Medicine Prices in the state of Rajasthan, India

Report of a survey of medicine prices, availability, affordability and price components in Rajasthan, India

Survey conducted: April – June 2003

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Conflict of interest

None of the authors or anyone who had influence on the implementation of the survey, and analysis and interpretation of the survey results, had any competing financial or other interests.

Executive summary

Background: In recent years there has been considerable concern that high prices make medicines beyond the reach of millions of people in developing countries. The prices of medicines have an impact on affordability and, therefore, access to essential medicines. In India, individuals have to bear the full cost of their medicines since medicines are not subsidized through social insurance. High prices and low availability are major barriers to the use of medicines and better health, yet little is known about the prices that people pay for medicines in low- and middle-income countries. This study was undertaken to access the prices and availability of essential medicines in Rajasthan – one of the largest states of India.

Methods: The survey was undertaken in accordance with a methodology described in the manual entitled "Medicine Prices – a new approach to measurement," published by the World Heath Organization and Health Action International (WHO/HAI, 2003). This method compares local medicine prices to international reference prices (Management Sciences for Health 2002 prices were used) – expressed as a median price ratio (MPR). Prices and availability of 36 medicines were surveyed; 27 medicines from the WHO/HAI core list and 9 locally important supplementary medicines. For each medicine, data was collected for the centrally-determined innovator brand (IB) and most sold generic equivalent (MSG) products, and the lowest priced generic equivalent (LPG) at each facility. Two data collectors collected data in three sectors, i.e. public sector (public facility procurement price), private retail pharmacies (patient prices) and co-operative pharmacies (patient prices) in the capital city Jaipur and three other randomly selected regions; Ajmer, Bikaner and Kota from April to June 2003. In each area, five public facilities, five private pharmacies and five co-operative pharmacies near the public facility were surveyed. Hence a total of twenty public facilities, twenty private pharmacies and twenty outlets in the co-operative sector were surveyed in four regions of Rajasthan. The cost of standard treatments and affordability for of the lowest paid unskilled government worker was calculated for ten medicines used to treat nine common diseases. An attempt was made to ascertain price components – taxes, mark-ups and other charges that determine the final price of a medicine.

Results: In the public sector, lowest priced generic equivalents were predominantly found. Their procurement price was acceptable - the median MPR was 0.96 compared to the international reference price. Overall availability of medicines in the public sector was poor - the median availability was 40% (LPG). However, a few important medicines in the public sector were available in all the facilities surveyed including albendazole, amoxicillin, atenolol, ciprofloxacin, co-trimoxazole suspension, diazepam, diclofenac, isoniazid, omeprazole, paracetamol, pyrazinamide and ranitidine. Two of the three anti-HIV/AIDS medicines surveyed, the lipid-lowering medicines, hydrochlorothiazide, losartan and a few other medicines that are not on the Rajasthan Essential Drugs List were not available in any of the public facilities. In Rajasthan, only a few categories of people are entitled to free medicines from public facilities. Most of the population buys their medicines from the private sector. The co-operative sector is quite small. Because of poor availability, poor patients eligible for free medicines from public facilities ultimately have to buy medicines from the private sector. In the private sector, the median MPRs for IBs, MSGs and LPGs was 2.81, 2.72 and 1.83 respectively. There was little difference

between IBs and MSGs, but the LPG was 33% cheaper than the MSGs. For all the medicines surveyed, 17 LPG medicines had prices less than twice the international reference price, indicating reasonable prices for these medicines in the private sector. Seven medicines were priced lower than the IRP. On the other hand, LPG prices of diazepam, diclofenac and albendazole were 26, 14 and 8 times higher in the private sector compared to public sector procurement prices indicating very high margins for the wholesaler and retailers for these medicines. In the private sector, the median availability was 0%, 82.5%, and 95.0% for IB, MSG and LPG respectively. For certain medicines innovator brands are not available (registered) in India. Hence, the availability of IBs was poor. Availability of generics for all surveyed medicines was high. Often the MSG was the only generic equivalent available at the pharmacies surveyed thus it is also the lowest priced generic equivalent. In the co-operative sector the median availability for IB, MSG and LPG was 0%, 72.5% and 90.0% respectively. The median MPRs for IB, MSG and LPG were 2.82, 2.01 and 2.01 respectively in the co-operative sector. The availability of the 3 medicines for AIDS treatment was extremely low in the public and co-operative sectors. Even in the private sector availability of these medicines was low.

The treatment for pneumonia with generic amoxicillin (250mg three times a day for 7 days) purchased in private pharmacies would cost 0.6 days' salary to the lowest paid unskilled government worker. Treatment of chronic diseases for a month would cost 0.3 days' salary for diabetes (glibenclamide 10mg daily), 0.4 days' for hypertension (atenolol 50mg daily) when the LPG or MSG is purchased. Only a small proportion of the population is employed in the government sector, and wages are very low in the unorganized sector. Thus the affordability of medicines for the unemployed would be more challenging.

The National Pharmaceutical Pricing Authority currently fixes the prices (using a standard formula) of 74 scheduled drugs. Other medicines not under price control (non-schedule drugs) have no guidelines for price determination. Their prices are the result of open market competition.

It was not possible to obtain detailed price component information in the private sector though discussions with wholesalers and retailers suggest mark-ups are variable and may be high. Public sector facilities pay 8% sales tax plus a 15% surcharge on the sales tax for this particular year. Local taxes of about 8.5% are charged in the private sector.

Conclusion: The survey measured the price and availability of a basket of essential medicines. It demonstrates that the Government of Rajasthan is procuring medicines at a reasonable price for a few categories of patients who are entitled to obtain free medicines in public sector facilities. However, overall availability was low. Therefore, most of the population has to purchase medicines from private pharmacies. In the private sector, the availability of generics was high but about half of the medicines surveyed were expensive (more than twice the IRP). Prices for certain medicines such as albendazole, diazepam and diclofenac in the private sector were very high compared to the procurement price. The availability of anti-HIV/AIDS medicines was very low in all three sectors surveyed. Treatment regimens for a selection of conditions were affordable for the lowest paid government worker, but a large proportion of the population earns much less.

Recommendations: Measures should be taken by health authorities to increase the availability of essential medicines procured by the government. The State Essential Drugs List needs to be revised to include certain medicines such as cholesterol-lowering medication and medicines to treat HIV/AIDS. Regulatory authorities should examine the mark-ups and other charges applied in the private sector especially for high priced medicines. Steps should be taken to increase the availability of medicines for HIV. The government should abolish taxes and other charges they levy on essential medicines. The prices and availability of medicines in the public and private sectors should be regularly monitored, and price data published so that people are informed about medicine prices.

1. INTRODUCTION

1.1 Background

India pledged to attain 'Health for All by the year 2000' with other WHO Member States at Alma-Ata in 1978; and in the same year signed the International Covenant for Economic, Social and Cultural Rights – Article 12, which declares that the state is obliged to achieve the highest attainable standard of health. Unfortunately, the situation has not greatly improved since then and the goal seems to be an elusive one. Indicators of health standards worldwide are also not encouraging, especially as one third of the world's population lacks reliable access to essential medicines according to an estimate made by the World Health Organization (WHO) (1). This situation is worse in poor countries (2).

Commonly in developing countries households have to purchase medicines and other aspects of health care "out-of-pocket". High medicine prices are a major barrier to access to essential medicines. Hence, medicine prices are crucial determinants of people's health.

Many developing countries do not have policies on medicine prices, and price variation for the same medicine among and within countries is very common. A survey undertaken in 1999 by the WHO (5) suggests that policies on medicines prices are less frequently found in low- and middle-income countries than in high-income countries. In many countries, duties, taxes, mark-ups and other distribution costs are high, thus making medicines unaffordable for large sectors of the population (3, 4).

Access to essential medicines has been viewed as an integral component of the right to health, which is a basic human right (6). Medicine prices throughout the world have enormous variation. Bala K et al have shown (7) that there are wide and indiscriminate variations in medicine prices among developing and developed countries, with retail price higher for some medicines in least developed countries than in OECD countries.

Since 1999 the World Health Assembly has made a number of resolutions about medicine prices. It was acknowledged by the WHO and public interest NGOs that a methodology was needed to systematically measure medicine prices and availability within countries. In 2003 WHO and Health Action International published a manual describing a method to measure medicine prices, affordability, availability and component costs in a standardized manner. This methodology had been field tested in various countries. This survey was carried out using the methodology described in the manual (8), "Medicines prices: A new approach to measurement" (WHO/HAI, 2003).

1.2 Objectives

The objectives of the survey were to answer the following questions -

1. What price do people pay for a selection of important medicines in Rajasthan?
2. Do the prices of these medicines vary in different sectors e.g., public, private and co-operative?
3. Do the prices of these medicines vary in different regions of Rajasthan?
4. What is the difference in prices of innovator brand (IB), most sold generic equivalent (MSG) and lowest priced generic equivalent (LPG) medicines?
5. How do the prices of medicines in the different sectors of the state compare with international reference prices?
6. What is the availability of the medicines in the different sectors?
7. What are the various price components that contribute to the retail price of medicines?
8. How affordable are medicines for ordinary people?

1.3 Country and State Data

India is a country with a population of 1,027,015,247, comprising of 28 states and 7 union territories. The average per capita income is $225 and 23.33% of the population lives below the poverty line. India has a substantial and competitive medicine manufacturing and exporting industry. About 70% of the Indian demand for bulk drugs and the entire demand for formulations (finished products) are met from local sources (9). India is the world's 10th largest net exporter (value of export minus value of imports) of pharmaceuticals. Two thirds of India's exports go to other low and middle-income countries.

The Indian health care system is highly dependent on "out-of-pocket" payments for healthcare expenses by people. In order to ensure availability at reasonable prices, the Government of India (Ministry of Chemicals and Fertilizers) has established (10) an independent body of experts – the National Pharmaceutical Pricing Authority (NPPA). The NPPA's primary function includes price determination, revision, and related activities, such as updating the list of medicines under price control (by inclusion and exclusion of drugs on the basis of established criteria and guidelines). In recent years the number of medicines under price control has fallen. The NPPA currently fixes the prices (using a standard formula – see Section 3.4) of 74 scheduled medicines. For other medicines not under price control (non-schedule) there are no guidelines for price - so prices are governed by market competition. However, the NPPA monitors the prices of medicines sold in all sectors. Imported life-saving medicines are exempted from custom duties.

