Medicine Prices, Availability, Affordability and Price Components in Peru

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INDEX

Executive summary

In 2006 Health Action International's Coordinating Office for Latin America and the Caribbean (AIS-LAC) undertook a survey measuring medicine prices, availability, affordability and component costs in Peru, using the World Health Organization and Health Action International (WHO/HAI) price measurement methodology. The purpose of the study was to measure the price people pay for medicines, and their availability, in various sectors and regions of the country as well as the government procurement price, the affordability of standard treatments for patients on low wages, and all the costs in the supply chain from the manufacturer to the patient (taxes, mark-ups etc).

Methodology

Price and availability data were collected for 38 drugs; 30 from the WHO/HAI core list and 8 supplementary medicines from the Essential Medicines List of Peru.

Data was collected in Lima, plus cities in five other regions: Lambayeque, Cerro de Pasco, Ayacucho, Ucayali and San Martin. Across these six regions, data was collected from 96 private retail pharmacies and 52 public sector facilities. Public sector procurement data was collected from the Ministry of Health and from public sector hospitals that purchase medicines locally. For each medicine, the price of the originator brand was collected (product identified centrally) and the lowest priced generic equivalent at each outlet.

Local unit prices were entered into a pre-programmed MS Excel workbook that accompanied the WHO/HAI survey manual. Median local prices were expressed as a ratio to an international reference price (Management Sciences for Health's 2004 *International Drug Price Indicator Guide*). The ratio is thus an expression of how greater or less the local price is to this international price.

Affordability was assessed as the number of days the lowest paid unskilled government worker had to work to purchase a standard course of treatment. Affordability was assessed for the treatment of 9 conditions (acute and chronic).

Price components in the supply chain were assessed for a selection of medicines in the public and private sector.

Findings

In private pharmacies, the median availability was 14.6% for originator brands and 60.9% for generics. In the public sector facilities, the median availability of originator brands was 0%, and 61.5% for generics.

In the private sector, originator brands were approximately 28 times the international reference price. Of the 30 originator brands found in four or more

private pharmacies, 9 were over 75 times the reference price. Lowest priced generics were approximately 6 times the reference price in the private sector. In this sector, originator brands were five times more expensive than lowest priced generics.

Few originator brand medicines were found in the public sector. Lowest priced generics in the public sector were 1.40 times the reference prices (an increase of 40%).

Overall, lowest priced generics in the private sector were almost four times the price of those in the public sector. For some individual medicines, the difference was over 500%.

Most of the medicines procured by the government were generics, at approximately 1.3 times the reference price. Patients in the public sector pay 19% more than the procurement price.

Generic medicines purchased in the public sector were generally affordable. Originator brands purchased in private pharmacies were far less affordable, especially when treating chronic conditions.

Numerous taxes are applied to medicines in both the public and private sectors (value added tax 12%, IGV tax 19%, municipal promotion tax 2%). Cumulative mark-ups in the public sector were about 100%, except for medicines exempt IGV and supplied via Ministry of Health programmes (cumulative mark-ups 40%). In the private sector, generics tended to have higher cumulative mark-ups (238-268%) compared to the more expensive originator brands (121-177%).

Conclusions

- Medicine prices in the private sector are considerably higher than the public sector, and are much higher than international reference prices. While originator brand medicines are found in the private sector, they were rarely found in the public sector due to medicine procurement laws where the price is the determining factor for the procurement.

- There is a 19% difference between public sector procurement prices and patient prices for generics.

- In general, there was little variation in prices across private retail pharmacies for originator brands or generics) and public sector facilities (generics). The ratio of the 75th percentile price observation to the 25th percentile observation for each medicine in each was between 1.3 and 1.8.

- Some treatments (particularly chronic conditions) are not affordable for families on a low income. For example, almost half a month's salary would be needed to treat a urinary tract infection with ciprofloxacin when the originator brand medicine is purchased from a private retail pharmacy.

- Multiple taxes and generally high mark-ups are applied to medicines. In the public sector, cumulative costs for some medicines exceed 100%. In the private sector, some exceed 200%.

1. Introduction and Background

Between May and June 2002, the Regional Coordinating Office of Health Action International for Latin America and the Caribbean (AIS-LAC) carried out a study that measured medicine prices in Peru using a methodology (in development) by the World Health Organization and Health Action International (WHO/HAI). The purpose of this study was to compare medicine prices in the public and private sectors, between regions in the country, and between originator brands and their generic equivalents. The method also assessed affordability and price components in the supply chain. This methodology was published in 2003 entitled "Medicine Prices: A New Approach to Measurement".

In 2005, the Coordinating Office undertook a new survey using the published WHO/HAI methodology which included measuring the availability of the survey medicines. Additionally, the outlets and medicines surveyed were greatly expanded in order to help WHO and HAI evaluate the validity of the sampling approach in the methodology. This survey was carried out between October and November of 2005 in six Peruvian cities: Lima, Lambayeque, Ayacucho, Cerro de Pasco, San Martin and Ucayali.

1.1 Country Information

The population of Peru is 26,152,265[1]; 54% of whom live in poverty and 18.7% in extreme poverty[2]. There are two systems of public health insurance:
a) EsSalud - a governmental institution that insures people who contribute on a monthly basis, especially those with formal employment, and
b) Integrated Health Insurance System (SIS) - who insures people living in extreme poverty without charging them.
EsSalud covers 25% of the population, and SIS covers around 30% of the population. The rest of the population have no health insurance, hence they have to pay for medicines.

Peru is divided into twenty-four regions across three distinct natural regions: coastline, highlands, and jungle. This difference in geography makes communication between populations difficult, especially in the remotest towns, and in general, it is difficult for the population in these areas to gain access to health care services. This is very evident in the highlands and jungle.

1.2 Pharmaceutical System

To be marketed, medicines require an authorization by the Ministry of Health called the "Sanitary Registration (RS)" or marketing approval. According to current laws, the process involved in obtaining the Sanitary Registration must not exceed seven days. If it takes longer, the RS is automatically granted. This flexibility in the law has

[1] X population census and Fifth household census
[2] ENAHO 1996 (National Household Survey)

considerably increased the number of pharmaceutical products entering the country, with more than 12,000 products registered by 2002. A revised law on obtaining Sanitary Registration has been proposed, with the support of the Ministry of Health and civil society, but it has not been adopted.

Medicine use in the public sector is determined by a national list of essential drugs called the "National Essential Drug List" or "Petitorio Nacional", which contains approximately 362 active substances. The use of medicines contained in the "National Essential Drug List" is mandatory in public sector outlets.

Peru's National Drug Policy, in place since December 2004, gives a reference framework for the implementation of strategies and procedures related to the use of medicines and public health in the country. The components of this policy are promotion of the rational use of drugs, universal access to essential drugs, and regulation and surveillance of the quality of drugs.

As a strategy for lowering the price of medicines, in 2001 the government abolished general sales tax (IGV=19%) and import tax (12%) for a range of cancer and antiretroviral medicines. Unfortunately, this policy change did not have the desired impact as the cost of the medicines did not substantially decrease[3]. Since late 2005, there has also been an initiative to eliminate these taxes for medicines to treat diabetes.

