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Utilization of Healthcare Resources by U.S. Children and Adults with Inflammatory Bowel Disease

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Abstract

Background—The inflammatory bowel diseases (IBDs), Crohn's disease (CD) and ulcerative colitis (UC) affect over 1 million people in the United States, yet little is known about healthcare utilization by affected individuals.

Objectives—1) To describe the healthcare utilization associated with IBD in an insured U.S. population. 2) To determine how sociodemographic factors impact healthcare utilization in this population.

Methods—Using an administrative database comprised of 87 health plans, we ascertained cases of CD and UC using an administrative definition. We identified inpatient, office-based, emergency, and endoscopy services occurring between 2003-2004 in IBD patients and matched controls. For each case, excess utilization was determined by subtracting the mean number of control visits from the number of case visits. Multivariable logistic and linear regressions were used to identify the sociodemographic factors associated with excess utilization.

Results—We identified 9,056 CD patients and 10,364 UC patients. The mean number of annual excess hospitalizations, ED visits, and office visits per 100 patients for CD were 21.7, 20.1, and 493 respectively. These values for UC were 13.3, 10.3, and 364 respectively. In general, utilization was higher in CD compared with UC, and in younger patients compared with older patients. Utilization also varied by gender, geographical region, and insurance type (Medicaid versus commercial).

Discussion—In the U.S., patients with IBD consume substantial healthcare resources. Resource utilization varies by patient age and disease type, and to a lesser extent, gender, geographical region, and insurance type. These findings may be used to inform health policy.

Keywords

Crohn's disease; ulcerative colitis; healthcare utilization

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Background

Crohn's disease (CD) and ulcerative colitis (UC), collectively known as inflammatory bowel disease (IBD), are chronic, idiopathic conditions of the gastrointestinal tract. Both are associated with high morbidity[1] and decreased quality of life[2, 3]. The public health burden of illness in the United States is also quite substantial. Between 1 and 1.5 million Americans are affected by these conditions[4-6], and the direct costs have been recently estimated at $3.1 billion for CD and $2.1 billion for UC[7]. Data regarding the utilization of health services by affected individuals is an important supplement to cost data and is necessary to further characterize the burden of IBD in the United States, both from the perspective of the individual patientas well as that of the healthcare system. From the patient's perspective, healthcare utilization represents another way of conceptualizing disease morbidity: time spent in physician offices, emergency departments, or inpatient settings is time away from work, hobbies, or other pursuits. From the health system perspective, detailed utilization data are required to understand and address the supply and demand of health services required by IBD patients at the population-level. Yet, studies describing IBD-related healthcare utilization in the United States are limited, owing to the decentralized nature of the health care system.

The aims of this study were 1) to describe the utilization of healthcare resources including hospitalization, office visits, endoscopic procedures, and ED visits in U.S. patients with CD and UC, and 2) to determine how healthcare utilization varies by disease type and sociodemographic factors including age, gender, geographical region, and insurance status.

Methods

Study Design and Data Source

We performed a cross-sectional study, analyzing the inpatient and outpatient insurance claims contained within the PharMetrics Patient-Centric Database (IMS Health, Watertown, MA) for the period January 1, 2003 through December 31, 2004. This longitudinal, patient-level database, which pools together claims from 87 different health plans in 33 states, has been used in previous epidemiological studies of inflammatory bowel disease.[6, 7] Prior studies have reported PharMetrics to be representative of the national commercially-insured population on a variety of demographic measures, including geographic region, age, gender, and health plan type[8].

Patient Selection

All individuals in the database with continuous health plan enrollment for the 24 month period between January 1, 2003 and December 1, 2004 were eligible for inclusion in this analysis. Patients 65 years of age or older were excluded in order to minimize under-estimation of resource utilization in commercial insurance claims due to Medicare dual eligibility.

We identified cases of CD and UC using a previously reported definition based on administrative data [6]. This definition included patients with at least 3 health care contacts, on different days, associated with an International Classification of Diseases, 9th Revision, Clinical Modification diagnosis code for CD (555.xx) or UC (556.xx), or patients with at least one claim for CD or UC and at least 1 pharmacy claim for any of the following medications: mesalamine, olsalazine, balsalazide, sulfasalazine, 6-mercaptopurine, azathioprine, infliximab, adalimumab, or enteral budesonide. For patients who had claims for both CD and UC, disease assignment was made according to the majority of the last 9 claims. For each case, we randomly selected up to 3 non-IBD controls from within the same health plan, matched on the basis of age (3 year increments), gender, and geographic region.

