

# Medicine Prices in Yemen

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## A Survey Report on Medicine: Availability, Prices and Affordability

**By**

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## **Abbreviations and acronyms**

<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>Cap</b>	Capsule
<b>CIF</b>	Cost, Insurance and Freight
<b>EMRO</b>	Regional Office for the Eastern Mediterranean
<b>GCC</b>	Gulf Cooperation Council
<b>GDP</b>	Gross Domestic Product
<b>HAI</b>	Health Action International
<b>HIV</b>	Human Immunodeficiency Virus
<b>IB</b>	Innovator Brand
<b>IQR</b>	Interquartile Range (the range between 25%ile & 75%ile)
<b>IRP</b>	International Reference Price
<b>LPG</b>	Lowest Price Generic Equivalent
<b>MoPH</b>	Ministry of Public Health & Population
<b>MPR</b>	Median Price Ratio
<b>MSH</b>	Management Sciences for Health
<b>NGO</b>	Non-Governmental Organization
<b>NHA</b>	National Health Account
<b>NPMS</b>	National Program for Medical Supply
<b>PBS</b>	Pharmaceuticals Benefit Scheme (Australia)
<b>QCL</b>	Quality Control Laboratory
<b>RoY</b>	Republic of Yemen
<b>SBDMA</b>	Supreme Board for Drugs & Medical Appliances
<b>Tab</b>	Tablet
<b>UNICEF</b>	United Nations International Children's Emergency Fund
<b>US = USA</b>	United State of America
<b>USD = \$</b>	United State Dollar
<b>WHO</b>	World Health Organization

## **Executive Summary**

The Supreme Board for Drugs & Medical Appliances, the drug regulatory authority, has carried out a field study to measure the prices of medicines in the Republic of Yemen using an international (HAI/WHO) methodology. Data on prices of 35 essential medicines were collected in the public and private outlets/pharmacies in the capital Sana'a City and three main cities in other governorates (Aden, Hodiedah and Taiz). The availability of the medicines was also measured and the added mark-ups were calculated by comparing the market selling prices with registered CIF prices.

The cost of the treatment was calculated for ten medicines and compared to the daily wage of lowest paid unskilled government worker.

The results showed that:

- The availability of medicines in the public sector outlets was very low. For this reason, we concentrate on the results of the private sector where, in general, good availability, if not excellent, was shown for the generic/branded-generic equivalents.
- In the private pharmacies innovator brands prices were considerably high, whereas prices of generic (mostly branded-generic) equivalents varied from very cheap to considerably high (for half of the surveyed medicines).
- The observed prices of innovator brand medicines in the private sector did not match the prices obtained by computing official mark-ups onto officially registered CIF prices. There was great variability with some medicines showing much more than the 'official mark-up' and other less than expected market mark-ups.
- The cost of treatment with generic equivalents is cheaper than with innovator brands.

## **Summary of recommendations**

1. The role of public sector should be enhanced to cover all medicines in the national essential medicines list.
2. A suitable medicine pricing system should be adopted that takes into consideration the use of pharmacoeconomic tools, prices in a well-chosen basket of countries and the international reference prices obtained by non-for-profit organizations.
3. There is a necessity to start an overall check and revision of the registered CIF prices.
4. Prescribing by generic name should be encouraged since they constitute the cheapest choice for poor patients.

## **1. Introduction and background**

During the month of July 2006, a field study on measuring the prices of medicines was carried out in Yemen. The ultimate goal of the study was to document and compare the prices of medicines in both public and private health sectors and to compare them with those in other countries.

The field work is based on a methodology developed by the World Health Organization (WHO) and Health Action International (HAI) using a short list of medicines to compare the prices of medicines in different health sectors. The methodology which is described in the published manual, *Medicine Prices: A new approach to measurement* (WHO/HAI, 2003), has

been designed for the collection, analysis and interpretation of medicine prices in a standard way. It also enables the composition of medicine prices to be investigated.

The objectives of our study were to answer the following questions:

- How are medicines priced in Yemen?
- What is the difference in the prices of innovator brand products and their generic equivalents?
- By how much do the medicine selling prices differ from their registered CIF prices and how realistic they are?
- What taxes and duties are levied on medicines and what is the level of the various mark-ups that contribute to the retail price of medicines?
- How affordable are medicines to low-income people in Yemen?

The study was carried out by Supreme Board for Drugs & Medical Appliances, Ministry of Public Health & Population.

## **Background – country data**



Yemen is an Arab country located in the south of the Arabian Peninsula. It is bordered by Kingdom of Saudi Arabia, Oman, Red Sea and Arabian Sea. Yemen has a population of approximately 19.7 million inhabitants, 71% of whom live in rural areas. The illiteracy rate is still high and reaches about 55.7%. Yemen is a low-income country with per capita Gross Domestic Product (GDP) of

659 USD<sup>1</sup>.

The total expenditure on health is not available at the present time, but the governmental contribution is about 256 million USD a year<sup>2</sup>. That is \$13 per capita and represents only 2% of the GDP.

In general the health services (either public or private) are mainly found in major cities, though primary health centers/units and polyclinics are scattered throughout the whole country including some rural areas. The statistical report (2003-2004) of the Ministry of Public Health & Population (MoPH) shows a total of 136 general hospitals (93 private), 470 polyclinics (341 private), 626 health centers (115 private), 2185 primary health care units, 380 maternity & child health centers, 1768 private pharmacies and a total of 4799 physicians (329 dentists and 974 specialists). In addition, there are a few Non-governmental Organizations (NGOs) and foreign medical missions.

<sup>1</sup> Population and illiteracy data are according to annual report (2005) of Central Statistical Organization, and the official website of the Ministry of Planning & International Co-operation.

<sup>2</sup> Bulletin of governmental finance statistics, No. 24, 2<sup>nd</sup> quarter 2006- Ministry of Finance.

Public health services are not free; the patient should pay a prescription fee, the ex-store cost of the medicines plus 10% (except for insulin, renal failure medicines, cancer and some antihypertensive medicines - which are given for free) and of course the cost of any diagnostic tests needed.

The local pharmaceutical industry still in its beginning phases and covers only around 10% of the total market, whereas imported medicines via private sector agents cover most of the country needs - around 85% as specified in the 2005 annual statistical report issued by Supreme Board for Drugs and Medical Appliances (SBDMA)<sup>3</sup>.

The Ministry of Public Health & Population establishes and adopts 5-year health developing plans. The third and the last one has been discussed and approved, through a workshop held in August 2005, for the period from 2006 to 2010. It includes the highlights for a national drug policy, which mainly addresses the necessity to complete the required legislations and to review and update the current regulating laws, bylaws and procedures in an attempt to enhance and improve the health services and management.

There is no implemented health insurance system up till now, but the MoPH is working on establishing and adopting a suitable one. More details about National Pharmaceutical Sector could be found in [Annex-I](#).

## **2. Methods**

SBDMA decided to survey the prices in the public sector outlets and the private pharmacies using the HAI/WHO 2003 methodology. A total of 35 essential medicines were sampled – 27 from the pre-selected core list for international comparisons and 8 supplementary medicines were added by the local investigators. The full list is attached as [Annex-II](#) and the reasons for exclusion and inclusion are described later.

For each substance, products were monitored, namely:

- Innovator Brand (IB) – the original patented pharmaceutical product.
- Lowest Price Generic (LPG) equivalent – the lowest priced generic equivalent found in the facility at the time of survey.

The procurement prices were obtained from the National Program for Medical Supply (NPMS) – the body which is responsible for central medical stores in MoPH, capital Sana'a City and three regional stores in the governorates (Aden, Mukalla and Hodiedah). The public and private outlets/pharmacies were surveyed on both the availability of the medicines and the patient-paid prices. The selection is described later.

The use of international reference prices (MSH – 2005) is explained under "Results". MSH prices were converted to Yemeni Rials using the exchange (bank selling) rate on 8 July 2006, the first day of the survey (1USD = 197.5600 Yemeni Rials).

The components of medicines prices were identified in order to be able to make an estimate of the manufacturers' prices and the add-ons which contribute to the final retail price.

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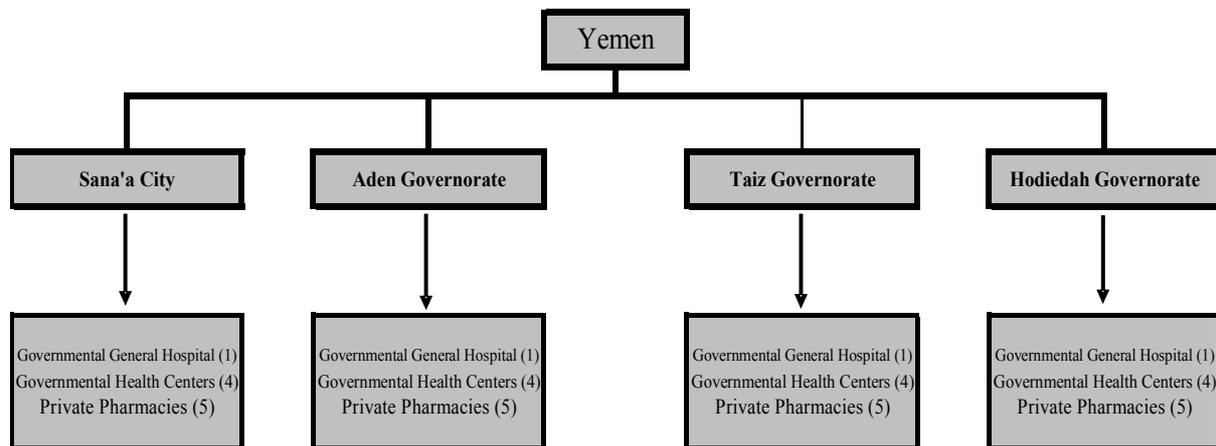
<sup>3</sup> The drug regulatory authority.

