

Medicine Prices: a new approach to measurement

Illustrative examples of results from pilot studies, 2001-2002¹

1. The approach

The WHO/Health Action International manual “Medicine Prices – a new approach to measurement” explains how to undertake a sample survey of the retail prices of 30 “core” medicines. The core medicines, listed on page 30 of the manual, were chosen as widely available medicines in standard formulations, used to treat both acute and chronic conditions that cause a significant share of the global burden of disease. Their importance is underscored by the presence of most on the WHO Model List of Essential Medicines. Investigators are encouraged to develop supplementary lists wherever local disease or policy concerns are not adequately reflected in the core list.

Prices and availability of innovator brand products as well as the nationally most sold and locally lowest priced generic equivalents are sampled. Software supplied with the manual allows up to four major sectors of local relevance to be sampled (e.g. public, private for-profit, private not-for-profit).

In addition to retail price data, the manual encourages investigators to examine the major components of price. In this way the manufacturer’s price or procurement price can be identified separately from price components reflecting local distribution costs and other add-ons, such as taxes and tariffs, wholesale and retail margins.

To assist in the interpretation of price information, the electronic worksheet which accompanies the manual automatically generates “treatment affordability” calculations for nine conditions, using local price information and the daily wage rate of the lowest paid government worker.

International price comparisons are facilitated by the use of a common set of “benchmark” or reference prices for the medicines surveyed. All analysis is in terms of ratios of local prices to these reference prices. Local prices are converted into US dollars at the exchange rate prevailing at the time of the study. The reference prices supplied with the worksheet are taken from the Management Sciences for Health (MSH) Drug Price Indicator Guide. MSH 2001 prices were used in the pilot studies; 2002 prices are supplied in the Microsoft Excel Workbook on the CD-ROM accompanying the manual. As the MSH prices are for volume purchase generic medicines they are often likely to be lower than the prices paid by patients. Nevertheless, the MSH prices do provide a useful benchmark of actual prices in international transactions.

The data that follow are from survey results from several countries that conducted field tests of the WHO/HAI Medicine Pricing Survey Methodology as it was being developed. Careful steps have been taken to present only data that were collected in a manner consistent with the revised survey methodology. The elimination of other, inconsistent data has in some instances led to facility samples or specific product samples that are smaller than the targeted sample sizes. For this reason,

¹ This paper was written principally by Jeanne Madden, PhD, with inputs from Dennis Ross-Degnan, ScD, both of Harvard University. It would not have been possible, of course, without the pilot surveys, and without the continuing involvement of all of the principal investigators identified on page 3 of the WHO/HAI pricing manual.

and because the studies described here represent the earliest survey efforts, these pilot findings should be treated as a preliminary illustration of what the methodology can produce.

Section 2 below presents data on price composition. Section 3 presents some within-country price comparisons, looking at innovator brand and generic prices, at regional price differences, and at price and availability differences in different sectors. Section 4 makes international comparisons, bringing together price information for some branded and generic medicines in 8 countries. The final section converts price data into affordability assessments for some chronic conditions and for acute infections, contrasting treatment costs for innovator brand and generic medicines internationally.

2. Examining price components

In order to understand some of the reasons why prices differ between sectors and among countries, the manual includes a module that breaks down prices into their component parts. This is a useful tool in determining where the money spent on medicines actually goes, and thus can help point toward policy solutions to medicine pricing problems revealed in the survey. Figure 1 presents an example from Sri Lanka of the locally added charges which combine with the procurement price to make up retail price in the private sector. It shows how a base price including ex-factory cost, insurance, and freight of 602 Sri Lankan rupees rises incrementally as it makes its way through the standard channels, eventually becoming a price to the consumer of 990 rupees for a package of 100 tablets. (In this example, mark-up percentages are actual, but the cost, insurance, freight (CIF) price was calculated backward from the median local facility price.)

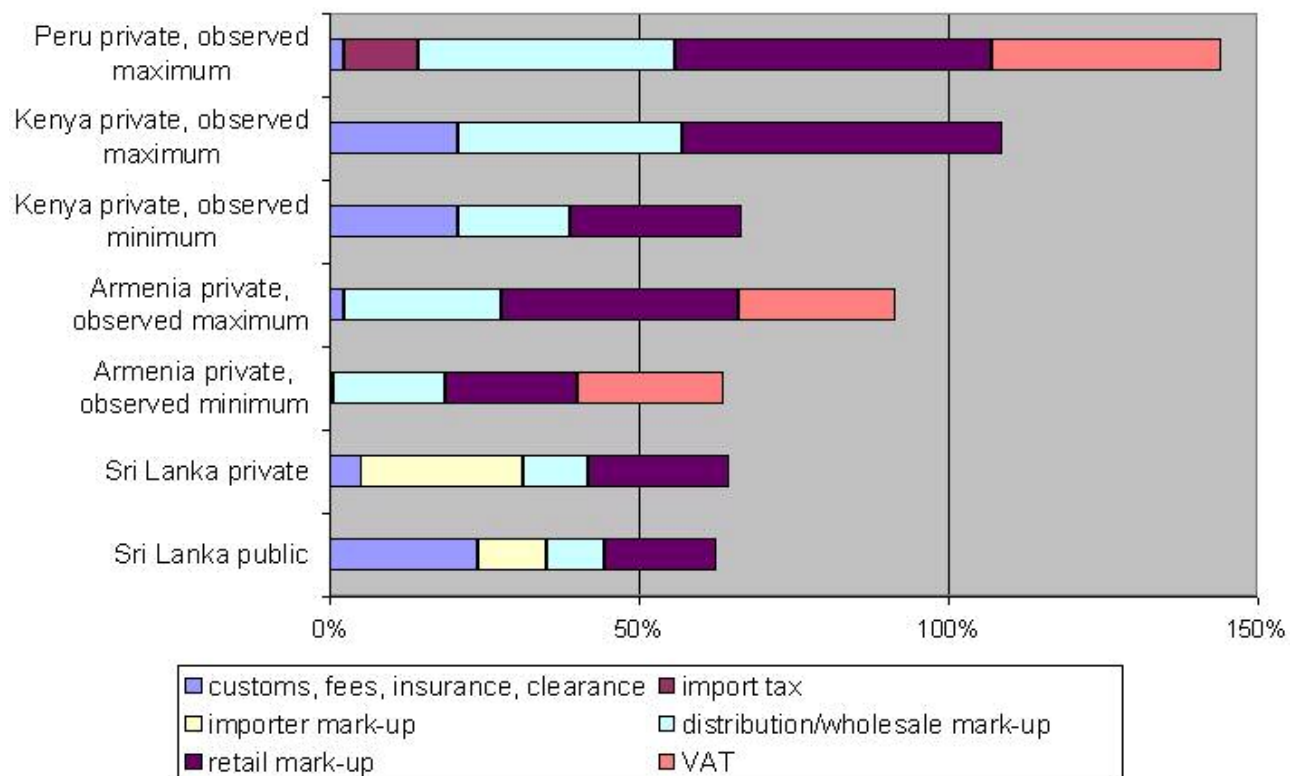
Figure 1
Components of retail price: example from Sri Lanka, private sector

Example 2: Medicine Name	Medicine Strength	Dosage Form	Target Pack Size	Dispensed Quantity	Type of Charge	Charge Basis	Amount of Charge	Price of Dispensed Quantity	Cumulative % Mark-up
Amoxicillin	250 mg	tab	21	100	Cost, insurance, freight (CIF) price	NA	NA	602.10	0.00%
					Stamp duty and clearing	percent	.05	632.21	5.00%
					Importer mark-up	percent	.25	790.26	31.25%
					Wholesale mark-up	percent	.08	853.48	41.75%
					Retail mark-up	percent	.16	990.03	64.43%

Figure 2 brings together and compares preliminary price components data from several countries. In countries where a range of results was reported, we have presented this range as separate minimum and maximum mark-ups. It should be mentioned that Kenya reported these data as the typical range, but added that for certain inexpensive generics the retail mark-up may be as much as 100% over the retailer’s purchasing cost. Figure 2 demonstrates that the price that consumers pay for imported medications is not merely a function of manufacturer’s price – consumer price also depends a great deal on fees associated with the importing process, on charges wholesalers and retailers later add, and, in some countries, government importation and value-added taxes.

Together with the international price comparisons discussed below, price components analysis allows decision-makers to assess the relative importance, for any medicine, of getting better prices from manufacturers or tackling local price add-ons. In many situations, both may be necessary.

