Economic Burden of Metastatic Castration-Resistant Prostate Cancer, by Line of Treatment, in Medicare Beneficiaries, 2014–2019

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BACKGROUND

- Approximately 268,490 new cases of prostate cancer and ~34,500 deaths from prostate cancer are estimated in the US for 2022[1]
- Resistance to androgen deprivation therapy (ADT) will eventually occur in most prostate cancer cases, with approximately 10%–20% developing into metastatic castration-resistant prostate cancer (mCRPC) within 5 years after the initial diagnosis[2-4]
- Metastatic CRPC therapies include novel hormonal therapy (abiraterone acetate, apalutamide, enzalutamide, darolutamide), checkpoint inhibitors (ipilimumab, nivolumab, pembrolizumab), immunotherapy (sipuleucel-T), targeted alpha-particle therapy (radium-223), PARP inhibitors (olaparib, rucaparib), and chemotherapy (docetaxel, cabazitaxel, mitoxantrone, carboplatin, cisplatin, etoposide, paclitaxel)
- Prior real-world studies have evaluated the economic burden in commercially insured patients with mCRPC[5]
- There is limited information describing the current economic burden associated with prostate cancer progression in men > 65 years of age, who account for approximately 60% of cases

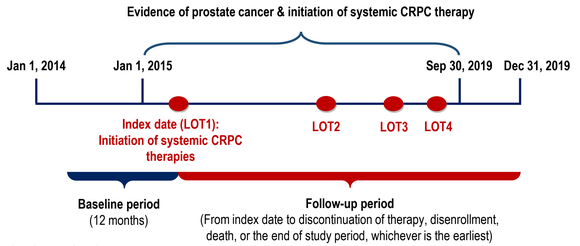
OBJECTIVE

- To describe prostate cancer–related and all-cause healthcare resource utilization and costs by line of therapy (LOT) among Medicare fee-for-service (FFS) beneficiaries with mCRPC who initiated systemic therapy

METHODS

Study Schema

- A retrospective cohort study using 100% Medicare FFS medical, pharmacy, and enrollment claims data; LOT was defined by a claims-based algorithm



Inclusion criteria:

- Men with Medicare FFS with at least one inpatient or two outpatient (30 days apart) medical claims for prostate cancer between January 1, 2015, and September 30, 2019
- Aged ≥ 66 years at the index date
- Continuous enrollment in Medicare Parts A, B, & D at least 12 months before and at least 3 months after the index date
- Exposure to ADT during the baseline period

Exclusion criteria:

- Exposure to systemic CRPC therapies during the baseline period
- Presence of other primary cancers during the baseline period

Outcomes:

- Direct healthcare resource utilization and costs, Medicare payments, patient's out of pocket (OOP) spending, and overall survival by LOT

RESULTS

Figure 1. Patient Attrition

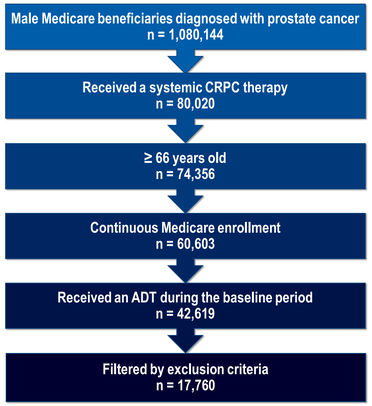


Table 1. Patient Characteristics

Characteristic	LOT1 n = 17,760
Age, mean (SD), years	77.5 (7.2)
Race/ethnicity, %	
White	80.0
Black or African American	12.9
Hispanic or Latino	1.7
Native	0.3
Other	5.1
Pre-index Charlson Comorbidity Index (CCI) score, mean (SD)	8.42 (3.52)
Pre-index comorbidity,[a] %	
Metastatic solid tumor[b]	70.4
Diabetes w/o chronic complication	33.0
Peripheral vascular disease	24.9
Renal disease	21.9
Chronic pulmonary disease	21.9

[a]Comorbidities > 20% in LOT1 are shown
[b]The metastatic characterization in claims data may not reflect the clinical diagnosis
LOT, line of therapy; SD, standard deviation

Figure 2. Patients Who Progressed and Required Subsequent Therapies

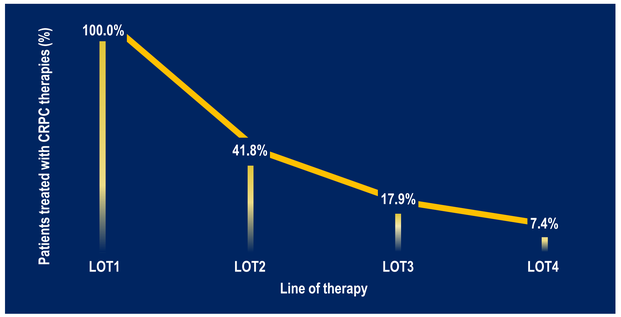
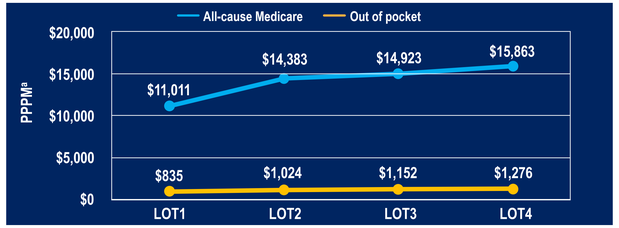


