

# **Medicine Prices, Availability, Affordability and Price Components in Mongolia**

*Report of a survey conducted October 1, 2012 to December 30 2012*

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## Abbreviations

Cap	capsule
EML	Essential Medicines List
Inh	Inhaler
Inj	Injection
HAI	Health Action International
HIF	Health Insurance Fund
LPG	Lowest priced generic equivalent
MPR	Median price ratio
MSH	Management Sciences for Health
MSG	Most sold generic
NMP	National Medicines Policy
RDF	Revolving Drug Funds
OB	Originator brand
STG	Standard treatment guidelines
Susp	Suspension
Tab	Tablet
USD	United States dollars (also \$)
WHO	World Health Organization
UNICEF	United Nations Children's Fund

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## **Conflict of Interest Statement**

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

## Executive summary

**Background:** A field study to measure the price, availability, affordability and price components of selected medicines was undertaken in Mongolia in October to December 2012 using a standardized methodology developed by the World Health Organization and Health Action International.

### Methods:

The survey of medicine prices and availability was conducted in six regions: Ulaanbaatar 1, Darkhan 2, Bulgan 3, Dornod 4, Umnugobi 5 and Uvs 6. Data on 50 medicines was collected in 31 public and 35 private sector medicine outlets, selected using a validated sampling frame. Data was also collected on government procurement prices. For each medicine in the survey, data was collected for the originator brand (OB), most sold generic equivalent (MSG) and lowest priced generic equivalent (LPG, generic product with the lowest price at each facility). Medicine prices are expressed as ratios relative to Management Sciences for Health international reference prices (IRP) for 2011 (median price ratio or MPR). Using the salary of the lowest-paid unskilled government worker, affordability was calculated as the number of days' wages this worker would need to purchase standard treatments for common conditions.

The price components survey included two types of data collection: central data collection on official policies related to price components, and tracking specific medicines through the supply chain to identify add-on costs. Medicine tracking was conducted in one region: Ulaandaatar. Five (5) medicines were tracked backwards through the distribution chains to identify the add-on costs that contribute to final price.

### Key results:

#### *Availability of medicines in the public and private sector:*

- Mean availability of originator brand and generic medicines in the public sector was 3.7% and MSG-20.8%, LPG-41.7% respectively, indicating that most patients must purchase medicines in the private sector. In this sector, the mean availability of originator brand and generic medicines was 22.4% and MSG- 48.5%, LPG-73% respectively.

#### *Public sector procurement prices:*

- In the public sector, the procurement agency is purchasing medicines at prices higher than international reference prices, indicating a poor level of purchasing efficiency. Lowest priced generics were 2.24 times higher than international reference prices.

#### *Public sector patient prices:*

- Final patient prices for originator brands and generic medicines in the public sector were OB-1.33 (based on only 1 medicine), MSG-2.25, LPG- 2.11 times their international reference prices.
- Public sector patient prices for generic medicines were very similar to procurement prices.

#### *Private sector patient prices:*

- Final patient prices for originator brands and generic medicines in the private sector were OB-7.23 and MSG- 4.37, LPG-4.59 times their international reference prices, respectively.
- When originator brand medicines are dispensed in the private sector, patients pay about 7% more than they would for generics however this calculation was based on only a few medicines.
- Generic medicines were priced MSG- 82.5%, LPG-87% higher in the private sector than in the public sector.

*RDF sector patient prices:*

- Final patient prices for originator brands and generic medicines in the RDF sector are OB-6.12 and MSG- 5.53, LPG-4.73 times their international reference prices, respectively.
- Generic medicines were priced MSG- 95.1%, LPG-106.7% higher in the RDF sector than in the public sector.

*Affordability of standard treatment regimens:*

- In treating common conditions using standard regimens, the lowest paid unskilled government worker would need between 0.4 (Hypertension, Diabetes, Adult respiratory infection, Paediatric respiratory infection) and 2.0 (Diabetes) days' wages to purchase lowest priced generic medicines from the private sector.. Some treatments were clearly unaffordable even using lowest-priced generics, e.g. the treatment of diabetes with metformin purchased in the private sector would cost 2.0 days' wages to purchase a months supply, and treating hypercholesterolaemia with simvastatin or atorvastatin would require 3-4 days wages

*Components of medicine prices in the private sector:*

- Cumulative % mark-ups for individual medicines ranged from 37.5% to 115.53%. Variations were observed between product types. The cumulative mark-up for originator brands ranged from 67.41% to 90.10%, compared to 74.40% to 115.53% for lowest priced generics.
- Add-on costs contribute a substantial amount to the final price of medicines, ranging from 0.05% to 30.44% for individual medicines. Total add-on costs varied by product type.
- Manufacturer's Selling Price (MSP) is the main contributor to the retail price. The other components with the major contributions to final price are retail mark-up (30.44% of final price) and wholesale mark-up (15.7% of final price).