To improve access to medicines, the government also established a price list for medicines and fixed a 25% profit[4] for public facility sales. It has proven difficult to supervise facilities and ensure this mark-up is not exceeded.

With regards to the number of pharmacies, the public sector has approximately 6,852 medicine outlets[5] in both hospitals and health centers, while there are approximately 10,820 medicine outlets in the private sector, including pharmacies and drug stores[6]. Few private, non-profit organizations exist.

Drug procurement in the public sector is mainly done by a centralized, national purchasing process, although hospitals are permitted to procure some medicines locally. In the private sector, there are pharmacy chains[7] that have captured a large portion of the private medicines market.

2. Methodology

[3] This is a finding of a study developed to assess the impact of the FTA between US and Peru on the access to medicines in Peru. Gerardo Valladares Alcalde et al "Evaluación de los potenciales efectos sobre acceso a medicamentos del tratado de libre comercio que se negocia con los Estados Unidos de América", October 2005. http://www.perufrentealtlc.com/?q=node/186

[4] This percentage is calculated over the procurement price, this strategy was established in 2002. Ministerial resolution Nº 1753-2002-SA/MINSA.

[5] General Department of Statistics and Informatics – Ministry of Health

[6] Drug Store (Botica): It is a pharmaceutical establishment that is not owned by a professional pharmacist, but the law does demand that it be supervised by a professional pharmacist.

[7] Just one pharmacy company that has several locations in a city or even nationwide

The price and availability of 38 essential medicines were measured in the public sector and in private retail pharmacies. Of these, 30 were from the WHO/HAI core list, and 8 were added by the local team as a supplementary list of medicines of local importance (see Appendix 1).

For each medicine, data on two versions were studied:

- Originator brand (determined centrally)
- Lowest price generic equivalents (determined at outlet level, so product and manufacturer may vary)

In order to measure the availability of medicines across the entire market (part of the WHO/HAI validation study), three therapeutic categories were chosen: ulcer healing drugs, ACE inhibitors, and oral diabetes drugs. The list of the drugs registered for each therapeutic category was made on the basis of PERUDIS (online), which is the official Peru Drug Registration System managed by the Ministry of Health. At the time of the study, PERUDIS contained a total of 268 registered drugs corresponding to twenty-three active ingredients.

The prices were measured at the central level (public procurement), in public health care facilities, and in pharmacies. The latter two were chosen according to a purposive plan in the selected cities: Lima, Lambayeque, Ayacucho, Cerro de Pasco, San Martin and Ucayali. There were two types of prices studied in the public sector: the price paid by the MOH or each hospital to manufacturers or distributors, and the price paid by the patient. All prices were converted into American dollars using the exchange rate for September 27th, 2005, which was the first day of the survey.

International reference prices were used to compare local prices to an international standard, further explained in section 3.2. To determine what drug prices mean in terms of affordability for citizens, some common treatment costs were measured and compared with the wage of the lowest-paid unskilled government worker, which at the time of the study was 460 Nuevos Soles per month (US$138.00). In all sectors, drug availability at the moment of data collection was also measured.

Finally, the individual components of the final price of each medicine were also identified in order to estimate the manufacturer's price and the charges and mark-ups added to this price as the medicine proceeds through the distribution chain.

2.1 Sample

As per the WHO/HAI methodology, survey areas were identified by first selecting the main metropolitan area, then randomly selecting 3 other regions within a day's journey from the main center. In addition, the validation plan called for adding two more regions, to be randomly selected from beyond a day's journey from the capital area. However, certain cities were excluded from the sampling for a variety of reasons (Appendix 2 - A). Thus, the six survey areas included in the sample were as follows:

Survey areas

	Main urban centre:		Less than one day's journey from the main centre		More than one day's journey from the main centre
1	Lima (Lima)	**2**	Lambayeque (Chiclayo)	**5**	Ucayali (Pucallpa)
		3	Cerro de Pasco	**6**	San Martin (Moyobamba) (Tarapoto)
		4	Ayacucho (Ayacucho)		

The geographic location of the six survey areas can be found in Appendix 2 -B.

Following the selection of survey areas, a representative group of public health care facilities and private retail pharmacies were selected according to the sampling method described in the WHO/HAI manual. This states that in the public sector, the main public facility in each survey area is selected, following which 4 additional facilities within 3 hours travel of the main facility, are selected at random. For the private sector sample, the closest private pharmacy to each of the 5 selected public facilities, are sampled. In Peru the sample was larger that in the standard WHO/HAI methodology (5 outlets per sector per survey area) in order to serve the purposes of the validation exercise (see Appendix 3). The expanded sample in Peru was designed to include addition outlets in more remote locations than those in the standard sample, in order to determine whether results are biased when the sample is limited to more convenient locations. This extra large sample in this survey allowed the team to conduct especially solid statistical analyses for those drugs which were found to be widely available. Further, because some outlets had less than 50% of the target drugs available, additional facilities had to be surveyed (without rejecting any outlets already surveyed). In total, the survey included fifty-two public facilities and ninety-six retail pharmacies and/or drug stores in the six selected cities.

Facilities included in the study

City	Zone	# of public establishments	# of private establishments	Total
Lima	1	7	14	21
Lambayeque	2	9	19	28
Ayacucho	3	7	17	24
Cerro de Pasco	4	10	11	21
Ucayali	5	7	16	23
San Martin	6	12	19	31
			TOTAL	148

It is important to point out that there are certain towns in Peru that are located very far from the main urban centers and are therefore are difficult to reach. In these places, they generally have a public health care facility, but there are no nearby pharmacies and drug stores, which in this event forced a change of location. Further, the WHO/HAI methodology suggests the inclusion of more sectors, such as the private non-profit sector (NGO). However, it was decided not to include this sector since NGOs have minimal presence in the pharmaceutical field in Peru.

2.2 Defining the Target Drug List

Some of the WHO/HAI core medicines listed in the standard survey methodology do not correspond to the Peru Essential Drug List. Some are rarely available in the private sector, in particular in pharmacies far from major cities. For this reason, and for the interest of the local research team, it was decided to include some supplementary medicines that are in high demand locally, specifically:

Amoxicillin	500 mg. capsule
Clotrimazole	500 mg. vaginal tab
Chlorphenamine	4 mg. capsule
Co-trimoxazole	800/160 mg. tablet
Erythromycin	500 mg. capsule
Fluconazole	150 mg. capsule
Ibuprofen	400 mg. capsule
Metronidazole	500 mg. capsule

In addition, as part of the methodological validation exercise that was designed and incorporated into the Peru survey, all registered medicines in three selected therapeutic categories (ulcer healing drugs, ACE inhibitors, and oral diabetes medicines) were added to the list of medicines to be surveyed. Results of the therapeutic category analysis will be reported separately.