Rajasthan can be geographically divided into urban, semi urban and rural areas. It is a large state with a population of 56,473,122 (urban- 13, 205,444 and rural- 43, 267,678) and has a per capita income of $274 (11).

There are 12,247 public health facilities in Rajasthan including: 219 hospitals, 268 dispensaries, 118 Mother and Child Welfare centers, 1674 primary health centers in villages, 29 primary health centers in cities, 13 aid-posts and 9926 "*Up Swasthya*" centers (health sub-center). There are approximately 25,000 private pharmacies in Rajasthan state (12).

Rajasthan has an Essential Drugs List (EDL) containing 311 medicines (13). The EDL is applicable only in the public sector. There is no central procurement system but a high-powered purchase committee for public facilities acts as the rate controller. The medicines supplied by a Rajasthan Government public sector unit are purchased as per the rate contract with the government; for the remaining medicines a tender is open to other public sector units of the country. The remaining medicines are subject to a two bid open tender.

There is a small sector, designated as the "co-operative sector", which supplies medicines through its outlets. The Co-operative Department of State Government controls these outlets. In order to support this sector, the government authorizes the outlets to charge less sales tax. These cooperative pharmacies (NGOs) are promoted by the Government with a service motto and limited profit. The co-operative sector has only a limited number of pharmacies in the state.

In public facilities, medicines are not supplied free-of-charge to all citizens but only to the following categories of patients – below poverty line families (BPL card holder), widows, destitutes, freedom fighters, senior citizens, and ex-servicemen. Therefore, most people from Rajasthan are dependent on the private sector for medicines and health care in general. Thus a survey of prices people pay for medicines needs to include both the public and private sector.

2. METHODS

The survey was conducted under the aegis of the Delhi Society for Promotion of Rational Use of Drugs (DSPRUD). The principal investigator frequently visited the neighbouring state of Rajasthan and with the help of a co-investigator from the state conducted the survey. Planning, logistics, and technical aspects of the survey were formulated by the principal investigator.

The survey was conducted based on a methodology developed by WHO and HAI, which has been designed to collect data, analyze and interpret the results in a standardized way. The Rajasthan State Drug Controller's Office assured co-operation and support for the survey. The survey was conducted from April to June 2003.

The survey was conducted in the public and private sectors; the third sector of co-operative pharmacies was categorized as the "other" sector.

2.1 Sampling of health facilities

The sampling method described in the WHO/HAI manual for selecting a representative number of public health facilities and pharmacies was used. The survey was undertaken in four geographical areas: Jaipur, which is the state capital and three other administrative randomly selected areas – Ajmer, Bikaner, and Kota. In each area, all three sectors were sampled to measures the prices and availability of the medicines surveyed. The three sectors were:

1. Public sector – Procurement prices were collected from each public health facility as local purchases are made. Patients do not pay for medicines in public facilities; they are available free-of-charge to various groups of patients (see page 12).
2. Private sector – Prices patients pay for medicines purchased from private retail pharmacies
3. Co-operative pharmacies – Prices patients pay for medicines purchased from co-operative pharmacies.

A list of public facilities indicating the level of health care provided (primary, secondary and tertiary care) was obtained from the Rajasthan State Drug Controller's Office. In each area five public facilities were surveyed: one teaching hospital (tertiary care hospital) and four other health facilities, which were selected according to convenience of sampling. Five private retail pharmacies located near the public facilities were selected and surveyed. A co-operative pharmacy near each public facility was also surveyed (5 in total per area). Thus, a total of 20 public health facilities, 20 private retail pharmacies and 20 pharmacies from the co-operative sector were surveyed in the four areas within the state.

2.2 Medicines surveyed

Of the 30 core list medicines identified in the WHO/HAI manual, three were dropped because the strength of medicine was not available or not in use in Rajasthan. These

include artesunate 100mg, diclofenac 25mg and fluconazole 200mg. These strengths of artesunate and diclofenac are not available in Rajasthan. Fluconazole 200mg tablets are available, but 150mg is most commonly used. Thus, fluconazole 150 mg tablets were included in the supplementary list. Diclofenac is available in the 50mg strength and was added to the supplementary list.

The WHO/HAI methodology provides for the inclusion of up to 20 supplementary medicines to reflect the local burden of disease. Accordingly, a supplementary list was prepared to which diclofenac 50mg, fluconazole 150mg and 13 other medicines were added. Out of these 15 supplementary medicines, 6 did not have a MSH 2002 international medicine reference price. Therefore, data was analyzed for a total of 36 medicines – 27 core medicines and 9 supplementary medicines. See Annexure I for the complete list. The supplementary medicines were-

Albendazole tab 400mg

Cephalexin cap/tab 250mg

Chloroquine tab 250mg

Diclofenac tab 50mg

Enalapril tab 5mg

Ibuprofen tab 400 mg

Isoniazid tab 300mg

Paracetamol tab 500 mg

Pyrazinamide cap/tab 500mg

For each medicine, three types of products were surveyed, namely:

1. Innovator brand (IB)
2. Most sold generic (MSG) equivalent
3. Lowest priced generic (LPG) equivalent

2.3 Medicine Price Data Collection Form

The product name and manufacturer for each innovator brand, and the registration status in India, was confirmed prior to finalizing the data collection form. A survey was conducted to determine the most sold generic equivalent product for all the medicines to be surveyed. The IB and MSG equivalent medicine product name and manufacturer were entered centrally in the Medicine Price Data Collection Form. The data collector recorded the name and manufacturer of the lowest priced generic equivalent of each medicine in each facility surveyed.

In all three sectors, and in the four areas surveyed, this form was used to enter the price and availability of the medicines at the time of data collection..

2.4 Affordability

In order to quantify the prices of medicines for ordinary citizens, the methodology incorporates an affordability indicator. The affordability indicator is based on the daily

wage of the lowest paid unskilled government worker. Thus, the affordability is a measure of the number of days an unskilled government worker needs to work to purchase standard treatment regimens for a selection of conditions using the medicine price data collected. The cost of treatment and affordability for ten pre-selected clinical conditions was calculated in the private and co-operative sectors. These conditions include acute and chronic diseases such as diabetes, hypertension, adult respiratory infection, pediatric respiratory infection, gonorrhea, arthritis, depression, asthma, and peptic ulcer.

The daily wage of the lowest paid unskilled government worker in Rajasthan is INR 130. As with other states, only a minority of the population are government employees. In India, as with many developing countries, a large proportion of the population earns less than the lowest paid government worker.

2.5 Medicine Price Components

To establish how the retail price of a medicine is determined and how different mark-ups and taxes contribute to this price, wholesalers and retailers were contacted and asked to provide information on price components. Discussions were held with various officials of the Ministry of Chemicals and National Pharmaceutical Pricing Authority (NPPA) in Delhi.

2.6 Data Collection

During their visits to the pharmacies, the data collectors recorded medicine pack prices, the pack size and the availability of medicines in all three sectors. From this the unit price was calculated. Two data collectors were engaged in the field survey. They visited all 4 regions included in the survey. Both data collectors were aware of the medicines' names (generic and proprietary), their dosage forms and strengths. One of the data collectors is a pharmacist in a public facility and knew personnel in the purchase section of main teaching hospital of Jaipur (capital city of Rajasthan); the other data collector is a senior pharmacist technician in a pharmacy-teaching institute.

Training of data collectors: A two-day training workshop was conducted to ensure survey personnel, especially the data collectors, understood the methodology and could work accurately and consistently. During the training, data collectors undertook a pilot survey using the data collection form, collecting data from a private pharmacy. A detailed session was undertaken on checking the data and solving potential problems they might encounter during data collection. The data collectors then visited a public facility to practice collecting procurement price data.

Written guidelines were given to data collectors to aid with data collection and ensure a consistent and accurate approach.

Public sector – The availability was checked by physical verification at each facility. The procurement price of medicines found in the facility was noted from invoices and registers. Data was collected from all twenty facilities to cover any local purchasing.

Private and Co-operative sectors – The availability and price of each medicine was surveyed at each selected facility. The Maximum Retail Price (MRP) is printed on the medicine strips and containers with the statement 'local taxes extra'. The data collectors asked the retailers to provide the actual price charged to the patient. A state sales tax of 8.5% was applicable at the time of survey.

All price data was entered in the data collection form and was checked by the area supervisor before being entered into the survey's workbook.

2.7 International Reference Prices and Median Price Ratios

The prices obtained in the survey are not presented in the actual currency of the country; instead, medicine prices are compared to international reference prices (IRP) to facilitate national and international comparisons. The reference price serves as an external standard for evaluating local prices. WHO and HAI recommend using the Management Sciences for Health (MSH) *International Drug Price Indicator Guide* (http://erc.msh.org/) as the reference source. The reference prices for the medicines in this study were taken from the 2002 Price Indicator Guide (14). The MSH prices are net prices from predominantly not-for-profit suppliers to developing countries and NGOs in large quantities. The median unit supplier (procurement) price was used. Where a supplier price was not available, the agency (tender) price was used. Thus, the prices tend to be low. However, they offer a very useful standard against which locally available medicines can be compared.

Median Price Ratios – prices are expressed as a "median price ratio" or MPR. The MPR is the median unit price across the facilities surveyed in a sector (in local currency) divided by the international reference price (also in local currency).

To obtain the MPR for a medicine in a particular sector, we entered the actual unit price obtained in each facility in the Excel Workbook that accompanies the manual. The workbook calculates the median unit price and then divides this amount by the median IRP (in local currency). The MPR indicates how expensive or cheap the local price is when compared to the external standard price. Hence, the MPR is a unit of measurement of price that ensures a standard approach for comparisons – the higher the MPR, the higher the price.

2.8 Data Entry and Analysis

The exchange rate was entered into the workbook on the first day of data collection (1US $= 47.8 Rupees). Data entry was done carefully for all sectors in the assigned pages in the workbook. Crosschecking was done by double data entry, and use of the workbook's automated data checker.

The workbook automatically generates MPRs, summary tables, availability and affordability data. MPRs are calculated in the private and co-operative sectors only if the medicine was found in at least four outlets - and at least one outlet for public sector procurement prices.