Demographic factors (age, gender), region, and whether patients were insured in a managed Medicaid or commercial insurance plan were recorded in each individual's enrollment file. Age, which was assigned at the end of the observation period, was analyzed as a categorical variable (< 20, 20-39, and 40-64).

Identification of Healthcare Utilization

We first classified each claim as inpatient or outpatient. The presence of a "room and board" revenue code indicated an inpatient stay; all claims submitted by the same facility with overlapping or contiguous dates were also considered part of a single inpatient stay. All remaining claims were considered outpatient.

Inpatient episodes were further categorized as "GI surgical" if 1 or more claims during the period of hospitalization contained a Current Procedural Terminology (CPT) code for a gastrointestinal (non-hepatobiliary or pancreatic) surgical procedure. Non-surgical admissions were then classified using discharge diagnoses as "primary IBD" if CD or UC was listed as the primary discharge diagnoses, "secondary IBD" if CD or UC was listed as a non-primary discharge diagnosis, and "other" if neither CD nor UC were listed as discharge diagnoses. Number of admissions and length of stay were analyzed for each inpatient category.

Outpatient claims were further categorized based on CPT codes as: emergency department (ED) visits, endoscopic procedures, and office visits. Office visits were then subclassified by provider specialty. As multiple claims are often generated during a single visit, we assigned measured office visits, and ED and endoscopy utilization on a "per day" basis.

Statistical Analysis

We first determined the number of hospitalizations, hospital days, emergency department visits, endoscopy visits, and office visits for each patient with CD, UC, and their respective controls. Annual utilization of each service type was reported by dividing the number of episodes occurring over the 24 month observation period by two. By using controls matched on age, gender, region, and health plan, we estimated IBD-attributable utilization (excess utilization) for each case using a two step process. First we determined the mean utilization for each case's matched controls. Next, excess utilization was calculated for each case by subtracting the mean control utilization from the case utilization.

We then compared the excess utilization of each service type between CD and UC patients using t-tests. Although the utilization of health services does not follow a normal distribution, the use of t-tests to compare means can be justified based on the large sample size of this analysis. Finally, we used multivariable logistic and linear regression to identify the independent effects of disease type (CD versus UC), age group, region, gender, and insurance type (Medicaid versus commercial) on excess utilization. Based on the frequency distributions of excess hospitalizations, ED visits, and endoscopic procedures (a very small number of cases had less utilization than their controls, a large proportion of patients had utilization equal to their controls, and a variably sized group of patients had greater utilization than their controls)), we modeled excess utilization as a dichotomous outcome. For example, if a case had 3 ED visits and the matched controls had a mean of 2 ED visits, then excess ED visits was coded as "yes". If a case had 3 ED visits and the matched controls had a mean of 3 or greater ED visits then excess ED visits coded was coded as "no". Office visits occurred frequently enough that we were able to use linear rather than logistic regression to determine the independent effects of disease type and patient demographics on office visits.

All statistical analyses were performed using SAS version 9.1 (Cary, NC), and the study protocol was granted exemption from review by the Institutional Review Boards at the University of North Carolina Chapel Hill and Harvard Pilgrim Health Care because it involved the use of existing, de-identified data.

Results

Study Population

Our study population included 9,056 CD, 10,364 UC patients, and 52,989 matched controls. Characteristics of included individuals are shown in Table 1. The mean ages of CD and UC patients were 42 years (s.d. 13 years) and 45 years (s.d. 12 years) respectively. Fifty-six percent of CD patients and 53% of UC patients were female. Approximately 1% of CD and UC patients were insured by Medicaid plans; the remainder was commercially insured. Each of the 4 major U.S. census regions was adequately represented.

Inpatient Utilization

The mean number of annual hospitalizations for CD and UC patients, and their controls, is shown in Table 2. (The median number of hospitalizations in these groups was zero, as most cases and controls were not hospitalized) For CD patients, the mean number of annual all-cause hospitalizations per 100 persons was 27.3 (equivalent to 0.273 per person per year), compared to 5.6 in their matched controls. UC patients experienced a mean of 19.1 annual hospitalizations per 100 persons, compared to 5.8 for their controls. The mean number of excess hospitalizations per 100 IBD patients was 21.7 for CD patients and 13.3 for UC patients ($p < 0.001$). Twenty-nine percent of CD patients and 21% of UC patients had 1 or more excess hospitalization. Medical hospitalizations with a primary IBD discharge diagnosis comprised the largest proportion of hospitalizations for CD patients; hospitalizations with a non-IBD primary or secondary diagnosis comprised the largest proportion of hospitalizations for UC patients. Compared to UC patients, CD patients also experienced higher numbers of excess hospitalization for surgical admissions, and medical hospitalizations with either a primary or secondary discharge diagnosis of IBD ($p < 0.001$ for all comparisons). The number of excess hospitalizations for other causes did not differ between CD and UC ($p = 0.14$).

