

Health Care Utilization and Costs Associated With Constipation (C-ONLY) and Co-occurring Irritable Bowel Syndrome With Constipation (IBS+C) Compared to Migraine in a Large Managed Care Population

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BACKGROUND

Chronic constipation is one of the most common disorders suffered by Americans, with an estimated prevalence between 2% and 27% (Higgins and Johanson, 2004). Irritable bowel syndrome (IBS) is also a common gastrointestinal (GI) disorder characterized by abdominal pain and altered bowel function that is estimated to affect between 10% and 20% of the US population (Camilleri and Choi, 1997; Drossman et al., 1993; Talley et al., 1991). Patients with these conditions are frequent users of the health care system and impose significantly increased costs on third-party payers (Lembo and Camilleri, 2003; Drossman et al., 2002). Few studies, however, have examined the economic burden of both isolated constipation (C-ONLY) and comorbid IBS and constipation (IBS+C) within the same population. In this retrospective analysis, we assessed the economic burden of C-ONLY and IBS+C in a population of managed care enrollees. We also benchmarked the economic burden of these conditions against patients with migraine, a chronic condition also known to have a significant cost burden.

OBJECTIVE

To estimate the economic burden of C-ONLY and IBS+C in a large US managed care population, with comparison to a benchmark group of patients with migraine.

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METHODS

Study Design

Retrospective analysis of longitudinal insurance claims from a large US health plan.

Data Source

i3 Innovus LabRx database: de-identified medical and pharmacy claims, laboratory data and enrollment data for >24 million lives spanning the period 1/1/2003 to 12/31/2005.

Inclusion Criteria

- Primary or non-primary ICD-9 diagnosis code for constipation, IBS+C, or migraine. Patients categorized into mutually exclusive cohorts:

Case Groups
C-ONLY: ICD-9 564.0x, with no evidence of IBS, diarrhea or anti-diarrheal prescriptions.

IBS+C: ICD-9 564.1 plus 564.0x (at any time), with no evidence of diarrhea or anti-diarrheal prescriptions.

Benchmark Group
MIGRAINE: ICD-9 346.xx, with no evidence of IBS+C, constipation, diarrhea or anti-diarrheal prescriptions.

- Continuous plan enrollment for ≥6 months prior to and ≥12 months following first observed (index) diagnosis.

Outcome Measures

Per patient utilization and charges during a period of 3 months prior to and 9 months following patients' index diagnosis (first observed diagnosis of the condition), stratified by cost category:

- Inpatient stays
- Physician office visits
- Outpatient hospital
- Emergency department visits
- Other outpatient/ancillary care
- Pharmaceutical prescriptions

Statistical Analyses

- Patient characteristics and outcome variables analyzed descriptively.
- Linear regression models estimated to formally assess difference in health care utilization and charges between patients with C-ONLY vs. MIGRAINE and patients with IBS+C vs. MIGRAINE.
- Models estimated for each outcome as a function of a dichotomous indicator for the case group of interest (e.g., 1=case group, 0=MIGRAINE).
- Covariates controlled for in the regression models include age, gender, geographic region, insurance type, GI comorbidities, Charlson Comorbidity Index Score (CCIS), comorbid cancer, and use of opioid analgesics.

RESULTS

Patient Characteristics (Table 1)

- We identified 91,632 patients with C-ONLY, 10,952 patients with IBS+C, and 101,418 patients with migraine.
- Mean age of patients with C-ONLY was 38 years, compared to 46 years among those with IBS+C. Mean age of patients in the MIGRAINE cohort was 38 years.
- Patients in the C-ONLY and IBS+C cohorts had a mean CCIS of 0.93 and 0.99, respectively, compared to 0.45 for MIGRAINE.
- Approximately 4.2% of C-ONLY patients and 3.6% of IBS+C patients had evidence of cancer, while only 1.6% of the MIGRAINE group had cancer.
- Patients in the MIGRAINE cohort had a higher percentage of opioid use (30%) compared to patients in the C-ONLY and IBS+C cohorts (21% and 29% respectively).

