ABSTRACT

PURPOSE: To compare direct healthcare costs by point of service (POS) for persons with and without constipation during the six months post diagnosis.

METHODS: An employer database containing medical claims, payroll, and demographic data for approximately 510,000 US employees from 1/1/01 to 6/30/06 was retrospectively analyzed. Semi-annual healthcare costs were captured based on claims from: doctor’s office, inpatient hospital, outpatient hospital or clinic, emergency department (ED), laboratory, other locations, and pharmacy. ICD-9 Codes 564.0 (Constipation), 564.00 (Unspecified), 564.01 (Slow Transit), and 564.09 (Other) were used to distinguish employees with constipation from the non-constipation cohort. The index date in the constipation cohort was defined as the date of first diagnosis during 2001 or later; the average constipation index date was used in the non-constipation cohort. For analysis, propensity scores based on age, gender, marital status, race, salary and other job-related variables, geographic region, existence of a medical cost, and the Charlson Comorbidity Index Score were used to match 24 non-constipation employees to each constipation cohort employee. Per member per month (PMPM) costs were compared for each POS category. All costs were adjusted to 2006 dollars.

RESULTS: Data were available for 1,015 persons with constipation and 24,360 propensity-score matched non-constipation controls. Both cohorts average 41 years of age and 73% female. The constipation cohort incurred $349 additional PMPM total costs ($<0.0001). Significant ($<0.001) cost differences by category for the constipation versus non-constipation cohorts were: outpatient hospital or clinic ($264 vs. $118), doctor’s office ($128 vs. $94), ED ($17 vs. $7), laboratory ($4 vs. $2). Prescription drug costs also were significantly higher for the constipation cohort ($98 vs. $75, $<0.0001). Findings for inpatient hospital ($228 vs. $106, $=0.092) and other locations ($18 vs. $6, $=0.096) were not significant.

CONCLUSIONS: Patients with constipation incur greater costs throughout the healthcare system.
INTRODUCTION

- Constipation imposes substantial direct and indirect costs and impairs health-related quality-of-life.\(^1\)
- Total direct costs for constipation in the US has been reported to exceed $235 million annually.\(^2\)
- Recent research suggests total direct costs for constipation in the US may approximate $3.12 billion.\(^3\)
- Understanding how direct costs of constipation are segmented throughout the healthcare system is important to managed care payers for effective cost containment.
- Most previous point-of-service (POS) direct cost analyses have been limited to other GI conditions, such as IBS.\(^4\)
- Few studies have focused on direct medical POS and prescription drug costs of constipation.\(^5\)

Aim

To examine the direct cost burden of constipation for insured employees, quantifying direct point-of-service costs of illness throughout the healthcare continuum.

METHODS

- A retrospective analysis was performed on data (1/1/2001 to 6/30/2006) from the Human Capital Management Services (HCMS) Research Reference Database consisting of approximately $10,000 employees representative of the US Employed Civilian Labor Force (2004).
- Anonymity of person-level data was maintained according to the Health Insurance Portability and Accountability Act guidelines.
- Healthcare for the entire employee cohort was provided through managed care plans contracted by respective employers.
- Semi-annual direct POS costs were captured based on claims from doctor’s office, inpatient hospital, outpatient hospital/clinic, emergency department (ED), laboratory, other locations, and pharmacy.
- International Classification of Diseases-9 (ICD-9) codes were used to distinguish employees with a primary, secondary, or tertiary diagnosis of constipation from employees without a constipation-related diagnosis.
  - $564.0 (Constipation)
  - $564.00 (Unspecified)
  - $564.01 (Slow Transit)
  - $564.09 (Other)
- Two cohorts were created for comparison purposes:
  - Constipation (C) cohort. Employees with record of constipation-related diagnosis (ICD-9 codes listed above).
  - Non-constipation (NC) cohort. Employees with no record of constipation-related diagnoses. The NC cohort was defined as the “control” group.
- The index date in the C cohort was defined as the date of first diagnosis of constipation during 2001 or later as noted by ICD-9 code in the claims record.
- The average index date in the C cohort was assigned to the NC cohort.
- Employees with IBS (ICD-9 $564.1) were removed from both cohorts.
- C and NC cohorts were compared over the six months following the employee’s “index date.”