The workbook generated the following data for analysis–

1. Within sector analysis

   MPRs of individual medicines

   Inter-quartile ranges, minimums and maximums of MPRs

Median MPRs for core only and all medicines (IB, MSG, LPG)

Product availability (individual medicines and summary data)

2. Cross sector comparisons

   MPRs of individual, core only and all medicines across sectors

   Paired analyses – median MPRs for the same medicines found in two sectors

   Medicine availability across sectors

3. Treatment Affordability

   Treatment affordability using 10 pre-selected standard regimens expressed as the numbers of days of wages for the lowest paid unskilled government worker required to pay for the treatment when purchased in the private and co-operative sector.

4. Price composition

   The different mark-ups and other charges that contribute to the retail price of medicine in the private sector. Price components were also assessed for public sector procurement.

3. RESULTS

3.1 Comparison of Medicine Prices with International Reference Prices

3.1.a Procurement prices in the public sector

Procurement prices were collected from all 20 public sector facilities. Only generics were found, and the median MPR was 0.96 with interquartile ranges for the 25th and 75th percentile 0.51 and 1.32 respectively (see Table 1). This shows the government procurement price is reasonable. Even the 75th percentile MPR was below 1.5.

No innovator brands were available in any public facility surveyed, whereas three MSGs were found:

- Beclomethasone inhaler - in 5 facilities
- Enalapril tabs - 1 facility
- Salbutamol inhaler - 1 facility

It was not surprising that few MSGs were found as the products were identified based on private sector sales.

Prices at which the government purchases the medicines for public facilities are generally reasonable as the median MPR was less than 1. The minimum MPR was 0.08 (ranitidine) and the maximum MPR was 3.66 (sulphadoxine-pyrimethamine).

MPRs for three medicines, and their interquartile range, are shown in Table 1 as well as the median MPR for all the medicines found. The most sold generic equivalent of beclometasone inhaler was procured at a reasonable price (MPR 0.77) in the public sector. The most sold generic product of enalapril was only found in one facility. They purchased it locally at a price 13.5 times higher than the median price ratio of the LPGs in this sector.

The Central Purchase Committee of the state fixes the rate for medicines purchased in the public facilities run by the state government, so all the state run facilities procure these medicines at the same rate. One such example (omeprazole) is shown in Table 1.

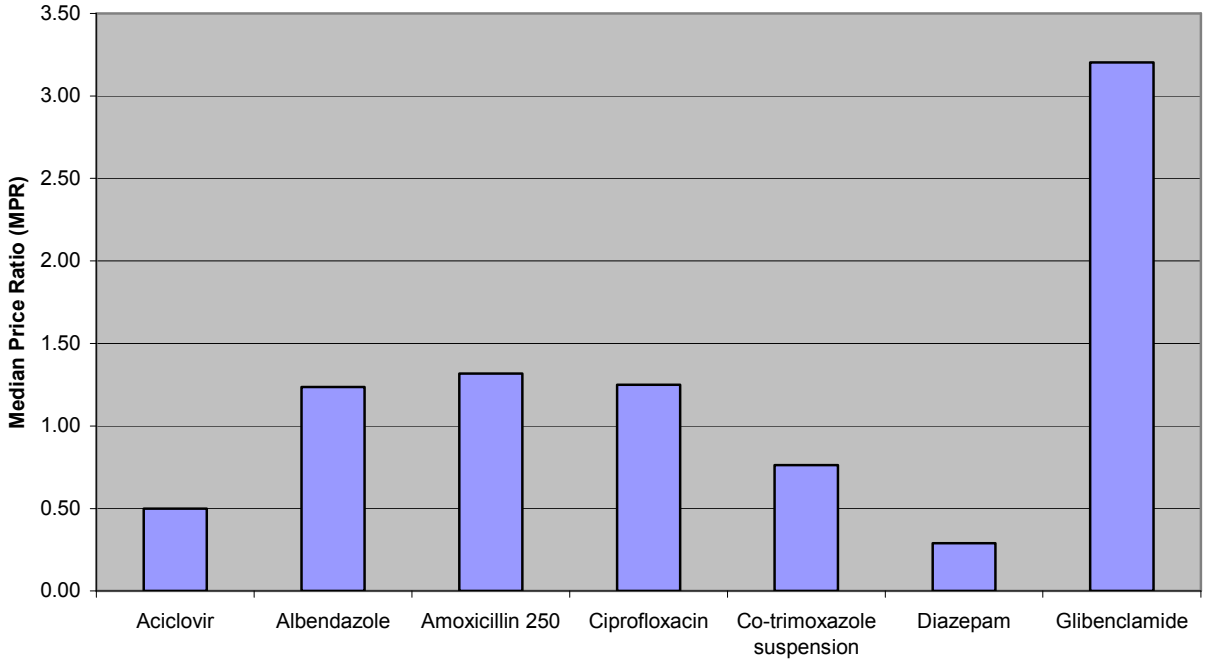
Table 1 MPRs for a selection of medicines in the public sector (procurement prices)

Medicine name		**Median price ratio**	**25th percentile**	**75th percentile**
All medicines (n=29)	**Lowest priced generic**	**0.96**	**0.51**	**1.32**
Beclometasone inhaler	Innovator brand			
(50mcg/dose)	Most sold generic	0.77	0.77	0.77
	Lowest priced generic	0.77	0.77	0.77
Enalapril 5mg	Innovator brand			

	Most sold generic	2.84	2.84	2.84
	Lowest priced generic	0.21	0.21	0.55
Omeprazole 20mg	Innovator brand			
	Most sold generic			
	Lowest priced generic	0.15	0.15	0.15

The MPRs of a selection of other medicines are shown in Figure 1. The procurement prices of diazepam and albendazole are quite low – MPR 0.29 and 1.24 respectively. Both medicines have much higher prices in the private sector; 7.57 and 10.31 respectively. In contrast, glibenclamide's procurement price (MPR 3.2) is slightly higher compared to the retail price in private pharmacies (MPR 2.73).

Figure 1 Procurement MPRs for a selection of medicines (LPG) in the public sector



3.1.b Patient prices in the private sector

Medicines price data was collected from 20 private retail pharmacies in four regions of Rajasthan. Table 2, copied from the workbook, shows the summary results for all medicines – core and supplementary. Amongst other things, the table shows the median value of the MPRs for IBs, MSGs and LPGs found in at least four facilities, along with the interquartile range. The median MPR for IB, MSG and LPG medicines was 2.81, 2.72 and 1.83 respectively. There was little difference between the prices of the IBs and MSGs. The LPG price is less than the price of the IB and MSG.

The summary table also shows the "pair data analysis". This is a more robust way of comparing prices as it compares only medicines found for both types, thus avoiding the problem of comparing different baskets of medicines. The analysis shows that if pair wise data is analysed for IB and MSG (n=16), there is not much difference in the price (MPR 2.81 vs. 2.78), and there is a small difference between the IB and LPG (2.81 vs. 2.28). When the price of MSG and LPG (n= 31) is compared, LPG was found to be 33% lower than the MSG.

Table 2 Median MPRs, all medicines, in the private sector

Private Sector Medicines Outlets (n=20 in survey) Core Meds./All Meds.

Includes Both Core and Non-Core Medicines (n=36 on list)

	Analysis Includes All Meds.			Analysis Includes Only Medicines With Prices Found for Both Types in Pair					
	Brand	Most Sold	Lowest Price	Brand	Most Sold	Brand	Lowest Price	Most Sold	Lowest Price
Overall Percent Availability of Medicines on List in Outlets Included in Analysis									
Median availability	0.0%	82.5%	95.0%						
25 %ile availability	0.0%	47.5%	62.5%						
75 %ile availability	82.5%	100.0%	100.0%						
Number of Listed Medicines For Which Prices Were Found in 4+ Outlets									
No. of meds. included	16	31	32	16	16	16	16	31	31
Summary of Medicine-specific Median Price Ratios (MPRs) For Meds. Found in 4+ Outlets									
Median MPR	2.81	2.72	1.83	2.81	2.78	2.81	2.28	2.72	1.83
25 %ile MPR	1.68	1.04	1.06	1.68	1.42	1.68	1.42	1.04	1.04
75 %ile MPR	5.26	4.21	3.56	5.26	4.66	5.26	4.34	4.21	3.77
Minimum MPR	0.20	0.09	0.09	0.20	0.20	0.20	0.20	0.09	0.09
Maximum MPR	13.25	12.78	10.31	13.25	12.78	13.25	10.31	12.78	10.31

