


Economic Burden and Healthcare Resource Utilization Associated with High-Risk Papillary Stage Ta & T1 Non-Muscle Invasive Bladder Cancer (NMIBC) Patients, 2008-2019

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Key Takeaways

- Patients with high-risk PAPT_{a1} NMIBC treated with iBCG and iGEM incurred high all-cause and BC-related HCRU during the study period
- High risk PAPT_{a1} NMIBC patients are more likely to experience poor prognosis and high recurrence and are therefore associated with significantly higher HCRU & cost of care per patient
- With significant comorbidities among this patient population, the high-risk PAPT_{a1} NMIBC patients have higher HCRU and costs which is reflected in longer inpatient stays, increased number of physician office visits and outpatient services, as well as treatment related encounters
- Inpatient costs accounted for nearly 50% of both all-cause and BC-related costs



Conclusions

- High-risk PAPT_{a1} NMIBC patients treated with iBCG or iGEM incur significant all-cause and BC-related HCRU and costs. New treatments that reduce healthcare utilization could provide significant benefits for both the health system and patients

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Disclosures
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Introduction

- Approximately 75% of newly diagnosed bladder cancer (BC) cases are non-muscle invasive (NMIBC), with a five-year recurrence risk of 31%–78%^{1,2}
- High-grade Papillary Ta & T1 (PAPT_{a1}) NMIBC is associated with poor prognosis³
- Despite treatment with intravesical Bacillus Calmette-Guérin (iBCG) and intravesical gemcitabine (iGEM), the most commonly used therapies in these patients, recurrence rates remain high^{4,5}
- Real-world healthcare resource utilization (HCRU) and costs among patients with high-grade PAPT_{a1} NMIBC have not been well quantified

Objective

- To evaluate HCRU and costs among Medicare beneficiaries with high-risk PAPT_{a1} NMIBC treated with iBCG or iGEM

Methods

Study design and data source

- This is a retrospective cohort study using the Surveillance, Epidemiology, and End Results (SEER)–Medicare database

Study cohort selection criteria

- Medicare beneficiaries newly diagnosed with BC at age 65 and older between 2008 and 2019
- Tumor grade of “high” and Tumor, Node, Metastasis (TNM) stage of Ta/T1, N0, M0
- Received iBCG or iGEM based on Medicare claims
- Continuous Medicare Part A and B Fee-for-Service (FFS) enrollment for ≥12 months prior to the first intravesical treatment (the index date)

Outcomes and measures

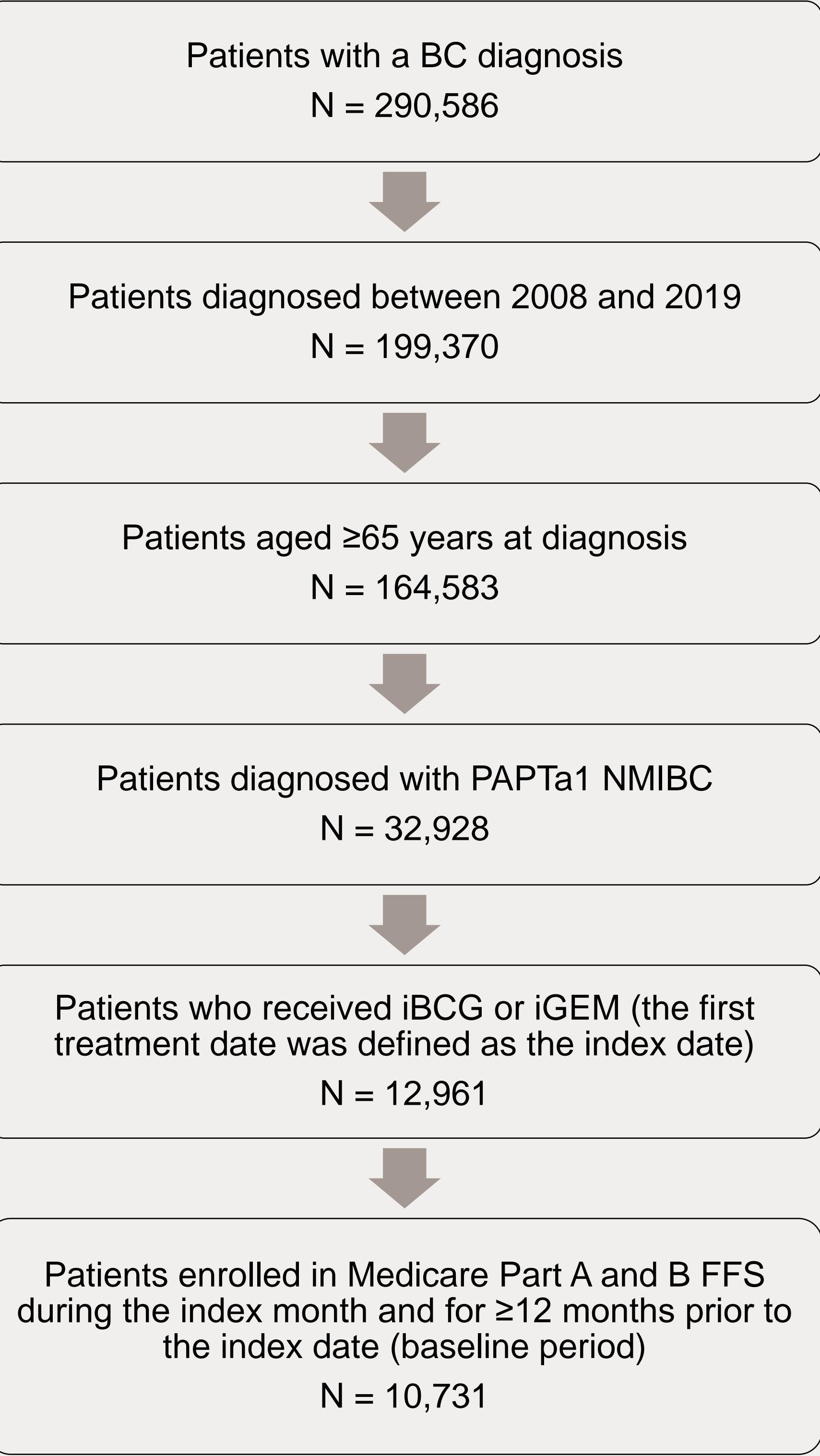
- All-cause and BC-related HCRU and costs were captured using Medicare FFS claims during the follow-up period, starting from the index date until the earliest of the following: end of Medicare data availability (12/31/2020), Medicare Part A and B FFS disenrollment, or death
- HCRU and cost outcomes were descriptively summarized on a per-patient-per-year (PPPY) basis, calculated as the total number of events or total cost divided by the total patient-years of observation
- All costs were adjusted to 2023 US dollars