Finally, in order to find out what the prices of medicines mean to the ordinary citizen, we measured the affordability of ten common treatments using the daily wage of the lowest paid unskilled governmental worker.

## 2.1 Sampling

The WHO/HAI sampling method was used for selecting a representative number of public and private health facilities and pharmacies. A total of 20 public sector outlets and 20 private pharmacies in the capital Sana'a City and three other populated governorates (main cities) namely: Aden, Taiz and Hodiedah. In each city we randomly selected one principal public general hospital, four public health centers and five private pharmacies. Of course the health centers and pharmacies were chosen to be in different areas of the mentioned cities. The following schematic diagram summarizes the process of sample selection:

Figure 1 - Sample selection, schematic diagram.



## 2.2 The targeted medicines

The original WHO/HAI core list contains 30 medicines, three of them (*Artesunate 100mg tab*, *Indinavir 400mg cap*, *Zidovudine 100mg cap*) neither registered in our country nor included in the national essential medicines list. For these reasons we excluded the three medicines and replaced them with a supplementary list of eight substances which are widely prescribed to treat a number of common cases of illness, and therefore which we are interested to monitor their availability and to what extent their costs are affordable by low-income patients.

The added medicines together with their therapeutic groups are:

- **Infectious diseases:** *Amoxicillin + Clavulanate, 500+125mg cap/tab*, *Clarithromycin, 250mg cap/tab*, *Mebendazole, 100mg cap/tab* and *Metronidazole, 250mg tab*.
- **Antimalarial:** *Chloroquine phosphate<sup>4</sup>, 250mg cap/tab*.
- **Thyroid hormones:** *Levothyroxine, 0.1mg cap/tab*.

<sup>4</sup> The innovator brand "Resochin" was under registration process when we started the survey.

- **Cardiovascular:** *Lisinopril, 10mg tab.*
- **Antipsychotic:** *Risperidone, 2mg tab.*

The full list of core and supplementary medicines is listed in [Annex-II](#).

## **2.3 Reference Price List**

Summary measures of the medicine prices found during the survey are expressed as unit-dose Median Price Ratios (MPR) relative to a standard set of reference prices i.e. the local unit price divided by the international reference converted to local currency. A MPR of 5 would therefore indicate that the local price was 5 times that of the international reference price. The Management Sciences for Health (MSH) reference prices have been used as listed in their published guide named "International Drug Price Indicator Guide (2005)" and also on their web site "<http://erc.msh.org>". (10), (4).

The MSH reference prices are global wholesale not-for-profit and for-profit procurement prices, presented as medians of recent procurement or tender prices offered by different kinds of suppliers to developing countries for multi-source (generic) products. Therefore MSH prices are relatively low and represent efficient bulk procurement without the cost of shipping or insurance (1).

## **3. Data Collection**

A standardized data collection form was used to collect data from each facility (public outlet or private pharmacy). The prices in both private pharmacies and public outlets in general hospitals and health centers were obtained by visiting the selected outlets or pharmacies, whereas, procurement prices were gathered from the NPMS which manages the public tenders and public medical stores in MoPH.

The data collectors were pharmacists and pharmacy assistants chosen from within the personnel of SBDMA and the General Directorate for Pharmaceutical Services. They were trained in a two-day workshop in the headquarters of SBDMA, Sana'a city to ensure the reliability of the survey and accuracy of the gathered data. Next day a small pilot study was undertaken in three randomly chosen areas of Sana'a city, in each area three public outlets (one general hospital and two health centers) and three private pharmacies were surveyed. These facilities were avoided later during the actual survey, and the collected pilot data were reviewed with the survey team to identify mistakes and discuss the difficulties experienced.

The survey team was divided into three groups each consisting of a supervisor and four data collectors. Sana'a city was assigned to group one, Taiz & Aden cities were assigned to group two and Hodiedah was assigned to group three. The field survey actually commenced on Saturday July 8, 2006.

## **4. Results**

The following points will be presented:

- 4.1 Medicines' availability in public and private sectors.
- 4.2 Medicine prices in comparison with international reference prices (IRPs).
- 4.3 Cross-sector medicine prices comparisons.
- 4.4 Price variations in Yemen.
- 4.5 The affordability of model treatment regimens.
- 4.6 The cumulative add-ons and mark-ups.
- 4.7 Medicine prices in Yemen from an international perspective.

### **4.1 Availability**

First of all, it is important to keep in mind that the availability presented is only the availability of targeted medicines on the day of the data collection at each surveyed facility.

Second, governmental medical stores were not surveyed in particular; instead the procurement data were gathered from the procurement orders managed by NPMS (successor of the former body "Drug Fund"), which is responsible for managing governmental procurements through local tenders bid by local representatives of international suppliers.

#### **4.1 – 1 Limitation of governmental procurements**

NPMS has almost limited its order to a small number of medicines used to treat cancer, diabetes (insulin only), renal failure and hypertension. According to their explanation, this limitation of activities since 2004 was due to complications in the process of obtaining sufficient budget from the Ministry of Finance and at the same time lack of other donors to support the procurements. Thus, this is why it was found that only 9 medicines (out of 35 surveyed medicines) were purchased in a total of 5 orders executed since Jan, 2004.

#### **4.1 – 2 Public sector availability**

Normally, innovator brands (IB) medicines are not supposed to be found at public outlets; this was confirmed by the zero median availability as shown in [Table-1](#). Also the results abnormally show a very poor availability of lowest price generic equivalents (LPGs). The details show that only 6 medicines (5 from core list) were found in at least four of the surveyed pharmacies, giving a whole 5% sector median availability. Even worse 75% of the medicines were found in no more than 12% of the surveyed pharmacies (20).

At the individual medicines level, a complete absence of more than 45% of the targeted medicines (16 out of 35) that treat important cases such as hypertension (only *Captopril* found), epilepsy (*Phenytoin*), diabetes (*Metformin*), thyroid disorders, asthma and HIV infections.

The relatively higher availability of medicines found in generic or branded-generic<sup>5</sup> forms in more than 12% of the surveyed public outlets were: *Amoxicillin* (20% avail), *Captopril* (30%), *Ceftriaxone* (25%), *Chloroquine phosphate* (70%), *Ciprofloxacin* (15%), *Co-trimoxazole suspension* (20%), *Diazepam* (15%), *Metronidazole* (15%) and *Ranitidine* (20%). Some of these medicines had been purchased from the local private market according to workers in the visited outlets and reported by data collectors and supervisors.

#### 4.1 – 3 Private sector availability

The availability of the targeted medicines in private pharmacies was much better than in public pharmacies, either for only core medicines or for the full list including the supplementary added medicines as listed and indicated in [Annex-II](#).

Results show very good (if not excellent) median and interquartile range availability values for LPG forms, in comparison to moderate availability rates for IB forms ([Table – 1](#)).

For medicines in LPG forms, half of the core list were found in 80% of the surveyed pharmacies and half of the full list were even found in 90% for the full list, with interquartile ranges (IQR) of (45 - 100%) for only core medicines and (70 - 97.5%) for full list medicines.

For medicines in IB forms, sector median availability was found to be 45% (for core medicines only) and 50% (for core and supplementary medicines) with IQR of (17.5 – 82.5%) for core list medicines and (17.5 – 90%) for full list medicines.

At the individual medicine level, the results show some significant issues; the most important ones are listed hereafter:

- A complete absence of three medicines in neither IB nor LPG forms. Namely the following cases:
  1. *Nevirapine*: absence may be attributed to its uses as a HIV infection medicine, the cases are controlled and monitored by a special AIDS program in the MoPH. The program financing is sponsored by UNICEF and the medicine is given to patients for free.
  2. *Lovastatin*: absence may be attributed to the presence of other alternatives from the same therapeutic group (*Simvastatin*, *Atorvastatin*, ... etc.) which are more favored by physicians.
  3. *Hydrochlorothiazide*: absence may be attributed to the existence of antihypertensive preparations such as with *Amiloride*, *Triamterne*, *Lisinopril*, ... etc.
- A 5% availability of *Resochin* (the innovator brand of *Chloroquine Phosphate*), though it was under registration process on the day of data collection. It might be a smuggled medicine or have been exceptionally permitted to be available in face of the prevalence of malaria in Hodiedah governorate where the medicine was found.
- Availability of some IBs and/or LPGs in all surveyed pharmacies as follows:
  1. *Captopril* (IB & LPGs),

<sup>5</sup> Generic equivalent medicine marketed by brand names other than the innovator brand name.

2. *Carbamazepine* (LPGs),
3. *Ceftriaxone* injection (LPGs),
4. *Ciprofloxacin* (LPGs),
5. *Co-trimoxazole* suspension (LPGs),
6. *Glibenclamide* (LPGs),
7. *Mebendazole* (LPGs),
8. *Ranitidine* (IB & LPGs) and
9. *Salbutamol* inhaler (LPGs).

The 100% availability of these medicines may be due to one or more of the following:

1. Widely spread cases of infectious diseases (*Ceftriaxone* injection, *Ciprofloxacin*, *Co-trimoxazole suspension* and *Mebendazole*), epilepsy (*Carbamazepine*) and ulcer (*Ranitidine*).
  2. Non-availability or limited availability of these medicines in the public sector outlets.
  3. Irrational prescribing and abuses especially in case of antibiotics.
  4. Preference of good-income patients to IB medicines rather their generic equivalents as in case of "*Capoten*" and "*Zantac*".
- For *Fluphenazine* injection and the combination of *Sulfadoxine & Pyrimethamine*, results show IB availability rates higher than their LPG equivalents because of rarity of sources for their generic (or branded-generic) equivalents.

