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Health care utilization, costs, and the burden of disease related to eosinophilic esophagitis in the United States

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Abstract

Objectives—Eosinophilic esophagitis (EoE) has rapidly become a major cause of upper GI morbidity, but health care costs related to EoE have not been described. This study aimed to estimate EoE-related health care costs and utilization in the United States.

Methods—We performed a study of health care utilization of EoE cases compared to age- and sex-matched controls using administrative claims data, representative of the commercially insured population in the U.S. Cases of EoE were identified using a previously validated definition. We assessed inpatient, outpatient, emergency department, outpatient prescription, and endoscopy-related costs for patients with EoE, and estimated total costs related to EoE extrapolated to the U.S. population.

Results—We identified 8,135 cases of EoE and 32,540 controls. The median total annual cost per EoE case was $3,304 compared to $1,001 for controls (p<0.001). For EoE, median costs

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included $2,508/year for outpatient visits, $157 for endoscopies, and $325 for pharmacy claims, compared to $699, $0, and $76 for controls (p<0.001 for all). The overall median costs associated with EoE were $2,302/year/patient. Total costs in the U.S. ranged from $503 million to $1.36 billion/year, depending on the prevalence estimate, with costs attributable to EoE ranging from $350-$947 million/year.

Conclusions—Patients with EoE have an estimated annual health care cost of as much as $1.4 billion in the U.S. This represents a remarkable burden of disease for an entity that was essentially unknown two decades ago. These cost data can be used by policy makers to guide resource allocation.

Keywords

Eosinophilic esophagitis; healthcare utilization; costs

Introduction

Eosinophilic esophagitis (EoE) is a recently recognized clinicopathologic condition that has become increasingly common and is associated with upper gastrointestinal morbidity in both children and adults (1, 2). It is currently defined as an allergic/immune-mediated disease characterized clinically by symptoms of esophageal dysfunction and histologically by a marked eosinophilic infiltrate in the esophageal mucosa in the absence of other competing causes of esophageal eosinophilia (3, 4).

Estimating the prevalence of EoE at the national level was made possible after the 2008 approval of an International Classification of Diseases, 9th Revision (ICD-9) code for EoE (530.13). Using this, we recently estimated that the prevalence of EoE in the United States, among children and adults between the ages of 0-64, is approximately 57 per 100,000 (5).

While the absolute numbers of patients affected by EoE are important, these numbers alone do not quantify the burden of disease attributable to EoE. To date, the healthcare utilization costs and patterns of use for patients diagnosed with EoE have not been previously described. The aims of the present study were to estimate EoE-related health care costs and utilization in the U.S. and to characterize the relative increase in costs and utilization for patients with EoE as compared to the general population.

Methods

Study design and data source

We performed a matched, case-control analysis using the IMS LifeLink® PharMetrics Health Plan Claims Database (IMS Health Inc, Watertown, MA) to characterize health care utilization and costs for EoE cases and controls. The database contains longitudinal, integrated, fully adjudicated medical and pharmaceutical claims for more than 75 million individuals from more than 80 health plans and has been shown to be representative of a U.S. national commercially insured population (6, 7). We analyzed data collected from January 1, 2009 through December 31, 2010. We restricted selection of cases and controls to

those patients age 0-64 who were continuously enrolled throughout this time period and whose benefit plan included prescription coverage.

Case and control selection

EoE cases were defined as patients with documentation of at least one instance of the ICD-9 code 530.13. We previously validated a single instance of this code for diagnosis of EoE by using health plan claims records among commercially insured patients (8). Because we found that this case definition had high specificity (>99%) but a low sensitivity (37%), we performed pre-planned sensitivity analyses (see below). Controls were randomly selected from the enrollees meeting study inclusion criteria and were age- and sex-matched in a 4:1 ratio to EoE cases.

Statistical analysis

We estimated total, all cause costs and claims for EoE patients both in sum and relative to controls. In this database, both charges and allowed costs are provided. For the purposes of this analysis, we used allowed costs, which represent the amount covered by the insurance provider plus the patient liability (e.g. co-pay, deductible, co-insurance).

