Gastroesophageal Reflux Disease in a Managed Care Setting: Charges by Place and Type of Service

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ABSTRACT: The objective of this study was to compare, by place and type of service, health care charges of managed care organization (MCO) patients with gastroesophageal reflux disease (GERD) to groups of other MCO members.

The study was conducted on patient records from a private benefit plan including HMOs and PPOs serving commercial and Medicare markets from Midwest and Southern states. The study consisted of a retrospective review of claims and eligibility data filed for services dated January 1, 1994, through December 31, 1994.

Selected patients were continuously eligible for drug benefits and were not enrolled in a capitated benefit plan. The GERD group ($n=5,254$) inclusion required a claim with a diagnosis for GERD. Three comparison groups, age/gender matched to the GERD group, were randomly selected ($n=5,254$ in each group). The first required membership in the MCO plan in 1994 whether or not claims were submitted. The second required that at least one claim had been submitted in 1994. The third required a claim with a diagnosis for low-back pain (LBP). The groups were mutually exclusive.

Outcome measures included overall average charge per member per month (PMPM) and disease-attributable average charge PMPM by place of service (emergency room, inpatient hospital, professional office visit), by type of service (laboratory/other diagnostic and surgical/other therapeutic services), and by age category.

The results of the study showed that overall GERD patient charges PMPM, like LBP patient charges, were significantly greater than MCO eligible and claims groups' overall charges PMPM for all measures—emergency room visits, inpatient hospital stays, office visits, laboratory/other diagnostic services and surgical/other therapeutic services. GERD charges were from four to six times greater than the eligible group charges and two to four times greater than the

claims group charges. Overall charges PMPM incurred by GERD patients were significantly greater than overall charges PMPM incurred by MCO members with LBP for inpatient hospital stays and for laboratory/other diagnostic services. GERD overall charges were not significantly different from LBP overall charges for emergency room visits, office visits, and surgical/other therapeutic services.

GERD-attributable charges PMPM for inpatient hospital stays, office visits, and laboratory/other diagnostic services were not significantly different from LBP-attributable charges PMPM. GERD-attributable charges PMPM for emergency room visits and surgical/other therapeutic services were significantly less than LBP-attributable charges.

GERD charges PMPM over all diagnoses for hospital stays, office visits, emergency room visits, laboratory/other diagnostic services, and surgical/other therapeutic services were high relative to overall charges for typical members without GERD and were generally comparable to overall charges for patients with a comparison condition, LBP. GERD-attributable charges were of the same magnitude as LBP-attributable charges for inpatient hospital stays, office visits, and laboratory/other diagnostic services. GERD patients apparently required significantly more resources than did typical MCO members, and GERD patients' disease-specific resource use was of the same magnitude as that of LBP patients. This study suggests that GERD patients' resource use is not negligible and requires further scrutiny to improve quality, effectiveness, and efficiency of care.

KEY WORDS: Gastroesophageal reflux, GERD, Cost, Economics, Managed care

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Gastroesophageal reflux disease (GERD) is an acid-reflux disorder. Typical symptoms of GERD are heartburn and regurgitation; additional symptoms may include chest pain, dysphagia, belching, bloating, hoarseness, and hypersalivation.¹ GERD occurs in approximately 5%–10% of the adult population² and may be associated with up to 50% of patients with noncardiac chest pain, 78% of patients with chronic hoarseness, and 82% of patients with asthma.³ Cost-effective medical management of GERD should consider the range and severity of symptoms.⁴ GERD management includes lifestyle modification and antacid therapy; pharmacological medications (histamine H₂ receptor antagonists, proton pump inhibitors, sucralfate, and prokinetics); and surgery for those 5%–10% of patients with nonresponsive GERD,^{1,5} resulting in what some consider a high rate of health care use.⁶ The cost

of managing GERD, especially in a managed care environment, has not received much attention in the literature. Because the prevalence of the disease and the potential morbidity and mortality of its complications and associated conditions may be underestimated, managed care organizations (MCOs) may not have developed appropriate diagnosis and treatment regimens and may not understand the costs of the disease. Our basic research question was two-fold: Do GERD patients in a managed care environment incur 1) higher costs than MCO members in general, or 2) higher costs than MCO members who have a different but comparable disease which is considered to be expensive? Understanding the cost of GERD and the sources of cost should enable MCOs to select the best management approaches to GERD patients in terms of cost and therapeutic effectiveness. A previous study⁷ showed that overall professional and facility charges for MCO patients with GERD were high relative to typical MCO members without GERD, but disease-related professional and facility charges were significantly less than disease-related charges for MCO members diagnosed with the comparison condition of low-back pain (LBP).

