

Pre-to-Postdiagnosis Increase in Utilization and Costs of Chronic-Use Medications and Other Medical Resources in Managed Care Enrollees With Diverticulitis

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BACKGROUND

- Diverticulitis (DV) is costly to managed care payers, particularly for reimbursement of gastrointestinal (GI)-related treatments, hospitalizations, and surgeries (Yen et al., 2012).
- The use and costs of other non-GI-related medical resources also may be high in persons with DV, but the increased use and costs of these services after diagnosis has not been studied.

OBJECTIVE

- To assess the use of chronic-use non-GI-related and GI-related medications and all-cause resource utilization and costs pre- to postdiagnosis in persons with DV.

METHODS

Study Design

- Retrospective cohort analysis

Data Source

- Administrative claims data from more than 40 United States (US) health plans representing approximately 50 million lives

- All US geographic regions

- Fully adjudicated cost information in the form of actual payments reimbursed by health plans to providers

- Longitudinal data linked within patients using a unique, de-identified patient ID

Inclusion Criteria

- Primary diagnosis of colonic DV (ICD-9-CM 562.11, 562.13) between 1/1/2005 and 12/31/2008
- Antibiotic within 3 days postdiagnosis (to increase capture of true DV cases)
- At least 12 months of continuous pre- and postdiagnosis health plan enrollment

Study Measures

- Background patient characteristics: age, sex, geography, Charlson Comorbidity Index (CCI) score, and setting of index DV diagnosis (inpatient, emergency room [ER], or outpatient)

- Pre-to-post diagnosis (12 months before through 12 months after) change in GI- and non-GI-related medication use

- Pre-to-postdiagnosis change in overall all-cause resource utilization and costs (adjusted to 2009 US dollars using the medical services Consumer Price Index)

Statistical Analyses

- All endpoints were descriptively evaluated pre- to postdiagnosis for DV cases.

- All-cause costs also were evaluated for a non-DV control group matched 2:1 on age, sex, and plan enrollment dates, with the index date assigned as the first observed diagnosis date of each respective DV match.

- Statistical significance of pre-to-postdiagnosis changes in endpoints was evaluated using one-sample student's t-tests.

RESULTS

Patient Characteristics (Figure 1, Table 1)

- 25,172 patients met all inclusion criteria.
- 51% were male, and mean age was 53 years.
- The index DV diagnosis occurred in an inpatient setting for 12% of patients.

