

Prices & availability of common medicines at six sites in India using a standard methodology

Anita Kotwani, Margaret Ewen*, Dalia Dey**, Shobha Iyer***, P.K. Lakshmi⁺, Archana Patel⁺⁺, Kannamma Raman⁺⁺⁺, G.L. Singhal[#], Vijay Thawani^{##}, Santanu Tripathi^{###} & Richard Laing[†]

*Department of Pharmacology, Vallabhbhai Patel Chest Institute, University of Delhi, India, *Health Action International (HAI) Europe, The Netherlands, **Faculty Associate, ICFAI Research Center, Kolkata, India, ***Citizen Consumer & Civic Action Group (CAG) Chennai, India, +Drug Information Centre, Karnataka State Pharmacy Council, Bangalore, India, ++Department of Pediatrics & Clinical Epidemiology Unit, Indira Gandhi Government Medical College, Nagpur, India, +++Association for Consumer Action on Safety & Health, Mumbai, India, #Assistant State Drugs Controller, Haryana, Department of Health, Haryana Govt., Panchkula, India, ##Department of Pharmacology, Government Medical College, Nagpur, India, ###Institute of Postgraduate Medical Education & Research & Seth Sukhlal Karnani Memorial Hospital, Kolkata, India & †Policy, Access & Rational Use, Medicine Policy & Standards, World Health Organization, Geneva*

Received August 7, 2006

Background & objectives: The price and availability of medicines are key components in determining access to effective treatment. Data on prices and availability of common medicines in public and private sector in different States of India are scarce. Hence, surveys were undertaken in different States of India to evaluate these metrics.

Methods: During October 2004 to January 2005, six surveys were undertaken simultaneously in five States of India to assess medicine prices and availability of essential medicines (n = 21-28) using the World Health Organization and Health Action International methodology. Surveys were conducted at Chennai, Haryana, Karnataka, West Bengal, and at two sites in Maharashtra. For each medicine, data were collected for the Innovator Brand (IB), Most Sold Generic (MSG), and Lowest Priced Generic (LPG) at randomly selected public and private facilities in each site surveyed. Prices were compared to an international reference benchmark (expressed as median price ratio - MPR).

Results: The procurement price of medicines in the public sector was 0.27 to 0.48 times the international reference price. However, these medicines were inadequately available and the median availability in the public sector ranged from 0 to 30 per cent. The median prices of medicines in the private sector were less than twice the IRP, although a few innovator brands were more expensive. No difference was observed between the prices of the most sold generic (MSG) and the lowest priced generic (LPG) available at the facilities. Interestingly, price variation was observed among different generic equivalents of ciprofloxacin in each region. The price of LPG diazepam in the private sector was thirty three times its procurement price in the public sector.

Interpretation & conclusion: The survey revealed low procurement prices and poor availability in the public sector. Thus, the majority of the population purchased medicines from private pharmacies, where generics were usually available although prices of certain medicines were high. Various policy measures could increase the availability and accessibility of medicines for the population.

Key words Medicine prices - private sector - procurement prices - public sector - WHO-HAI methodology

The World Health Organization (WHO) reported that one third of the world's population lacks reliable access to required medicines and the situation is even worse in developing countries, which are finding it increasingly difficult to finance medicines as expenditure on medicines has been growing steadily¹. While people in industrialized countries generally have insurance or subsidies that cover most of the cost of their medicines, those in poorer countries with less developed health systems pay the full cost of almost all their medicines themselves. Over 80 per cent of India's health financing is borne by patients². Thus, the price of medicines is a crucial determinant of the health of citizens. Inadequate distribution systems also affect the availability of medicines³. The pharmaceutical industry obtains higher profits with greater margins than other industries⁴, and it has been argued that these margins are far beyond the sums required to finance research and development⁵.

