Title
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Journal
The Laryngoscope, 127(8)

ISSN
0023-852X

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Publication Date
2017-08-01

DOI
10.1002/lary.26479

The Laryngoscope

Price Variation in the Most Commonly Prescribed Ear Drops in Southern California

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Objectives/Hypothesis: To evaluate the variability and discrepancies among the most commonly prescribed ear drops sold at pharmacies in southern California.

Study Design: Prospective study evaluating 11 commonly used ear drops to treat otologic disorders.

Methods: Randomly selected drug stores in three major counties in Southern California (Los Angeles, Orange, and San Diego) were included. Mean, range, minimum, and maximum prices for each drug were calculated and analyzed. The median income of pharmacy ZIP code was also cross-referenced.

Results: Data were collected from 108 pharmacies. The mean prices are noted for each of the individual drugs: Cortisporin (brand) 10 mL, $82.70; neomycin, polymyxin B sulfates, and hydrocortisone (Cortisporin–generic) 10 mL, $34.70; ofloxacin (generic) 10 mL, $99.95; sulfacetamide (generic) 15 mL, $40.18; Ciprodex (brand) 7.5 mL, $194.44; Cipro HC (brand) 10 mL, $233.32; Vosol (brand) 15 mL, $120.75; acetic acid (Vosol–generic) 10 mL, $116.55; VosolHC (brand) 10 mL, $204.14; acetic acid/aluminum acetate (Domeboro–generic) 60 mL, $22.91; and Tobradex (brand) 5 mL, $166.47.

Conclusions: There is significant variability among the prices of ear drops across Southern Californian pharmacies, which can be a financial burden to patients paying out of pocket or with high deductibles. A state-mandated, publically accessible report of drug prices may help decrease variability and cost by promoting competition among pharmacies. Price negotiations by governmental payers may assist in reducing prices. In the treatment of otologic disorders, clinicians can help reduce costs for patients by prescribing generic ear drop medications and cheaper alternatives when clinically appropriate.

Key Words: Ear drop, otic drop, pharmacy, price variation, ototopic.

Level of Evidence: 4.

***Laryngoscope*, 127:1780–1784, 2017**

INTRODUCTION

Variation in the price of prescription medications is common and can be attributed to the lack of price fixation or regulations in the United States. Many pharmaceuticals in the United States are purchased by pharmacy benefit administrators that use their market power to negotiate better prices for managed care organizations.[1,2] As a result, the usual and customary price, or the price that consumers would pay without insurance, is determined at the level of individual pharmacies and is influenced by prices set by the manufacturer, wholesaler, or direct purchaser. As such, these prices are ultimately driven by supply and demand.[3]

The uninsured are especially vulnerable to high retail prices, and the economic burden of medication costs most frequently impacts the low-income and elderly populations who resort to self-restriction of medications to save money, potentially leading to long-term health implications.[4,5] In 2010, 48% of those uninsured and in poor health went without prescription drugs as a direct result of cost.[6] One study showed that lowering the copayment for lipid-lowering drugs, for example, increased drug compliance, highlighting the importance of medication cost in patient adherence.[7]

Patients with insurance can also be vulnerable to high prescription drug prices. Since the implementation of the Patient Protection and Affordable Care Act in 2010, an estimated additional 10.2 million consumers are receiving coverage as of 2015.[8] Nationwide, patients who obtained health insurance through the federal and state marketplaces were responsible for deductibles for prescription drug coverage ranging from 17% to 97% for platinum to catastrophic plans, respectively.[9] The average deductible for generic medications for patients with this high deductible coverage is $13, lower than the $44 for preferred brand name drugs.[9] Those with employer-based insurance had similar out of pocket medication costs, with an average of $11 for generics and $31 for preferred brand name drugs.[10]

The differences in prices between various pharmacies make it difficult for the uninsured or those with high

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Editor's Note: This Manuscript was accepted for publication November 28, 2016.

Abstract presented at Triological Society Combined Sections Meeting, Miami Beach, Florida, U.S.A., January 22–24, 2016.

The authors have no funding, financial relationships, or conflicts of interest to disclose.

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DOI: 10.1002/lary.26479

TABLE I.
Price Breakdown of the Top 11 Most Prescribed Ear Drops.