We also characterized the costs and number of claims for EoE cases and controls for several types of services of interest. Specifically, we summed the total number of claims and costs (all cause) for inpatient, outpatient, and emergency department services by patient and then obtained the mean and median claims and costs for service for cases and for controls. We also calculated the total mean and median number of claims and costs for outpatient prescriptions and for upper endoscopies. Claims for upper endoscopies were identified by Current Procedural Terminology (CPT) codes (Supplementary Table 1). We also evaluated costs and claims for EoE patients with and without concomitant allergic conditions as identified from ICD-9 diagnostic codes (Supplementary Table 1).

We assessed for statistically significant differences in costs and claims for EoE patients versus controls overall and by service type and evaluated for differences by age and sex. We also calculated the difference in costs between the case and the control groups to represent the health care utilization attributable to EoE and conducted a sensitivity analysis for these total costs based on a range of possible prevalences. Details of the statistical analyses are described in the Supplementary Material (available online).

This study was designated as exempt from review by the UNC Institutional Review Board.

Results

A total of 8,135 cases of EoE and 32,540 sex and age-matched controls met inclusion criteria (Table 1). The mean age was 35.5 ± 16.8 years, 21% were < 18 years of age, and 65% were male. As expected with the matching strategy, cases and controls were identical in their distribution of age and sex. Relative to controls, a higher proportion of cases resided in the Midwest region and a smaller proportion of cases resided in the East. A somewhat smaller proportion of cases had received insurance coverage through Medicaid (1.8% versus 6.7%) (Table 1).

Costs and claims attributable to EoE

For the 2 year period analyzed, all cause total cost of health care services and the total number of claims was significantly higher for EoE cases than controls (Table 2). Median total costs were $6,608 for cases compared to $2,003 for controls ($p < 0.001$), and median number of claims for cases was double that of controls (67 versus 34; $p < 0.001$). These data are right-skewed due to small numbers of patients having significantly higher claims and costs relative to most patients. However, the higher costs and number of claims associated with EoE was also observed when comparing means (Table 2). Stratification of patients by age (<18 versus 18-64) indicated that for cases, the costs and number of claims was higher among the pediatric population (Table 2).

Furthermore, we found the relative difference in costs between cases and controls was significantly higher for younger patients, and the differences were more pronounced for males. For costs for males, we found that for each 5 year increase in age there was a 12 percent decrease (95% CI: 13%, 11%) in the costs for cases relative to controls. Among females, there was a 9 percent decrease (95% CI: 11%, 8%). Similarly, for total claims for males, for each 5 year increase in age there was a 17 percent decrease (95% CI: 19%, 15%) in the number of claims and for females there was a 13 percent decrease (95% CI: 16%, 11%). Moreover, relative to patients in the oldest age group, the difference between cases and controls was progressively greater as age decreased. This was true among both males and females (Figure 1).

There were 3,227 (39.7%) EoE cases with concomitant claims for an allergic condition. The median, all cause total costs for cases with allergic disease was higher than for those without of allergic disease ($10,584 versus $4,190; $p < 0.01$). Similarly, the median number of claims was higher for EoE patients with allergic disease (106 versus 43; $p < 0.01$).

Inpatient, outpatient, and emergency room services

Evaluation of inpatient, outpatient, and emergency department services identified similar patterns of higher costs and numbers of claims for EoE patients, although most subjects (EoE cases and controls) had no inpatient claims during the study period (Table 3). Of note, the inpatient costs for pediatric controls was low, reflecting that most children are healthy and do not require hospital admission.

For outpatient services, the number of claims and allowed costs were significantly higher in EoE cases than in controls (Table 4). The difference between cases and controls was highest among children, where the median costs for cases was $6,327 versus $752 for controls ($p < 0.001$). Similarly, the difference in number of claims was highest among children.

While few patients obtained emergency room department services in the 2-year study period, claims and costs were still significantly higher in EoE cases than in controls (Supplementary Table 2).