Many low-income countries do not have policies for controlling medicine prices, and price of the same medicine often varies within the country and is also different among such countries. WHO and Health Action International (HAI) recognized the need for a standard methodology to measure medicine prices in countries so that a clearer picture of what patients actually pay for medicines in low- and middle-income countries could be obtained. These two organizations jointly published a manual⁶, which described a methodology for collecting data and measuring medicine prices in various countries. A field survey was conducted in Rajasthan, India, during April-June 2003⁷ using this methodology. After the successful completion of the Rajasthan survey, WHO and HAI held a workshop in April 2004 to plan for more surveys in other states so that drug price and availability in India could be gauged more accurately. Therefore, six surveys were conducted at different sites between October 2004 and January 2005 with the following objectives:

(i) Measure the price patients pay for certain commonly used medicines in different States and to

investigate whether there is any price variation in different States for the same medicines; (ii) Measure the difference in prices of innovator brand, most sold generic equivalents, and lowest price generic equivalents for the medicines surveyed; (iii) Measure the price the State government pays for procuring medicines for public facilities in different states; (iv) Compare the prices of medicines in both the public (procurement) and private sector (patient price) in different States compared with the international reference price; and (v) Assess the availability of medicines in the public and private sectors.

This paper reports the findings of these surveys.

Material & Methods

The surveys used the methodology developed by the WHO and HAI, which was designed to collect, analyse, and interpret the data in a standardized way. The methodology requires a systematic survey of the prices and availability of a core list of medicines and allows for a supplementary list of medicines that are selected by each survey team (country) on the basis of their importance in treating major health problems. Selection of survey facilities, for generating data on prices to patients in both the private and public sectors, uses a sampling approach that selects one central area, the major urban city (usually the capital of the State/country), and three other administrative areas chosen randomly from a list of areas that can be reached within one day's travel from the central area. In each of the four identified areas, at least five public health facilities are selected, including the main public hospital (tertiary care level). The choice of private sector pharmacies sample is based on their proximity to the public health facilities surveyed; at least five public, five private pharmacies per survey area should be included. A standardized computerized workbook (that accompanies the manual on a CD Rom and can also be downloaded from the HAI website) is used to double enter the data collected in the field. Data analysis, using the same software application, generates information on the prices in different sectors, geographical areas, health facilities and pharmacies and on availability of

medicines. Medicine prices are expressed as median price ratios (MPRs), *i.e.*, median prices from the survey, compared to an international reference price. These surveys were conducted by academics teaching in medical college/universities, social scientists, and consumer activists working with non-governmental organizations (NGOs). Data were collected from October 2004 to January 2005.

Survey sites: India has a population of 1,027,015,247, living in 28 States and 7 union territories (India States, 2005)⁸. The annual mean per capita income (2005) was Rs.17,947 (approximately US\$400)⁹. Six surveys were conducted in five different States located in north, south, east and west parts of the country. The six survey sites included Chennai (southern India), Haryana (northern India), Karnataka (southern India), West Bengal (eastern India), and two surveys sites in Maharashtra State (western India). The first Maharashtra survey was referred to as the “Maharashtra (12 districts)” survey since 12 districts were surveyed and the second study was called the “Maharashtra (4 regions)” survey because it was limited to 4 regions. The population⁸ of Haryana, Karnataka, Maharashtra and West Bengal were 21,082,989, 52,733,958, 96,752,247 and 80,221,171 respectively.

Pricing policy: The Government of India has established the National Pharmaceutical Pricing Authority (NPPA) to fix medicine prices in the country. The NPPA is an independent body of experts which fixes prices for only those medicines that are listed in a ‘schedule’ found in the Drugs Prices Control Order¹⁰. This organization currently fixes the prices of 74 scheduled drugs using a standard formula. There are no official guidelines for setting the prices of other medicines, which are determined through free market competition. However, prices are monitored and excessive price rises (in excess of 20%) are subject to governmental action.