## 4.2 Medicine prices in comparison with IRPs

The local median price of each medicine is presented as a ratio of international reference price of the medicine, and that is what we refer to, in the whole study, as Median Price Ratio (MPR). For instance, a MPR of 5 would indicate that the local price is five times greater than the reference price.

### 4.2 – 1 Public procurement prices

For the reasons mentioned previously, public procurement price data for 2004-2006 was available only for 9 medicines (8 from core list) and even three of them (*Beclometasone* inhaler, *Fluphenazine* injection and *Phenytoin*) were not found in any of the twenty surveyed public outlets. For the latest procurement order (2006), only 6 medicines (5 from the core list) were present.

In spite of the poor public procurement data, using all the available procurement orders (from 2004 through 2006) the results show feasible MPRs in the range of 0.49 to 1.76 with IQR from 0.62 to 0.83 and a median of 0.76 of the MSH reference prices. When only using the latest procurement order, the median MPR was 0.79 (0.69 to 1.24).

This low median MPR for procurement suggests that the NPMS is efficient when procuring medicines. However, we are fully convinced that the available procurement data is not adequate to judge the efficiency of the management of public procurements and tenders due to the small number of medicines procured among the survey list.

### 4.2 – 2 Public sector retail prices

The poor procurement data and the limitation of NPMS activities were reflected on availability and price data of medicines at the public outlets on the day of data collection. Regardless, [Table – 2](#) summarizes MPR ranges for the medicines which were found in more than three of the public surveyed outlets. The MPRs range from 0.64 to 2.33 with 75% of the surveyed medicines having MPR values less than 1.49 times the reference prices.

Though, these MPR values seems to be acceptable, sound and feasible judgment is very difficult and may be misleading due to the limited public procurement and accordingly limited public data (only 6 medicines, all generics, were available for analysis).

At the medicines level, the details show three innovator brands each found in only one of the surveyed outlets, namely: *Amoxicillin+Clavulanate*, *Ceftriaxone* injection and *Mebendazole*. The data collectors and groups' supervisors reported the three as purchased from the private local market by the health facilities to meet their patients' needs.

## 4.2 – 3 Private sector retail prices

Out of 35 medicines in the full list, 26 IBs (20 from the core list) and 30 LPG equivalents (22 from the core list) were found in at least four of the surveyed private pharmacies. The MPRs of the found medicines could be summarized as follows:

For innovator brands, MPRs varied from around 2 to 129 times greater than the MSH reference prices (75% of them > 7 times; median 18.1).

For lowest price generic equivalents, MPRs varied from 0.26 to 18 times greater than the HAI reference prices (50% < 4 times; median 3.5).

These incredible and astonishing findings initiate a lot of questions about the pricing of innovator brands, from the original level of the CIF price, mark-ups and add-ons added to the CIF prices of the medicines and of course, the absence of an efficient pricing system. For more details [Table – 2](#) presents the median and interquartiles of the MPRs for the medicines found from both core and full list in both public and private sectors, whereas [Figure – 2](#) presents the details for each found IB medicine.

At the medicines level, the results show that:

- MPRs of some LPG medicines were much less than the reference prices such as *Losartan* (0.42) and *Risperidone* (0.26). This may be attributed to registered cheap sources from south and south-eastern Asia like India, Pakistan, etc. but is also a reflection that the MSH reference price is high for these products (only buyer prices were available which are higher than supplier prices).
- The differences between MPRs for IBs and their LPG equivalents were very high. For instance it reaches 24 times in case of *Ciprofloxacin* and a little bit more than 11 times in cases of *Fluconazole*, *Omeprazole* and *Ranitidine*. The histogram in [Figure – 3](#) gives an indication about the brand premiums by comparing the MPRs for the innovator brands with the generic equivalents for each found medicine, while [Table – 4](#) presents MPRs of LPGs as percentages of those for IBs .

- The maximum MPR values for some medicines (both IBs and LPGs) were almost double their median and 75<sup>th</sup> percentile values (as for *Co-trimoxazole* suspension, *Diazepam*, *Diclofenac*, and *Metronidazole*) and around four times for the lowest price generic equivalents of *Chloroquine & Ciprofloxacin*.

Though, the wide varieties of sources of medicines (domestic, Arabic, South-east Asia and European producers) may explain the high price variations in case of LPGs or branded-generics, it is very difficult to give a feasible explanation or interpretation in case of IBs, unless the cheap IB products were imported from a subsidised factory in countries with very cheap labor. For example, a GSK product like "*Septin*" of Egyptian origin (MPR range 8.21 – 16.42). However, in reality, the unit cost of production may not vary much and it may just be the pricing strategies of the companies which lead to this variation.

Although only based on 5 pharmacies in each region, it is possible to compare the median MPR for IBs and LPGs in the four centres of the survey ([Table – 9](#)). The median MPR for brand medicines varied between all the regions although this might be due to differences in availability between the regions (median availability 50%). Availability of generics was high and the median MPR was quite consistent except for Al-Hodiedah where it was slightly higher. The need for air conditioning during most hours of the day may explain somehow the higher prices in hot governorates of Al-Hodiedah and Aden.

### 4.3 Cross-sector medicine price comparisons

Since public procurements rarely include IBs products, only LPGs prices will be compared in both private and public sectors. The prices of the medicines found in the surveyed public outlets will be included as listed in [Table – 3](#).

Again the poor public data makes it difficult to come out with reasonable cross-sector conclusions that can be generalized, except a remark about the possibility that *Ceftriaxone* injection had been purchased from the local private market as mentioned earlier, which accounts for the similarity in price across the sectors (private/public ratio 1.18).

### 4.4 Medicine price variations in Yemen

This section is devoted to price variations of LPGs in private pharmacies. Results show great differences in MPRs for generic equivalents of some medicines. [Table – 8](#) lists eight medicines with significant variations in MPRs as found in the 20 surveyed private pharmacies. Every two successive MPR values in a row (except the last shadowed value) represent differences in MPRs for 25% of the observed prices of the medicine heading the row. The last shadowed column expresses the difference between minimum and maximum MPRs of the same medicine as times of MSH reference prices and show 8 to 33-times variation.

The following paragraphs are presented as an attempt to explain the price variations of a given medicine:

- The open market of medicines leads to great varieties in the sources of imported generic equivalents (branded-generics in most cases) of the medicines in addition to the locally manufactured ones. The numerous countries of origins of equivalents of a given medicine lead to huge differences in their officially registered CIF prices and accordingly the selling wholesale and retail prices. For instance, it is our impression that medicines imported from south eastern Asia (e.g. India, Pakistan, etc.) are cheaper than those imported from Arabian countries and the later are cheaper than those imported from USA or European countries (the sources of most expensive branded-generics). However, differences in manufacturing and transport costs alone are unlikely to account for the variation and some producers may inflate their prices.
- No doubt, there exist cases that are solely because of greedy wholesalers and/or retailers.
- The ability of a retailer to pay in cash and/or dispense more products of a specific wholesaler may make him more favorable with more privileges and bonuses than others, so such a retailer can sell a product cheaper than his rivals.
- Finally, the marketing and promotional capabilities of medical representatives and the skills of their working staffs may constitute a factor which should not be ignored.

#### **4.5 The affordability of model treatment regimens**

Here, we come to the point of showing "what do the study outcomes mean to the ordinary citizen?" To what extent are the current selling prices affordable by patients, especially the very low-income ones.

The WHO/HAI methodology suggests ten common treatment regimens ([Table – 5](#)). The cost was measured by the daily wage of the lowest paid unskilled governmental worker. That is around \$2.81 a day as adopted and implemented by the Ministry of Civil Services and Social Security in their latest wages strategy (2005).

For the public sector, only the costs of course treatments for three cases were calculated due to the lack of data as mentioned earlier in previous sections of the study. In the three cases the affordability values were less than the wage of half a day, but it is not wise to come out with a generalized judgment with such poor data on hand.

For the private sector, hereafter are some of the significant findings we came out with:

- Amoxicillin IB cost was not listed because it was only found in one pharmacy, while all calculations have been done for medicines found in more than three pharmacies.
- The costs of course treatments with IBs were two to twelve times greater than their correspondent treatments with LPGs.
- Of all found innovator brands, only *Bactrim (Co-trimoxazole)* suspension (used for pediatric respiratory infections) costs less than the wage for one day. But costs of treatments using LPGs were less than the wage of one day for eight of the eleven

listed cases. More even the left three cases, with treatment costs greater than the wage of one day; still constitute only one-third to around half of their correspondent IBs.

This situation logically and economically suggests LPGs as a cheap and acceptable alternatives for treatment that better suit low-income people. However, in some cases even the generics may be difficult to afford e.g. *Amitriptyline* which would cost 1.8 days' wages from the private sector. One must also bear in mind that this only considers the cost of the medicine and not additional treatment costs.

## 4.6 The cumulative add-ons and mark-ups

The official mark-ups for private sector traders reach a total of 57.44%. The components that constitute this cumulative percentage are presented in [Annex-III](#) for 20 aciclovir tablets 200mg, given that it is the same for every medicine either locally manufactured or imported; innovator brand or generic/branded- generic.

Prices for medicines in the private sector are supposed to be based on registered CIF values. To see how much the observed prices differ from the registered CIF prices in comparison with the official legal margin (57.44%), the median unit price of each medicine was compared to its registered CIF unit price in US dollar with the exchange rates as listed by the Central Bank of Yemen the day prior to that of data collection i.e. in essence the difference between the local unit price in the retail pharmacy and its registered CIF price, expressed as a percentage of the CIF price.

For LPGs, it is difficult to perform or rely on such comparisons, due to the wide ranges of prices of generic (or branded-generic) equivalents of a given medicine. Besides, given the multiple number of generics and their sources, the significant differences in the registered CIF prices of the generic equivalents of each medicine make analysis difficult.