The purpose of this study was to provide MCOs with a descriptive overview of overall health care cost (direct charges) of MCO patients diagnosed with GERD as compared to those incurred by other groups of MCO members. Specifically, this study examined charges by place of service (office visits, inpatient hospital, emergency room) and type of service (laboratory/other diagnostic services, surgical/other therapeutic services).

METHODS

Data Source

Data were obtained from the Computerized On-line Medical Pharmaceutical Analysis and Surveillance System (COMPASS), a database of facility, professional, and pharmacy claims data from public and private benefit plans. For these analyses, private benefit plan data, derived from health maintenance organizations (HMOs) and preferred provider organizations (PPOs) serving the commercial and Medicare markets and covering approximately 2.7 million eligible lives, were used. Members resided primarily in 22 U.S. Midwest and Southern states and the District of Columbia. Because this article focuses on charges by place and type of service, only facility and professional claims were used.

Study Population

Patients selected for the GERD group were required to have a diagnosis of GERD (International Classification of Diseases, Ninth Revision, Clinical Modification [ICD-9-CM]⁸ codes 530.1, 530.10, 530.11, 530.19, 530.81) in 1994. Patients were excluded if they were not continuously eligible for pharmacy benefits or if they received services under a capitated benefit plan.

Three comparison groups were selected. The first comparison group included 1:1 gender- and age-matched members randomly selected from the eligible population without GERD

in 1994; this population included members who may or may not have received services during the year. The second comparison group included 1:1 gender- and age-matched patients randomly selected from the 1994 population without GERD who had received services of some type during 1994. The third comparison group included 1:1 gender- and age-matched patients randomly selected from the 1994 population without GERD having a diagnosis of low-back pain (LBP) in 1994 (ICD-9-CM codes 720.0, 720.1, 720.2, 721.3, 721.42, 722.10, 722.2, 722.52, 722.6, 722.73, 722.8, 722.83, 722.93, 724, 724.2, 724.3, 724.4, 724.5, 724.6, 724.7, 724.8, 724.9, 739.3, 734.4). This allowed an evaluation of GERD relative to another disease that is a common, chronic condition subject to exacerbations, experienced by a broad age spectrum, typically managed without surgery except in especially severe cases, and considered to be expensive in terms of resource use.⁹⁻¹³ The GERD and comparison groups were mutually exclusive. Age categories were 0–19 years, 20–39 years, 40–64 years, and 65 years and over. These age categories were chosen to describe the charges in age groups that have different general health status and associated illness patterns.

Measures

The billed amount on a claim represents charges prior to distribution among payment categories such as copay or other insurers. Using the billed amounts on the claims, overall and attributable charges were tabulated by place and type of service. Place of service included inpatient hospital stays, emergency room visits, and professional office visits. Claims for inpatient hospitalizations or emergency room visits were identified by codes occurring on facility claims that signified such visits. Claims for professional office visits were identified by Physicians' Current Procedural Terminology, Fourth Edition¹⁴ (CPT), and Health Care Financing Administration Common Procedure Coding System¹⁵ (HCPCS) codes that signified professional office visits on professional claims (i.e., on claims submitted by providers such as physicians, physical therapists, and dentists). Type of service included laboratory/other diagnostic services and surgical/other therapeutic services, which were components of either facility or professional claims. Laboratory/other diagnostic services were those undertaken for the purpose of identifying, evaluating, and/or diagnosing a state of health or possible condition, such as radiological services, while surgical/other therapeutic services were those undertaken to treat an existing condition (excluding outpatient pharmaceutical therapy). Specific ICD-9-CM, CPT, and HCPCS procedure codes were classified as laboratory/other diagnostic or surgical/other therapeutic services, and the portion of the total claim charge due to these specific services was captured.