3. Data Collection, Entry and Analysis

3.1 Data Collection

A standard data collection form was used, which listed all the medicines on the core and supplementary lists, as well as the therapeutic medicines list (for three chronic diseases). A working team was set up in each of the surveyed cities, and each group had a supervisor and two data collectors. There were six working teams in the field.

Each working team participated in a three-day training workshop that included a small pilot study. The pilot was carried out in one district of the capital city of Lima, in facilities not included in the study. It allowed participants to make some observations on data collection and adjust the data collection tools for the survey.

Each team surveyed at least seventeen public and private establishments. If they did not find at least 50% of the targeted medicines in any given establishment, an additional establishment was surveyed. As a result, the time required for data collection was four weeks, during which time fifty-two public and ninety-six private establishments were surveyed (148 in total).

At each of the selected public and private facilities, data was collected through a personal interview and was recorded on the data collection form. Coordination with the health authorities was undertaken in advance of data collection interviews to arrange for permission. The person in charge of each facility was interviewed, with interviews lasting around forty minutes, taking into consideration the time for serving customers while the interview progressed.

The collected data were as follows:

- Medicine procurement prices in the public sector. Data were gathered at two levels: 1) the central level, namely, current prices from the centralized national procurement of medicines[8] by the Ministry of Health; and 2) the local level, namely local purchases made by public sector hospitals.

- Prices paid by patients at the public health care facilities and private pharmacies.

- The composition of medicine prices was assessed through interviews with the applicable authorities and reviewing available data on individual medicines.

3.2 Data Entry and Analysis

Price data obtained at health facilities was entered as unit prices into the pre-programmed MS Excel workbook provided by the WHO/HAI methodology. Data entry was checked using the double entry function of the workbook.

[8] Last national medicine procurement done by the Ministry of Health in 2004

Availability is calculated as the percentage (%) of facilities where an individual medicine was found. It must be kept in mind that the availability data only refers to the day of data collection at each particular facility and may not reflect average monthly or yearly availability of medicines at individual facilities.

Medicines needed to be available in at least 4 pharmacies for their price data to be included, in the analysis, except for procurement prices where a single data point was accepted. The price data from the survey are expressed as median price ratios (MPRs) calculated using international reference prices:

$$\text{Median Price Ratio (MPR)} = \frac{\text{Median local unit price}}{\text{Median international reference unit price}}$$

The ratio is thus an expression of how much greater or less the local medicine price is than the international reference price e.g. an MPR of 2 would mean that the local medicine price is twice that of the international reference price. Median price ratios facilitate cross-country comparisons of medicine price surveys.

The reference prices used were the Management Sciences for Health (MSH) reference prices, taken from the International Drug Price Indicator Guide (2004). These reference prices are the medians of recent procurement or tender prices offered by for-profit and not-for-profit suppliers to international not-for-profit agencies for generic products. These agencies typically sell in bulk quantity to governments or NGOs, and are therefore prices are relatively low and represent efficient bulk procurement without the costs of shipping or insurance.

There are no hard and fast rules in the interpretation of MPRs since factors such as market size and penetration, competition and therapeutic alternatives, consumption, economies of scale, national wealth and wealth distribution, health system structure and accessibility, distribution and storage charges, local taxation and regulation need to be considered. However, local prices are generally considered acceptable when:

- MPR ≤ 1 in case of public sector procurement prices
- MPR ≤ 2.5 in case of retail pharmacy prices

The magnitude of the price variations among the surveyed establishments is presented as the difference between the 25^{th} and 75^{th} percentiles of all collected prices for a given medicine. This will provide the range of prices found for that medicine in half (50%) of the establishments surveyed.

Additional details about the WHO-HAI survey methodology can be found on the Medicines Prices project website -- http://www.haiweb.org/medicineprices/

4. Results

4.1 Medicine prices and availability

4.1.1.Private retail pharmacy medicine prices and availability

Table #1: Summary of the private retail pharmacy median price ratios for the thirty-eight medicines surveyed:

	Median % of outlets with target medicine found, across all surveyed medicines (Availability) (n = 96)	Number of medicines in survey with at least 4 price observations	Median of Median Price Ratios for medicines with at least 4 price observations (median price vs. MSH price)
Originator Brand	14.6%	30	27.79
Lowest Price Generic	60.9%	31	5.61

In the private retail sector, when comparing the medicine prices with the international reference prices representing bulk generic supply, the prices of originator brand products were about 28 times more expensive than the international reference price, while the lowest priced generics were typically about 6 times higher than the international reference price. It was also seen that originator brand medicines were available in about 15% of the private retail pharmacies (median availability), while generic products were available in 61% of them.

To enable price comparisons between originator brands and their generic equivalents, only those medicines for which both product types were found in at least four medicine outlets were selected for analysis. In this matched pair analysis, which includes 28 medicines, the median MPR for originator brands was 27.79, compared to 5.61 for lowest price generics. The ratio of originator brand price to generic price is 4.95, and as such, the originator brand premium in the Peru private sector is on average a 418% increase in patient price.

Table #2: Examples of medicine price ratios, private retail pharmacies

Medicine Name	Medicine Type	Median Price Ratio	25% Percentile	75% Percentile
Amoxicillin	Originator Brand	23.85	20.44	27.68
	Lowest Priced Generic	5.11	4.26	7.66
Atenolol	Originator Brand	65.66	60.64	81.43
	Lowest Priced Generic	10.40	6.93	13.86
Beclometasone	Originator Brand	4.64	4.46	5.80
	Lowest Priced Generic	3.13	1.87	3.55

Captopril	Originator Brand	19.70	17.27	21.15
	Lowest Priced Generic	2.66	1.53	3.98
Ceftriaxone	Originator Brand	7.12	6.77	10.01
	Lowest Priced Generic	0.67	0.56	0.89
Ciprofloxacin	Originator Brand	143.56	122.68	144.52
	Lowest Priced Generic	5.98	3.59	5.98
Co-trimoxazole	Originator Brand	22.17	20.06	23.65
	Lowest Priced Generic	5.61	3.85	7.39
Omeprazole	Originator Brand	39.33	38.73	51.53
	Lowest Priced Generic	3.04	2.43	3.65
Ranitidine	Originator Brand	17.60	17.12	20.63
	Lowest Priced Generic	2.46	1.97	2.96

The median prices across sampled outlets for the LPGs ranged from 0.4 to 40 times the international reference price. Median prices of originator brands ranged from 2 to 181 times the same references.

4.1.2.Public sector medicine prices

Table #3: Summary of public sector medicine prices (procurement prices and public sector patient prices)

	Median % of outlets with targeted medicine found, across medicines (Availability)	Number of medicines in survey with at least 4 price observations	Median of Median Price Ratios for medicines with at least 4 price observations (median price vs. MSH price)
Procurement Prices (Lowest Price Generic)	Not assessed	29	1.28
Patient Prices (Lowest Price Generic)	61.5% (n = 52)	27	1.40

The median of the Median Price Ratios was 1.28 for public sector procurements (or 28% above the FOB international reference price from bulk generic suppliers) which is encouraging for public officials in charge of procurements, since the comparison is between the FOB price and a price in Peru that includes cost, insurance, and freight (CIF).

