The 30-Day Economic Burden of Newly Diagnosed Complicated Urinary Tract Infections in Medicare Patients

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Background

- Complicated urinary tract infections (cUTIs) are among the most frequent bacterial infections in the community and were the 14th ranked principal diagnosis for hospital admissions in the 2018 Healthcare Cost and Utilization Project.[1]
- Elderly patients are at increased risk for cUTIs and the spectrum of disease severity ranging from a mild illness with limited or no systemic symptoms to severe sepsis.[2,3]
- Treatment of cUTIs, including acute pyelonephritis (AP), due to multi-drug resistant (MDR) Gram-negative uropathogens (e.g., extended-spectrum ß-lactamase (ESBL)-producing and fluoroquinolone-resistant strains) is associated with poor outcomes and increase costs of care.[4,5]
  - The ESBL rates among community-acquired UTIs rose by 10.4% per year between 2012 and 2017.[6]
- Despite the frequency of cUTIs in elderly patients, most U.S. burden of illness studies have focused on younger patient cohorts[7-8] and scant data are available on the financial burden associated with incident cUTIs episodes in a cohort of predominately elderly patients.

Objective

- This study sought to examine total and cUTI-related 30-day Medicare spending, a proxy for healthcare costs, among Medicare beneficiaries who resided in the community with newly diagnosed cUTIs.

Methods

Study Design and Data Source

- A retrospective multicenter cohort study of adult beneficiaries in the Medicare fee-for-service (FFS) database with a cUTI between 2017 and 2018 was performed. cUTI diagnoses were identified using an algorithm from peer-reviewed literature.[8]
- Medicare spending was considered related to the cUTI if the claim(s) included any diagnosis (i.e., primary or secondary) of a UTI. Data aggregation, analysis, and visualization were performed using **Tableau** 2021.4 and Microsoft Excel.

Inclusion Criteria

- Enrolled in Medicare FFS and Medicare Part D from 2016-2019
- Not enrolled in Medicare Advantage
- cUTI first diagnosis in 2017-2018
- No evidence of any UTI diagnoses in 2016
- No residence in a long-term care facility in 2016-2018

Outcomes

- Overall and cUTI-related 30-Day Medicare spending
- Overall and cUTI-related 30-Day Medicare spending in each service category
- Average overall and cUTI-related 30-Day Medicare Spending per beneficiary
- Average overall and cUTI-related 30-Day Medicare spending per encounter in each service category
- Average overall and cUTI-related number of encounters per beneficiary
- Average overall and cUTI-related number of encounters per beneficiary in each service category

Results

Table 1. Baseline characteristics

Patient Characteristics	n=579,339	
Age distribution		
<65	71,079	12.3%
65-74	173,346	29.9%
75-84	205,261	35.4%
85+	129,653	22.4%
Sex distribution		
Male	377,609	65.2%
Female	181,007	31.2%
Unknown	20,723	3.6%
Race distribution		
Non-Hispanic White	460,865	79.6%
Black	38,865	6.7%
Hispanic	31,154	5.4%
Asian / Pacific Islander	14,492	2.5%
Other / Unknown	33,963	5.9%
Dual eligible status		
Full dual	71,740	12.4%
Partial dual	20,113	3.5%
Non-dual	487,486	84.1%
LIS status		
Full LIS	93,271	16.1%
Partial LIS	10,928	1.9%
No LIS	475,140	82.0%

Table 2. Top 10 Comorbidities ≥ 10% Prevalence rates

30-Day Diagnosis	Total individuals n=579,339	
	n	(%)
Specified Heart Arrhythmias	153,463	26.5%
Vascular Disease	153,110	26.4%
Diabetes with Chronic Complications	142,000	24.5%
Congestive Heart Failure	132,801	22.9%
Chronic Obstructive Pulmonary Disease	121,420	21.0%
Acute Renal Failure	118,728	20.5%
Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock	79,006	13.6%
Diabetes without Complication	76,881	13.3%
Coagulation Defects and Other Specified Hematological Disorders	66,027	11.4%
Dementia without Complications	59,427	10.3%

