

Similarities Between Constipation With and Without Irritable Bowel Syndrome in a California Medicaid (Medi-Cal) Population: Costs Trends By Category in the 12 Months After Diagnosis From 1997 to 2002

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Introduction

- Chronic constipation (CC) is a highly prevalent functional GI disorder estimated to affect up to 20% of the North American population.¹
- Constipation and irritable bowel syndrome with constipation (IBS-C) impose substantial direct and indirect costs on the healthcare system and impair health-related quality-of-life.²⁻⁷
- Understanding the costs of CC and IBS-C over time and by location of care is important for evaluating cost containment strategies.
- While comprehensive data are available for other functional GI disorders such as IBS,⁸⁻¹¹ limited data exist for chronic constipation.^{4,12}
- While some point-of-service (POS) direct cost analyses have been conducted on IBS,^{8,9,11} few have compared IBS-C with chronic constipation.^{3,13}
- Similarities in costs for constipation and IBS-C would suggest that both have a similar impact on the healthcare system.

Aim

- To assess and compare the costs trends of newly diagnosed C and IBS co-occurring with C (IBS+C) among the California Medicaid (Medi-Cal) population in the year following diagnosis.

Methods

- A retrospective analysis was performed on cost and epidemiologic data extracted from California Medicaid (Medi-Cal) pharmacy and medical claims (1995-2003) using a randomly selected 20% sample of recipients.
- Medi-Cal provides health care financing for California residents who are disabled or have limited resources and income.
- CC was defined according to one of the following criteria:
 - 2 or more diagnoses of constipation at least 30 days apart using one of the following International Classification of Diseases-9 [ICD-9] codes:
 - 564.0 [Constipation]; 564.00 [Unspecified]; 564.01 [Slow Transit]; 564.09 [Other Constipation]
 - Constipation diagnosis and a constipation-related prescription >30 days after the diagnosis date for products with one of the following Hierarchal Ingredient Codes (HIC3):
 - Q3S (Laxatives, Local/Rectal); or D6S with American Hospital Formulary Service (AHFS) Therapeutic Class Code = 561200 (cathartics and laxatives).
- Patients with CC co-occurring with an IBS diagnosis (ICD-9 code 564.1) during the same year were excluded from the CC cohort and assigned to the IBS+C cohort (representative of the IBS-C population).
- All subjects were newly diagnosed (i.e. no diagnosis in the 24 months prior to their index date) and had continuous data for at least 12 months after their diagnosis.
- For each CC subject, an index date was defined as the date of their first claim for CC.
- For each IBS+C subject, the index date was defined as the date of their first claim for IBS.
- For beneficiaries who were eligible for Medi-Cal for an entire year, the protocol examined annual CC and IBS+C incidence as well as annual demographic statistics (age, sex) of CC and IBS+C cohort.
- Cost outcomes were calculated for one year after their index dates for the following categories:
 - Outpatient (including Emergency Department); Inpatient; Long-term care;
 - Drug [Prescription (Rx) and over-the-counter (OTC) agent] costs.
- Results are presented as per patient per month (PPPM) for total costs, by category, and by percentage of total.
- Percentage of annual costs by category was compared over time.
- Cohorts are reported over multiple timeframes due to inclusion criteria requirements and time required post-index date for follow-up in the different analyses.

Statistical Analysis

- Mean annual costs between the CC and IBS+C cohorts were compared using student *t* tests.
- Statistical significance was defined as $P \leq 0.05$.