Figure 1. Sample Attrition

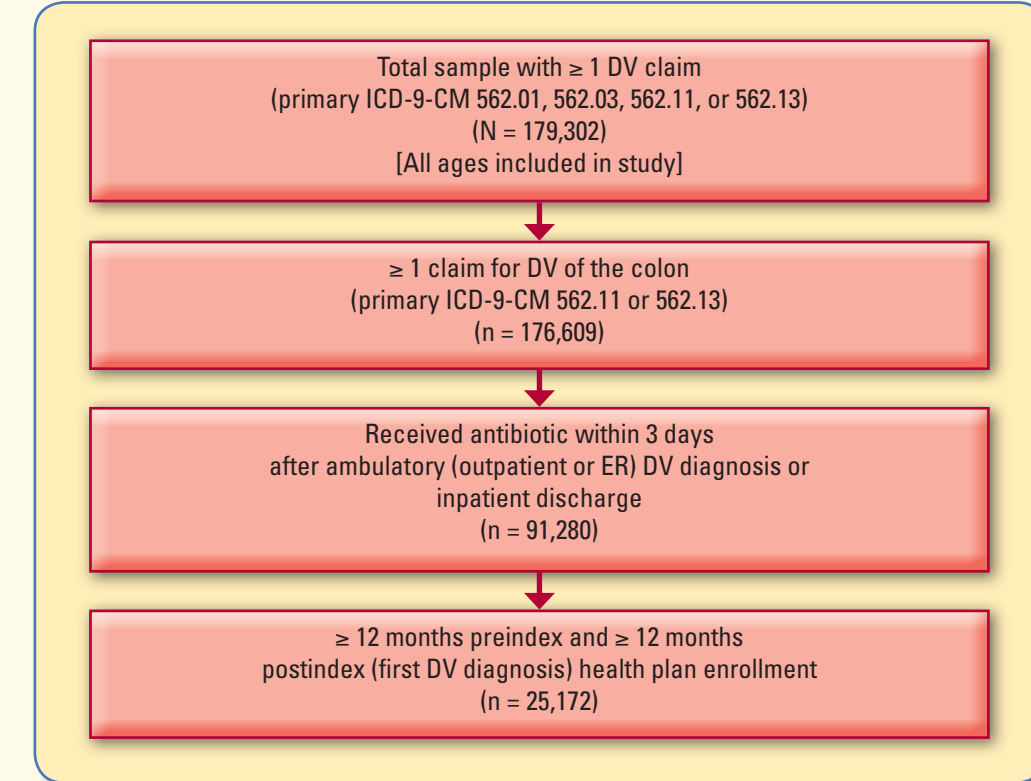


Table 1. Patient Characteristics

	All DV Patients (N = 25,172)		Control Group (N = 50,344)	
	n	%	n	%
Age category				
< 35	1,129	4.5	2,258	4.5
35-45	4,230	16.8	8,460	16.8
46-55	8,239	32.7	16,478	32.7
56-65	8,578	34.1	17,156	34.1
65+	2,996	11.9	5,992	11.9
Age, mean (SD)	53.1 (10.8)		53.1 (10.8)	
Sex				
Male	12,897	51.2	25,794	51.2
Female	12,275	48.8	24,550	48.8
Geographic region				
Northeast	10,983	43.6	43,501	86.4
South	7,840	31.2	4,288	8.5
Midwest	3,974	15.8	1,468	2.9
West	2,367	9.4	1,073	2.1
Other/unknown ^a	8	0.0	14	0.0
CCI score,^b mean (SD)	0.6 (1.3)		0.4 (1.1)	
Setting of index DV diagnosis				
Inpatient	3,102	12.3	---	---
ER	5,643	22.4	---	---
Outpatient	16,427	65.3	---	---

SD = standard deviation.

^a To protect patient anonymity, the database assigns some individuals at high risk of identification based on geographic region to a generic region of other/unknown.

^b CCI score based on comorbid diagnoses observed during 6 months preindex DV diagnosis.

Pre-to-Postdiagnosis Change in Medication Utilization (Figure 2)

- The most prevalent chronic-use (non-GI-related) medications during the preindex period were antihyperlipidemics (30.0% of patients), antihypertensives (27.5%), antidepressants (20.9%), dermatologicals (20.0%), and beta blockers (15.7%).
- Postindex use of these medications increased by 8.9%, 8.2%, 7.3%, 9.1%, and 11.7%, respectively (all $P < 0.01$).
- The largest postdiagnosis increase in non-GI-related medication use was observed for anti-anxiety agents (+28%; $P < 0.01$).
- As expected, use of GI-related medications (particularly antibiotics and pain analgesics) increased substantially in the postdiagnosis period.

Figure 2. Postdiagnosis Percentage Increase in the Top-10 Most Common Chronic-Use Medications Observed During the Preindex Period