The median of the Median Price Ratios for public sector patient prices was 1.40. When compared to procurement prices (1.28), the average mark-up faced by patients in the public sector was approximately 9%, although these two figures were calculated on slightly different baskets of medicines. The paired analysis (same medicines in each sector) showed that for 27 generic medicines, patients paid 18.6% more than the

procurement price for medicines in the public sector (procurement median MPR 1.18; public sector patient price median MPR 1.4).

In the 52 public sector facilities surveyed, the median percentage availability for all 38 medicines (generics) was 61.5%. However, the true picture is somewhat more positive because only 32 of the 38 targeted medicines were on the Essential Medicines List (EML) in Peru. Also, the survey includes 8 medicines that are not commonly used at the community health facility level (i.e., the public facilities known as "Centros de salud"). Instead, those medicines are used mainly in hospitals. So we expected to find 14 of the medicines with 0% or very low availability. For the remaining medicines on the EML, the availability among facilities ranged from 11% to 100%.

4.1.3. Comparative ratios of public sector and private sector medicine prices for patients

Table #4: Summary of cross-sector data

	Public Sector Facilities Median Price Ratio	Private Retail Pharmacy Median Price Ratio	Private Sector Prices expressed as a % of Public Sector Prices
Lowest Price Generic (results are for n=25 medicines found in both sectors)	1.46	5.61	384.2%

There were no originator brand medicines from the survey list found in public sector facilities except fluphenazine ampoules (3.8%), acyclovir tablets (1.9%) and beclometasone inhaler (1.9%). The Peruvian public health care facilities can only have one type of medicine, which is almost always a generic drug. As originator brands were not found in 4 or more public sector facilities, only the prices of generic drugs were compared between sectors. There were 25 medicines found in both sectors in sufficient numbers for analysis. In the public sector, prices for these generic drugs were generally 46% higher than the corresponding international reference prices. Prices for the lowest priced generics found in the private sector were typically 5.6 times greater than the international reference price. This means that for these 25 drugs, generics found in the private sector were almost four times more expensive than those of the public sector.

Thus, it is clear that private sector patient prices are much more expensive than those in the public sector. This survey did not determine whether originator brand medicines or less expensive generics were the most widely sold products in the private sector. Given that we found a brand premium where originator brand medicines in the private sector cost about 5 times what lowest priced generics cost, and private sector generics cost nearly 4 times what public sector generics cost, we can estimate that originators in the private sector cost patients nearly 20 times the price of generic equivalents in the public sector. However, this cross-sector comparison on medicine types includes different baskets of medicines.

Availability was similar in the two sectors: median availability for generics was 61.5% in the public sector and 60.9% in private pharmacies. Originator brand availability (median 14.6%) was much lower than generic availability in the private sector. In private pharmacies it was rare to find an originator product with no generic equivalent. Over all 38 medicines surveyed in 96 private pharmacies, in less than 10% of cases an originator brand was found and no generic equivalent.

4.1.4.Variability of the prices

By taking the ratio between the 75th and 25th percentile price observations for each medicine, we measured variation for different sectors and product types (Table 5).

Table #5: Comparison of 75th and 25th percentile price observations for public sector and private sector medicine prices

Drug	Strength	Dosage form	LP Generic Public sector	LP Generic Private sector	Originator Private sector
			75th/25th Percentile Ratio	75th/25th Percentile Ratio	75th/25th Percentile Ratio
Aciclovir	200 mg	cap/tab	1.5	2.3	1.3
Amitriptyline	25 mg	cap/tab	1.0	1.3	1.2
Amoxicillin	250 mg	cap/tab	1.3	1.8	1.4
Amoxicillin	500 mg	cap/tab	1.2	1.8	1.1
Artesunate	100 mg	cap/tab			
Atenolol	50 mg	cap/tab	1.5	2.0	1.2
Beclomethasone	0.05 mg/dose	dose		1.9	1.3
Captopril	25 mg	cap/tab	1.5	2.6	1.2
Carbamazepine	200 mg	cap/tab	1.0	1.6	1.3
Ceftriaxone	1 g/vial	gram	1.4	1.6	1.5
Ciprofloxacin	500 mg	cap/tab	1.2	1.7	1.2
Chlorpheniramine	4 mg	cap/tab	2.5	2.0	1.2
Clotrimazol	500 mg	Ovu	1.3	2.0	2.6
Cotrimoxazol	8+40 mg/ml	milliliter	2.2	1.9	1.2
Cotrimoxazol	160/800 mg	cap/tab	1.0	2.0	1.2
Diazepam	5 mg	cap/tab	2.1	2.5	1.3
Diclofenac	25 mg	cap/tab	1.5	1.6	1.6
Erythromycin	500 mg	cap/tab	1.1	1.8	1.3
Phenitoin	100 mg	cap/tab	1.3	1.5	2.1
Fluconazole	200 mg	cap/tab		2.1	
Fluconazole	150 mg	cap/tab	1.6	1.6	1.3
Fluphenazine (decanoate)	25 mg/ml	milliliter			1.1
Fluoxetine	20 mg	cap/tab		1.9	1.1
Glibenclamide	5 mg	cap/tab	1.5	2.8	
Hydrochlorothiazide	25 mg	cap/tab	2.6	1.9	
Ibuprofen	400 mg	cap/tab	1.7	2.0	1.3
Indinavir	400 mg	cap/tab			

Losartan	50 mg	cap/tab		1.3	1.1
Lovastatin	20 mg	cap/tab		1.9	1.1
Metformin	500 mg	cap/tab		1.5	1.1
Metronidazole	500 mg	cap/tab	1.0	2.0	1.4
Nevirapine	200 mg	cap/tab	1.0		
Nifedipine retard	20 mg	tab			
Omeprazol	20 mg	cap/tab	1.3	1.5	1.3
Ranitidine	150 mg	cap/tab	1.6	1.5	1.2
Salbutamol	0.1 mg/dose	dose	1.5	1.3	1.3
Sulfadoxine-pyrimethamine	500+25 mg	cap/tab			1.1
Zidovudine	100 mg	cap/tab	3.4		

Minimum 75th/25th Ratio			1.0	1.3	1.1
Maximum 75th/25th Ratio			3.4	2.8	2.6
Mean 75th/25th Ratio			1.5	1.8	1.3

The ratio between the 75th and 25th percentile price observations varied from 1.3 to 2.8 for lowest priced generics in the private sector, from 1.1 to 2.6 for originator brands in the private sector, and from 1.0 to 3.4 for generics in the public sector. Examining the average of these ratios across all medicines, we found little difference in terms of variation among the three groups (G. Public=1.5, G. Private=1.8 and OB Private= 1.3).

When we assess the dispersion of MPR results for all medicines in the survey, by sector and product group, we find a high dispersion (Table 6).