Results

- A total of 23,753 subjects were identified in the Medi-Cal 20% sample for the years 1995-2003 with at least one diagnosis of constipation with/without IBS.
- From 1997-2003, a total of 9,201 subjects satisfied the definition for CC and 86 subjects satisfied the definition for IBS+C (**Table 1**).
 - Differences in Medi-Cal eligibility requirements during the time period resulted in the population ranging from 726,767 to 979,401.
- The following trends were detected from 1997 to 2003:
 - The annual incidence of CC ranged from 1.77% to 2.23% with increasing trends over time in the number of patients and rate of CC (**Figure 1**).
 - The annual incidence of co-occurring IBS and CC (IBS+C) remained constant (**Figure 1**).
 - Both cohorts decreased in mean age (**Figure 2**):
 - CC decreased from 64.8 to 55.7 years.
 - IBS+C decreased from 67.1 to 56.6 years.
 - The incidence of females decreased in the CC cohort from 66% to 60% and fluctuated in the IBS+C cohort (**Figure 3**).
 - Over the time period from 1997 to 2002:
 - All costs for all categories, and in total, were similar between groups (**Table 2, no significance**).
 - There was an overall increase in mean PPPM total costs for the CC cohort from \$1207 to \$1912 (\$705, 58%), which was not statistically significant (**Table 2**).
 - There was an overall increase in mean PPPM total costs for the IBS+C cohort from \$1386 to \$1562 (\$176, 13%), which was not statistically significant (**Table 2**).
 - By cost category (**Table 2**):
 - Outpatient costs increased 147% (\$612 for CC) and 99% (\$484 for IBS+C) which was not statistically significant; Drug Cost increased 165% (\$265 for CC) and 99% (\$176 for IBS+C) which was not statistically significant; Inpatient Costs decreased 29% (-\$141 for CC) and 67% (-\$421 for IBS+C) which was not statistically significant.
 - For both cohorts, the percentages of inpatient and long-term care costs decreased over time while the percentages of drugs and outpatient costs increased over time (**Figure 4**).

Table 1. Distribution of Subjects with Chronic Constipation (1997-2003)

CC Diagnostic Criteria	N
2 Constipation Diagnoses	2,372
3 Constipation Diagnoses	928
>3 Constipation Diagnoses	929
1 Constipation Diagnoses + Separate Drug Record (≥30 Days After Diagnoses Date)	4,972
Total	9,201

Figure 1. Annual Incidence of Chronic Constipation and IBS+C (Medi-Cal 20% Sample) From 1997-2003

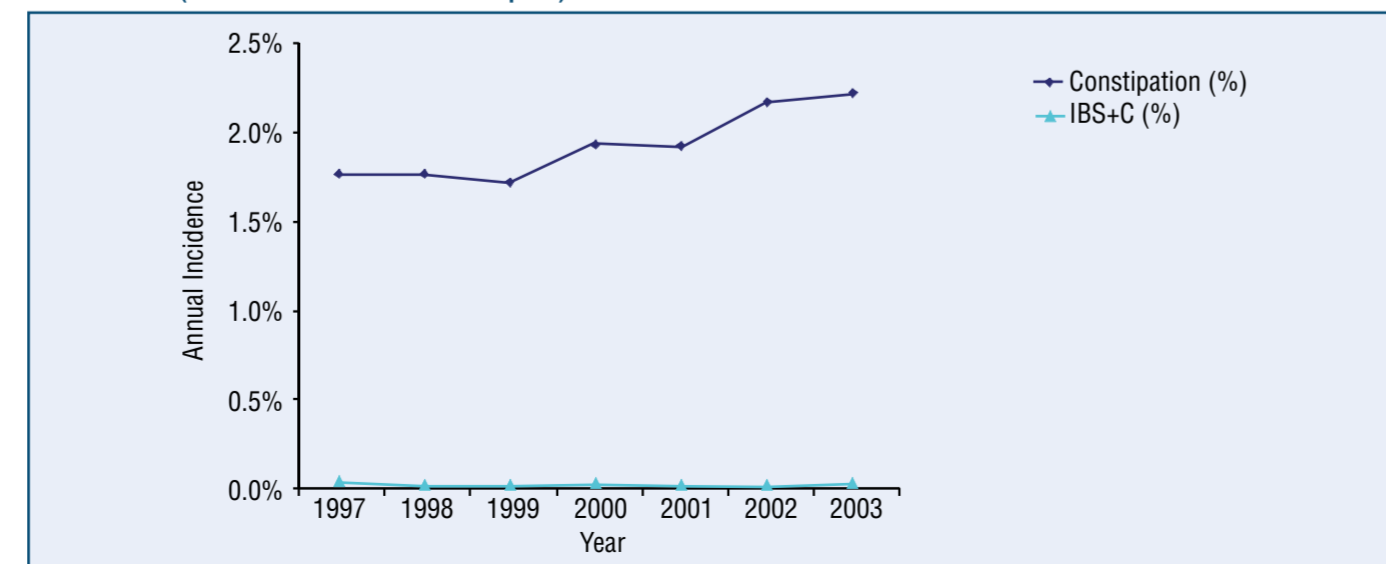


Table 2. PPPM Costs by Category (US Dollars)