Prescriptions

The median number of prescription claims was significantly higher for EoE cases than controls (Table 5). The median allowed costs for outpatient prescriptions were generally

about 4-fold higher for EoE cases versus controls overall ($650 vs $151; $p < 0.001$) and these differences persisted after stratification by age (Table 5).

Upper endoscopies

The number of claims and costs for upper endoscopies was significantly higher for EoE cases as compared to controls (Supplementary Table 3). This yielded increased overall median costs for the EoE cases ($331 vs $0; $p < 0.001$) and these differences persisted after stratification by age (Supplementary Table 3).

Total burden of disease attributable to EoE

The annual, all cause median cost per EoE patient was $3,304, and $1,001 for non-cases. Therefore, the EoE-attributable annual median cost for EoE patients is $2,302. Based on previously described prevalence estimates (5), we extrapolated total estimated costs for EoE in the U.S.. A lower bound (56.7 cases/100,000) estimate of the total annual health care costs related to EoE is $502,710,208 per year. The lower bound on total excess costs for EoE patients is $350,329,980 per year. Extrapolating to the upper bound estimate (153.2 cases/100,000), the total costs for EoE patients could be as high as $1,358,677,488 billion, with $946,633,044 million costs in excess of baseline costs.

Discussion

Over the past two decades, eosinophilic esophagitis has transformed from a case-reportable disease to a major cause of upper GI morbidity (9-15) with an estimated prevalence of 0.5-1/1000 (5, 16-21). With EoE becoming more common, there is a pressing need to assess the disease burden of EoE as measured by heath care costs, claims, and utilization.

In this study, we used a large administrative database to estimate, for the first time, the costs associated with having EoE. The results were striking, but not necessarily surprising. EoE diagnosis and treatment is expensive, and represents a substantial health care burden. Depending on the prevalence estimate used, the total costs attributable to having a diagnostic code for EoE range from more than $500 million to more than $1.3 billion per year. Moreover, when the baseline costs from a control population are removed, approximately two-thirds of these costs remain directly attributable to EoE. Interestingly, costs and claims were higher for EoE patients with concomitant allergic diseases, but costs for EoE patients without allergic disease were still higher than controls.

Putting these values into context illustrates that this is a remarkable level of expenditures for EoE. Based on a recent analysis of the burden of all GI illnesses, the costs attributable to EoE are roughly of the same order of magnitude as hospital-related costs for acute appendicitis ($1.4 billion), GI hemorrhage ($1.1 billion), *Clostridium difficile* infection ($1.1 billion), and inflammatory bowel disease ($1 billion) (22). The only cost data related to EoE of which we are aware were presented in abstract form and were derived from the Nationwide Inpatient Sample (23). However, this study is not directly comparable to ours for several reasons: the data source was based on discrete hospitalizations, not longitudinal inpatient and outpatient records; the study population included only patients hospitalized for esophageal foreign body impactions; and the study analyzed hospital charges, not costs.

The high costs for patients with EoE reflected in this analysis are consistent with the current management paradigm for EoE. For some patients, diagnosis and monitoring of the initial treatment course (often with expensive topical corticosteroids) will require three endoscopies over the course of 4-6 months (1). Additionally, EoE is primarily managed in the outpatient setting, explaining the low number of inpatient claims that we found. The higher costs in children are also understandable, as children undergoing endoscopy often require a hospital-based procedure unit and general anesthesia.