Table #6: Comparison and variability of MPRs for medicines in the public sector and private sector

Drug	Strength	Dosage form	Public	Private	
			Generic	Generic	OB
			MPR	MPR	MPR
Aciclovir	200 mg	cap/tab	0.7	2.1	17.8
Amitriptyline	25 mg	cap/tab	10.0	25.4	51.4
Amoxicillin	250 mg	cap/tab	2.0	5.1	23.8
Amoxicillin	500 mg	cap/tab	1.5	2.9	12.8
Artesunate	100 mg	cap/tab			
Atenolol	50 mg	cap/tab	7.8	10.4	65.7
Beclomethasone	0.05 mg/dose	dose		3.1	4.6
Captopril	25 mg	cap/tab	0.3	2.7	19.7
Carbamazepine	200 mg	cap/tab	0.9	3.0	19.2
Ceftriaxone	1 g/vial	gram	0.4	0.7	7.1
Ciprofloxacin	500 mg	cap/tab	1.2	6.0	143.6

Chlorfeniramine	4 mg	cap/tab	6.0	40.6	180.9
Clotrimazol	500 mg	Ovu	0.1	0.7	15.0
Cotrimoxazol	8+40 mg/ml	millilitre	1.8	5.6	22.2
Cotrimoxazol	160/800 mg	cap/tab	1.9	8.7	34.8
Diazepam	5 mg	cap/tab	2.2	14.4	107.7
Diclofenac	25 mg	cap/tab	11.4	17.1	64.3
Erythromycin	500 mg	cap/tab	1.0	1.9	9.6
Phenitoin	100 mg	cap/tab	7.9	10.6	31.7
Fluconazole	200 mg	cap/tab		4.0	
Fluconazole	150 mg	cap/tab	1.2	3.6	85.8
Fluphenazine (decanoate)	25 mg/ml	millilitre			13.6
Fluoxetine	20 mg	cap/tab		10.7	103.3
Glibenclamide	5 mg	cap/tab	1.4	14.0	
Hydrochlorothiazide	25 mg	cap/tab	25.1	31.4	
Ibuprofen	400 mg	cap/tab	1.4	7.0	83.5
Indinavir	400 mg	cap/tab			
Losartan	50 mg	cap/tab		0.4	1.8
Lovastatin	20 mg	cap/tab		6.6	42.7
Metformin	500 mg	cap/tab		10.7	14.9
Metronidazole	500 mg	cap/tab	4.6	19.3	154.6
Nevirapine	200 mg	cap/tab	0.6		
Nifedipine retard	20 mg	tab			
Omeprazole	20 mg	cap/tab	0.9	3.0	39.3
Ranitidina	150 mg	cap/tab	1.5	2.5	17.6
Salbutamol	0.1 mg/dose	dose	0.8	1.8	4.1
Sulfadoxine-pyrimethamine	500+25 mg	cap/tab			79.6
Zidovudine	100 mg	cap/tab	0.7		

Standard deviation			5.3	9.5	48.4
Average			3.5	8.9	49.0
Coefficient of Variation (=std.dev./average)			151%	106%	99%

The high dispersion in MPR results is demonstrated by the coefficient of variation, which is about 100% in the private sector and 150% in the public sector. This means that the standard deviation among the individual results was as large as, or greater than, the average result. There are many possible explanations. It may be that there are some medicines with little generic competition, or without many therapeutic alternatives on the market, which results in high local prices relative to the international reference, as compared to other medicines surveyed. Or perhaps some medicines in the survey are not common in the kind of outlets surveyed (i.e., first level facilities), such as diclofenac tablets and amitriptyline, again leading to high relative prices. It is also reasonable to suppose that different medicines in the survey come from different types of original manufacturers, pass through different types of distributors, are suggested by different types of prescribers, and bought by different types of patients. These various actors

may have different profit-seeking goals or responsiveness to price. Finally, different taxation policies apply to different groups of drugs, which affects their final price.

4.1.5.Price components and cumulative mark-up

We measured price components for imported medicines. There is no difference in the taxes applied in the public sector and private sector. Both sectors are different only in the structure of their mark-ups, as we can see in Table 7.

Table #7: Price components of two imported medicines in both private and public sectors

Type of Charge	Captopril 25 mg tab (Private sector)			Ciprofloxacin 500 mg tab (Public sector)		
	Amount of Charge	Price of Dispensed Quantity	Cumulative % Mark-up	Amount of Charge	Price of Dispensed Quantity	Cumulative % Mark-up
CIF	ND	0,09	0,00%	ND	0,12	0,00%
Ad-Valorem Tax (VAT)	12,00%	0,10	12,00%	12,00%	0,14	12,00%
IGV Tax (GST)	19,00%	0,11	33,28%	19,00%	0,16	33,28%
Municipal promotion tax	2,00%	0,12	35,95%	2,00%	0,17	35,95%
Insurance	2,00%	0,12	38,66%	2,00%	0,17	38,66%
Importer mark-up	30,00%	0,15	80,26%	20,00%	0,20	66,40%
Wholesale mark-up	25,00%	0,19	125,33%			
Retail mark-up	50,00%	0,29	237,99%			
Public facilities mark-up				25,00%	0,26	108,00%
Total		0,29	237,99%		0,26	108,00%

Note: The prices obtained refer to one tablet, and are in local currency (nuevos soles), Change: $US 1,00 = S/. 3,31.

In these examples, each sector showed different cumulative mark-ups. In the private sector, medicines had three mark-ups: importer, wholesale and retail; while in the public sector there was only one mark-up (Ministry of Health, 25%).

The mark-up in the private sector varies substantially according to the medicine. Some medicines have high mark-ups (particularly generics), and some have small mark-ups (innovator brands). The variability observed in the survey was primarily due to differences in the retail mark-up. See Tables 8 and 9.

Table #8: Price components of a generic medicine with a high retail mark-up, ranitidine 150 mg tab (Private sector)

Type of charge	Amount of charge	Price of Dispensed Quantity	Cumulative % Mark-up
CIF	ND	0,06	0,00%
Ad-Valorem Tax (VAT)	12,00%	0,07	12,00%
IGV Tax (GST)	19,00%	0,08	33,28%
Municipal promotion tax	2,00%	0,08	35,95%
Insurance	2,00%	0,08	38,66%
Importer mark-up	30,00%	0,11	80,26%
Wholesale mark-up	20,00%	0,13	116,32%
Retail mark-up	**70,00%**	0,22	267,74%

Note: The prices obtained refer to one tablet and are in local currency (nuevos soles),
Change: $US 1,00 = S/. 3,31.

Table #9: Price components of an innovator brand medicine with a small retail mark-up, Bactrim® (cotrimoxazole) 8 + 40 mg/ml bottle (Private sector)

Type of charge	Amount of charge	Price of Dispensed Quantity	Cumulative % Mark-up
CIF	ND	5,12	0,00%
Ad-Valorem Tax (VAT)	12,00%	5,73	12,00%
IGV Tax (GST)	19,00%	6,82	33,28%
Municipal promotion tax	2,00%	6,96	35,95%
Insurance	2,00%	7,10	38,66%
Importer mark-up	40,00%	9,94	94,13%
Wholesale mark-up	25,00%	12,42	142,66%
Retail mark-up	**14,00%**	14,16	176,64%

Note: The prices obtained refer to one 60 ml bottle, and are in local currency (nuevos soles),
Change: $US 1,00 = S/. 3,31.