Year	N		Outpatient Care		Inpatient Care		Drugs		Long-Term Care		Total Cost	
	CC	IBS+C	CC	IBS+C	CC	IBS+C	CC	IBS+C	CC	IBS+C	CC	IBS+C
1997	1,976	86	\$416	\$489	\$489	\$630	\$161	\$177	\$142	\$89	\$1,207	\$1,386
1998	1,598	46	\$464	\$497	\$404	\$469	\$201	\$228	\$67	\$0	\$1,135	\$1,194
1999	1,621	51	\$455	\$338	\$329	\$232	\$262	\$284	\$90	\$14	\$1,137	\$868
2000	1,725	67	\$525	\$315	\$340	\$347	\$317	\$287	\$115	\$61	\$1,297	\$1,010
2001	1,758	44	\$564	\$282	\$384	\$309	\$365	\$340	\$117	\$0	\$1,431	\$977
2002	1,510	41	\$1,028	\$973	\$348	\$209	\$426	\$353	\$110	\$26	\$1,912	\$1,562

All comparisons between cohorts were similar (no significance) except Long-Term Care costs in 1998 and 2001, where there were no observations for IBS+C.

Figure 2. Average Age at Index Date of CC and IBS+C Cohort Population (Medi-Cal 20% Sample) From 1997-2003

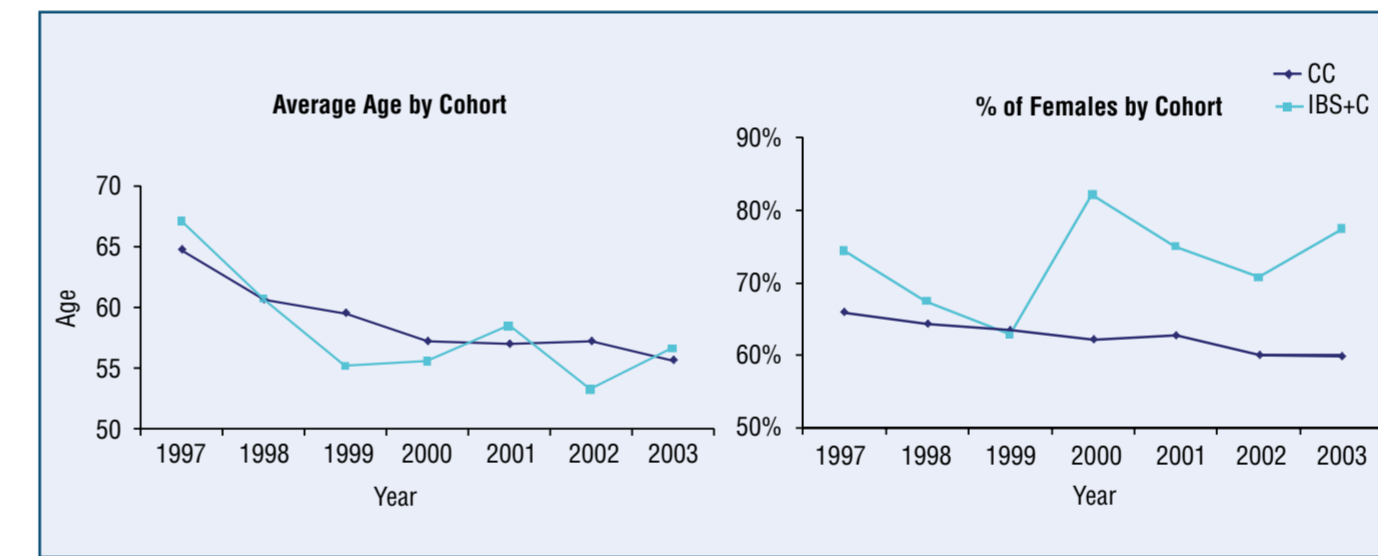


Figure 3. Annual Gender Composition of CC and IBS+C Cohort Population (Medi-Cal 20% Sample) From 1997-2003