There are some limitations of this study. First, because we used an administrative database, we had limited information pertaining to certain demographic and clinical variables such as race, socioeconomic status, and practice setting. Second, misclassification of disease status is possible. Administrative claims lack or histologic data, and there are no diagnostic codes for proton pump inhibitor-responsive esophageal eosinophilia. If there were EoE cases who did not truly have EoE, their individual costs could either be higher or lower, depending on the condition that led them to seek treatment. However, we previously found that the ICD-9 code for EoE has a high specificity but low sensitivity (8), which would likely lead to underestimating the number of EoE cases and therefore lower cost estimates. Given the relative rarity of EoE, misclassification of disease-free status among controls seems unlikely. Third, because of the database used, our cost estimates are restricted to those individuals aged 0-64 with commercial insurance and prescription drug coverage, and are not necessarily generalizable to the under- or uninsured. However, the vast majority of EoE cases are in this age range. There were also a higher proportion of controls with Medicaid as compared to cases. While this could inflate the costs for cases, it should not impact the number of claims. A sensitivity analysis restricting the case and control sample to subscribers with no Medicaid coverage did not materially change the results ($6,602 for cases vs $2,109 for controls; $p<0.001$). Finally, while comparison to controls provides an estimate of healthcare utilization associated with EoE, we cannot discern from these data whether thes increase in costs for EoE patients with allergic disease represent costs attributable to the allergic disease itself, varying treatment approaches for EoE patients with atopy (ie food elimination diets with expensive follow-up endoscopic monitoring), or a more difficult to treat and costly phenotype of EoE.

Despite these potential limitations, this is a very large claims database that has been demonstrated to be representative of all patients in the U.S. with commercial insurance, and allowed a comprehensive analysis of a large number of cases (6, 7). We used actual costs, including allowed payouts by insurances and subscriber liability, instead of charges, so our results closely reflect true expenditures. We had the granularity to perform a detailed analysis of claims, sites of care, and pharmacy claims. Finally, we not only assessed the total costs related to EoE diagnostic codes, but calculated the costs directly attributable to EoE or EoE-related comorbidity by including matched control subjects in the analysis.

Our study design captured both incident and prevalent cases, which would include a proportion of patients who might have stable disease and require minimal ongoing evaluation. Therefore, the utilization estimates presented in this study provide the best-known estimate of the healthcare burden for EoE disease given current standards for diagnosis and treatment. However, our study could not account for costs related to dietary

therapy (either more expenses for hypoallergenic food products or for elemental formulas, neither of which are reimbursed by most insurers), for costs related to home health care, or for costs related to work absenteeism because of procedures or office visits for either and their caretakers.

In conclusion, this matched, case-control analysis of a large administrative database found that EoE has an estimated annual health care cost between $0.5 and $1.4 billion in the U.S. This represents a remarkable burden of disease for an entity that was essentially unknown two decades ago. These cost data reflect current management strategies, which rely on upper endoscopy with biopsies for disease diagnosis and management. These data can also be used by policy makers for planning and to inform resource allocation.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations

CPT	Current Procedural Terminology
EoE	eosinophilic esophagitis
ICD-9	International Classification of Diseases, 9th Revision

References

1. Dellon ES. Diagnosis and management of eosinophilic esophagitis. Clin Gastroenterol Hepatol. 2012; 10:1066–78. [PubMed: 22728382]
2. Furuta GT, Liacouras CA, Collins MH, et al. Eosinophilic esophagitis in children and adults: a systematic review and consensus recommendations for diagnosis and treatment. Gastroenterology. 2007; 133:1342–63. [PubMed: 17919504]
3. Liacouras CA, Furuta GT, Hirano I, et al. Eosinophilic esophagitis: Updated consensus recommendations for children and adults. J Allergy Clin Immunol. 2011; 128:3–20. e6. [PubMed: 21477849]
4. Dellon ES, Gonsalves N, Hirano I, et al. ACG Clinical Guideline: Evidence based approach to the diagnosis and management of esophageal eosinophilia and eosinophilic esophagitis. Am J Gastroenterol. 2013; 108:679–92. [PubMed: 23567357]
5. Dellon ES, Jensen ET, Martin CF, et al. Prevalence of Eosinophilic Esophagitis in the United States. Clin Gastroenterol Hepatol. 2014; 12:589–596. e1. [PubMed: 24035773]
6. Stempel DA, Meyer JW, Stanford RH, et al. One-year claims analysis comparing inhaled fluticasone propionate with zafirlukast for the treatment of asthma. J Allergy Clin Immunol. 2001; 107:94–8. [PubMed: 11149997]
7. Kappelman MD, Rifas-Shiman SL, Kleinman K, et al. The prevalence and geographic distribution of Crohn's disease and ulcerative colitis in the United States. Clin Gastroenterol Hepatol. 2007; 5:1424–9. [PubMed: 17904915]