**Conclusions:**

The results of the survey show that the affordability, availability and price of medicines in Mongolia should be improved in order to ensure equity in access to basic medical treatments, especially for the poor. This requires multi-faceted interventions, as well as the review and refocusing of policies, regulations and educational interventions.

**Recommendations:**

Based on the results of the survey, the following recommendations can be made for improving the availability, price and affordability of medicines in Mongolia:



### ***Availability***

1. Allocate the drug budget in an optimal manner and provide stable financing.
2. Accurately estimate the drug consumption based on demand and prevent drug shortage.
3. The Government should take measures to increase the drug budget

### ***Procurement***

1. Use of International Reference Prices as benchmark should be encouraged for ensuring lower procurement prices in the Government Sector.
2. Improve efficiency of public procurement system using centralized purchasing.

### ***Pricing***

1. Overhauling of the pricing policy mechanism is required in order to achieve a greater level of transparency, uniformity and predictability in the pricing of medicines.
2. Development of a Medicines Price Index for monitoring and assessment of medicine prices on a regular basis.
3. Adopting a suitable pricing system with a view to further improve availability and affordability.
4. Monitor and assess the Manufacturer's Selling Price with a view to improving access of medicines to the population.

### ***Affordability***

1. Awareness creation and promotion of generic acceptance in the community and among the health professionals.
2. Stimulation of generic prescribing and dispensing through incentives.
3. Providing adequate training for doctors to improve prescribing practices around cost effective generics.
4. Exempt VAT on essential medicines and consider recouping lost revenue by increasing taxes on unhealthy goods such as alcohol, cigarettes and sugary drinks.

## Introduction

In October to December 2012, the Ministry of Health Pharmacy School of Health Sciences University conducted a nationwide study on the prices, availability, affordability and price components of a selection of medicines in Mongolia. The main goals of the study were to document the prices, availability and affordability of medicines and compare them across products types (originator brands and generics), sectors, and other countries; and to categorize price component costs and identify those with the most significant contribution to the final price of medicines.

This study was conducted using the standardized methodology developed by the World Health Organization (WHO) and Health Action International (HAI). The WHO/HAI methodology is described in the manual *Measuring Medicine Prices, Availability, Affordability and Price Components* (WHO/HAI, 2008) and is accessible on the HAI website (<http://www.haiweb.org/medicineprices>).

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

- Is the public sector purchasing medicines efficiently in comparison with international reference prices?
- What is the availability of originator brand and generic medicines in the public and private sectors?
- What is the price of originator brand and generic medicines in the public and private sectors, and how does this compare with international reference prices?
- What is the difference in price of originator brand products and their generic equivalents?
- How affordable are medicines for the treatment of common conditions for people with low income?
- What different charges get added on to the price of medicines as they proceed from manufacturer to patient?
- How do the prices of medicines in Mongolia compare to those in other countries?

## Country background

Mongolia is a large sized country, covering an area of 1560000 km<sup>2</sup>. It is divided into 21 provinces (aimag). The total population is 2.868.000, with the majority of population living in 67.1% urban areas (Health indicator of Mongolia, 2005, MOH) and 20% of the population is nomadic. Unemployment rate was approximately 9.9%, while inflation rate was 10.2% in 2011.

Mongolia is divided into 21 aimags<sup>1</sup> (provinces) and the capital city Ulaanbaatar. Aimags are divided into soums<sup>2</sup> which are further alienated into baghs<sup>3</sup>. Presently, the country has 21 aimags, 329 soums and 1578 baghs. The capital city Ulaanbaatar has 9 districts and they are subdivided into 152 khoroo<sup>4</sup>.

Health situation of the population differs not only across income groups, but also geographically. In terms of size, wealth, population and density, there are differences among 21 aimags and cities.

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<sup>1</sup> Aimag is an administrative unit equivalent to province

<sup>2</sup> Soum is an administrative unit equivalent to district outside Ulaanbaatar

<sup>3</sup> Bagh is the smallest rural subnational administrative-territorial unit

<sup>4</sup> Khoroo is administrative subdivision of Ulaanbaatar city

Mongolia is a middle income country with a GDP of US \$3129 per capita (2011, in current US dollars, source World Bank). About 13.9% of the population live on less than US \$1/day. Of the total labor force, approximately 3.6% of persons are unemployed.

Life expectancy at birth is 68.32 years (2011), with 4% (2011) of the population over the age of 65 years. The infant mortality rate was 16.3 per 1000 live births in 2011.