Sampling: Each team surveyed both public and private facilities in randomly selected districts. Chennai, the State capital of Tamil Nadu, was divided into four geographical zones so that drug pricing and availability information could be

obtained for all pockets of the city. In Haryana, the six districts studied were Panchkula, Faridabad, Yamunanagar, Panipat, Rohtak and Hissar. The Karnataka team surveyed two districts each in four geographical divisions of Karnataka (Bangalore, Mysore, Belgaum and Gulbarga). The districts were chosen according to the population density. In Maharashtra (12 districts) study, districts were surveyed on the basis of UNDP Human Development Report¹¹ status and population level. The 12 selected districts included Ahmednagar, Amaravati, Bhandara, Dhule, Nashik, Pune, Jalna, Satara, Solapur, Sindudurgh, Raigarh, and Yavatmal. The Maharashtra (4 regions) study designated Nagpur, Aurangabad, Akola and Nanded as representative of the “richest, upper-middle, lower middle and poor” categories specified by the UNDP¹¹. The West Bengal survey included Kolkata city and six other randomly selected districts: Burdwan, Jalpaiguri, Purulia, Midnapore, Malda, and 24 Parganas South district.

In each randomly selected districts/regions, both public facilities (tertiary, secondary and primary health facilities) and nearby private facilities (chemist shops) were randomly selected to be surveyed (Table I). All survey teams included State-run public facilities in their studies. The Maharashtra (4 regions) team also included facilities run by municipal and government employees’ insurance schemes since these are State-funded. Medicines are provided free of charge to everyone visiting public facilities.

Table I. Total number of districts, public and private facilities surveyed in six areas of India

State/city	Districts/ regions	Public facilities	Private facilities
Chennai	4	20	40
Haryana	6	30	30
Karnataka	8	24	40
Maharashtra (12 districts)	12	60	60
Maharashtra (4 regions)	4	20	48
West Bengal	7	26	35

Medicines surveyed: The WHO/HAI manual identifies a core list of 30 medicines (Annexure) that are used in the treatment of common conditions both acute and chronic, are available in standard formulations and widely used. The majority of the core medicines are on the WHO Model List of Essential Medicines. The core list includes both old that are 'off patent' and new and 'on patent' medicines and specifies the form and dosage of each item. All the medicines surveyed were registered with the State drug regulatory authority. There was no substitution of medicines, dosage forms, or strength. As tablets of diclofenac sodium 25 mg and artesunate 100 mg were not available in India in the strength mentioned in the manual, all survey teams dropped these two medicines from their studies. Fluconazole 200 mg tablets were

Annexure. WHO-HAI list of core medicines

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

not commonly used, therefore, all except the Maharashtra (4 regions) team dropped this item. Chennai, Haryana, Karnataka, and Maharashtra (12 districts) had 27 items on their core list of medicines while Maharashtra (4 regions) included 28 items. The West Bengal survey team used a core list of 21 medicines as other drugs mentioned in the WHO/HAI manual were not included in the West Bengal Essential Medical List (EML) used for public procurement. Further, the survey team believed that availability of the drugs excluded from the State EML in the private sector would also be poor. In addition, all survey teams included their own supplementary list of medicines. In this study we included only the core list of medicines surveyed as these were the common medicines to all the six surveys. For each medicine, three products were monitored: innovator brand (IB), most sold generic equivalent (MSG), and lowest price generic equivalent (LPG). The first two groups, *i.e.*, IB and the national MSG of each medicine were identified before conducting the field survey. Of the 27 core medicines, 10 IBs were not registered in India. The LPG product for each medicine was identified at each facility. IB connotes the originator brand of a particular therapeutic moiety developed by a particular pharmaceutical company; MSG is the generic equivalent of IB that is most popular and most sold generic version of a particular medicine; LPG is the generic equivalent of a particular therapeutic moiety that is available at the pharmacy and its price is less than the MSG. Hence, the name of LPG varied from pharmacy to pharmacy depending upon the availability of the lowest priced generic equivalent of a particular medicine. If no other generic equivalent other than MSG was available or the generic equivalent was priced more than the price of MSG, MSG became the LPG.

Data collection: Medicine Price Data Collection Form was finalized with IB and MSG names of all the medicines to be surveyed and LPG name to be filled after identifying at each facility. These forms were used in all the areas surveyed to enter the price and availability of the medicine at the time of data collection.

Data collectors were well trained before the surveys; they undertook a pilot survey using the standardized forms prepared for the survey. Data collectors visited facilities with a standardized medicine price data collection form and recorded the prices of those medicines which were available.