Table 1. Characteristics of the Study Population

	Patient Cohort					
	C-ONLY (N=91,632)		IBS+C (N=10,952)		MIGRAINE (N=101,418)	
	N	%	N	%	N	%
Mean Age (Std. Dev.)	37.50 (25.68)		45.73 (16.00)		37.63 (14.41)	
Gender						
Female	57,215	62.44	9,214	84.13	75,797	74.74
Male	34,417	37.56	1,738	15.87	25,621	25.26
Geographic Region						
Northeast	10,307	11.25	1,340	12.24	11,003	10.85
South	38,847	42.39	5,320	48.58	43,729	43.12
Midwest	32,414	35.37	3,177	29.01	33,185	32.72
West	10,064	10.98	1,115	10.18	13,501	13.31
Insurance Status						
Commercial	78,189	85.33	10,015	91.44	97,026	95.67
Medicaid	5,105	5.57	208	1.9	3,156	3.11
Medicare	8,338	9.1	729	6.66	1,236	1.22
Health Plan Type						
EPO	10,091	11.01	1,292	11.8	12,629	12.45
HMO	31,330	34.19	3,129	28.57	27,342	26.96
POS	32,235	35.18	4,362	39.83	42,499	41.9
PPO	15,283	16.68	1,917	17.5	18,324	18.07
Independent/self	2,693	2.94	252	2.3	624	0.62
Mean CCIS (Std. Dev.)	0.93 (1.77)		0.99 (1.66)		0.45 (1.07)	
Evidence of GI Comorbidities						
Crohn's disease	277	0.3	95	0.87	191	0.19
Ulcerative colitis	366	0.4	110	1	195	0.19
Other IBD	4,079	4.45	724	6.61	2,162	2.13
Diverticulitis	1,810	1.98	382	3.49	365	0.36
Evidence of Cancer	3,836	4.19	390	3.56	1,663	1.64
Evidence of Opioid Use	19,410	21.18	3,161	28.86	30,633	30.2

Unadjusted Health Care Utilization and Charges (Table 2, Figures 1 and 2)

- Total health care charges among patients with C-ONLY and IBS+C were \$15,808 and \$16,378, respectively, compared to \$10,405 among patients with MIGRAINE (differences \$5,403 and \$5,973, respectively, both $P<.0001$).
- Mean total medical encounters per patient were 40 and 51 for C-ONLY and IBS+C, respectively, compared to 38 for MIGRAINE (differences 2 and 13, respectively, both $P<.0001$).
- Rate of inpatient admission was 15% and 12% for patients in the C-ONLY and IBS+C cohorts, respectively, compared to only 9% for patients in the MIGRAINE group (differences 6% and 8%, respectively, both $P<.0001$).

Table 2. Total Medical Encounters and Charges per Patient

	Patient Cohort		
	C-ONLY (N=91,632)	IBS+C (N=10,952)	MIGRAINE (N=101,418)
Total number of medical encounters	40.02	51.38	37.58
Total charges	\$15,808	\$16,378	\$10,405

Figure 1. Health Care Utilization Rates by Patient Cohort

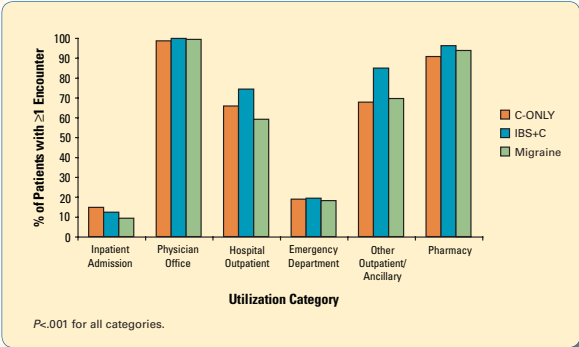
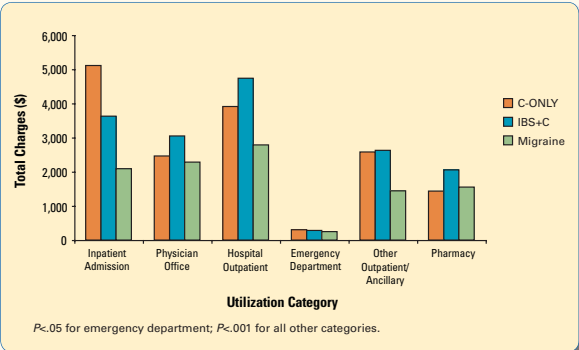