Results

Patient characteristics

- A total of 10,731 patients met the study criteria (**Figure 1**). Patient demographic and clinical characteristics are presented in **Table 1**

Figure 1. Patient Flowchart



Abbreviations: BC, bladder cancer; iBCG, intravesical Bacillus Calmette Guérin; FFS, Fee-For-Service; iGEM, intravesical gemcitabine; NMIBC, non-muscle invasive bladder cancer; PAP, papillary.

HCRU

- During a mean follow-up of 4.3 years, most patients had both all-cause and BC-related physician office visits (99.1% vs 93.2%), received outpatient services (96.4% vs 74.5%), and had cystoscopy or cystourethroscopy (96.1% vs 89.7%)
- The mean HCRU rates were 1.0 (SD, 1.5) for all-cause emergency room visits, 0.9 (SD, 1.6) for hospital admissions, 13.3 (SD, 8.6) for physician office visits, and 7.9 (SD, 8.2) for outpatient encounters (**Table 2**)

Table 1. Patient Characteristics (N = 10,731)

	Overall N = 10,731	iGEM cohort N = 251	iBCG cohort N = 10,480
Demographics			
Age at index, mean (SD), years	77.3 (6.9)	78.0 (7.4)	77.3 (6.9)
Sex, n (%)			
Male	8,655 (80.7)	202 (80.5)	8,453 (80.7)
Female	2,076 (19.3)	49 (19.5)	2,027 (19.3)
Race, n (%)			
White		10,102 (94.1)	
Black		298 (2.8)	
Other ^a /unknown		331 (3.1)	
Ethnicity, n (%)			
Non-Hispanic and non-Latino		10,462 (97.5)	
Hispanic or Latino		269 (2.5)	
Marital status, n (%)			
Married (including common law)	7,051 (65.7)	166 (66.1)	6,885 (65.7)
Other	3,680 (34.3)	85 (33.9)	3,595 (34.3)
Rural-urban classification, n (%)			
Urban	9,176 (85.5)	203 (80.9)	8,973 (85.6)
Rural	1,555 (14.5)	48 (19.1)	1,507 (14.4)
Census tract-level income, mean (SD), \$	72,089 (32,649)	71,250 (32,555)	72,109 (32,653)
Census tract-level education, %			
Less than high school	10.6 (8.4)	10.3 (7.9)	10.61 (8.5)
High school	25.7 (11.1)	24.9 (11.6)	25.7 (11.1)
Some college	29.2 (8.1)	30.4 (8.3)	29.18 (8.0)
College	34.5 (19.0)	34.3 (20.3)	34.51 (19.0)
Clinical characteristics			
BC histology, n (%)			
Transitional cell papillomas and carcinomas	10,686 (99.6)	251 (100)	10,435 (99.6)
TURBT history, n (%)	10,568 (98.5)	245 (97.6)	10,323 (98.5)
Most common comorbidities, n (%)			
Diabetes	3,713 (34.6)	81 (32.3)	3,632 (34.7)
COPD	3,333 (31.1)	76 (30.3)	3,257 (31.1)
Peripheral vascular disease	3,143 (29.3)	80 (31.9)	3,063 (29.2)
Renal disease	2,124 (19.8)	68 (27.1)	2,056 (19.6)
Cerebrovascular disease	2,076 (19.3)	48 (19.1)	2,028 (19.4)
Congestive heart failure	1,833 (17.1)	47 (18.7)	1,786 (17.0)
Prior BC-related diagnostic procedures and treatments, n (%)			
Cystoscopy or cystourethroscopy	8,657 (80.7)	144 (57.4)	8,513 (81.2)
Other intravesical therapy ^b	1,039 (9.7)	29 (11.6)	1,010 (9.6)
Other active treatments ^c	513 (4.8)	30 (12.0)	483 (4.6)