Figure 2
Total mark-up as percentage of CIF price, for imported medicines:



3. Comparing prices within a country

3.1 Comparisons prices for individual medicines in a sector

Country investigators consolidate data from each sector they survey (e.g., private pharmacies, public clinics) into a single spreadsheet page in the electronic Workbook that accompanies the WHO/HAI manual. A portion of such a page pertaining to the Armenian private sector is shown as a screen-capture in Figure 3. The two right-most columns show local currency unit prices from the first two facilities, as entered by the investigators. In the central shaded columns are summary statistics for each medicine product across all the private sector facilities.

The “median price ratio” or MPR is the featured statistic in most of the following discussion. This is the median across the surveyed facilities of the prices found, expressed not in local currency but as a ratio of the local price in US\$ to the MSH international reference price.

The Armenia example illustrates the market variation captured by the survey. Innovator brand ceftriaxone can generally be obtained at 5.2 times the international generic price, while the most commonly sold generic version can be found at less than half of the local brand price (i.e.,

MPR=2.4). Price ratios for brand ceftriaxone ranged from 4.6 to 6.7 in the 40 private facilities sampled. The median price ratio among the cheapest generic versions found at each outlet was 2.3.

For ciprofloxacin produced by the original manufacturer, on the other hand, Armenians in the private sector must pay about 95.5 times the international generic price, and even the leading generic has quite a high price ratio (16.0). Facilities were much more likely to carry the popular generic than the innovator brand (75% of facilities vs. 15%, respectively). At least one generic version was found in 85% of the outlets. The MPR among the cheapest generic ciprofloxacin available was 6.7.

Figure 3
Single-Product Statistics across Facilities: Armenia Private Sector

No.	Medicine Name	Medicine Type	Median (MPR)	25%ile	75%ile	Min	Max	% with med.	1	2
9	Ceftriaxone injection	Brand	5.24	5.08	5.70	4.60	6.66	60.0%	4200	4250
9	Ceftriaxone injection	Most sold	2.42	2.30	2.66	2.18	3.03	52.5%	2000	1900
9	Ceftriaxone injection	Lowest price	2.30	2.27	2.54	1.74	3.03	57.5%	2000	1900
10	Ciprofloxacin	Brand	95.54	94.39	96.26	90.73	103.48	15.0%		1970
10	Ciprofloxacin	Most sold	16.00	15.40	17.21	13.48	19.83	75.0%	300	320
10	Ciprofloxacin	Lowest price	6.74	4.81	15.88	4.33	19.83	85.0%	100	95
11	Co-trimoxazole suspension	Brand	8.69	7.72	8.93	7.00	9.65	82.5%	18	16
11	Co-trimoxazole suspension	Most sold	8.20	7.24	8.20	5.65	9.27	42.5%	15	
11	Co-trimoxazole suspension	Lowest price	7.82	6.76	8.20	5.65	8.69	55.0%	15	

3.2 Summarizing results for all products in a sector

A simple button in the Workbook shifts the view from the data detail in Figure 3 to a summary across the sector, a portion of which has been captured below as Figure 4. In this instance, the data are from Kenya's private sector. On the left side of Figure 4, data are summarized across surveyed products that were found in sufficient numbers to be considered representative (i.e., in 4 or more facilities). There were 17 innovator brand products found in sufficient numbers, 15 nationally-identified "most sold" generic products, and 20 locally "lowest priced" generics. As a group, these provide a reasonable representation of the price conditions in Kenya's private market. Among brand products, the median of the MPRs for the individual medicines is about 17 – the "typical" ratio of local retail price in Kenya over the competitive international standard. For generics, Kenyan prices are considerably closer to the international standard, with a typical ratios of 3.0 and 3.6. Below the median MPRs in Figure 4 are other statistics which demonstrate the variation in price ratios among different products. The highest median MPR for any of the 17 brand medicines was about 123 and the lowest just 3.5. Half of the leading generic products had median prices in the range of 2.5 to 4 times the international standard.

Figure 4
Summary Price Statistics for Products in a Sector: Kenya Private Sector

	Analysis Includes All Meds.			Analysis Includes Only Medicines With Prices Found for Both Types in Pair					
No. of meds. included	Brand	Most Sold	Lowest Price	Brand	Most Sold	Brand	Lowest Price	Most Sold	Lowest Price
	17	15	20	11	11	15	15	15	15
	Summary of Medicine-specific Median Price Ratios (MPRs) For Meds. Found in 4+ Outlets								
Median MPR	16.96	3.03	3.57	16.96	3.48	16.96	3.86	3.03	3.41
25 %ile MPR	7.87	2.46	2.31	9.57	2.46	9.57	2.41	2.46	2.31
75 %ile MPR	30.14	3.98	6.06	30.03	5.70	36.92	7.12	3.98	3.92
Minimum MPR	3.45	1.88	1.70	4.67	1.88	4.67	1.70	1.88	1.89
Maximum MPR	122.98	12.03	16.55	107.87	12.03	122.98	16.55	12.03	10.01

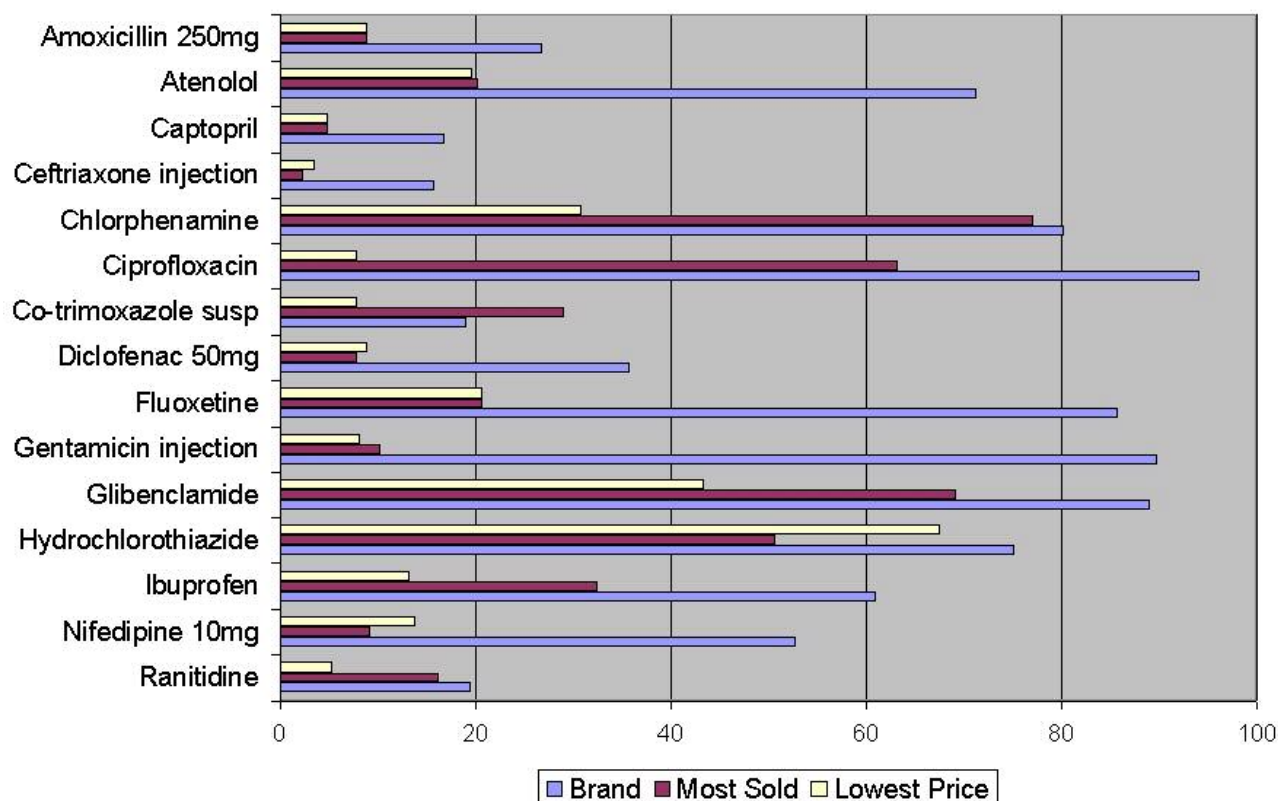
3.3 Comparing brand and generic prices within a sector

While 30 medicines were *targeted* in the Kenya survey, the products that were actually *found* (and included on the left side of Fig. 4) are obviously fewer than 30 for each of the main categories (i.e., innovator brand, most sold generic and lowest priced generic). It is also clear from the numbers of found medicines that the categories do not include equivalent sets of medicines. In order to make a fair and accurate comparison between any two categories in the Kenyan private market, the analysis should be limited to medicines with equivalents found in both versions. On the right-hand side of Figure 4, results for equivalent pairs are presented. Looking at the first pair of columns on the right, we can see that there were 11 medicines found in both the brand and most sold generic version. The median MPRs for this restricted analysis happen to be very similar to those in the all-medicines analysis – 17 and 3.5 respectively. Also, the minimum-maximum range for the most sold generic MPRs is the same as before (i.e., about 2 to 12). However, the range for brand MPRs has narrowed somewhat. This is because the brand product with the highest MPR (ciprofloxacin) apparently does not have a strong generic competitor on the Kenyan private market. Accordingly, ciprofloxacin dropped out of the restricted analysis. The results in these first two columns on the right side of Figure 4 can be read as indicating that the “typical brand premium” paid by Kenyans in the retail setting is approximately a 487% increase in price (i.e., 16.96/3.48).

