among the care patterns. Numbers of claims per patient are higher when chiropractic care is involved; however, mean charges per chiropractic claim are significantly less than mean charges per medical claim. Mean charges per physical therapy claim are higher than mean charges per chiropractic claim; however, numbers of physical therapy claims per patient are on average fewer than numbers of chiropractic claims per patient.

Utilization increased for all care patterns over the decade; however, utilization increased most dramatically for care involving MDs, PTs, and referral providers or services. DC care showed the least gains in patients and claims over the decade. Charges increased considerably on average for both uncomplicated and complicated neck pain from 2000 to mid-decade and decreased or stabilized, then increased again in 2008 and 2009. This opens the question of the possible impact of policy changes taking place between 2005 and 2007. Over the decade, complicated neck pain resulted in greater charges than uncomplicated neck pain for the vast majority of care patterns.

For several years, 2006-2009, risk scores were available for analysis. The scores reflect measure of risk of expected health care cost and utilization relative to that of the overall population. For example, a score of 1.00 indicates risk comparable to that of the population used in developing the risk groups, whereas a score of 2.00 indicates 100% greater risk than the average for the population. The risk score tables are included in the table section of this report (see Appendix pages 501-502).

The risk score data reveal patterns of care with MDs generally have somewhat higher risk scores than patterns of care with DCs. For example, for uncomplicated neck pain, the mean risk score over the 4-year period was 1.77 for MD only care and 1.67 for DC only care (the more stable medians were 1.16 and 1.17, respectively, indicating essentially equivalent risks). Comparing MDs with referral care and DCs with referral care, the 4-year mean difference is about 10% (2.30 for MDs and 2.09 for DCs). The median risks are even more similar (1.60 for MD care, 1.51 for DC care [6% greater risk]). The risk scores for complicated neck pain are on average higher than for uncomplicated neck pain; however, the MD vs. DC differences are largely similar and in the same direction, e.g., MD only vs. DC only care over the 4-year period (16% greater mean risk for MD only cases: 2.22 vs. 1.92; medians 1.61 vs. 1.47 [10% greater risk]). MD with referral cases of complicated neck pain had on average 25% greater mean risk than DC cases with referrals (2.70 vs. 2.16); medians 1.97 vs. 1.64 (20% greater risk).

Uncomplicated neck pain cases involving both medical and chiropractic care had similar risk scores as cases with medical and physical therapy care over the 2006-2009 period (without additional referrals: means 2.05 vs. 2.04; medians 1.53 vs. 1.46; with additional referrals: means 2.47 vs. 2.35; medians 1.90 vs. 1.66). Complicated neck pain cases with both MD and DC claims also had largely similar risk scores as MD cases with PT claims (without additional referrals: means 2.42 vs. 2.47; medians 1.97 vs. 1.76; with additional referrals: means 2.43 vs. 2.70; medians 1.85 vs. 1.95).

Overall, for uncomplicated neck pain in 2009, care patterns with MDs (with or without referral to PT or other providers but without DC care) incurred average total per patient charges of $2904; and care patterns with DCs (with or without MDs or referral care but without PT care) incurred average total per patient charges of

$1971. Therefore, MD care for uncomplicated neck pain in 2009 was on average $933 (or 47.3%) more expensive than DC care. Although pharmaceutical charges account for about one-third of total charges, physical therapy charges are responsible for much of the difference in charges between MD and DC care for uncomplicated low back pain. On average over the decade, the combination of medical and chiropractic care (without additional referral care) incurred $450 greater total charges per patient than the combination of medical care with physical therapy (without additional referral care); however, with additional referral care, the combination of medical and chiropractic care incurred $1274 fewer total charges per patient than the combination of medical and physical therapy care. Referrals associated with medical care over the decade were also much more expensive than referrals associated with chiropractic care (MD vs. DC referrals: $1172 greater total charges for patient; MD-PT vs. MD-DC referrals: $1724 greater total charges per patient).

Overall, for complicated neck pain in 2009, care patterns with MDs (with or without referral to PT or other providers but without DC care) incurred average total per patient charges of $7984; and care patterns with DCs (with or without MDs or referral care but without PT care) incurred average total per patient charges of $2686. Therefore, MD care for complicated neck pain in 2009 was on average $5298 (or 197%) more expensive than DC care. Surgery, advanced imaging, and physical therapy charges are the main drivers of the difference in charges between MD and DC care for complicated neck pain. On average over the decade, the combination of medical and chiropractic care (without additional referral care) incurred $1159 greater total charges per patient than the combination of medical care with physical therapy (without additional referral care). The combination of medical and chiropractic care with additional referral care incurred $1947 fewer total charges per patient than the combination of medical and physical therapy care with additional referral care. As with uncomplicated neck pain, referrals associated with medical care over the decade were also much more expensive than referrals associated with chiropractic care (MD vs. DC referrals: $6313 greater total charges for patient; MD-PT vs. MD-DC referrals: $3106 greater total charges per patient).

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