

Pre- and Post-Hospitalization Resource Utilization and Costs Associated with Urinary Tract Infection (UTI) in both Commercial and Medicare Populations

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ABSTRACT

Background: In the United States, urinary tract infections (UTIs) result in an estimated 7 million office visits, 1 million emergency department visits, and over 500,000 hospitalizations with an associated annual cost of \$1.6 billion. Little is known regarding pre- and post-hospitalization resource use. Here, we quantify resource utilization and costs associated with both commercially insured and Medicare patients hospitalized for UTI.

Methods: A retrospective multi-center study using data from the MarketScan® Commercial and Medicare Supplemental Databases was performed. Inclusion criteria: (1) inpatient hospital admission with a primary ICD-10 diagnosis for UTI between October 1, 2015 and December 31, 2017 (index hospitalization), (2) at least 6 months of continuous enrollment and pharmacy benefits prior to the index date, (3) at least 12 months of continuous enrollment and pharmacy benefits after the index date, (4) patient age < 64 (Commercial) or ≥65 (Medicare) on the index date. Demographics, hospitalization characteristics, antibiotic use, and resource utilization/costs in the pre- and post-index periods were examined.

Results: 5,248 Commercial and 7,791 Medicare patients were eligible for analysis. 29.7% and 24.1% of Medicare and Commercial patients, respectively, were male. 5.9% of Medicare patients had a claim for skilled nursing facilities (SNF) in the 14 days pre-index admission (1.0% Commercial), 9.1% had emergency department claims (13.1% Commercial), and 39.8% had office visit claims (49.9% Commercial). Post-hospitalization, 20.3% (1.3% Commercial) were discharged to SNF and 15.4% (4.7%) were discharged to home health services. Mean insurer UTI-related costs were \$8,677 (Commercial) and \$5,358 (Medicare) in the 6 months pre-index hospitalization. Similarly, costs were \$21,135 (Commercial) and \$22,342 (Medicare) in the 12 months post hospitalization (\$3,944 and \$2,988 in the first 30 days post-discharge, respectively).

Conclusions: UTI is associated with substantial costs and resource utilization to insurers in both pre- and post-hospitalization settings. Understanding total costs of care and location of service may aid in cost-reduction strategies for treating UTI.

INTRODUCTION

- In the United States, urinary tract infections (UTIs) result in an estimated 7 million office visits, 1 million emergency department visits, and over 500,000 hospitalizations with an associated annual cost of \$1.6 billion. Little is known regarding pre- and post-hospitalization resource use.

OBJECTIVE

- We quantified resource utilization and costs associated with both commercially insured and Medicare patients hospitalized for UTI.

METHODS

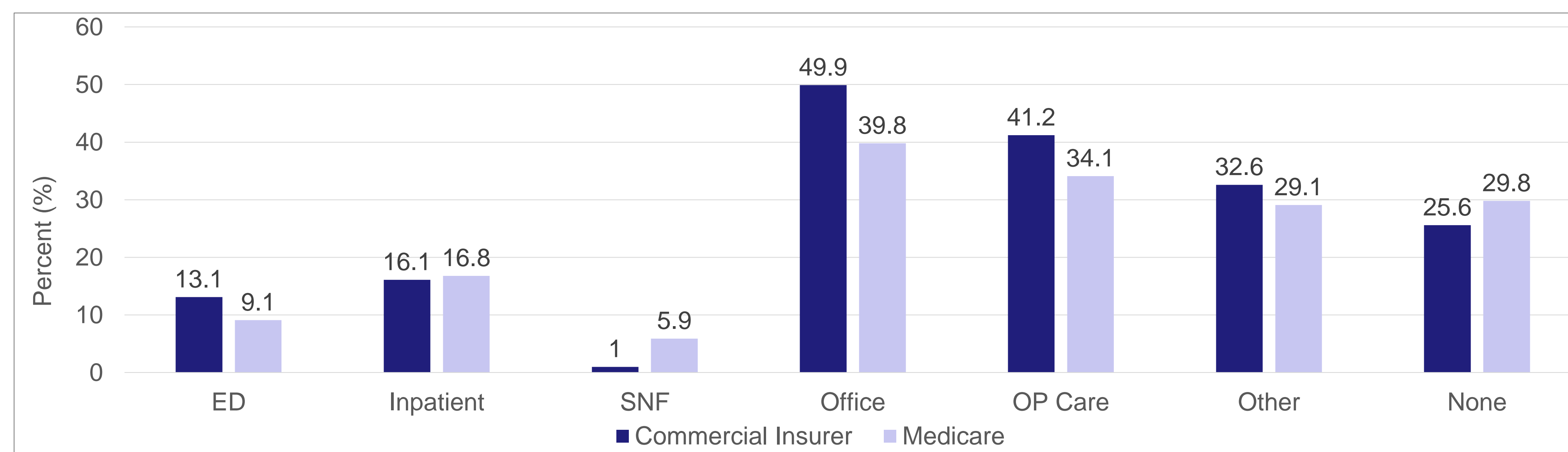
- A retrospective multi-center study using data from the MarketScan® Commercial and Medicare Supplemental Databases was performed.
- Inclusion criteria:
 - inpatient hospital admission with a primary ICD-10 diagnosis for UTI between October 1, 2015 and December 31, 2017 (index hospitalization)
 - at least 6 months of continuous enrollment and pharmacy benefits prior to the index date
 - at least 12 months of continuous enrollment and pharmacy benefits after the index date
 - (4) patient age < 64 (Commercial) or ≥65 (Medicare) on the index date.
- Demographics, hospitalization characteristics, antibiotic use, and resource utilization/costs in the pre- and post-index periods were examined.