The percentage variation in the mark-up shown in Tables 8 and 9 may depend on the price of the medicine. When a medicine has a lower CIF price, the percentage mark-up can be higher. Conversely with innovator brand medicines, the CIF price is higher and the mark-up often lower, but the final cost per unit is higher.

It should be mentioned that in Peru some medicines are exempt from IGV tax, namely certain medicines used for the treatment of cancer and HIV, and more recently, some antidiabetics medicines. An example is shown in Table # 10.

Table # 10. Price components of a medicine exempt from IGV tax

Type of charge	Amount of charge	Price of Dispensed Quantity	Cumulative % Mark-up

CIF	ND	0,08	0,00%
Ad-Valorem Tax (VAT)	12,00%	0,09	12,00%
IGV Tax(GST)	0,00%	0,09	12,00%
Municipal promotion tax	2,00%	0,09	14,24%
Insurance	2,00%	0,10	16,52%
Importer mark-up	20,00%	0,11	39,83%
Special Public Health Program	0,00%	0,11	39,83%

The importer gives a special reduced mark-up for medicines sold to public sector and special public health programs (named Institutional sells). This reduced mark-up is possible due to the huge volume of medicines procured centrally, either for a large region or the country as a whole.

The mark-ups in the private sector examples above are estimations based on interviews and data obtained for selected medicines. The amount of each mark-up is approximate, and true mark-up amounts are believed to vary widely. There is no official limit on private sector mark-ups.

Price components data were somewhat difficult to obtain, but the CIF values and the related taxes of some medicines were available. Establishing the mark-ups applied by wholesalers and retailers was especially difficult due to the confidentiality of this information and the existence of a free market policy.

4.2 Affordability

The wage of the lowest paid unskilled government worker (460 Nuevos Soles per month, or 15.33 Nuevos Soles per day) was used to estimate the affordability of treatments for acute and chronic illnesses in both sectors.

Table # 11: Treatment costs for two infections – respiratory and urinary

Condition and Treatment	Product type	Public Sector		Private Retail Pharmacy	
		Median Treatment Price	Number of Days' Wages	Median Treatment Price	Number of Days' Wages
Adult Respiratory Infection: Amoxicillin 250 mg x 3 for 7 days	Originator Brand			29.40	1.9
	Lowest Price Generic	2.52	0.2	6.30	0.4
Urinary Tract Infection: Ciprofloxacin 500 mg x 2 for 7 days	Originator Brand			168.00	11.0
	Lowest Price Generic	1.40	0.1	7.00	0.5

As shown in Table 11, to treat an uncomplicated adult respiratory infection with the lowest priced generic amoxicillin, a patient must pay the equivalent of 0.2 days' wages when the medicine is purchased in a public sector health care facility. In a private retail pharmacy, the cost increases to 1.9 days' wages for originator brand amoxicillin and 0.4 days' wages for lowest priced generic equivalent. For the treatment of a urinary tract infection in a public sector health care facility, the patient would need to pay the equivalent of 0.1 days' wages. In the private retail pharmacy, the cost was 11 days' wages for originator brand medicine and 0.5 days' wages for the generic equivalent. It is important to take into consideration that these costs refer only to the medicinal component of the treatment. Consultation fees, diagnostic tests, and transportation costs can make the total patient cost considerably higher.

Table 12 shows the treatment costs for glibenclamide and metformin to treat diabetes. Of the two, glibenclamide was much more affordable, especially when purchased in the public sector, however, availability was only 64%. Metformin was not affordable, even when treated with the lowest priced generic (3.4 days wages for 30 days treatment). Availability of the generic was poor in the private sector (8%). While the originator brand was slightly more available (17%), it was even less affordable (4.7 days wages). Metformin was not found in any of the public sector facilities surveyed.

Table # 12: Treatment cost for medicines to treat diabetes

Treatment	Product type	Public Sector		Private Retail Pharmacy	
		Median Treatment Price	Number of Days' Wages	Median Treatment Price	Number of Days' Wages
Glibenclamide 5mg x 2 for 30 days	Originator Brand				
	Lowest Price Generic	1.2	0.1	12	0.8
Metformin 500mg x 3 for 30 days	Originator Brand			71.82	4.7
	Lowest Price Generic			51.54	3.4

4.3 Discussion

The medicine price survey in Peru shows wide differences in the prices of the same generic medicines between the public and private retail sectors. Wide differences are also observed between the originator brand medicines and their generic equivalents in the private sector; the price difference between originator brand medicines and the

generic equivalents is nearly six-fold. While prices in the public sector are comparable to international reference prices, in the private sector both originator brands and lowest priced generics often cost many times their international reference price. One-quarter of the originator brand medicines surveyed cost over 75 times their international reference price. The public sector prices are systematically lower than those in the private sector, but in places where public sector medicine availability is a problem, patients are forced to use the private sector.

Low availability of medicines can influence the reliability of the data and the study conclusions. It is important to point out that the availability expressed in the results refers to all thirty-eight surveyed medicines, including the eight supplementary medicines that were locally selected. The median availability of the thirty international comparison medicines (core list) was only 11.5% for generics in the public sector. In addition, the sample of outlets in Peru was extraordinarily large because it was designed for a separate validation project, which more than compensates for the lack of medicines and price observations in some outlets.

One limitation of the medicine price study relates to the quality of the products examined. In this current study, all the pharmaceutical products were registered in Peru, and therefore meet the minimum threshold of quality represented by the registration process. However, since there is no established process for quality control analysis, we cannot say whether or not some products are below acceptable standards.

It must be stressed that this report does not express the complete study results, especially in the case of the price components for the reasons given above. The analyses of additional medicines and product versions in the three special therapeutic categories will be reported separately.

5. Lessons learned from field survey activities

- There are some areas that have a public health care facility but not private retail pharmacies, so the teams in the field had to visit other cities in the region to complete the survey.
- The staff managing pharmacies in public health care facilities were often afraid to give information. Similarly, staff in some private retail pharmacies were not allowed to respond to the survey unless permission was given by the owner or manager. This happened mainly in drug store chains.
- Some WHO/HAI core list medicines were not found in public health care facilities as they are not on the National Essential Medicines List.
- Artesunate is on the EML and supplied without charge as part of the national health strategy (vertical programs). It was therefore not possible to obtain price information from the public health facilities. This medicine can only be found in hospitals of endemic malaria areas (Ucayaly and San Martin); in these cities the medicine was rarely available.

6. Conclusions and Recommendations

The main conclusions of the study are the following:

- Medicine prices in the private sector are considerably higher than those in the public sector, and are much higher than international reference prices. While originator brand medicines are found in the private sector, they are very scarce in the public sector due to medicine procurement laws that set price as the determining factor in the purchase of medicines by public establishments.