Overall charges were derived from any claims, whether or not disease-specific, and were tabulated for GERD patients and the three comparison groups. Attributable charges were tabulated for GERD and LBP patients. For place of service, attributable charges were calculated by summing all billed

Figure 1. Average 1994 Overall Charges PMPM: GERD and Comparison Groups

Table 1. Average 1994 Overall Charges PMPM: GERD and Comparison Groups by Place of Service

Place of Service	Age Group	N	GERD Group		Eligible Group		Claims Group		LBP Group	
			Average \$ PMPM	95% CI*	Average \$ PMPM	95% CI*	Average \$ PMPM	95% CI*	Average \$ PMPM	95% CI*
Inpatient Hospital†	Total	5,254	448.43	±60.21	106.90	±27.38	166.11	±38.62	299.07	±100.73
	0-19	226	685.48	±617.28	24.65	±36.44	43.50	±45.21	29.55	±15.58
	20-39	1,230	175.92	±54.50	43.04	±27.62	47.55	±19.59	115.08	±39.85
	40-64	2,886	394.20	±73.90	81.86	±34.15	139.36	±45.70	251.69	±78.46
	65+	912	928.81	±188.37	292.60	±107.55	441.06	±165.45	763.92	±520.79
Emergency Room†	Total	5,254	24.30	±2.34	5.78	±1.03	10.72	±2.08	21.39	±2.88
	0-19	226	16.28	±5.40	1.54	±1.05	4.14	±1.63	16.05	±5.86
	20-39	1,230	22.95	±3.95	4.79	±2.19	14.86	±6.54	22.35	±6.10
	40-64	2,886	22.71	±3.04	4.41	±0.95	9.32	±2.38	18.27	±3.96
	65+	912	33.18	±7.64	12.54	±4.15	11.21	±3.00	31.30	±6.92
Office Visit†	Total	5,254	51.82	±19.39	13.35	±1.60	22.38	±3.56	50.54	±14.22
	0-19	226	35.50	±5.68	6.53	±1.90	8.66	±2.09	24.06	±4.90
	20-39	1,230	46.65	±16.58	10.33	±1.69	21.23	±3.25	34.42	±5.53
	40-64	2,886	60.52	±34.58	16.00	±2.77	22.08	±3.31	62.91	±25.54
	65+	912	36.67	±2.57	10.71	±1.54	28.24	±17.11	39.66	±10.78

* CI is the 95% confidence interval.

† Overall charges include charges for all claims whether or not claim was disease-specific.

amounts on all claims for each place of service with a diagnosis for the respective disease. If a claim had additional diagnoses other than GERD for GERD patients or LBP for LBP patients, then the claim amount was divided by the number of diagnoses on the claim before contributing to the summation. For type of service, attributable charges were calculated differently, as procedure codes often are not directly linkable to a diagnosis (e.g., laboratory claims often contain no diagnoses and, while facility claims may contain several diagnoses and procedure codes, there is no direct link established between a procedure and or any diagnosis code). To accommodate this limitation, ICD-9-CM, CPT, and HCPCS procedure codes were identified for services that are likely to be used for patients with GERD or for patients with LBP. Clinicians systematically identified services that were expected to be performed for GERD or LBP patients, then selected the corresponding codes that would be used to bill for those services. Charges were included from claims with no diagnosis listed or with a diagnosis of interest (GERD or LBP). Charges were not included from claims that had diagnoses, but not of GERD or LBP. Attributable charges were calculated by summing billed amounts of the components of the claim corresponding to these services.

Per member per month (PMPM) overall and attributable charges were calculated for each patient by dividing the total charges by the number of eligible months for each patient in the GERD and comparison groups for overall charges, and in the GERD and LBP groups for attributable charges. Average

charges PMPM were calculated by place and type of service, by age category, and overall age categories. An analysis of variance was performed using SAS statistical software¹⁶ to compare the GERD group and the comparison groups on average overall and attributable charges PMPM.

This study was limited in scope to selected comparison groups, definitions of GERD and LBP groups, and definitions of attributable services, without sensitivity analyses to determine the impact of our choices. It does provide a basis for further analysis of the impact of our choices and methodological issues such as variability in coding, misclassifications, effect of plan type (HMO, PPO), and effect of comorbidities.

