Healthcare resource utilization (HCRU) and costs in patients with metastatic urothelial cancer (mUC) who received first-line (1L) treatment: results from IMPACT UC II

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SCOPE

- **This study evaluated treatment patterns, HCRU, and costs by 1L treatment among commercial and Medicare Advantage health insurance plan members diagnosed with mUC between July 1, 2015, and June 30, 2020. The study period extended from January 1, 2015, to August 31, 2021**

CONCLUSIONS

- **In this retrospective observational analysis conducted before the approval of avelumab 1L maintenance (1LM), >50% of commercial and Medicare Advantage health insurance plan members diagnosed with mUC did not receive an identified 1L treatment**
- **Among treated patients with mUC, the number of emergency department (ED) visits, inpatient (IP) stays, and all-cause total healthcare costs were highest for patients who received 1L immuno-oncology (IO) monotherapy followed by those who received platinum-based chemotherapy**
- **Considering the paradigm shift in the mUC treatment landscape following the introduction of avelumab 1LM, future research is needed to evaluate reasons for lack of treatment and assess HCRU and costs by treatment sequence to inform optimal treatment selection in patients with mUC**

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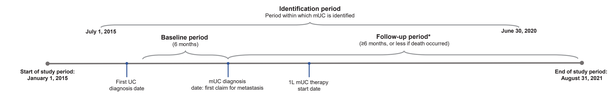
BACKGROUND

- Urothelial carcinoma is the most common histological subtype of bladder cancer in the United States and accounts for approximately 90% of all bladder cancers[1]
- Approximately 5% of patients present with metastasis at diagnosis, and up to 50% of patients with early-stage urothelial carcinoma will later develop metastatic disease[2,3]
- Systemic platinum-containing chemotherapy is the standard of care in 1L settings for platinum-eligible patients with mUC. A cisplatin-based combination regimen is recommended for cisplatin-eligible patients.[1,3] However, for patients ineligible to receive cisplatin due to medical frailty or comorbidities, including heart disease, renal insufficiency, or peripheral neuropathy, a combination of carboplatin + gemcitabine is preferred due to its lower toxicity profile[2,3]
- The introduction of anti–PD-L1 and anti–PD-1 antibodies, including the PD-L1 inhibitor avelumab as 1LM in patients with mUC that had not progressed with 1L platinum-containing chemotherapy, has drastically changed the treatment landscape in mUC[2,4]
- To date, real-world data on HCRU and costs by 1L treatment among patients with mUC are limited
- To provide a baseline for future studies, this study assessed treatment patterns, HCRU, and costs among patients diagnosed with mUC prior to the approval of avelumab as 1LM

METHODS

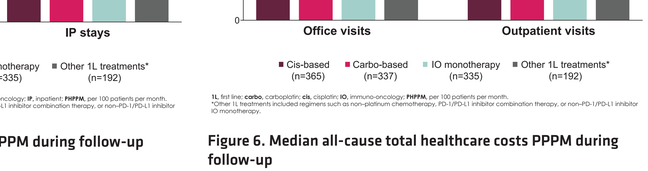
- This retrospective claims-based analysis (**Figure 1**) used the Optum Research Database, which includes claims data for approximately 8% of enrollees on commercial health insurance plans and 18% of Medicare Advantage enrollees in the United States
- Adult patients were diagnosed with mUC between July 1, 2015 and June 30, 2020 (**Figure 2**)
  - The date of the first claim for metastatic disease occurring on or after the UC diagnosis date was considered the mUC diagnosis date
  - Patients were required to have ≥6 months of continuous health insurance plan enrollment before and after the mUC diagnosis date or less if death occurred
  - Patients were followed up from the mUC diagnosis date until the earliest date of health plan disenrollment, death, or end of study period (August 31, 2021)
- Patients with claims for mUC treatment were categorized by their 1L treatment: cisplatin (cis)- based, carboplatin (carbo)-based, IO monotherapy, or other treatments
- Baseline clinical and demographic characteristics were evaluated; unadjusted all-cause HCRU and costs during follow-up were reported by 1L treatment cohort per 100 patients per month (PHPPM) or per patient per month (PPPM)

Figure 1. Study design



1L, first line; **mUC**, metastatic urothelial cancer; **UC**, urothelial cancer.
*Follow-up period ended at the earliest date on which death or disenrollment from health insurance plan occurred or at end of study period.