Drug name	No. of Prices Obtained*	Average	Maximum	Minimum	Range	Standard Deviation
Cortisporin (brand) 10 mL	16	$82.70	$105.00	$49.96	$55.04	$15.81
Neomycin, polymyxin B sulfates, hydrocortisone (Cortisporin–generic) 10 mL	82	$34.70	$44.00	$25.00	$19.00	$5.09
Ofloxacin (generic) 10 mL	85	$99.95	$174.00	$15.00	$159.00	$50.06
Sulfacetamide (generic) 15 mLl	92	$40.18	$100.00	$9.00	$91.00	$20.49
Ciprodex (brand) 7.5 mL	90	$196.28	$281.32	$107.00	$174.32	$28.40
Cipro HC (brand) 10 mL	75	$233.32	$299.99	$112.37	$187.62	$ 35.34
Vosol (brand) 15 mL	36	$120.75	$274.00	$25.00	$249.00	$89.35
Acetic acid (Voso–generic) 10 mL	43	$116.55	$226.60	$34.99	$191.61	$64.25
Vosol HC (brand) 10 mL	64	$204.14	$300.48	$94.00	$206.48	$ 39.53
Acetic acid/aluminum acetate (Domeboro–generic) 60 mL	56	$22.91	$94.60	$4.60	$90.00	$20.66
Tobradex (brand) 5 mL	67	$166.47	$338.00	$44.00	$294.00	$58.67

*Not all pharmacies carried every drug.

deductibles to obtain the best price without spending a significant amount of time comparing prices. When the lowest possible price is not attainable, essential income is lost, adding to the economic burden of a population most sensitive to cost fluctuations. Due to the impact of medication price on patient compliance, we sought to evaluate the cost of ototopical drops, a medication commonly prescribed by otolaryngologists. The purpose of this study was to evaluate the variability and discrepancies among the most commonly prescribed otic preparations in Southern California pharmacies, and to assist clinicians in prescribing less expensive alternative ear drops when clinically appropriate.

MATERIALS AND METHODS

This cross-sectional study assessed 11 of the most commonly prescribed ear drops used to treat various otologic disorders in August 2014. A list of state-licensed pharmacies was obtained from the California State Board of Pharmacy website (http://www.pharmacy.ca.gov/) and chosen by computer randomization within three major locations in southern California, including Orange County, San Diego County, and Los Angeles County. All inpatient pharmacies were excluded. Data were collected over the course of 1 month; each pharmacy was contacted by phone about the cash drug price, excluding any coupons or discounts for each of the 11 medications. Up to three phone calls were made to each pharmacy to obtain all drug prices. Additionally, medications that were outliers were confirmed with a repeat phone call at a later day to confirm accuracy. Some of the drops for which prices were obtained were for ophthalmologic preparation, which are commonly used in the ear. Coupons were also excluded. The list of medications collected included Cortisporin (brand) 10 mL, neomycin-polymyxin B sulfates-hydrocortisone (Cortisporin–generic) 10 mL, ofloxacin (generic) 10 mL, sulfacetamide (generic) 15 mL, Ciprodex (brand) 7.5 mL, Cipro HC (brand) 10 mL, Vosol (brand) 15 mL, acetic acid (Vosol–generic) 10 mL, VosolHC (brand) 10 mL, acetic acid-aluminum acetate (Domeboro–generic) 60 mL, and Tobradex (brand) 5 mL. Pharmacies included national retail chain pharmacies in addition to independent pharmacies. In 2014, an estimated 57% of prescriptions were dispensed at national retail chain stores. Thus, we chose to include a representative sample of 60 chain pharmacies in this study, comprising 56% of our dataset.[11]

The median income bracket for residents living in each ZIP code was chosen to represent the income bracket for each of the pharmacy locations. Income data were retrieved from the office of Internal Revenue Service according to 2013 data. ZIP code–level census data were used to represent an area-based measure of socioeconomic status.[12] The median income of each ZIP code was divided into four categories: $1 to $25,000, $75,000 to $100,000; $50,000 to $75,000, and $25,000 to $50,000. Big chain pharmacies were defined to include the following: CVS, Walgreens, Rite Aid, Von's, Sav-On, Target, Walmart, and Costco, with the rest being considered as independent.

The mean drug prices for the 11 drops were calculated using PASW Statistics 18.0 software (IBM, Armonk, NY). One-way analysis of variance (ANOVA) was used to compare medication costs to the ZIP code income bracket of the pharmacy's location. Additionally, ANOVA testing was performed for each individual drug among the three counties (San Diego, Orange, Los Angeles) as a means of comparing drug prices across counties. Independent sample t tests were used to compare ear drop prices between small and big chain pharmacies. A P value of $<.05$ was considered statistically significant.

RESULTS

The average price, minimum/maximum price, range, and standard deviation of the 11 most commonly prescribed ear drops are shown below in Table I. Prices ranged from $4.60 for generic acetic acid-aluminum acetate 60 mL (Domeboro–generic) to $338.00 for brand Tobradex (5 mL). The price range for any single ear drop was lowest for neomycin, polymyxin B sulfates, and hydrocortisone (Cortisporin–generic) at $19.00 and highest for brand Tobradex at $294.00.