- There is a modest difference between public sector patient prices and the international reference prices, as reflected by the median MPR of 1.4 (40% over the international price). The reference prices used are FOB, while the patient prices are assumed to include CIF prices plus taxes and facility-level mark-up. Given this structure, the relatively small difference found may reflect the strategy of the government to establish a sales price list for the public health facilities and establish a uniform mark-up. These policies are valid only in the public sector.

- In general, for three groups of drugs (private originator, private generic, and public generic) we found similar results in terms of the variation in prices seen across multiple outlets. We calculated the ratio of the 75th percentile price observation to the 25th percentile observation for each drug in each group. This ratio was on average between 1.3 and 1.8.

- Also, we found a high dispersion in terms of the MPR results for different medicines in the survey. The coefficient of variation for these results was about 100% (or greater, depending on sector and product type), which means that the difference between the average result and the typical result was the same magnitude as the average itself.

These data show that the medicines targeted by the study have a high dispersion of prices. This may be because there were some drugs with fewer generics on the market, or little presence in the first level health facilities, and therefore they have a high price with respect the international reference, while on the other hand there were other drugs with many generics on the market and widespread availability in the first level health facilities, which may result in lower prices relative to the international reference.

- With regard to the composition of the price, in the public sector the mark-up was 25%, in addition to the applicable taxes. Whereas in the private sector, the final patient price includes three marks-up (importer, wholesale, and retail) and commonly these make up a large percentage of the final price. In combination, these mark-ups typically add more than 100% to the prior price of the medicine.

- Some treatments (particularly chronic conditions) are not affordable for families on a low income. For example, almost half a month's salary would be needed to treat a urinary tract infection with ciprofloxacin when the originator brand medicine is purchased from a private retail pharmacy.

Based upon the study results the following recommendations are made:

1. In Peru, many core list medicines are not widely marketed in the country. They tend to be sold exclusively in private clinics and only in large cities. For this reason, availability of these medicines was low in the public sector (11.4%). For future surveys, the local supplementary medicine list should be expanded.

2. There are certain strengths that are not commonly marketed in Peru, such as 200 mg fluconazole tabs or 25 mg diclofenac tabs. Even if there are few such cases, the possibility of analyzing these medicine prices based upon a Defined Daily Dose should be examined for the purpose of performing potential comparisons with results from countries that do market these medicines.

3. The findings of this study should be used to develop strategies that improve patient access to medicines.

4. This study gives important data on the price of medicines in Peru, in particular the prices that people pay, and variations across facilities and sectors. It is important to carry out an in-depth study to further investigate the price discrepancies in the private sector. This survey will assist in defining the key problems and identifying where they are occurring.

This present study uses basic indicators and cannot give a complete impression of the pharmaceutical sector in Peru. Nevertheless, the AIS-LAC coordination office proposes that the conclusions and recommendations of this report be studied, and a deeper analysis of the Peru pharmaceutical sector be considered for the future, for the purpose of improving access to, and affordability of, medicines for everybody.

7. Policy Options

In Peru, it is supply and demand that set the prices for medicines. What is more, because no price regulating mechanism is in place, suppliers have complete freedom to set prices according to how "the market reacts". There are just a few examples where the government has exonerated payment of taxes in order to lower medicine prices, namely for cancer, anti-diabetic, and anti-retroviral drugs, yet results of such a move have not been as expected.[9]

Hence, certain characteristics of the Peruvian medicine market suggest adopting new strategies for getting medicine to people who need them:

7.1. Promoting generic medications

Generics have proven themselves to be a more economical alternative for improving access to medicines through creating competition in the supply of low cost drugs, yet they have become, at the same time, a target of misinformation on their efficacy and safety in an attempt to exclude them as an effective option. All the same, Peruvian government backed TBC, HIV, and other programs mainly use generic drugs for beneficiaries and have been able to comply with their goals of reducing mortality and improving the quality of life of the people being treated.

In addition, the current public and private health care systems in Peru are using generic medications; nevertheless, it is necessary that we increase the trust of health care professionals and users in them by taking the subsequent measures:

- To make and implement a generic drug policy that promotes their manufacturing and use, guaranteeing their quality as is done for all medicines on the market.
- To design and implement a media campaign which informs the public that generic medicines are a valid option for treating illnesses.
- To strengthen compliance with established regulations, like the obligation of prescribing the INN and the generic substitute.
- To ban all publicity and other promotional activities used to discredit generic products through applying current legislation

7.2. Making drug prices known to the public

Consumers should have access to price information in order for them to compare the different options on the market so they can make the best informed choice for themselves.

[9] Valladares G., Cruzado R., Seclen J., Pichigua Z. "Evaluation of the Potential Effects of the Free Trade Agreement Being Negotiated with the U.S. on Access to Medicines". April 2005, Lima.

Furthermore, drug price information and medicine substitution options must be a duty undertaken by the pharmacists within what it known as “pharmaceutical care”.

Regulations need to be set out on the kinds and amount of incentives given to health professionals and pharmacy workers for discouraging users from purchasing certain options available in the market.

7.3. Creating a medicine price and availability monitoring system

The government / Ministry of Health (MoH) must undertake to create a system for monitoring drug prices and availability in both the private and public markets so that measurable proof exists for decision making that enables access essential medicines. This monitoring system can likewise offer information to the general public.

7.4. Exonerating taxes

The elimination of taxes on specific groups of medications, particularly those related to “high cost illnesses” or to diseases with greater prevalence in the country, would cut roughly 9% - 12% off the CIF and 19% off the final cost of medicines, constituting a substantial reduction in price. Monitoring process implementation and results of prices on tax free medicines would be important, as well.

7.5. Transparency mechanisms

Promoting transparency when setting medicine prices so as to avoid undue profit margins that may jeopardize access to essential medicines should become a component of social responsibility in regards to public health.

7.6. Medicine Price Observatory

Support should be given to the Andean Community of Nations – Hipolito Unanue Agreement in creating a Medicine Price Observatory so governments can share data on how much each pays for medicines through public procurements.

7.7. Data handling

Government must set in motion and maintain simple mechanisms for handling data on international supplier prices (catalogues, etc.) that will increase support when it comes time to negotiate and make informed decisions on drug procurement.