Figure 2. Patient selection criteria



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RESULTS

- Of 3,006 patients, 1,229 (40.9%) received ≥1L treatment. Among treated patients, the mean (SD) age was 72.6 (9.8) years; 71.9% were male, and 78.7% were enrolled in Medicare Advantage (**Table 1**)
- 1L treatment was platinum-based chemotherapy in 57.1% (29.7% cis-based; 27.4% carbo-based), IO monotherapy in 27.3%, and other in 15.6% of treated patients (**Table 1**)
- A lower proportion of patients who received cis-based therapy had heart failure (2.2%), high-stage chronic kidney disease (4.9%), or poly or peripheral neuropathy (1.9%) compared with patients who received carbo-based or IO treatment (**Table 1**)

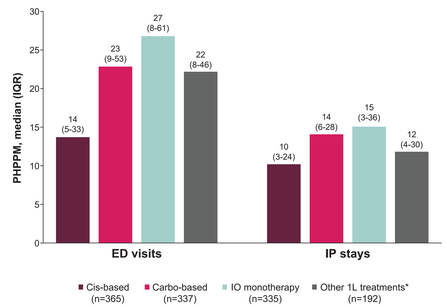
Table 1. Baseline patient characteristics

	Untreated total (n=1,777)	1L total (n=1,229)	Cis-based (n=365)	Carbo-based (n=337)	IO monotherapy (n=335)	Other 1L treatments (n=192)
Demographics						
Age, mean ± SD (median), years	77.3 ± 9.3 (78)	72.6 ± 9.8 (73)	67.4 ± 9.5 (68)	73.5 ± 8.6 (74)	77 ± 8.9 (78)	73.5 ± 9.3 (74)
Age group, n (%)						
18-64	141 (7.9)	215 (17.5)	126 (34.5)	40 (11.9)	26 (7.8)	23 (12)
65-74	481 (27.1)	460 (37.4)	155 (42.5)	135 (40.1)	96 (28.7)	74 (38.5)
75-84	697 (39.2)	421 (34.3)	76 (20.8)	131 (38.9)	140 (41.8)	74 (38.5)
85+	458 (25.8)	133 (10.8)	8 (2.2)	31 (9.2)	73 (21.8)	21 (10.9)
Male, n (%)	1278 (71.9)	884 (71.9)	268 (73.4)	247 (73.3)	235 (70.2)	134 (69.8)
Insurance type, n (%)						
Commercial	176 (9.9)	262 (21.3)	137 (37.5)	49 (14.5)	48 (14.3)	28 (14.6)
Medicare Advantage	1601 (90.1)	967 (78.7)	228 (62.5)	288 (85.5)	287 (85.7)	164 (85.4)
Medicare/Medicaid dual eligible[1]	143 (8.9)	56 (5.8)	15 (6.6)	16 (5.6)	21 (7.3)	4 (2.4)
Medicare/Medicaid non–dual eligible[1]	1073 (67)	697 (72.1)	149 (65.4)	199 (69.1)	214 (74.6)	135 (82.3)
Other/unknown[1]	385 (24)	214 (22.1)	64 (28.1)	73 (25.3)	52 (18.1)	25 (15.2)
US region, n (%)						
Northeast	345 (19.4)	199 (16.2)	60 (16.4)	50 (14.8)	51 (15.2)	38 (19.8)
Midwest	501 (28.2)	407 (33.1)	121 (33.2)	117 (34.7)	111 (33.1)	58 (30.2)
South	769 (43.3)	505 (41.1)	138 (37.8)	144 (42.7)	143 (42.7)	80 (41.7)
West	162 (9.1)	118 (9.6)	46 (12.6)	26 (7.7)	30 (9)	16 (8.3)
1L treatment start date						
2015	–	50 (4.1)	16 (4.4)	25 (7.4)	0	9 (4.7)
2016	–	172 (14)	59 (16.2)	76 (22.6)	13 (3.9)	24 (12.5)
2017	–	232 (18.9)	69 (18.9)	64 (19)	76 (22.7)	23 (12)
2018	–	252 (20.5)	69 (18.9)	65 (19.3)	81 (24.2)	37 (19.3)
2019	–	310 (25.2)	89 (24.4)	73 (21.7)	106 (31.6)	42 (21.9)
2020	–	199 (16.2)	61 (16.7)	33 (9.8)	55 (16.4)	50 (26)
2021	–	14 (1.1)	2 (0.6)	1 (0.3)	4 (1.2)	7 (3.7)
Clinical characteristics						
CCI score, mean ± SD (median)	2.7 ± 2.2 (2)	2 ± 1.9 (2)	1.4 ± 1.7 (1)	2.3 ± 2 (2)	2.3 ± 2 (2)	2.1 ± 1.9 (2)
Presence of select comorbidities, n (%)						
Heart failure	226 (12.7)	71 (5.8)	8 (2.2)	28 (8.3)	24 (7.2)	11 (5.7)
High-stage chronic kidney disease	424 (23.9)	177 (14.4)	18 (4.9)	55 (16.3)	80 (23.9)	24 (12.5)
Polyneuropathy or peripheral neuropathy	176 (9.9)	59 (4.8)	7 (1.9)	14 (4.2)	24 (7.2)	14 (7.3)
Hypertension	1384 (77.9)	898 (73.1)	232 (63.6)	259 (76.9)	264 (78.8)	143 (74.5)
Disorders of lipid metabolism	1111 (62.5)	742 (60.4)	197 (54)	209 (62)	205 (61.2)	131 (68.2)
Anemia	798 (44.9)	424 (34.5)	86 (23.6)	115 (34.1)	148 (44.2)	75 (39.1)

1L, first line; **CCI**, Charlson Comorbidity Index; **carbo**, carboplatin; **cis**, cisplatin; **IO**, immuno-oncology; **mUC**, metastatic urothelial cancer.
Baseline included the 6 months prior to the mUC diagnosis date. Other 1L treatments included regimens such as non-platinum chemotherapy, PD-1/PD-L1 inhibitor combination therapy, or non-PD-1/PD-L1 inhibitor IO monotherapy.

