

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

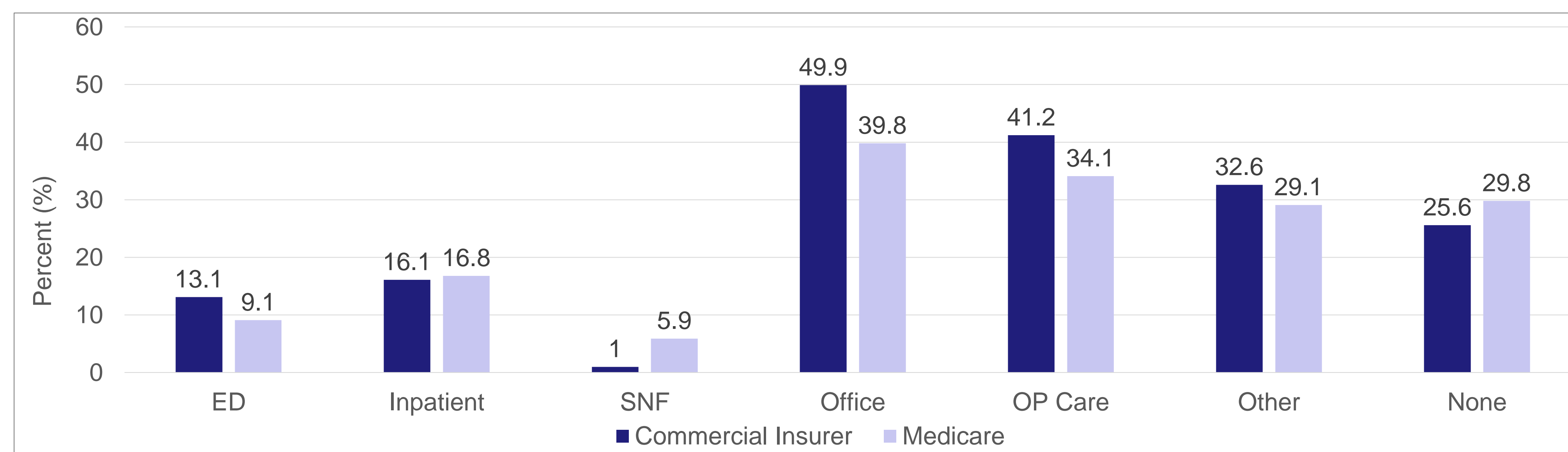
- A retrospective multi-center study using data from the MarketScan® Commercial and Medicare Supplemental Databases was performed.
- Inclusion criteria:
 - inpatient hospital admission with a primary ICD-10 diagnosis for UTI between October 1, 2015 and December 31, 2017 (index hospitalization)
 - at 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

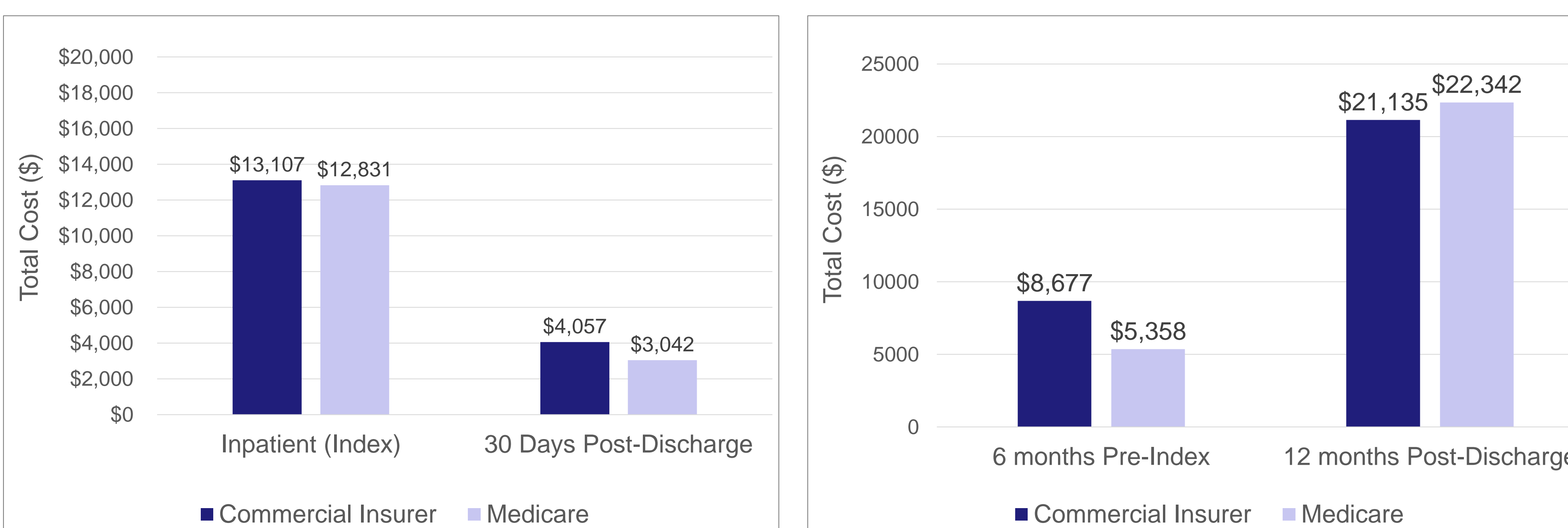


Table 2: UTI-Related Utilization and Cost by Location of Care

| | 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 | 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.