Public sector- In public hospitals patients do not pay for the medicines so procurement prices and availability data for the medicine surveyed were noted at each facility. Procurement price was collected from all the public facilities even though the medicine price/rate was fixed centrally as authorities may purchase a few medicines locally for the facility. The price of a medicine can vary across public facilities in the same State because of local purchases authorized by State-run facilities.

Private sector- In the private sector, prices and availability of selected medicines were collected at each enrolled retail pharmacy.

Data entry and analysis: Medicine unit prices were entered into Microsoft Excel spreadsheets with double entry, auto-checking, and automated analysis features. Price results were presented in terms of MPR, which is the ratio of the median price for each medicine across facilities divided by an international reference price converted into local currency¹². The international reference price was obtained from the International Drug Price Indicator Guide¹³. The workbook automatically generates summary tables and analysis such as MPRs of all medicines (IB, MSG and LPG), median MPR, inter-quartile range of MPRs, product availability, within-sector comparisons, and cross-sector comparisons. When comparing groups of medicines (IB to generic), analyses were available for pairs of medicines found in both groups.

Results

Public sector procurement prices

The number of public facilities surveyed in each area ranged from 20 to 60 (Table I). IB

products were unavailable and MSGs were rarely found in the surveys. The median MPR for the LPG was lowest for Chennai (0.27) and highest for Karnataka (0.48). The median MPRs were 0.33, 0.41, and 0.38 for Haryana, Maharashtra (some for both 12 districts and 4 regions), and West Bengal, respectively. The highest procurement median MPR for all the medicines surveyed was less than 1, indicating that the government procured medicines at a price lower than the international reference price.

Availability of medicines in public sector facilities

The median availability for core medicines was found to be 30.0 per cent in Chennai, 10.0 per cent in Haryana, 12.5 per cent in Karnataka, 3.3 per cent in Maharashtra (12 districts), 10.5 per cent in Maharashtra (4 regions), and 0 per cent in West Bengal (Table II). These data showed that availability of medicines was poor in the public sector. Availability of tablet glibenclamide (5 mg) used for the treatment of diabetes was 100 per cent in Karnataka, 95 per cent in Chennai and 83.3 per cent in Haryana whereas availability of glibenclamide was poor (15%) in Maharashtra (12 districts), and in West Bengal it was only 3.8 per cent *i.e.*, glibenclamide was available only in one facility out of 26 public facilities surveyed. Availability of three antibiotics, co-trimoxazole paediatric suspension and ciprofloxacin 500 mg was also low in West Bengal (Table III).

Table II. Availability of generics of core medicines in the public sector in six areas surveyed in India

Survey sites	(%) Median availability	Inter-quartile range (25%, 75%)
Chennai	30.0	0.0, 87.5
Haryana	10.0	0.0, 36.7
Karnataka	12.5	2.1, 54.2
Maharashtra (12 districts)	3.3	0.0, 35.8
Maharashtra (4 regions)	10.5	0.0, 32.9
West Bengal	0.0	0.0, 3.8

Private sector facility medicine prices

The median MPRs of IB varied from 1.74 to 4.38 and there was not much difference in the inter-quartile ranges. The median MPRs for MSG was 1.3 to 1.69 and for LPG it was 1.3 to 1.84, indicating that there was not much variation in MPRs in the different states studied (Fig.).

For various medicines, the differences between prices of IB, MSG and LPG were calculated. The data have been compared where 'IB and MSG', 'IB and LPG' and 'MSG and LPG' median ratios were available. When sets of equivalent pairs were compared it was observed that there was very little difference in the prices of IB and MSG across the surveys (-10% to +2.3%). When IB and LPG equivalent sets were compared they did not show

much difference, except for Maharashtra (4 regions) where IB was more (29.2%) than LPG. There was no difference in the price of MSG and LPG at any of the sites except Maharashtra (4 regions) where the MSG was slightly more (3.8%) than the LPG (Table IV). Maharashtra (4 regions) had found three IBs (amoxicillin, phenytoin and they had fluconazole in their list) that were not available in other surveys. Median price ratios for IB amoxicillin, fluconazole and phenytoin were 4.62, 4.38 and 6.32 respectively.