8. Rybnicek DA, Hathorn KE, Pfaff ER, et al. Administrative coding is specific, but not sensitive, for identifying eosinophilic esophagitis. Dis Esoph. Epub Nov 12, 2013.
9. Attwood SE, Smyrk TC, Demeester TR, et al. Esophageal eosinophilia with dysphagia. A distinct clinicopathologic syndrome. Dig Dis Sci. 1993; 38:109–16. [PubMed: 8420741]
10. Straumann A. [What is your diagnosis? Primary eosinophilic esophagitis]. Schweiz Rundsch Med Prax. 2004; 93:795–6.
11. Kelly KJ, Lazenby AJ, Rowe PC, et al. Eosinophilic esophagitis attributed to gastroesophageal reflux: improvement with an amino acid-based formula. Gastroenterology. 1995; 109:1503–12. [PubMed: 7557132]
12. Prasad GA, Talley NJ, Romero Y, et al. Prevalence and Predictive Factors of Eosinophilic Esophagitis in Patients Presenting With Dysphagia: A Prospective Study. Am J Gastroenterol. 2007; 102:2627–32. [PubMed: 17764492]
13. Veerappan GR, Perry JL, Duncan TJ, et al. Prevalence of Eosinophilic Esophagitis in an Adult Population Undergoing Upper Endoscopy: A Prospective Study. Clin Gastroenterol Hepatol. 2009; 7:420–426. [PubMed: 19162236]
14. Desai TK, Stecevic V, Chang CH, et al. Association of eosinophilic inflammation with esophageal food impaction in adults. Gastrointest Endosc. 2005; 61:795–801. [PubMed: 15933677]
15. Dellon ES, Speck O, Woodward K, et al. Clinical and Endoscopic Characteristics do Not Reliably Differentiate PPI-Responsive Esophageal Eosinophilia and Eosinophilic Esophagitis in Patients Undergoing Upper Endoscopy: A Prospective Cohort Study. Am J Gastroenterol. 2013; 108:1854–60. [PubMed: 24145677]
16. Arias A, Lucendo AJ. Prevalence of eosinophilic oesophagitis in adult patients in a central region of Spain. Eur J Gastroenterol Hepatol. 2013; 25:208–12. [PubMed: 23075697]
17. Hruz P, Bussmann C, Heer P, et al. Escalating Epidemiology of Eosinophilic Esophagitis: 21 Years of Prospective Population-Based Documentation in Olten County. Gastroenterology. 2011; 140(Suppl 1):S238–9.
18. Prasad GA, Alexander JA, Schleck CD, et al. Epidemiology of eosinophilic esophagitis over three decades in Olmsted County, Minnesota. Clin Gastroenterol Hepatol. 2009; 7:1055–61. [PubMed: 19577011]
19. Spergel JM, Book WM, Mays E, et al. Variation in prevalence, diagnostic criteria, and initial management options for eosinophilic gastrointestinal diseases in the United States. J Pediatr Gastroenterol Nutr. 2011; 52:300–6. [PubMed: 21057327]
20. Buckmeier BK, Rothenberg ME, Collins MH. The incidence and prevalence of eosinophilic esophagitis. J Allergy Clin Immunol. 2008; 121(Suppl 2):S71, AB 271.
21. Dellon ES. Epidemiology of eosinophilic esophagitis. Gastroenterol Clin North Am. 2014; 43:201–218. [PubMed: 24813510]
22. Peery AF, Dellon ES, Lund J, et al. Burden of gastrointestinal disease in the United States: 2012 update. Gastroenterology. 2012; 143:1179–87. e1–3. [PubMed: 22885331]
23. Stobaugh D, Deepak P, Ehrenpreis E. An analysis of hospital charges and length of stay in patients with eosinophilic esophagitis admitted for foreign body in the esophagus. Am J Gastroenterol. 2013; 108(Suppl 1):S12–13. AB 33.