The mean length of stay across all admission types was 6.7 days for CD, and 6.9 days for UC. In both diseases, surgical hospitalizations were associated with the longest lengths of stay (9.2 days for CD, 10.5 days for UC).

The mean number of hospital days per year forCD patients is 1.8 days, compared to 0.3 days in their controls. For patients with UC, the mean number of annual hospital days is 1.3, compared with 0.3 for their controls. The mean number of excess hospital days for CD is 1.5 days versus 1.0 for UC ($p < 0.001$).

Table 3 describes the independent effects of disease type and patient demographics (age, gender, region, and Medicaid status) on an IBD patient having at least 1 excess hospitalization from any cause (compared to their controls) over the 2-year study period. Excess hospitalization occurred more frequently in CD versus UC (OR 1.5, 95% CI 1.4-1.6), and in females versus males (OR 1.3, 95% CI 1.3-1.4). There was an inverse relationship with age. Compared to those ≥ 40 years of age, those < 20 years (OR 1.3, 95% CI 1.2-1.5) and between 20 and 39 years (OR 1.2, 95% CI 1.1-1.3) were more likely to have had excess hospitalization Regional variation was also observed [OR 1.2 (95% CI 1.1-1.4 for Midwest versus West; OR 1.3 (95% CI 1.2-1.5) for South versus West]. There was a non-significant trend towards increased hospitalization among those insured by the included managed Medicaid plans, compared to commercially insured patients (OR 1.3, 95% CI0.9-1.7).

Outpatient Utilization

Emergency Department (ED)—The mean number of annual ED visits per 100 patients for CD patients was 36.0, compared with 15.1 in the CD controls. For UC patients, the mean number of annual ED visits per 100 patients was 26.2 versus 15.7 for the UC controls. CD patients experienced a mean of 20.1 excess annual ED visits per 100 persons, compared to 10.3 for UC patients ($p < 0.001$). Excess ED utilization was observed in 33.7% of CD patients and 26.6% of UC patients. CD patients were more likely than UC patients to have excess ED utilization (OR 1.4, 95% CI 1.3-1.5). Female gender was positively associated with excess ED utilization (OR 1.1, 95% CI 1.1-1.2), as was younger age (OR 1.3, 95% CI 1.2-1.5 for those < 20 versus those 40-65 years of age). Differences in excess ED utilization by geographical region were not observedt. Patients with Medicaid insurance were significantly more likely to use the ED, compared to patients with commercial health insurance (OR 2.4, 95% CI 1.7-3.2).

Endoscopy—The mean number of annual endoscopic procedures in CD cases was 41.4 procedure days per 100 patients (6.4 for CD controls), and in UC cases was 52.0 per 100 patients (7.1 for UC controls). Excess utilization of endoscopy among IBD patients was significantly higher in UC patients than CD patients (45.0 vs. 35.0, $p < 0.001$). After adjustment, CD patients remained significantly less likely than UC patients to undergo excess endoscopy (OR 0.61, 95% CI 0.58-0.65). Compared to those greater than 40 years of age, those in younger age groups were less likely to undergo excess endoscopy (OR 0.63, 95% CI 0.56-0.71 for age < 20 years; OR 0.89, 95% CI 0.84-0.95 for those between 20 and 39 years). Patients with Medicaid were less likely than those with commercial insurance to undergo excess endoscopy (OR 0.72, 95% CI 0.53-0.99). Gender and region were not significantly associated with excess endoscopy utilization.

Outpatient visits—The mean number of annual office visits to any provider, per 100 patients, was 1030 for CD patients, 544 for CD controls, 921 for UC patients, and 560 for UC controls (Table 4). CD patients had a mean of 493 excess office visits per 100 patients, compared to 364 for UC patients ($p < 0.0001$). Of these excess visits, the mean number of annual visits to a gastrointestinal specialist was 172 per 100 patients for CD and 121 for UC. Overall, 77.4% of CD patients and 71.5% of UC patients had at least 1 or more excess visits to a GI specialist. The breakdown of office visits by specialty (primary care, gastroenterology, surgery, and other specialties) is provided in Table 4. CD and UC patients had more outpatient visits in each category (including visits to non IBD-related specialists), compared to their matched controls. The number of excess outpatient visits in each specialty was greater for CD patients versus UC patients ($p < 0.01$ for all comparisons).