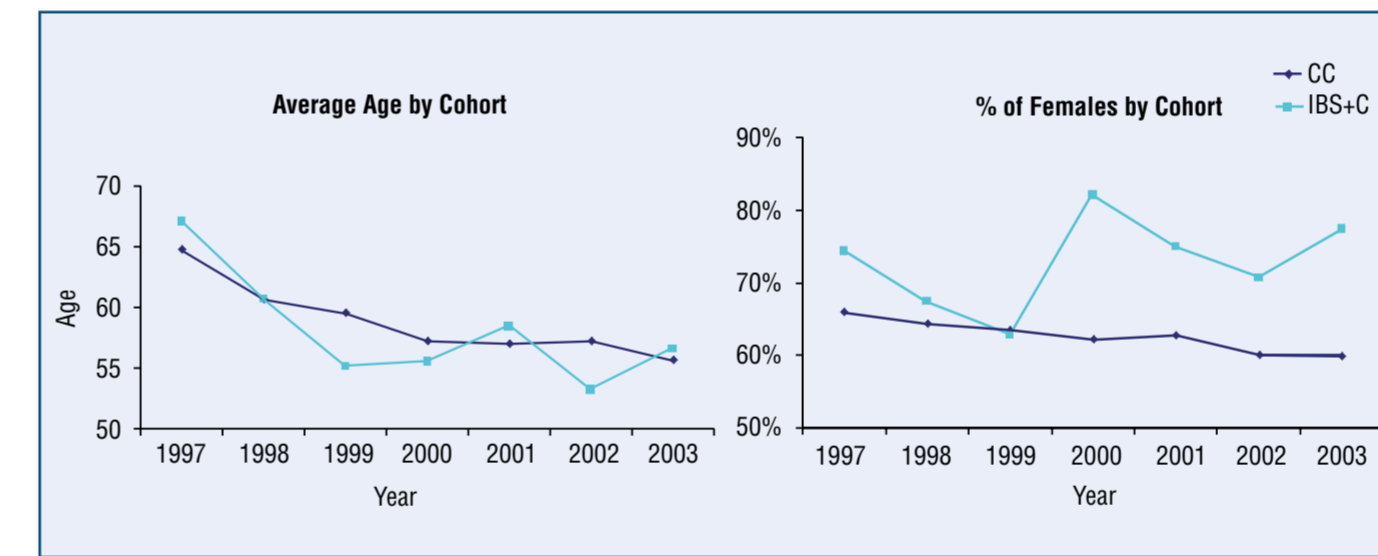
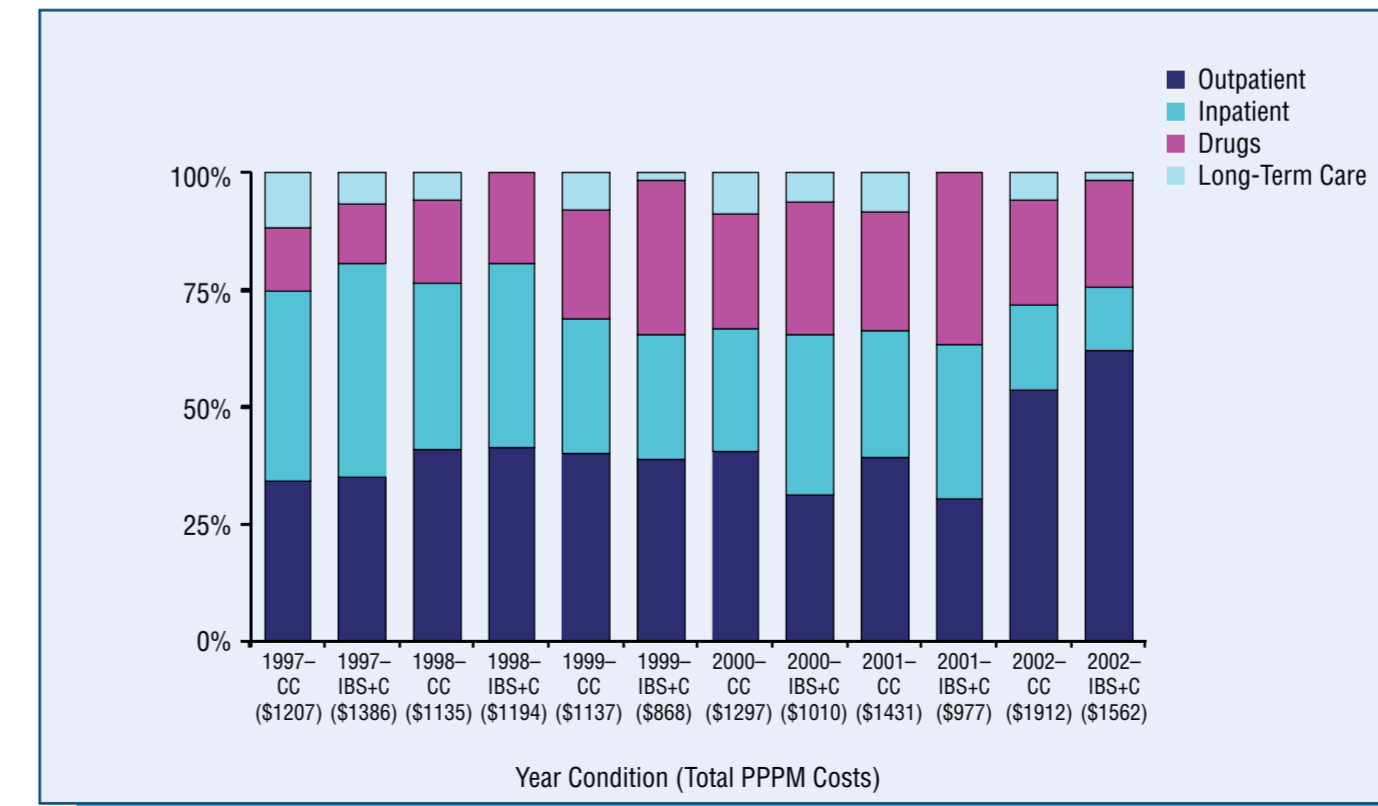