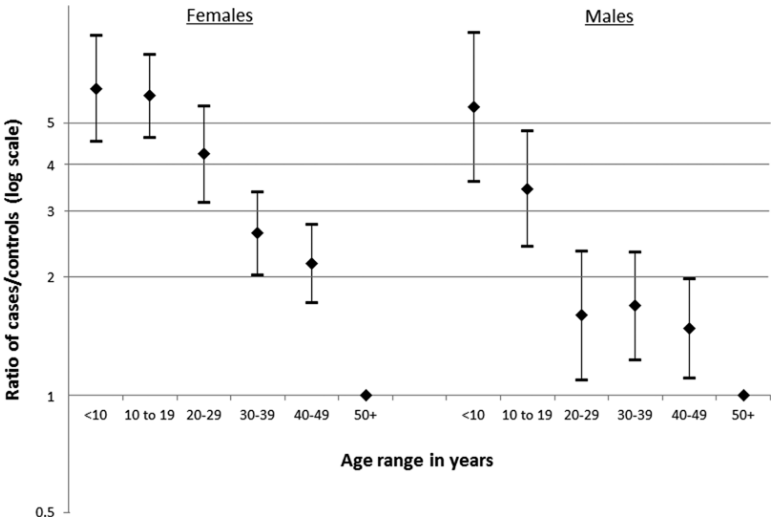

Figure 1.

Relative all cause costs for EoE patients versus controls by age and sex. Data source: IMS LifeLink® PharMetrics Health Plan Claims Database, January 2001-November 2011, IMS Health Incorporated. All Rights Reserved.

Table 1

Characteristics of study population, 1:4 case-control matched on age and sex

	Cases (n=8,135) mean or %	Controls (n=32,540) mean or %
Age[a] (mean in years (sd))	35.5 (16.8)	35.5 (16.8)
<18	21.1	21.1
18-64	78.9	78.9
Sex		
Male	64.9	64.9
Female	35.1	35.1
Region of residence		
East	8.5	13.5
Midwest	37.1	28.8
South	36.9	37.9
West	17.6	19.8
Medicaid[b]		
Yes	1.7	6.8
No	98.3	93.2

Data source: IMS LifeLink® PharMetrics Health Plan Claims Database, January 2001–November 2011, IMS Health Incorporated. All Rights Reserved.

[a] Age as of 2010

[b] Patients with one or more month of enrollment in Medicaid-type insurance plan

Table 2

All cause utilization of health care services for number of claims and total costs for cases and controls from 2009-2010

		All ages (0-64 years)		Children (0 – 17 years)		Adults (18 – 64 years)	
		Cases (n=8,135)	**Controls (n=32,540)**	**Cases (n=1,716)**	**Controls (n=6,864)**	**Cases (n=6,419)**	**Controls (n=25,676)**
Claims[a]	Mean number (sd)	99 (125)	63 (96)	102 (103)	33 (55)	99 (125)	70 (103)
	Median number	67	34	75	21	65	39
	IQR	25 - 131	11 - 80	32 - 133	9 - 42	23 - 130	12 - 91
	Range	0 - 2,107	0 - 4,511	0 - 1,963	0 - 1,930	0 - 2,107	0 - 4,511
	p[c]	<0.001		<0.001		<0.001	
Costs (USD)[b]	Mean (sd)	13,341 (36,347)	7,107 (24,714)	15,956 (40,108)	2,861 (9.071)	12,734 (35,391)	8,094 (26,990)
	Median	6,608	2,003	8,012	997	6,273	2,460
	IQR	2,416 - 14,200	514 - 6,379	2,857 - 16, 398	372 - 2,597	2,337 - 13,720	589 - 7,598
	Range	0 - 1,500,320	0 - 1,875,520	0 - 963,200	0 - 329,954	0 - 1,500,321	0 - 1,875,520
	p[c]	<0.001		<0.001		<0.001	

[a] all cause number of claims within 2009-2010

[b] all cause expenses paid – includes any subscriber deductible and insurance provider payment for any claims