In 2011, the 5 leading causes of population mortality are:

- Diseases of the circulatory system (22,6 per 10 000 population)
- Neoplasm (12,6 per 10 000 population)
- Illnesses and other external causes (11,2 per 10 000 population)
- Diseases of the digestive system (5,5 per 10 000 population)
- Diseases of the respiratory system (2,4 per 10 000 population)

Main 5 causes of morbidity (per 10 000 population), 2001-2011:

- Diseases of the respiratory system - 1048.2
- Diseases of the genitor-urinary system – 766.4
- Injury and poisoning and certain other consequences of external cause – 491.8
- Diseases of the digestive system - 953.2
- Diseases of the circulatory system - 752.1

### **Health sector**

In 2012, the per capita total expenditure on health was US\$ 126.5 (1395 tugrig). Approximately 3.1% of the GDP is spent on health. Of the total expenditure on health, 76 % is government expenditures, which represents 7% of all government expenditures. The remaining 3% of total expenditures on health is private expenditures.

The public health sector is composed of 3 levels - tertiary hospitals, secondary level hospitals primary health care centres.

- Tertiary care level: Central hospitals and Specialized centers in Ulaanbaatar, regional diagnosis and treatment centers in aimags.
- Secondary care level: districts hospitals in Ulaanbaatar, aimag and rural general hospitals in aimags
- Primary care level: family health centers in Ulaanbaatar and aimag centers, soum health centers and inter soum hospitals in aimags

There are 15 tertiary level hospitals and centers, 3 regional diagnostic and treatment centers, 18 aimag general hospitals, 9 districts general hospitals, 6 rural general hospitals, 35 intersoum hospitals, 289 soum health centers, 228 family health centers in Mongolia. Due to the remoteness and low density of the population, transportation and communication are the main issues for health care in Mongolia. The distance between the aimag centers and soums range from 5 to 380 kilometers, the average being about 140 kilometers.

Most health expenditure has traditionally been financed from the state budget, although decentralizing reforms in the 1990s meant that public sector health expenditure was financed from both central and regional budgets. Health expenditure in Mongolia is officially directed towards

population health protection and ensuring health for all, and multiple sources of revenue have evolved and developed in line with the socioeconomic situation in society.

The health system in Mongolia is financed from four main sources: state taxation, social health insurance, out-of-pocket payments and international donor contributions.

Social health insurance in Mongolia is called Citizens' Health Insurance and was introduced in 1994 in order to ensure sustainable funding for the health system, because direct funding from the state budget for all services channeled insufficient funds. While the package of essential services is funded directly from the state budget, the HIF finances the complementary package of services, which includes nearly all kinds of hospital care, except for the treatment of specific chronic and infectious diseases, which is funded directly from the state budget. The HIF covers payments for inpatient services, outpatient services, some sanatoria and pharmaceuticals included in the Essential Medicines List. However, HIF payments do not cover the full costs of treatment. The fixed costs for service provision are covered by budgetary transfers to facilities or by direct funding from the budget. Family Health Centres are paid on the basis of risk-adjusted capitation. The payments were initially made by the HIF, but following changes to the Health Law early in 2006, all primary care services were due to be funded from the state budget from July 2006.

With the aim to expand health insurance benefits and ensure greater access to primary health care services by insured population, the drug price discount system was introduced since the beginning of health insurance scheme establishment in 1994. Today, insured patients can get on the Essential List (355) partly refunded (50-70%) by health insurance if these drugs were prescribed by a family practitioner/doctor, soum health center doctor and *bagh* feldshers and delivered by HIF designated or contracted pharmacies. For this purpose, an insured patient should present a prescription stating the insurance number and the doctor's code (in Ulaanbaatar). Every year, Health Insurance Council (HIC) approves the list of HIF reimbursable drugs and medicines with upper price ceilings and rates at which drugs will be discounted. Prices of HIF discounted drugs are set based on average price ranges obtained through routine surveys organized by the Ministry of Health.

As of 2011, 1013 private clinics and 171 private hospitals were registered 1677 physicians and 1135 nurses provide professional care in these hospitals and clinics. In total private hospitals and clinics 4842 staff. In 2011 number of private hospitals beds reached 3069 which account for 16.2% of the total hospital beds. The number was 1982 in 2005. Starting from 2005, health sector has taken a policy to restrict establishment of new private health organizations especially those with beds, while supporting existing hospitals by contracting out some of the public hospital services.

### **Pharmaceutical sector**

There are approximately 1212 of licensed retail medicine outlets in the country which including 901 private pharmacies and 311 Revolving Drug Fund. RDFs were established with the assistance from the UNICEF in about 97% of soums between 1993 and 2007.

### National Medicines Policy

In Mongolia, a National Medicines Policy (NMP) document exists in official form. The NMP of Mongolia was approved in December, 2002 by the State Great Khural of Mongolia. An implementation plan that sets out activities, responsibilities, budget and timeline is not in place. National Medicine Policy is being updated (amended) and is planned to be approved in 2013.

### Regulatory system

In Mongolia, there is no formal medicines regulatory authority. The Ministry of Health is carrying out the duties of MRA and the Government of Mongolia is planning to establish MRA in 2013. Legal provisions are in place requiring transparency and accountability and promoting a code of conduct in regulatory work. A medicines regulatory authority provides information on: legislation, regulatory procedures, prescribing information (such as indications, contraindications, side effects, etc.), authorised companies, and/or approved medicines.