However, this method fits well in the case of IBs since it is unique for each medicine and the only thing that matters is the registered CIF prices for multiple sources (more than one country of origin) products; and this was considered in calculating the CIF unit prices for each registered source ([Table – 7](#)).

For 26 IBs (4 of them from dual sources) each found in more than three of the surveyed private pharmacies and in comparison with the official legal margin considered for private sector retailers, the following most obvious findings are presented:

- Nine cases were greater than 57.44% with excessive market mark-ups and add-ons for:
  1. *Amitriptyline* (128.5%; i.e. the retail unit price was 128% of the CIF price),
  2. *Ciprofloxacin* (719.3%),
  3. *Co-trimoxazole* suspension – French origin (103.1%),
  4. *Glibenclamide* – French origin (393%),
  5. *Nifedipine* Retard (478.5%) and
  6. *Phenytoin* (214.8%).

This situation drives us to think in three possibilities:

- Either, greedy wholesalers and/or retailers violate the official legal margin of profit.
  - Or, registered CIF prices are not real and/or up-to-date and/or intentionally reduced to decrease the later on liabilities (the 1% importation fee for the cost of each proforma invoice and the 5% customs fee for the cost of each shipment).
  - Otherwise, the official margin of 57.44% is not feasible and considered to be unfair by medicines traders.
- Nineteen cases were less than 57.44% and even negatives for:
    1. *Captopril* – UK origin (-5.4%),
    2. *Carbamazepine* – Swiss origin (-13.8%),
    3. *Co-trimoxazole* suspension – Swiss origin (-11.8%),
    4. *Diclofenac* (-10.2%),
    5. *Lisinopril* (-28.3%),
    6. *Metformin* (-11.5%) and
    7. *Omeprazole* (-11.0%).

These cases may lead to exaggeration in the registered CIF prices.

- To get an idea about how many cases are around the official margin, let us consider a  $\pm 10\%$  offset as reasonable and acceptable. By doing so, we end with the following list:
  1. *Aciclovir* (56.1%),
  2. *Amoxicillin + Clavulanate* (48.3%),
  3. *Carbamazepine* – Italian origin (55.9%),
  4. *Clarithromycin* (65.5%),
  5. *Fluconazole* (54.6%),
  6. *Fluphenazine* injection (55.3%),
  7. *Mebendazole* (51.9%) and
  8. *Sulbutamol* inhaler (51.7%).
- The last incredible finding is shown clearly in the vast differences in mark-ups for the four dual sources ([Table – 7](#)). For example, IB *Co-trimoxazole* sourced from Switzerland is being sold at less than the registered CIF price, while that sourced from France is being sold at 100 times the registered CIF price. We can't comment on this situation but, the registered CIF prices should be checked and revised on a fair and reliable basis.

## **4.7 Medicine prices in Yemen in an international perspective**

Up to now the study shows high medicine prices (especially for IBs) in comparison with the MSH international reference prices. What is the story if the medicine local private sector MPRs are compared with their correspondent sector in other countries? For this purpose we had chosen 15 medicines with existing MPR values in three Arabian countries (Jordan, Lebanon and Kuwait), in addition to India (Maharashtra state) and Tanzania.

[Table – 6](#) lists MPRs for both IBs and LPGs in Yemen and the five chosen countries. The data for comparable countries has been taken from the medicine price surveys results as presented by HAI global databases, [www.haiweb.org/globaldatabase/survey-result/result.php](http://www.haiweb.org/globaldatabase/survey-result/result.php). Note: no adjustments were made for varying MSH prices over the years of the surveys (MSH prices from 2002 to 2005 were used in the six surveys).

The most important findings were as listed hereafter:

- MPRs for five local IB medicines were higher than in all other countries, and two were higher than in Lebanon and Jordan only.
- Whereas for all LPGs, local MPRs were better than in compared Arabic countries except for *Amitriptyline*. Though this is not the case if compared with India values and seven LPG values in Tanzania market.

A big question arises at the end of this section "is it feasible and logical that 7 out of 15 medicines in their IB forms were more expensive than in Jordan, Lebanon and Kuwait even though the Yemen GDP per capita (\$659) does not exceed 14% of Jordanian (\$4,700), 12% of Lebanese (\$5,611) and only around 4% of Kuwaiti (\$16,536)?"<sup>6</sup>

## 4.8 Discussion

We come to the point of presenting the many un-answered questions that have been arisen during the whole process of the survey study and in relation to almost every stage of it. These questions or actually points of discussion are of great importance to all who are concerned about (or have interests in) medicine prices, availability and/or affordability whether they are individuals (pharmacists, physicians, researchers, health policy makers, etc.) or institutions (SBDMA, NPMS, MoPH, WHO, MSH, NGOs, universities, etc.).

We encountered a problem of getting information about the total health expenditure, or at least an approximation of it. The point here is "why does the MoPH not establish and adopt the National Health Account (NHA) methodology?" which by definition tracks the path of funds through the health sector, from their sources through financial institutions, to providers and functions. If it were implemented it would provide greater information for planning and accountability.

It is clear that there is a problem with public procurement – that most medicines outside of the list of those procured are not available at public health centres. To expand public procurement would require increased funding for this enterprise either from the government or from donors. Since public procurements are currently facing a lot of obstacles, what if our country joins other GCC members in their pooled procurement – do the problems still stand? What will be the gained benefits and/or drawbacks (if any)? It could open the opportunity for obtaining more generics medicines at a reasonable price by international standards. However, there is the possibility that the GCC prices may be higher than Yemen or its citizens could afford given the difference in wealth of Yemen and GCC countries.

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<sup>6</sup> Numbers and calculations are based on the price survey presentations of these countries during WHO/HAI post medicine price surveys regional workshop, Cairo 7-9 Jan, 2007.

Why is there very poor availability of essential medicines in the public sector? Does the problem lie in the management skills of the NPMS personnel or the solution lie in seeking for a cheaper therapeutic alternatives? Or is it simply a question of needing greater resource allocation?

Nobody can argue that sufficient financing is of primary importance but, the more important question is "how to expend the financial allowances optimally." Could the use of NHA methodology help in rationalizing and directing the health expenditure correctly?

What are the acceptable MPR values? Do the HAI cut-off points, suggested in their report on the prices and affordability of chronic disease medicines (2)<sup>7</sup>, suit every situation in every country? If so, why are MPR values are high in all comparable countries (except India)? While they are reasonable for generics procured by tender from international markets in the public sector, for the private sector it is more likely that these are guidance values which will be amended as more medicine pricing information becomes available. Do we need to compare our local market prices with other international reference prices such as the Australian Pharmaceuticals Benefit Scheme (PBS) prices<sup>8</sup> especially, for private retail prices? This is probably not necessary given the data that is being generated through the HAI/WHO surveys of medicines prices although it could be done. However, there will be need to consider the different wealth of the countries in such comparisons.

Is it logical and feasible to have 75% of the innovator brand products with MPRs > 7 times and up to 129 times (in case of *Ciprofloxacin*) than the MSH reference prices? This means that at least 600% of the product cost was added for various mark-ups and brands premiums or high CIF prices. Who is/are responsible(s) for such an exaggeration in add-ons to medicines prices? What is the role of SBDMA in diminishing and controlling such unreasonable margins of profit? A National Drug Policy can help to balance the competing demands of industry with the access of disadvantaged patients to essential medicines.

Though, we do not doubt in any way the performance of our Quality Control Laboratory (QCL), we can't but ask ourselves about the quality of the LPGs found in some of the surveyed private pharmacies with much less MPR values than the reference prices (0.26 and 0.42). Do the very low prices in some south eastern Asia countries like India fully exclude any suspicions about quality? In fact, as long the QCL does its job effectively, this should prevent low quality products entering the market, whether they are cheaper generics or expensive brands. Also, these very low MPRs may be a result of high MSH reference prices for these medicines which are still on patent in many countries.

Are the high variations in the MPRs for some LPG equivalents of the same medicine acceptable and/or reasonable in spite of the numerous sources of each medicine?

Could the relatively good affordability be considered as a good and sufficient indicator, taking into consideration that at any time not all IBs & LPGs could be found in every pharmacy either in rural or urban areas all over the country? Do we need to find a way to guarantee the existence of all products in all pharmacies at any given time?

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<sup>7</sup> MPR ≤ 1.0 for public procurement, MPR ≤ 1.5 for public retail price and MPR ≤ 2.5 for private retail price.

<sup>8</sup> The reimbursement prices that the Government of Australia has agreed to pay for the medicines it makes available in government-supported insurance programs.

Finally, are the current CIF-registered-prices determinants and considerations taken by SBDMA sufficient and efficient? Given that the study shows some negative market mark-ups and some others much exceed the proposed to be official margin. Alternative methods of regulating prices or determining acceptable CIF prices may need to be explored. A full study of price components would also help answer these questions.

## **5. Conclusions and recommendations**

The main conclusions of the study are as follows:

1. For any of the main issues of the survey study (medicines: availability, prices and patients affordability), sound judgment about the public health sector is very difficult and can be misleading due to very limited public procurement data. However, for the medicines which were included in this survey, public procurement appeared to be efficient.
2. The availability of medicines in the private sector is somewhat good, if not excellent for medicines found in their generic equivalents forms (mostly branded-generics). However, the 100% availability of some third generation antibiotics like *Ceftriaxone* injection - that is mainly used for meningitis, pneumonia and septicemia - may give an indication about the abuse of the newer generations of antibiotics.
3. In comparison with the Management Sciences for Health reference prices, the prices of branded-generic/generic medicines in the private sector vary from very cheap to considerably high (50% of them < 4 times). Whereas most of innovator brand medicines are more expensive (75% of them > 7 times).
4. The prices of innovator brand medicines are considerably higher than those of their generic equivalents.
5. Almost half of the innovator brand prices are higher than in three Arab countries with much higher GDP per capita namely: Jordan, Lebanon and Kuwait.
6. In comparison with the registered CIF prices of medicines, most market cumulative mark-ups are less than the official (57.44%) or even negative (that certainly leads to exaggeration in the registered prices), while others reflect greater market mark-up values.