[c] p for statistically significant difference in median claims and median costs for each matched set – Wilcoxan signed rank test of the difference of the median of the sum of claims and costs for cases and the median of the median of the sum of claims and costs for each matched set of controls

Table 3

Inpatient claims and costs for cases and controls from 2009-2010

		All ages (0-64 years)		Children (0 – 17 years)		Adults (18 – 64 years)	
		Cases (n=8,135)	**Controls (n=32,540)**	**Cases (n=1,716)**	**Controls (n=6,864)**	**Cases (n=6,419)**	**Controls (n=25,676)**
Claims[a]	Mean (sd)	4 (22)	2 (15)	4 (19)	1 (7)	4 (23)	3 (16)
	Median	0	0	0	0	0	0
	IQR	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
	Range	0 – 794	0 – 708	0 – 383	0 – 309	0 – 794	0 - 708
	p[c]	<0.001		<0.001		<0.001	
Costs (USD)[b]	Mean (sd)	2,571 (25,908)	1,499 (11,198)	3,040 (26,207)	346 (3,060)	2,462 (25,839)	1,768 (12,328)
	Median	0	0	0	0	0	0
	IQR	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
	Range	0 – 1,310,681	0 – 462,227	0 – 800,753	0 – 72,864	0 – 1,310,681	0 – 462,227
	p[c]	<0.001		<0.001		<0.001	

Data source: IMS LifeLink® PharMetrics Health Plan Claims Database, January 2001–November 2011, IMS Health Incorporated. All Rights Reserved.

[a] all cause number of claims for claims in an inpatient setting within 2009-2010 – excludes claims made for emergency department services

[b] all cause expenses paid (US dollars) for claims made in an inpatient setting – includes any subscriber deductible and insurance provider payment for any claims

[c] p for statistically significant difference in median claims and median costs for each matched set – Wilcoxan signed rank test of the difference of the median of the sum of claims and costs for cases and the median of the median of the sum of claims and costs for each matched set of controls

Table 4

Outpatient claims and costs for cases and controls from 2009-2010

		All ages (0-64 years)		Children (0 – 17 years)		Adults (18 – 64 years)	
		Cases (n=8,135)	**Controls (n=32,540)**	**Cases (n=1,716)**	**Controls (n=6,864)**	**Cases (n=6,419)**	**Controls (n=25,676)**
Claims[a]	Mean (sd)	67 (87)	40 (68)	75 (95)	24 (44)	65 (86)	44 (72)
	Median	45	22	53	15	43	24
	IQR	16 - 88	7 - 50	23 - 98	6 - 30	15 - 85	7 - 56
	Range	0 – 1,770	0 – 4,166	0 – 1,296	0 – 1,668	0 – 1,770	0 – 4,166
	p[c]	<0.001		<0.001		<0.001	
Costs (USD)[b]	Mean (sd)	8,630 (16,037)	4,170 (14,007)	10,687 (18,688)	1,863 (6,641)	8,145 (15,308)	4,714 (15,181)
	Median	5,016	1,398	6,327	752	4,739	1,696
	IQR	2,169 – 9,822	474 – 4,011	2,516 – 11,668	331 – 1,715	2,090 – 9,339	537 – 4,702
	Range	0 – 441,179	0 – 1,015,755	0 – 400,317	0 – 259,937	0 – 441,179	0 – 1,015,755
	p[c]	<0.001		<0.001		<0.001	

Data source: IMS LifeLink® PharMetrics Health Plan Claims Database, January 2001–November 2011, IMS Health Incorporated. All Rights Reserved.

[a] all cause number of claims for claims in an outpatient setting within 2009-2010 – excludes claims made for emergency department services

[b] all cause expenses paid (US dollars) for claims made in an outpatient setting – includes any subscriber deductible and insurance provider payment for any claims

[c] p for statistically significant difference in median claims and median costs for each matched set – Wilcoxan signed rank test of the difference of the median of the sum of claims and costs for cases and the median of the median of the sum of claims and costs for each matched set of controls