Figure 4. Percentage of Annual Costs by Category and Time



Limitations

- Incidence of CC and IBS+C may be underreported by ICD-9 coding, thereby, underestimating costs and incidence.
- IBS+C is represented by co-occurring CC and IBS ICD-9 codes.
- Because Medi-Cal used a constant billing rate, the medical costs were not inflation adjusted; however, discounting may be useful to account for future value.
- Costs in 2002 showed a dramatic increase which can not be explained by the data.

Summary and Conclusions

- There is a considerable burden of CC and IBS+C in the Medi-Cal population.
- The costs of CC and IBS+C were similar for each year, type of cost category, and in total.
- The age of initial diagnosis of CC is decreasing over time, and the characteristic pattern of CC as a predominantly female disorder is becoming less pronounced in the Medi-Cal population.
- Because CC and IBS+C present similar burdens, they may require the same priority of management.
- These results indicate an opportunity exists for improved management of patients with either constipation or IBS+C.

References

- Harris LA. Prevalence and ramifications of chronic constipation. *Manag Care Interface*. 2005;18:23-30.
- Dennison C, et al. The health-related quality-of-life and economic burden of constipation. *Pharmacoeconomics*. 2005;23:461-76.
- Kleinman NK, et al. Medical, Pharmacy, and Sick Leave Costs for Constipation and for Irritable Bowel Syndrome with Constipation in the 6 Months Before and After Diagnosis: An Employee Perspective. *Am J Gastroenterol*. Sep 2007; 102(suppl2):S451-452.
- Brook RA, et al. Cost of Illness for Constipation: Medical, Pharmacy, and Work Absence Costs in Employees With or Without Constipation. *Am J Gastroenterol*. Sep 2006; 101(suppl2):S408.
- Martin B, et al. Direct medical costs of constipation in the United States. *Manag Care Interface*. December 2006, 43-49.
- Nyrop KA, et al. Costs of health care for irritable bowel syndrome, chronic constipation, functional diarrhoea and functional abdominal pain. *Aliment Pharmacol Ther*. 2007 Jul;26(2):237-248
- Irvine EJ, et al. Health-related quality-of-life in functional GI disorders: focus on constipation and resource utilization. *Am J Gastroenterol*. 2002;97:1986-93.
- Leong SA, et al. The economic consequences of irritable bowel syndrome: a US employer perspective. *Arch Intern Med*. 2003;163:929-35.
- Longstreth GF, et al. Irritable bowel syndrome, health care use, and costs: a U.S. managed care perspective. *Am J Gastroenterol*. 2003;98:600-7.
- Inadomi JM, et al. Systematic review: the economic impact of irritable bowel syndrome. *Aliment Pharmacol Ther*. 2003;18:671-82.
- Cash B, et al. Total costs of IBS: employer and managed care perspective. *Am J Manag Care*. 2005;11:S7-16.
- Singh G, et al. Use of health care resources and cost of care for adults with constipation. *Clin Gastroenterol Hepatol*. 2007 Sep;5(9):1053-8. Epub 2007 Jul 10.
- Brook RA, et al. Functional gastrointestinal disorder comorbidities: Comparisons of prevalence and costs in the 6 months before and after diagnoses of constipation (C) and irritable bowel syndrome and constipation (IBS+C). *Am J Gastroenterol*. Sep 2007; 102(suppl2):S510.