RESULTS

The selection criteria were met by 5,254 patients in the GERD group. Fifty-nine percent of the GERD group and its comparison groups were female; 53% of the entire managed care organization's population was female. Each study group's mean age (±SD) was 48.7 (±16.7) years, with a median age of 48 years (the average and median age was the same for the GERD group and each comparison group since each comparison patient was age-matched to the GERD group). The MCO population (n=2,672,453) mean age (±SD) was 41.4 (±25.6) years, with a median age of 39 years. The age distribution of the study groups was as follows: 4% were less than 20 years, 23% were from 20–39 years, 55% were from 40–64 years,

Table 2. Average 1994 Overall Charges PMPM: GERD And Comparison Groups By Type of Service

Type of Service	Age Group	N	GERD Group		Eligible Group		Claims Group		LBP Group	
			Average \$ PMPM	95% CI*	Average \$ PMPM	95% CI*	Average \$ PMPM	95% CI*	Average \$ PMPM	95% CI*
Laboratory/Other Diagnostic Services†	Total	5,254	280.38	±36.25	53.21	±10.78	75.70	±10.15	192.74	±47.85
	0-19	226	211.16	±97.25	2.47	±1.04	8.11	±3.75	58.16	±34.64
	20-39	1,230	166.34	±30.71	19.50	±4.49	45.10	±8.38	99.94	±22.88
	40-64	2,886	297.60	±60.62	55.60	±14.35	74.45	±11.69	233.54	±85.61
	65+	912	396.85	±66.24	103.66	±41.66	137.70	±43.59	222.12	±38.69
Surgical/Other Therapeutic Services†	Total	5,254	420.57	±71.71	86.66	±31.60	200.33	±56.06	320.14	±51.17
	0-19	226	338.34	±309.22	4.96	±3.35	24.61	±16.24	53.70	±28.01
	20-39	1,230	188.65	±50.33	40.62	±11.65	111.85	±33.84	193.60	±44.45
	40-64	2,886	429.65	±116.47	77.44	±51.63	194.13	±90.10	356.82	±85.81
	65+	912	725.03	±153.96	198.19	±78.42	382.80	±143.94	440.71	±96.36

* CI is the 95% confidence interval.

† Overall charges include charges for all claims whether or not claim was disease-specific.

and 18% were 65 years or older. The age distribution of the MCO's population was as follows: 23% were less than 20 years, 29% were from 20–39 years, 26% were from 40–64 years, and 22% were 65 years or older. The mean (±SD) months of eligibility for the GERD, eligible, claims, and LBP groups were 10.7 (±2.6), 9.9 (±3.3), 9.4 (±3.8), and 10.6 (±2.8) months, respectively; the MCO mean months of eligibility (±SD) was 9.3 (±3.8) months. The GERD study group accounted for nearly 1% of all 1994 MCO charges, of which 5% were attributable to GERD-related diagnoses and services.

Comparing Overall Charges

The GERD and LBP groups' average overall charges PMPM (see Figure 1) were significantly ($p<0.05$) greater than eligible and claims groups' charges PMPM for each place and type of service (see Tables 1 and 2). The average overall inpatient hospital charges PMPM for the GERD, LBP, claims, and eligible groups were \$448, \$299, \$166, and \$107, respectively; the GERD average inpatient hospital charges were significantly ($p<0.05$) greater than LBP average inpatient hospital charges. GERD average inpatient hospital charges were greatest in the 0–19 and the 65+ age categories. The average overall emergency room charges PMPM were \$24, \$21, \$11, and \$6 for the GERD, LBP, claims, and eligible groups, respectively; GERD and LBP emergency room charges were not significantly different. GERD average emergency room overall charges PMPM increased as age increased. The average overall office visit charges PMPM were \$52, \$51, \$22, and \$13 for the GERD, LBP, claims, and eligible groups, respectively; the GERD and LBP charges were not significantly different. GERD average office visit charges were greatest in the 40–64 age category. The average overall laboratory/other diagnostic charges PMPM were \$280, \$193, \$76, and \$53 for the GERD, LBP, claims,

and eligible groups, respectively; the GERD charge was significantly ($p<0.05$) greater than the LBP charge. The average surgical/other therapeutic charges PMPM were \$421, \$320, \$200, and \$87 for the GERD, LBP, claims, and eligible groups, respectively; the GERD and LBP charges were not significantly different. Average laboratory/other diagnostic and surgical/other therapeutic charges were greatest in the 65+ age category.

Comparing Attributable Charges

The percentage of overall inpatient hospital charges classified as disease-attributable in GERD and LBP groups were 3% and 6%, respectively. The percentage of overall emergency room charges classified as disease-attributable in GERD and LBP groups were 7% and 13%, respectively. The percentage of overall office visit charges classified as disease attributable in GERD and LBP groups were 12% and 19%, respectively. The percentage of overall laboratory/other diagnostic charges classified as disease-attributable to GERD and LBP groups were 12% and 17%, respectively. The percentage of overall surgical/other therapeutic charges classified as disease-attributable in GERD and LBP groups were 3% and 12%, respectively.