Based on the main findings mentioned above, the following recommendations are presented:

1. The role of public sector should be enhanced to cover all medicines in the national essential list after revising and updating it to accommodate with the new therapeutic orientations and any emerging cases of illness.
2. Finding alternative sources of financing and in general implementing suitable mechanisms that help to rationalize and direct the health expenditures optimally. The National Health Account methodology might be of great benefit in this manner.
3. Adopting a suitable pricing system that takes into consideration:
  - Whether the medicines are locally produced or imported; brands or generics/branded-generics; life saving or otherwise.
  - Medicine prices in a well-chosen group of countries (basket) which use cost-effectiveness analysis, taking into account differences in their wealth to that of Yemen.

- Possibility of using regressive mark-ups<sup>9</sup> for globally very expensive medicines.
  - Cost of therapeutic equivalents with same risk-benefit trade-offs.
  - Using registration of new medicines to reduce prices of older brands from the same pharmaceutical company.
  - Consulting the international prices compiled by non-profit institutions/organizations such as those of Management Sciences for Health, the Australian Pharmaceuticals Benefit Scheme and other sources.
  - Extensive use of pharmacoeconomics tools and measurements including cost-benefit analysis, cost-effectiveness analysis, cost-minimization analysis and cost-utility analysis.
  - Socioeconomic situation of the country as well as the affordability for poor patients.
4. An overall check and revision of registered CIF prices should be carefully performed on a fair, reliable and regular basis; given that prices of raw materials decrease annually for innovator brands with numerous generic/branded-generic equivalents.
  5. Encouraging prescribing in generic name towards making it a daily practice of physicians and pharmacists. The information media and health syndicates/associations could play an important role to achieve this goal.

## 6. References

1. Ball, D., et al. Medicine Prices in the State of Kuwait: Report of a survey on medicine prices in Kuwait. Department of Pharmacy Practice, Faculty of Pharmacy, Kuwait University: Kuwait, 2005.
2. Gelders, S., et al. Price, availability and affordability: An international comparison of chronic disease medicines. World Health Organization/Health Action International: Cairo, 2006.
3. Management Sciences for Health. Global database: Survey results. MSH 13 Dec. 2006 <[www.haiweb.org/globaldatabase/survey-result/result.php](http://www.haiweb.org/globaldatabase/survey-result/result.php).>
4. Management Sciences for Health/World Health Organization. International Drug Price Indicator Guide. MSH/WHO: Cambridge, MA USA, 2005 edition. <http://erc.msh.org>.
5. Ministry of Finance. Bulletin of Governmental Finance Statistics. Ministry of Finance: Sana'a, 24 (2<sup>nd</sup> quarter 2006).
6. Ministry of Planning & International Cooperation. Development Challenges: Major Development Challenges. MPIC 24 Dec. 2006 <<http://www.mpic.gov.ye>>
7. Ministry of Planning & International Cooperation. Statistical Year – Book. Central Statistical Organization: Sana'a, 2005. <http://www.cso-yemen.org>
8. Ministry of Public Health & Population. Annual Health Statistical Report. General Directorate for Health Information and Research: Sana'a, 2003-2004.
9. Ministry of Public Health & Population. Annual Report. Supreme Board for Drugs & Medical Appliances: Sana'a, 2005.
10. World Health Organization/Health Action International. Medicine Prices: a new approach to measurement. WHO/HAI: Geneva, 2003 edition.

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<sup>9</sup> Setting lower profit margins for more expensive drugs.

**Table 1 - Availability of innovator brand and lowest priced generic at the sector level on the day of data collection.**

Sector	Surveyed Medicines	Median availability (IQR)	
		Brand	LPG
Public	Only core medicines (n=27)	0%	5% (0 -12.5%)
	All medicines (n=35)	0%	5% (0 - 12.5%)
Private	Only core medicines (n=27)	45% (17.5 - 82.5%)	80% (45 - 100%)
	All medicines (n=35)	50% (17.5 - 90%)	90% (70 - 97.5%)

*LPG* - Lowest priced generic equivalent of the innovator brand.  
*IQR* - Interquartile range (the range between 25%ile and 75%ile)

**Table 2 - Median price ratio<sup>1</sup> comparison of innovator brand and lowest priced generic at the sector level on the day of data collection.**

Sector	Surveyed Medicines	Type and No. of medicines	Median Price Ratio (MPR)		
			Median (IQR)	Minimum	Maximum
Public	All medicines (n=35)	Brand (n=0)	-	-	-
		Generic (n=6)	1.09 (0.86 - 1.49)	0.64	2.33
	Only core medicines (n=27)	Brand (n=0)	-	-	-
		Generic (n=5)	1.30 (.86 - 1.55)	0.64	2.33
Private	All medicines (n=35)	Brand (n=26)	18.11 (7.44 - 35.60)	1.95	129.4
		Generic (30)	3.5 (1.87 - 7.45)	0.26	18.08
	Only core medicines (n=27)	Brand (n=20)	19.29 (8.88 -35.81)	2.64	129.4
		Generic (n=22)	3.50 (2.28 - 5.91)	0.42	11.19

*LPG* - Lowest Priced Generic equivalent of the innovator brand.

*IQR* - Interquartile Range (the range between 25%ile and 75%ile).

*MSH* - Management Sciences for Health.

*MPR* - Median Price Ratio. In this case it is the median of MPRs of individual medicines which are calculated as ratios of "Management Sciences for Health (MSH)" international reference prices.

**Table 3 - Median prices ratios for lowest price generic equivalents found in both public and private sectors**

Medicine name <sup>1</sup>	Median Price Raatio (MPR)		
	Public	Private	(Prive/Public) times
1 - Amoxicillin	1.55	2.27	1.46
2 - Captopril	0.86	3.48	4.05
3 - Ceftriaxone injection	2.33	2.76	1.18
4 - Chloroquine phosphate	0.87	3.2	3.68
5 - Co-trimoxazole suspension	1.3	2.28	1.75
6 - Ranitidine	0.64	1.17	1.83

**1 Medicines that have LPGs found in both public and prive sectors**

**Table 4 - Comparison of lowest price generic and innovator brand availability & prices for medicines  
in the private sector**

<sup>1</sup> Medicine name	Generic price as percentage of brand			Brand MPR
	Brand Availability (%)	Generic Availability (%)	Brand MPR	
- 1 Aciclovir	31	20	70	19.11
- 2 Amitriptyline	50	60	70	22.39
- 3 Amoxicillin+clavulanate	62	95	95	1.95
- 4 Atenolol	20	90	95	28.76
- 5 Captopril	25	100	100	13.91
- 6 Carbamazepine	29	95	100	8.83
- 7 Ceftriaxone injection	33	75	100	8.49
- 8 Ciprofloxacin	4	45	100	129.40
- 9 Clarithromycin	52	65	95	7.09
- 10 Co-trimoxazole suspension	26	70	100	8.89
- 11 Diazepam	23	55	80	35.19
- 12 Diclofenac	13	20	95	44.62
- 13 Fluconazole	9	45	80	88.34
- 14 Glibenclamide	17	95	100	51.92
- 15 Lisinopril	33	90	90	2.85
- 16 Mebendazole	38	95	100	48.21
- 17 Metformin	38	30	90	6.51
- 18 Metronidazole	25	35	95	35.73
- 19 Nifedipine Retard	11	35	90	37.67
- 20 Omeprazole	8	50	95	21.30
- 21 Ranitidine	9	100	100	12.50
- 22 Risperidone	13	60	80	1.99
- 23 Salbutamol inhaler	40	90	100	2.64
- 24 Sulfadoxine-pyrimethamine	43	95	55	19.47
<b>(Median (n=24</b>	<b>26</b>	<b>68</b>	<b>95</b>	<b>19.29</b>

<sup>1</sup>.Medicines found in both brand and generic versions

**Table 5 - Affordability of standard treatments to the lowest paid governmental Yemeni workers**

Disease condition and 'model' drug treatment			No. of days' wages		
			Public	Private	
Condition	Drug name	Dosage and duration	LPG	IB	LPG
Diabetes	Glibenclamide cap/tab	5mg, twice daily * 30 days	-	4.3	0.7
Hypertension	Atenolol cap/tab	50mg, once daily * 30 days	-	2.7	0.5
.Adult resp. infects	Amoxicillin cap/tab	250mg, three times daily * 21 days	0.2	-	0.2
.Pediatric resp. infects	Co-trimoxazole suspension	5ml, twice daily * 7 days	0.1	0.8	0.2
Gonorrhoea	Ciprofloxacin cap/tab	500mg, once daily * 1 day	-	1.2	0.1
Arthritis	Diclofenac cap/tab	25mg, twice daily * 30 days	-	5	0.6
Depression	Amitriptyline cap/tab	25mg, three times daily * 30 days	-	3.5	1.8
Asthma	Salbutamol inhaler	0.1mg, as needed * 1 pack	-	1.5	0.6
Peptic ulcer	Ranitidine cap/tab	150mg, twice daily * 30 days	0.3	5.8	0.5
Diabetes	Metformin cap/tab	500mg, three times daily * 30 days	-	3.6	1.4
Epilepsy	Carbamazepine cap/tab	200mg, twice daily * 30 days	-	3.7	1.1

**IB** Innovator Brand  
**LPG** Lowest Price Generic -

**Table 6 - Comparison of median price ratios (MPRs) for selected medicines <sup>1</sup> from private retail pharmacies in six countries**

