

An Evaluation of Over the Counter & Prescription Medications in Independent & Chain Pharmacies: A Survey Using WHO/HAI Methods

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Acronyms & Abbreviations

AMP	Average Manufacturer Price
cap	Capsule
CBO	Congressional Budget Office
g	Gram
HAI	Health Action International
IRP	International Reference Unit Price
iu	International Unit
LPG	Lowest Price Generic
mg	Milligram
mcg	Microgram
MIPA	Massachusetts Independent Pharmacy Association
ml	Milliliter
MPR	Median Price Ratio
MSH	Management Sciences for Health
OB	Originator Brand
OTC	Over the Counter
PBM	Pharmacy Benefit Manager
Rx	Prescription
tab	Tablet
WHO	World Health Organization

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Abstract

Background

Surveys completed in 2014, 2015, and 2016 by Boston University students evaluated the price and availability of essential medicine in the Boston area. In 2017, the study was repeated using the same WHO/HAI methodology. Qualitative data was collected from independent pharmacy owners and managers and quantitative data was collected from independent, chain, and big box pharmacies.

Methods

Random sampling was used to select independent pharmacies, which were then paired with the closest accessible chain pharmacy. A total of 15 pharmacies, a combination of independent and chain, provided quantitative data on essential medicine pricing and availability using WHO/HAI methodology. Qualitative data was collected from independent pharmacies via student interviews.

Results

Qualitative interviews with independent pharmacies emphasized their patient-centered approach and willingness to discuss medicine costs with patients. Independent pharmacies depend on their personal connection with patients and provide services not typically offered in chain pharmacies.

The median price ratio (MPR) of over the counter (OTC) originator brand (OB) medicines was slightly less expensive in independent pharmacies compared to chain pharmacies, although the MPR for OTC lowest priced generics (LPGs) was less expensive in chain pharmacies. The availability of prescription LPGs and prescription OB medicines was higher in chain pharmacies than independent pharmacies (10% & 12% respectively). Big box stores often offered lower prices, but prices varied greatly amongst fellow big box stores (Simvastatin 20mg Min/Max Ratio of 4.59).

Conclusion

This study showed major differences between chain and independent pharmacies in terms of services provided, the availability of medicines, and the cost of medicines. The findings were in line with findings from previous years surveys. Availability was higher in chain pharmacies, prices were lower in independent pharmacies, and big box pharmacies exhibited the greatest variation in prices. Patients need to shop around to obtain the best medicine prices.

Background

The lack of transparent drug pricing information makes it difficult for consumers to shop around when it comes to their medicines. Drug prices have long been on the rise and the cost of medicines to the consumer is a primary factor when considering whether to use chain, independent, or big box pharmacies. Even within the different types of pharmacies, specifically big box pharmacies, prices of medicines significantly vary. Although this study was conducted in the Greater Boston area, this is a nation-wide issue that is of interest to the federal government. To provide a solution to the increasing drug prices, robust data is critical.

The cost of prescription drugs has been an area of political interest for some time and was a major platform issue of the 2016 presidential election. More than two dozen bills have been introduced to Congress in an attempt to curb drug costs, with no progress in reducing drug costs.¹ On October 17th, 2017 the Senate held a hearing on drug prices. Representatives from PBMs, pharmaceutical companies, and distribution groups were all present and offered their own ideas about who is to blame for high drug prices.² Despite the hearing and the numerous bills introduced, no legislation has been passed detailing how to lower these costs.² Transparent medicine pricing data is needed to support any potential solutions to rising drug costs.

The right to health was first proclaimed in the World Health Organization (WHO) Constitution in 1946.³ Presently, access to essential medicines as a part of the right to health is a globally accepted concept.³ Accessible medicines must be both available and affordable. The Lancet Commission on Essential Medicines Policies released a report in November 2016 that detailed the importance of essential medicines in “promoting health and achieving sustainable development”.⁴ The report discusses the lack of medicine pricing information as a barrier to making informed decisions regarding

medicines.⁴ In an effort to make essential medicines affordable, the Lancet Commission recommends maintaining a database regarding price and availability in both the public and private sectors.

Many surveys have been conducted using the WHO/HAI pricing manual, originally published in 2003.⁵ The WHO/HAI methodology uses international references for price reported by Management Sciences for Health in their annual International Drug Price Indicator Guide, which was originally published in 1986.⁶ These international price references are useful benchmarks to conduct research in the area. To date, most attention has been devoted to access barriers in low and middle-income countries, where availability and affordability are generally low.⁷ Subsequently, a global calling to improve access through higher generic promotion and availability of alternative financing mechanisms has ensued, as highlighted by the Lancet Commission. However, this is a problem of the developed world as well.

In the United States, Consumer Reports publishes national survey results that investigate drug pricing and availability. According to a July 2016 report, the costs of prescription drugs rose \$2 billion in 2015 alone.⁸ This rise affected, three in ten Americans, or approximately 32 million people, costing an average of \$63 more per treatment, per person.⁸ Additionally, the prices of longtime generics for diabetes, high blood pressure, and high cholesterol have significantly increased.⁸ The analysis discusses how medicines prices have increased over time, suggesting the following reasons: unregulated drug manufacturer pricing, the increasing cost of health insurance, medicines being reformulated as a means of patent extension, generic drug shortages, and investments in expensive specialty drugs.⁸

Consumer Reports' analysis suggests that increased medicine prices are due in part to the commercial pressure to secure profit among large pharmaceutical manufacturers and insurance companies, to the detriment of the consumer.⁸ This is largely in part due to the less known player who acts as middleman between insurers and customers:

pharmacy benefit managers (PBMs).⁹ PBMs negotiate discounts and rebates from drug manufacturers that ideally lower healthcare costs. However, PBMs are unregulated and often do not pass along the savings they negotiate.⁹

To secure the best price, consumers must shop around when it comes to their medications. Prices vary between pharmacies, and asking the pharmacist is the first step in obtaining medicine prices. Unfortunately, pharmacists sign contracts with PBMs that may contain a gag order clause.⁹ This clause prohibits pharmacists from providing cost information.⁹ For example, if a medication will cost less without a patient's insurance, the pharmacist is not allowed to tell the patient.⁹

In 2014, 2015 and 2016, price and availability of essential medicines surveys¹⁰ were performed in Boston by a team of students under the direction of Dr. Richard Laing. Using the WHO/HAI methodology, the teams surveyed "availability and undiscounted price data for both originator brand and lowest price generic" from 15 independent pharmacies. Independent pharmacies are those operated and owned by a person rather than a chain, such as Rite Aid, CVS, or Walgreens. The 2016 survey found that originator brands of OTC medication in independent pharmacies had an average lower availability of 54.5% compared to chain pharmacies with an availability of 63.6%.⁵ Chains also had slightly higher availability of generic OTC medicines compared to independent pharmacies. Prescription medicines were also more available in chain pharmacies compared to independent.

Although chain pharmacies had greater availability, independent pharmacies generally offered better prices. The MPR of prescription OB medicines and LPGs were lower among independent pharmacies than among chains pharmacies. The same trend was found among generic MPRs. The lowest MPRs were found among big-box retailers, however these retailers offered a limited range of products. Prescription medicines in general had higher MPRs than OTC medicines in both chain and independent pharmacies. Big box stores were found, both in 2015 and 2016, to offer the lowest

priced medicines.^{11,12} Big box stores are those such as Walmart, Target, or Costco that offer deals such as \$4 a month for a prescription medicines or \$10 a month for three prescriptions.

Qualitative findings in 2015 and 2016 highlighted the niche occupied by independent pharmacies.^{11,12} Independent pharmacies offered services not available at chain pharmacies.^{11,12} These services included blister packing, counseling, and increased dedication to patient knowledge.^{11,12}

These findings are consistent with previous research conducted with similar methods, despite the continually changing environment. The changing environment trending toward vertical integration, as seen in the Aetna-CVS deal, further supports the need for these types of analysis. The present study presents the fourth and third iterations of quantitative and qualitative analysis, respectively, in this line of research. The survey detailed in this report is limited to the private sector and includes chain and independent pharmacies. The value of this research is further supported by the Lancet Commission's acknowledgement of affordability and pricing of medicines being a significant access barrier.

Methods

Qualitative Methods and Analysis

To guide the interviews, domains and subdomains were agreed upon prior to conducting the pharmacist interviews. The domains investigated were brainstormed based on available literature and general information gaps in the understanding of the sector on both a state and national level. The domains and subdomains are enumerated in the qualitative results section. Upon implementing the sampling method, pharmacies were interviewed by one or a team of two students during business hours. Detailed notes were taken about the conversation and notable quotes were typed up and sorted into the predetermined domains. The quotes from each interview were then amalgamated using the cut and paste method and the findings within each domain were synthesized.

Medicines Surveyed

Medicines in the survey were selected from the global WHO/HAI essential medicines list, including 19 prescription and 11 OTC medicines. This year's collection also included the diabetes medicines insulin and metformin. The price of the available pack-size that was closest to the recommended pack size was obtained. All surveyed medicines are commonly used, and have available IRP.

Data Collection

Data collection was performed utilizing forms developed by WHO/HAI. Individual tables were used to survey both OTC and prescription medicine availability and price. The individual data tables were systematically entered into the computerized WHO/HAI Medicine Price Workbook. To prevent errors during data entry process, a second person was involved to overlook the process. Following entry, the data was entered twice into the workbook (double entry) to check for any data entry errors using the built-in automated analysis feature of the workbook.

Quantitative Analysis

The prices of a preselected list of essential medicines were collected from both independent and chain pharmacies. All prices obtained for medicine packs were converted to unit prices and compared to the international reference price.⁶ The MPR was calculated, as shown below, instead of the actual prices obtained from the pharmacies in order to have a standard number to compare between different pharmacies.

$$\text{Median Price Ratio (MPR)} = \frac{\text{Local Unit Price}}{\text{International Reference Unit Price}}$$

Initially, individual purchase prices and medicine availability were reviewed. Within-sector prices and availability were analyzed by comparing prices within independent pharmacies. A similar analysis was completed for chain pharmacies. Patient prices were compared between independent and chain pharmacies in our cross-sector analysis. Finally, using summary measures, prices between independent and chain pharmacies were compared. The summary measures Mean Percent Availability, Standard Deviation for Mean Percent Availability, Median of the MPRs calculated for each medicine, 25th percentile MPR, 75th percentile MPR, Minimum MPR, and Maximum MPR were calculated using the workbook provided. A price survey of prescription drugs, similar to the ones collected from chain and independent pharmacies, was conducted at big-box stores. These medications were sourced from official webpages and the Good Rx site for prices from Costco, Walmart, Health Warehouse, Hannaford Rx Club, and Target CVS. The reference prices from the MSH website in the results section were also included.

Results

Qualitative Results

In the qualitative portion of our analysis, interviewers focused on five domains pertaining to the services, functions, and information sources of the independent pharmacies who agreed to participate. The five domains included the following:

1. Who the pharmacies serve and what services they offer
2. Sources of pricing information
3. Patient knowledge of pricing and insurance
4. Managing cost information
5. Suggestions

Domains	<i>Patient population and services offered</i>	<i>Sources of pricing information</i>	<i>Patient knowledge of pricing and insurance</i>	<i>Managing cost information</i>	<i>Suggestions</i>
Sub-domains	Socioeconomic status Patient characteristics Languages Services	Range of information available Pricing negotiation/discretion Insurers Pharmacy Benefit Managers	Insurance coverage Payment Plans Cost sharing	Information sharing Gag rules Ethical responsibilities Big box stores/clubs	

Figure 1. Qualitative Analysis Domains and Sub Domains

A total of seven pharmacists agreed to participate in our interview survey from the initial random sampling of ten pharmacies. Within these results, quotes from Todd Brown, Executive Director of the MIPA, are included. Todd Brown’s primary role is in policy as it pertains to independent pharmacies in Massachusetts, and he is publicly recognized as a leading advocate in the topic. To see a full list of quotes from the interviews, refer to Appendix 1.

Who the Patients Are/ What the Pharmacies Do

Within the domain of who the pharmacies serve and the service offered there are four sub-categories: (1) Socioeconomic status, (2) Patients Characteristics, (3) Languages, and (4) Services. We further divided the subgroups for this domain for patients and services. Patients' socioeconomic status differed widely between pharmacies, however pharmacies reported that many customers were senior citizens with an increasing trend to pay cash.