GERD- and LBP-attributable average charges PMPM (see Figure 2) were not significantly different for inpatient hospital, office visit, and laboratory/other diagnostic charges (see Tables 3 and 4). The GERD-attributable average inpatient hospital charge PMPM (\$13) was 24% lower than the LBP-attributable charge (\$17); the GERD-attributable average office visit charge PMPM (\$6) was 33% lower than the LBP charge (\$9). The GERD-attributable average laboratory/other diagnostic charge (\$34) was the same as the LBP-attributable average laboratory/other diagnostic charge (\$34). GERD-attributable charges for inpatient hospital and laboratory-diagnostic claims were greatest in the 40–64 and 65+ age categories, while LBP-attributable

Figure 2. Average 1994 Attributable Charges PMPM: GERD and LBP Groups

Table 3. Average 1994 Attributable Charges PMPM: GERD And LBP Groups By Place of Service

Place of Service	Age Group	N	GERD Group		LBP Group	
			Average \$ PMPM	95% CI*	Average \$ PMPM	95% CI*
Inpatient Hospital†	Total	5,254	13.27	±2.80	17.46	±3.84
	0-19	226	10.01	±9.04	4.83	±7.65
	20-39	1,230	7.36	±3.24	17.97	±8.65
	40-64	2,886	14.83	±4.61	20.77	±5.66
	65+	912	17.09	±4.82	9.43	±5.40
Emergency Room†	Total	5,254	1.71	±0.38	2.75	±0.97
	0-19	226	0.97	±0.94	1.32	±0.89
	20-39	1,230	2.32	±1.04	3.47	±1.72
	40-64	2,886	1.39	±0.40	2.34	±1.44
	65+	912	2.05	±1.03	3.46	±2.17
Office Visits†	Total	5,254	6.26	±3.20	9.47	±2.47
	0-19	226	4.43	±1.09	4.25	±1.03
	20-39	1,230	6.46	±3.14	8.02	±1.30
	40-64	2,886	7.27	±5.66	12.06	±4.46
	65+	912	3.26	±0.43	4.52	±0.64

* CI is the 95% confidence interval.

† Attributable charges were derived from claims with GERD diagnoses for the GERD group, LBP diagnoses for the LBP group.

charges were greatest in the 20–39 age category. GERD- and LBP-attributable office visit charges were greatest in the 20–39 and 40–64 age categories.

The GERD-attributable average emergency room and surgical/other therapeutic charges PMPM were significantly lower ($p < 0.05$) than LBP-attributable charges PMPM. The GERD-attributable average emergency room charge PMPM (\$2) was 33% lower than the LBP-attributable charge (\$3); the GERD-attributable average surgical/other therapeutic charge PMPM (\$13) was 67% lower than the LBP-attributable charge (\$39). Emergency room charges were greatest in the 20–39 and 65+ age categories for both GERD- and LBP-attributable charges. GERD-attributable surgical/other therapeutic charges were greatest in the 40–64 age category, while these charges were greatest in the 20–39 and 40–64 age categories for LBP-attributable charges.

DISCUSSION

Overall GERD charges PMPM (i.e., overall charges irrespective of diagnoses), like those of patients with the comparison condition of LBP, were significantly greater than overall MCO eligible and claims groups' charges PMPM for all measures—emergency room visits, inpatient hospital stays, office visits, laboratory/other diagnostic services, and surgical/other therapeutic services. These results suggest that overall comorbidity

in GERD patients, like that of LBP patients, was related to high resource use relative to that of typical MCO members without GERD. These results are consistent with the results of the previous study⁷ showing that overall GERD and LBP professional and facility charges were significantly greater than such charges for MCO eligible and claims groups. Emergency room, inpatient hospital, laboratory/other diagnostic, and surgical/other therapeutic charges appearing on facility claims contributed to total facility charges, while office visit, laboratory/other diagnostic, and surgical/other therapeutic charges appearing on professional claims contributed to total professional charges.