Additional columns in the right half of Figure 4 compare innovator brands with “lowest priced” generics, and “most sold” generics to “lowest priced” generics, always using equivalent sets. Note that sometimes the “lowest priced” products, which are identified at the facility level, may sometimes have medians above those for equivalent “most sold” products. This is because the “lowest price” measurements can be taken in all shops that carry the leading generic, as well as in some other shops that carry only alternative generic versions. Shops with different selections undoubtedly differ in other important ways that affect sales prices.

Investigators in Peru also collected data on the three versions of the medicines targeted by the survey: the innovator brand product, the nationally most-sold generic, and the locally lowest price version. In Figure 5, data for 15 medicines that were widely available in all three price categories in Peru are presented in graphical form. Because each of the bars in this graph is a median among facility observations for that category, these data only hint at the wide range of retail prices actually found.

Figure 5
Comparison of Private Sector MPRs for 14 Medicines in Peru:
Innovator Brand, Most Sold Generic, and Lowest Price Generic Versions



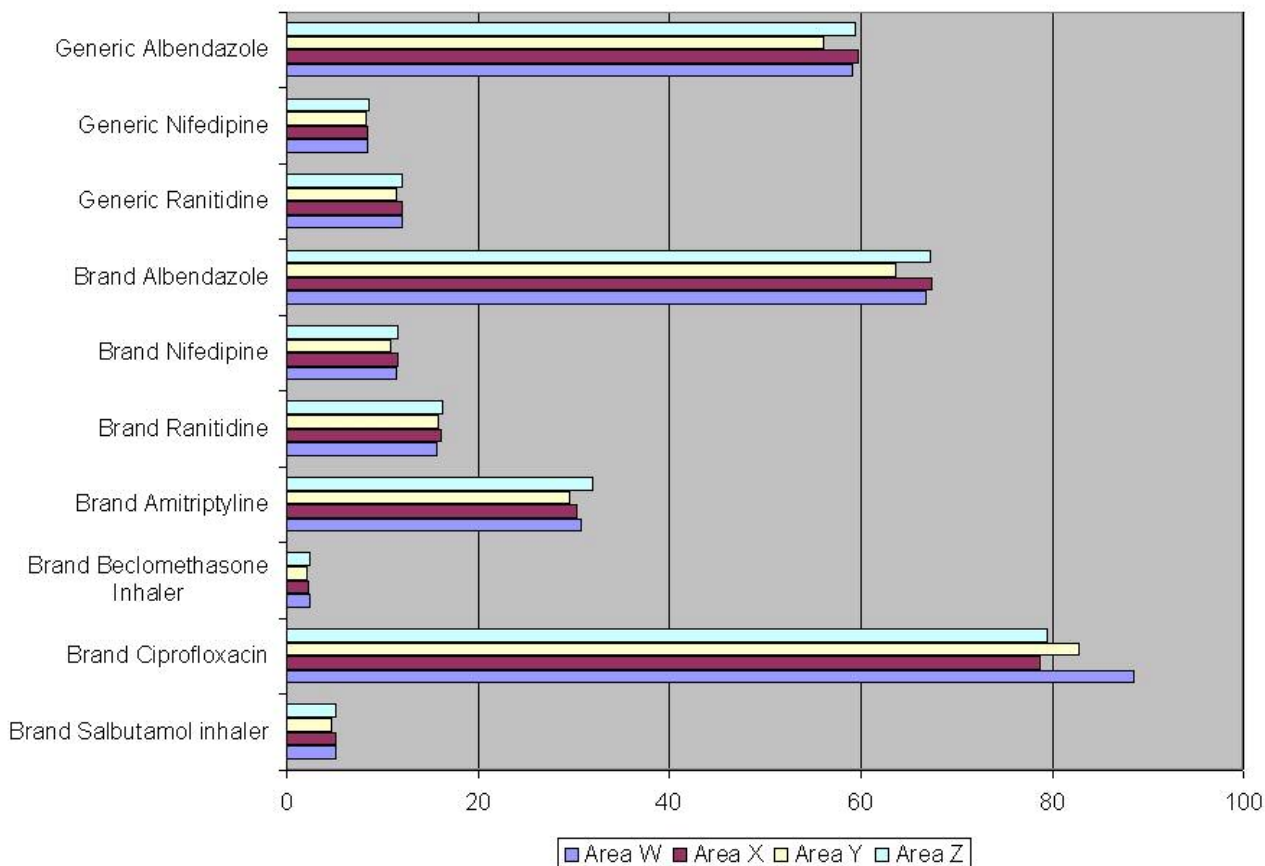
The innovator brand price is almost invariably the highest price for any medication. Co-trimoxazole suspension appears to be the exception among the 15 medicines shown for Peru, because the most popular generic version was found selling at a higher unit price than the innovator brand. However, this is actually a special case. Peru’s survey defined Bactrim as the innovator and Seprin as the popular generic, when in reality their manufacturers each held patents on one of the two components in this medicine, and the drugs were launched simultaneously.

Overall in Peru, the “lowest priced” generics are cheaper than the “most sold” generics (medians 9 and 20, respectively, for the medicines shown). However, for several medicines (e.g., nifedipine hydrochlorothiazide), the “most sold” generic appears cheaper. As mentioned earlier, to understanding the reasons would require closer investigation. Results for these two measures of generic price are influenced by the relative popularity and availability of different generic alternatives, as well as the characteristics of the facilities which stock them.

3.4 Comparing prices for different geographic regions within a country

Figure 6 shows MPRs in 4 different geographic areas surveyed in Brazil, for several products (3 most sold generics and 7 innovator brands) available in at least 2 private sector outlets in each area. These comparisons were made possible by a feature in the Workbook that allows users to restrict an analysis to a subset of facilities (such as one region, or urban versus rural). Results obtained for each of the 4 separate areas were copied into a new spreadsheet and graphed. (The current survey Workbook does not include an automated graphing capability.) The comparisons in Figure 6 suggest that MPRs were very similar over the 4 geographic areas sampled in Brazil.

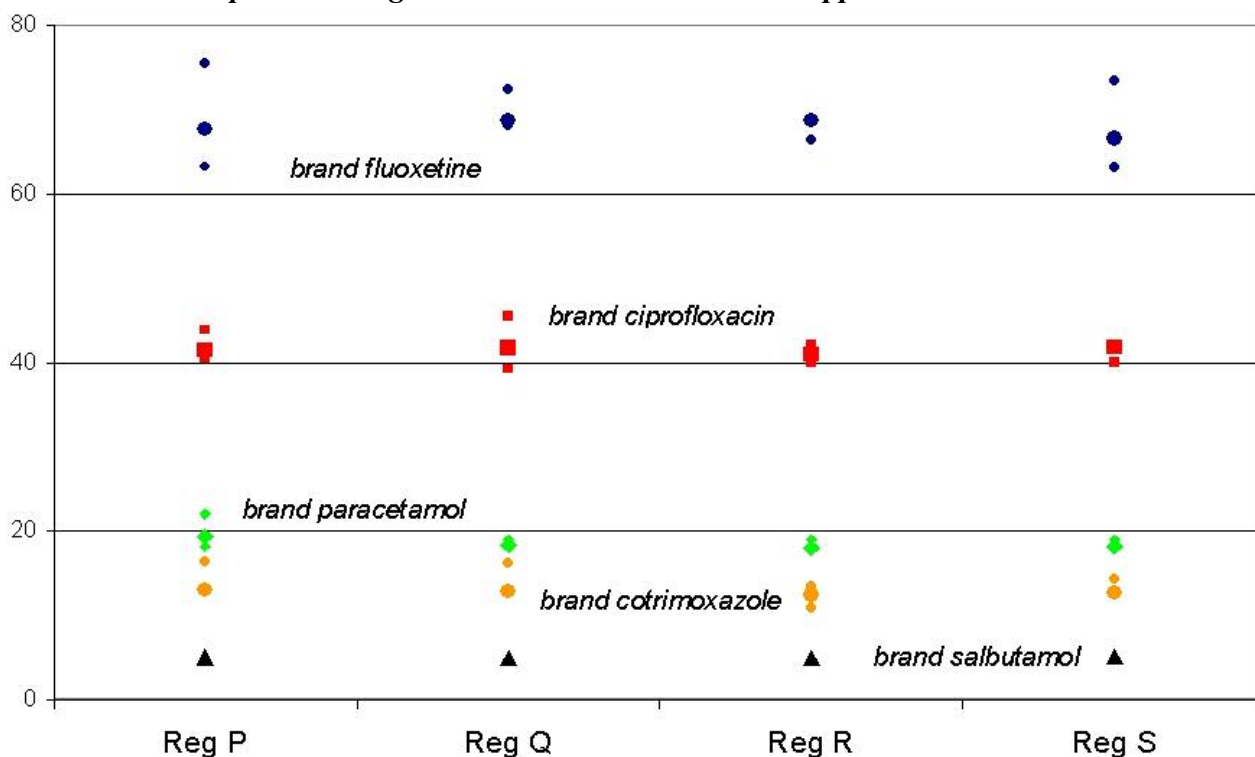
Figure 6
Regional Variations in Price Ratios: Brazil Private Sector