“Large section of our patients are wealthy senior citizen using Medicare part D and now we are having new families with kids last five years. It is nice to have all kinds of population” (6-1)

“We have more cash patients than we did years ago” (1-1)

“A lot of people have turned down medication due to co-pays.” (1-16).

Pharmacists had a lot to say about the relationship they have with their clients. In line with previous research, the independent pharmacists valued knowing the patient's name and having repeat customers versus serving a high number of patients.

“We don't want 10 consumers who walks in once, we look for that one customer who walks in 10 times. We concentrate on service delivery which is why we're standing well for over 80 years.” (11-1).

“...most of them are through referral or word of mouth. We don't have a large budget for advertising and we can't compete with the large chains so most of it is by word of mouth reference through the doctor's office based on services we provided. “(10-8)

“(about Walgreens down the street) It's fancy so they go there and get a bunch of other items... not necessarily because the service is good, but it's a bigger chain.”

Many independent pharmacists reported having the ability to speak multiple languages to their customers, however they do not hire people based on this.

“We are not using pharmacists based on the language skills but some patients speak French and one pharmacist speaks Armenian.” (6-3).

Services provided to customers varied widely between pharmacies, with many providing delivery and blister packing of medications. Vaccination services were rarer, as were medication management services. Customer services was also a focal point of many responses.

“We have to do the best we can to get our customers, providing services like delivery, really managing patients’ medication.... We really have to put in that much time and we really care about the patient...there you’re just a member.” (10-6).

“...because what’s happening now with the big chains in order to stay in business as an independent, you really have to go above and beyond to provide certain good services to the customers which makes them want to come back. Like if someone walks in here, I want to personalize the care. I know them by name.” (10-1).

Overall, the independent pharmacists reported customers being much happier with the degree of service provided by independent pharmacies compared to chain, citing service as a main reason customers returned.

Sources of Pricing Information

Within this domain, interviewers explored how the pharmacists obtained the pricing information in order to accurately price medications for each person and plan, while remaining profitable. There were four sub categories in this domain: (1) Range of Information Available, (2) Pricing Negotiation/Discretion, (3) Insurers, and (4) Pharmacy Benefit Managers. All of the pharmacists interviewed commented on the pricing issue, and their access to information. Some reported how little flexibility they had, while others reported on how competitive independent pharmacies had to be compared to the chain pharmacies. Most pharmacists reported prices that were in line with region averages.

“We want to give good service and keep our prices consistent; we are always in the price average in the region.” (3-5)

“We get the price from the computer, everything.” (4-4)

“I think we have little flexibility concerning the establishment of the price” (4-7).

Information recorded regarding negotiation of prices was variable, with some pharmacists noting that there was a set formula for the prices, while another was unaware of the formula or criteria used to set prices by the insurers.

“Masshealth is our biggest customer. I don’t know the criteria they use to set prices, but I believe they set it based on shopping around and then going with the lowest possible price in order to save money.” (10-3)

“The owner sets up the formula for the price of medication and we follow the price.” (6-4)

According to Todd Brown though, the insurance companies, and not the owners, set the prices.

“Insurance companies set the price and most of the time get a good deal because the insurance companies negotiate their prices with the pharmacies.” T-8

Many of the pharmacists mentioned dealings with patients that use both Masshealth and Medicare part D to pay for their drugs, making it relatively affordable. Pharmacists also reported difficulty in pricing due to insurers reacting slowly to price changes, suggestive of private interests to do so.

“Masshealth copays are usually extremely low.” (10-6).

“Our patients are using Masshealth as a complementary insurance to pay the copay of Medicare part D.” (6-6)

“It’s a calculated game for the insurers. If price drops they change it fast, compared to if price hikes. The pharmacy on the other hand is bound to see to the patients and still lose money.” (3-6).

Responses regarding pharmacy benefit managers (PBMs) were also variable, ranging from complete lack of knowledge of PBMs, to specific operational information, to complete disregard for PBMs.

“We were actually audited by two PBMs, we have to send them a certain amount of prescriptions, they control it, and will adjust the payment according to their observations.” (6-15)

“More control concerning the PBM.” (6-17)

Patient Information/ Knowledge

Pharmacists were also asked about their perceptions of customer knowledge in regard to insurance coverage, payment plans, and insurance cost sharing. Within this domain there were three subcategories: (1) Insurance Coverage, (2) Payment Plans, and (3) Cost Sharing. When asked about insurance coverage, pharmacists reported customers not asking about the cash versus insurance price difference, but did say that they would tell the customer if asked.

“We had zero questions about price difference last year and we are having more questions this year.” (6-9)

“Clearly tell the price difference if they ask.” (6-10)

“Patients are not aware of the price difference between cash-pay and insurance.” (6-7)

When questioned about how customers pay, pharmacists reported little issue in this area. Most customers were on Medicare or MassHealth which covers nearly all the cost, and those that were not covered went back to their doctor to ask for a different drug. One pharmacy reported that should someone be unable to pay, they can usually work something out.

“We do have mostly Medicaid patients. It’s a poor neighborhood so most of them have Medicaid.” (10-2)

“Most people don’t have this problem (cannot pay for the medication) they just don’t want to pay for the medicine, return to the doctor to ask for another one.” (4-2)

“If the patient cannot afford, we always find a way or a solution in the most extreme cases. We don’t want to ruin patient relationship for a few hundred dollars.” (3-7)

In regard to insurance plan cost sharing, pharmacists reported mixed experiences with customer knowledge of deductibles and that copays were generally very low. Most patients who chose not to use insurance was not due to a co pay, but because of the medication availability.

“It is almost insulting/ ridiculous how low the copay is.” (4-8)

“Most of them know about the copay and deductible.” (4-11)

“They are not many who choose not to use their insurance and when they don’t use it, it is not because of the price, but because of the medications.” (4-10)

“Patients forget there is a deductible and we have to explain it to them.” (6-8)

Managing Cost Information

The purpose of the domain is to understand how the information of drug costs is handled by pharmacists. It also seeks to clarify factors revolving around the sharing of that information with customers. There are 4 sub-categories within this domain: (1) information sharing; (2) gag rules; (3) ethical responsibility; (4) big box stores/clubs. In total, 14 quotes (displayed below) were gathered across the 4 subcategories. It was observed that the sharing of information is not spontaneous between pharmacists and patients, but rather something that needs to be initiated by patient inquiries. There was no apparent recognition of a ‘gag rule’ constraining the sharing of information with customers. This poor communication also appears to exist between pharmacists, insurers, and pharmacy benefit managers.

“I will not tell all the price options without being asked because I do not have time” 6-11

“It (disclosing prices) used to be very easy when I first entered this profession because we used to have limited number of insurance types and the (price) variation is not that great. People know what they want and they compare all the options before coming here. Sometimes, they are more knowledgeable than us.” 11-3

“I tell patients to call and ask their insurance (regarding pricing information).” 1-15

“I have no problem or restriction to tell the price to the patient, but they usually don’t ask” 4-15

These responses are in conflict with claims by Todd Brown that they are maybe prohibited from disclosing price information.

“Contracts that the PBMs give pharmacies prohibit the pharmacies to tell patients that they are better off paying cash.” T-11

Pharmacists surveyed valued ethical professional principles in regards to patient education and pricing.

“It doesn’t have to be MIPA, but we have a moral obligation to be ethical in our practice and in conducting our duties. You just follow the code in good faith to dispense medicines in good faith and do your due diligence when you have to practice using the best moral obligation standards that you can attain.” 10-9

“Making sure that the patients adhere to taking their medicines. Studies show that if patients are not taking medicines the way they are supposed to take it, the government ends up spending more money because there is an increase in hospitalization.” 10-7

“We are more concerned about education than about the money. We are here for the long run.” 3-4

Suggestions

In the final domain, pharmacists were asked whether they had any suggestions for policy makers or other industry leaders on the topics of laws, ethical codes,

transparency, and patient education. In general, the pharmacists interviewed did not provide a lot of input in this domain, with very few suggesting anything to do with patient education. Most concerning to pharmacists were legislative issues, one pharmacist commented on the need for improved transparency for patients.

“We need laws, but it’s always a political fight. The law is on the ballot, and has long path ahead.” 3-9

“As a profession we are not as active as we should be toward the legislator, to ensure that pharmacist are not screwed, we do not have a national corporation.” 4-17

“If they could at least increase the reimbursement for independent pharmacies so that way more of them could stay in the business, things would be much better.” 10-10

“Transparency should be improved for the patients.” 6-16

Todd Brown also agrees that there should be an increased transparency in the way drugs are priced.

“The healthcare market should be more transparent, it’s more of a struggle in the pharmacy arena, because PBMs are large companies that fight transparency in order to be able to play these games of charging more”. T-19

“Patients are not aware of what is going on at all. Most patients aren’t cash patients, so their copays will be the same almost anywhere. But many times, they don’t know that paying cash can be better”. T-22

He further suggested that asking about cash prices or different pricing information directly could reduce the amount some patients are paying for their medications.

“What we’ve been doing is raising the issue to educate patients if they have an expensive medication to ask about the cash price, which the pharmacies should tell them”. T-24

“Copay for inexpensive generics or brand medicine in low quantity could be greater than the cash price or the price that PBM is even paying the pharmacy.” T-10

Quantitative Analysis

Over the Counter Medicines (OTC)

Out of the 20 pharmacies sampled, data on OTC medicines were obtained from six independent and nine chain pharmacies. In total, 15 pharmacies took part in the survey. The medicines included in the survey were analgesic, antihistaminic, heartburn and gastric ulcers medications, topical and vaginal antifungal and topical anti-inflammatory (See Appendix 2). This list was issued from the MS excel computerized Workbook include in the WHO/HAI publication.¹³

Availability:

The availability of generic OTC medicines is higher than the availability of OB OTC medicines in both chain and independent pharmacies. Chain pharmacies had greater availability of both generic OTC and OB OTC medicines. The availability of OB medicines was 20% higher in chain pharmacies compared to independent pharmacies. Generic OTC medicines were 14% more available in independent versus chain pharmacies.

Overall availability is reported as either generic or originator brand medicines availability in Figure 2.

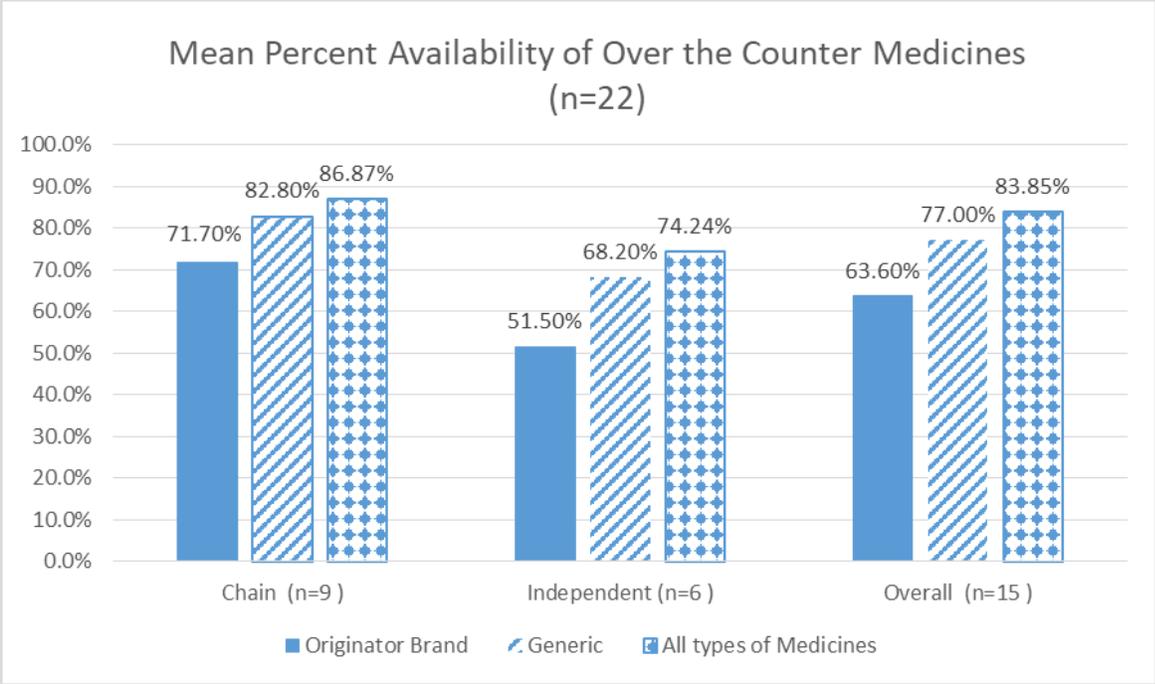


Figure 2. Mean Percent Availability of Over the Counter Medicines

Availability in Independent Pharmacies:

In all the six independent pharmacies, the generic pain medication Acetaminophen/Paracetamol, was present while the OB was found in only 83.3% of them. Ibuprofen followed the same availability trend, and the OB Advil was present in 83.3% of the pharmacies. Acetylsalicylic Acid 500mg was not found in any of the independent pharmacies surveyed.