Generic Name	Strength	Form	Pack Size	<sup>2</sup>												
				Yemen		India		Jordan		Lebanon		Kuwait		Tanzania		
				Jul - 2006	LPG	Jan - 2005	LPG	May - 2004	LPG	Mar - 2004	LPG	Jul - 2004	LPG	Sep - 2004	LPG	
- 1	Aciclovir	mg 200	cap/tab	25	19.11	5.94	1.69	1.33	20.94	7.99	26.14	11.44	29.01	-	-	2.46
- 2	Amitriptyline	mg 25	cap/tab	100	22.39	11.19	5.81	4.35	-	8.65	9.25	-	14.62	-	-	4.3
- 3	Atenolol	mg 50	cap/tab	60	28.76	5.75	5.80	3.39	45.75	18.39	47.81	9.80	50.22	47.37	-	6.46
- 4	Captopril	mg 25	cap/tab	60	13.91	3.48	-	3.16	12.38	8.24	12.73	4.86	15.25	16.00	-	3.54
- 5	Carbamazepine	mg 200	cap/tab	150	8.83	2.6	1.88	1.77	11.68	5.78	10.33	5.03	15.57	-	18.79	4.7
- 6	Ceftriaxone injection	g/vial 1	gram	1	8.49	2.76	-	0.66	10.69	6.81	8.13	5.45	9.82	8.62	-	1.28
- 7	Ciprofloxacin	mg 500	cap/tab	1	129.4	5.33	4.49	2.67	100.32	22.06	104.06	29.27	110.22	100.05	-	3.53
- 8	.Co-trimoxazole susp	mg/ml 8+40	millilitre	70	8.89	2.28	1.29	1.26	15.06	4.66	12.74	8.86	-	14.62	-	1.88
- 9	Glibenclamide	mg 5	cap/tab	60	51.92	8.76	3.77	4.31	38.37	18.45	29.26	5.99	55.45	50.76	-	8.55
- 10	Metformin	mg 500	cap/tab	100	6.51	2.44	-	0.99	6.61	3.24	-	12.71	5.28	4.84	-	5.25
- 11	Nifedipine Retard	mg 20	tab	100	37.67	4.24	-	1.47	-	10.76	19.75	8.04	26.21	-	-	4.33
- 12	Omeprazole	mg 20	cap/tab	30	21.3	1.7	-	0.49	14.27	5.56	17.6	5.41	17.94	15.72	-	0.48
- 13	Phenytoin	mg 100	cap/tab	100	17.11	-	4.38	4.23	9.3	-	10.27	-	8.72	-	-	3.95
- 14	Ranitidine	mg 150	cap/tab	60	12.5	1.17	0.49	0.49	24.29	13.12	12.67	1.86	18.74	14.05	-	1.88
- 15	Salbutamol inhaler	mg/dose 0.1	dose	200	2.64	1.05	0.94	0.93	2.6	1.1	3.45	2.65	7.86	-	-	1.2

**IB** .Innovator Brand -

**LPG** .Lowest Priced Generic equivalent -

<sup>1</sup> The above 15-medicine have MPR values in the six countries -

<sup>2</sup>

.Only Maharashtra state -

e years of the surveys (MSH2002 - MSH2

Table 7 - Cumulative mark-ups of innovator brands compared to registered CIF prices, in private sector

Medicine Name	Medicine Strength	Dosage Form	Manuf. Pack Size	Core List (Yes/No)	Unit Median/MSH Ref. Price (1)	Unit CIF/MSH Ref. Price (2)	{{(1)-(2)} / (2)%	Origin
Aciclovir	200 mg	cap/tab	25	yes	19.1107	12.2449	56.1	Spain
Amitriptyline	25 mg	cap/tab	30	yes	22.3853	9.7959	128.5	Netherlands
Amoxicillin+clavulanate	500+125 mg	cap/tab	20	no	1.9504	1.3154	48.3	UK
Atenolol	50 mg	cap/tab	28	yes	28.7600	22.3182	28.9	UK
Captopril	25 mg	cap/tab	28	yes	13.9059	14.6923	-5.4	UK
			30			12.8187	8.5	France
Carbamazepine	200 mg	cap/tab	50	yes	8.8256	10.2410	-13.8	Switzerland
						5.6615	55.9	Italy
Ceftriaxone injection	1 g/vial	gram	1	yes	8.4850	8.1639	3.9	Switzerland
Ciprofloxacin	500 mg	cap/tab	10	yes	129.3982	15.7932	719.3	Germany
Clarithromycin	250 mg	cap/tab	14	no	7.0894	4.2847	65.5	Italy
Co-trimoxazole suspension	8+40 mg/ml	millilitre	50	yes	8.8923	10.0811	-11.8	Switzerland
						4.3784	103.1	France
Diazepam	5 mg	cap/tab	25	yes	35.1912	20.4762	71.9	Switzerland
Diclofenac	25 mg	cap/tab	30	yes	44.6164	49.6923	-10.2	Switzerland
Fluconazole	200 mg	cap/tab	1	yes	88.3419	57.1541	54.6	Italy
Fluphenazine injection	25 mg/ml	millilitre	1	yes	6.2525	4.0250	55.3	UK, Italy
Glibenclamide	5 mg	cap/tab	30	yes	51.9154	30.7692	68.7	Germany
			20			10.5128	393.8	Egypt
Lisinopril	10 mg	tab	28	no	2.8475	3.9722	-28.3	UK
Mebendazole	100 mg	cap/tab	240	no	48.2072	31.7381	51.9	Belgium
Metformin	500 mg	cap/tab	30	yes	6.5101	7.3584	-11.5	France
Metronidazole	250 mg	tab	21	no	35.7300	27.2353	31.2	Germany
Nifedipine Retard	20 mg	tab	30	yes	37.6689	6.5116	478.5	Germany
Omeprazole	20 mg	cap/tab	28	yes	21.3037	23.9242	-11.0	Sweden
Phenytoin	100 mg	cap/tab	100	yes	17.1109	5.4348	214.8	UK
Ranitidine	150 mg	cap/tab	60	yes	12.4974	10.8009	15.7	Spain
			10			11.1111	12.5	UK
Risperidone	2 mg	tab	60	no	1.9924	1.4399	38.4	Italy
Salbutamol inhaler	0.1 mg/dose	dose	200	yes	2.6402	1.7407	51.7	France
Sulfadoxine-pyrimethamine	500+25 mg	cap/tab	500	yes	19.4683	10.3462	88.2	Switzerland

**.Table 8 - Lowest price generic equivalents with great MPR variations in the private sector**

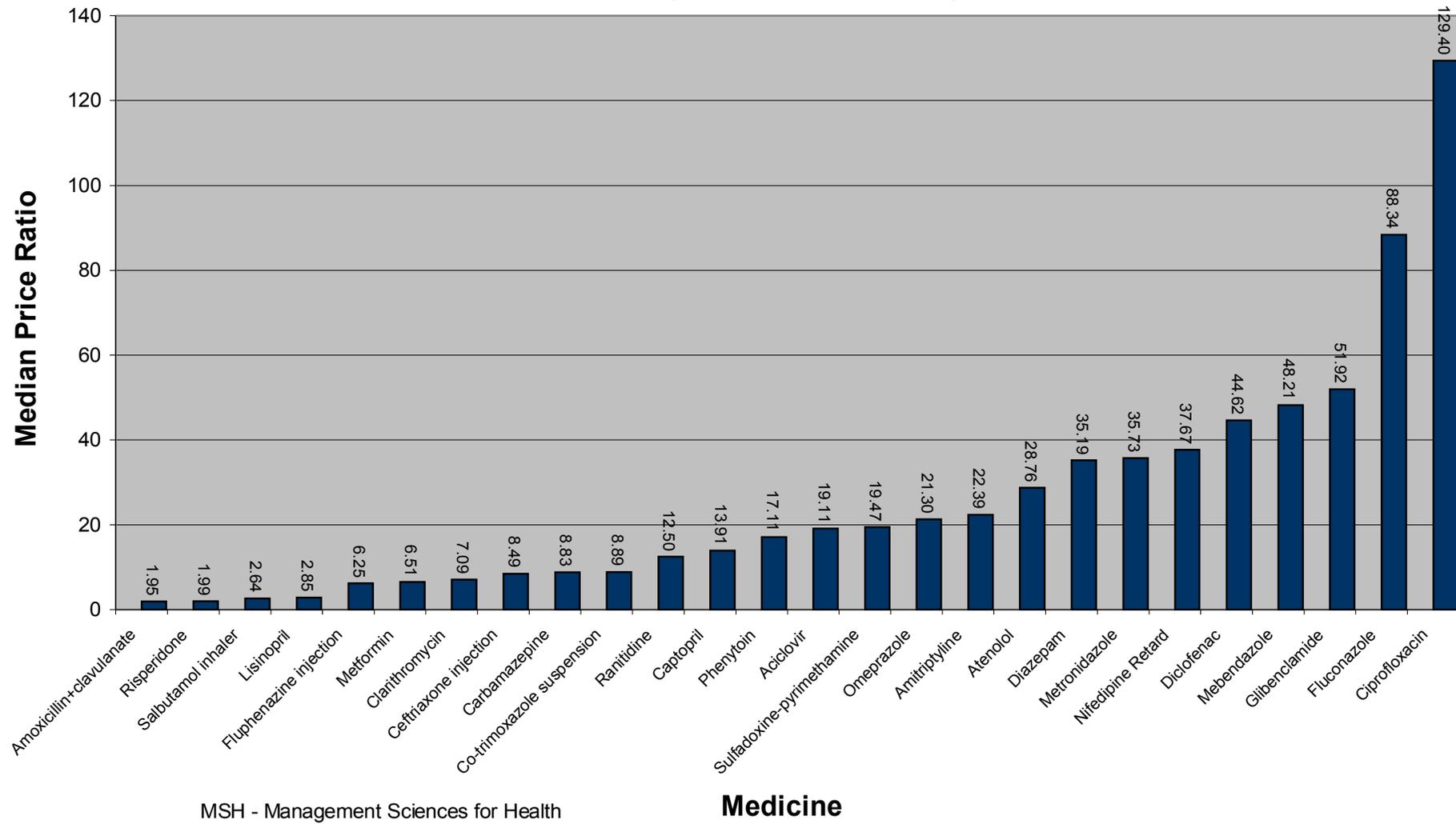
Medicine name <sup>1</sup>	(Median Price Ratio (MPR					Max - Min
	Minimum	25%ile	Median	75%ile	Maximum	
- 1 Amitriptyline	4.96	9.56	11.91	17.43	22.73	17.77
- 2 Chloroquine phosphate	2.56	2.88	3.20	3.20	14.10	11.54
- 3 Ciprofloxacin	3.43	4.76	5.33	5.71	16.17	12.74
- 4 Diazepam	3.62	6.93	8.13	9.04	20.09	16.47
- 5 Diclofenac	4.87	5.84	5.84	6.33	13.14	8.27
- 6 Fluoxetine	3.28	3.52	3.52	4.83	12.89	9.61
- 7 Mebendazole	5.05	14.31	18.08	20.09	22.09	17.04
- 8 Metronidazole	5.96	8.56	8.93	9.30	38.71	32.75