RESULTS

Table 1. Baseline Characteristics

	Commercial N=5,248	Medicare N=7,791
Age, years (mean ± standard deviation)	43.2 ± 18.1	81.6 ± 8.0
Age Categories (n, %)		
0-17	627 (11.9)	--
18-24	455 (8.7)	--
25-34	393 (7.5)	--
35-44	656 (12.5)	--
45-54	1,204 (22.9)	--
55-64	1,913 (36.5)	--
65-74	--	1,701 (21.8)
75+	--	6,090 (78.2)
Sex (n, %)		
Male	1,263 (24.1)	2,317 (29.7)
Insurance Plan Type (n, %)		
Comprehensive	311 (5.9)	3,807 (48.9)
Exclusive Provider Organization or Preferred Provider Organization	2,963 (56.5)	3,020 (38.8)
Point of Service	460 (8.8)	325 (4.2)
Health Maintenance Organization	480 (9.1)	454 (5.8)
Consumer Directed Health Plan or High Deductible Health Plan	932 (17.8)	60 (0.8)
Missing	102 (1.9)	125 (1.6)
Geographic Region (n, %)		
Northeast	892 (17.0)	1,528 (19.6)
North Central	1,028 (19.6)	3,205 (41.1)
South	2,790 (53.2)	2,486 (31.9)
West	514 (9.8)	563 (7.2)
Unknown	24 (0.5)	9 (0.1)
Population Density (n, %)		
Urban	4,455 (84.9)	6,649 (85.3)
Rural	784 (14.9)	1,134 (14.6)
Unknown	9 (0.2)	8 (0.1)

Figure 1. Location of Care in the 14 Days Prior to Index Admission



ED; Emergency Department. SNF; Skilled Nursing Facility; OP; Outpatient.