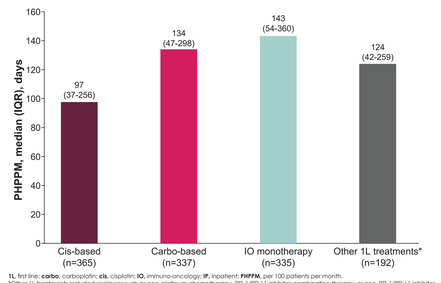
- The number of IP stays and ED visits PHPPM during follow-up were highest with IO monotherapy (IP stays, 15 [3-36]; ED visits, 27 [8-61]) followed by carbo-based (IP stays, 14 [6-28]; ED visits, 23 [9-53]), and cis-based (IP stays, 10 [3-24]; ED visits, 14 [5-33]) treatment (**Figure 3**)
- The length of IP stays PHPPM during follow-up were longest with IO monotherapy (143 days [54-360]) and shortest for cis-based treatment (97 days [37-256]; **Figure 4**)

Figure 3. Median number of all-cause ED visits and IP stays PHPPM during follow-up



1L, first line; **carbo**, carboplatin; **cis**, cisplatin; **ED**, emergency department; **IO**, immuno-oncology; **IP**, inpatient; **PHPPM**, per 100 patients per month.
*Other 1L treatments included regimens such as non-platinum chemotherapy, PD-1/PD-L1 inhibitor combination therapy, or non-PD-1/PD-L1 inhibitor IO monotherapy.

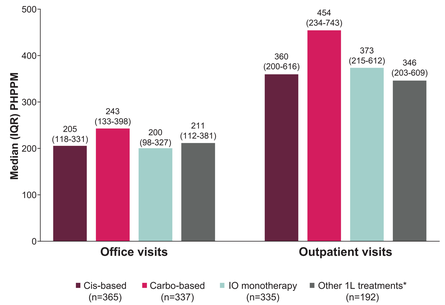
Figure 4. Median length of IP stays PHPPM during follow-up



1L, first line; **carbo**, carboplatin; **cis**, cisplatin; **IO**, immuno-oncology; **IP**, inpatient; **PHPPM**, per 100 patients per month.
*Other 1L treatments included regimens such as non-platinum chemotherapy, PD-1/PD-L1 inhibitor combination therapy, or non-PD-1/PD-L1 inhibitor IO monotherapy.

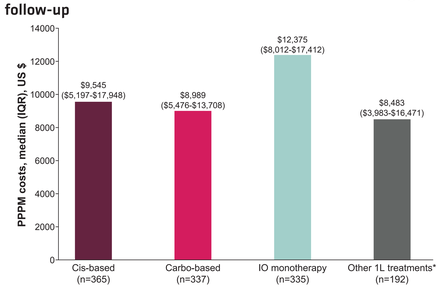
- The number of office visits (ie, office or clinic) and outpatient visits (ie, outpatient hospitals) PHPPM during follow-up were highest with carbo-based treatment (office visits, 243 [133-398]; outpatient visits, 454 [234-743]) and were comparable among the IO monotherapy, cis-based, and other treatment groups (**Figure 5**)
- IO monotherapy had the highest all-cause total healthcare costs PPPM ($12,375 [$8,012-$17,412]) followed by cis-based ($9,545; [$5,197-$17,948]) and carbo-based ($8,989; [$5,476-$13,708]) treatment (**Figure 6**)

Figure 5. Median number of all-cause ambulatory visits PHPPM during follow-up



1L, first line; **carbo**, carboplatin; **cis**, cisplatin; **IO**, immuno-oncology; **PHPPM**, per 100 patients per month.
*Other 1L treatments included regimens such as non-platinum chemotherapy, PD-1/PD-L1 inhibitor combination therapy, or non-PD-1/PD-L1 inhibitor IO monotherapy.

Figure 6. Median all-cause total healthcare costs PPPM during follow-up



1L, first line; **carbo**, carboplatin; **cis**, cisplatin; **IO**, immuno-oncology; **PPPM**, per patient per month.
*Other 1L treatments included regimens such as non-platinum chemotherapy, PD-1/PD-L1 inhibitor combination therapy, or non-PD-1/PD-L1 inhibitor IO monotherapy.

LIMITATIONS

- Administrative claims are submitted for reimbursement purposes and not for research; therefore, claims data may lack certain clinical details such as stage and disease severity
- An algorithm to define lines of therapy was developed based on information from claims for mUC treatment; some lines of therapy may be misclassified
- Patients were selected from a managed care population; therefore, study results may not be generalizable to other patient populations, such as the uninsured

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