**Medicines that have LPGs with large MPR variations 1**

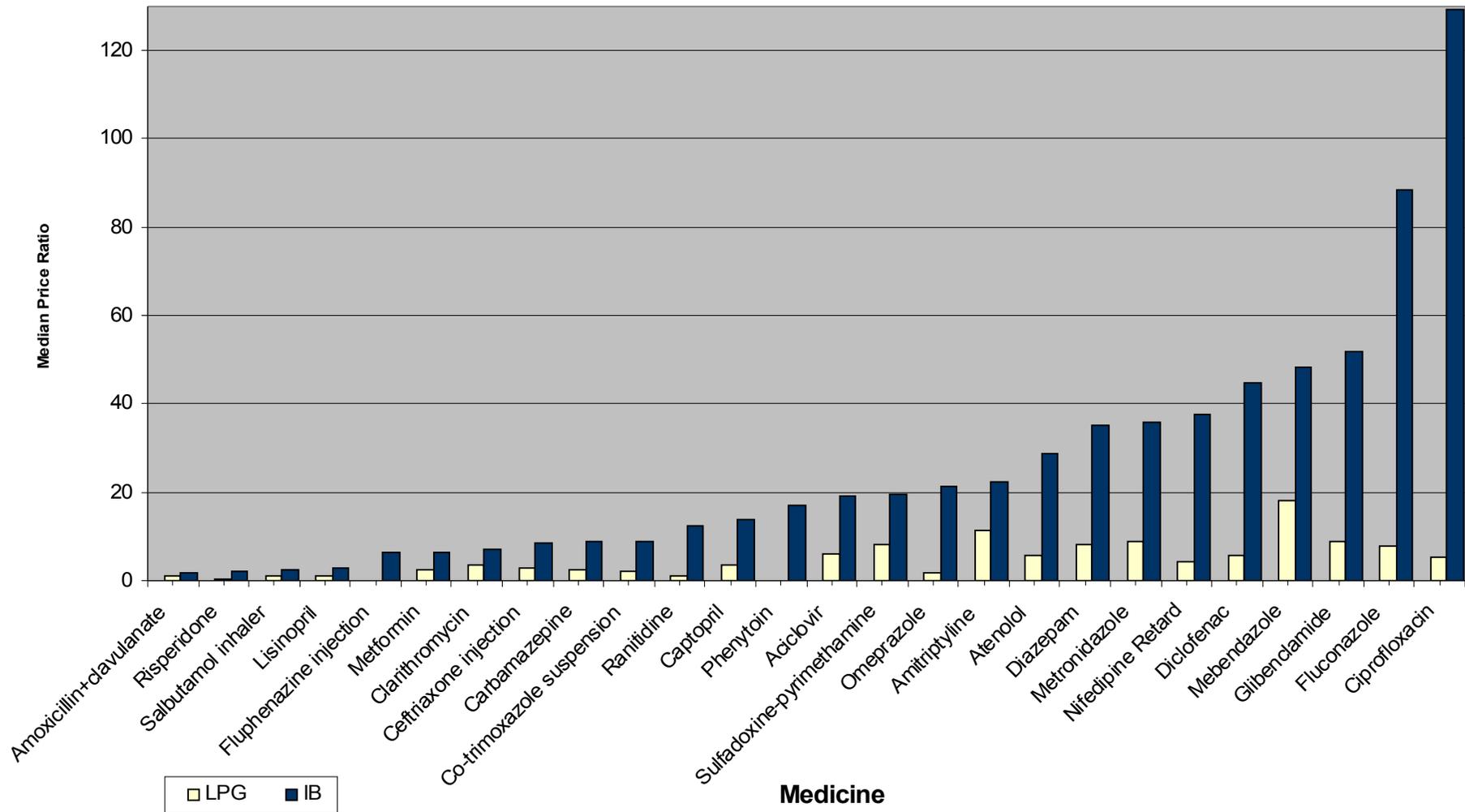
**Table 9 - Median price ratios for both innovator brands and lowest price generic equivalents in the four surveyed cities**

	<b>Innovator Brands</b>					<b>Lowest Price Generic Equivalents</b>				
	Median Price Ratio					Median Price Ratio				
	Min	25%ile	Median	75%ile	Max	Min	25%ile	Median	75%ile	Max
<b>Sana'a City</b>	1.88	2.81	12.42	23.24	50.22	0.24	2.33	3.52	6.77	20.09
<b>Taiz</b>	1.88	6.92	10.8905	20.23	51.92	0.26	1.70	3.48	6.20	16.07
<b>Aden</b>	1.88	7.60	15.34	21.56	47.20	0.24	2.05	3.48	5.84	18.08
<b>Hodiedah</b>	2.02	8.40	13.66	32.08	129.40	0.30	2.43	4.17	8.93	20.09

**Figure 2 - Median price ratios for innovator brands at private pharmacies compared to MSH reference prices.**



**Figure 3 - Median price ratios for innovator brands and lowest price generics at private pharmacies - compared to MSH reference prices.**



## **Annex I:**

### **National Pharmaceutical Sector form**

Date: **6/7/2006**

Population: **19,721,643 inhabitants**

Daily wage of lowest-paid government worker: **555 Yemeni Rial.**

Rate of exchange (commercial “buy” rate) to US dollars on the first day of data collection: **197.56 Yemeni Rial.**

Sources of information:

**.Ministry of Planning and International Cooperation, Central Statistical Organization -1**

**MoPH, the General Directorate for Pharmaceutical Services and Medical Supply -2**

**.(GDPS&MS**

**.(MoPH, the National Program for Medical Supply (NPMS -3**

**.(MoPH, Supreme Board for Drugs and Medical Appliances (SBDMA -4**

**.(Others (personal accumulated knowledge -5**

## General information on the pharmaceutical sector

Is there a formal National Medicines Policy document covering both the public and private sectors?  Yes  No

Is an Essential Medicines List (EML) available?  Yes  No

If yes, state total number of medicines on national EML: **321 pharmaceutical forms.**

If yes, year of last revision: **2005 (Directly by NPMS and the MoPH minister's drug advisor)**

If yes, is it (tick all that apply):

- National
- Regional
- Public sector only
- Both public and private sectors
- Other (please specify):

If yes, is the EML being used (tick all that apply):

- For registration of medicines nationally
- Public sector procurement only
- Insurance and/or reimbursement schemes
- Private sector
- Public sector

Is there a policy for generic prescribing or substitution?  Yes  No

Are there incentives for generic prescribing or substitution?  Yes  No

## Public procurement<sup>10</sup>

Is procurement in the public sector limited to a selection of essential medicines?  Yes  No

If no, please specify if any other limitation is in force:

Type of public sector procurement (tick all that apply):

- International, competitive tender
  - Open
  - Closed (restricted)
- National, competitive tender
  - Open
  - Closed (restricted)
- Negotiation/direct purchasing

Are the products purchased all registered?  Yes  No

**For some life saving drugs at least the manufacturer must be registered (that is to ensure wide and more chance for price competition.)**

<sup>10</sup>If there is a public procurement system, there is usually a limited list of items that can be procured. Products procured on international tenders are sometimes registered in the recipient country only by generic names. Import permits to named suppliers are issued based on the approved list of tender awards. An open tender is one that is publicly announced; a closed one is sent to a selection of approved suppliers

Is there a local preference?<sup>11</sup>  Yes  No  
 Are there public health programmes fully implemented by donor assistance which also provide medicines?  Yes  No  
 (e.g. TB, family planning, etc.)

If yes, please specify:

- **Reproductive health and family planning.**
- **National leprosy elimination program.**
- **Yemen family care association.**
- **Expanded program for immunization.**
- **Schistosomiasis control program.**
- **National TB control program.**

## Distribution<sup>12</sup>

Is there a public sector distribution centre/warehouse?  Yes  No

If yes, specify levels: **Sana'a (the main center), Aden, Taiz and Hodiedah.**

Are there private not-for-profit distribution centres:  Yes  No  
 e.g. missions/nongovernmental organizations?