Registration fees do not differ between originator brands and generic equivalents, and differ between imported and locally produced medicines.

In Mongolia, there are legal provisions for marketing authorization. A total of 2739 medicinal products have been approved for marketing. A list of all registered products is publicly accessible.

Legal provisions are in place for the licensing of manufacturers, wholesalers, importers, exporters of medicines, but not for the licensing of distributors of medicines.

A quality management system with an officially defined protocol for ensuring the quality of medicines, is in place in Mongolia. Medicine samples are tested for medicines registration/post-marketing surveillance. In 2011, 2184 samples were quality tested, with 230 failing to meet quality standards. Regulatory procedures are in place for ensuring the quality of imported medicines.

Legal provisions are in place for the licensing and practice of prescribers and pharmacy. Prescribing by generic name is obligatory in the public and private sector. Generic substitution is permitted in public and private pharmacies.

There are no incentives to dispense generic medicines at public or private pharmacies.

There are provisions in the medicines legislation covering promotion and advertising of medicines.

### Medicines supply system

Public sector procurement is not pooled at the national level but there is centralized procurement for the provinces. Public sector medicines procurement is the responsibility of the Ministry of Health and Health Departments of provinces. Public sector medicines distribution is the responsibility of the private institutions contracted by the government.

The following tender processes are used for public sector procurement: National competitive tender - 100% of total cost

Public sector procurement/is not limited to medicines on the Essential Medicines List. There are regulations for local preference in public sector procurement .

### Medicines financing

In 2012, the total public expenditure for medicines was US\$ 51 million. Approximately 80% by value, are imported.

There is a national policy to provide some medicines free of charge (i.e. patients do not pay out-of-pocket for medicines) at public primary care facilities. The following patients receive medicines for free: patients who has diseases need treatment for long time.

There is no fees are charged at primary care facilities.

Prescribers in the public sector occasionally dispense medicines, while prescribers in the private sector frequently dispense medicines.

In Mongolia, all the population has public health insurance, which covers some medicines. The insured patients can get on the EML partly refunded by health insurance if these drugs were prescribed by a family practitioner/doctor, soum health center doctor and *bagh* feldshers and delivered by HIF designated or contracted pharmacies. None of the population has private health insurance.

Mongolia does not have a policy covering medicine prices. The government does not set the price of all originator brand products and generic products.

The national Essential Medicines List is not being used for setting prices of medicines in the private sector. Setting prices is not part of market authorization.

Mongolia does not have a national medicine price monitoring system for retail prices. There are no regulations mandating retail/patient medicine price information to be made publicly accessible. There are no official written guidelines on medicine donations that provide rules and regulations for donors and provide guidance to the public, private and/or NGO sectors on accepting and handling donated medicines.

#### Rational use of medicines

Mongolia's EML, last updated in 2009, contains 419 unique medicine formulations. The national EML is being used for public insurance reimbursement. There is committee responsible for the selection of products on the national EML.

The health ministry produces national standard treatment guidelines for major conditions. These were last updated in 2008 for national STGs.

Antibiotics are always sold over the counter without a prescription, while injections are always sold over the counter without a prescription.

## **Methodology**

### **Overview**

The survey of the prices, availability and affordability of medicines in Mongolia was conducted using the standardized WHO/HAI methodology (WHO/HAI 2008). Data on the availability and final (patient) prices of medicines were collected in medicine outlets in the public and private sectors. Government procurement prices were also surveyed.

A total of 50 medicines were surveyed – 27 from the WHO/HAI core list (12 global medicines and 15 regional medicines), and 23 supplementary medicines selected at the country level. For each medicine in the survey, up to two products were monitored, namely:

- Originator brand (OB) - the original patented pharmaceutical product
- Lowest-priced generic equivalent (LPG) - the lowest-priced in the facility at the time of the survey
- Most sold generic- generic equivalent (MSG)

All prices were converted to US dollars using the exchange rate (buying rate) on 3 October 2012, the first day of data collection, i.e. 1 USD = 1395 TUGRIK.

A price components survey was also conducted to identify the various components contributing to the final price of medicines. The survey included two parts: a pharmaceutical policy investigation at the central level and research into actual price components along the medicine distribution chain. In the latter, a selection of survey medicines were traced backwards through the supply chain, from dispensing point to importer or local manufacturer, and different charges and mark-ups were identified.

### **Selection of medicine outlets**

Sampling was conducted in a manner consistent with the WHO/HAI methodology, which has been shown through a recent validation study to yield a nationally representative sample<sup>5</sup>.