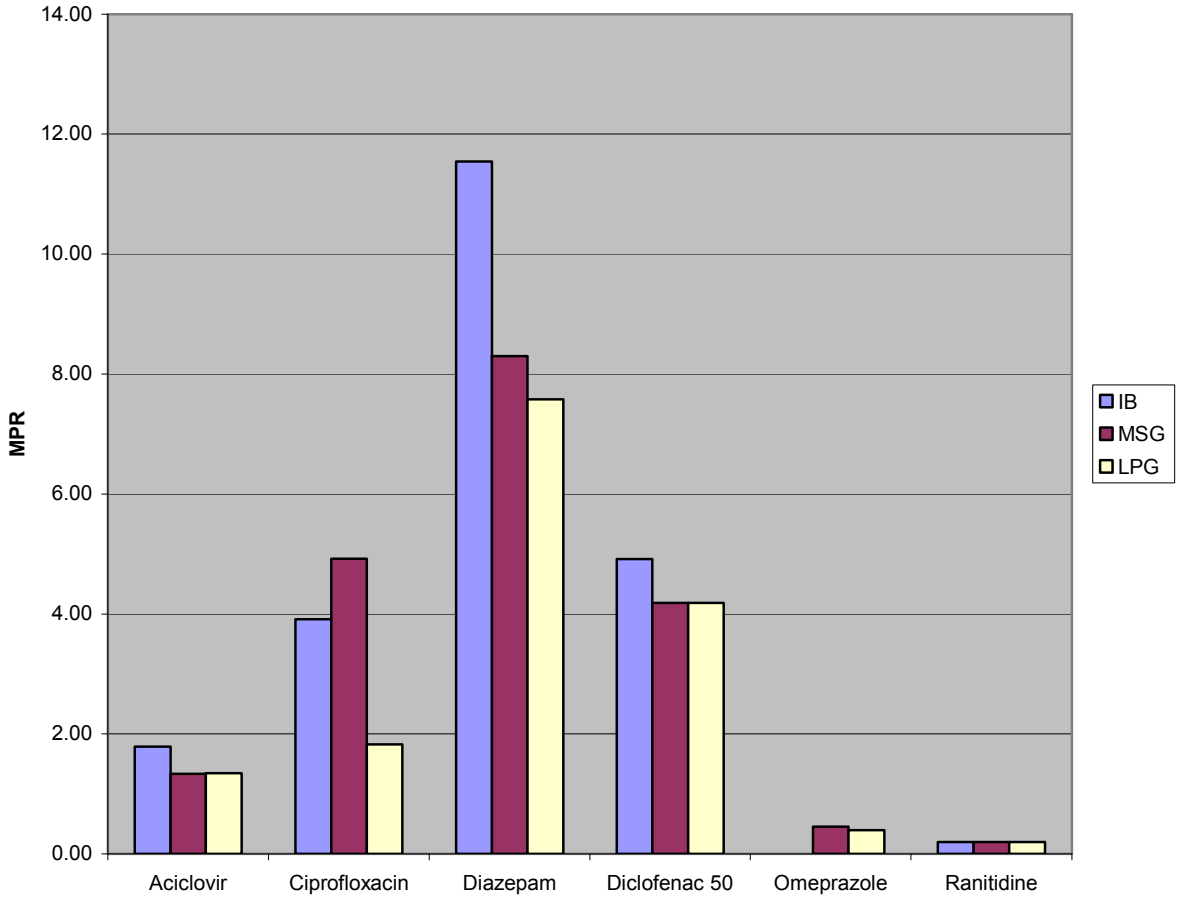
Reference Price Data Used = MSH

Interesting retail price data in the private sector

There was a marked variation between the prices of the IB, MSG and LPG for ciprofloxacin. The MSG price was 2.7 times the LPG price, and the price of the IB (3.91) was less than the MSG price (4.92) - see Figure 2.

For ranitidine the price was found to be the same for all three types - IB, MSG and LPG. The MPR of ranitidine (0.2) was lower than omeprazole (0.4), also used to treat peptic ulcers.

Figure 2 MPRs of some interesting medicines in the private sector



A total of 32 LPG medicine prices were analyzed in the private sector. Albendazole, followed by diazepam, had the highest MPRs. Losartan had the lowest MPR.

- LPG medicines with MPRs less than 1 were: beclometasone inhaler, ceftriaxone inj, losartan (lowest MPR, 0.09), metformin, omeprazole, ranitidine, and salbutamol inhaler.

- LPG medicines with MPRs between 1 and 2 were: aciclovir, carbamazepine, chloroquine, ciprofloxacin, co-trimaxozole suspension, ibuprofen, isoniazid, lovastatin, nifedipine retard, salbutamol inhaler, and sulfadoxine-pyrimethamine.

- LPG medicines with MPR between 2 and 4 were: captopril, cephalexin, enalapril, fluoxetine, glibenclamide, phenytoin, and pyrazinamide.

- LPG medicines with MPR greater than 4: albendazole (highest MPR 10.31), amoxicillin, amitryptyline, atenolol, diazepam, diclofenac, hydrochlorothiazide, and paracetamol.

3.1.c Patient prices in the co-operative sector

Data was collected from 20 co-operative pharmacies in the four regions. We found little difference in patient prices in this sector compared to private retail pharmacies.

Table 3 Median MPRs in the co-operative sector

	No. of medicines found in 4 or more facilities	Median MPR	25th percentile	75th percentile
Innovator brand	15	2.82	1.56	5.29
Most sold generic	28	2.01	0.99	4.21
Lowest priced generic	28	2.01	0.99	3.56

When pair wise comparisons of median MPRs of IB, MSG and LPG were analysed in this sector, the following median MPRs were found:

IB 2.82 and MSG 2.84 (n=15 medicines)

IB 2.82 and LPG 2.81 (n=15); and

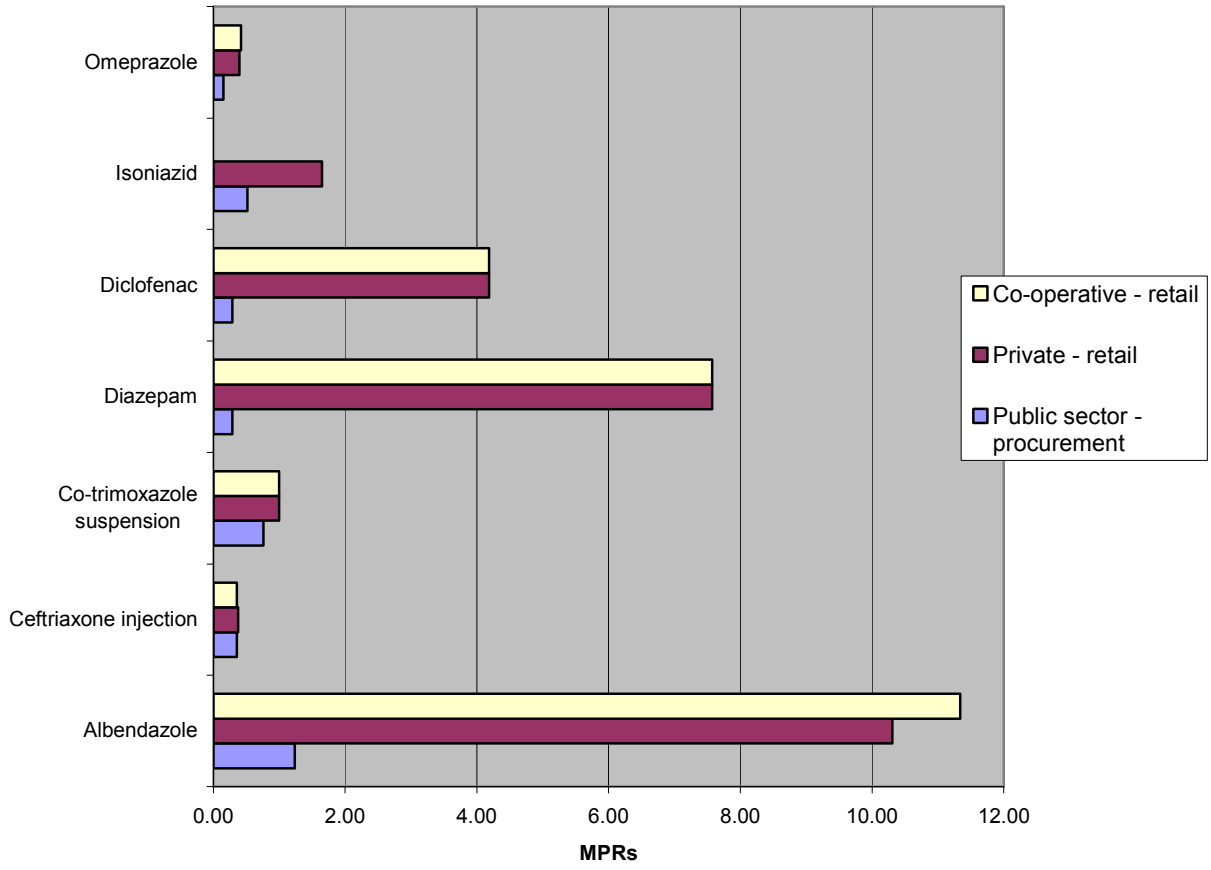
MSG 2.01 and LPG 2.01 (n= 28)

There was virtually no difference in the price of IBs and MSGs, and IBs and LPGs of the same medicines in the co-operative sector. At most co-operative pharmacies only the MSG product was available thus the MSG was often also the LPG (so the price ratios were identical).

3.1.d Comparative median price ratios across sectors for a selection of interesting medicines

In the public sector mainly LPGs were available (rarely was the MSG product available). Figure 3 compares MPRs for a selection of LPGs in the public sector (procurement), private retail pharmacies, and pharmacies in the co-operative sector.

Figure 3 MPRs for a selection of medicines (LPG) found in all three sectors



For a few LPG medicines, the price difference between public procurement and retail prices in private and co-operative pharmacies was not appreciable e.g. ceftriaxone injection and co-trimoxazole suspension. Conversely, the retail price of other LPG medicines were much higher than government procurement prices e.g. diazepam was approximately 26 times higher in both private and co-operative pharmacies, diclofenac was 14 times higher, and albendazole about 8 times higher. This finding indicates that the mark-ups for these medicines are very high in the distribution chain from manufacturer to patient. Interestingly, when medicines are locally purchased at a public facility, the price of the medicine can be higher than the price the patient pays in retail pharmacies. This was observed for glibenclamide which was available only at 3 facilities in the public sector. The MPR was determined to be 3.12 whereas in the private sector the MPR of the LPG was 2.73. This observation was seen for sulphadoxine-pyrimethamine as well. The MPR in the public sector (available at 2 facilities) was 3.66; but the MPR in the private sector was 1.81. Prices in the co-operative sector and the private sector were almost identical.

3.2 Availability

In the public sector, the median availability for all 36 medicines surveyed was 40% for any generic (LPG). None of the IBs were available and only three MSG products were available. Out of these, one medicine was available in five outlets and two were available in a single facility only.

Anti-HIV/AIDS medicines, lipid lowering medicines, hydrochlorothiazide, losartan and a few other medicines not found on the Rajasthan EDL were not available in any of the facilities. The availability of any generic for a few important medicines in the public sector was found to be 100%: albendazole, amoxicillin, atenolol, ciprofloxacin, co-trimoxazole suspension, diazepam, diclofenac, isoniazid, omeprazole, paracetamol, pyrazinamide, and ranitidine.

In the private sector, the median availability was 0.0% for innovator brands, 82.5% for MSGs, and 95% for LPGs (see Table 4).

Availability in the co-operative pharmacies stands between the public and private sector: 0%, 72.5% and 90.0% for IB, MSG, and LPG respectively (also see Table 4).