Also interesting in this example from Brazil are the relatively small brand premiums evident for the 3 medicines found in both the most sold generic and innovator brand versions. (For all 9 medicines found in brand and most sold generic versions on the private retail market in Brazil, the brand premium obtained by comparing median MPRs was +17%.) The competitiveness of medicine prices in Brazil, as compared to international supplier prices, varies greatly from medicine to medicine. The beclomethasone inhaler was the most competitive of the innovator brand medicines surveyed (median price ratio 2.5), while brand ciprofloxacin was the least competitively priced (MPR 81.3).

In the Philippines, as in Brazil, preliminary regional analyses did not find systematic price differences among the regions surveyed. Examples of regional MPRs for several essential medicines are shown in Figure 7. The five medicines in this graph were selected for the wide range of MPRs that they illustrate. In Figure 7, each medicine appears as a different colour. The median price ratio for each region is a large point, and the interquartile range of price ratios in the region appears as a pair of smaller points (sometimes obscured by the median). Because investigators in the Philippines surveyed 77 private sector facilities across four regions, it is possible to examine price variations within each region. The interquartile range, by definition, includes only the center-most 50% of prices. The full variation among the facilities surveyed, from minimum price ratio to maximum, is of course considerably wider (not shown). The price variations in these Philippine examples appear more striking for the medicines with larger MPRs, such as brand fluoxetine. No price significant variation in brand salbutamol is evident from this graph.

Figure 7
Regional Variation and Facility-Level Variation in Price Ratios:
Interquartile Ranges and Medians within the Philippines' Private Sector



3.5 Comparing prices between sectors within a country

The screen-capture below in Figure 8 shows part of the “Sector Summary” analysis provided automatically by the Workbook. These data are from Ghana, where patient prices for 28 medicines were sought in a survey of three sectors – public, private for-profit, and NGO. (NGO results appear as the “Other Sector” in Figure 8). Procurement prices were not available. Few innovator brand medicines were found outside the private retail sector, as can be seen by the low “# of Meds” figures for the top row in each quadrant of Figure 8. Medicines identified as the most sold generic versions in Ghana, however, appeared often in all three sectors. “Most Sold” is the middle row in each quadrant of Figure 8. The upper right quadrant compares results among 11 most sold generic products that were found in both the public sector and the private retail sector. The median MPR results show that, although these were identical products (same name, same manufacturer), they sold to patients for nearly twice the amount in the retail sector as in the public (that is, 3.06 is 181% of 1.68). The NGO sector appears to have patient prices somewhere in between the other two sectors – with a median MPR that is approximately 147% of the public sector median MPR, and 90% of the retail median MPR, when identical sets of most sold generic products are compared.

Even more of the medicines targeted in the Ghana survey were found in at least some generic version in all sectors. The evidence can be seen in the bottom row of each quadrant in Figure 8. “Lowest price” refers to the lowest generic price within each facility for the targeted medicines. Interestingly, by this measure the sectors appear a bit more similar in terms of prices than they do for nationally most sold generic products. The median MPR for lowest priced generics in the NGO

or “Other” sector is 112% of the median MPR among an equivalent set of 16 medicines in the public sector. Meanwhile, comparing equivalent sets of 19 targeted medicines, NGO prices were found to be about 91% of retail prices for lowest-priced generics.

Figure 8
Comparisons among Sector Summaries: Medicines in Ghana

	Procurement (n=orders)	Other Sector (n=17 outlets)	# of Meds. in Both Sectors	Ratio Other to Procurement		Public Sector (n=19 outlets)	Private Sector (n=33 outlets)	# of Meds. in Both Sectors	Ratio Private to Public
Brand			0		Brand	9.68	13.67	4	141.2%
Most Sold			0		Most Sold	1.68	3.06	11	181.8%
Lowest price			0		Lowest price	2.13	2.84	16	133.5%

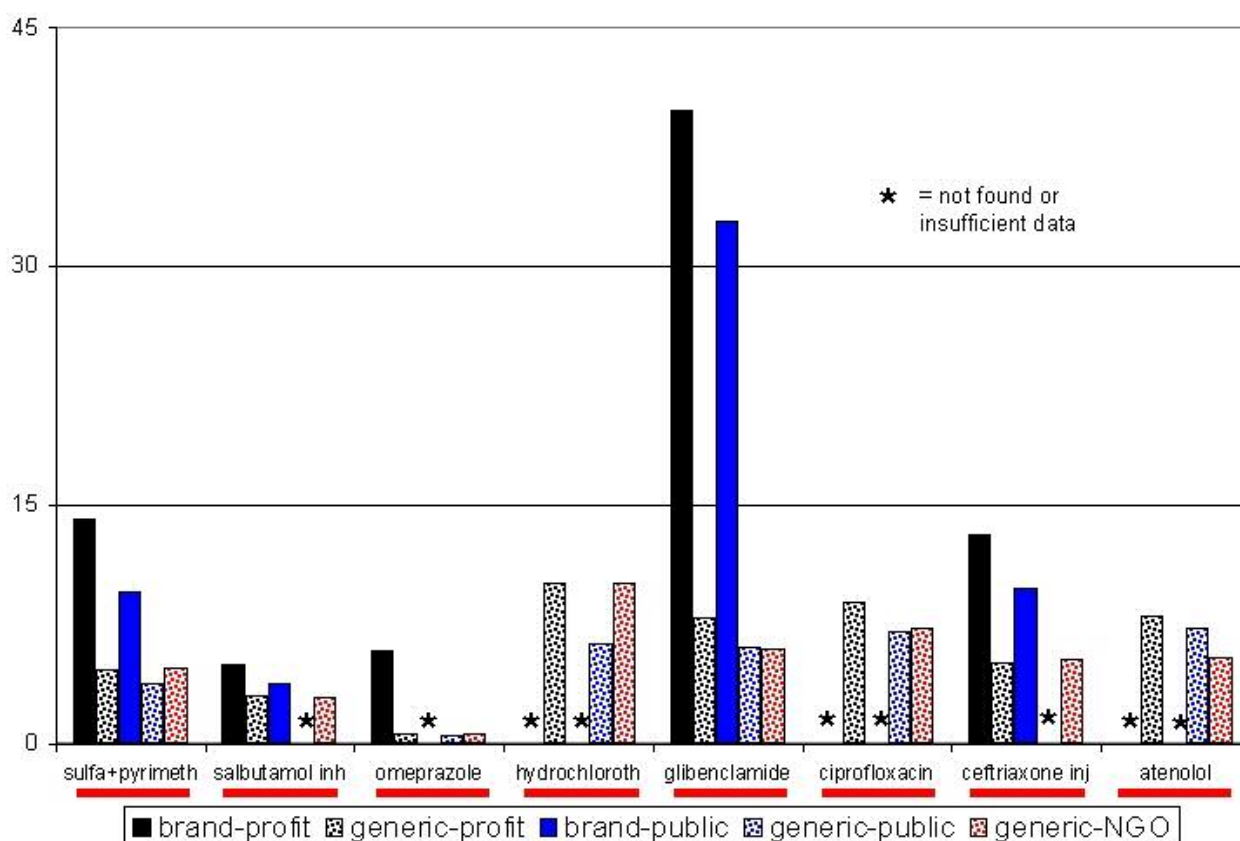
	Public Sector (n=19 outlets)	Other Sector (n=17 outlets)	# of Meds. in Both Sectors	Ratio Other to Public		Private Sector (n=33 outlets)	Other Sector (n=17 outlets)	# of Meds. in Both Sectors	Ratio Other to Private
Brand			0		Brand			0	
Most Sold	1.33	1.96	9	147.3%	Most Sold	3.06	2.75	11	90.0%
Lowest price	2.13	2.39	16	112.2%	Lowest price	3.21	2.91	19	90.7%

Figure 9 on the following page shows examples of MPRs for patient prices in the same three sectors in Ghana. There were 18 targeted medicines that were found in either brand or generic form in all three sectors in Ghana (private for-profit, public, and NGO). Ten of those medicines were left out of Figure 9 for the sake of simplicity. The medicines not shown were locally-selected supplemental medicines and/or had very low MPRs and very little variation among sectors and product versions. Consequently, these examples are not the most representative results from the Ghana survey. They are instead the most outstanding.