Excess gastrointestinal specialist visits were higher in CD patients, compared to UC patients ($p < 0.001$). As with inpatient utilization, age was inversely associated with the outpatient gastrointestinal outpatient visits ($p < 0.001$). Compared to the West, patients in the Northeast and South experienced a greater number of excess outpatient gastrointestinal visits ($p < 0.001$). Differences between the Midwest and West were of a much smaller magnitude ($p = 0.01$). Gender effects were also of a small magnitude, and the effect of insurance type did not reach significance.

Discussion

This study provides a contemporary and detailed analysis of the utilization of inpatient and outpatient healthcare resources by U.S. children and adults with IBD, a necessary step in understanding the overall burden of inflammatory bowel disease in this country. In our large study population which was diverse in terms of patient age, gender, geographical region, and

health plan, we observed substantial resource utilization by IBD patients. Excess annual hospitalizations for IBD patients were as high as 21.7 and 13.3 per 100 patients for CD and UC respectively. Outpatient utilization was also quite remarkable. The excess number of ED visits for CD and UC patients was 20.1 and 10.3 visits per 100 patients respectively. Excess annual office visits (per 100 patients) totaled 493 for CD and 364 for UC.

This analysis of healthcare utilization among individuals with CD and UC is important in several aspects. First, patients with IBD undergo a substantial number of office visits, ED visits, endoscopic procedures, and hospitalizations, as compared to non-IBD controls. Taken together, this excess utilization can be considered an indirect measure of morbidity and quality of life, as time spent in these various care environments is time away from work, school, and other interests. Second, the detailed descriptions of health service utilization across multiple settings is useful, from a policy perspective, in planning for necessary access to services for affected individuals. IBD is largely an outpatient disease, as indicated by the nearly 20-fold ratio of outpatient to inpatient visits. Finally, comparing health service utilization between subpopulations of IBD can be used to further understand natural history/ disease course as well as to identify variation in care or possible disparities. We observed generally higher healthcare utilization for CD, compared to UC, consistent with other indicators of disease morbidity. A notable exception to this was the use of endoscopy, which may represent the increased colorectal cancer surveillance required by patients with UC[9]. We also observed, in general, greater excess resource utilization in younger patients, compared with older patients. The higher rates of excess hospitalization, ED visits, and office visits in younger patients, particularly children, are likely multifactorial. These differences may be explained by the increased severity and extent of disease in children compared with adults, as suggested in a number of recent reports[10, 11]. This trend may also be related to the amount of time from diagnosis. Younger patients are more likely to be closer to their time of diagnosis than older patients, and prior work from Longobardi et al recently demonstrated a decreased trend in utilization over time[12, 13]. We were unable to directly analyze trends in utilization as a function of time from diagnosis, given the limited ability to identify dates of diagnosis in a cross-sectional study using administrative data. Another explanation for the decreasing healthcare utilization with age may be differences in practice patterns between pediatric and adult providers. In contrast to hospital, ED, and office utilization, a reverse trend was observed in endoscopic utilization where older patients underwent more frequent endoscopic procedures. This is likely due to increased colorectal cancer surveillance, for which current guidelines recommend annual or biannual surveillance beginning 8-10 years following diagnosis.[9]

Although based on small numbers of Medicaid patients from a limited number of managed Medicaid plans, the differences in healthcare utilization between individuals insured by Medicaid and those with commercial insurance were substantial. Despite similar numbers of outpatient visits,those with Medicaid insurance were more likely to visit an ED than those with commercial insurance. Differences in hospitalization did not reach statistical significance, but suggest a difference in the same direction. . We consider these trends to be exploratory in nature given the limitations described above, and further work with more direct measures of socioeconomic status including neighborhood income and other sociodeomgraphic variables, should be undertaken to confirm this differential utilization of healthcare resources. Nevertheless, ssocioeconomic disparities such as these are well-described in a number of other chronic conditions[14]. By providing detailed descriptive and comparative data regarding the utilization of office visits, ED visits, endoscopic procedures, and hospitailzations among IBD patients in the United States, this study complements other recently published studies which describe time trends IBD health service utililzation[15, 16]. Hence, this analysis represents an important contribution to the existing literature describing the burden of these gastrointestinal conditions. Although cross-national comparisons are