For medicines used in the treatment of heartburn and gastric ulcers, the availability of generic Omeprazole was similar to generic Ranitidine (83.3% availability of the OB). In the same class of medicines, Cimetidine was only found in the OB version in 33.3% of the independent pharmacies.

In regard to antihistamine medicines, the availability was the same for Diphenhydramine and Loratadine. In this case, the availability of the generic versions were greater than the OB's (100% vs 83.3% for both).

The Hydrocortisone cream was found in generic in 100% of the pharmacies, however it is important to note that no OB exists.

Concerning the two antifungal creams, Clotrimazole was only found in 50% of the independent pharmacies and was only found as a generic. The availability of Miconazole was also 50% for the generic, however the OB was found in 33.3% of the independent pharmacies. A detailed overview of OTC availability in independent pharmacies can be seen in Figure 3.

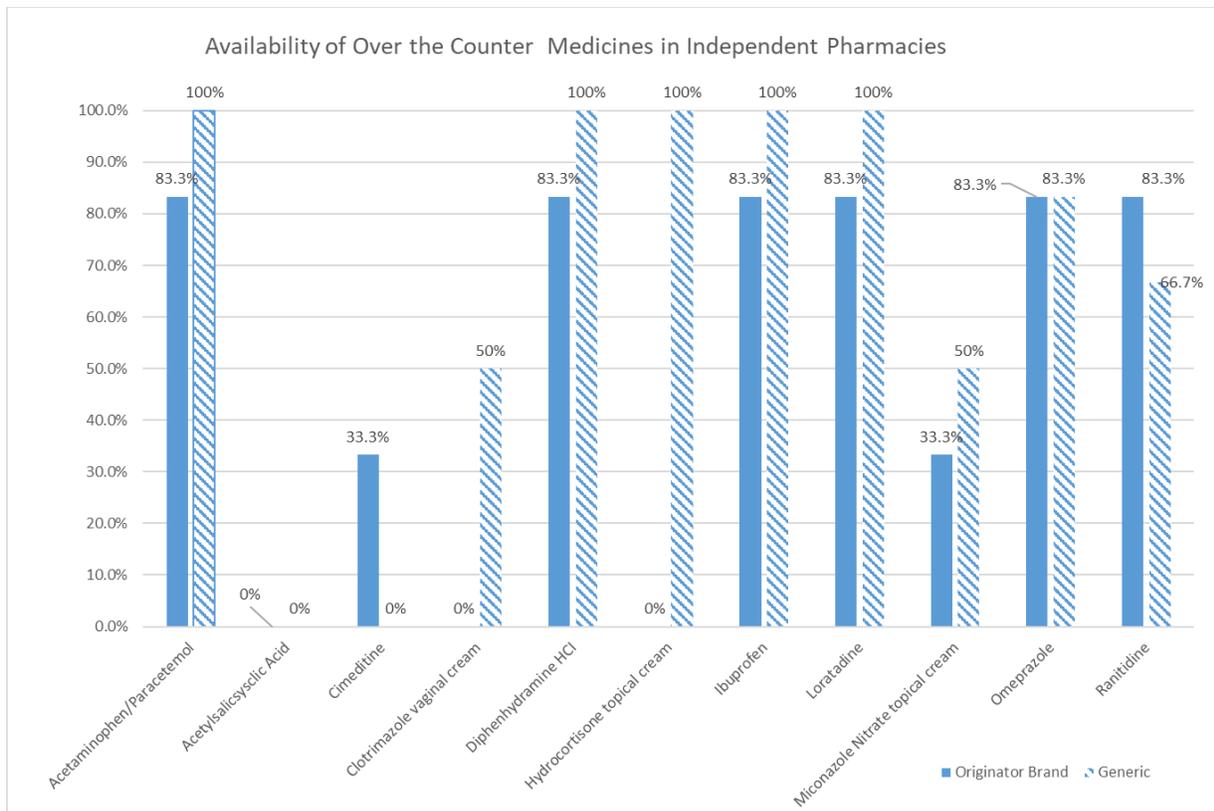


Figure 3. Availability of Over the Counter Medicines in Independent Pharmacies

Availability in Chain Pharmacies:

In the nine chain pharmacies surveyed, the generic pain medicine Acetaminophen/Paracetamol and the OB Tylenol were found to be 100% available. Ibuprofen was also found to be 100% available. Acetylsalicylic Acid 500mg was found only in 33.3% of the pharmacies in its OB version and 11.1% in its generic version.

For heartburn and gastric ulcers medicines, the availability of Omeprazole was 100% for generic and OB, with the highest availability for this group of medicines. The availability of Ranitidine was 88.9% for both generic and OB. Finally, the availability of the OB of Cimetidine was higher than its generic (88.9% and 77.8% respectively).

Regarding antihistamines, there was 100% availability of generic and OB Diphenhydramine and Loratadine.

The generic Hydrocortisone cream was found in 100% of the chain pharmacies, however it is important to note that the OB does not exist.

Finally, the two antifungal creams, Clotrimazole was found, only in its generic form, in 66.7% of the chain pharmacies. The availability of Miconazole was higher, the OB was found in 77.8% of the chain pharmacies and the generic in 66.7% of the chain pharmacies. A detailed overview of availability of OTC medicines in chain pharmacies can be seen in Figure 4.

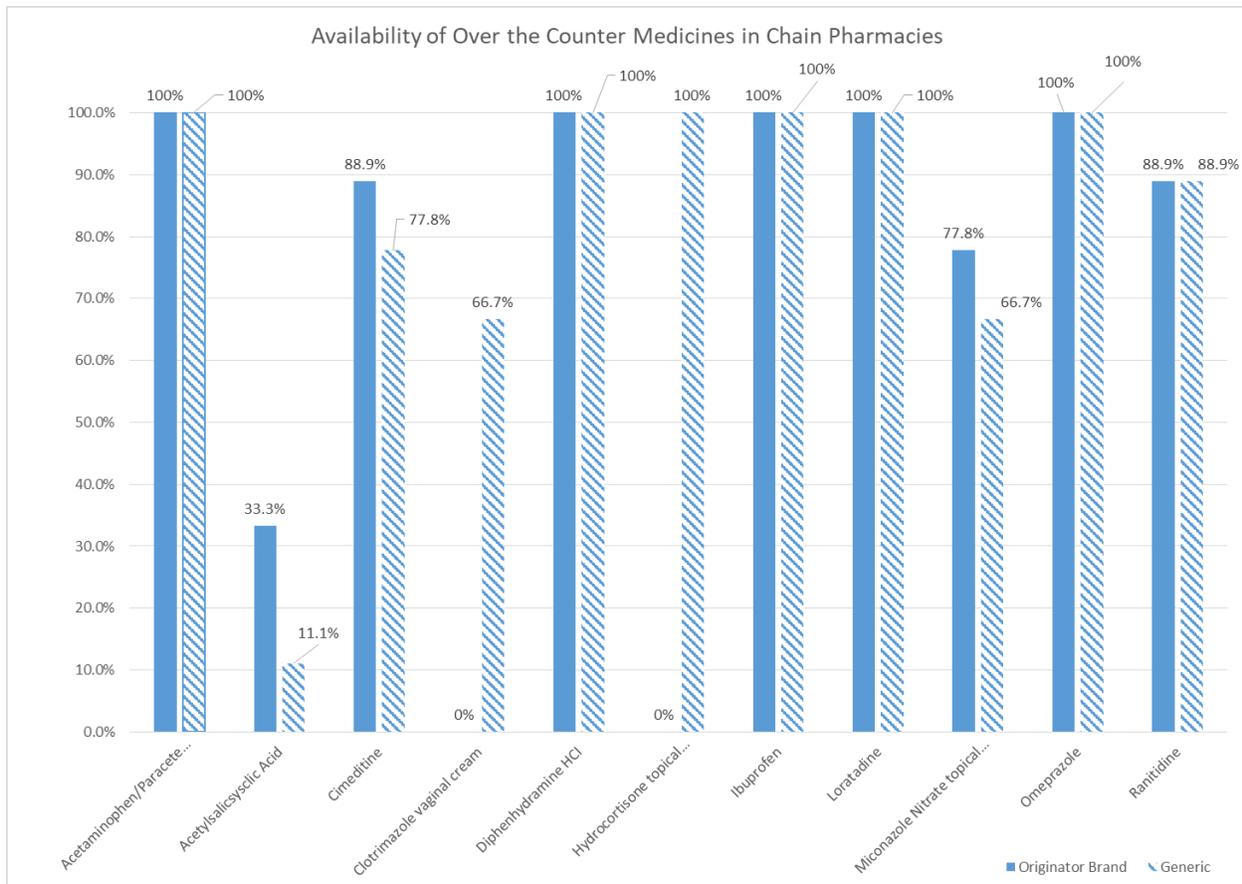


Figure 4. Availability of Over the Counter Medicines in Chain Pharmacies

Pricing:

The median MPR of the OB was slightly less expensive in the independent pharmacies (21.54) compared to the chain pharmacies (22.61). However, the MPR for the lowest priced generics (LPG's) was less expensive in chain pharmacies (9.13) in contrast to the independent pharmacies (12.54). Below, Table 1 exhibits the MPRs of OBs and LPGs regarding OTC medicines.

The matched pair analysis on Table 2 shows that OBs available in chain pharmacies had a median MPR of 23.36 compared to 25.31 in independent pharmacies. In addition, median MPR of the LPGs were 15.6 in the chain pharmacies and 15.29 in the independent pharmacies.

Table 1. Median Price Ratios of Originator Brands and Lowest Priced Generics with respect to Over the Counter Medicines in Chain and Independent Pharmacies - Summary

Summary of Median Price Ratios of the surveyed Over the Counter Medicines						
	Overall		Chain Pharmacies		Independent Pharmacies	
	Originator brand (medicines = 9)	Lowest Priced Generics (medicines=11)	Originator brand (medicines = 9)	Lowest Priced Generics (medicine= 11)	Originator brand (medicines = 8)	Lowest Priced Generics (medicines = 9)
Median MPR	23.58	14.18	22.61	9.13	21.54	12.47
Minimum MPR	11.32	3.92	11.41	3.46	11.24	3.62
Maximum MPR	113.8	71.7	117.25	103.11	35.64	32.63
25 th Percentile	14.19	7.5	13.4	4.96	15.52	7.51
75 th Percentile	32.4	26.9	34.58	23.17	26.62	18.86

Table 2. Median Price Ratios of Originator Brands and Lowest Priced Generics with respect to Over the Counter Medicines in Chain and Independent Pharmacies – Matched Pair Analysis

Matched Pair Analysis of the Over the Counter Medicines						
	Overall		Chain Pharmacies		Independent Pharmacies	
	Originator brand (medicines = 9)	Lowest Priced Generics (medicines = 9)	Originator brand (medicines = 9)	Lowest Priced Generics (medicines = 9)	Originator brand (medicines = 7)	Lowest Priced Generics (medicines = 7)
Median MPR	23.58	15.4	23.36	15.6	25.31	15.29
Minimum MPR	11.32	4.24	11.41	4.17	11.24	3.62
Maximum MPR	113.8	71.7	117.25	103.11	53.24	32.63
25 th Percentile	14.19	9.42	14.05	7.32	16.27	11.4
75 th Percentile	32.4	26.96	31.83	26.96	31.35	19.41

Pricing in Independent Pharmacies:

As demonstrated in Figure 5, Acetaminophen/Paracetamol and Loratadine had the largest differences in the median MPR in independent pharmacies (OB: 27.6, LPG: 15.29). Cimetidine had the highest median MPR, likely due to the unavailability of its LPG. The median MPR was not able to be compared for Acetylsalicylic Acid, Cimetidine, Clotrimazole, and Hydrocortisone cream due to unavailability of the medicines.