In Figure 9, solid bars represent MPRs for innovator brand medicines, while patterned bars are MPRs for the lowest priced generics found at facilities. Colors distinguish the three sectors. No innovator brands were found in the NGO sector. Of particular note are high brand prices when compared to equivalent generics, especially for omeprazole and glibenclamide. Generic prices are sometimes similar across sectors (salbutamol, omeprazole), while for some other medicines, generic prices are higher at private for-profit outlets than at certain alternative outlets (hydrochlorothiazide, atenolol).

In the South Africa pilot survey, an example was found of two distinct sectors with very similar price results (details not shown). Charges to patients for medicines in private sector pharmacies were compared with the medicine charges of private sector “dispensing doctors”. For 18 innovator brand name medicines found in both sectors, the median MPRs were nearly identical: 27.0 and 26.8 times the international reference price for those medicines. For 14 medicines found in both private sectors in their most sold generic versions, the median MPRs were 9.2 and 9.1 times the international standard, respectively.

Figure 9
Comparisons of MPRs for 8 Medicines among Sectors Surveyed in Ghana



3.6 Comparing availability between and within sectors

Looking at these same two private sector sources in South Africa, there appeared to be important differences in product availability. From data organized in the workbook’s “Product Summary” analysis sheet (availability portion shown in Figure 10 below), we identified 23 brand products and 20 most-sold generic products which were available in *at least one* outlet in both private sectors. (Thus we ensured that the products in this analysis were definitely on the market.) The median availability among the 23 innovator brand products was 80% in the pharmacies but only 67% at dispensing doctors’ offices. Among 20 “most sold generic” medicines found at least once in each sector, median availability was again 80% at pharmacies and 67% at dispensing doctors’ offices. This analysis suggests that dispensing doctors carry a more limited selection of medicines or are more prone to stockouts.

Individual medicine-by-medicine comparisons within a sector can also be illuminating. For example, all of the private pharmacies surveyed in South Africa had the innovator brand of omeprazole available, but only 50% had the most sold generic. Meanwhile, pharmacies were more likely to carry the most sold generic version salbutamol inhaler than the innovator brand (100% vs. 80% of pharmacies, respectively).

[Note that this pilot survey did not measure availability of an alternative generic version of the targeted medicine. “Availability of any generic version” is now measured under the revised WHO/HAI methodology. More recent and future surveys gather price information on the lowest

priced generic version in each facility. In doing so, they record whether any generic version in the specified strength is present at the time that data collectors visit.]

Figure 10
Availability of Individual Medicine Products:
South Africa Private Retail Pharmacies and Dispensing Doctors

Medicine Name	Core List (yes/no)	Brand			Most Sold		
		Public (n=)	Private (n=20)	Other (n=9)	Public (n=)	Private (n=20)	Other (n=9)
Aciclovir	yes		75.0%	66.7%		70.0%	55.6%
Albendazole	no		0.0%	0.0%		40.0%	22.2%
Amitriptyline	yes		85.0%	44.4%		100.0%	88.9%
Amoxicillin 250	yes		80.0%	66.7%		70.0%	77.8%
Atenolol	yes		0.0%	0.0%		0.0%	0.0%
Azithromycin	no		55.0%	88.9%		0.0%	0.0%
Beclometasone inhaler	yes		80.0%	88.9%		90.0%	88.9%
Captopril	yes		85.0%	66.7%		80.0%	66.7%
Ceftriaxone injection	yes		60.0%	22.2%		10.0%	0.0%
Ciprofloxacin	yes		100.0%	88.9%		5.0%	0.0%
Co-trimoxazole suspension	yes		60.0%	55.6%		95.0%	100.0%
Diclofenac 25	yes		0.0%	0.0%		0.0%	0.0%
Diclofenac 50	no		90.0%	33.3%		80.0%	66.7%
Ethinylestradiol+Levonorgestrel	no		0.0%	0.0%		100.0%	77.8%
Fluconazole	yes		75.0%	66.7%		0.0%	0.0%
Fluoxetine	yes		85.0%	55.6%		80.0%	77.8%
Furosemide	no		85.0%	66.7%		95.0%	88.9%
Hydrochlorothiazide	yes		35.0%	55.6%		90.0%	33.3%
Ibuprofen	no		75.0%	66.7%		75.0%	77.8%
Insulin	no		0.0%	0.0%		95.0%	66.7%
Isoniazid	no		0.0%	0.0%		35.0%	22.2%
Lamivudine+Zidovudine	no		70.0%	66.7%		0.0%	0.0%
Mefloquine	no		85.0%	88.9%		90.0%	88.9%
Nevirapine	yes		70.0%	77.8%		0.0%	0.0%
Nifedipine 10	no		80.0%	66.7%		85.0%	66.7%
Omeprazole	yes		100.0%	100.0%		50.0%	11.1%
Prednisolone	no		0.0%	0.0%		30.0%	0.0%
Ranitidine	yes		90.0%	55.6%		75.0%	33.3%
Rifampicin	no		0.0%	0.0%		0.0%	0.0%
Salbutamol inhaler	yes		80.0%	77.8%		100.0%	55.6%
Simvastatin	no		95.0%	77.8%		0.0%	0.0%

4. International Comparisons

4.1 Private sector median price ratios and brand premiums

Median price ratios and brand premiums from different sectors are especially interesting when compared among countries. Because MPRs are not in local currencies, but rather are expressed in ratios with respect to international supplier prices (after conversion to US dollars), they permit many quick comparisons: among individual medicines, whole sectors, regions, market categories, and countries. Figure 11 below shows the medians and interquartile ranges of MPRs found in 8 pilot survey countries. In each country, sets of individual essential medicines that were found in both innovator brand and most sold generic versions have been compared. (Methods for surveying

the “lowest priced” category of medicines underwent several revisions during development. As a result, this metric is not available from all pilot countries and was not used for the international comparisons in this report.) The number of different medicine pairs in a country’s set of medicines is indicated by the “n” at the bottom of Figure 11. The median MPR among the brand versions of these medicines is shown as a black diamond above, while the median MPR among the generic version of the same medicines is appears as an open white circle. The black lines span the interquartile range of the MPRs found (that is, from the 25th percentile to the 75th percentile of MPRs). The sets of medicines included in the analysis for each country are not the same, as shown in the table labeled Figure 12. Nevertheless, there is overlap among the countries’ sets, and by showing only the interquartile range, and not the extreme values, we obtain a fairly representative picture of retail medicine prices for each country. From this data picture, certain patterns emerge.

The results vary greatly between countries. Relatively competitive prices were found for medicines in Sri Lanka and Armenia. Medicine prices overall and the brand premium paid in Peru are unusually large. There are also notably sharp brand premiums in the African countries surveyed.