Availability of medicines surveyed in private sector facilities

Availability of generics, both MSG and LPG, was better than that of IBs in the private sector (Table V). Availability also varied by State, with Chennai

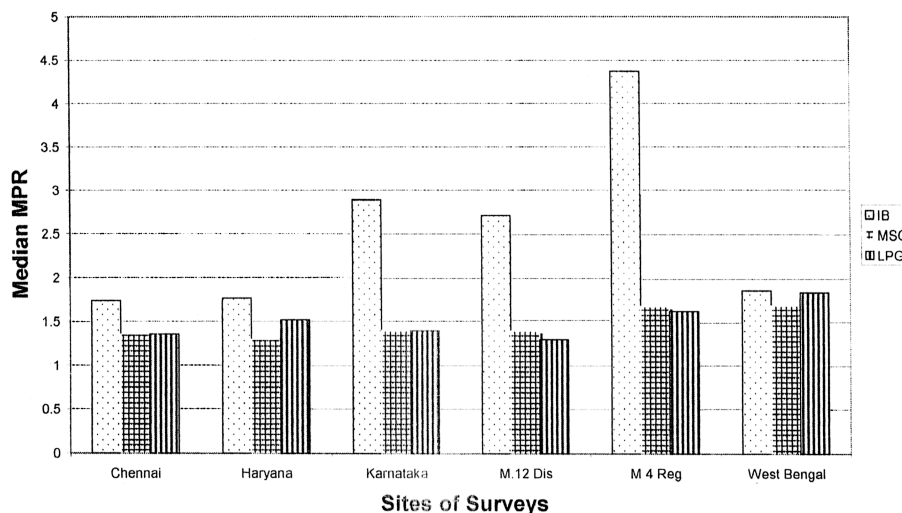


Fig. Medicine prices in private sector for innovator brand (IB) most sold generic (MSG) and lowest price generic (LPG) at six survey sites in India.

Table III. Per cent availability of specific medicines (generics) in the public sector in six survey areas in India

State/site	Glibenclamide (5 mg)	Atenolol (50 mg)	Amoxicillin (250 mg)	Co-trimoxazole (8+40 mg/ml)	Ciprofloxacin (500 mg)
Chennai	95.0	100.0	100.0	45.0	55.0
Haryana	83.3	90.0	73.3	6.7	80.0
Karnataka	100.0	4.2	45.8	29.2	83.3
Maharashtra (12 districts)	15.0	46.7	81.7	78.3	61.7
Maharashtra (4 regions)	42.1	47.4	52.6	31.6	42.1
West Bengal	3.8	15.4	96.2	3.8	0.0

Table IV. Comparison of median MPRs of paired data for innovator brand (IB), most sold generic (MSG) equivalents and lowest price generic (LPG) equivalents in the private sector in six areas in India

Survey site	Percentage difference between IB and MSG (no. of IB & MSG paired products)	Percentage difference between IB and LPG (no. of IB & LPG paired products)	Percentage difference between MSG and LPG (no. of MSG & LPG paired products)
Chennai	-1.7 (n=11)	-1.7 (n=11)	no difference (n=25)
Haryana	-3.3 (n=9)	+1.7 (n=9)	no difference (n=21)
Karnataka	-10 (n=10)	-6.8 (n=10)	no difference (n=21)
Maharashtra (12 districts)	-7.2 (n=12)	+17.3 (n=12)	no difference (n=22)
Maharashtra (4 regions)	+2.3 (n=13)	+29.2 (n=13)	+3.8 (n=24)
West Bengal	+1 (n=13)	+1 (n=13)	no difference (n=20)

Table V. Availability of innovator brand (IB), most sold generic (MSG) equivalents and lowest price generic (LPG) equivalents of core medicines in the private sector in six areas surveyed in India

State/area	% Median availability IB	% Median availability MSG	% Median availability LPG
Chennai	0.0	95.0	95.0
Hararyana	0.0	50.0	60.0
Karnataka	2.5	50.0	62.5
Maharashtra (12 districts)	3.3	66.7	73.3
Maharashtra (4 regions)	2.1	47.9	51.0
West Bengal	22.9	74.3	77.1

having the highest and Maharashtra (4 regions) the lowest availability of generic products.