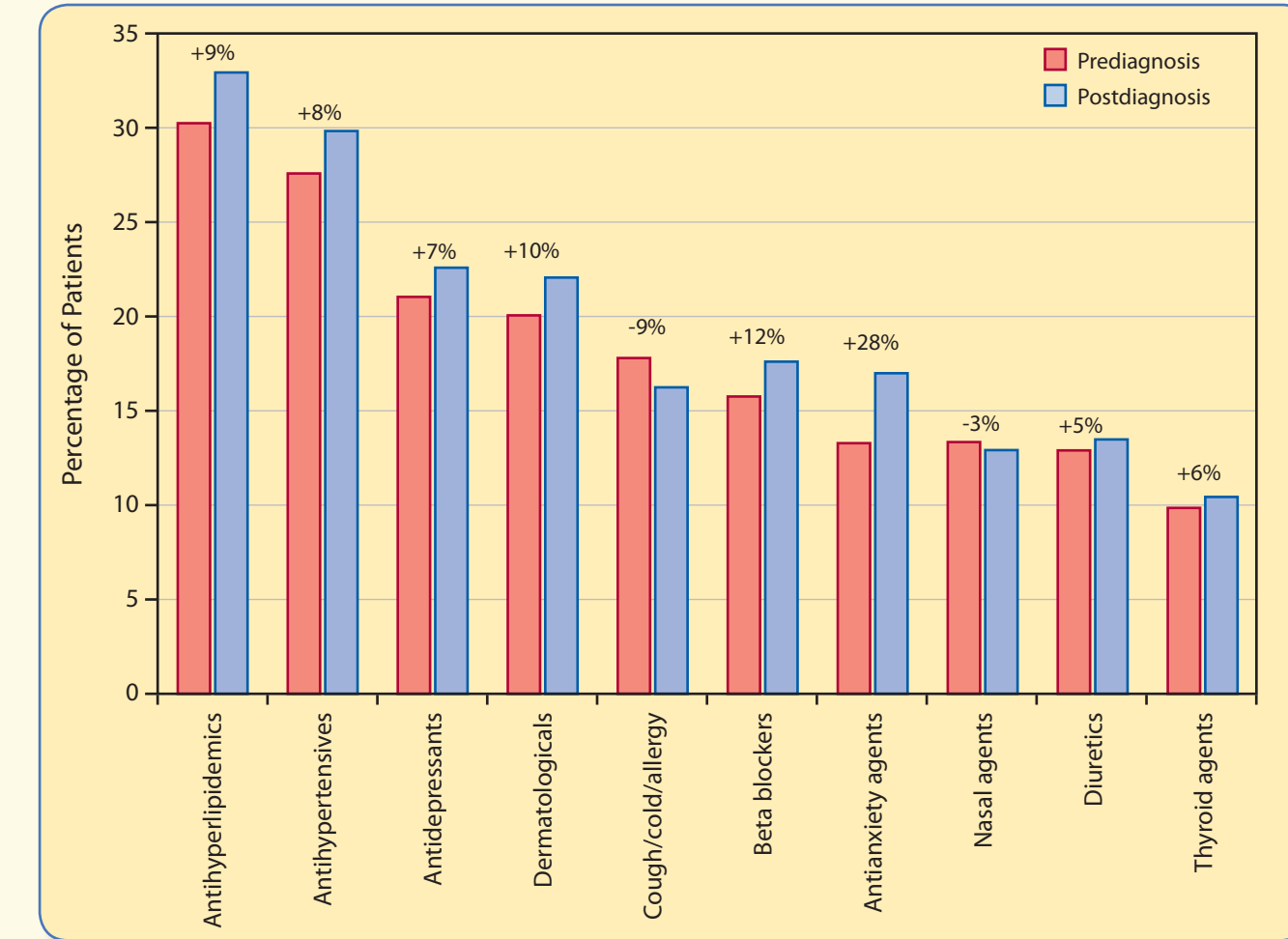
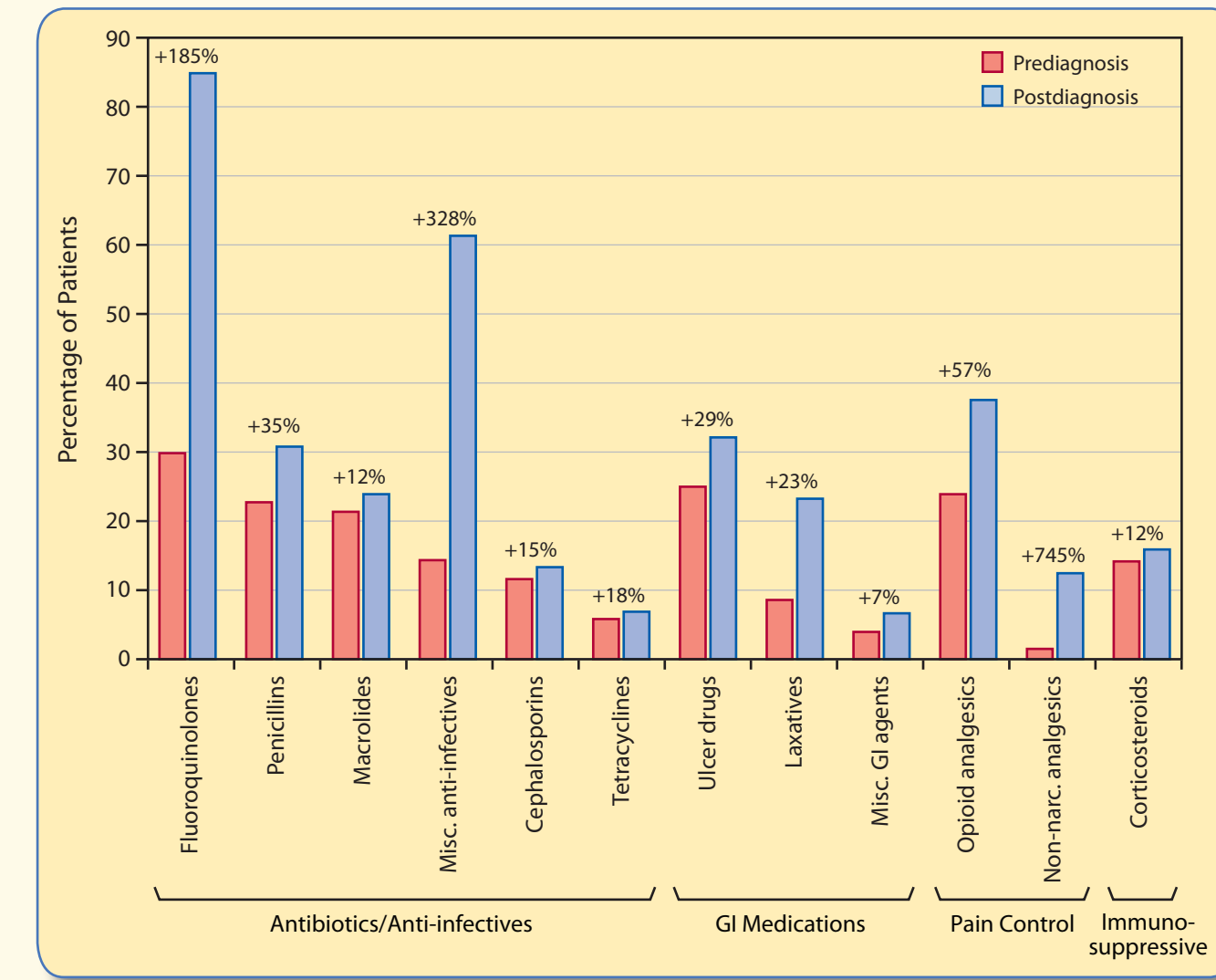