Figure 11
Interquartile Ranges and Medians for Private Sector MPRs in 8 Countries

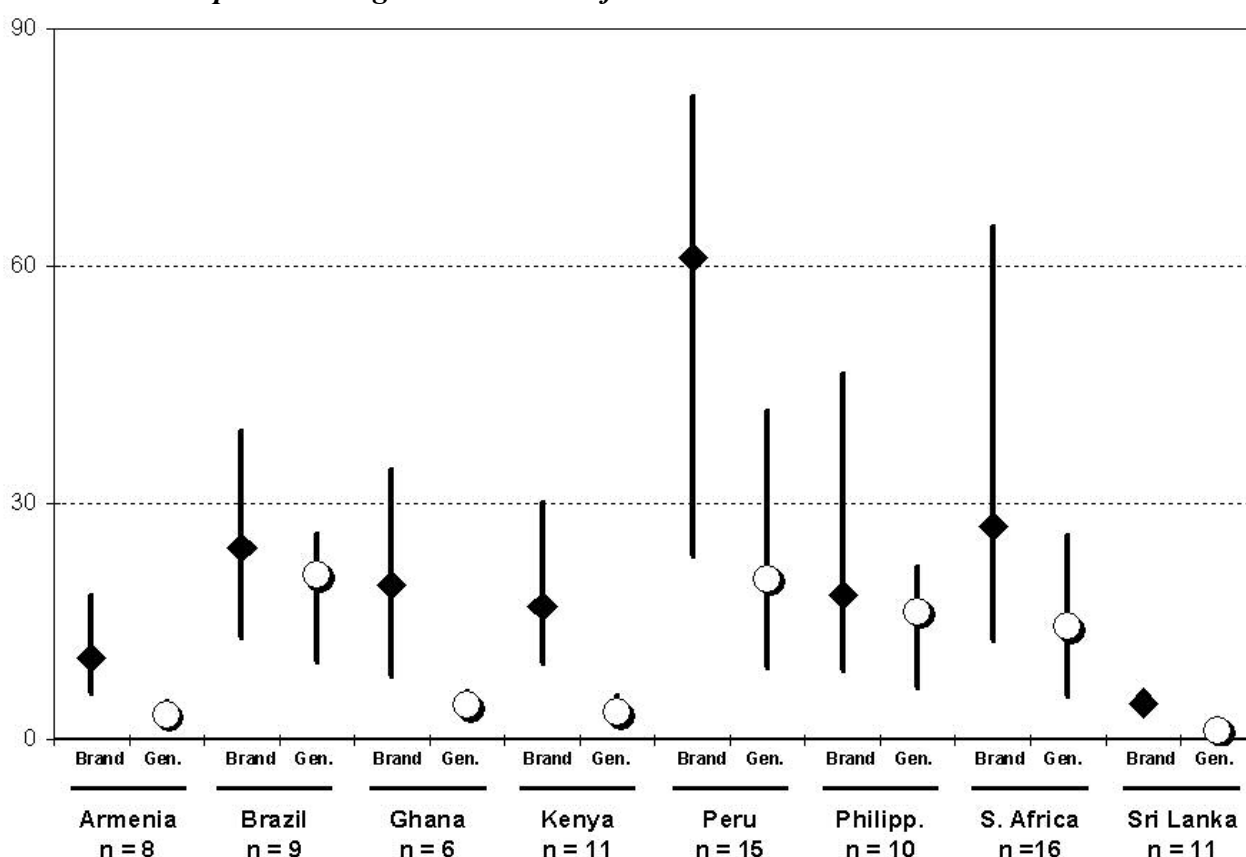


Figure 12
Pairs of Matching Brand and Generic Medicines
Used to Calculate Median MPRs and MPR Interquartile Ranges

MEDICINE unit & strength	Int'l refer. \$US price per unit	Ratio of Local Median Retail Price over International Reference Price (innovator brand MPR appears above most sold generic MPR)							
		Armenia	Brazil	Ghana	Kenya	Peru	Philipp.	S. Africa	Sri Lanka
Aciclovir tab 200 mg	0.070	15.7 3.8						23.7 7.0	
Albendazole tab 400 mg	0.025		67.1 59.5						
Amitriptyline tab 25 mg	0.006		31.5 26.1		15.6 2.2			70.5 29.6	6.3 0.9
Amoxicillin tab 250 mg	0.016				6.2 2.3	26.8 8.9	10.8 17.6	23.6 11.4	6.5 1.2
Atenolol tab 50 mg	0.007					71.3 20.4	57.3 21.9		
Beclomethasone inh. dose 0.05 mg/dose	0.019							4.9 2.3	1.5 1.2
Co-amoxiclav tab 500+125 mg	0.395						6.5 6.6		
Captopril tab 25 mg	0.030					16.9 5.0		14.4 5.8	4.1 0.5
Ceftriaxone vial 1 g	1.475	5.2 2.4			18.6 12.0	15.9 2.4			
Chlorphenamine tab 4 mg	0.002					80.3 77.2			
Ciprofloxacin tab 500 mg	0.037	95.5 16.0	81.3 31.4			94.1 63.2			5.9 1.2
Cotrimoxazole susp. ml 8+40 mg/ml	0.004	8.7 8.2			11.3 1.9	19.2 29.1	12.7 9.1	30.4 5.5	
Diclofenac tab 50 mg	0.016	26.2 3.3	12.9 9.8	24.9 4.0	30.1 3.5	35.8 7.9	20.1 18.4	72.5 72.5	12.8 0.4
Ethambutol tab 400 mg	0.021						8.7 4.8		
Fluoxetine tab 20 mg	0.028		39.1 20.9			85.9 20.7		170.3 88.5	
Furosemide tab 40 mg	0.005	6.1 3.0	24.4 21.0		107.9 2.7			108.9 24.6	3.7 0.8
Gentamicin inj 2ml amp 40 mg/ml	0.071					89.8 10.3			
Glibenclamide tab 5 mg	0.003			39.9 6.6		89.0 69.3	47.0 56.1		
Hydrochlorothiazide tab 25 mg	0.003					75.2 50.8		60.4 48.5	
Ibuprofen tab 400 mg	0.007				29.9 3.5	61.1 32.6		20.2 17.2	4.6 1.5
Mefloquine tab 250 mg	0.439				7.9 4.3			3.0 3.5	
Nifedipine tab 10 mg	0.010		11.7 8.6	37.4 9.0	43.7 9.3	52.8 9.3	46.3 34.8	63.2 22.8	
Omeprazole tab 20 mg	0.336		5.7 3.9	5.9 0.6				6.4 5.1	3.2 0.1
Paracetamol tab 500 mg	0.003						18.3 16.2		
Ranitidine tab 150 mg	0.027	12.1 2.0	16.2 12.2		17.0 7.1	19.6 16.4		30.7 22.8	5.6 2.2
Salbutamol inhaler dose 0.1 mg/dose	0.006	2.2 1.5		4.9 3.2	4.7 2.6		4.9 4.2	7.3 3.2	2.8 1.6
Sulfadox.+Pyrimeth. tab 500+25 mg	0.023			14.2 4.7					

4.2 Single medicine international price comparisons

It is instructive to note how results for one medicine can vary among countries. In Figure 12 above, the innovator brand version of furosemide has MPRs higher than 100 in two African countries surveyed, under 10 in two Asian countries surveyed, and 24 in Brazil.

In Figures 13 and 14 below, MPRs are presented for omeprazole and ranitidine in all 9 countries that participated in the pilot surveys. These two medicines are used in the treatment of ulcers, dyspepsia, and other gastrointestinal conditions, and are often taken long-term. (Missing data are indicated by “N/A” where not enough observations were found in the field survey for the specified product version, dosage form, and strength.)

Although there is considerable price variation among countries, and between the innovator brand version and the most sold generic in each country, it is also clear that, overall, omeprazole was priced far closer to the international standard than was ranitidine. If we take the median of all the observations in Figure 13 (crudely lumping the brand and generic versions together), we find that the median MPR for omeprazole across the surveyed countries was 5.1 times the international supplier price. By contrast, the median MPR for ranitidine was 16.4 times the reference. Thus, these private markets are performing much more poorly in terms of providing ranitidine to consumers at an internationally competitive price.

5. Local Affordability

Comparing price ratios does not complete the picture. Another way to measure “price” to consumers is in terms of their ability to pay for treatment of illness. The WHO/HAI methodology also collects data on the minimum daily wage paid to government employees, so that investigators can calculate the number of days’ wages required to purchase a typical course of treatment. Although in poor countries even this government minimum wage is higher than what many people earn, it provides a useful basis upon which to compare medicine prices.

Figures 15 and 16 show how many days’ earnings are equivalent to the local median retail price for these two ulcer medications. When this affordability metric is used, the findings of our comparison between these two ulcer medicines are quite different. Although the national markets for ranitidine perform more poorly, ranitidine is a less expensive treatment. The reference price for ranitidine is about 3 US cents per tablet, whereas omeprazole is sold by major non-profit suppliers at about 34 cents per tablet. Standard treatment with ranitidine consists of 60 tablets per month, while for omeprazole 30 tablets are needed for one month.

Again taking the median across brand and generic observations in the 9 countries, we find that 8.2 days’ wages are needed to purchase a month of ranitidine treatment and 17.6 days are needed for omeprazole. In many countries then, according to this analysis, ranitidine should be the treatment of choice, assuming equal effectiveness. However, this is not true everywhere. In Peru, for example, omeprazole appears more affordable. A complementary strategy to lower cost to consumers would be to seek more competitive prices for ranitidine.

Notably, though, the overall picture of affordability here indicates that treatment for ulcers using either of these two medicines is simply out of reach for much of the population.

