

# Prostatic Diseases and Male Voiding Dysfunction

## Extreme Price Variation for Generic Benign Prostatic Hyperplasia Medications



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<b>OBJECTIVE</b>	To characterize geographic variability of generic benign prostatic hyperplasia (BPH) medications in order to improve drug price transparency and improve patient access to affordable medication sources. This is of interest because BPH is one of the most common chronic diseases in men and contributes to individual healthcare cost. Medical therapy is the main treatment modality for BPH, burdening patients with lifelong medication expenses which may impact adherence and subsequent outcomes. With an aging population, this is compounded by many older individuals requiring multiple daily medications.
<b>METHODS</b>	All pharmacies within a 25-mile radius of our institution were identified and classified as chain, wholesale or independent. The out-of-pocket price for a 30-day supply of tamsulosin (0.4 mg), finasteride (5 mg), oxybutynin (5 mg TID), and oxybutynin 10 mg XL were obtained using a scripted telephone survey. Multivariable linear regression assessed the association between census-tract level demographic and socioeconomic factors and disparate generic out-of-pocket drug-pricing.
<b>RESULTS</b>	The response rate was 93% with 255 pharmacies across 173 census tracts providing data. By pharmacy type, there was up to 5.5-fold variation in median out-of-pocket drug prices for the most common BPH medications. Demographic and socioeconomic factors were not significantly associated with generic BPH drug price variation.
<b>CONCLUSION</b>	The out-of-pocket price of generic medications for BPH varies significantly between pharmacies in a geographically-confined area. This study highlights the need for quality improvement initiatives that empower patients to price-compare and improve drug price transparency. UROLOGY 124: 223–228, 2019. © 2018 Elsevier Inc.

Benign prostatic hypertrophy (BPH) is the fourth most common chronic disease in aging men with approximately 40% of men over 60 years experiencing moderate-to-severe lower urinary tract symptoms.<sup>1,2</sup> The development of highly effective medications for BPH-related lower urinary tract symptoms has resulted in a paradigm shift, where medical therapy has supplanted surgical intervention as the initial management of this condition.<sup>3,4</sup> This can create significant financial strain on aging patients who face lifelong medication costs. While generic medications may ease the financial burden, insurance coverage is variable while the prices of prescriptions have been steadily increasing.<sup>5</sup>

One consequence of high medication prices is prescription nonadherence. Up to one-third of adults in the United States reported not filling a prescription or skipping medication doses due to cost in 2016.<sup>6</sup> This is detrimental because medication nonadherence for chronic conditions results in poorer health outcomes compared to medication-compliant patients.<sup>7-10</sup> Individuals may have to decide whether to pay for their prescription medications or for basic necessities such as food, housing, or utilities.<sup>11</sup> These issues may be compounded by some evidence pointing to higher drug costs in lower income areas.<sup>12</sup> Despite this dilemma, few patients compare prices when paying for medications<sup>13</sup> and it is only now becoming evident that prices for prescription medications may vary greatly within a restricted geographic area.<sup>12,14,15</sup>

Several studies have reported impressive variation in the cost of medications across pharmacies in close vicinity,<sup>12,14,15</sup> however, no such study has been conducted with a focus on urologic or BPH medications. Characterizing and understanding price variability for these medications

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could allow urologists to counsel patients on limiting out-of-pocket costs and thus improve compliance and health outcomes. We sought to measure the out-of-pocket price variation for different generic BPH and overactive bladder medications across pharmacies in Pittsburgh and the surrounding metropolitan region.

## METHODS

We identified all pharmacies within a 25-mile radius of our institution using a publicly available service powered by Google called MedImpact.<sup>16</sup> Each pharmacy was called by a single investigator using a script (Supplementary Figure 1) to determine the out-of-pocket price (ie price paid by an uninsured or cash-paying patient) of a 30-day prescription of: tamsulosin 0.4 mg daily, finasteride 5 mg daily, oxybutynin 5 mg immediate release TID, and oxybutynin extended release 10 mg XL. We chose these 4 medications because they represent the most commonly prescribed medications for patients with BPH at our institution and all exist in generic formulation. All calls were completed between February and April, 2017.