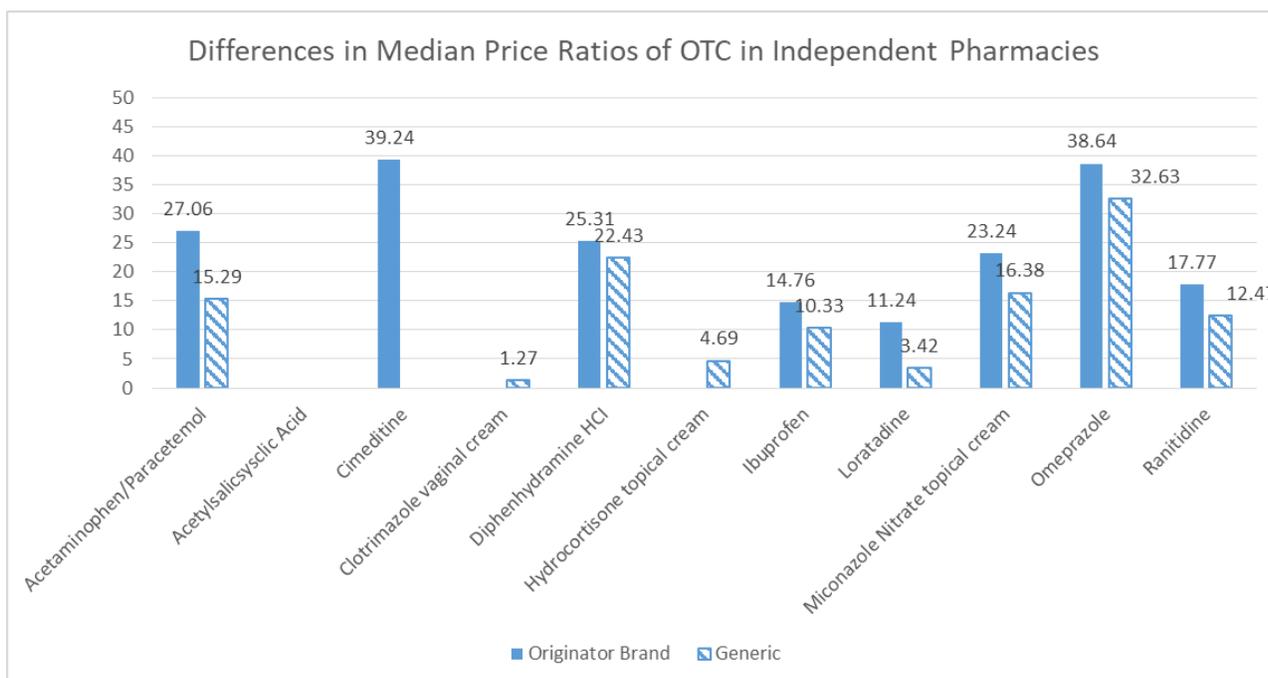


Figure 5. Differences in Median Price Ratios of OTC in Independent Pharmacies

Pricing in Chain Pharmacies:

Cimetidine had the largest difference in median MPR in the chain pharmacies (OB: 48.82, LPG: 26.96). The median MPR was not able to be compared for Clotrimazole or Hydrocortisone cream due to the low availability of the medicines. The results are displayed below in Figure 6.

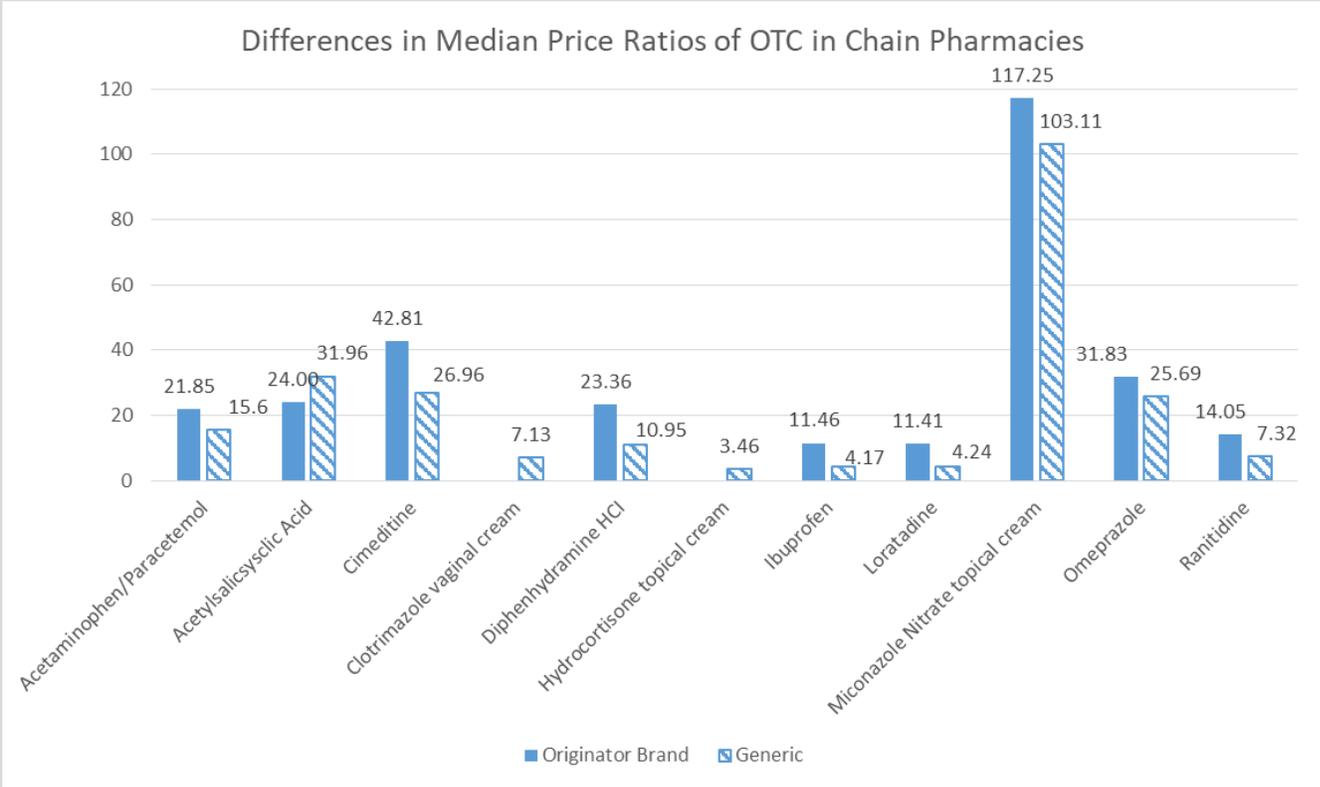


Figure 6. Differences in Median Price Ratios of OTC in Chain Pharmacies

Prescription Medicines

Of the 20 pharmacies sampled, pricing data for prescription medicines was obtained from five independent and four chain pharmacies.

Availability:

Overall, there was higher availability of generic prescription medicines than brand prescription medicines at both independent and chain pharmacies. Availability of both brand and generic prescription medicines was also higher in chain pharmacies than in independent pharmacies. The availability of OB medicines is approximately 12% higher in chain pharmacies, and approximately 10% higher for generic prescription medicines.