Significant findings on specific medicines

Ciprofloxacin and ranitidine were two medicines controlled by the NPPA and have shown some interesting results. (i) There were greater differences in the prices of IB, MSG and LPG of ciprofloxacin (unlike other medicines where the differences were minimal); (ii) the price of IB ciprofloxacin was lower than the MSG equivalent; and (iii) the variation in price of LPG, and at many outlets the LPG price, was much lower than the MSG - a finding not seen with other medicines surveyed.

The average MPRs for IB, MSG and the LPG of ciprofloxacin at all private sector sites were 4.48, 6.03 and 3.86, respectively. The average procurement price in the public sector was 1.1. This showed that the LPG of ciprofloxacin available in the private sector was approximately three and a half times the price at which the company supplies that medicine to the government facilities.

On the other hand, the price of ranitidine, another “controlled/scheduled” drug surveyed, was found to be very consistent in all the regions surveyed, and the price of IB, MSG and LPG was the same, with an average MPR of 0.48 in the private sector. The average procurement MPR in the public sector was 0.28.

Other ‘scheduled’ medicine with controlled price were captopril, carbamazepine, co-triamoxazole and salbutamol. Their prices were not as consistent as ranitidine but showed little variation in the price of IB, MSG and LPG at all the survey sites.

Diazepam, a commonly used medicine, was procured by government agencies in all States at a reasonable price, and the average MPR was 0.27 (except in Maharashtra 4 regions where it was 0.9). The same medicine was available at a very high price in the private sector, the average MPR for IB, MSG and LPG being 11.82, 9.56 and 8.98 respectively which was 43, 35 and 33 times the procurement MPR.

Discussion

The findings of six surveys conducted at various sites in different Indian States gives a snapshot of medicine prices and availability across the country. This is the first such study conducted simultaneously at six sites in one country using the same methodology. This methodology was field-tested in many other countries and one survey had already been conducted in 2003 in Rajasthan, India^{7,14,15}. Quality testing of the drugs was not performed as this was not the surveys' purpose.

In the public sector the products available were usually generic equivalents. Across the six surveys, the innovator brand of only one medicine was found in a single facility. Most sold generic equivalents were rarely found which was to be expected as the identification of the product was based on private sector sales. The median availability of any generic in the public sector was poor in all the States. In these surveys availability was measured 'one time' on the day of data collection from any health facility. Availability of certain important medicines such as glibenclamide, co-trimoxazole paediatric suspension and amoxicillin was poor at different sites though the medicines were in the procurement list of public sector. According to essential medicine definition essential medicines should be 100 per cent available at all times in all the facilities.

This study provides baseline data for interventional studies which can be planned to improve the availability of medicines in the public facilities of concerned States. Among the various reasons for poor availability of medicines could be (i) medicines which are not on the States' essential medicines list (EML) or procurement list are not purchased, (ii) inefficient distribution systems leading to frequent 'stock-outs', (iii) dispensaries having different EMLs which do not have medicines prescribed by specialists (*e.g.*, antipsychotic medicines), (iv) financial constraints of State governments, (v) this was a 'one time' availability survey, and (vi) the core list is different from the EML of the survey areas. For example, in West Bengal of the 21 core list medicines surveyed, 8

were also in the Central Medical Stores List of West Bengal. Of these 8 medicines, 5 were available in at least 4 public sector outlets. Haryana and Karnataka had 14 medicines in their procurement list out of the 27 in the core list; Maharashtra (4 regions) had 14 out of 28, and Chennai had 16 medicines in their procurement list out of the 27 core list medicines surveyed.

Prices at which State governments procured medicines for free distribution at public facilities were found to be reasonable. The median MPR for all the medicines surveyed was lowest for Chennai (0.27) and highest for Karnataka (0.48), implying that the prices at which all State governments were buying medicines were much lower than the MSH reference price. A pooled procurement system for Delhi State's public facilities has been reported to have decreased duplication of work, resulted in better prices (about 30-40% cheaper) and increased availability of essential medicines¹⁶. Tamil Nadu's pooled procurement (2005) is well known in India and has resulted in economical prices and improved availability¹⁷. Other State governments will do well to learn from the Tamil Nadu system and implement it in their own States to reduce prices, and improve quality and availability of essential medicines.