Socioeconomic and demographic information for each pharmacy's census tract was obtained using the American Community Survey 5-year estimates. The American Community Survey 5-year estimates were used rather than the 1-year estimates because 5-year data perform better when studying smaller populations and geographic areas.<sup>17</sup> Data collected included size of the census tract, population size, median age, median household income, percent male, race breakdown, percent below the poverty line, percent married, education level, and Diez Roux Neighborhood Score (composite score of 6 factors: median household income, home value, percent of adults that completed high school, percent of

adults that completed college, households with investment income, and percent of adults employed in professional occupations; the score represents the variation from the mean of all areas, with positive scores indicating more affluent areas and negative scores indicating less affluent areas).<sup>18</sup> For the purpose of comparing price, pharmacies were classified into 1 of 3 groups as shown in Table 1—chain, independent, or wholesale.

## Statistical Analysis

Median drug prices were compared across pharmacy type. Univariate regressions were performed to test for significant associations between socioeconomic and/or demographic variables and drug price. Due to the consistent association between pharmacy type and drug price, multivariable regression models were also created to investigate the association between each of socioeconomic and/or demographic variables and drug price, while adjusting for pharmacy type. Since the drug price violated the normality assumption required for standard linear regression, we used Bootstrap method to calculate valid *P* values that do not depend on the outcome distribution. All analyses were carried out using Stata/SE 15.1. and *P* value <.05 was considered statistically significant. Pharmacy locations were geocoded using R 3.4.4 and *ggmap*,<sup>19,20</sup> and choropleths were created using 2017 U.S. Census TIGER/Line shapefiles and QGIS.<sup>21</sup>

## RESULTS

A total of 255 pharmacies spanning 6 counties and 173 census tracts were included. The distribution of pharmacy types was 165 chain, 84 independent, and 6 wholesale (Table 1). Demographic and socioeconomic data for the census tracts is shown in Table 2, with most having a population of 3400 with median

**Table 1.** Descriptive data of pharmacies and medication prices

Pharmacy Data	Variable	Number (%) or Median Price \$ [IQR]	
Type of pharmacy	Chain	165 (65%)	
	Wholesale	6 (2%)	
	Independent	84 (33%)	
	Pharmacy	Chain	
		Rite aide	70 (27%)
		Giant eagle	36 (14%)
		CVS	25 (10%)
		Walgreens	16 (6%)
		Target	9 (4%)
		Wal-Mart	5 (2%)
Wholesale	Kmart	4 (2%)	
	Sam's club	4 (2%)	
	Costco	2 (1%)	
	Independent		
	All independent pharmacies	84 (33%)	
County	Allegheny	218 (85%)	
	Westmoreland	17 (7%)	
	Washington	10 (4%)	
	Beaver	6 (2%)	
	Butler	2 (1%)	
	Armstrong	2 (1%)	
	Medications	Tamsulosin	87 [21, 102]
Finasteride		82 [17, 83]	
Oxybutynin (5 mg TID)		49 [11, 54]	
Oxybutynin XL (10 mg)		85 [53, 95]	