Abbreviations: BC, bladder cancer; CCI, Charlson Comorbidity Index; COPD, chronic obstructive pulmonary disease; iBCG, intravesical Bacillus Calmette Guérin; iGEM, intravesical gemcitabine; SD, standard deviation; TURBT, transurethral resection of bladder tumor.

^a Includes American Indian or Alaska Native and Asian or Pacific Islander.

^b Includes mitomycin, epirubicin, valrubicin, and docetaxel.

^c Includes radical cystectomy, radiotherapy, and systemic therapy.

Table 2. All-Cause and BC-Related HCRU Rates

HCRU	All-cause mean ± SD			BC-related mean ± SD		
	Overall N = 10,731	iGEM cohort N = 251	iBCG cohort N = 10,480	Overall N = 10,731	iGEM cohort N = 251	iBCG cohort N = 10,480
ER visits	1.0 ± 1.5	0.9 ± 1.6	1.0 ± 1.5	0.1 ± 0.4	0.2 ± 0.7	0.1 ± 0.4
Inpatient admissions	0.9 ± 1.6	0.7 ± 1.5	0.9 ± 1.6	0.3 ± 0.9	0.4 ± 0.9	0.3 ± 0.9
Inpatient stay, days	7.7 ± 19.8	6.0 ± 17.2	7.8 ± 19.9	2.3 ± 9.2	3.0 ± 10.4	2.2 ± 9.2
PO visits	13.3 ± 8.6	12.1 ± 8.5	13.3 ± 8.6	4.1 ± 4.9	4.1 ± 4.9	4.1 ± 4.9
Outpatient services	7.9 ± 8.2	12.9 ± 13.1	7.8 ± 8.1	2.5 ± 4.8	6.4 ± 8.7	2.4 ± 4.6
Treatment-related encounters (not mutually exclusive from above)						
Cystoscopy/cystourethroscopy	8.8 ± 6.5	4.5 ± 3.7	8.9 ± 6.5	6.3 ± 5.5	3.5 ± 3.4	6.4 ± 5.6
Radiotherapy	1.0 ± 4.8	0.2 ± 2	1.0 ± 4.9	0.5 ± 3.5	0.2 ± 2	0.5 ± 3.6
Systemic therapy	0.9 ± 4.1	0.5 ± 2.7	0.9 ± 4.1	0.7 ± 3.5	0.4 ± 2.4	0.7 ± 3.5
Supportive care	0.5 ± 1.9	0.3 ± 1.2	0.5 ± 2	0.3 ± 1.4	0.3 ± 1.1	0.3 ± 1.4

Abbreviations: BC, bladder cancer; ER, emergency room; HCRU, healthcare resource utilization; iBCG, intravesical Bacillus Calmette Guérin; iGEM, intravesical gemcitabine; PO, physician office; SD, standard deviation.

Costs

- For the overall cohort, the average all-cause healthcare cost was \$30,425 (SD, \$42,802) PPPY, and the average BC-related cost was \$10,576 (SD, \$23,110) PPPY (**Figure 2** and **Table 3**)
- Inpatient costs accounted for approximately 50% of both all-cause (mean, \$14,177; SD, \$32,632) and BC-related expenditures (mean, \$4,659; SD, \$18,300) (**Figure 2** and **Table 3**)