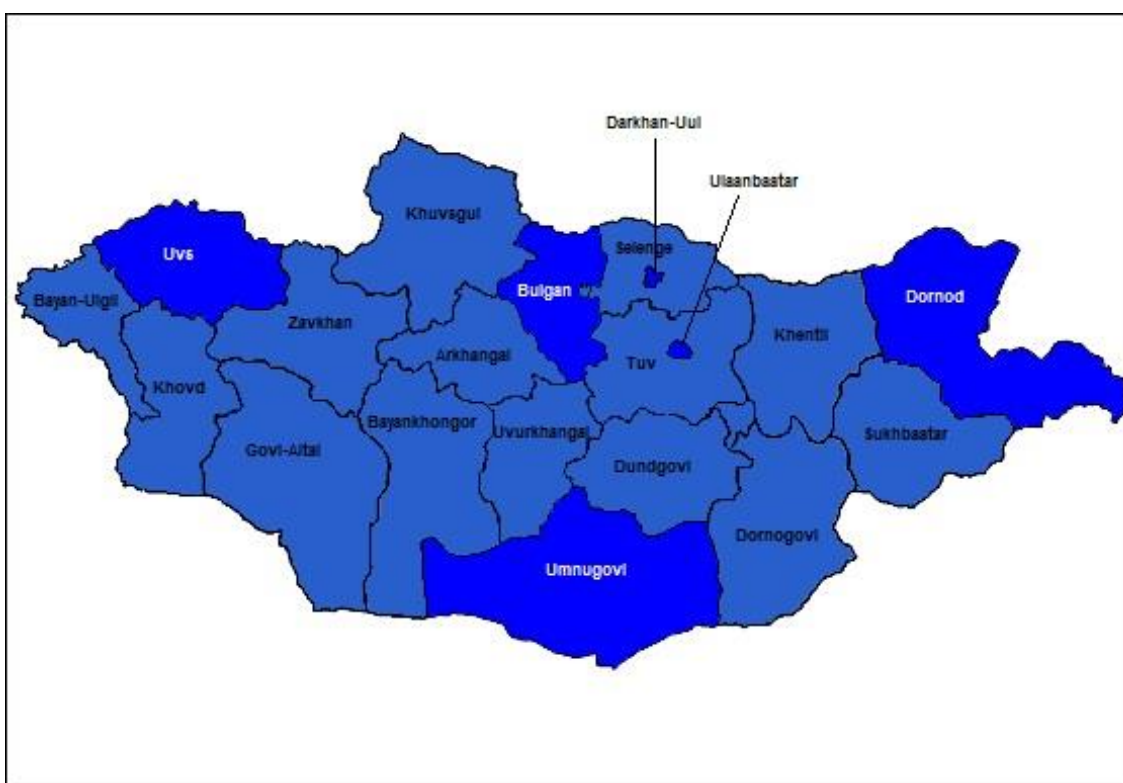
In the first step, six regions/provinces/districts were selected as "survey areas" for data collection. The major urban centre of Ulaanbaatar was selected as one survey area, and an additional five areas were chosen at random from those which could be reached within a one day's drive from Ulaanbaatar. This resulted in the following six survey areas:

1. Ulaanbaatar city (major urban centre)
2. Darkhan city
3. Bulgan aimag
4. Dornod aimag
5. Umnugobi aimag
6. Uvs aimag

### **Figure1. Geographic location of the six survey areas sampled in the survey**

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<sup>5</sup> The WHO/HAI sampling methodology was validated in 2005 when a medicine prices survey conducted in Peru. In this survey, a much larger selection of public and private medicine outlets, from a greater number of geographical regions, were included than is required in the standard sample. Results from the expanded sample were consistent with those from the standard sample, showing that the standard sampling frame is nationally representative.



In each survey area, the sample of public sector medicine outlets was identified by first selecting the main public hospital. An additional four public medicine outlets (e.g. hospital out-patient medicine outlets, dispensaries) per survey area were then selected at random from those within a 4 hour's drive from the main hospital. In Mongolia, this selection was made from all public facilities expected to stock most of the medicines in the survey, namely tertiary, aimag, district hospitals, primary health care centres. As family health centres and bagh feldshers are not expected to stock the majority of medicines in the survey, these were excluded from the sampling frame. The public sector sample therefore contained five public medicine outlets in each of the six survey areas, for a total of 30 public outlets. The private sector sample was identified by selecting the private sector medicine outlet closest to each of the selected public medicine outlets, yielding a total of 30 private outlets.

**Table 1. Sample of public and private medicine outlets**

	Ulaanbaatar city 1	Darkhan city 2	Bulgan aimag 3	Dornod aimag 4	Umnugobi aimag 5	Uvs aimag 6
Public sector	-2 tertiary hospital - 4 district hospitals	-1 tertiary hospital	-1 secondary hospital	-1 secondary hospital - 5 primary care centres	- 1 secondary hospital - 5 primary care centres	- 1 tertiary secondary hospital - 5 primary care centres
Private sector	- 10 pharmacies	- 5 pharmacies	- 5 pharmacies	- 5 pharmacies	- 5 pharmacies	- 5 pharmacies
Other sector	-	-	-5 RDF	-5 RDF	-5 RDF	-5 RDF



## **Selection of medicines to be surveyed**

The WHO/HAI methodology specifies a core list of 14 global medicines and 16 regional medicines to be surveyed, representing medicines commonly used in the treatment of a range of chronic and acute conditions. The methodology also includes the specific dosage form and strength that is to be collected for each medicine. This ensures that data on comparable products are collected in all surveys, thereby allowing international comparisons to be made.