These surveys clearly show that a lot has to be done by the State governments to increase availability of medicines in the public facilities. One aspect is to go in for pooled procurement system to decrease the procurement price and better distribution system. Simultaneously in-depth studies should be done to find out the various reasons for poor availability of medicines and plan suitable interventions to improve the situation.

In the private sector, there was not much variation in MPRs in the different States studied. Our results showed that the IB was 1.74 to 4.38 times higher than the international reference price. Paired data analysis revealed that there was little difference in the price of the IB, MSG and LPG for the same pairs of medicines. There was also little variation in the prices of the same

medicine among States. 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 in most pharmacies. Moreover, until April 2006, drug manufacturers could not seek patent protection for innovator brands. Thus, innovator brands are not priced at a premium in comparison to their generic counterparts.

The prices of medicines in the private sector were about 3-5 times the procurement price in the public sector which is actually quite high. It indicates that there is lot of margins for manufacturer, wholesaler and retailer. A detailed study is desirable to find out the different mark ups involved in deciding the final retail price of a medicine. The prices of a few medicines such as LPG of diazepam were very high in the private sector compared to the procurement price. Similarly, the Rajasthan (2003) survey revealed that LPG diazepam price was 26 times the procurement price⁷.

Lalitha¹⁸ has described how the Indian Government is rolling back the scope of its regulation policies and increasingly relying on the forces of market competition. The Government fixes prices for the medicines that are listed in the schedule Drug Price Control Order (DPCO), and no pharmaceutical company can charge more than the price fixed by the authority for this select group. Ciprofloxacin is a medicine that is regulated by the DPCO, and its price is controlled by the NPPA. These surveys showed that there was a great variation in the price of this product and that IB ciprofloxacin was cheaper than the MSG. The price of ciprofloxacin has not been revised for a long time and the maximum price fixed by NPPA is very high as compare to the price of ciprofloxacin chemical which has decreased over the years. IB of ciprofloxacin is not a popular brand in the country so it is available at a lower price than the MSG.

The availability of IBs was much less than the generics at all sites surveyed. This was expected as out of 27 core medicines, IBs of 10 were not registered in India and it is the MSG which is popular and is most sold. Generic availability was

highest in Chennai compared with the other States surveyed.

A multifaceted approach is required for medicine price regulation in the market. A useful first step is to establish transparency, which was not apparent at the time of the surveys. Price components could not be obtained in spite of our best efforts. Promoting transparency in the supply chain through price catalogues, use of Internet-based price lists, or prices regularly published by a reputed NGO/research team in popular newspapers will raise public awareness about medicine prices and empower people. Consumer consciousness about medicine prices will be useful in bringing down the overall price of medicines in markets that lack transparency. Governments of economically developing countries like India have limited resources to manage the pharmaceutical market. The government can try to offer some incentives to manufacturers, prescribers and dispensers to support equitable and cost-effective use of medicines. Another approach to decrease medicine prices can be to regulate each element of the price component chain including checking on the profit margins of manufacturers, wholesalers and retailers, reduction of taxes and duties on raw material, price freezes and promotion of generic medicines. Other interventions, such as removal of duties, value added tax (VAT) or taxes on essential medicines could also reduce prices of essential medicines.

Surveillance of medicine prices using the WHO/HAI methodology is a useful tool for international price comparisons of medicines. Prices can be benchmarked against countries with similar levels of wealth. Suitable interventions can be implemented by regulatory authorities or policy makers to make medicines affordable and available. One immediate policy option for the state and the national government is to exempt medicines, especially essential medicines, from all taxes and duties. For products coming under price control regulation the price controlling authorities would do well by tracking international or public sector procurement prices to ensure that prices are not set at an excessive level, as has been the case with ciprofloxacin.