Figure 3. Postdiagnosis Percentage Increase in DV-Related Medications



Pre-to-Postdiagnosis Change in All-Cause Resource Utilization and Costs (Tables 2 and 3)

- Among DV patients, mean all-cause hospital days and costs per patient increased significantly pre- to postdiagnosis (0.9 vs. 2.3 days, \$3,223 vs. \$6,341; all $P < 0.01$).
- Other significant ($P < 0.010$) increases in mean pre- to postindex utilization were seen for:
 - ER visits (0.7 vs. 1.2, \$432 vs. \$1,012)
 - Prescriptions (22 vs. 27 fills, \$1,910 vs. \$2,081)
 - Office visits (10 vs. 12, \$1,747 vs. \$2,251)
 - Other outpatient/specialty consultations (3 vs. 5, \$2,676 vs. \$4,288).
- Total all-cause costs increased by 60% postdiagnosis (\$10,419 vs. \$16,672; $P < 0.010$).
- The highest postdiagnosis cost increases were seen for skilled nursing (+195%), ER visits (+134%), and hospitalizations (+97%).
- Minimal change occurred for controls (\$6,299 vs. \$6,494), although it was statistically significant ($P = 0.01$) due to large sample size.

Table 2. Pre-to-Postdiagnosis Change in All-Cause Health Care Utilization

	All Patients (N = 25,172)			Control Group (N = 50,344)		
	Pre-diag	Post-diag ^a	Percentage Change in Mean	Pre-diag	Post-diag ^a	Percentage Change in Mean
Hospital days						
Mean	0.94	2.31	145.7	0.32	0.36	12.0
SD	3.58	5.76	---	2.39	2.90	---
Median	0	0	---	0	0	---
Skilled nursing facility days						
Mean	0.02	0.04	174.6	0.03	0.04	33.2
SD	0.41	0.82	---	0.63	0.80	---
Median	0	0	---	0	0	---
ER visits						
Mean	0.77	1.15	50.8	0.24	0.24	0.7
SD	2.27	2.55	---	0.98	0.94	---
Median	0	1	---	0	0	---
Home health care visits						
Mean	0.47	0.97	105.1	0.43	0.52	21.3
SD	3.29	5.18	---	3.40	4.11	---
Median	0	0	---	0	0	---
Office visits						
Mean	10.13	12.31	21.5	7.94	8.19	3.2
SD	10.61	11.26	---	10.44	10.70	---
Median	7	9	---	5	5	---
Days with lab encounter						
Mean	1.94	2.60	33.9	0.77	0.81	5.2
SD	2.80	3.49	---	1.86	1.90	---
Median	1	2	---	0	0	---
Other outpatient/ancillary visits						
Mean	3.36	4.75	41.1	3.36	3.46	3.1
SD	5.96	6.92	---	7.22	7.21	---
Median	2	3	---	1	1	---
Prescriptions filled						
Mean	22.49	27.34	21.6	14.66	15.76	7.5
SD	23.85	25.11	---	19.97	20.97	---
Median	15	20	---	7	8	---