In Mongolia, 2 of the 14 global core medicines, and 2 of the 16 regional medicines, from the WHO/HAI core list were excluded in the survey. The following 4 medicines were excluded:

- Fluoxetine 20mg cap/tab
- Sodium valproate 200mg cap/tab

These medicines were excluded from the survey as not registered in the country.

- Diazepam 5mg cap/tab
- Amitriptyline 25mg cap/tab

These medicines were excluded from the survey as they are not available.

An additional 24 supplementary medicines were selected at the country level for inclusion in the survey. Supplementary medicines were selected based on local importance. The full list of survey medicines is provided in Annex 1.

Of the 50 medicines surveyed, 47 were not included in the national Essential Medicines List (EML). The three survey medicines not on the EML were erythromycin 250mg caps and 125mg/5ml suspension, and fluconazole 150mg caps.

## **Data Collection**

The survey team consisted of a survey manager, 6 area supervisors, 6 data collectors and 2 data entry personnel. All survey personnel received training in the standard survey methodology and data collection/data entry procedures at a workshop held in September 2012. As part of the workshop, a data collection pilot test was conducted at public and private medicine outlets which did not form part of the survey sample.

Data collection took place between 1 October and 30 December 2012. Data collectors visited medicine outlets in pairs and collected information on medicine availability and price using a standard data collection form specific to the medicines being surveyed in Mongolia. Area supervisors checked all forms at the end of each day of data collection, and validated the data collection process by collecting data at 20% of the medicine outlets and comparing their results with those of the data collectors.

Public procurement data was collected on the prices that the government pays to procure medicines. Data was collected for the same global, regional and supplementary medicines as surveyed in medicine outlets. Procurement data was obtained from 9 of purchase orders from 27 of public health facilities.

To collect data on price components, 5 "tracer" medicines were selected from the list of survey medicines. The price of these medicines was tracked backwards, from sample medicine outlets to

central sources, to identify the different charges added to the price of the medicine at each stage of the distribution chain. This was accomplished by contacting suppliers, procurement officers, wholesalers, Ministry of Health officials.

### **Data Entry**

Survey data was entered into the pre-programmed MS Excel *Workbook* provided as part of the WHO/HAI methodology. Data entry was checked using the 'double entry' and 'data checker' functions of the *Workbook*. Erroneous entries and potential outliers were verified and corrected as necessary. HAI also checked the data.

### **Data Analysis**

The availability of individual medicines is calculated as the percentage (%) of medicine outlets where the medicine was found. Mean (average) availability is also reported for the overall 'basket' of medicines surveyed. The availability data only refers to the day of data collection at each particular facility and may not reflect average monthly or yearly availability of medicines at individual facilities. The availability of individual medicines in the public sector was limited to those facilities where the medicine was expected to be available. For example, if a survey medicine is only provided through secondary or tertiary hospitals, the calculation of the medicine's % availability was limited to these facilities.

To facilitate cross-country comparisons, medicine prices obtained during the survey are expressed as ratios relative to a standard set of international reference prices:

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

The ratio is thus an expression of how much greater or less the local medicine price is than the international reference price e.g. an MPR of 2 would mean that the local medicine price is twice that of the international reference price. Median price ratios were only calculated for medicines with price data from at least 4 medicine outlets and procurement prices. The exchange rate used to calculate MPRs was 1 US\$ = 1395 Tugrik; this was the commercial “buy” rate on the first day of data collection taken from Bank of Mongolia.

The reference prices used were the 2011 Management Sciences for Health (MSH) reference prices, taken from the International Drug Price Indicator Guide. These reference prices are the medians of recent procurement prices offered by for-profit and not-for-profit suppliers to international not-for-profit agencies for generic products. These agencies typically sell in bulk quantity to governments or large NGOs, and are therefore relatively low and represent efficient bulk procurement without the costs of shipping or insurance.

Price results are presented for individual medicines, as well as for the overall 'basket' of medicines surveyed. Summary results for the basket of medicines have been shown to provide a reasonable representation of medicines in the country and price conditions on the market. As averages can be skewed by outlying values, median values have been used in the price analysis as a better representation of the midpoint value. The magnitude of price and availability variations is presented as the interquartile range. A quartile is a percentile rank that divides a distribution into 4 equal parts.

The range of values containing the central half of the observations, that is, the range between the 25<sup>th</sup> and 75<sup>th</sup> percentiles, is the interquartile range.