If yes, please specify:

- **United Nations development program.**
- **United Nations population fund.**
- **Charity establishment for cancer support.**
- **Rehabilitation fund and care of handicapped.**
- **Al-Salam Hospital in Sa'adah.**
- **Al-Gamhouri Hospital in Hajjah.**
- **Gipla Papist Hospital in Ibb.**

Number of licensed wholesalers: **450 officially registered in SBDMA (from which less than 200 are annually active.)**

## Retail

	Urban	Rural	Overall
Number of inhabitants per pharmacy (approx.)			<b>4260</b>
Number of inhabitants per qualified pharmacist (approx.)			<b>7685</b>
Number of pharmacies with qualified pharmacists			<b>225</b>
Number of medicine outlets with pharmacy technician			<b>54</b>
Number of other licensed medicine outlets			<b>127</b>

<sup>11</sup> A local preference means that local companies will be preferred even if their prices are not the cheapest. Local preference is normally in the range of 10–20% <sup>11</sup>

<sup>12</sup> The public sector often has a central storage and distribution centre which may have at least one sublevel. The private not-for-profit sector may be dominated by one type of NGO (e.g. church missions), but may also comprise others such as Bamako Initiative type projects, Red Cross or Red Crescent Society, Médecins Sans Frontières.

**N.B. these numbers are from only the four chosen governorates in the medicine price survey.**

**Private sector<sup>13</sup>**

Are there independent pharmacies?  Yes  No Number: N/A  
 Are there chain pharmacies?  Yes  No Number:  
 Do doctors dispense medicines?<sup>14</sup>  Yes  No  
 If yes, approximate coverage or % of doctors who dispense:  
 Are there pharmacies or medicine outlets in health facilities?  Yes  No

**Financing**

(Give approximate figures, converted to US dollars at current exchange rate: commercial “buy” rate on the first day of data collection) **197.56 Yemeni Rial.**

Type of expenditure	Approximate annual budget (US dollars)
National public expenditure on medicines including government insurance, military, local purchases in past year	<b>\$9,710,706</b>
Estimated total private medicine expenditure in past year (out of pocket, private insurance, NGO/mission) <i>(Including local industry.)</i>	<b>\$157,904,928</b>
Total value of international medicine aid or donations in past year	<b>\$1,058,015</b>
What percentage of medicines by value are imported?	<b>91%</b>

**Government price policy**

Is there a medicines regulatory authority?  Yes  No  
 Is pricing regulated?  Yes  No  
 Is setting prices part of market authorization/registration?  Yes  No  
 Do registration fees differ between:

- Innovator brand and generic equivalents  Yes  No
- Imported and locally produced medicines  Yes  No

**Public sector**

Are there margins (mark-ups) in the distribution chain?  Yes  No

- Central medical stores **10%**

Retail outlets may be called pharmacies, medicine outlets, drug stores, chemists, etc. They may be run/owned by a qualified pharmacist (with diploma) or 13 .another category: e.g. pharmacy technician, or a lay person with short training

.Many countries allow doctors to dispense and sell medicines 14

- Regional store %
  - Other store (specify) %
  - Public medicine outlet %
- Are there any other fees or levies?  Yes  No
- If yes, please describe:

**Private retail sector**

Are there maximum profit margins?  Yes  No

If yes (if they vary, give maximum and minimum):

- Wholesale **10%**
- Retail **20%**

Is there a maximum retail price (sales price)?  Yes  No

(If it varies, give maximum and minimum)

- Maximum:
- Minimum:

Do patients pay professional fees (e.g. dispensing fee)?  Yes  No

If yes, please describe:

**“Other” sector**

Are there maximum profit margins?  Yes  No

If yes (if they vary, give maximum and minimum):

- Wholesale .
- Retail %

Is there a maximum sales price?  Yes  No

**Insurance, risk-sharing or prepayment schemes**

Are there any health insurance, risk-sharing or prepayment schemes or revolving medicine funds?  Yes  No

If yes, please describe:

Are all medicines covered?  Yes  No

If no, state which medicines are covered (e.g. EML, public health programmes):

Sometimes, a little shortage in some items may occur during the year.

Are some patients / groups of patients exempted, regardless of insurance coverage? (e.g. children < X yrs, war veterans)  Yes  No

If yes, please specify:

Estimated percentage of population covered N/A %

Is it official policy to supply all medicines free at primary health care level?  Yes  No

If no, are some free?  Yes  No

If yes, tick 3 all that apply:

Tuberculosis

Malaria

Oral rehydration salts

Family planning

Others, please specify: (**Diseases of: cancer, renal failure, heart, AIDS, diabetes and blood diseases vaccines.**)

Are there official user charges/patient co-payments/fees?  Yes  No

Are all medicines supplied free at hospitals?  Yes  No

If no, are some free?

Yes  No

If yes, please specify: (**Medicines for the above mentioned diseases.**)

## Annex II - List of surveyed medicines in Yemen, July 2006

Generic Name	Strength	Form	Pack Size	Core List?	Innovator Brand	Manufacturer	Country of Production
1 - Aciclovir	200 mg	cap/tab	25	yes	Zovirax	GSK	Spain
2 - Amitriptyline	25 mg	cap/tab	100	yes	Tryptizol	MSD	Netherlands
3 - Amoxicillin	250 mg	cap/tab	21	yes	Amoxil	GSK	UK
4 - Amoxicillin+clavulanate	500+125 mg	cap/tab	15	no	Augmentin	GSK	UK
5 - Atenolol	50 mg	cap/tab	60	yes	Tenormin	AstraZenica	UK
6 - Beclometasone inhaler	0.05 mg/dose	dose	200	yes	Becotide	GSK	UK
7 - Captopril	25 mg	cap/tab	60	yes	Capoten	BMS	UK, France
8 - Carbamazepine	200 mg	cap/tab	150	yes	Tegretol	Novartis	Switzerland, Italy*
9 - Ceftriaxone injection	1 g/vial	gram	1	yes	Rocephin	Roche	Switzerland
10 - Chloroquine phosphate	250 mg	cap/tab	100	no	Roesochin	Bayer	Germany
11 - Ciprofloxacin	500 mg	cap/tab	1	yes	Ciprobay	Bayer	Germany
12 - Clarithromycin	250 mg	cap/tab	14	no	Klacid	Abbott	Italy
13 - Co-trimoxazole suspension	8+40 mg/ml	millilitre	70	yes	Bactrim	Roche	Switzerland, France*
14 - Diazepam	5 mg	cap/tab	100	yes	Valium	Roche	Switzerland
15 - Diclofenac	25 mg	cap/tab	100	yes	Voltaren	Novartis	Switzerland
16 - Fluconazole	200 mg	cap/tab	30	yes	Diflucan	Pfizer	Italy
17 - Fluoxetine	20 mg	cap/tab	30	yes	Prozac	Lilly	UK
18 - Fluphenazine injection	25 mg/ml	millilitre	1	yes	Modecate	BMS	UK, Italy, Egypt*
19 - Glibenclamide	5 mg	cap/tab	60	yes	Daonil	HMR	Germany, Egypt*
20 - Hydrochlorothiazide	25 mg	cap/tab	30	yes	Dichlotride	MSD	Netherlands
21 - Levothyroxine	0.1mg	cap/tab	100	no	Eltroxine	GSK	Egypt, UK*
22 - Lisinopril	10 mg	tab	20	no	Zestril	AstraZenica	UK
23 - Losartan	50 mg	cap/tab	30	yes	Cozaar	MSD	Netherlands
24 - Lovastatin	20 mg	cap/tab	60	yes	Mevacor	MSD	Netherlands
25 - Mebendazole	100 mg	cap/tab	48	no	Vermox	Janssen	Belgium
26 - Metformin	500 mg	cap/tab	100	yes	Glucophage	Merck	France
27 - Metronidazole	250 mg	tab	20	no	Flagyl	Bayer	Germany
28 - Nevirapine	200 mg	cap/tab	60	yes	Viramune	Boehringer I	Germany
29 - Nifedipine Retard	20 mg	tab	100	yes	Adalat Retard	Bayer	Germany
30 - Omeprazole	20 mg	cap/tab	30	yes	Losec	AstraZenica	Sweden
31 - Phenytoin	100 mg	cap/tab	100	yes	Epanutin	Pfizer	UK
32 - Ranitidine	150 mg	cap/tab	60	yes	Zantac	GSK	Spain, UK*
33 - Risperidone	2 mg	tab	60	no	Risperdal	Janssen	Italy
34 - Salbutamol inhaler	0.1 mg/dose	dose	200	yes	Ventoline	GSK	France
35 - Sulfadoxine-pyrimethamine	500+25 mg	cap/tab	3	yes	Fansidar	Roche	Switzerland

\* Multiple officially registered origins.

# Annex - III : Medicine Price Components

Type of Charge	Charge Basis	Amount of Charge	Price of Dispensed Quantity	Cumulative % Mark-up
) Lowest priced generic variation of <b>Aciclovir</b> (200mg. cap/tab. 20's) in private sector (imported)				
<b>Cost, insurance, freight (CIF) price</b>	NA	NA	810	0
<b>Bank Charges</b>	percent	1.00%	818.0999998	1.00%
<b>Drug Support Fund Lot</b>	percent	1.00%	826.2809996	2.01%
<b>Customs</b>	percent	5.00%	867.5950502	7.11%
<b>Storage and Transportation</b>	percent	5.00%	910.9748034	12.47%
<b>Taxes</b>	percent	5.00%	956.5235442	18.09%
<b>-Others (Damaged goods during inter-governorates transport and storage + other petty cashes)</b>	percent	1.00%	966.0887795	19.27%
<b>Whole-sale Benefits</b>	percent	10.00%	1062.697659	31.20%
<b>Retail Benefits</b>	percent	20.00%	1275.237194	<b>57.44%</b>
Generic <b>Captopril</b> 25mg. cap/tab. 60's in public sector outlets purchased from NPMS				
<b>Cost, insurance, freight (CIF) price</b>	NA	NA	133.71	0
<b>Storage and transportation + workers encouraging rewards</b>	percent	10%	147.081	10%

1 Just an example since all medicines have the same mark-ups :

2 .Insulin, renal failure medicines, cancer and some antihypertensive medicines are given to patients for free :  
 .NPMS: National Program for Medical Supply