^a Based on paired t-tests, all pre-to-postdiagnosis mean cost differences were significantly different from zero at $P < 0.01$.

Table 3. Pre-to-Postdiagnosis Change in All-Cause Health Care Costs (2009 US Dollars)

	All Patients (N = 25,172)			Control Group (N = 50,344)		
	Pre-diag	Post-diag ^a	Percentage Change in Mean	Pre-diag	Post-diag ^a	Percentage Change in Mean
Hospitalization costs						
Mean	3,223	6,341	96.7	1,196	1,187	-0.8
SD	11,302	17,003	---	8,678	8,067	---
Median	0	0	---	0	0	---
Skilled nursing facility costs						
Mean	25	74	194.6	41	64	57.9
SD	803	1,386	---	855	1,405	---
Median	0	0	---	0	0	---
ER costs						
Mean	432	1,012	134.0	112	112	0.0
SD	1,314	2,000	---	452	426	---
Median	0	195	---	0	0	---
Home health care costs						
Mean	152	273	79.2	172	166	-3.1
SD	2,664	3,234	---	6,600	4,924	---
Median	0	0	---	0	0	---
Office visit costs						
Mean	1,748	2,251	28.8	1,353	1,394	3.0
SD	3,442	5,232	---	3,032	3,526	---
Median	958	1,277	---	620	634	---
Lab costs						
Mean	251	351	39.6	89	96	7.8
SD	577	793	---	305	343	---
Median	83	145	---	0	0	---
Other outpatient/ancillary costs						
Mean	2,676	4,288	60.2	1,893	2,012	6.3
SD	8,244	9,999	---	6,970	7,858	---
Median	491	2,229	---	229	249	---
Pharmacy costs						
Mean	1,911	2,081	8.9	1,444	1,463	1.3
SD	3,166	3,416	---	3,401	3,154	---
Median	987	1,126	---	394	426	---
Total health care costs						
Mean	10,419	16,672	60.0	6,299	6,494	3.1
SD	18,337	25,480	---	16,176	15,970	---
Median	5,168	9,295	---	2,542	2,596	---

^a Based on one-sample student's t-test, all pre-to-postdiagnosis mean cost differences were significantly different from zero at $P < 0.01$.

Note: All cost data inflated to 2009 dollars using the medical services Consumer Price Index.

LIMITATIONS

- Data were taken from a commercially insured population and may not be representative of patients in other payer systems (e.g., Medicare or Medicaid).
- All cost analyses represent the perspective of commercial third-party payers and therefore ignore the broader societal costs of DV, including patient out-of-pocket costs, caregiver burden, and lost workplace productivity.

CONCLUSIONS

- Patients with DV have higher use of common chronic-use prescriptions after diagnosis, as well as significantly higher use and costs of general all-cause medical services.
- Medication, service utilization, and costs among DV patients also were high during the year before diagnosis, suggesting a possible ramp up in symptoms, diagnostic work-up, and morbidity associated with DV prior to formal diagnosis.
- Payers, health care providers, and other stakeholders should be aware of the high costs associated with DV in both the pre- and postdiagnosis settings, and particularly increased costs postdiagnosis, when making decisions on the provision of optimal care for this patient population.

REFERENCE

Yen L, Davis KL, Hodgkins P, Loftus EV, Jr., Erder MH. Direct medical costs of diverticulitis in a US managed care population. Am J Pharm Benefits 2012. [In press].

DISCLOSURE

This study and the preparation of this poster were funded by Shire Development LLC (Shire). Linnette Yen and Paul Hodgkins are employees of Shire and hold stock and/or stock options in Shire.

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