In conclusion, the present survey has shown that while the governments of different States are procuring medicines at a very reasonable price, the availability of medicines was very low. This means that many patients have no option but to go to the private sector where there was generally better availability of generic products but at a higher price. While it is to be expected that private sector retail prices would be higher than public sector procurement prices of generics, the differences observed seemed excessive. Further investigation is needed to quantify price components.

While India has a deserved reputation for being an efficient producer of low-priced generic medicines, much could be done to improve availability in the public sector and to reduce medicine prices in the private sector.

Acknowledgment

Authors thank all the officials, pharmacists, and data collectors who cooperated with their teams and helped all six survey sites obtain reliable data. All the surveys, except the Chennai survey, were funded by WHO/HAI Project on Medicine Prices. The Chennai survey was funded by WHO, SEARO, New Delhi.

References

1. Who pays for health systems? *World Health Report 2000*. Geneva: World Health Organization.
2. Creese A, Kotwani A, Kutzin J, Pillay A. Evaluating pharmaceuticals for health policy in low- and middle-income country settings. In: Freemantle N, Hill S, editors. *Evaluating pharmaceuticals for health policy and reimbursement*. Massachusetts, USA: Blackwell Publishing (in collaboration with WHO, Geneva); 2004 p. 227-43.
3. Pecoul B, Charac P, Trouiller P, Pinel J. Access to essential drugs in poor countries: a lost battle? *JAMA* 1999; 281 : 361-7.
4. Angell M. The pharmaceutical industry: to whom is it accountable? *N Engl J Med* 2000; 342 : 1902-4.
5. Henry D, Lexchin J. The pharmaceutical industry as a medicines provider. *Lancet* 2002; 360 : 1590-5.
6. Medicine prices - a new approach to measurement. Geneva: World Health Organization and Health Action International. 2003. Available from: www.haiweb.org/medicineprices (accessed on August 28, 2005).
7. Kotwani A. Medicine prices in the state of Rajasthan, India. Survey Report. 2006. Available from http://www.haiweb.org/medicineprices/surveys/200306IN/survey_report.pdf (accessed on January 3, 2006).
8. India States. Available from: <http://www.statoids.com/uin.html> (accessed on August 28, 2005).
9. Per capita income of Indian States. Available at: <http://www.broadcastindia.com/article2393.html> (accessed on August 28, 2005).
10. NPPA. Government of India, National Pharmaceutical Pricing Authority homepage. Available from: <http://www.nppaindia.nic.in/index1.html> (accessed on August 28, 2005).
11. Human Development Report Maharashtra 2002. Government of Maharashtra, Mumbai. 2002. Available from: <http://data.undp.in/shdr/maharashtra/report.pdf> (accessed on August 28, 2005).
12. Madden J. What is a median price ratio? *Essential Drug Monitor* 2003; 33 : 17.
13. Management Sciences for Health. *International drug price indicator guide*. 2003. Available from: <http://erc.msh.org> (accessed on August 28, 2005).
14. Laing R. Medicine prices around the world and options for controlling them. Paper presented for the Symposium on Medicine Prices and Availability. *Proceedings of the 38th Annual Indian Pharmacological Society Conference*; December 28-30, 2005; Chennai: Institute of Pharmacology, Madras Medical College; 2005 p. 20.
15. Madden J, Kotwani A. Availability of essential medicines: an example from Rajasthan, India. *Essential Drug Monitor* 2003; 33 : 17.
16. Delhi Society for Promotion of Rational Use of Drugs (DSPRUD) Activity Report. WHO-India Essential Drugs Programme. Activity Report, January 1998-December 1999. WHO, New Delhi and Delhi Society for Promotion of Rational Use of Drugs.
17. Procurement - Tamil Nadu Medical Service Corporation. Available at: <http://tnmsc.tn.nic.in/procurement.htm> (accessed on February 10, 2006).
18. Lalitha N. Indian pharmaceutical industry in WTO regime. *Econ Polit Wkly* 2002; 37 : 3542-56.

Reprint requests: Dr Anita Kotwani, Reader, Department of Pharmacology, Vallabhbai Patel Chest Institute University of Delhi, Delhi 110007, India
e-mail: anitakotwani@yahoo.com