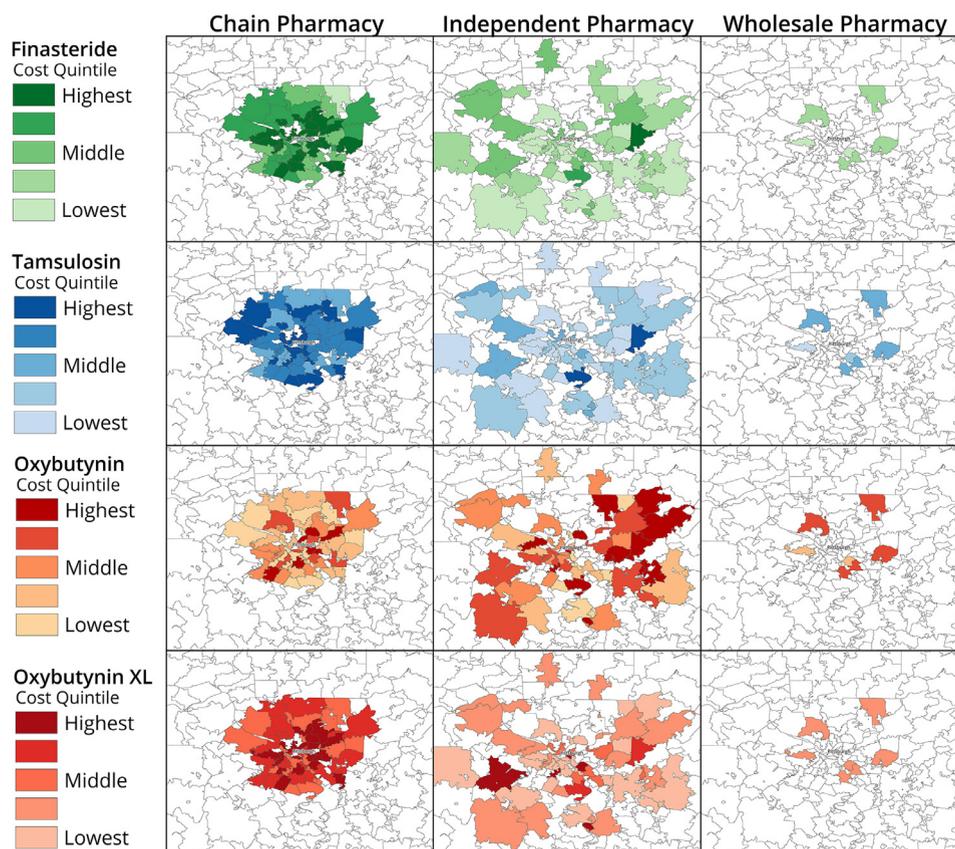
IQR, interquartile range, mg, milligrams.

**Table 2.** Descriptive data for census tracts

Census Tract Data	Variable	Number (%) or Median [IQR]
Pharmacies per census tract (n = 173 census tracts)	1 pharmacy	110 (64%)
	2 pharmacies	46 (27%)
	3 pharmacies	15 (9%)
	4 pharmacies	2 (1%)
Census tract characteristics	Pharmacies per square mile	1.4 [0.6, 3.0]
	Diez Roux neighborhood score	0.48 [-1.98, 3.97]
	Size (square miles)	1 [0.4, 2.3]
	Population (K)	3.4 [2.3, 4.6]
	Median age	43 [38, 46]
	Median household income (K)	52 [39, 64]
	% Male	48 [46, 50]
	% White	87 [75, 94]
	% Black	4 [1, 12]
	% Hispanic	1 [1, 2]
	% Single	53 [44, 61]
	% High school or higher	94 [91, 96]
	% Bachelors or higher	31 [22, 45]
% Below poverty line	11 [6, 19]	

IQR, interquartile range, K, in thousands.

### Generic Drug Price Variation for BPH Treatment Among Pharmacies



**Figure 1.** Descriptive data of pharmacies and medication prices. (Color version available online.)

age 43, and median income of \$52,000 per year, 48% male and 87% white.

Overall, the median price for a 30-day prescription of tamsulosin, finasteride, oxybutynin immediate release and oxybutynin XL was \$87, \$82, \$49, and \$85, respectively. There was wide

variability in drug prices across the 25-mile radius (Fig. 1). There was significant variation in drug prices by pharmacy type for tamsulosin, finasteride, and oxybutynin XL (tamsulosin [chain \$91, wholesale \$32, independent \$17,  $P = .0001$ ], finasteride [chain \$83, wholesale \$18, independent \$15,  $P = .0001$ ], oxybutynin

**Table 3.** Comparison of median drug prices by pharmacy type

Medication	Price at Chains (\$) Median [IQR] (n = 165)	Price at Wholesale (\$) Median [IQR] (n = 6)	Price at Independent (\$) Median [IQR] (n = 84)	P value <sup>†</sup>
Tamsulosin	91 [87, 102]	32 [19, 34]	17 [12, 23]	0.0001*
Finasteride	83 [82, 84]	18 [12, 18]	15 [10, 20]	0.0001*
Oxybutynin (5 mg TID)	54 [11, 54]	49 [33, 51]	45 [35, 55]	0.32
Oxybutynin (10 mg XL)	94 [85, 99]	56 [53, 61]	38 [30, 52]	0.0001*

IQR, interquartile range.