limited by differences in study methodology and population characteristics, such comparisons may be useful to broadly confirm similarities and/or highlight differences in healthcare delivery across countries. Longobardi et al have recently undertaken a series of studies detailing IBD healthcare resource utilization in Manitoba, Canada.[13, 17] Similar to our study, they also report a substantial burden of outpatient and inpatient visits in IBD patients, compared to controls as well as generally higher healthcare utilization in CD as compared to UC.[17] In terms of absolute utilization, the total number of outpatient visits in Manitoba study was quite similar to the number in the U.S. reported here (1380 visits per 100 patient years for CD Manitoba versus 1030 in the U.S.; 1255 visits per 100 patient years for UC Manitoba versus 921 in the U.S.) The total number of inpatient days was also of a similar magnitude. Hence, despite significant differences in the organization and financing of healthcare delivery in the U.S. and Canada, the burden of illness, as measured by healthcare utilization, is remarkably similar.

An important strength of this study is the large number of patients and health plans included in this analysis, and the diversity of the study population with regard to patient age, gender, and geographical region. Therefore, the utilization data presented here are likely to be broadly generalizable to the commercially insured population of the United States. In addition, resource utilization was directly assessed through insurance claims, and therefore not subject to recall or other biases inherent in patient self-reporting.

An inherent limitation to studies involving administrative data is the possibility of misclassification. We used a stringent case definition that required either multiple IBD-related health contacts or IBD-specific pharmaceutical claims to establish a diagnosis of CD or UC. This definition is similar to and represents a balance between administrative definitions that have been previously validated in the U.S. and Canada[18 19]. Nevertheless, our study may not have identified milder cases that did not seek medical attention or utilize health care services. Similarly, the use of claims data does not allow precise determination of which medical services used by patients identified as having IBD were used specifically to treat IBD versus other comorbid conditions. To account for this, we matched IBD patients with non-IBD patients of similar age, gender, region, and health plan in order to estimate excess healthcare utilization in patients with IBD. A third limitation is that this study was a non-random sample of the U.S. population, and thus might not fully represent the geographic, ethnic, and socioeconomic distribution of the overall population. In addition, our analysis included a small number of Medicaid patients, so our findings regarding differences in those covered by Medicaid must be considered preliminary. Nevertheless, we believe that the robust sample size of patients and health plans, and the detailed information on the actual utilization of healthcare services used in the analysis outweigh these limitations

In conclusion, this study provides a contemporary description of the resource utilization required by U.S. patients with IBD. In addition to other studies detailing the prevalence, costs, morbidity, mortality, quality of life, and missed work/school, this study adds to the growing body of literature describing the burden of illness for CD and UC. We anticipate these research findings will be useful 1) inform IBD-related health policy, including the planning of appropriate clinical services 2) help estimate the indirect costs of these conditions, including transportation costs and missed work/school associated with outpatient and inpatient care, and 3) promote additional research regarding the possibility of socioeconomic disparities in care.

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Table 1
Characteristics of CD and UC Patients and Controls

	CD patients	CD controls	UC patients	UC controls
Mean age (s.d.)	42 (13)	42 (13)	45 (12)	45 (12)
Age				
< 20 n (%)	737 (8.1)	2066 (8.3)	488 (4.7)	1394 (5.0)
20-39 n (%)	2755 (30.4)	7510 (30.3)	2661 (25.7)	1760 (25.4)
40-64 n (%)	5564 (61.4)	15253 (61.4)	7215 (69.6)	19606 (69.6)
Gender				
Female n (%)	5090 (56.2)	13965 (56.2)	5464 (52.7)	14828 (52.7)
Male n (%)	3966 (43.8)	10864 (43.8)	4900 (47.3)	13332 (47.3)
Region				
Northeast n (%)	2124 (23.5)	5818 (23.4)	2402 (23.2)	6567 (23.3)
Midwest n (%)	2114 (23.3)	5903 (23.8)	2276 (22.0)	6339 (22.5)
West n (%)	1859 (20.5)	4930 (19.9)	2367 (22.8)	6190 (22.0)
South n (%)	2959 (32.7)	8178 (32.9)	3319 (32.0)	9064 (32.2)
Medicaid n (%)	104 (1.2)	345 (1.4)	60 (0.6)	312 (1.1)
Total	9056	24829	10364	28160