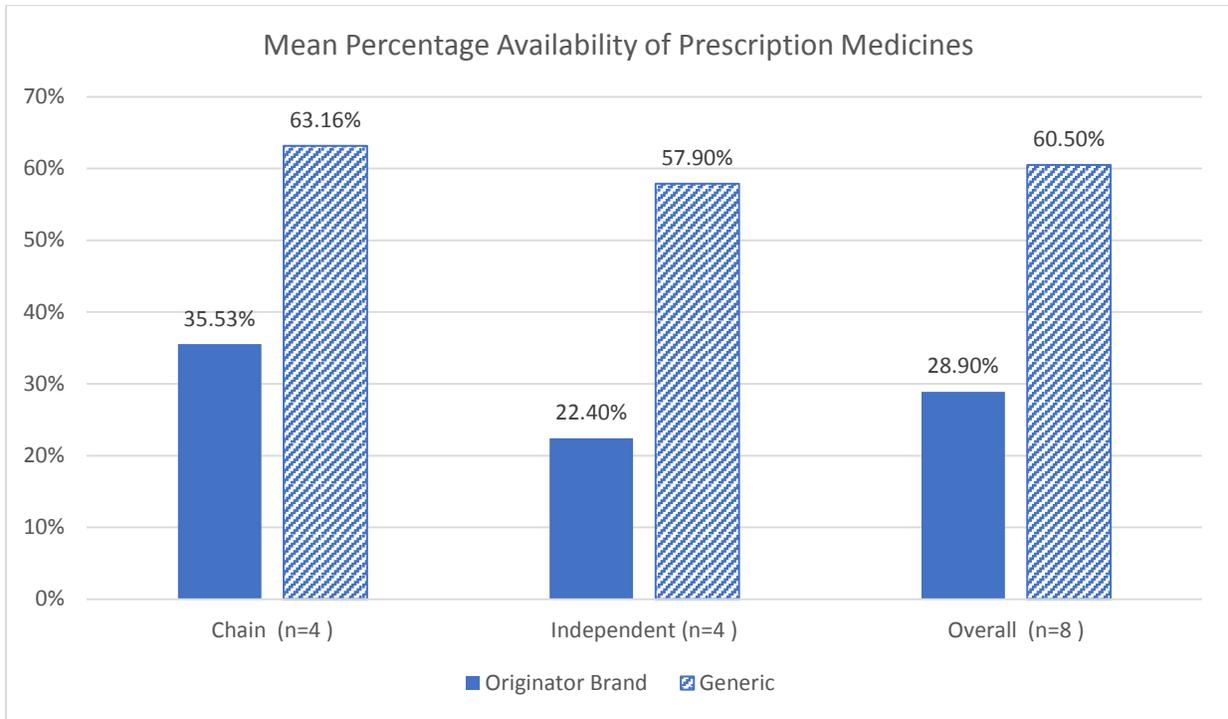


Figure 7. Mean Percentage Availability of Prescription Medicines

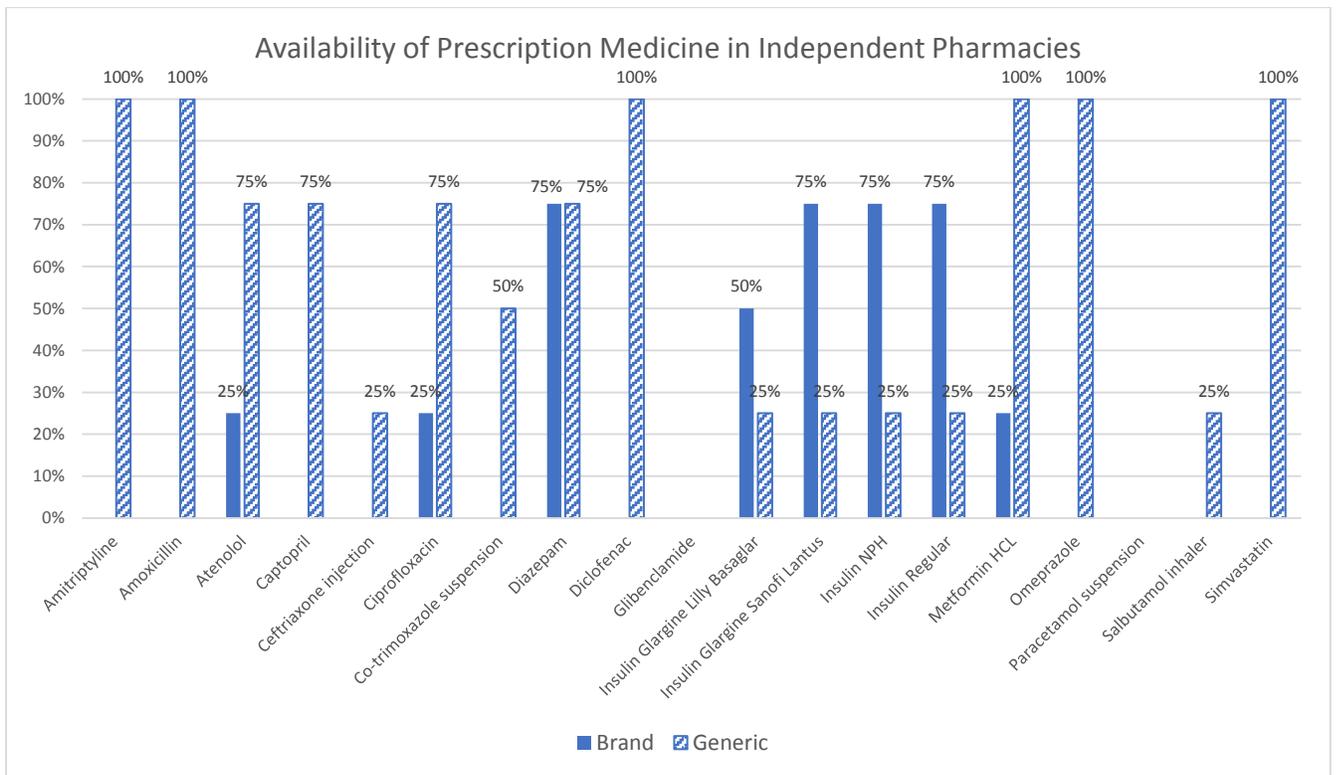


Figure 8. Availability of Prescription Medicines in Independent Pharmacies

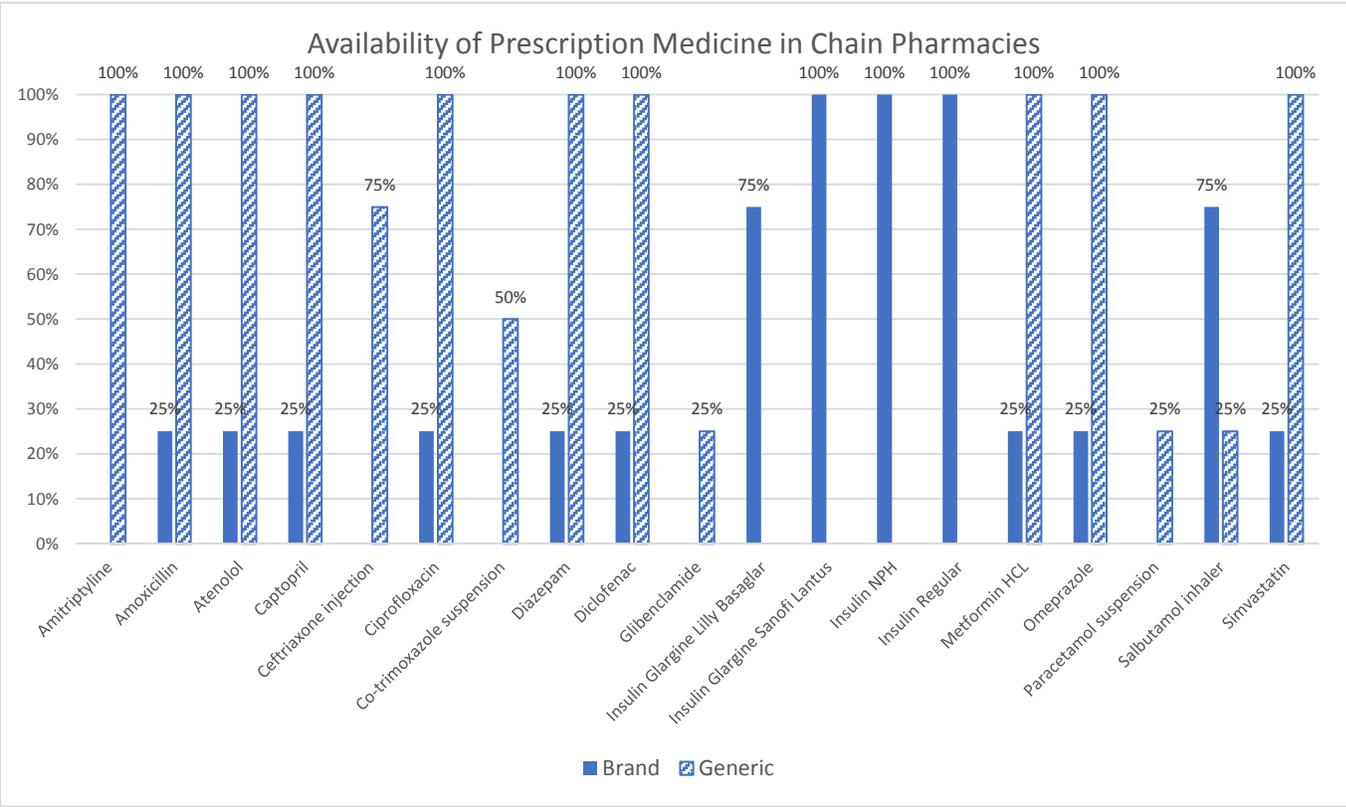


Figure 9. Availability of Prescription Medicines in Chain Pharmacies

With respect to availability, the main exception to the aforementioned trend was noticed with the insulins. These were not available in generic form in the chain pharmacies, and were only available in generic form in one out of five independent pharmacies. Acetaminophen/Paracetamol suspension and Glibenclamide were only found in generic form in one of four chain pharmacies, and were not found in any of the independent pharmacies. The data discrepancy for the Acetaminophen/Paracetamol suspension could be explained by the fact that this medicine was accounted for in the OTC data collection portion, causing the pharmacists to exclude it from this portion of the survey.

Pricing:

Due to the low availability of OB prescription medicines and the low response rates from the pharmacies, insufficient data made it impossible to perform matched pair analysis between OB and generic medicine prices. The MPR for the three OB products (Insulin Glargine Sanofi Lantus, Insulin NPH, and Insulin Regular) found in all outlets was 32.33 compared to an MPR of 38.46 for the 12 LPGs.

Table 3. Comparison of MPRs in Chain and Independent Pharmacies

	Overall		Chain Pharmacies		Independent Pharmacies	
	Originator Brand (medicines=3)	Lowest Priced Generics (medicines= 12)	Originator Brand (medicines=2)	Lowest Priced Generics (medicines=10)	Originator Brand (medicines=0)	Lowest Priced Generics (medicines=6)
Median MPR	32.22	37.04	N/A	34.98	N/A	51.08
Minimum MPR	31.22	26.83	N/A	21.94	N/A	39.75
Maximum MPR	341.40	89.64	N/A	39.31	N/A	59.75
25th Percentile	30.23	16.01	N/A	16.01	N/A	24.28
75th Percentile	650.58	199.31	N/A	179.09	N/A	317.76

Disaggregating the data based on pharmacy type, generic Diclofenac had the highest MPR in both chain (179.09) and independent (259.27) pharmacies. The greatest contrast in MPR for a prescription medicine was seen for Omeprazole, which had an MPR of 143.69 in chain pharmacies, compared to an MPR of 43.64 in independent pharmacies.

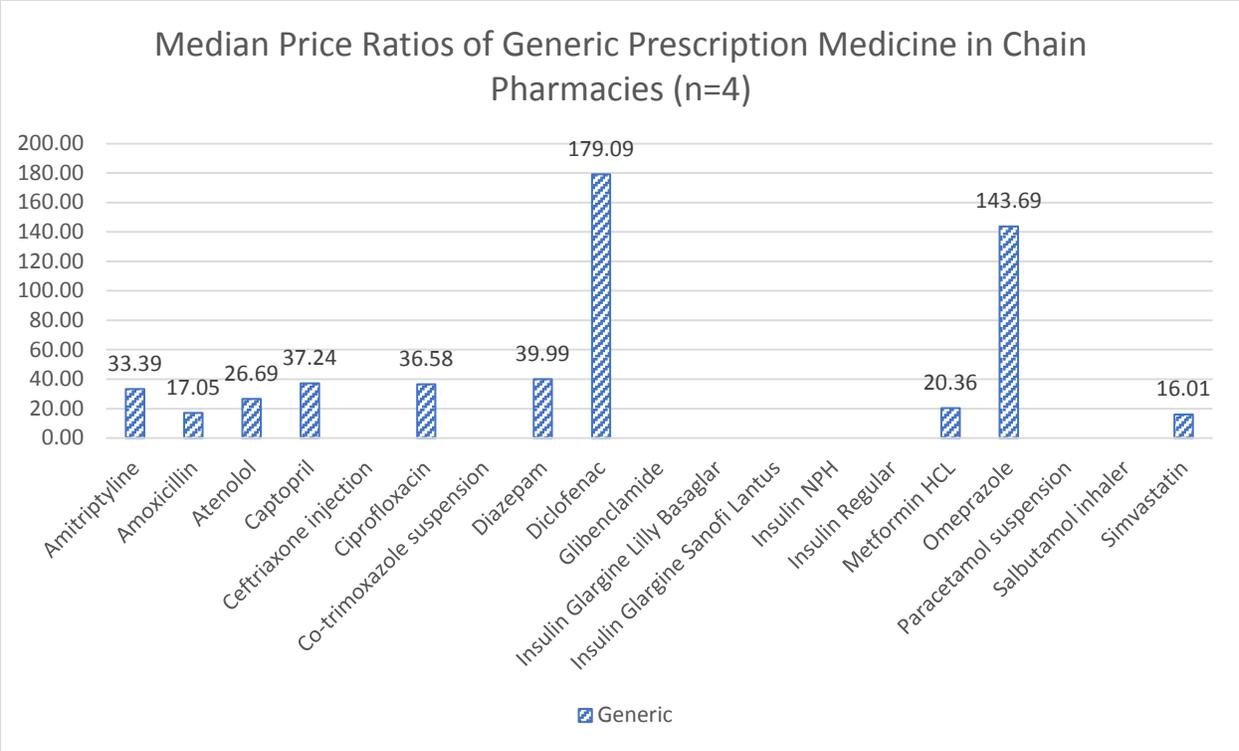


Figure 10. Median Price Ratios of Generic Prescription Medicines in Chain Pharmacies

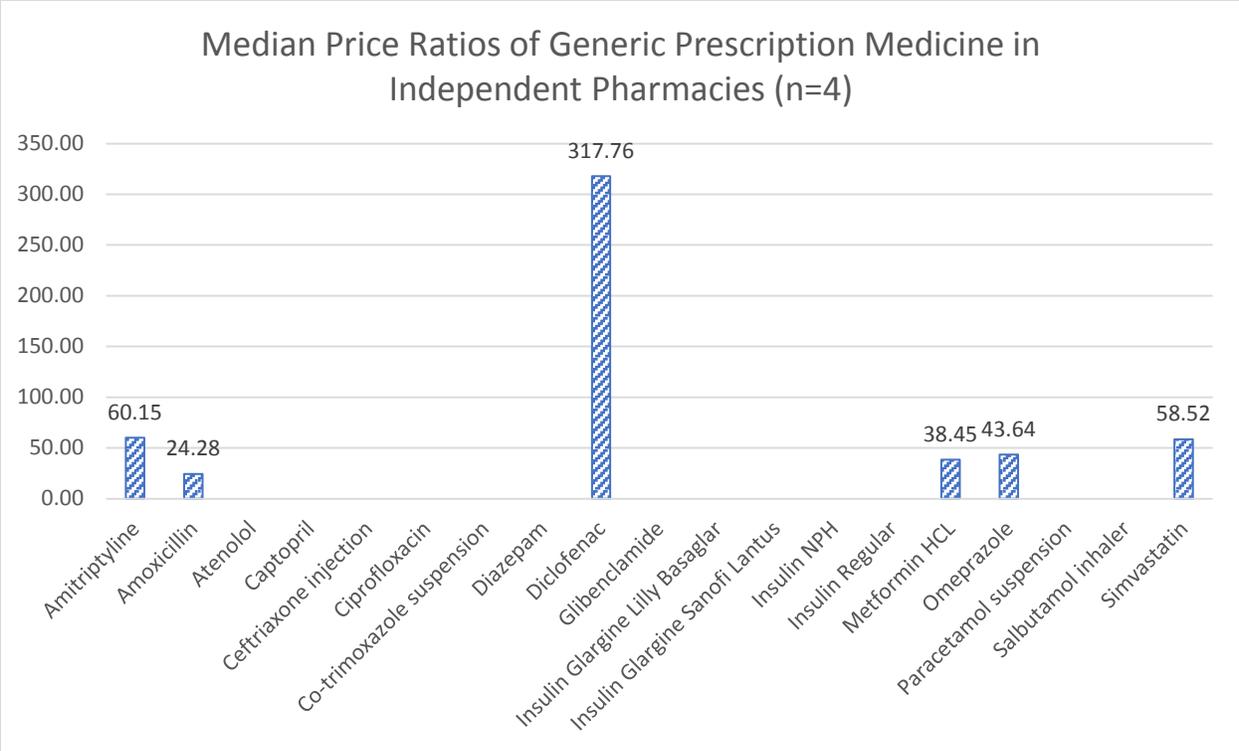


Figure 11. Median Price Ratios of Generic Prescription Medicines in Independent Pharmacies

Big Box Price Comparison

A price survey and inclusion of prescription drugs, similar to the ones collected from chain and independent pharmacies, was conducted at big-box stores. These medications were sourced from official webpages and the Good Rx¹⁴ site for prices from Costco¹⁵, Walmart¹⁶, Health Warehouse¹⁷, Hannaford Rx Club¹⁸, and Target CVS. We also included the reference prices from the MSH website.⁶ The median reference prices were obtained from the MSH website for the selected essential prescription medicines (Table 4). The price ratios were calculated using the online individual drug unit price and the MSH reference price.