RESULTS

- Employees from C and NC cohorts were required to be continuously employed and eligible for health benefits for at least six months after their index date.
- The following outcomes measures were compared between C and NC cohorts:
  - POS direct costs
    - POS direct medical costs: doctor’s office; inpatient hospital; outpatient hospital or clinic; ED; laboratory; other
    - Prescription drug (Rx) costs.
  - Per member per month (PMPM) costs for each POS category.
  - Total direct costs: direct medical costs + Rx costs.

Statistical Analysis

- Employees in the C and NC cohorts were matched 1:24 using logistic regression and propensity scores for age, tenure (years with current employer), sex, marital status, race, exempt/nonexempt status (exempt employees are not paid on an hourly basis and are not paid for overtime work), full-time/part-time status, salary, Charlson Comorbidity Index score,\(^6\) region (defined by first digit of employee’s postal zip code), and existence of a direct medical claim.
- All costs were adjusted to 2006 dollars.
- Significant differences in costs between C and NC cohorts were defined via t-tests at \(P<0.05\).

Table 1. Descriptive statistics of employees with constipation and without constipation. (Table 1)

<table>
<thead>
<tr>
<th>Variable</th>
<th>C Cohort</th>
<th>NC Cohort</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (at index date)</td>
<td>40.83</td>
<td>40.63</td>
<td>-0.02%</td>
</tr>
<tr>
<td>Tenure (at index date)</td>
<td>7.47</td>
<td>7.45</td>
<td>-0.04%</td>
</tr>
<tr>
<td>Female</td>
<td>73.1%</td>
<td>73.3%</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Married</td>
<td>49.0%</td>
<td>48.9%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>White</td>
<td>56.7%</td>
<td>57.4%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Black</td>
<td>12.3%</td>
<td>11.9%</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>15.8%</td>
<td>15.7%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Exempt</td>
<td>36.7%</td>
<td>37.0%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Full Time</td>
<td>97.1%</td>
<td>97.0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Annual Salary</td>
<td>$51,913</td>
<td>$52,221</td>
<td>$308</td>
</tr>
</tbody>
</table>

- Following propensity score matching, both cohorts averaged 41 years, were predominately female (73%), and were predominantly full-time workers (97%). The majority of employees in both cohorts were white (57%).

Presented at the Academy of Managed Care Pharmacy’s (ACMP) 19th Annual Meeting & Showcase in San Diego, CA April 11-14
**Service for Persons With N: An Employer Perspective**

Arthur K. Melkonian, MD¹, and Robert W. Baran, PharmD³

The JeSTARx Group, Newfoundland, NJ ³Takeda Global Research and Development, Deerfield, IL

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**SUMMARY AND CONCLUSIONS**

- Constipation is associated with substantial direct cost (burden) of illness, which can be a large financial liability to employers.
- Total direct PMPM costs are approximately 2 times higher in constipated subjects than in non-constipated controls.
- Individuals with constipation incur significantly higher total direct PMPM costs and higher costs across every point-of-service than those without constipation. Thus, individuals with constipation incur greater costs throughout the healthcare system.
- Outpatient hospital/clinic and inpatient hospital costs are the major drivers of incremental total direct costs, together accounting for 75% of the cost increment.
- Total direct medical costs (excluding Rx medications) contribute to 93% of total incremental costs in this study, suggesting an opportunity to manage the major cost driver with therapy.
- Constipation may be underreported in healthcare databases due to ICD-9 coding.
- These results indicate an opportunity for improved management of patients with constipation, which may result in reduced costs from an employer perspective.

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**REFERENCES**

¹Dennison C, Prasad M, Lloyd A, et al. The health-related quality-of-life and economic burden of constipation. *Pharmaceuticals.* 2005;23:461-76.


⁴Kleinman NL, Brook RA, Melkonian AK, Baran RW. Healthcare Cost Comparisons by Point of Service for Persons With or Without Constipation. The American College of Gastroenterology Annual Scientific Meeting. *Am J Gastroenterol.* Sep 2006; 101(suppl2):S408.


