**Introduction**

- 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.  
- Recent research demonstrates:  
  - The projected total incremental direct costs for constipation in all US employees is $3.12 billion per year.  
  - The total direct costs in the US for healthcare encounters where constipation was the primary diagnosis exceeded $235 million annually.  
  - Patients presenting for GI complaints within the Group Health Cooperative health system incurred annual mean costs of $5049 for IBS and $7521 for constipation.  
  - Additional studies are needed to quantify the comparative costs of constipation and IBS-C.  
  - Similarities in costs for constipation and IBS-C suggest that both have a similar impact on the healthcare system.

**AIM**

- To examine the comparative direct and indirect cost burden of constipation and IBS co-occurring with constipation (IBS-C) for insured employees.

**Methods**

- A retrospective analysis was performed on data extracted from the Human Capital Management Services (HCMS) Research Reference Database consisting of approximately 510,000 employees representative of the US Employed Civilian Labor Force (2004).
- Patient healthcare claims from 1/1/2001 to 6/30/2006 were included in the analysis.
- 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.
- International Classification of Diseases-9 (ICD-9) codes in claims records were used to identify employees with primary, secondary, or tertiary diagnoses of constipation:  
  - 564.0 (Constipation)  
  - 564.00 (Unspecified)  
  - 564.01 (Slow Transit)  
- ICD-9 codes in claims records were also used to identify employees with secondary, primary, or tertiary diagnoses of IBS:  
  - 564.1 (IBS-C)  
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  - 564.1 (IBS-C)  
- Two cohorts were created for comparison purposes:  
  - Constipation (C) cohort:  
    - Employees with at least one record of constipation diagnosis (constipation ICD-9 codes listed above) and no ICD-9 for IBS.
  - Irritable Bowel Syndrome plus constipation (IBS+C) cohort:  
    - Employees with at least one record of constipation diagnosis (constipation ICD-9 codes listed above) and at least one record of IBS diagnosis (IBS-C for IBS).

**Statistical Analysis**

- For each employee in the IBS-C cohort, 5 control employees were matched using logistic regression and propensity scores for age, tenure (years with current employer), sex, marital status, race, exempt/nonexempt status (exempt employees are paid on an hourly basis and are not paid for overtime work), full/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.
- Significance was measured by t tests at P<0.05.
- Differences were explored for significance:  
  - Between cohorts (C vs. IBS-C), for the:  
    - 6 months prior to the index date,  
    - 6 months after the index date, and  
    - Change (after – prior).
  - Within cohorts (6 months prior to index date vs. 6 months after index date).

**Results**

- Data were available for 309 IBS-C persons with constipation and 1,545 propensity score matched C persons (Table 1).  
- Propensity score matching, no significant differences were observed between cohorts.
- Comparisons of PMPM costs (Table 2):  
  - Between cohorts:  
    - Prescription drug costs were $26 higher (P=0.05) PMPM for the IBS-C cohort than the C cohort in the period after diagnosis.
  - All other between group comparisons were non-significant (P>0.05).
  - Within cohorts:  
    - Prescription drug costs were significantly increased (P=0.05) both from the 6 months before to the 6 months after diagnosis for both IBS-C and C cohorts.
  - Direct medical costs were significantly increased (P=0.05) both from the 6 months before to the 6 months after diagnosis for both IBS-C and C cohorts.

**Limitations**

- Both Constipation and IBS-C may be underreported in healthcare databases due to ICD-9 coding anomalies.
- Cohorts were composed of continuously employed subjects, suggesting a relatively healthy population for analysis and the potential for underestimation of disease burden.

**Summary and Conclusions**

- Both Constipation and IBS-C are associated with substantial direct cost burden of illness, which can be a large financial liability to employers.
- The only cost difference between groups was for prescription drug which may be due to medications which are uniquely indicated for IBS-C.
- In the 6 months after diagnosis:  
  - Costs increased significantly for both groups.
- Absentism was higher for IBS-C.
- These results indicate an opportunity for improved management of patients with both constipation and IBS-C, which may result in reduced costs from an employer perspective.
ABSTRACT

Purpose: Both constipation (C) and irritable bowel syndrome with C (IBS+C) are known to be very costly. However, whether the costs of C are driven by the same factors that drive IBS+C costs is unknown. We aimed to assess the cost of illness (COI) for C without and with IBS (IBS+C) among US-based employee cohorts.

Methods: A retrospective analysis was conducted using the Human Capital Management Services Research database, which represents multiple US-based employers and contains employee health claims data from 2001-2005. Data included medical, pharmacy, payroll, work absence, and demographics. ICD9 Codes were used to include employees in the C cohort: 564.0 (Constipation), 564.00 (Unspecified), 564.01 (Slow Transit), and 564.09 (Other). Employees with C and an ICD9 for IBS (564.1x) at any time were included in the IBS+C cohort. Propensity scores based on demographics, job-related variables, region, existence of medical claims, and Charlson Comorbidity Index Score were used to match 5 C employees to each IBS+C cohort employee. For the C cohort the index date was the date of the first C claim. For the IBS+C cohort the index date was the date of the first IBS claim. Mean costs for each cohort were adjusted to 2006$ and compared by category for medical, prescription drug (Rx), and sick leave costs in the 6-months before and after index diagnosis (dx).

Results: Data were available for 1854 employees. Demographics for both cohorts were similar (P>.05). All between cohort COI comparisons (Figure) were similar (P>.05), except for Rx costs after dx ($26 higher for IBS+C, P=.0363). Within cohort comparisons (6-months before vs. after dx) identified significant increases in medical and Rx costs for both cohorts (P<.05). Sick leave costs and days increased after dx in both C and IBS+C cohorts (P>.05). Persons with IBS+C averaged an additional 1.3 sick leave days during the 6-month period after dx when compared with the C cohort (P<.03).

Conclusion: Costs of illness for IBS+C and C are very similar. Total costs and sick leave days for both cohorts increased after dx.

<table>
<thead>
<tr>
<th>Medical Pharmacy and Sick Leave Costs for Constipation and for Irritable Bowel Syndrome with Constipation in the 6 Months Before and After Diagnosis: An Employer Perspective</th>
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<table>
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<th>Cost Category</th>
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# Between cohorts P=.0363

* Within cohort (Before vs. After) P<.05.