

# Variation in the Types of Physicians Visited among Men Diagnosed with Stage IV Prostate Cancer

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## Background

- Multi-specialist contact may be beneficial for patients diagnosed with advanced prostate cancer (PCa) and ensure that they receive comprehensive care and select the most appropriate, evidence-based treatment.
- Little is known about specialist visit patterns among patients with advanced PCa in the period immediately following diagnosis.

## Objective

- We investigate whether metastatic (M1) PCa is associated with increased variation in the types of physicians seen following diagnosis compared to stage IV non-metastatic PCa, and the impact of patient clinical and demographic factors on multi-specialist contact.

## Methods

Dataset: Linked Surveillance Epidemiology and End Results (SEER)-Medicare data

### Study inclusion and exclusion criteria:

- AJCC (American Joint Committee on Cancer) stage IV prostate cancer from 2000-2007 with claims data from 1999-2009
- Age 66+ at the time of diagnosis
- Continuously enrolled in Medicare Parts A and B for the 12 months prior to diagnosis
- Enrolled in an HMO during the 12 months prior to diagnosis
- History of cancer (except non-melanoma skin cancer) within 5 years prior to prostate cancer diagnosis
- Unknown diagnosis month
- Prostate cancer found on autopsy or death certificate

### Outcome of interest

- Multi-specialist contact, measured by the Physician Visit Index (PVI), during the one month post-diagnosis and six months post-diagnosis.

- PVI was calculated using claims indicating visits to the following physician types:

- Urologist
  - Medical oncologist
- Radiation oncologist
  - Primary care physician (PCP)

### Calculation of the Physician Visit Index

- Derived from the Herfindahl Index.
- Ranges from 0-1.
- Measured by summing the squared shares of the patient's total physician visits for each physician type visited. See Table 1.

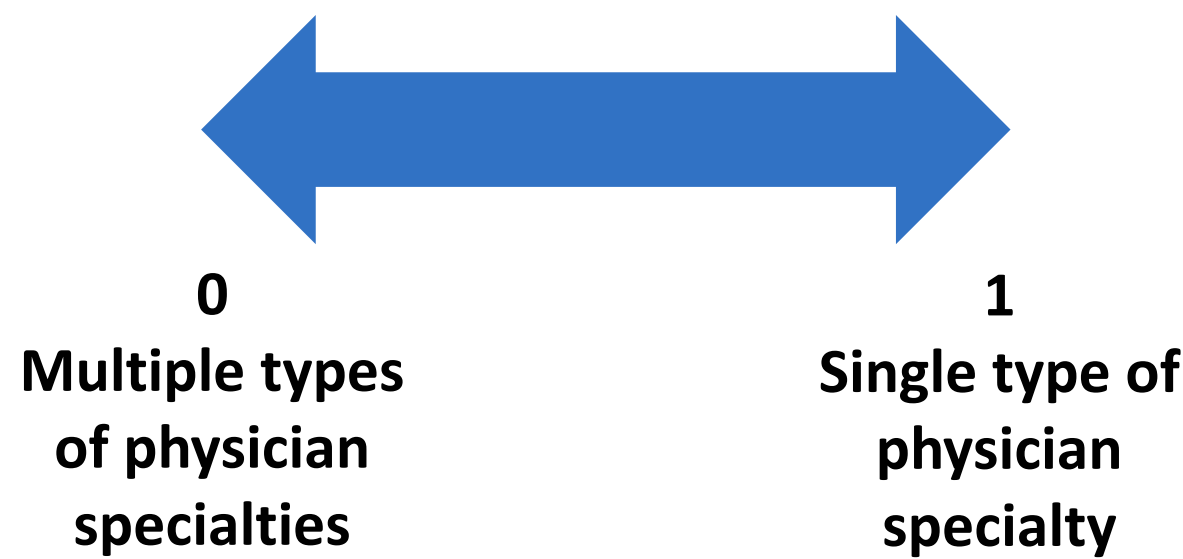


Table 1. Calculating the PVI

Visits	Patient A	Patient B
Urologist	2	3
Medical oncologist	2	0
Radiation oncologist	0	0
Primary care physician	2	3
No. of visits	6	6
PVI calculation	$(2/6)^2 + (2/6)^2 + (0/6)^2 + (2/6)^2 = 0.33$	$(3/6)^2 + (0/6)^2 + (0/6)^2 + (3/6)^2 = 0.50$

### Statistical Analysis

- We estimated a beta regression model to identify the clinical and demographic factors associated with a lower value of the PVI.