The IB of certain medicines are not registered in India, e.g., captopril ceftriaxone inj, fluoxetine, fluphenazine decanoate inj, hydrochlorothiazide, indinavir, metformin, nevirapine, phenytoin, and sulfadoxine-pyrimethamine. Hence, the resulting availability for IBs in this survey was low. Moreover, the availability is based on a "one point in time" investigation. The LPG availability is a measure of the availability of any generic whose price is lowest in the particular facility being surveyed, whereas the MSG availability refers to a specific product identified before the field survey.

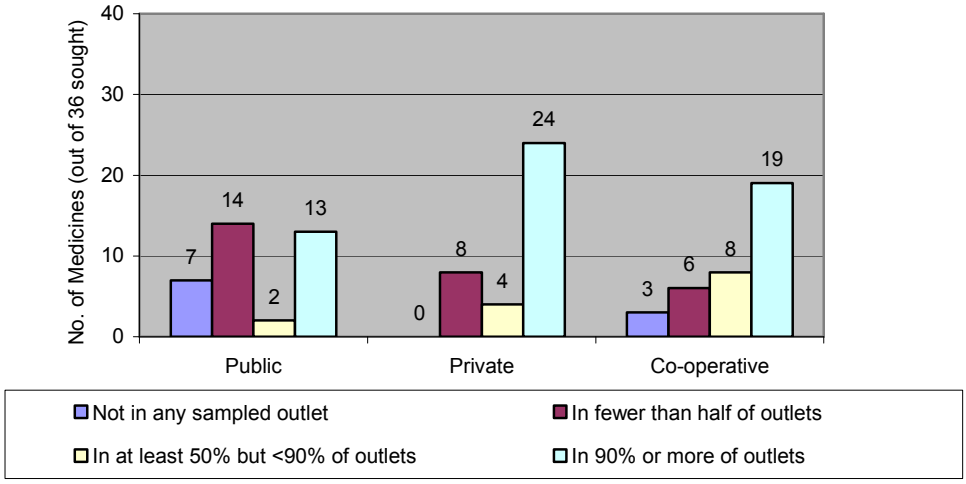
Table 4 Median percentage availability of all medicines across three sectors

	Public sector (n=20)	Private sector (n=20)	Co-operative sector (n=20)
IB	0.0%	0.0%	0.0%
MSG	0.0%	82.5%	72.5%
LPG	40.0%	95.0%	90.0%

Availability of the innovator brand, most sold generic and any generic (LPG) is shown below in Figures 4, 5 and 6. Availability is classified for each product as follows:

1. Never found in the facilities surveyed
2. Hard to find (found in <50% of outlets surveyed)
3. Available in many facilities (50% - 89% of outlets surveyed)
4. Good availability (90% or more of surveyed outlets)

Figure 4 Availability of any generic version in all 3 sectors



The availability of generics was very good in the private sector. In contrast, in the public sector there were 7 medicines that could not be found (as generics or innovator brands) in any public facility.

Medicines that were rarely available (≤5%) in the public sector included captopril, fluphenazine injection, hydrochlorothiazide, indinavir, losartan, lovastatin, nevirapine and zidovudine.

Availability of innovator brands and the most sold generic equivalent versions followed a similar pattern in the three sectors surveyed. Availability results in Figures 5 and 6 show that availability was consistently highest in the private sector, and somewhat lower for the co-operative sector. The public sector, on the other hand, did not stock innovator brands for any of the 36 medicines surveyed (Figure 6). There were just three products (beclomethasone inhaler, salbutamol inhaler and enalapril) whose MSG was found in the public sector, in only a few outlets - the remaining 33 MSGs were not found in the public sector. These availability patterns illustrate the strength of the generics markets in Rajasthan.

Figure 5 Availability of the most sold generic in all 3 sectors

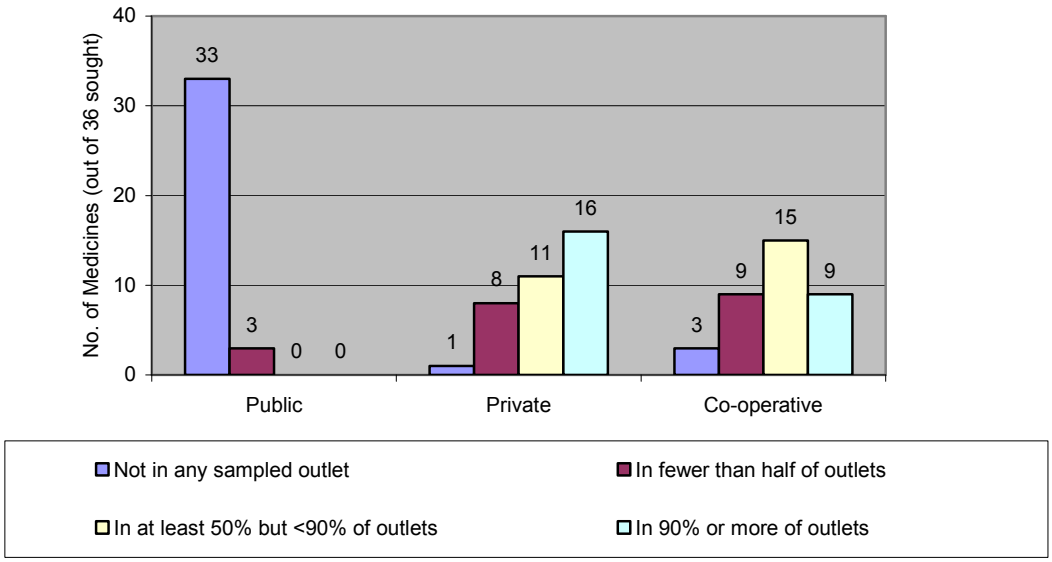
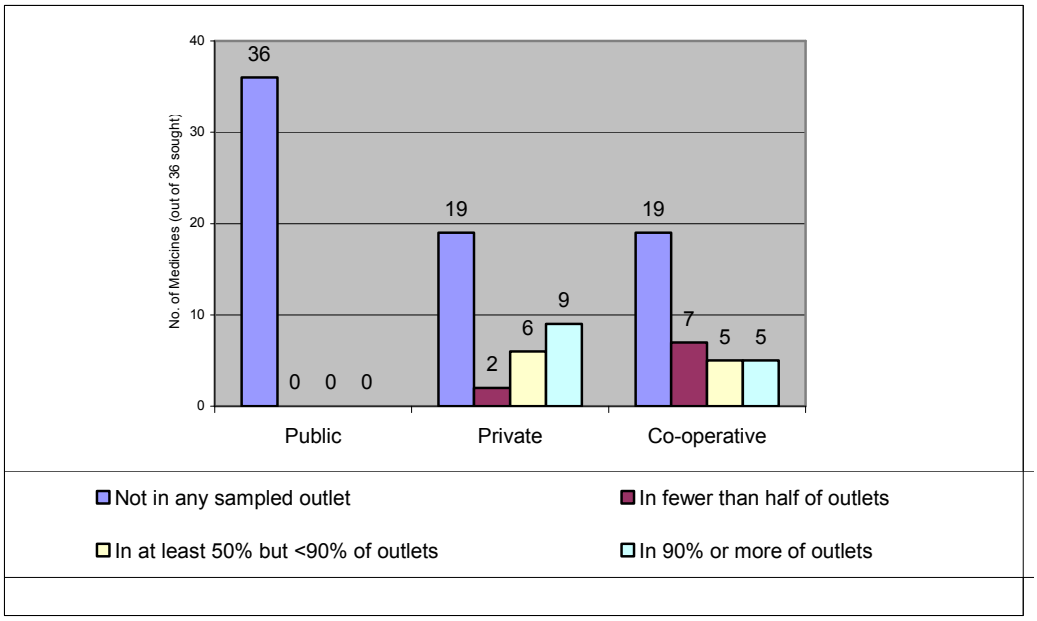


Figure 6 Availability of innovator brands in all 3 sectors



3.3 Affordability

A list of the 10 conditions for which the affordability of treatment was measured is included in Annexure 4. Affordability was calculated on the basis of the daily wage of an unskilled government worker. The monthly salary of the lowest paid regular government worker was Rs. 3900/- i.e., Rs. 130 per day. The cost of treatment and affordability of four conditions is tabulated below (Table 5). The prices of treatments in the private and other sectors were almost equal; hence the affordability in terms of number of days' wages a lowest paid government worker has to pay for the treatment of a particular disease is the same.

Table 5 Affordability of standard treatment regimens for hypertension, pneumonia, arthritis and depression

Treatment	**Type of Medicine**	**Number of days wages**	
		Private Sector	**Co-operative Sector**
Hypertension: Atenolol 50 mg x 1 for 30 days	Innovator brand	0.5	0.5
	Most sold generic	0.4	0.4
	Lowest priced generic	0.4	0.4
Pneumonia: Amoxicillin 250 mg x 3 for 7 days	Innovator brand		
	Most sold generic	0.6	0.6
	Lowest priced generic	0.6	0.6
Arthritis: Diclofenac 50 mg x 2 for 30 days	Innovator brand	0.6	0.6
	Most sold generic	0.5	0.5
	Lowest priced generic	0.5	0.5
Depression: Amitriptyline 25 mg x 3 for 30 days	Innovator brand	1.2	1.2
	Most sold generic	1.0	1.0
	Lowest priced generic	1.0	1.2

Figure 7 shows the affordability of six other treatment regimens in the private sector as listed below:

Peptic ulcer (ranitidine tab 150mg x 2 for 30 days)

Diabetes (glibenclamide tab 5 mg x 2 for 30 days)

Hypertension (hydrochlorothiazide tab 25 mg daily for 30 days)