Finally, the affordability of treating 16 common conditions was assessed by comparing the total cost of medicines prescribed at a standard dose, to the daily wage of the lowest paid unskilled government worker i.e. 6685.68 tugrik (source Ministry of Labor) which equated to \$4.79 USD at the time of the survey). Though it is difficult to assess true affordability, treatments costing one days' wage or less (for a full course of treatment for an acute condition, or a 30-day supply of medicine for chronic diseases) are generally considered affordable.

### **Price components survey**

At the central level, interviews were conducted with staff in various ministries and health-care delivery systems to collect information on government policies and regulations that affect price components. In the second phase, data was collected on the actual price components of selected medicines. Target medicines were tracked backwards, from the end of the supply chain (retail pharmacies in the private sector) to the beginning (manufacturers and importers), to identify add-on costs.

Five products were tracked through the supply chain: Bentolin 100mcg/dose inhaler 200 doses, Salbutamol inhaler 100mcg/dose 90 doses, Augmentin 625mg cap/tab x14, Amoxiclav 625mg cap/tab x15, and Chlorphenamine maleate 4mg cap/tab x20. Medicines were selected from the global and supplementary medicines included in the medicine prices survey to reflect a range of categories (imported and locally produced products) in which different price structures could be found.

Data were collected in the main urban area (Ulaanbaatar). Survey sites were selected from the facilities used in the Medicine Prices survey based on the following criteria:

- Most of the target medicines were available at the time of the medicine prices survey
- Medicine prices were found to be outside the normal range (e.g. outside interquartile range)
- Pharmacist (or facility staff) at the dispensing site were cooperative and would be likely to participate in additional data collection
- Convenience/feasibility—public and other sector facilities can be selected based on their proximity to a private sector outlet satisfying the above criteria.

Beginning at the dispensing point, the products were tracked backwards along the supply chain to their point of origin. For example, at the private retail pharmacies, information was collected on the procurement price and the dispensing price, as well as any mark-ups, taxes and dispensing fees, and the wholesaler was identified for each medicine. Next identified wholesalers were visited, and data was collected on wholesale mark-ups, local distribution costs and any taxes collected. Data collection proceeded in this manner through each stage of the supply chain, ending with the importer (for imported medicines) and the manufacturer (for locally produced medicines).

The data collected on the components of medicine prices were analysed according to five common stages of the supply chain:

- manufacturer's selling price + insurance and freight (Stage 1);
- landed price (Stage 2);
- wholesale selling price (private) or central medical stores price (public) (Stage 3);

- retail price (private) or dispensary price (public) (Stage 4); and
- dispensed price (Stage 5).

Analysis includes the cumulative percent mark-up at the end of each stage, the total cumulative percent mark-up, and the percent contribution of individual components to the final medicine price.

## Results

### 1. Availability of medicines on the day of data collection

**Table 2. Mean availability of medicines on the day of data collection, public, private and RDF sectors**

	Public sector (n=31 outlets)						Private sector (n = 35 outlets)			RDF sector (n = 20 outlets)					
	All medicines (n = 50 medicines)			EML medicines only (n = 47 medicines)			All medicines (n = 50 medicines)			All medicines (n = 50 medicines)			EML medicines only (n = 47 medicines)		
	OB	MSG	LPG	OB	MSG	LPG	OB	MSG	LPG	OB	MSG	LPG	OB	MSG	LPG
<b>Mean avail</b>	3.7%	20.8%	41.7%	4.3%	21.8%	42.8%	22.4%	48.5%	73.0%	7.9%	30.7%	58.5%	9.2%	31.9%	60.0%
<b>Std dev.</b>	8.4%	23.0%	32.3%	9.0%	23.3%	32.3%	23.2%	27.7%	30.7%	9.1%	29.5%	38.9%	9.2%	30.0%	38.8%

- Average (mean) availability of all survey medicines in the public sector was low at OB-3.7%, MSG- 20.8%, and LPG-41.7%. When analysis is limited to survey medicines listed on the national EML, public sector availability increases slightly to OB-4.3%, MSG- 21.8%, LPG-42.8%.
- In the public sector, generics were the predominant product type available.
- Average availability in the private sector was higher at OB-22.4%, MSG-48.5%, LPG-73% but still below WHO's target of 80% in both sectors. Generics were the predominant product type available.
- Average availability in the RDF sector was fair at OB-7.9%, MSG-30.7%, LPG-58.5%. Generics were the predominant product type available. When analysis is limited to survey medicines listed on the national EML, RDF sector availability increases slightly to OB-9.2%, MSG- 31.9%, LPG-60.0%.
- In the private and RDF sectors medicine availability was higher than in the public sector.