Average prices of the ear drops were also stratified according to ZIP code income (Table II). Ear drop prices were determined to be lowest in the highest-income ZIP code and highest in low-income neighborhoods as depicted in Figure 1. One-way ANOVA statistical testing was performed to assess the relationship between the average

TABLE II.
Price Breakdown by Average Income of Pharmacy ZIP Code.

	Income Bracket			
	$1–$25,000	$25,000–$50,000	$50,000–$75,000	$75,000–$100,000
Cortisporin (brand) 10 mL	$87.70	$121.26	$79.48	$92.80
Cortisporin (generic) 10 mL	$35.79	$67.99	$54.52	$35.46
Floxin (generic) 10 mL	$97.76	$193.11	$177.63	$93.53
Sulfacetamide (generic) 15 mL	$51.52	$68.22	$59.09	$55.20
Ciprodex (brand) 7.5 mL	$186.97	$384.27	$345.20	$203.73
Cipro HC (brand) 10 mL	$213.85	$461.52	$375.90	$242.98
Vosol (brand) 15 mL	$105.60	$207.68	$262.40	$131.00
Vosol (generic) 10 mL	$101.50	$221.25	$160.00	$132.00
Vosol HC (brand) 10 mL	$213.75	$381.23	$338.09	$197.00
Domeboro (generic) 60 mL	$25.51	$42.61	$20.29	$45.50
Tobradex (brand) 5 mL	$172.58	$323.18	$191.20	$129.31
No. of pharmacies	28	59	13	5
Average price	$121.72	$119.42	$105.24	$100.46

drug prices across pharmacies located in ZIP codes within the same income bracket. The analysis shows statistical significance for two drugs: sulfacetamide (generic) (P = .003), and Cipro HC (brand) (P = .032), demonstrating that the prices of these two medications vary across pharmacies located in different median incomes. When comparing drug prices across the three counties, ANOVA testing demonstrated statistical significance for the following drugs; sulfacetamide ($40.58, $49.52, $25.74; $P \leq$ .001), Vosol HC ($180.57, $209.49, $216.59; P = .008), and Tobradex ($142.50, $163.56, $191.56; P = .022) for San Diego, Los Angeles, and Irvine respectively. Independent sample t tests between big chain and small chain pharmacies showed significance for Floxin (small chain cheaper by $33.19; P = .005), sulfacetamide (small chain more expensive by $22.67; P = .001), VosolHC (small chain cheaper by $21.81 ($P$ = .002), and Tobradex (small chain cheaper by $40.25; P = .024).

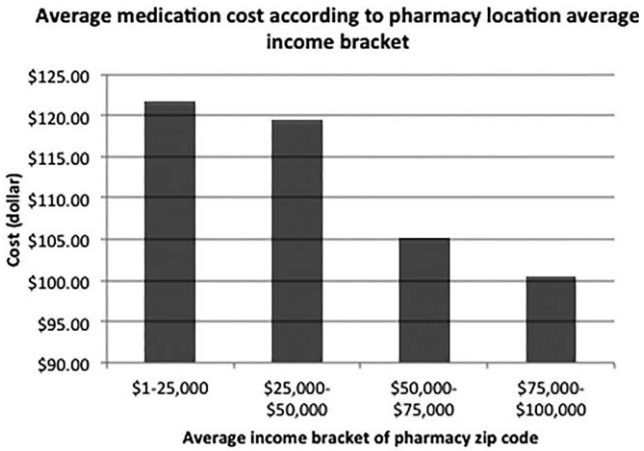

Fig. 1. Graph of the average price according to average income bracket of pharmacy ZIP code.

DISCUSSION

Our study demonstrated wide variation in prices among the most commonly prescribed ear drops with the lowest price variation of a single drug for generic Cortisporin ($74.00) and highest for brand Tobradex ($294.00). Consumers face many options in choosing from which pharmacy to buy, especially in the densely populated areas of Southern California. The three counties sampled compose 42.7% of the entire California population and represents 12.1% of the United States population.[13]

Pharmaceuticals have been reported to engage in price discrimination on an international level.[14] Drug prices tend to be higher in higher-income countries, despite no difference in manufacturing or distribution costs.[15] This phenomenon is seen in the United States, where the prices of brand name drugs are 35% to 55% higher compared to prices in developed countries.[16] Within California, our study shows variation in retail pricing between different ZIP codes of the same income bracket, with significant variation found in two medications, sulfacetamide and Cipro HC. In our study, higher-income ZIP codes had lower average ear drop prices (Fig. 1). In addition to the variation in drug prices across ZIP codes, there was a significant difference in drug prices between big chain pharmacies versus small chain pharmacies and when comparing drug prices across counties. No substantial trend exists, but further investigation shows variation in drug prices does exist. Similar findings have also been seen in other states, including Michigan and Florida, where drug prices are higher in lower-income neighborhoods and lower in higher-income neighborhoods.[17,18] This may be due to a higher proportion of patients with high deductibles in the lower-income neighborhoods. Without a regularly updated price reference, a tremendous burden is placed upon patients to seek out the lowest price, which is less likely to be in their neighborhood. This can further impose economic burdens to the most vulnerable.