Figure 2. Total UTI-associated Costs

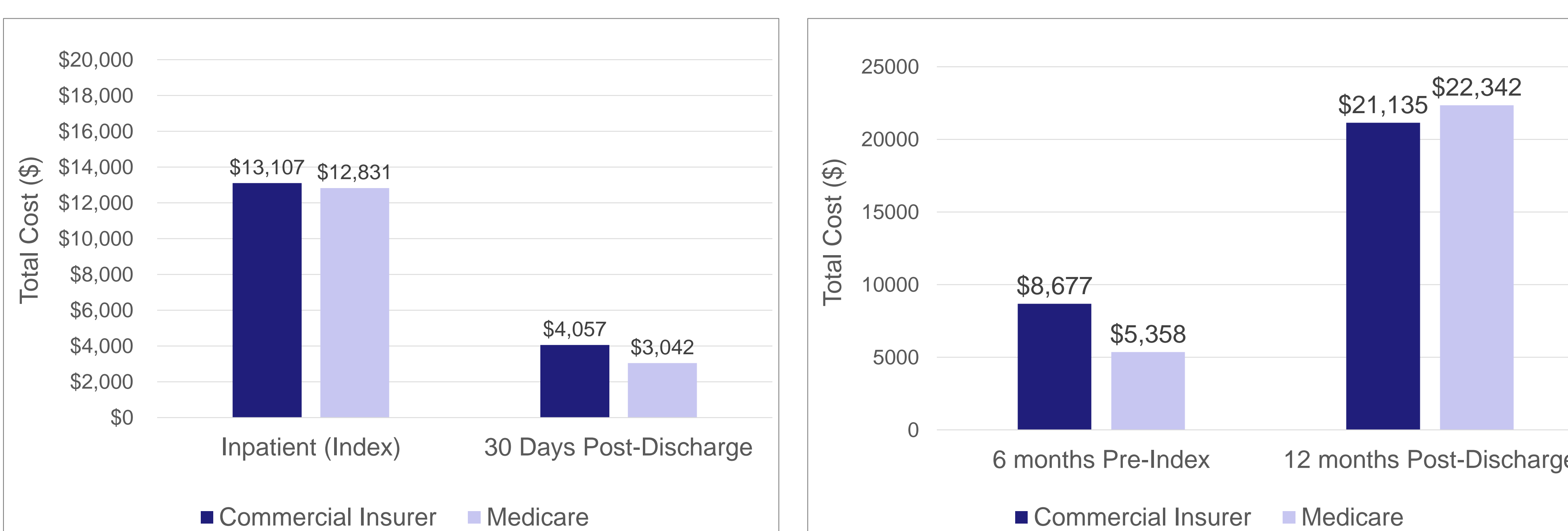


Table 2: UTI-Related Utilization and Cost by Location of Care

	6 Months Pre-Index		12 Months Post Index	
	Commercial (n=5,248)	Medicare (n=7,791)	Commercial (n=5,248)	Medicare (n=7,791)
ED Admission, n (%)	609 (11.6)	750 (9.6)	696 (13.3)	1,312 (16.8)
Total Cost (mean \$)	1,533	1,424	2,068	1,825
Skilled Nursing Facility, n (%)	41 (0.8)	335 (4.3)	116 (2.2)	2,171 (27.9)
Total Cost (mean \$)	2,500	4,492	8,110	9,552
Urgent Care, n (%)	105 (2.0)	64 (0.8)	127 (2.4)	87 (1.1)
Total Cost (mean \$)	216	204	291	209
Office Visit, n (%)	1178 (22.4)	1290 (16.6)	2675 (51.0)	3324 (42.7)
Total Cost (mean \$)	230	249	390	387
Other Outpatient Services, n (%)	1214 (23.1)	1766 (22.7)	2264 (43.1)	4027 (51.7)
Total Cost (mean \$)	1,617	808	2,038	1,087
Pharmacy Services, n (%)	3268 (62.3)	4255 (54.6)	4768 (90.9)	6624 (85.0)
Total Cost (mean \$)	108	120	206	176

ED; Emergency Department

Table 3. Patients with Oral or Intravenous Antibiotic Claims

	6 Months Pre-Index		14 Days Post-Index	
	Commercial (n=5,248)	Medicare (n=7,791)	Commercial (n=5,248)	Medicare (n=7,791)
Oral Antibiotics				
Amoxicillin/clavulanate	11.1%	6.3%	4.7%	3.1%
Cephalexin	11.1%	13.2%	7.5%	8.4%
Ciprofloxacin	22.4%	20.7%	21.3%	13.5%
Fosfomycin	0.6%	0.7%	0.6%	0.3%
Levofloxacin	9.8%	8.3%	5.1%	3.9%
Moxifloxacin	0.3%	0.3%	0	0
Nitrofurantoin	14.1%	14.1%	5.1%	3.9%
TMP/SMX	19.0%	13.9%	8.1%	4.6%
IV Antibiotics				
Aminoglycoside	2.0%	1.2%	0.8%	0.3%
Cephalosporin	16.3%	8.9%	3.9%	1.8%
Beta-lactam	1.5%	1.0%	2.9%	1.0%
Penicillin	1.5%	0.6%	0.6%	0.1%
Carbapenem	1.6%	1.0%	2.9%	1.0%

TMP/SMX; Trimethoprim-Sulfamethoxazole. IV; Intravenous

CONCLUSIONS

- 5.9% of Medicare patients had a claim for skilled nursing facilities (SNF) in the 14 days pre-index admission (1.0% Commercial), 9.1% had emergency department claims (13.1% Commercial), and 39.8% had office visit claims (49.9% Commercial).
- Post-hospitalization, 20.3% (1.3% Commercial) were discharged to SNF and 15.4% (4.7%) were discharged to home health services.
- Mean insurer UTI-related costs were \$8,677 (Commercial) and \$5,358 (Medicare) in the 6 months pre-index hospitalization.
- Similarly, costs were \$21,135 (Commercial) and \$22,342 (Medicare) in the 12 months post hospitalization (\$3,944 and \$2,988 in the first 30 days post-discharge, respectively).
- Per-patient, per-month mean costs in the post index period were \$1,761 for commercial and \$1,862 for Medicare patients.
- UTI is associated with substantial costs and resource utilization to insurers in both pre- and post-hospitalization settings. Understanding total costs of care and location of service may aid in cost-reduction strategies for treating UTI.