5.1. Additional examples: median price ratios verses affordability

Figures 17 through 20 provide further examples of MPR and affordability results for hypertension treatments. We compare nifedipine and hydrochlorothiazide. The scales in all these graphs have been standardized, to facilitate visual comparisons among medicines.

The median among all the MPR observations for nifedipine in Figure 17 is 16.9, while for hydrochlorothiazide (Fig. 18) the median of MPRs is 50.8. The relative competitiveness of prices for this pair of medicines varies from country to country. Ghana has a lower price ratio for hydrochlorothiazide, while other countries (e.g., Brazil, Peru) have much lower price ratios for nifedipine. In terms of affordability, hydrochlorothiazide appears to be the cheapest option everywhere the comparison could be made, with the exception of Armenia (Figs. 19 and 20).

Note that affordability results depend heavily on definitions of standard treatment course. Standard nifedipine treatment has been defined above as a total of 60 tablets of 10mg each in a month, while 30 tablets of 25mg hydrochlorothiazide were recommended.

We also present MPR comparisons between ciprofloxacin and amoxicillin, which are both used for treating infections in adults. Most countries in the pilot surveys pay exceptionally high local retail prices for ciprofloxacin, as compared with the international reference price (Fig. 21). Except in Sri Lanka, brand ciprofloxacin is typically found in the range of about 40 to 125 times the reference price. By comparison, amoxicillin (Fig. 22) is purchased at prices closer to the international reference price: in all cases the MPR is under 30. Because they are not direct therapeutic substitutes, we do not compare treatment affordability between ciprofloxacin and amoxicillin here.

The data described in this report, along with additional information collected in each of the pilot surveys, are available on the website (survey profiles or the database of results). Those interested in conducting a survey along the lines proposed in the manual should contact:

Essential Drugs and Medicines Policy Department
World Health Organization
1211 Geneva 27, Switzerland
email: medicineprices@who.int

or

Health Action International Europe
Jacob van Lennepkade 334-T
1053 Amsterdam, The Netherlands
email: info@haiweb.org