Mean Charlson Comorbidity (CCI) Index of 2.16

Figure 1. 30-Day Expenditures by Setting of Care: Overall vs cUTI

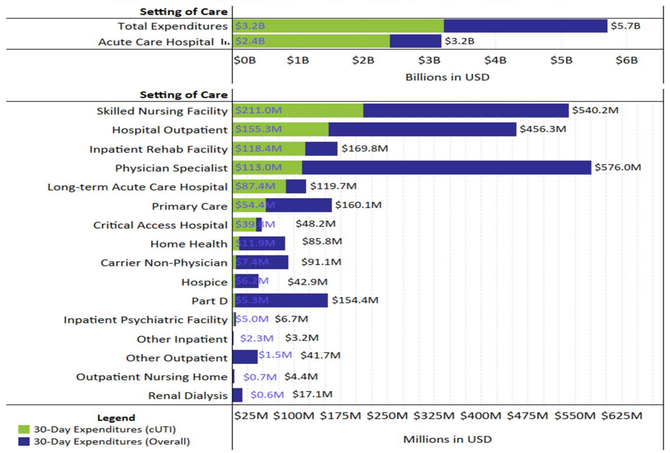
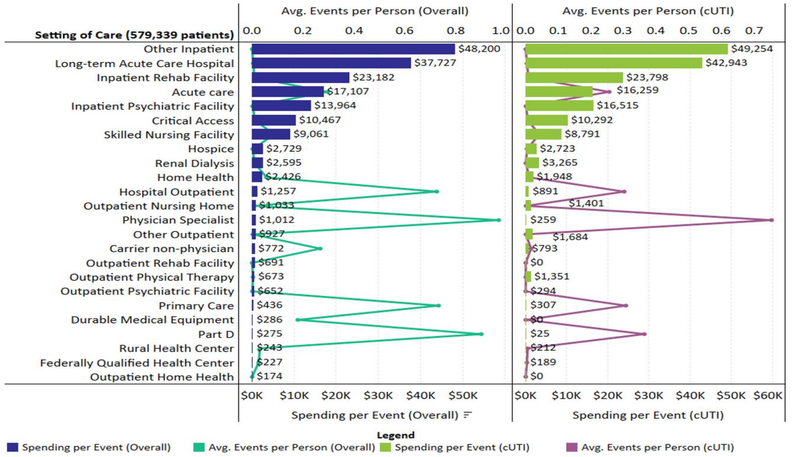


Figure 2. 30-Day Spending Per Event & Average Event Per Person by Setting of Care: Overall vs cUTI



Overall 30-day MS per patient: $9,838
Mean overall service per person: 4.2

cUTI 30-day MS per patient: $5,565
Mean cUTI service per person: 2.1

Conclusions

- Thirty-Day Medicare spending for beneficiaries who resided in the community with incident cUTIs were substantial, with overall and cUTI-related expenditures costing the Medicare program $5.7 billion and $3.2 Billion, respectively.
  - cUTI-related Medicare spending accounted for 56% of the total expenditures.
- Acute care hospitalizations was the major cost driver and accounted for 75% of 30-Day Medicare spending.
- Given the spending associated with acute care hospitalizations, even modest reductions in hospitalization rates will have a major impact on cUTI-related Medicare Spending.
  - For instance, if hospital admissions were reduced by 5% to 15%, this would save the Medicare program approximately between $160 to $480, million annually.
- Additional treatment options, such as new oral antibiotics that overcome antimicrobial resistance, are needed to opt the efficiency of healthcare delivery for beneficiaries who can be safely and effectively be managed in the outpatient setting.

References

1. Agency for Healthcare Research and Quality (AHRQ), Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS), 2018.
2. Shallcross L et al. *PLoS Med* 2020;9:e1003336
3. Wagenlehner FM et al. Int J Urol 2013;10:963-70.
4. MacVane SH, et al. *J Hosp Med.* 2014 Apr;9(4):232-8
5. Critchley IA, et al. 2019; *PLoS ONE* 14(12): e0220265
6. Jernigan JA, et al. N Engl J Med 2020;382:1309-19
7. Lodise, T.P., et al. Am J Infect Control. 2021;S0196-6553(21)00382-5
8. Carreno JJ, et al. OFID 2019;11.