Figure 2. Total Health Care Charges by Patient Cohort



Regression Analysis Results (Table 3)

- After controlling for covariates, total health care charges for patients in the C-ONLY group were \$2,144 higher than those incurred by the MIGRAINE cohort, $P<.0001$.
- Total health care charges for the IBS+C group were \$1,296 higher than those incurred by the MIGRAINE group, $P<.0001$.
- Patients in the C-ONLY cohort had higher charges for inpatient stays (+\$1,367; $P<.0001$) and outpatient hospital (+\$447; $P<.0001$) compared to the MIGRAINE cohort.
- IBS+C patients had higher charges for outpatient hospital (+\$832; $P<.0001$) compared to patients in the MIGRAINE cohort.
- There was no statistically significant difference in emergency department utilization and charges between either case group compared to MIGRAINE.

Table 3. Linear Regression Results for Per Patient Health Care Utilization and Charges

Regression Specification (Dependent Variable)	C-ONLY vs. MIGRAINE		IBS+C vs. MIGRAINE	
	β_1	P-value	β_1	P-value
Inpatient				
Number of admissions	0.048	<0.0001	-0.009	0.035
Charges	\$1,367	<0.0001	-\$161	0.2782
Physician's Office				
Number of visits	-0.262	<0.0001	1.621	<0.0001
Charges	-\$247	<0.0001	\$81	0.0624
Outpatient Hospital				
Number of visits	0.667	<0.0001	0.901	<0.0001
Charges	\$447	<0.0001	\$832	<0.0001
Emergency Department				
Number of visits	-0.106	<0.0001	-0.009	0.6817
Charges	\$1	0.8295	-\$20	0.1057
Other Outpatient/Ancillary Care				
Number of visits	1.040	<0.0001	0.941	<0.0001
Charges	\$768	<0.0001	\$538	<0.0001
Prescription Drugs				
Number of prescriptions	-0.909	<0.0001	0.596	0.0023
Charges	-\$190	<0.0001	\$25	0.3887
Total Health Care Claims				
Number of health care claims	0.477	0.0008	4.041	<0.0001
Charges	\$2,144	<0.0001	\$1,296	<0.0001

Regression coefficient β_1 indicates parameter estimate for dichotomous variable equal to 1 if patient has condition of interest (C-ONLY or IBS+C) and 0 if patient belongs to the migraine benchmark group. Other covariates included in the regression and not shown in the table are age, gender, geographic region, insurance type, evidence of GI-related comorbidities, cancer, opioid use and Charlson Score.

CONCLUSIONS

- C-ONLY and IBS+C are costly conditions that present a greater economic burden to managed care payers than migraine.
- Large and statistically significant differences in total health care charges remained between each case group as compared to the migraine benchmark group even after controlling for additional covariates.
- Institutional costs are primary drivers for constipation expenditures.
- Opportunities exist for improving the pharmacological treatment of both constipation and IBS+C.

LIMITATIONS

- Patients were identified based on ICD-9-CM diagnosis codes that, if recorded inaccurately, may have caused some patients to be misidentified as belonging to the C-ONLY, IBS+C or MIGRAINE cohorts. Validity of results therefore depends on the accuracy of record keeping among providers submitting claims in the LabRx database.
- Data are from a single health plan with a geographic distribution biased toward the Midwest and South regions; generalizability of results to the overall US managed care population is therefore uncertain.
- All cost data in the LabRx database represent charges rather than payments. Our study therefore overestimates actual costs associated with the conditions of interest. Crude estimates of actual costs may be derived by assuming a cost-to-charge ratio of 0.5 (Friedman et al., 2002).

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