\*  $P < .001$ .

<sup>†</sup> Kruskal-Wallis equality-of-populations rank test.

XL [chain \$94, wholesale \$56, independent \$38,  $P = .0001$ ] (Table 3).

Independent pharmacies offered the lowest prices while chain pharmacies charged the highest prices. Specifically, there was a 5.4-fold difference in the median drug prices for tamsulosin between independent and chain pharmacies. In addition, there was a 5.5-fold difference in the median drug prices for finasteride between independent and chain pharmacies. Lastly, there was 2.5-fold difference in oxybutynin XL between these 2 pharmacy types (Supplementary Figure 2).

Multivariable linear regression including pharmacy type and other socioeconomic factors revealed that the type of pharmacy is the only consistent factor significantly associated with variation in out-of-pocket BPH drug prices (Supplementary Table 1).

## DISCUSSION

We found marked variation in the out-of-pocket prices for generic BPH and overactive bladder medications across pharmacies in close proximity. Chain pharmacies charged on an average 500% more for a 30-day prescription of tamsulosin and finasteride compared to independent pharmacies. In addition, chain pharmacies charged approximately 250% more for a prescription of oxybutynin XL compared to independent pharmacies. There was not a significant difference in the cost of oxybutynin immediate release across pharmacies. This may be because there are fewer companies manufacturing this medication which can result in less competition to drive price variability as well as lower demand for the product due to many substitutes that now exist. We did, however, find substantial and large variation in the prices for the other 3 medications consistent with other studies in nonurologic conditions, but to a much larger magnitude than previously reported.

Several other studies in nonurologic diseases also found price differences in generic drugs. The New York City Council found variation in the cost of 30-day prescriptions of 5 different medications (Lipitor, Prevacid, Norvasc, Allegra, and Celebrex) within and among the boroughs in New York.<sup>15</sup> Across all boroughs there ranged a 9%-60% difference between the highest and lowest prices for these prescriptions, and chain pharmacies charged higher prices than independent pharmacies. Hauptman et al<sup>14</sup> compared prices for both 30- and 90-day prescriptions of 3 different heart failure medications spanning 55 ZIP codes and 2 states. They found up to 33-fold difference in

the combined price of the medications across pharmacies, but price was not associated with ZIP code, median income of ZIP code, or pharmacy type as in our study. Lastly, a Florida-based study evaluated the price of a 30-day prescription of 3 brand name medications (Plavix, Advair, and Nexium).<sup>12</sup> They found that the ZIP codes in the lowest income areas had the highest populations and fewest number of chain pharmacies. Further, ZIP codes in lower income areas had the highest medication costs (9% above state average) and this was largely driven by independent pharmacies which were charging 15% higher rates for these medications than the national average.

Lower income areas often face higher prices for goods and services, a concept that has been dubbed America's "poverty tax"<sup>22</sup>; we could not confirm this finding in our study (Supplementary Table 1). A study from the Brookings Institute found that low income individuals pay more for food, housing, utilities, and transportation than their higher income counterparts. Also, lower income individuals are much less likely to shop for goods because of constraints on transportation.<sup>23</sup> We did not find that a census tract's median income was predictive of drug prices, but rather, pharmacy type was the sole and strongest predictor of variability in medication costs.<sup>24</sup>

The solutions to combat this pricing variability seem obvious but are in fact more elusive than most casual readers would anticipate. Lack of transparency in medication pricing has become a subject of criticism and lies at the heart of the problem. Many times, there is actual legislation that bars pharmacists from telling patients about lower prices for the drugs they seek. Articles in Bloomberg<sup>25</sup> and the New York Times<sup>26</sup> have shed light on contract-specific restrictions that some pharmacists face prohibiting them from discussing cheaper price options with their patients. Specifically, some medications may be cheaper if bought out-of-pocket when compared to their insurance copayment, but this information is rarely shared. Further, financing and distributing medications in the United States is highly complex and involves many different players including manufacturers, distributors, payers, pharmacy benefit managers, and patients; all of which add layers to this apparently incomprehensible scheme.<sup>24</sup>