Figure 2. All-Cause and BC-Related Healthcare Costs PPPY, Overall Cohort

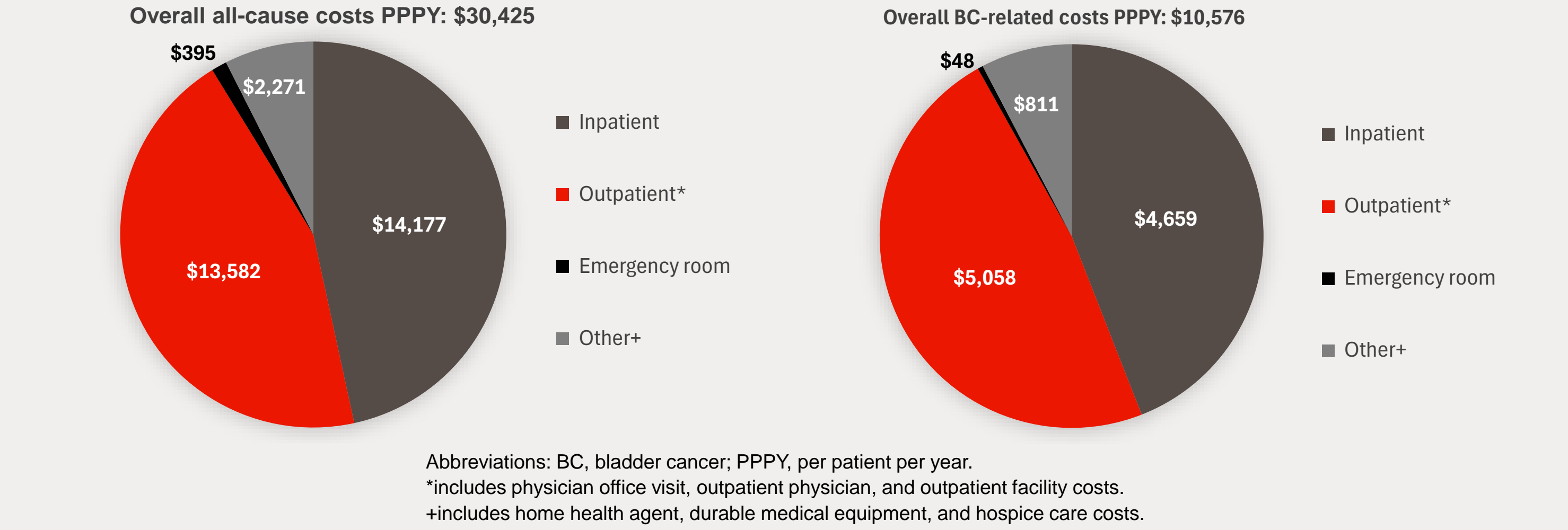


Table 3. All-Cause and BC-Related Costs

Costs	All-cause mean ± SD			BC-related mean ± SD		
	Overall N = 10,731	iGEM cohort N = 251	iBCG cohort N = 10,480	Overall N = 10,731	iGEM cohort N = 251	iBCG cohort N = 10,480
Total healthcare costs	30,425 ± 42,802	31,460 ± 44,923	30,400 ± 42,752	10,576 ± 23,110	16,552 ± 32,669	10,432 ± 22,815
Emergency room	395 ± 735	359 ± 677	395 ± 736	48 ± 249	85 ± 376	47 ± 245
Inpatient	14,177 ± 32,632	13,102 ± 34,890	14,203 ± 32,578	4,659 ± 18,300	6,955 ± 26,090	4,604 ± 18,070
Outpatient total	13,582 ± 13,686	16,107 ± 17,293	13,521 ± 13,583	5,058 ± 8,255	8,630 ± 14,580	4,972 ± 8,025
Physician office visits	1,116 ± 819	963 ± 754	1,119 ± 820	325 ± 426	319 ± 429	325 ± 425
Professional provider	7,527 ± 8,850	6,278 ± 8,854	7,556 ± 8,849	2,621 ± 4,785	2,488 ± 7,436	2,624 ± 4,703
Outpatient facility	4,939 ± 8,302	8,867 ± 14,198	4,845 ± 8,087	2,111 ± 5,679	5,823 ± 11,941	2,022 ± 5,411
Other	2,271 ± 5,170	1,892 ± 4,430	2,281 ± 5,186	811 ± 3,360	883 ± 3,171	809 ± 3,365
Home health agent	943 ± 2,292	831 ± 2,644	946 ± 2,283	317 ± 1,280	394 ± 1,687	315 ± 1,269
Durable medical equipment	421 ± 1,738	419 ± 1,625	421 ± 1,740	29 ± 343	40 ± 553	29 ± 337
Hospice care	907 ± 3,812	642 ± 2,763	914 ± 3,833	465 ± 2,901	449 ± 2,558	466 ± 2,908

Abbreviations: BC, bladder cancer; ER, emergency room; HCRU, healthcare resource utilization; iBCG, intravesical Bacillus Calmette Guérin; iGEM, intravesical gemcitabine; PO, physician office; SD, standard deviation.