## Results

- The study sample included 9,826 men diagnosed with incident stage IV PCa, of whom 74% (N=7,301) had M1 disease.
- The mean age of the sample was 77 years. Additional descriptive statistics are provided in Table 2.
- The distribution of PVI values during one month post-diagnosis and six-months post-diagnosis are shown in Figure 1.

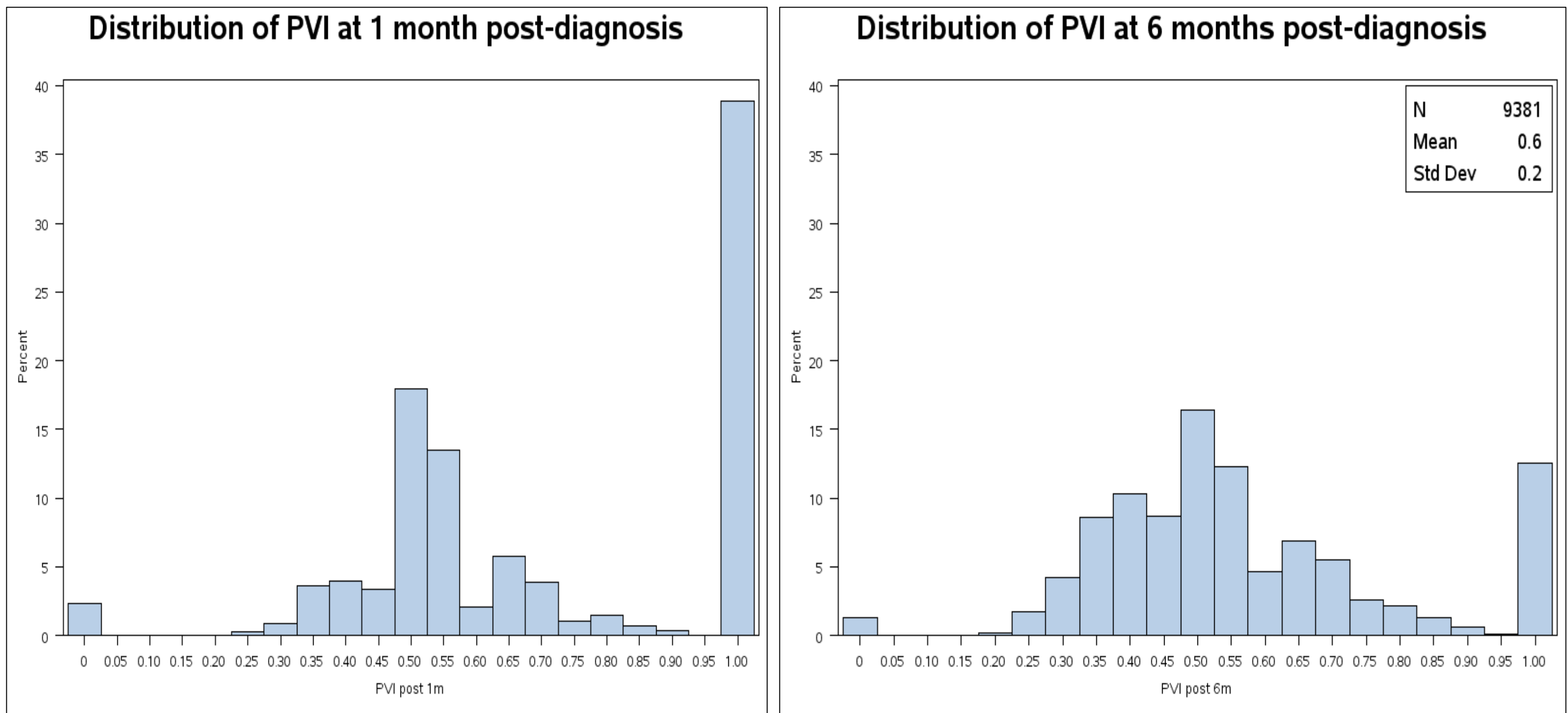
Table 2. Descriptive statistics for patients diagnosed with metastatic prostate cancer in 2000-2007 (N=9,826)