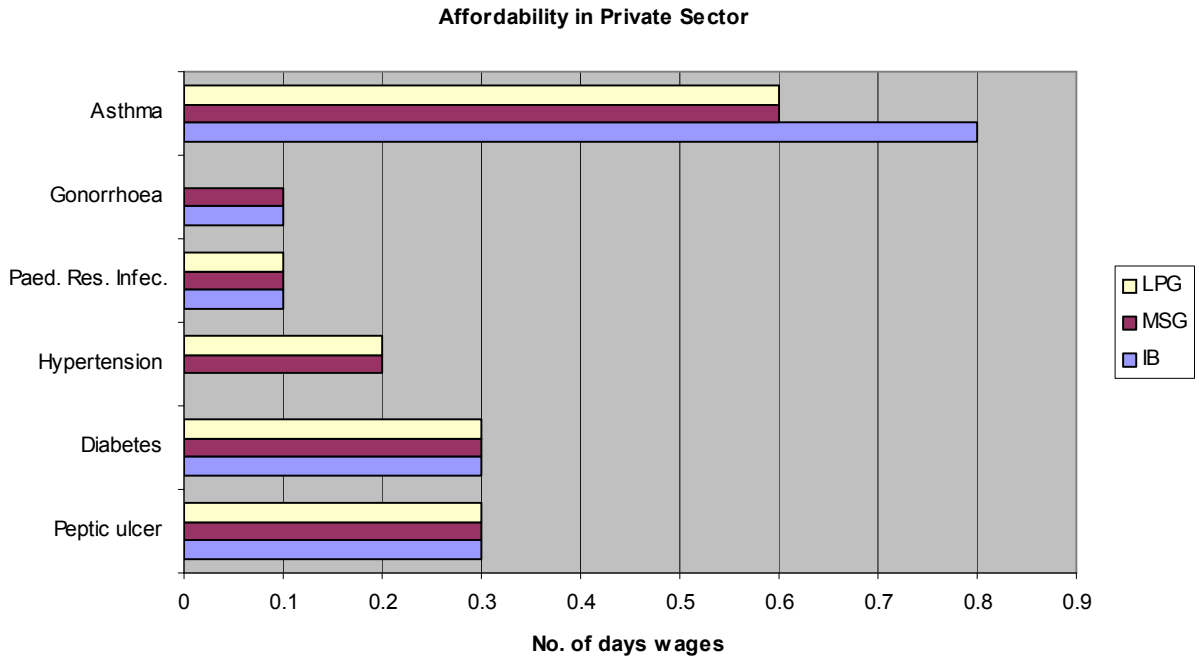
Pediatric Respiratory Infection (co-trimoxazole susp 10ml daily for 7 days)

Gonorrhoea (ciprofloxacin 500mg tab x 1)

Asthma (salbutamol inhaler, 0.1 mg/dose 1 inhaler - 200 doses)

As there was little difference in the prices of the IB, MSG and LPG for each medicine, the number of days wages a lowest paid government worker has to pay for the treatment is the same for each type of product (except for asthma).

Figure 7 Affordability of treating various conditions when the medicines were purchased in the private sector



The treatment of these diseases is affordable for the small percentage of people employed in the government sector. The wages paid in the large unorganized sector are very low compared to the government wage. In addition, these costs only include the medicine costs. Doctors' consultation fees and diagnostic tests will likely mean that the total cost to the patient may be considerably higher.

3.4 Price components and cumulative mark-ups

The Government of India has established an independent body of experts, the National Pharmaceutical Pricing Authority (NPPA), to determine the prices of certain medicines in the country. They fix the prices of 'schedule' medicines i.e. the Drugs (Prices Control) Order (10). This schedule currently contains 74 medicines. The retail price is calculated using the following formula:

R.P= (M.C + CC + P.M. + P.C) X (1 + MAPE/100) +ED

Where: R.P: retail price; M.C.: material cost; C.C: conversion cost; P.M.: cost of the packing material; P.C.: packing charges; MAPE (Maximum Allowable Post – manufacturing Expenses): all costs incurred by a manufacturer from the stage of ex-factory cost to retailing including trade margin and a margin for the manufacturer not to exceed 100% for indigenously manufactured scheduled formulations; E.D.: excise duty.

For imported medicines, the landed cost forms the basis for fixing the price. Other costs, such as margins to cover selling and distribution expenses, including interest and the

importer's profit, should not exceed 50% of the landed cost. The 'landed cost' includes customs duty and clearing charges. Of the 74 drugs in the Schedule, only 3 are imported.

Table 6 Price components and cumulative mark-ups for Ranitidine 150mg, 100 tabs (schedule drug) in the private sector

Component	Amount of charge	Price INR
Material, Conversion, Packing material and Packing charges. The total cost all aspects inclusive		30.10
MAPE (Maximum Allowable Post Manufacturing Expense)	100%	30.10
Excise duty (actually 16% but on some material excise duty is already paid)	12.36%	7.40
Retail price		67.60
Sales tax/ Local tax	6.5%	71.99

For all other medicines, the government does not fix the price. The pharmaceutical industry competes in an open market. It is believed that competition will keep the prices of medicines 'in check'. In general, the wholesaler mark-up is 10% and retailer mark-up is about 20%. The Maximum Retail Price (MRP) is always printed on every formulation and applicable local taxes which vary from state to state are added. The average tax is about 8.5%.

The survey and interviews with retailers did not reveal much on components prices in the private sector. Personnel at retail outlets and wholesalers agreed that mark-ups show great variation for generic equivalent products. Margins were reported to be less for MSGs or IBs than for other generics; the reason could be that IBs and MSGs are generally manufactured by reputed companies. Our respondents, however, were not willing to reveal the margins. We gathered that for certain generics (e.g. ciprofloxacin) the margin could be as high as 100%. Aside from the regular margins, manufacturers often offer promotional schemes to retailers. For example, for every 10 strips of a particular medicine purchased, 2 strips are offered free of charge. It was thus evident that mark-ups were neither clear-cut nor transparent. It was not possible to get more information in this study.

The procurement price tender rate is fixed by the Central Purchase Committee in the public sector. 8% sales tax is charged on the procurement price. A surcharge of 15% was also charged on the sales tax for this particular year.

4. DISCUSSION

The present survey was done in the Rajasthan State of India according to the methodology described in the WHO/HAI manual for measuring medicine price. Of 30 core medicines listed in the manual, 3 were dropped as they were not available in the country in the pre-selected strength. The provision for supplementary medicines allows local morbidity patterns to be better represented. Nine medicines were added to supplementary list for this survey. A total of 36 medicines were surveyed for price and availability in the public, private and co-operative sectors in Rajasthan.

In the public sector, the lowest price generic was mostly available and the median availability was 40%. The median MPR of the LPGs for public procurement is 0.96 and the MPR for 50% of the medicines procured was in the range of 0.51 and 1.32. Therefore, most of the medicines were procured at prices less than the international reference prices, so the government is buying these medicines at a reasonable price. Public facilities can purchase medicines locally when faced with 'stock-outs' or if a patient requires a particular medicine not normally stocked. When enalapril (MSG) was locally purchased by one facility, the price was 13.5 times the procurement price and it was slightly higher than the price in private pharmacies. Sulfadoxine-pyrimethamine was also purchased by another public facility for about twice the private sector price. We recommend that the process of local purchase be streamlined and made transparent at public facilities.

Unlike many other states in India, all patients do not get free medicines dispensed at government hospitals in Rajasthan. Only a few categories of patients such as families below the poverty line (BPL card holders), widows, destitutes, freedom fighters, senior citizens, and ex-servicemen are entitled to free medicines. The remaining patients do not have to pay doctors' consultation fees but must buy the prescribed medicine from private outlets. Since the co-operative sector is very small, the prices and availability of medicines in the private sector are of utmost importance. Availability of medicines in the public sector was not satisfactory. In the public sector, median availability for all 36 medicines surveyed was 40% for LPGs. Even patients entitled to free medicines are forced to buy medicines from private pharmacies.

In the private sector, the median MPR for IBs and MSGs were almost equivalent (2.81 vs. 2.78), and the median MPR for IBs was slightly higher than the LPG (2.81 vs. 2.28). This may be due to no or less restricted patent laws in India. LPGs were 33 % less expensive than MSGs (1.83 vs. 2.72), and price variation among lowest priced generics was observed. In private pharmacies, often the MSG was the only generic available so it was also the LPG at that particular facility. Generally, the domestic market has many other generic equivalents that are less expensive than the MSGs. Often the retailers do not sell these lower priced generics, possibly because health care practitioners prescribe only MSGs and/or margins are higher. There may be more promotional schemes (rebates or discounts) for the MSGs. A study done by Rane (2002) has shown that 90 percent of the pair wise comparisons (same medicines and strengths) show significant inter-enterprise (pharmaceutical companies) price differences (15). Cardio-vascular medicines

were compared. These findings have policy implications. Our study has also shown difference in prices of generic equivalent medicine e.g., ciprofloxacin. A multifaceted approach is required for medicine price regulation in the market. The first step is establishment of transparency in the supply chain. A regular publication of medicine prices of different generics by some reputed NGO/research team will increase public awareness and empower consumer. Consumer consciousness about medicine price will be helpful in bringing down the prices of medicines in the market. Government can give incentive to the prescribers and dispensers for equitable and cost effective use of medicines. The Government can decrease medicine prices by decreasing the margins (profits) of all actors of supply chain, by abolishing taxes on essential medicines and by promoting generics.

In general, prices of medicines in the private sector were about 2-3 times the procurement price in the public sector. The MPR of aciclovir was 0.5 in the public sector (LPG) vs. 1.79, 1.34, and 1.35 for IB, MSG and LPG respectively in the private sector. Conversely, there were a few medicines whose prices were very high in the private sector compared to the procurement price e.g. LPGs of albendazole, diazepam, and diclofenac in the private sector were 8, 26 and 14 times the procurement price respectively. The mark-ups applied by wholesalers and retailers for these medicines must be very high. Information on mark-ups was sought but not provided by the retailers or wholesalers. This requires further study and intervention from the regulatory authorities.

Ciprofloxacin is a medicine which comes under DPCO (scheduled drug) and its price is controlled by the NPPA. The survey revealed that there is variation in the price of this medicine. In private pharmacies, the MSG was 2.7 times the price of the LPG, and the IB was cheaper than the MSG price. Ranitidine is another scheduled medicine whose price is controlled - the retail price in private pharmacies was the same for the IB, MSG and LPG.

Of the medicines surveyed in the private sector, 17 were available for less than twice the IRP and an additional 7 were available for less than the IRP. Medicines less than the IRP were beclomethasone inhaler, ceftriaxone inj, losartan, metformin, omeprazole, ranitidine, and salbutamol inhaler (MSG and LPG). This is a very good sign because these medicines are used to treat chronic conditions such as asthma, hypertension, and diabetes. This implies that these medicines are available at a reasonable price in the private sector. In contrast, prices of these medicines were very high in some other poor countries and there was great variability in prices of innovator brands and their generic equivalents in those countries (16, 17). A study done in Mexico also shows that the prices of essential brand-name drugs are very high (18). In Rajasthan, we did not find much variation in branded and generic medicine prices probably because of less restrictive Indian patent laws. The Indian government is rolling back the scope of its regulation policies and relying increasingly on the forces of market competition. The government fixes prices for the medicines that are listed in a schedule (DPCO), and no pharmaceutical company can charge more than the price fixed by the authority.