Insurance companies also contribute to drug price variation. Insurance companies are able to direct prescribing patterns of clinicians through the use of formularies, encouraging the use of some drugs over others.[19] With this, companies have the power to negotiate for lower prices.[20] Such opportunities are not available to the uninsured cash payer due to the discrepancy in negotiating power.

The federal or state governmental payers can potentially mandate price controls or negotiate drug prices for all Medicare or Medicaid patients. In addition, alternative approaches exist to potentially benefit the uninsured as an initial step toward reducing costs. One option is to develop a state-sponsored drug registry. These websites would be created by the state and would mandate pharmacies to submit cash pricing, providing an accurate and powerful tool that patients can utilize when searching for medication. Although third-party websites such as GoodRx.com have been created in an attempt to disseminate this information, our study team found them to be discordant to the prices obtained from calling the pharmacist directly.[21] Third-party sites take into account various coupons that are subject to constant change, and can partly explain this price discrepancy. There is no substitute for the accuracy of a state-sponsored website mandated by law. With substantial price variation of medications, it is difficult for the consumer to determine which pharmacy is offering the best price for their prescription on a day-to-day basis. Although prices obtained at the time of data collection are accurate, a patient performing a search today would potentially find slightly different prices than what we found due to fluctuation of pricing from the pharmaceutical industry or pharmacies. Our team spent a significant amount of time in this study calling each pharmacy to obtain these prices. The time spent obtaining these prices by both consumer and pharmacy staff proves the inefficiencies of the current system. Several states have instituted drug-comparison websites to remedy this problem, including Florida, Michigan, Missouri, New Jersey, and New York. To our knowledge, an evaluation of the impact of these websites has yet to be reported.

Many retail pharmacies object to the creation of a database, due to the high administrative costs.[20] This argument is unsubstantiated, because data on pricing in most pharmacies are electronic and auto-syncing these websites can be easily accomplished. A database can encourage a free market and provide a platform to compare pharmacies' pricing for the same drug. In turn, pharmacies could be pressured to offer the best possible prices to consumers. It is our hypothesis that this competition will protect those most sensitive to changes in prescription prices.

Specific to otolaryngologists' prescribing pattern of ear drops, Ciprodex (brand) has been found to be prescribed more often than ofloxacin or Cortisporin ear drops, both available in generic forms.[22] In our study, we found generic medications to be on average less expensive than their brand name counterpart. Generic drugs are nearly equivalent to brand name drugs because of Food and Drug Administration requirements to prove equivalency in addition to containing the same active ingredient.[23] Clinicians should, therefore, prescribe generic alternatives more often. Also, cost to the patient can be reduced if clinicians prescribe the less expensive alternatives when clinically appropriate. As an example, in the treatment of otitis externa, the use of Cortisporin or Ciprodex has been shown to have no significant difference in bacteriologic or clinical cure rates.[24] A small difference exists in overall symptom resolution with Ciprodex, showing 90.9% cure rates on day 18 versus 83.9% with Cortisporin.[25] In another study comparing Ciprodex and ciprofloxacin in the treatment of tympanostomy tube otorrhea, those treated with Ciprodex recovered 1 day faster than the ciprofloxacin group, which is clinically insignificant, with no difference at 14 days.[26] Although this difference was found to be statistically significant, cost must be taken into consideration when comparing an arguably marginally more effective but more expensive medication, especially when it can impact patient compliance. Others have embraced this ideology, with one study using Cortisporin exclusively for ventilation tube otorrhea and abandoning the use of Floxin and Ciprodex, demonstrating no change in sensorineural hearing loss after surgery and a cost savings of up to $34,000.[27] In our study, the average price difference between 10 mL of generic Cortisporin and 7.5 mL of Ciprodex was found to be $161.58 (Table I). Clinicians should consider the price difference between these medications, especially for the uninsured or patients with high deductibles. The burden of responsibility should be on the prescribing otolaryngologist to make an effort to ensure the least expensive and efficacious medication is provided to the patient. The authors of this study thus recommend prescribing generic medications and less expensive alternatives when clinically appropriate.

CONCLUSION

This study found significant variability among ear drop prices across different pharmacies in Southern California. A searchable, state-mandated database of drug prices for the general population may help reduce costs of drugs by encouraging a free market and providing a platform to compare pharmacies' pricing for the same drug. Price negotiation by governmental payers may assist in reducing prices as well. Otolaryngologists can improve medication compliance and decrease patient cost burden by prescribing generic ear drop medications and cheaper alternatives for patients when clinically appropriate.

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