The median reference prices were obtained from the MSH website for the selected essential prescription medicines (Table 4). The price ratios were calculated using the

online individual drug unit price from various big box stores and the MSH reference price.

Table 4. Selected Essential Medicines with Correlating MSH Reference Price

Sl.No	Selected Essential Prescription Drugs	Dosage Form and Strength	MSH Reference Price Units (2015)
1	Amitriptyline	25 mg cap/tab	0.0047/tab-cap
2	Amoxicillin	500 mg cap/tab	0.0184/tab-cap
3	Atenolol	50 mg cap/tab	0.0036/tab-cap
4	Captopril	25mg cap/tab	0.0110/tab-cap
5	Ceftriaxone injection	1g/vial	0.2428/vial
6	Ciprofloxacin	500 mg cap/tab	0.0231/tab-cap
7	Co-trimoxazole suspension	8+40 mg/ml	
8	Diazepam	5 mg	0.0027/tab-cap
9	Diclofenac	50 mg	0.0024/tab-cap
10	Glibenclamide	5 mg	0.0020/tab-cap
11	Insulin Glargine lilly Basaglar	100 iu/ml vial	
12	Insulin Glargine Sanofi lantus	100 iu/ml vial	
13	Insulin NPH	100 iu/ml vial	0.4379/ml
14	Insulin Regular	100 iu/ml vial	0.3050/ml
15	Metformin HCL	500 mg cap/tab	0.0070/tab-cap
16	Omeprazole	20 mg cab/tab	0.0093/tab-cap
17	Paracetamol suspension	24 mg/ml	0.0008/ml
18	Salbutamol inhaler	100 mcg/dose	0.0057/dose
19	Simvastatin	20 mg cab/tab	0.0525/tab-cap

Table 5. Acute (n=7) Medicine Price Ratios

Store	Amoxicillin 500 mg	Ciprofl- oxacin 500 mg	Diclofenac 50 mg	Omeprazole 20 mg	Ceftriax- one injection 1g/vial	Co- trimoxazole suspension 8+40 mg/ml	Paraceta- mol suspensi on 24mg/ml
Costco	8.15	7.36	175	24.73	39.37		
Walmart	5.98	7.36	141.67	34.41	45.10		
Health warehous e	8.15	17.32	141.67	10.75			
Hannafor d Rx club	5.98	7.36		32.26			
Target CVS	16.30	19.05	137.5	27.96	57.91		
Median price ratio	8.15	7.36	141.67	27.96	45.10		
Lowest median price ratio	5.98	7.36	137.5	10.75	39.37		
Highest median price ratio	16.30	19.05	175	34.41	57.91		
Max/Min Ratio	2.73	2.58	1.27	3.20	1.28		

Table 6. Chronic (n=12) Medicine Price Ratios

Store	Amitriptyline 25 mg	Atenolol 50 mg	Captopril 25 mg	Diazepam 5 mg	Insulin NPH 100 IU/ml	Insulin Regular 100 IU/ml	Insulin Glargine Sanofi lantus (UNIT PRICE)
Costco	44.68	41.67	63.63	29.63	38.14	54.75	183.78/10ml
Walmart	23.40	30.56	52.72	25.93	37.18	53.38	183.79/10ml
Health warehouse	102.13	16.67	64.55	55.56			
Hannaford Rx club		30.56					
Target CVS	46.81	47.22	58.18	44.44	39.23	56.33	183.79/10ml
Median price ratio	45.74	30.56	60.91	37.04	38.14	54.75	183.79/10ml
Lowest median price ratio	23.40	16.67	52.72	25.93	37.18	53.38	183.78/10ml
Highest median price ratio	102.13	47.22	64.55	55.56	39.23	56.33	183.79/10ml
Max/Min Ratio	4.36	2.83	1.22	2.14	1.05	1.06	

Table 6 (Continued). Chronic (n=12) Medicine Price Ratios

Store	Metformin HCL 500 mg	Simvastatin 20 mg	Salbutamol inhaler	Glibenclamide	Insulin Glargine lilly Basaglar (UNIT PRICE)
Costco	18.57	2.86		70	45.56/3ml
Walmart	15.71	4.19		55	45.56/3ml
Health warehouse	8.57	1.33		205	
Hannaford Rx club	8.57	2.10			
Target CVS	12.86	6.10		105	45.56/3ml
Median price ratio	12.86	2.86		87.5	
Lowest median price ratio	8.57	1.33		55	
Highest median price ratio	18.57	6.10		205	
Max/Min Ratio	2.17	4.59		3.73	

Table 7. Summarizes the medicine inclusion, median price ratios of the big box stores, minimum and maximum price in each big box store.

Store	Type of medicine	Acute n=7	Chronic n=12	Overall n=19
Costco	Inclusion(n%)	71.4	75	74
	Median Price Ratio	24.73	41.6	38.76
Health Warehouse	Inclusion(n%)	57.1	58.3	53
	Median Price Ratio	14.04	55.56	17.32
Walmart	Inclusion(n%)	71.4	75	74
	Median Price Ratio	34.41	30.56	32.49
Target (CVS)	Inclusion(n%)	71	75	74
	Median Price Ratio	27.96	46.81	46.63
Hannaford Rx Club	Inclusion(n%)	42.9	25	32
	Median Price Ratio	7.36	8.57	7.97
Overall summary	Inclusion(n%)	71	75	74
	Median Price Ratio	24.73	41.6	74

Results show that the overall inclusion percentage of studied medicines was variable, ranging from 32% (Hannaford) to 74% (Costco, Walmart, and Target). None of the stores showed 100% inclusion. Overall, chronic medicines (n=12) were marginally more available than acute medicines (n=7), with a mean inclusion of 75% compared to 71%, respectively. Almost all of big box stores had higher chronic medicine inclusion rates than acute except Hannaford.

Price

Costco and Target CVS had the highest MPR among all the discount programs at 38.76 and 46.63. Hannaford and Health Warehouse had lowest at 7.97 and 17.32 respectively. Walmart had a median of 32.49. Note that as different medicines are available, median prices vary. However, when we look at the maximum and minimum price ratios in tables 5 and 6, it is clear that prices vary considerably among the different big box stores.

When we compared the median price ratios to the year 2016 we see an overall increase in the price change. Although the sample size was greater in the year 2016.

Discussion

This study is part of a series that began in 2014 to evaluate access to essential medicines in the Boston area. The purpose of the 2017 iteration was again to identify and analyze the differences in the price and availability of prescription and OTC medicines, between chain and independent pharmacies. Both quantitative and qualitative methods were used to investigate price variations and assess barriers to the availability of affordable medicines, respectively.

Fifteen independent pharmacies and chain pharmacies were evaluated. Pharmacies were chosen by simple random sampling from a list of all operating independent pharmacies within the greater Boston area. Chain pharmacies were subsequently selected on the basis of their proximity to each of the independent pharmacies included in the sample, and only those accessible in relation to each independent pharmacy were included (see the section on sampling for more detail).

Price and availability data of a selected list of essential medicines was collected from chain and independent pharmacies using the WHO/HAI methods referenced above. Price calculations per dose unit (e.g. tablet or capsule) facilitated a comparative quantitative analysis of both prescription and OTC medicines.

Overall, similar trends were found across pharmacy settings for both prescription and OTC medicines. Chain pharmacies had higher availability of both prescription and OTC medicines. Generic medicines were more commonly available than their OB counterparts in both settings. And independent pharmacies tended to have a larger relative offer of generics versus OB medicines, as compared to chain pharmacies. However, this differential availability of generics versus OB medicines, was larger for OTC than for prescription medicines. For OTC medicines, a proportional difference in availability of 11% was found in chain pharmacies (72% OB versus 83% generics), whereas a proportional difference in availability of 17% was found in independent pharmacies (53% OB versus 68% generics). In the case of prescription medicines, a

proportional difference in availability of 28% (63% OB versus 35% generics) was found in chain pharmacies, against a proportional difference in availability of 31% in independent pharmacies (54% OB versus 23% generics). These findings left a net difference of availability of 5.6% and 3.0% respectively for OTC and prescription medicines, always higher for generics versus OB across both settings. This is coherent with the finding that the proportional availability of OB medicines was consistently higher than for generics within each pharmacy type.

In terms of affordability, the matched pair analysis of prices across settings showed that the MPR for OTC medicines tended to be lower in chain pharmacies for both generic and OB medicines. In the case of prescription medicines, it was not possible to conduct pricing matched-pairs analysis due to the low availability of OB medicines and limitations in data collection.

While the aggregated MPR analysis also showed lower prices for OTC generic medicines in chain pharmacies, OTC OB medicines appeared to be less expensive in independent pharmacies. Notably, for prescription medicines, the aggregated MPR analysis showed that the median MPR for LPGs was lower in chain pharmacies. Again, no median MPR was available for these medicines.

Findings within specific therapeutic classes are of particular interest. Among prescription antidiabetic drugs, there was striking unavailability. Generic insulins were unavailable in chain pharmacies and only available in one independent pharmacy of five investigated. The opposite was true for Glibenclamide (a Sulfonylurea), which was found in one of four chain pharmacies and in no independent pharmacy. Even among a small sample, it was noted that OB medicines tended to have lower MPRs than generic medicines. Among prescription medicines, omeprazole had the largest MPR difference between pharmacy settings, higher among chain versus independent pharmacies (150 vs. 44). Among all prescription medicines, diclofenac had the absolute highest MPR across all pharmacy settings.

Considering only OTCs, analgesic medicines showed significant variations in availability relative to pharmacy setting. Among independent pharmacies there was lower availability, because OB medicines were generally absent. In contrast, chain pharmacies tended to have 100% availability, except for acetylsalicylic acid which was poorly available (and absent in independent pharmacies). In the case of anti-acid drugs, availability patterns were more comparable between pharmacy settings, with omeprazole particularly having the highest availability in chain pharmacies (100%). Cimetidine was consistently more available as an OB. In the case of antifungal topic medicines, the trend was also of higher availability for OB than for generic versions in chain pharmacies. Finally, concerning antihistamines, the availability was almost 20% higher for generics than for OB versions in independent pharmacies, while fully available (100%) in chain pharmacies. Hydrocortisone, which had no OB option, was also fully available in all settings. Antihistamines and Paracetamol had the largest median MPR difference in independent pharmacies, whereas Cimetidine was the respective medicine in chain pharmacies.

Finally, regarding a comparison with big box stores, it was generally found that a higher availability existed for medicines treating chronic conditions, than those for acute conditions. In terms of price, the common variations were expectedly subject to the availability of medicines, as the survey results showed that different suppliers have different median price ratios depending on the availability of medicines. It is therefore desirable to look into all the discount programs to identify the medicines at the lowest price. Additionally, consumers must look into individual medicine prices from multiple sources (warehouse, big box, grocery, online and chain retail stores) in order to obtain the best possible price. In fewer words, patients need to shop around.

From this quantitative analysis, it is evident that significant variations for availability and affordability of medicines are found across pharmacy settings (i.e. independent and chain), and therapeutic classes. But untangling the causal explanations of these findings is not an easy task because understanding access barriers requires an analysis at various levels. Therefore, it should be realized that giving the advice to patients to

'shop around' is not as straightforward in practice as it sounds. Availability and affordability comprise essential pillars of access to medicines,¹⁹ with various determinant aspects within. Whereas the causes for variations in availability may reasonably correspond to issues around forecasting, distribution, delivery or other aspects, the discussion needs to be simultaneous to affordability. This is because unless medicines are affordable at the system and individual level, availability may become reduced in practice. But most determinant for this discussion, is an analysis focused on the architecture of the health system that underlies these access pillars. In the case of the United States, this concerns a system of highly convoluted organizational structures and dynamics,²⁰ in which the structure of price benefits such as discounts may significantly vary depending on the health insurance plan that the patient has. However, common to all insurance conditions, the average patient payments per drugs have sustainably increased in the last years, particularly for OB prescription medicines.²⁰ According to the 2016 Consumer Report, significant part of the revenue from total pharmaceutical sales (27%) were redistributed back to various actors in the distribution chain in 2016.²⁰ Understandably, the main impact of the complexity of this system and the resulting transactions, is a diffusion of accountability and a lack of transparency in price setting, as noted in the findings from the qualitative analysis of this report.