In co-operative pharmacies, prices are almost the same as in the private sector. There was not much variation in the prices of the same medicine in different regions of the state. This is because the Maximum Retail Price (MRP) is printed on every pack/container of medicine and local taxes are added to the MRP. Medicines are sold at the MRP at most

pharmacies. Sometimes chemists may not charge the local tax or decrease their profit margin, resulting in small variations in price for certain medicines.

It was interesting to compare availability of medicines across sectors and types of products. All 36 medicines could be found in a generic version in at least some private outlets (albeit the availability of the 3 HIV medicines was very low). In other words, there were no medicines that were not available in any of the private sector facilities. Most of the medicines (24 out of 36) were found in at least 90 percent of the private pharmacies surveyed. In contrast, in the public sector there were 7 medicines that could not be found in any public facility. Availability of generics is highest in the private sector, lowest in the public sector, and in-between in the co-operative facility.

Innovator brands were not available in any of the public facilities and only three most sold generic equivalents were available in the public sector. Availability of innovator brands and the most sold generic equivalent versions followed a similar pattern in the three sectors surveyed, i.e., highest in the private sector followed by co-operative and least in the public sector.

In the public sector, median availability of the LPG medicines surveyed was 40% on the day of data collection. The medicines not found were 2 of the 3 anti-HIV/AIDS (antiretroviral) medicines surveyed, losartan, hydrochorothiazide and lipid-lowering medicines that are not on the State EDL (state procurement is based on the EDL). One public facility purchased zidovudine locally. Another reason for poor availability is that the financial year starts in April in India, and the rate control and tender are released then. Due to some local problems, there was a delay in releasing rate control information for certain medicines in 2003. There are provisions for obtaining antiretroviral drugs free of charge from hospital under PEP (Post Exposure Prophylaxis) for medical and para-medical staff. Drugs for the treatment of AIDS are available for BPL card holders (below poverty line) at the main teaching hospital of Jaipur. Only nevirapine 200mg and zidovudine 100mg are available, not indinavir (the other HIV medicine surveyed). These medicines are not available in the main pharmacy but for particular patients they are purchased from the Chief Minister Medical Relief Fund. Very few patients avail this facility.

The affordability indicators imply that the treatment of chronic diseases should not be difficult for poor patients. But this may not reflect reality, as our calculations are based on the wage of the lowest paid government worker. Only a very small proportion of the population is employed in the government sector. People working in other or unorganized sectors are poorly paid and it is often not viable for them to purchase medicines from private pharmacies. Affordability can be very difficult if more than one family member is ill or if the earning member falls ill.

5. Conclusions

The survey, conducted in Rajasthan, determined the price, availability, and affordability of a selection of essential medicines in the public, private-for-profit and co-operative sectors according to a standardized methodology published by WHO/HAI. Important findings include:

- The government of Rajasthan purchases medicines at a reasonable price for patients who are eligible for free medicines at public health facilities.
- In private pharmacies almost half the medicines surveyed were priced less than twice the international reference prices (and some were lower than the IRP). This indicates that prices of these medicines are reasonable.
- Certain medicines such as albendazole, diazepam, diclofenac, amoxicillin, atenolol, paracetamol, and hydrochlorothiazide were expensive in the private sector. The government should take regulatory actions to control the prices of these medicines.
- The price of albendazole, diazepam, and diclofenac in the private sector was 8, 26 and 14 times the procurement price in the public sector, indicating wholesale and retail margins are probably very high or the manufacturer price is higher for private sector than the public sector.
- In the private sector, prices of the lowest priced generic medicines were 33% lower than the most sold generic equivalents.
- In the co-operative sector, there was virtually no price difference between LPGs and MSGs. This is probably because only the most sold generic was available or another generic whose price was nearly the same as the most sold generic was available.
- Availability in the public sector was low, so poor patients are forced to buy medicines (some of which are expensive) from private pharmacies or go without treatment.
- The availability of medicines to treat HIV/AIDS was very low in all sectors.

6. Recommendations

On the basis of the findings, the following recommendations are made:

1. Steps should be taken to improve the availability of medicines in the public sector. The quantity of drugs required in the pharmacy should be determined so that there are no stock-outs for essential medicines. Thus, fewer medicines will be procured locally at often substantially higher prices.
2. Local procurement should be streamlined and transparent so as to maintain reasonably low costs.
3. The Essential Drugs List should be revised to include lipid-lowering and other much needed medicines.
4. Some commonly used medicines (e.g. diazepam, paracetamol, albendazole, diclofenac, amoxicillin, atenolol, and hydrochlorothiazide) are expensive in the private sector, so measures should be taken by the pricing authority to decrease the prices of these medicines.
5. Prices of certain medicines such as diazepam, albendazole, and diclofenac were found to be very high in the private sector compared to procurement prices. A study should be undertaken to examine the various mark-ups, taxes and other charges applied in the distribution chain. Intervention by regulatory authorities will likely be needed to regulate these mark-ups and taxes should be abolished for essential medicines.
6. The availability of antiretroviral medicines and medicines to treat opportunistic infections should be improved in both the public and private sector
7. An in-depth study of the private sector should be undertaken to address:
    a. Poor availability of antiretroviral drugs.
    b. Prescribing practices of doctors, especially the prescribing of expensive brand products.
    c. Medicines 'prescribed and dispensed' to patients by pharmacists because certain medicines may be frequently and unnecessarily recommended to patients to increase profits.
8. Other surveys should be undertaken in different states to accurately determine the availability and price of medicines in different regions of India.
9. Prices, availability and affordability of medicines in the public and private sectors should be regularly monitored, and price data published so that people are informed about medicine prices.

REFERENCES

1. Core Indicators on Country Pharmaceutical Situation. Geneva: World Health Organization, Draft October 2000.
2. Background Paper for the WHO-WTO Secretariat Workshop on Differential Pricing and Financing of Essential Drugs. Hosbjor, Norway: World Health Organization/World Trade Organization, 2001:p8.
3. Bale HE Jr. Consumption and Trade in Off-patented Medicines. CMH Working Paper Series. 2001:Paper no WG 4:3. May
4. Duties and Taxes on Essential Medicines Used in Directorate-General for trade. Brussels: European Commission, 2002.
5. EDM/WHO. World Drugs Situation Survey, 1999
6. Hogerzeil H. Access to essential medicines as a human right. Essential drug monitor 2003; 33:25-26.
7. Bala K,Lanza O, Kaur SR. Retail drug prices:the law of the jungle. HAI News, April 1998,1-16.
8. Medicine Prices – a new approach to measurement. World Health Organization and Health Action International; 2003.
9. Government of India, National Pharmaceutical Pricing Authority. Modifications in Drug Policy, 1986. http://www.nppaindia.nic.in/drug_pol86/modif86/mod1.html (accessed 6 February2004)
10. Government of India, National Pharmaceutical Pricing Authority homepage. http://www.nppaindia.nic.in/index1.html (accessed 6 February 2004)
11. Economic Survey. Government of India. Ministry of Finance &Company Affairs, Economic Division; 2002-2003.
12. Annual Progress Report (2002-03). The Medical &Health Department of Rajasthan; February 2003.
13. Rajasthan State Essential Drugs List. Government of Rajasthan, Medical, Health &Family Welfare Department, Jaipur (Rajasthan); 2000.
14. Management Sciences for Health. International Drug Price Indicator Guide; 2002, http://erc.msh.org

15. Rane W. :Prices of prescription drugs. Economic and Political Weekly 2002; 37: 3402-04.
16. Aristakesyan M. Some results from Armenia. Essential Drugs Monitor 2003; 32:6.
17. Nurghozian T. The survey in Kazakhstan. Essential Drugs Monitor 2003; 32:6-7
18. Molina-Salazar RE, Rivas-Vilchis JE. Overpricing and affordability of drugs: the case of essential drugs in Mexico. Cad Saude Publica 1998; 14:501-6.

ANNEXURE I

LIST OF CORE MEDICINESS SURVEYED

1. Aciclovir tab 200 mg
2. Amitriptyline tab 25 mg
3. Amoxicillin cap 250 mg
4. Atenolol tab 50 mg
5. Beclometasone inhaler 50 mcg/dose
6. Captopril tab 25 mg
7. Carbmazepine tab 200 mg
8. Ceftriaxone 1 g powder for injection
9. Ciprofloxacin tab 500 mg
10. Co-trimoxazole paediatric suspension (8 + 40) mg/ml
11. Diazepam tab 5mg
12. Fluoxetine tab 20 mg
13. Fluphenazine decanoate injection 25 mg/ml
14. Glibenclamide tab 5 mg
15. Hydrochlorothiazide tab 25 mg
16. Indinavir cap 400 mg
17. Losartan tab 50 mg
18. Lovastatin tab 20 mg
19. Metformin tab 500 mg
20. Nevirapine tab 200 mg
21. Nifedipine Retard tab 20 mg
22. Omeprazole cap 20 mg
23. Phenytoin tab 100 mg
24. Pyrimethamine with sulfadoxine tab (25 + 500) mg
25. Ranitidine tab 150 mg
26. Salbutamol inhaler 0.1 mg per dose
27. Zidovudine cap 100 mg

SUPPLIMENTARY MEDICINES SURVEYED

1. Albendazole tab 400 mg
2. Cephalexin caps 250 mg
3. Chloroquine tab 250 mg
4. Diclofenac tab 50 mg
5. Enalapril tab 5 mg
6. Ibuprofen tab 400 mg
7. Isoniazid tab 300 mg
8. Paracetamol tab 500 mg
9. Pyrazinamide tab 500 mg

