

# Prescribing Patterns Among Radiation Oncologists in the United States

Bethel Adefres<sup>1</sup>, Tina Q. Huang<sup>1</sup>, Eric M. Chang<sup>2</sup>, and Ann Raldow<sup>2</sup>

<sup>1</sup>David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA

<sup>2</sup>Department of Radiation Oncology, University of California Los Angeles, Los Angeles, CA



David Geffen  
School of Medicine

UCLA Health

## PURPOSE/OBJECTIVE(S)

Radiation oncologists (ROs) are a diverse group of physicians who play an important role in the pharmacologic management of cancer and treatment-related side effects.

A large portion of cancer patients in the United States (US) are older; by the year 2040, 73% of cancer survivors are expected to be 65 years old and older.<sup>1</sup>

Given the concern for medication safety for older adults,<sup>2</sup> understanding variation in prescribing patterns is essential to improving healthcare delivery.

We sought to identify the most common classes of drugs prescribed by ROs and whether certain physician characteristics could predict prescribing behavior within these top prescribed classes of drugs

## MATERIAL & METHODS

Data for ROs were extracted from the 2017 Medicare Part D Prescriber Data file, and using National Provider Identifiers, linked with the 2017 Medicare Physician Compare National Downloadable File.

We categorized the drugs by class and identified the most common drug classes prescribed by ROs.

The physician characteristics explored included: sex, years since medical school graduation, group practice size, and geographic location.

The association between number of prescriptions per RO and demographic characteristics of ROs was assessed via two-sample t-test or one-way analysis of variance (ANOVA) when appropriate.

Multivariable linear regression was performed to further evaluate the relation between number of prescriptions and these factors.

## RESULTS

- The total number of prescriptions per physician (Table 1) was significantly ( $p<0.001$ ) associated with sex ( $109.3 \pm 240.3$  male vs.  $73.1 \pm 244.7$  female), years since graduation ( $46.6 \pm 45.1$  1-10 years vs.  $92.5 \pm 204.9$  11-24 years vs.  $117.5 \pm 283.1$   $\geq 25$  years), and region ( $87.8 \pm 170.5$  Midwest vs.  $72.7 \pm 83.2$  Northeast vs.  $138.4 \pm 361.1$  South vs.  $78.4 \pm 93.8$  West).
- On multivariable linear regression modelling, male sex ( $\beta$  28.07,  $p<0.01$ ), years since graduation ( $\beta$  1.38,  $p<0.001$ ) and practice in South region ( $\beta$  55.67,  $p<0.001$ ) compared to Northeast region were predictive for total number of prescriptions (Table 2).
- Among all drug classes, alpha 1-adrenergic blocking agents, opioid analgesics and glucocorticoids were the top three most frequently prescribed classes (Table 3).
- On multivariable analyses for the top 10 drug classes, practice in the South region was predictive with 5 drug classes, years since medical school graduation with 4 drug classes and male sex with 1 drug class only.

Table 2. Multivariable linear regression of total Medicare Part D drug prescription per radiation oncologist

Provider characteristics	Regression coefficients ( $\beta_n$ )	Standard error	t-value	Pr(> t )
Intercept ( $\beta_0$ )	18.43	16.17	1.14	0.25
Male vs Female	28.07	10.72	2.62	<b>&lt;0.01</b>
Years since medical school graduation	1.38	0.40	3.42	<b>&lt;0.001</b>
Practice group size	0.00	0.00	-0.91	0.36
Region				
Midwest vs Northeast	11.98	13.66	0.88	0.38
South vs Northeast	55.67	12.58	4.42	<b>&lt;0.001</b>
West vs Northeast	6.51	13.79	0.47	0.64
P-values for main effects are bolded				

Table 1. Participant Characteristics (n=2941) and total prescription behavior, stratified by provider characteristics

Characteristics	Category	No., (%)	Mean drugs prescribed (SD)	P-value
Sex	Female	633 (21.5%)	73.1 (244.7)	<b>&lt;0.001</b>
	Male	2308 (78.48%)	109.3 (240.3)	
Years since medical school graduation	1-10	248(8.4%)	46.6 (45.1)	<b>&lt;0.001</b>
	11-24	1161 (39.5%)	92.5 (204.9)	
	$\geq 25$	1513 (51.4%)	117.5 (283.1)	
	NA	19 (0.6 %)		
Number of members in practice	$\leq 10$	750 (25.5%)	108.6 (272.3)	0.22
	11-49	495 (16.8%)	101.8 (135.3)	
	50-99	235 (8.0%)	81.0 (98.9)	
	$\geq 100$	1293 (44.0%)	89.8 (255.0)	
Region	NA	168 (5.7 %)		<b>&lt;0.001</b>
	Midwest	662 (22.5%)	87.8 (170.5)	
	Northeast	550 (18.7%)	72.7 (83.2)	
	South	1080 (36.7%)	138.4 (361.1)	
	West	649 (22.1%)	78.4 (93.8)	
Abbreviation: NA, not applicable; SD, standard deviation P-values for main effects are bolded				

Table 3. Top 10 Medicare Part D drug class by number of prescribing radiation oncologists in 2017

Rank	Drug class	Frequency of prescribers
1	Alpha-adrenergic blockers	2096
2	Opioid analgesics	2049
3	Glucocorticoids	1225
4	Antibacterial agents	996
5	Local anesthetics	719
6	Hormonal agents	510
7	Antifungal agents	398
8	Benzodiazepine derivative sedatives/hypnotics	386
9	Anticonvulsants	243
10	Antidepressants	235

## SUMMARY/CONCLUSION

- We found ROs' sex (male), years since graduation and region of practice (South vs Northeast) to be predictors of total number of drug prescriptions for entire cohort as well as among the top classes of drugs.
- These findings can be used to inform future interventions to improve efficiency and appropriateness of drug treatment for cancer patients in the US.

## REFERENCES/ACKNOWLEDGEMENTS

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