There are other barriers to combating the pricing variability we have found. The ability of patients to compare prices may be limited due to economic

hardship, poor health literacy, or transportation challenges. Thus, interventions aimed at informing patient choice may be most productive at limiting medication nonadherence, and the resultant detrimental health consequences, that stem from unaffordability. Specifically, patients should be counseled on the utility of price-comparing for prescriptions with high out-of-pocket costs.

One unanticipated and unintended barrier to patient's searching for the best medication prices in the increased use of the electronic medical record to send virtual prescriptions to an individual pharmacy. Patients are much less likely to price-compare without a physical script in hand, especially if their prescription is ready for pick-up at their familiar pharmacy. One potential solution would be physicians identifying a number of pharmacies around town or their hospital that offer the lowest prices and offer to electronically prescribe to those low-price pharmacies. This would save patients the hassle of price-comparing, while also limiting wait time at the pharmacy, and still offers the best price. This concept is the focus of small startup in San Francisco who has partnered with Gemini Health to help doctors' price-compare prior to prescribing medications.<sup>27</sup>

Our study has several limitations. First, we only included pharmacies within a 25-mile radius and did not include mail-order pharmacies. However, the purpose of this study was to characterize medication variability within a geographically confined area which this study highlights. Another limitation is that the demographic and socioeconomic data from the American Community Survey for each census tract has approximately a 10% margin of error, however, this is the best data available to study geographical areas this small in size. Also, our study only collected information on the theoretical prices charged to patients, not the prices actually paid by a patient. Several larger and chain pharmacies offer a variety of discount cards which may help lower the cost of these prescriptions, however, it was not possible to gather that data without a physical prescription in hand at each of the pharmacies visited. Lastly, when testing for demographic and socioeconomic predictors of drug price, we could not account for the patients that travel outside of their census tract to buy medications.

Despite these limitations, our study highlights some important findings. The out-of-pocket price of generic medications for BPH varies substantially between pharmacies in a geographically-confined area by as much as 500%. Independent and wholesale pharmacies seem to offer the lowest cash prices to customers. No socioeconomic factors were consistently predictive of medication cost. This study highlights the need for future policy creation surrounding transparency in drug-pricing as well as the importance of patient counseling to shop-around for the lowest costs when paying for these medications out of pocket.

## SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.urology.2018.10.020>.

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Studies in other fields have demonstrated similar variations in prices for generic drugs.<sup>3</sup> These findings have considerable implications for patients, especially those in low-income areas and those who may not be able to travel to multiple pharmacies. Indeed, it is not clear how well equipped patients are to "price shop" and if physicians and electronic medical records create further barriers to finding the most affordable retailers.<sup>4</sup> The data presented in this paper will help raise awareness of this issue within urology and motivate us to guide patients to lower cost pharmacies. While policy solutions for high drug prices are often debated, they are uncertain. For now, a physician recommendation to find an independent pharmacy and to call to inquire about price may be the simplest way to reduce financial burden for patients and improve medication adherence.

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## EDITORIAL COMMENT



The rising cost of prescription drugs is of increasing interest to policymakers, patients, and the general public. As blockbuster new drugs are known to be expensive, the timely availability of generic drugs and encouraging their use are important strategies to keep drug costs in check.<sup>1,2</sup> High prices for generic medications, therefore, are particularly vexing. The authors of this study examined the variation in price for generic medications commonly used in the management of benign prostatic hyperplasia. By calling all pharmacies in a restricted geographic area around Pittsburgh, the authors determined the out of pocket prices that would be quoted to a patient without prescription drug insurance. They found that the price of tamsulosin, finasteride, and extended release oxybutynin varied by up to 500% between pharmacies. Chain pharmacies (eg, CVS, Walgreens) were significantly more expensive than independent pharmacies for each of these drugs.

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