Table 2

Mean number of annual hospitalizations (per 100 individuals) for U.S. patients with Crohn's disease, ulcerative colitis, and controls matched on age, gender, health plan, and geographical region

	Crohn's disease			Ulcerative colitis			
Admission type	**Patients (n = 9056)**	**Controls (n = 24,829)**	**Excess hospitalization[#]**	**Patients (n=10,364)**	**Controls (n=28,160)**	**Excess Hospitalization[#]**	**p[*]**
Surgical hosp	5.4 (s.d. 20)	0.4 (s.d. 4.9)	5.0 (s.d. 20)	3.6 (s.d. 18)	0.4 (s.d. 4.9)	3.2 (s.d. 18)	< 0.001
Medical hosp (1^0 IBD dx)	10.4 (s.d. 34)	0 (s.d. 0)	10.4 (s.d. 34)	5.2 (s.d. 19)	0 (s.d. 0)	5.2 (s.d. 19)	< 0.001
Medical hosp (2^0 IBD dx)	4.2 (s.d. 17)	0 (s.d. 0)	4.2 (s.d. 17)	2.2 (s.d. 12)	0 (s.d. 0)	2.2 (s.d. 12)	< 0.001
Other hosp	7.2 (s.d. 32)	5.2 (s.d. 21)	2.0 (s.d. 34)	8.1 (s.d. 31)	5.4 (s.d. 22)	2.7 (s.d. 34)	0.14
All cause	27.3 (s.d. 63)	5.6 (s.d. 22)	21.7 (s.d. 64)	19.1 (s.d. 49)	5.8 (s.d. 23)	13.3 (s.d. 52)	< 0.001

[#]The number of excess hospitalizations for each case was determined by subtracting the mean number of control hospitalizations from the number of case hospitalizations.

[*]P values reported here, obtained by t-tests, compare the mean number of excess hospitalizations between CD and UC patients.

Table 3

Independent effects of disease type, age, gender, region, and Medicaid status on excess hospitalization among IBD patients in the United States

Variable	OR (95% CI)*
Disease type (CD vs. UC)	1.5 (1.4-1.6)
Age (vs. 40 -65 yrs)	
< 20 years	1.3 (1.2-1.5)
20-39 years	1.2 (1.1-1.3)
Gender (female vs. male)	1.3 (1.3-1.4)
Region (vs. west)	
Northeast	1.1 (1.0-1.2)
Midwest	1.2 (1.1-1.4)
South	1.3 (1.2-1.5)
Medicaid (vs commercial insurance)	1.3 (0.9-1.7)

* Results obtained from multivariable logistic regression modeling the outcome of “excess hospitalization”. Excess utilization was said to occur when IBD patients had a greater numbers of visits than their age, gender, region, and health plan matched controls.

Table 4

Mean number of annual outpatient visits per (100 individuals) for U.S. patients with Crohn's disease, ulcerative colitis, and controls matched on age, gender, health plan, and geographical region

	Crohn's disease			Ulcerative colitis			
Provider specialty	**Patients (n = 9056)**	**Controls (n = 24,829)**	**Excess outpatient visits#**	**Patients (n=10,364)**	**Controls (n=28,160)**	**Excess outpatient visits#**	**p***
Primary care	167 (s.d. 305)	118 (s.d. 225)	51 (s.d. 320)	151 (s.d. 276)	115 (s.d. 216)	39 (s.d. 301)	0.006
Gastro-intestinal	179 (s.d. 208)	7 (s.d. 33)	172 (s.d. 208)	128 (s.d. 155)	7 (s.d. 32)	121 (s.d. 155)	< 0.001
General surgery	22 (s.d. 72)	6 (s.d. 31)	16 (s.d. 74)	19 (s.d. 63)	7 (s.d. 36)	13 (s.d. 66)	0.002
Other specialty	662 (s.d. 885)	412 (s.d. 656)	254 (s.d. 943)	622 (s.d. 819)	432 (s.d. 684)	191 (s.d. 890)	< 0.001
Total	1030 (s.d. 998)	544 (s.d. 719)	493 (s.d. 1059)	921 (s.d. 905)	560 (s.d. 743)	364 (s.d. 983)	< 0.001

#The number of excess outpatient visits for each case was determined by subtracting the mean number of control visits from the number of case visits.

*P values reported here, obtained by t-tests, compare the mean number of excess outpatient visits between CD and UC patients.