Qualitative surveys were conducted with independent pharmacy owners or managers to identify major access barriers for patients. Using semi structured interviews based on predefined domains, pharmacists were asked about diverse topics from professional ethics, to legal barriers, as shown in Diagram 1. The main findings are outlined below in Figure 12.

Domains	<i>Patient population and services offered</i>	<i>Sources of pricing information</i>	<i>Suggestions</i>
Main Findings	Mostly older patients Cash payments Close relationships High customer retention Focal/niche value services Long-term view of service provision	Variability in price competition and price determination Some plans increased access Poor price Information updates Contrasting views on PBMs	Patient education Foster legislative action Improve transparency
Domains	<i>Patient knowledge of pricing and insurance</i>	<i>Managing cost information</i>	
Main Findings	Patients often ignoring the differences of prices Willingness to inform and to help patients. Co-pays rarely the reason to prefer cash	Information sharing left on patients' hands Poor acknowledgement of Gag rules. Poor communication between all distribution actors. High value on ethical principles	

Figure 12. Main Findings from Qualitative Assessment per Domain Area.

Independent pharmacies were generally characterized for having a long-term approach to their business, leading to strategic management decisions. This was represented in the considerable variety of value-adding services they offered, such as medicines prepackaging, patient counseling, education, etc. The driving principle of this differentiated role was generally a view of their practice as a long-run exchange. This meant that pharmacy owners were reportedly eager to offer more competitive prices than chain stores, and were willing to help patients by making exceptions/adaptations for those in need. As a result, these pharmacies were highly reliant on a routine pool of customers.

It was also acknowledged that affordability of medicines was considerably variable depending on the health insurance plan of the patient, being easier for those with Medicare and Masshealth. However, it was also pointed that co-pays rarely tended to be the reason to prefer cash payments instead of using the insurance plan. For this, it is important to understand the fact that not many patients inquired for cash alternatives to insurance co-pays, generally because of ignoring any differential benefit. The few that

did, were usually prompted to do so by the situation of medicine price or availability they were in. This clearly exemplifies the main barrier of information sharing on cost: it is basically left on patients' hands, oblivious of the existing asymmetry of information. And yet, it was striking to find a poor acknowledgement of Gag rules. Understandably, the lack of recognition can be fed by political and contractual pressures ultimately pushing down on frontline pharmaceutical staff: the pharmacists.

It is worth noting that while strong perceptions of ethical values of the profession were present in the pharmacist's' narratives, there are significant discrepancies in actual behaviors around information sharing. This appears to respond predominantly to externally coercive factors rather than internal motivations. The slow price updates by upstream distributors like PBMs and their cumbersome operative processes, are significant contributors. This is compounded by poor communication channels between actors in the distribution chain, which further amplifies this problematic situation for pharmacists and patients. For the former, all of these systemic inefficiencies represent significant financial risks. Independent pharmacies tend to be the ones bearing the losses from outdated prices held by PBMs, when these have been changed by manufacturers. According to one pharmacy owner, this represents substantial amounts of dollars lost to their businesses every year, and changes are still at the pre-legislative phase. The concern is that pushing for structural changes in the current pharmaceutical distribution system is a very slow process with significant pressures in opposition.

The central issue of all this situation is ultimately the impact on patients. As noted above, essential medicines in the Boston area present considerable variations in availability and affordability across pharmacies. At the patient level this may pose a significant access barrier, of particularly regressive nature if considering the elder population that tends to rely on a higher number of medications and who also tend to be unemployed, thus lacking financial capacity. The surveys from this study demonstrate that there is currently a valuable offer of services by independent pharmacies in the area to fulfill patient needs. However, more can and needs to be done. For example, unless behaviors and belief systems regarding the transparent and spontaneous flow of

information exist, the regressive consequences on health inequalities for most vulnerable populations (i.e. the elderly) may worsen. This is especially important if considering that the general demographic trends for the US population show an aging of the population²¹, with an increasing life expectancy, likely as a result of progress in medical knowledge. This population will thus rely on more chronic medication treatments and poly-pharmacy. Considering that the US does not have long-term health financing mechanisms in place to cover for the elderly as in other developed nations, this argument gains more urgency today. Moreover, these nations have more regulated pharmaceutical systems that protect the consumer. A first step in this direction involves continuing research in this area, to increase availability of evidence for the current and increasing political debate in the US. Evidence is needed for legislative progress to gain traction, for transparency to increase and for patients and the public at large to be informed.

Strengths and Limitations

A limitation of this study was that some sampled pharmacies had to be excluded to reduce the sample size for logistical convenience. Moreover, the number of pharmacies assessed were less than expected mostly because pharmacy owners refused to participate in a research on this topic. However, this is a hardly modifiable factor, which has been consistently found in previous work in this line of research. In fact, studying this topic, and particularly from a qualitative approach, seems to be inherently difficult. According to findings highlighted above, this is coherent as a manifestation of information barriers and perceived fears or threats resulting for price information disclosures by pharmacists. However, it could also be consistent with the implications of high workloads in their practices. This remains to be clarified.

Another reflection of the magnitude of the problem of lack of transparency and information sharing on drug prices is that some pharmacists insisted on filling the data themselves. This poses an additional potential limitation due to possible information bias. Along the same lines, the price information corresponded to prices paid out of pocket, which may not be close to what most patients end up paying when they have

insurance. Supposing most patients are unaware of more affordable alternatives and are not confident enough to ask for these prices, it is likely that this research reflects an underestimation of the magnitude of the problem. It is also important to consider that the list of medicines evaluated do not necessarily represent the most severe situation of lack of access in Boston. To control this selection bias, a larger sample size and list of medicines would be recommended for future studies.

Despite the various limitations, this research has considerable strengths. First, our findings are consistent with Consumer Reports, showing an important variation of availability and prices for OTC and prescription medicines depending on location. Second, the WHO/HAI methodology used in this work is a notable contribution to the external validity of this research, as it comprises a method widely used around the globe. Third, this study is part of a long line of research, which substantially supports its internal validity in some aspects. For example, availability trends were generally consistent with previous reports¹⁰, such that in proportion, generics tended to be more readily available in independent pharmacies, and OTC medicines in chain pharmacies. The latter also tended to have higher availability rates overall. Nonetheless, regarding affordability, less similarities were found with previous reports. This may be due to inherent characteristics of the sampled pharmacies included in this analysis, as well as constraints of data collection. Potential improvements for future studies could include more robust samples and human resources. Finally, it is reasonable to suggest that at this point, the qualitative data from a cumulative perspective with past research, may lend itself as a preliminary piece of information to guide the design of future assessments to potentially transform the current debate. To achieve this, further qualitative research is decisive. By fully understanding the underlying perspectives and behaviors of the various stakeholders, is that informed action can be planned and successfully implemented through design thinking.²² This is coherent with other systems thinking frameworks, like the RAPIA assessments that encompasses analysis at the macro, meso and micro levels to inform policy change for increased medicines accessibility in health systems.²³ In conclusion, it is necessary to continue doing

research in this topic that combines both quantitative and qualitative methods. Only in this way is that informed action can be planned and successfully implemented.

Policy Perspective

Consumers in the United States encounter a variety of prices for the same medicines. Unfortunately, deciphering why prices differ for the same medicines is hardly straightforward. Prices are affected by costs associated with the medicines themselves—research and development, manufacturing, supply chain operations, and dispensing—but also by discounting and rebating, formulary management, and legislation. Addressing the increasing burden that high prices place on consumers is a political priority among legislators nationwide and several policy options are being weighed. Restricting out-of-pocket costs, establishing price controls, and facilitating market competition represent three policy options with the potential to benefit consumers. A combination of policies will be necessary to create meaningful impact.

Whether a patient carries health insurance that includes prescription drug coverage has a significant impact on the price they pay at the pharmacy and on their use of medicines. While uninsured patients face the highest prices, a significant proportion of patients who carry insurance also face prices they cannot afford, especially when deductibles must be paid before insurance takes effect. Among patients with insurance, 14% report skipping a prescription or a dose because it was unaffordable.²⁴ Increasing coverage is not enough to address affordability and seven states have passed legislation to limit out-of-pocket spending on prescription medicines. Limits can lessen out-of-pocket spending by setting monthly or annual caps or by banning insurers and PBMs from creating formularies that tier certain drugs above the traditional generic, preferred, or brand categories.²⁵ Although these policies lower out-of-pocket costs for individual patients, they increase premiums by spreading more costs across all policy holders.

Price controls that act on the cost of medicines at the manufacturer and wholesaler levels may do more to decrease costs without raising premiums. Allowing Medicare to

negotiate medicine pricing with manufacturers has been long touted as one means to lower costs, but as a 2004 Congressional Budget Office (CBO) report points out, cost-savings could only be achieved if the HHS Secretary were additionally allowed to establish a formulary and restrict access to certain medicines.²⁶ Without a formulary, CBO has suggested that the Secretary would not be able to achieve cost-savings through discounts and rebates beyond what is already achieved by private Medicare Part D plan sponsors.²⁶

Unlike Medicare, federal law requires manufacturers to provide Medicaid a rebate between 13.0 and 23.1% of the average manufacturer price (AMP) per unit, depending on categories in which medicines are included. The CBO has estimated that extending this rebate to just dual-eligible Medicare beneficiaries—those qualified for both Medicare and Medicaid—could reduce federal spending on medicine by \$145 billion between 2017 and 2026.²⁷ Whether or not these rebates reduce Medicare premiums and cost-sharing would depend on whether the government could afford to pass on its savings and would decide to do so.

Provided the uncertainty in federal price control strategies, many policy-makers have proposed leveraging market forces to increase competition among medicines manufacturers. Reducing patent exclusivity periods and facilitating the introduction of generic biosimilars could create billion-dollar savings. Expanding value-based medicine purchasing by requiring the use of least-costly alternatives represents another competition-driven option, though likely less impactful. Policies that aim to increase competition can leverage forces within the retailer market as well. Retailers have the potential to benefit especially those patients without insurance or whose insurance imposes unaffordable deductibles and cost-sharing. Big box retailers compete on large sales volumes and several offer medicines at cash prices less than what consumers would pay if they used their insurance. Independent pharmacies are sometimes able to price match when patients mention lower prices found at competing nearby pharmacies.²⁸ However, patients unaware of competitive cash price options or without easy access to big box retailers are unlikely to benefit. Policies that promote competition

among retailers might aim to bolster patient awareness by increasing price transparency among pharmacies.

Although little has happened to increase price transparency at the federal level, Louisiana, Nevada, Maryland, North Carolina and Vermont have passed legislation to increase price transparency among manufacturers.²⁹ Arizona, California, Connecticut, Florida, Illinois, Indiana, Maine, Massachusetts, Michigan, Montana, Oregon, Rhode Island, Tennessee, Virginia and Washington are considering similar measures.³⁰ Whether these efforts can result in meaningful change is unknown and complicated by difficulties in measuring the real prices paid for medicines, after discounts and rebates.³¹ Some laws require manufacturers who raise wholesale prices by certain percentage thresholds to report increases in advance or even to justify them. However, these laws may encourage manufacturers to set initial prices even higher—to avoid having to report large increases over time—and justifications are likely to reiterate explanations policymakers have heard before.³² Increasing transparency at the point of sale may do more to benefit the consumer. North Carolina prohibited PBMs from contractually restricting pharmacists from informing their patients about the efficacy of lower-priced alternative drugs when available—outlawing the so-called gag rules PBMs impose on the pharmacies they contract with.³³

Policymakers will learn from emerging state-based efforts to increase transparency and benefit the patient-consumer, especially provided the diversity of strategies being tested. As not every policy option discussed benefits all consumers equally, a combination of measures that reduce consumer cost-sharing, effectively restrict high prices, and facilitate market competition will be necessary to meaningfully address the cost of medicines.