APPENDIX 1 - Medicines selected for the study

Core List

Medicine	Brand	Manufacturer (owner)	Manufacturer for Peru	O.B. in Peru	Peru Ess Medicine
1. Acyclovir 200 mg tab	Zovirax	GSK	GLAXO WELLCOME MEXICO S.A	YES	YES
2. Amitriptyline 25 mg tab	Tryptanol	Merck	MERCK SHARP & DOHME (I.A.) CORP.	YES	YES
3. Amoxicillin 250 mg tab	Amoxil	GSK	GLAXOSMITHKLINE PERU - GRIMANN S.A.	YES	YES
4. Artesunate 100 mg tab	Arsumax	Sanofi Winthrop		NO	YES
5. Atenolol 50 mg tab	Tenormin	ASTRA ZENECA	ASTRAZENECA PERU SA - CIFARMA S.A.	YES	YES
6. Beclomethasone inhaler 50 mcg/dose	Becotide	GSK	GLAXOSMITHKLINE MEXICO S.A.	YES	YES
7. Carbamazepine 200 mg tab	Tegretol	NOVARTIS	NOVARTIS FARMACEUTICA S.A.	YES	YES
8. Ceftriaxone injection 1 g/vial	Rocephin	ROCHE	F. HOFFMANN LA ROCHE S.A.	YES	YES
9. Ciprofloxacin 500 mg tab	Ciproxina	BAYER	BAYER S.A.	YES	YES
10. Co-trimoxazole suspension (200+40) mg/5 mL	Bactrim	ROCHE	PRODUTOS ROCHE QUIMICOS E FARMACEUTICOS S.A.	YES	YES
11. Diazepam 5 mg tab	Valium	ROCHE	PRODUTOS ROCHE QUIMICOS E FARMACEUTICOS S.A.	YES	YES
12. Diclofenac 25 mg	Voltaren	NOVARTIS	NOVARTIS BIOCIENCIAS S.A.	YES	NO (not i form
13. Phenytoin 100 mg caps/tab	Epamin	PFIZER	Pfizer - W - L LLC COLOMBIA	YES	YES
14. Fluconazole 200 mg tab	Diflucan	PFIZER	PFIZER S.A.	YES	NO (not i form
15. Fluoxetine 20 mg tab	Prozac	ELI LILLY	ELI LILLY LABORATORIES	YES	YES
16. Fluphenazine hydrochloride, inj. 25 mg/ml	Anatensol	BMS	BRISTOL MYERS SQUIBB ECUADOR C.A.	YES	YES
17. Hydrochlorothiazide 25 mg tab	Dichlotride	MERCK		NO	YES
18. Indinavir 400 mg caps	Crixivan	MERCK	MERCK SHARP & DOHME LABORATORIES	YES	YES
19. Losartan 50 mg tabs	Cozaar	MERCK	MERCK SHARP & DOHME LTD.	YES	NO
20. Lovastatin 20 mg tabs	Mevacor	MERCK	MERCK FROSST CANADA & CO.	YES	YES
21. Nevirapine 200 mg tab	Viramune		ROXANE LABORATORIES INC.	YES	YES
22. Nifedipine Retard 20 mg tab	Adalat	BAYER	BAYER HEALTHCARE AG	YES	NO
23. Sulfadoxine and Pyrimethamine (25+500) mg tabs	Fansidar	ROCHE	PRODUTOS ROCHE QUIMICOS E FARMACEUTICOS S.A.	YES	YES
24. Salbutamol inhaler 0.1 mg/dose - dose	Ventolin	GSK	GLAXOSMITHKLINE BRASIL LTDA.	YES	YES
25. Zidovudine 100 mg caps	Retrovir	GSK	SMITHKLINE BEECHAM PHARMACEUTICALS	YES	YES

Supplementary List

	Medicine	Orig. Brand	Manufacturer
1	Amoxicillin 500 mg cap	Amoxil	GSK
2	Clotrimazole 500 mg tab	Canesten	Bayer
3	Chlorpheniramine 4 mg tab	Clorotrimeton	Schering Plough
4	Co-trimoxazole 800/160 mg tab	Bactrim F	Roche
5	Erythromycin 500 mg cap	Pantomicina	Abbott
6	Fluconazole 150 mg cap	Diflucan	Pfizer
7	Ibuprofen 400 mg tab	Motrin	Pfizer
8	Metronidazole 500mg tab	Flagyl	Aventis Pharma

Therapeutic Categories

ACE inhibitors

	Medicine	Orig Brand	Manufacturer	Nº of registered products
1	Captopril 25 mg tab	Capoten	BMS	31
2	Enalapril 10 mg tab.	Renitec	MSD	39
3	Cilazapril 2.5 mg tab	Inhibace	Roche	1
4	Fosinopril 10 mg tab	Monopril	BMS	1
5	Lisinopril 10 mg tab	Zestril	Astrazeneca UK Limited	9
6	Quinapril 10 mg tab	Accupril	Pfizer / W - I llc Colombia	3
7	Ramipril 2.5 mg tab	Tritace	Aventis Pharma S.A.	1

Oral Antidiabetic preparations

	Medicine	Orig Brand	Manufacturer	Nº of registered products
1	Glibenclamide 5 mg tab			18
2	Metformin 500 mg tab	Glucophage	Merck	9
3	Clorpropamide 250 mg tab	Diabinese	Pfizer S.A.	1
4	Gliclazide 80 mg tab	Diamicron	Química Suiza / Profarma S.A.	3
5	Glimepiride 4 mg tab	Amaryl	Aventis Pharma Ltda.	6
6	Glipizide 5 mg tab	Minidiab	Pfizer	2
7	Pioglitazone 30 mg tab	Actos	Abbott / Takeda Chemical Ind. Ltd.	5
8	Rosiglitazone 4 mg tab	Avandia	GSK	3

Ulcer medications

	Medicine	Orig Brand	Manufacturer	Nº of registered products
1	Omeprazole 20 mg tab	Losec	AstraZeneca	54
2	Ranitidine 150 mg tab	Zantac	GSK	50
3	Lansoprazole 30 mg tab	Ogastro	Abbott / Takeda Chemical Ind. Ltd.	19
4	Cimetidine 400 mg tab	Tagamet	GSK / Smithkline Beecham Mexico S.A.	2
5	Esomeprazole 20 mg tab	Nexium	Quim.Suiza/Astrazeneca A.B.	3

6	Famotidine 40 mg tab			3
7	Pantoprazole 40 mg tab			4
8	Rabeprazole 20 mg tab			2

APPENDIX 2 – Regions surveyed

A. Cites excluded from sampling and corresponding reasons

City name	Reason	Distance
Tumbes Capital: Tumbes	Border zone, the price of medicines can be influenced by smuggling.	Less than one day from Lima by bus
Puno Capital: Puno	Border zone, the price of medicines can be influenced by smuggling	More than one day from Lima by bus
Tacna Capital: Tacna	Border zone, the price of medicines can be influenced by smuggling	Less than one day from Lima by bus
Loreto Capital: Iquitos	The city could have a few private outlets to distance of more than 3 hours from metro	More than one day from Lima by bus
Madre de Dios: Capital: Puerto Maldonado	The city could have a few private outlets to distance of more than 3 hours from metro	Less than one day from Lima by bus
Amazonas Capital: Chachapoyas	The city could have a few private outlets to distance of more than 3 hours from metro	Less than one day from Lima by bus
Moquegua Capital: Moquegua	The city could have a few private outlets to distance of more than 3 hours from metro	Less than one day from Lima by bus

B. Geographic location of survey areas

Length of Peruvian coast: 3080 km

APPENDIX 3 - Schematic diagram for expanded sample including more remote outlets