Annexure 2: Availability of individual medicines

Medicine Name Core List (yes/no)		Medicines Availability in Outlets								
		Innovator Brand			Most Sold Generic			Lowest Price Generic		
		Public (n=20)	Private (n=20)	Other (n=20)	Public (n=20)	Private (n=20)	Other (n=20)	Public (n=20)	Private (n=20)	Other (n=20)
Aciclovir	yes	0.0%	55.0%	25.0%	0.0%	80.0%	50.0%	35.0%	95.0%	60.0%
Albendazole	no	0.0%	95.0%	75.0%	0.0%	55.0%	30.0%	100.0%	95.0%	95.0%
Amitriptyline	yes	0.0%	95.0%	75.0%	0.0%	70.0%	30.0%	20.0%	95.0%	75.0%
Amoxicillin	yes	0.0%	10.0%	0.0%	0.0%	100.0%	85.0%	100.0%	100.0%	100.0%
Atenolol	yes	0.0%	75.0%	55.0%	0.0%	100.0%	75.0%	100.0%	100.0%	100.0%
Beclometasone inhaler	yes	0.0%	0.0%	20.0%	25.0%	65.0%	55.0%	25.0%	65.0%	55.0%
Captopril	yes	0.0%	0.0%	0.0%	0.0%	25.0%	15.0%	0.0%	25.0%	15.0%
Carbamazepine	yes	0.0%	90.0%	90.0%	0.0%	90.0%	90.0%	40.0%	90.0%	95.0%
Ceftriaxone injection	yes	0.0%	0.0%	0.0%	0.0%	95.0%	80.0%	75.0%	95.0%	90.0%
Cephalexin	no	0.0%	0.0%	0.0%	0.0%	60.0%	60.0%	10.0%	100.0%	75.0%
Chloroquine	no	0.0%	60.0%	10.0%	0.0%	100.0%	95.0%	75.0%	100.0%	100.0%
Ciprofloxacin	yes	0.0%	50.0%	25.0%	0.0%	85.0%	85.0%	100.0%	95.0%	100.0%
Cotrimoxazole suspension	yes	0.0%	70.0%	45.0%	0.0%	100.0%	75.0%	100.0%	100.0%	80.0%
Diazepam	yes	0.0%	90.0%	75.0%	0.0%	75.0%	70.0%	100.0%	95.0%	90.0%
Diclofenac	no	0.0%	100.0%	90.0%	0.0%	100.0%	85.0%	100.0%	100.0%	100.0%
Enalapril	no	0.0%	0.0%	0.0%	5.0%	100.0%	80.0%	40.0%	100.0%	95.0%
Fluoxetine	yes	0.0%	0.0%	0.0%	0.0%	90.0%	90.0%	10.0%	90.0%	95.0%
Fluphenazine injection	yes	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	15.0%	0.0%
Glibenclamide	yes	0.0%	90.0%	100.0%	0.0%	20.0%	25.0%	15.0%	20.0%	25.0%
Hydrochlorothiazide	yes	0.0%	0.0%	0.0%	0.0%	35.0%	5.0%	0.0%	35.0%	5.0%
Ibuprofen	no	0.0%	100.0%	100.0%	0.0%	75.0%	80.0%	95.0%	100.0%	100.0%
Indinavir	yes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	0.0%
Isoniazide	no	0.0%	0.0%	0.0%	0.0%	40.0%	5.0%	100.0%	55.0%	5.0%
Losartan	yes	0.0%	0.0%	0.0%	0.0%	95.0%	90.0%	0.0%	95.0%	95.0%
Lovastatin	yes	0.0%	0.0%	0.0%	0.0%	10.0%	5.0%	0.0%	20.0%	10.0%
Metformin	yes	0.0%	0.0%	0.0%	0.0%	95.0%	95.0%	40.0%	100.0%	100.0%
Nevirapine	yes	0.0%	0.0%	0.0%	0.0%	5.0%	10.0%	0.0%	5.0%	10.0%
Nifedipine Retard	yes	0.0%	0.0%	0.0%	0.0%	100.0%	100.0	5.0%	100.0%	100.0%
Omeprazole	yes	0.0%	0.0%	0.0%	0.0%	100.0%	95.0%	100.0%	100.0%	100.0%
Paracetamol	no	0.0%	100.0%	65.0%	0.0%	85.0%	55.0%	100.0%	100.0%	90.0%
Phenytoin	yes	0.0%	0.0%	0.0%	0.0%	50.0%	55.0%	40.0%	75.0%	80.0%
Pyrazinamide	no	0.0%	80.0%	30.0%	0.0%	50.0%	40.0%	100.0%	80.0%	50.0%
Ranitidine	yes	0.0%	100.0%	95.0%	0.0%	100.0%	95.0%	100.0%	100.0%	100.0%
Salbutamol inhaler	yes	0.0%	45.0%	10.0%	5.0%	100.0%	95.0%	30.0%	100.0%	95.0%
Sulfadoxine-pyrimethamine	yes	0.0%	0.0%	0.0%	0.0%	90.0%	75.0%	10.0%	90.0%	75.0%
Zidovudine	yes	0.0%	0.0%	0.0%	0.0%	5.0%	0.0%	5.0%	5.0%	0.0%

Annexure 3: Median price ratios of individual medicines

Innovator brand (IB), most sold generic equivalent (MSG) and lowest priced generic equivalent (LPG) in the public sector (procurement) and private and other sectors. Reference price-MSH 2002

Medicine Name	Core List (yes/no)	Pro-cure-ment (n=20)	Private (n=20)	Other (n=20)	Pro-cure-ment (n=20)	Private (n=20)	Other (n=20)	Pro-cure-ment (n=20)	Private (n=20)	Other (n=20)
Aciclovir	yes		1.79	1.67		1.34	1.34	0.50	1.35	1.35
Albendazole	no		13.25	13.25		12.78	12.37	1.24	10.31	11.34
Amitriptyline	yes		5.35	5.35		4.23	4.27	1.51	4.27	5.32
Amoxicillin	yes					4.65	4.65	1.32	4.55	4.62
Atenolol	yes		5.74	5.64		4.57	4.54	1.11	4.53	4.26
Beclometasone inhaler	yes			0.96	0.77	0.90	0.90	0.77	0.90	0.90
Captopril	yes					2.77			2.77	
Carbamazepine	yes		1.76	1.76		1.70	1.70	1.42	1.69	1.70
Ceftriaxone injection	yes					0.46	0.46	0.35	0.38	0.35
Cephalexin	no					2.89	2.74	1.42	2.73	2.72
Chloroquine	no		2.18			1.83	1.83	1.13	1.83	1.83
Ciprofloxacin	yes		3.91	3.91		4.92	4.92	1.25	1.82	2.92
Co-trimoxazole suspension	yes		1.00	1.00		1.00	1.00	0.76	1.00	1.00
Diazepam	yes		11.54	11.54		8.30	7.57	0.29	7.57	7.57
Diclofenac	no		4.92	4.92		4.18	4.18	0.29	4.18	4.18
Enalapril	no				2.84	2.72	2.73	0.21	2.54	2.72
Fluoxetine	yes					2.20	2.20	0.55	2.05	2.20
Fluphenazine injection	yes									
Glibenclamide	yes		2.82	2.82		2.73	2.73	3.20	2.73	2.73
Hydrochlorothiazide	yes					6.15			6.15	
Ibuprofen	no		1.45	1.45		1.45	1.45	1.05	1.45	1.45
Indinavir	yes									
Isoniazide	no					2.89		0.52	1.65	
Losartan	yes					0.09	0.09		0.09	0.09
Lovastatin	yes								1.30	
Metformin	yes					0.97	0.97	0.71	0.97	0.97
Nevirapine	yes									
Nifedipine Retard	yes					1.09	1.09	0.51	1.09	1.09
Omeprazole	yes					0.45	0.45	0.15	0.40	0.42
Paracetamol	no		5.23	5.23		5.30	5.30	1.03	4.53	4.53
Phenytoin	yes					3.57	3.56	3.09	3.35	3.35
Pyrazinamide	no		2.81	2.81		2.83	2.84	0.96	2.81	2.81
Ranitidine	yes		0.20	0.20		0.20	0.20	0.08	0.20	0.20
Salbutamol inhaler	yes		1.28		0.91	0.94	0.94	0.64	0.94	0.94
Sulfadoxine-pyrimethamine	yes					1.81	1.81	3.66	1.81	1.81
Zidovudine	yes							2.69		

Annexure 4 Affordability of Standard Treatment Regimes
Daily wage of skilled govt. worker Rs. 130

Diabetes						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Glibenclamide	5 mg	cap/tab	30	60	Brand	39.60	0.3
					Most Sold	38.40	0.3
					Lowest Price	38.40	0.3

Hypertension						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Hydrochlorothiazide	25 mg	cap/tab	30	30	Brand		
					Most Sold	30.00	0.2
					Lowest Price	30.00	0.2

Hypertension						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Atenolol	50 mg	cap/tab	30	30	Brand	67.50	0.5
					Most Sold	53.70	0.4
					Lowest Price	53.25	0.4

Adult resp. infects.						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Amoxicillin	250 mg	cap/tab	7	21	Brand		
					Most Sold	83.16	0.6
					Lowest Price	82.53	0.6

Pediatric resp. infecs.						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Co-trimoxazole suspension	8+40 mg/ml	millilitre	7	70	Brand	14.00	0.1
					Most Sold	14.00	0.1
					Lowest Price	14.00	0.1

Gonorrhoea						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Ciprofloxacin	500 mg	cap/tab	1	1	Brand	6.67	0.1
					Most Sold	8.40	0.1
					Lowest Price	3.11	0.0

Arthritis						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Diclofenac	50 mg	cap/tab	30	60	Brand	80.60	0.6
					Most Sold	68.40	0.5
					Lowest Price	68.40	0.5

Depression						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Amitriptyline	25 mg	cap/tab	30	90	Brand	161.10	1.2
					Most Sold	127.35	1.0
					Lowest Price	128.70	1.0

Asthma						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Salbutamol inhaler	0.1 mg/dose	dose	as needed	200	Brand	104.00	0.8
					Most Sold	76.00	0.6
					Lowest Price	76.00	0.6

Peptic ulcer						Private Retail	
Select Medicine Name	Medicine Strength	Dosage Form	Treatment Duration (in Days)	Total # of Units per Treatment	Product Type	Median Treatment Price	Days' Wages
Ranitidine	150 mg	cap/tab	30	60	Brand	40.20	0.3
					Most Sold	40.20	0.3
					Lowest Price	40.20	0.3