Figure 13

OMEPRAZOLE: Median Price Ratios in the Private For-profit Sector

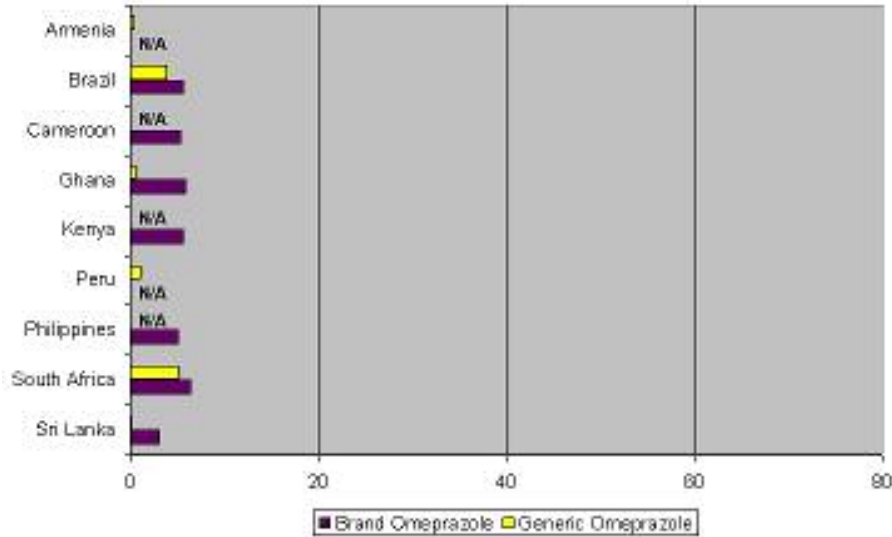


Figure 14

RANITIDINE: Median Price Ratios in the Private For-profit Sector

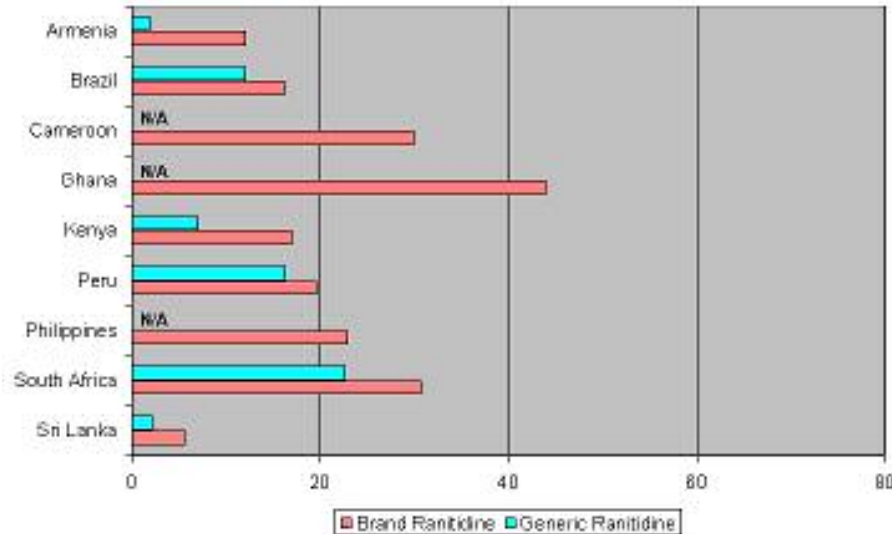


Figure 15

OMEPRAZOLE: Days' Wages Needed to Purchase 30 Days' Ulcer Treatment

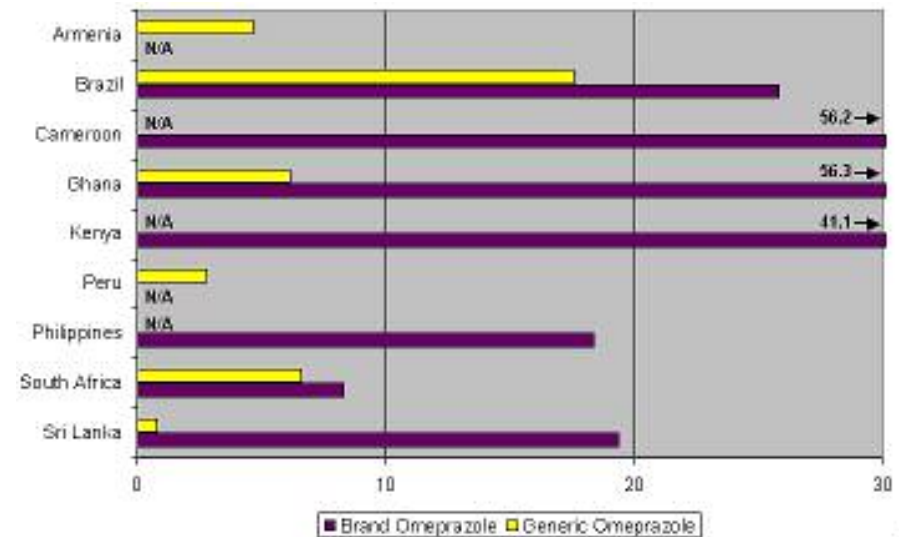


Figure 16

RANITIDINE: Days' Wages Needed to Purchase 30 Days' Ulcer Treatment

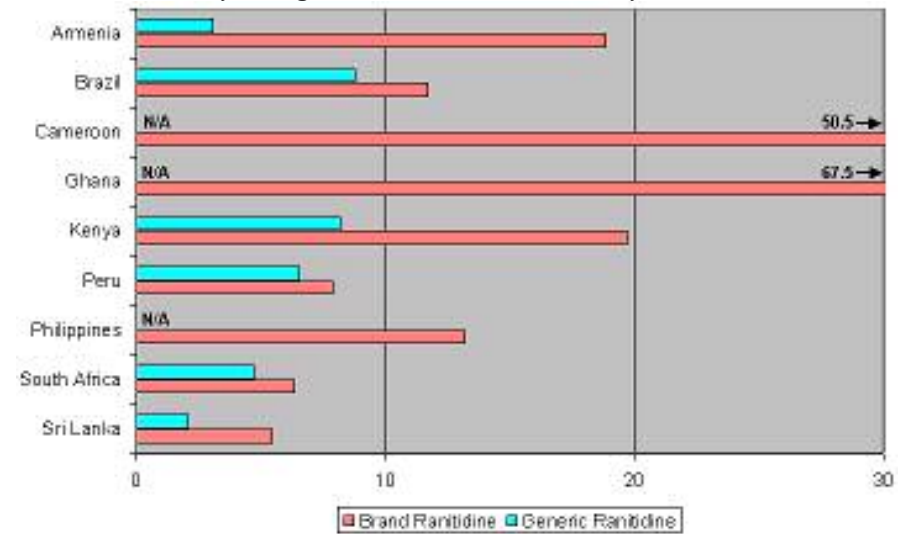


Figure 17

NIFEDIPINE: Median Price Ratios in the Private For-profit Sector

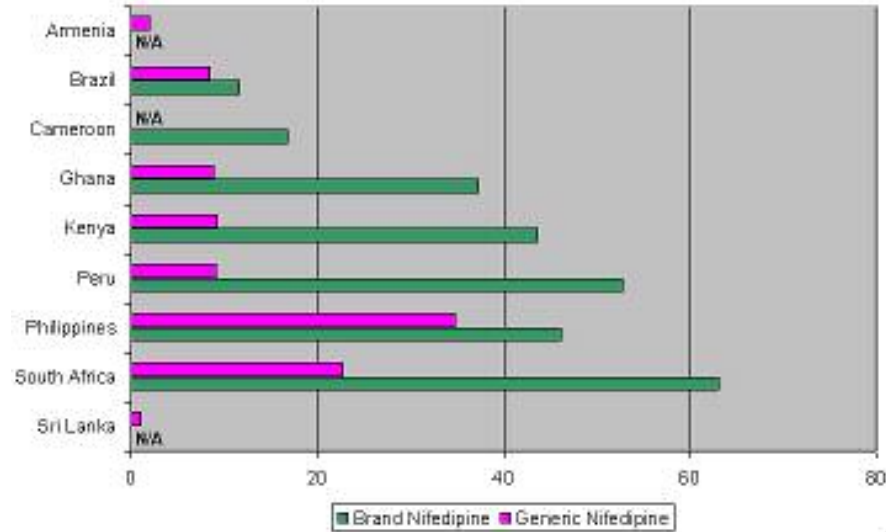


Figure 19

NIFEDIPINE: Days' Wages Needed for 30 Days' Hypertension Treatment

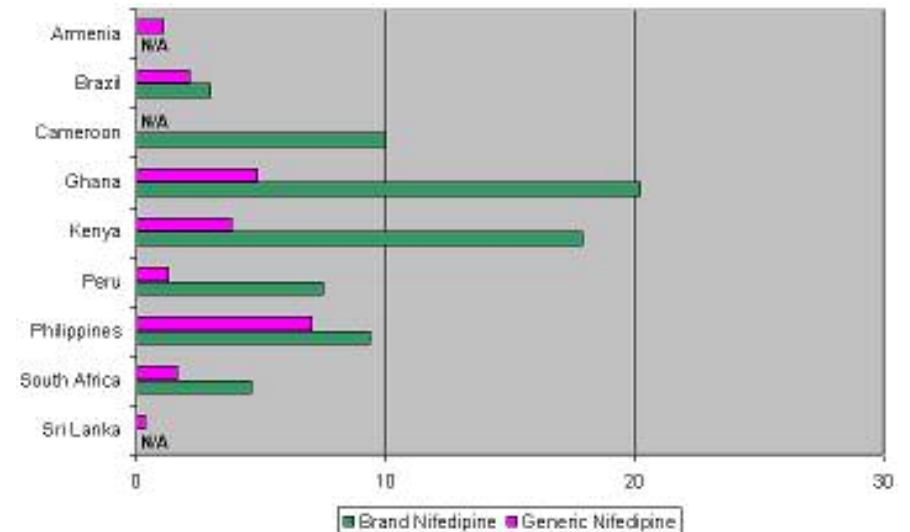


Figure 18

HYDROCHLOROTHIAZIDE: MPRs in the Private For-profit Sector

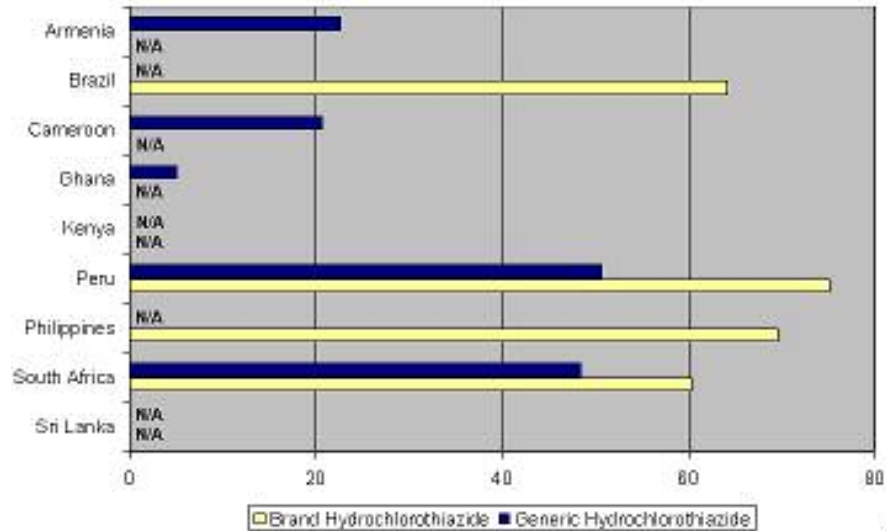


Figure 20

HYDROCHLOROTHIAZIDE: Days' Wages for 30 Days' HT Treatment

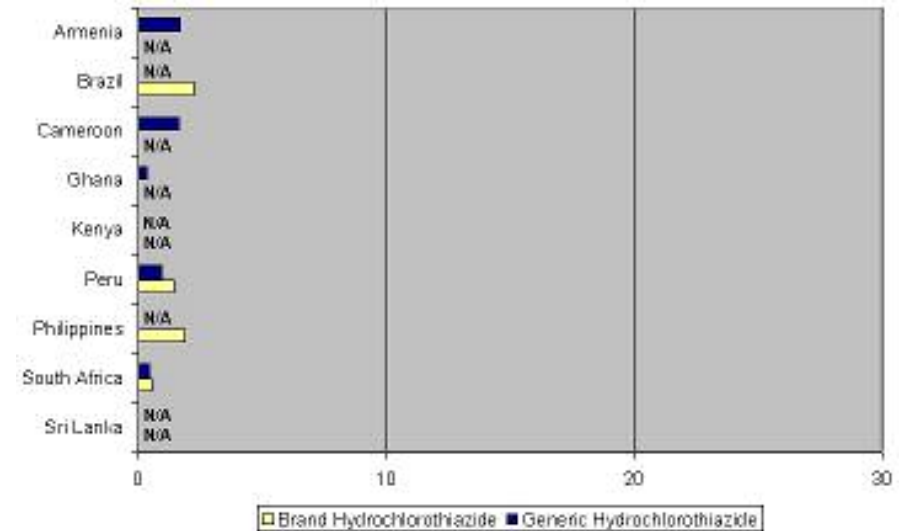


Figure 21

CIPROFLOXACIN: Median Price Ratios in the Private For-profit Sector

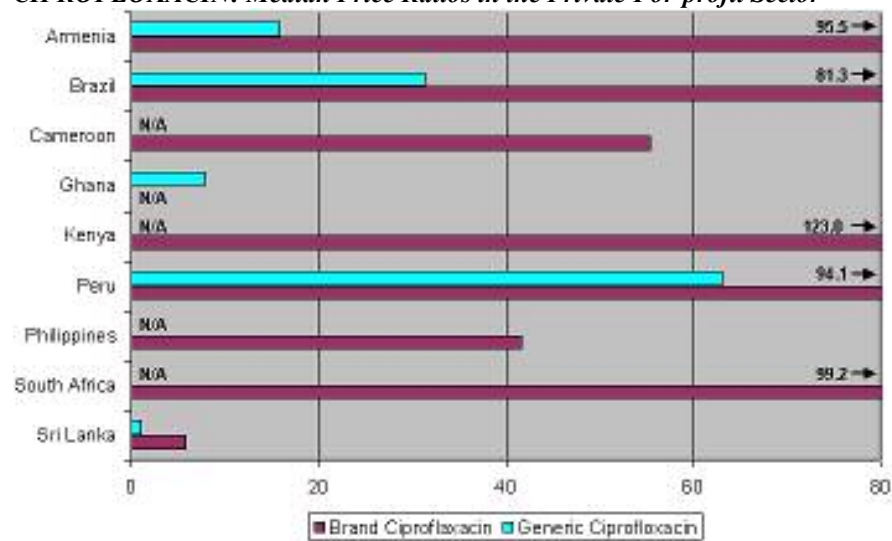


Figure 22

AMOXICILLIN: Median Price Ratios in the Private For-profit Sector