Overall charges PMPM incurred by GERD patients were significantly greater than overall charges PMPM incurred by the LBP patient group for inpatient hospital stays and for laboratory/other diagnostic services, and were not significantly different for emergency room visits, office visits, and surgical/other therapeutic services. These findings suggest that overall comorbidity in GERD patients resulted in increased hospitalization resource use and increased laboratory/other diagnostic resource use as compared with that for LBP

patients. Also, GERD patients' overall comorbidity resulted in charges PMPM due to emergency room visits, office visits, and surgical/other therapeutic service of the same magnitude as those for LBP patients. The previous study⁷ showed that GERD facility charges overall were significantly greater than LBP charges overall. The current results showed that charges specifically contributing to facility charges, inpatient hospital, and laboratory/other diagnostic charges, were significantly greater in the GERD group than in the LBP group, while GERD emergency room and surgical/other therapeutic charges were not significantly different from LBP charges, although both were greater than LBP charges and contribute to the overall facility differences. The previous study⁷ showed that GERD professional charges overall were greater (but not statistically) than LBP charges overall; the current study shows that professional charges for office visits were not significantly different in GERD and LBP patients. Professional charges also were composed of laboratory/other diagnostic and surgical/other therapeutic charges from professional claims; in this study laboratory/other diagnostic charges from both professional and facility claims for GERD patients are greater than those for LBP, but not for surgical/other therapeutic charges.

GERD-attributable charges PMPM (i.e., charges specifically related to GERD) for inpatient hospital stays, office visits, and laboratory/other diagnostic services were of the same magnitude

Table 4. Average 1994 Attributable Charges PMPM: GERD And LBP Groups By Type of Service

Type of Service	Age Group	N	GERD Group		LBP Group	
			Average \$ PMPM	95% CI*	Average \$ PMPM	95% CI*
Laboratory/Other Diagnostic Services†	Total	5,254	34.20	±20.35	33.57	±14.33
	0-19	226	19.00	±12.49	18.04	±17.34
	20-39	1,230	20.29	±5.38	24.07	±5.54
	40-64	2,886	40.48	±36.78	41.55	±25.81
	65+	912	36.85	±11.60	25.00	±8.33
Surgical/Other Therapeutic Services†	Total	5,254	12.70	±9.87	39.42	±7.87
	0-19	226	4.28	±4.29	8.74	±10.23
	20-39	1,230	8.65	±5.82	40.96	±15.78
	40-64	2,886	16.54	±17.77	47.18	±12.27
	65+	912	8.11	±3.55	20.40	±9.16

* CI is the 95% confidence interval.

† Attributable charges were derived from claims with GERD- or LBP-defined procedure codes.

as the LBP comparison group's attributable charges PMPM (i.e., charges specifically related to LBP). These findings suggest that specific GERD patient resources were directly linked to GERD and were as costly to an MCO as those for LBP patients. GERD-attributable charges PMPM for emergency room visits, and surgical/other therapeutic services were significantly lower than LBP-attributable charges. Emergency room visit charges for GERD patients may be fewer in number and/or the diagnosis may not be specifically coded as GERD (e.g., diagnoses may be coded nonspecifically or may be coded with a perceived emergency-worthy diagnosis such as "chest pain"). The previous study⁷ showed that GERD-attributable professional charges were significantly lower than LBP-attributable professional charges; the current study shows that the portion of professional charges due to office visits did not appear to contribute significantly to this result.

The previous study⁷ also showed that GERD-attributable facility charges were significantly lower than LBP-attributable facility charges; the current study shows that the portion of facility charges due to inpatient hospital charges does not appear to contribute to this result and that while GERD-attributable emergency room charges were significantly lower than LBP-attributable charges, emergency room charges were small relative to total facility charges. While the previous study⁷ underestimated facility and professional charges because laboratory/other diagnostic and surgical/other therapeutic charges (derived from both facility and professional claims) were not included as attributable charges if no diagnosis was included on the claim, the current study includes

more of these charge types. The fact that only GERD-attributable surgical/other therapeutic charges were significantly lower than LBP-attributable charges suggests that this category of services was a contributing factor to the previous results.

CONCLUSION

GERD overall charges PMPM for all study measures were high relative to overall charges for typical members without GERD and were generally comparable to LBP patients' overall charges. GERD-attributable charges were of the same magnitude as LBP-specific charges for inpatient hospital stays, office visits, and laboratory/other diagnostic services. GERD patients apparently required significantly more resources than did typical MCO members, and GERD patients' disease-specific resource use was of the same magnitude as that of LBP patients on several measures. This study suggests that GERD patients' resource use is not negligible and requires further scrutiny to improve quality, effectiveness, and efficiency of care.

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