Conclusion

The lack of transparent medicine pricing at the state and federal levels must be addressed. There is an astounding amount of data suggesting the significant variance in pricing among independent, chain, and big box pharmacies. Big box pharmacies in particular have large cost discrepancies despite similar procurement methods. Data must also be collected on how much the state health insurance programs are paying for medicines, as there is minimal transparency. The costs associated with state health programs are likely to be the lowest. Although this survey attempted to collect data regarding MassHealth, the data was unavailable. This data is required for lawmakers to pass legislation regarding the reduction of drug prices.

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Appendices

Appendix 1: Complete List of Quotes

Socioeconomic status

“A lot of people don’t have insurance because they can’t afford it.” (1-2)

“Large section of our patients are wealthy senior citizen using Medicare part D and now we are having new families with kids last five years. It is nice to have all kinds of population.” (6-1)

Finance

“We have more cash patterns than we did then years ago.” (1-1)

“A lot of people have turned down medication due to co-pays.” (1-16)

“Our patients are mainly from middle/upper class, and from 0 to 100 years old.” (4-2)

Relationship with patients:

“People are not a number, we know their names, they know we care about them so they are willing to come back.” (3-1)

“We know our patients by name.” (6-1)

“.... most of them are thought referral or words of mouth. We don’t have a large budget for advertising and we can’t compete with the large chains so most of it is by word of mouth- reference through doctor’s office based on services we provided.” (10-8)

“We don’t want 10 consumers who walks in once, we look for that once customer who walks in 10 times. We concentrate on service delivery which is why we’re standing well for over 80 years.” (11-1)

Languages

"We speak English but we have a pharmacist who speaks Armenian and sometimes serves people of the community in Armenian." (4-3)

"We are not using pharmacists based on the language skills but some patients speak French and one pharmacies speaks Armenian." (6-3)

"I myself speak English and Spanish fluently and we have Greg (Pharmacist) who can speak Haitian." (11-2)

Services

"We haven't started it (MTM) yet...it's very time consuming. (1-3)

"We are offering vaccination services but free delivery services ad blister packing". (4-3)

"I am opposed to providing services such as a vaccination, especially without an appointment and we want to focus on providing medication." (6-2)

"We have to do the best we can to get our customers, providing services like delivery, really managing patients' medication.... We really have to put in that much time and we really care about the patient...there you're just a member." (10-6)

Customer Service

"I got a lot of people coming from chains...it's definitely something to do with consumer services." (1-17)

"We get people in and out fast and no waiting time for patients." (6-3)

"... because what's happening now with the big chains in order to stay in business as an independent, you really have to go above and beyond to provide certain good services to the customers which makes them want to come back. Like if someone walks in here, I want to personalize the care. I know them by name." (10-1)

Pricing Information Availability

"I think we have little flexibility concerning the establishment of the price" (4-7)

"We get the price from the computer, everything." (4-4)

“The price is very competitive honestly compared to the chain pharmacies.” (6-12)

“We want to give good service and keep our prices consistent; we are always in the price average in the region.” (3-5)

“There’s truly very strong competition with the chains.” (10-7)

“Masshealth is our biggest customer. I don’t know the criteria they use to set prices, but I believe they set it based on shopping around and then going with the lowest possible price in order to save money.” (10-3)

“The prices are set by a formula; the owner must have a small flexibility to adjust it.” (4-5)

“The owner sets up the formula for the price of medication and we follow the price.” (6-4)

Insurers

“Masshealth copays are usually extremely low.” (10-6)

“We deal with the different plans with the computer, same for Masshealth.” (4-9)

“It’s a calculated game for the insurers. If price drops they change it fast, compared to if price hikes. The pharmacy on the other hand is bound to see to the patients and still lose money.” (3-6)

“Our patients are using Masshealth as a complementary insurance to pay the copay of Medicare part D.” (6-6)

“We have more information for the Medicare patient, as we have access to patients’ database, but for the rest, the patients must come with their insurance plan.” (4-6)

Pharmacy Benefit Managers

“We are actually audited by two PBMs, we have to send them a certain amount of prescriptions, the control it, and will adjust the payment according to their observations.” (6-15)

“More control concerning the PBM.” (6-17)

“Oh, the PBM, they exist, but I don’t have a lot of knowledge about it.” (4-14)

“PBM is evil and they are making revenue stream.” (6-5)

Insurance Coverage

“We had zero questions about price difference last year and we are having more questions this year.” (6-9)

“Clearly tell the price difference if they ask.” (6-10)

“Patients are not aware of the price difference between cash-pay and insurance.” (6-7)

Customer Payments

“We do have mostly Medicaid patients. It’s a poor neighborhood so most of them have Medicaid.” (10-2)

“Most people don’t have this problem (cannot pay for the medication) they just don’t want to pay for the medicine, return to the doctor to ask for another one.” (4-2)

“Patients buying OTC drugs or paying in cash, a 10% discount is offered after a certain amount of purchase in a time period.” (3-10)

“If the patient cannot afford, we always find a way or a solution in the most extreme cases. We don’t want to ruin patient relationship for a few hundred dollars.” (3-7)

“I don’t know about that (Masshealth) but we will give them the drugs which makes sense for both of us (patient and store).” (11-4)

Insurance Cost Sharing

“It is almost insulting/ ridiculous how low the copay is.” (4-8)

“Most of them know about the copay and deductible.” (4-11)

“They are not many who choose not to use their insurance and when they don’t use it, it is not because of the price, but because of the medications.” (4-10)

“Patients forget there is a deductible and we have to explain it to them.” (6-8)

Pricing Information Sharing:

“I will not tell all the price options without being asked because I do not have time” 6-11

“The patients generally call their insurance when they want more information”. 4-13

“The pharmacy does not interact directly with PBMs ‘We don’t communicate with them at all’”. 8-2

“The owner stated that all of his pricing information derives ‘entirely from consumers’”. 8-1

“It (disclosing prices) used to be very easy when I first entered this profession because we used to have limited number of insurance types and the (price) variation is not that great. People know what they want and they compare all the options before coming here. Sometimes, they are more knowledgeable than us.” 11-3

“I tell patients to call and ask their insurance (regarding pricing information).” 1-15

Price Information Gag Rules

“I have no problem or restriction to tell the price to the patient, but they usually don’t ask” 4-15

Ethical Responsibility

“It doesn’t have to be MIPA, but we have a moral obligation to be ethical in our practice and in conducting our duties. You just follow the code in good faith to dispense medicines in good faith and do your due diligence when you have to practice using the best moral obligation standards that you can attain.” 10-9

“We are very price conscious, at the end of the day we need to sleep well.” 3-3

“We are more concerned about education than about the money. We are here for the long run.” 3-4

“Making sure that the patients adhere to taking their medicines. Studies show that if patients are not taking medicines the way they are supposed to take it, the government ends up spending more money because there is an increase in hospitalization.” 10-7

“We are very ethically driven profession. We were considered top second in the national surveys of most trusted profession”. 3-8

Big box stores/clubs

“(about Walgreens down the street) It’s fancy so they go there and get a bunch of other items... not necessarily because the service is good, but it’s a bigger chain.”

“I can beat any chain price”. 1-10

Suggestions

“Transparency should be improved for the patients.” 6-16

“We need laws, but it’s always a political fight. The law is on the ballot, and has long path ahead.” 3-9

“This all has to be done legislatively.” 4-16

“As a profession, we are not as active as we should be toward the legislator, to ensure that pharmacist are not screwed, we do not have a national corporation.”
4-17

“If they could at least increase the reimbursement for independent pharmacies so that way more of them could stay in the business, things would be much better.”
10-10

Todd Brown, MIPPA Interview

“Independent pharmacies are very able to compete with in the marketplace typically by developing closer relationship with their patients”. T-1

“Areas that have a high particular ethnicity people a pharmacist from same ethnicity opens up pharmacy because people like to interact with the pharmacist who looks, thinks and acts like them”. T-2

“They (independent pharmacies) offer specific services that differentiate them with the chain and big box pharmacies.” T-3

“Services like adherence management, counselling and education for patients, compounding medications and delivery.” T-4

“Higher percentage of patients are insured and very few pay cash price and hence pharmacies are focusing less on this as the population is less.” T-5

“Cash prices are based on standard formulas and mostly they (pharmacies) modify it based on the area and competition.” T-6

“Chain pharmacies through their advertising have created an impression that they have low prices but that’s not the case their prices are very high.” T-7

“Insurance companies set the price and most of the time get a good deal because the insurance companies negotiate their prices with the pharmacies.” T-8

“If drug prices have increased the copay and coinsurance also increase.” T-9

“Copay for inexpensive generics or brand medicine in low quantity could be greater than the cash price or the price that PBM is even paying the pharmacy.” T-10

“Contracts that the PBMs give pharmacies prohibit the pharmacies to tell patients that they are better off paying cash.” T-11

Ethical professional challenges? - “pharmacists are very concerned about it, that is why I’m writing these articles to create awareness to prohibit PBMs to charge more than they should.” T-12

“We don’t have an official written position, but we communicate to legislators that we don’t agree it’s correct for the patients (...) many times, nobody knows it, that’s why we want to raise this issue so it can be addressed”. T-13

“Pharmacies are concerned about not getting caught by PBMs, which would end the contracts they signed if they deviate” T-14

“this is gaining more tension at state and federal levels”. T-15

“Feds are concerned in Medicare and Medicaid programs which are not that affected”. T-16

“In Medicaid most programs don’t use PBMs to manage the pharmacy, they use the PBMs to administer and do as they say, but the Medicaid program sets the rules such as setting the price.” T-17

“Medicare D could potentially have that, but insurers again cannot charge more than the manufacturer price to avoid the Doughnut Hole”. T-18

“The healthcare market should be more transparent, it’s more of a struggle in the pharmacy arena, because PBMs are large companies that fight transparency in order to be able to play these games of charging more”. T-19

Do PBMs get rebates by manufacturers? - “Yes, and they do not pass it all along to the consumer. And if they do they create other fees. They are excellent and finding ways to capture more revenue that they don’t pass along”. T-20

“There’s been a lot of focus in the price of insulin, it’s clear it has skyrocketed. The PBM would say the companies are raising their prices, the drug company is saying it’s because the PBMs are driving discounts which is why they have to rise prices to cover these costs.” T-21

“Patients are not aware of what is going on at all. Most patients aren’t cash patients, so their copays will be the same almost anywhere. But many times, they don’t know that paying cash can be better”. T-22

“The PBM in their contracts with pharmacies prohibit them from suggesting to patients who have insurance, that they not use the insurance. If they get caught doing that by one of the PBMs they can be cancelled the contract”. T-23

“What we’ve been doing is raising the issue to educate patients if they have an expensive medication to ask about the cash price, which the pharmacies should tell them”. T-24

“The real fix is in the legislature to prevent the action of not telling patients. All the purpose behind these articles is to keep pressure on the legislature to raise attention on the issues with the PBMs, which is only one of the many issues”. T-

25

Appendix 2: List of OTC & Prescription Medicines Included in the Survey

Name of Medicines	Dosage and form(s)
Acetaminophen/Paracetamol	500 mg cap/tab
Acetylsalicylic Acid	500 mg cap/tab
Cimetidine	200 mg cap/tab
Clotrimazole	0.01g vaginal cream
Diphenhydramine HCl	25 mg cap/tab
Hydrocortisone	0.01g topical cream
Ibuprofen	200 mg cap/tab
Loratadine	10 mg cap/tab
Miconazole Nitrate	0.02 g topical cream
Omeprazole	20 mg cap/tab
Ranitidine	150 mg cap/tab

Name of Medicines	Dosage and form(s)
Amitriptyline	25mg cap/tab
Amoxicillin	500mg cap/tab
Atenolol	50mg cap/tab
Captopril	25mg cap/tab
Ceftriaxone Injection	1g/ vial
Co-trimoxazole Suspension	8 + 40 mg/ml
Diazepam	5mg cap/tab
Diclofenac	50mg cap/tab
Gilbenclamide	5mg cap/tab
Insulin Glargine Lilly Basaglar	100 iu/ml vial
Insulin Glargine Sanofi Lantus	100 iu/ml vial

Insulin NPH	100 iu/ml vial
Insulin Regular	100 iu/ml vial
Metformin HCL	500mg cap/tab
Omeprazole	20mg cap/tab
Paracetamol Suspension	24 mg/ml
Salbuterol Inhaler	100 mcg/dose
Simvastatin	20mg cap/tab