Variable	Full Sample (N=9,826)	N/Mean	%/S.D.
Physician Visit Index (PVI) (Mean, S.D.)			
0-1 month post-diagnosis		0.70	0.26
0-6 month post-diagnosis		0.57	0.22
Physician Visits (6m post-diagnosis)			
Urologist	8,137		82.8%
Medical oncologist	2,970		30.2%
Radiation oncologist	2,249		22.9%
Primary care physician	4,006		40.8%
Age			
66-69	1,896		19.3%
70-74	2,187		22.3%
75-79	2,044		20.8%
80-84	1,918		19.5%
85+	1,781		18.1%
Race			
White	8,087		82.3%
African American (AA)	1,291		13.1%
Non-White, non-AA	448		4.6%
Married	6,063		61.7%
Urban residence	8,707		88.6%
Poorly differentiated tumor	5,641		57.4%
Charlson Comorbidity Index			
Zero	5,720		58.2%
One	1,851		18.8%
Two or higher	1,394		14.2%
Missing	861		8.8%
Poor functional status proxy*	2,334		23.8%
Preventive services indicator**	6,513		66.3%

\* Poor functional status proxy is an indicator for any use of wheelchair, walking aid, oxygen, skilled nursing facility service, or hospitalization in the year prior to diagnosis.

\*\* Preventive services indicator is an indicator for any bone mineral density test, PSA test, colorectal cancer screening, preventive care visit, or flu shot in the year prior to diagnosis.

Figure 1. Distribution of physician visit index (PVI) values at 1 month post-diagnosis and 6 months post-diagnosis among patients diagnosed with metastatic prostate cancer in 2000-2007 (N=9,826)



## Results

- PVI varies with time and is lower when calculated over a longer post-diagnosis interval.
- Table 3 shows the impact of patient clinical and demographic factors on PVI at 1 month and 6 months post-diagnosis
- Based on a multivariable beta regression, an incident diagnosis of M1 PCa was associated with a decrease in the 6m PVI of 0.03 (95% CI: -0.04 to -0.02).
- The 6m PVI also was statistically significantly lower among individuals residing in an urban area, with a non-zero CCI score, or with prior use of preventive services compared to individuals in the reference categories.
- The PVI was statistically significantly higher among AA men, individuals above 85yrs, and individuals with poor functional status.

Table 3. Impact of patient clinical and demographic factors on PVI at 1 month and 6 months post-diagnosis among patients diagnosed with metastatic prostate cancer in 2000-2007 (N=9,826)

Variable	Model of PVI at 1 month		Model of PVI at 6 months	
	Direction of effect	p-value	Direction of effect	p-value
M stage				
M0	Reference		Reference	
M1	-	<0.01	-	<0.01
Age				
66-69	Reference		Reference	
70-74	-	0.29	-	0.26
75-79	-	0.11	-	0.46
80-84	-	0.14	-	0.86
85+	-	0.43	+	<0.01
Race				
White	Reference		Reference	
African American (AA)	-	0.58	+	<0.01
Non-White, non-AA	-	0.72	+	0.14
Marital status				
Not married	Reference		Reference	
Married	-	0.48	-	0.08
Urban residence	-	0.17	-	<0.01
Poorly differentiated tumor	-	0.34	-	0.07
Charlson Comorbidity Index (CCI)				
CCI Zero	Reference		Reference	
CCI One	-	<0.01	-	<0.01
CCI Two or higher	-	<0.01	-	<0.01
CCI Missing	-	<0.01	-	0.06
Poor functional status proxy*	-	0.01	+	0.05
Preventive services indicator**	+	<0.01	-	0.04
Presence of osteoarthritis	-	0.80	-	0.24
Presence of osteoporosis	+	0.34	+	0.11

Regression models also controlled for year of diagnosis and SEER registry.

## Conclusions

- The number of physician types seen following PCa diagnosis varies according to metastatic disease status as well as patient race and comorbidity status.
- Given the relationship between physician contact and treatment receipt, the downstream implications of these clinical and demographic differences in PVI score are worth further investigation.

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