Table 2. Top Five CRPC Therapies by LOT

LOT1 (%) n = 17,760	LOT2 (%) n = 7,421	LOT3 (%) n = 3,177	LOT4 (%) n = 1,312
Abiraterone (38.0)	Enzalutamide (32.1)	Docetaxel (27.4)	Cabazitaxel (24.5)
Enzalutamide (32.4)	Abiraterone (29.7)	Enzalutamide (16.5)	Docetaxel (23.7)
Docetaxel (11.4)	Docetaxel (14.1)	Abiraterone (16.0)	Enzalutamide (10.0)
Sipuleucel-T (8.7)	Radium-223 (4.6)	Cabazitaxel (10.1)	Abiraterone (9.6)
Apalutamide (3.6)	Sipuleucel-t (3.2)	Radium-223 (8.6)	Radium-223 (9.4)

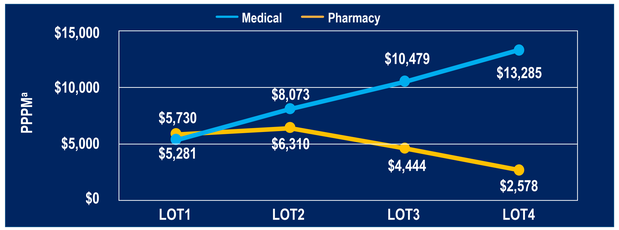
Figure 3. Mean All-Cause Medicare and Patient Out-of-Pocket Costs by LOT



	All-cause Medicare PPPM	SD	Out of pocket PPPM	SD
LOT1	$11,011	$9,579	$835	$839
LOT2	$14,383	$25,848	$1,024	$1,715
LOT3	$14,923	$19,058	$1,152	$1,855
LOT4	$15,863	$19,276	$1,276	$2,084

[a]Costs were adjusted to 2020 USD
LOT, line of therapy; PPPM, per patient per month; SD, standard deviation

Figure 4. Mean Medical and Pharmacy Costs in Medicare Payments by LOT



	Medical PPPM	SD	Pharmacy PPPM	SD
LOT1	$5,281	$10,074	$5,730	$4,352
LOT2	$8,073	$24,584	$6,310	$9,801
LOT3	$10,479	$14,410	$4,444	$11,463
LOT4	$13,285	$19,197	$2,578	$4,506

[a]Costs were adjusted to 2020 USD
LOT, line of therapy; PPPM, per patient per month; SD, standard deviation

Table 3. Duration of Follow-up After Initiation of LOT1

	n	Mean	SD
LOT1 start → end, days	17,760	364.3	321.6
LOT1 start → end, days among patients who did not receive LOT2	10,339	391.8	350.7
LOT1 start → LOT2 end, days	7,421	569.0	342.0
LOT1 start → LOT3 end, days	3,177	746.4	339.6

LOT, line of therapy; SD, standard deviation

Table 4. Survival Probability

	1st month	6th month	12th month	18th month	36th month
Survival probability	1.00	0.96	0.94	0.94	0.92
Cumulative survival probability	1.00	0.89	0.67	0.49	0.14

KEY FINDINGS

- Among patients with mCRPC, novel hormonal therapy was more common in earlier LOTs, while chemotherapy was more common in later lines
- The cumulative survival probability was 0.14, with more than one-third of patients dying during the study period
- All-cause Medicare and out-of-pocket costs increased as the number of LOTs increased
- The medical cost of care increased with each subsequent LOT, while the pharmacy cost decreased after LOT2
- Prostate cancer-related costs comprised 75.7% of all-cause costs in LOT1, 68.8% in LOT2, 58.2% in LOT3, and 50.8% in LOT4

LIMITATIONS

- Clinical information is mainly unavailable in Medicare claims data
- Hormone-sensitive or non-metastatic CRPC could be misclassified as mCRPC because some CRPC therapies are approved for the treatment of those diseases
- Reasons for treatment discontinuation were not captured in the data

CONCLUSIONS

- **In this real-world study of male Medicare beneficiaries with mCRPC, there was limited use of anti-cancer treatment after LOT1. Among those receiving subsequent LOTs, the medical cost of care PPPM increased with each LOT**

ACKNOWLEDGMENTS

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DISCLOSURES

A.P., S.B.R., S.K., S.B., and P.I. are employees of Inovalon Insights (they were employees of Avalere Health at the time the study was conducted). N.B. is an employee of Avalere Health. M.H., N.D., and M.G. are employees and stockholders of Amgen. D.B., Z.M., and M.C. were employees of Amgen.

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