Annex 3 contains the availability of individual medicines in the three sectors. In the public sector, medicines with particularly low availability include Albendazole(0%), Atorvastatin (0%), Beclometasone inhaler (0%), Paracetamol suspension (0%), Clotrimazole topical cream (0%). In the private sector, medicines with particularly low availability include Albendazole (2.9%), Beclometasone inhaler (0%), Cephalexin (2.9%). In the RDF sector, medicines with particularly low availability include Albendazole(0%), Beclometasone inhaler (0%), Atorvastatin (0%), Cephalexin (0%), Paracetamol suspension (0%),

### 2. Public sector prices

#### 2.1 Public sector procurement (tender) prices

**Table 3. Public sector procurement - ratio of median unit price to MSH international reference price (median price ratio or MPR), median for all medicines found (at least 1 tender price)**

<b>Product type</b>	<b>Median MPR</b>	<b>25<sup>th</sup> percentile</b>	<b>75<sup>th</sup> percentile</b>
Originator brand (n = 1 medicines)	<b>1.06</b>		
Lowest price generic (n = 45 medicines)	<b>2.24</b>	<b>1.75</b>	<b>4.35</b>
Most sold generic (n = 40 medicines)	<b>2.24</b>	<b>1.78</b>	<b>5.02</b>

Of the 50 medicines included in the survey, across the 7 provincial tenders only 1 originator brand was procured. Prices were available for 40 MSG products and 45 LPG's; the public sector is therefore procuring predominantly generic products. Based on the median MPRs, the public sector is procuring generics at 2.24 times their international reference prices. Thus, the government procurement agency is purchasing inefficiently. The interquartile range shows substantial variation in median price ratios across individual medicines.

Annex 4 contains procurement prices for individual medicines.

## 2.2 Public sector patient prices

**Table 4. Public sector patient prices - ratio of median unit price to MSH international reference price (median price ratio or MPR), median for all medicines found**

<b>Product type</b>	<b>Median MPR</b>	<b>25<sup>th</sup> percentile</b>	<b>75<sup>th</sup> percentile</b>
Originator brand (n = 1 medicines)	<b>1.33</b>	<b>1.33</b>	<b>1.33</b>
Lowest price generic (n = 36 medicines)	<b>2.11</b>	<b>1.72</b>	<b>4.52</b>
Most sold generic (n = 26 medicines)	<b>2.25</b>	<b>1.75</b>	<b>4.40</b>

The results above show that in the public sector:

- originator brand medicines are generally sold at 1.33 times their international reference price. Half of the originator brand medicines were priced at 1.33 (25<sup>th</sup> percentile) to 1.33 (75<sup>th</sup> percentile) times their international reference price; there is therefore little variation in MPRs across individual originator brand medicines in the public sector.
- lowest price generic medicines are generally sold at 2.11 times their international reference price. Half of the lowest priced generic medicines were priced at 1.72 (25<sup>th</sup> percentile) to 4.52 (75<sup>th</sup> percentile) times their international reference price; there is therefore substantial variation in MPRs across individual generic medicines in the public sector.
- Most sold generic medicines are generally sold at 2.25 times their international reference price. Half of the lowest priced generic medicines were priced at 1.75 (25<sup>th</sup> percentile) to 4.40 (75<sup>th</sup> percentile) times their international reference price; there is therefore substantial variation in MPRs across individual generic medicines in the public sector.

Annex 5 contains the median price ratios for individual medicines found in the public sector. The only originator brand found was salbutamol inhaler at 33% more than the international reference price (MPR = 1.33). The 25<sup>th</sup> and 75<sup>th</sup> percentiles for individual medicines show that, for originator brands, prices not vary significantly between public sector medicine outlets. MSG generic medicines priced several times higher than international reference prices include Diclofenac 1

(MPR = 12.8), Chlorphenamine maleate 2 (MPR = 11.45), Enalapril 3 (MPR = 9.37),. The 25<sup>th</sup> and 75<sup>th</sup> percentiles for individual medicines show that, for generic medicines, prices vary significantly between public sector medicine outlets.

### 2.3 Comparison of patient prices and procurement prices in the public sector

**Table 5. Median MPRs for medicines found in both public procurement and public sector medicine outlets (final patient prices)**

<i>Product type</i>	<i>Median MPR Public Procurement</i>	<i>Median MPR Public Patient Prices</i>	<i>% difference patient prices to procurement</i>
Originator brand (n = 1 medicines)	<b>1.06</b>	<b>1.33</b>	<b>25%</b>
Lowest price generic (n = 36 medicines)	<b>2.18</b>	<b>2.11</b>	<b>-3.6%</b>
Most sold generic (n = 26 medicines)	<b>2.22</b>	<b>2.25</b>	<b>1%</b>

In the above table, only those medicines found in both public procurement and public sector medicine outlets were included in the analysis to allow for the comparison of purchase price to final patient price. Results show that final patient prices in the public sector were 3.6% less than procurement prices for lowest priced generics. Public sector patient prices for most sold generics were virtually identical to procurement prices.

## 3. Private sector prices

### 3.1 Private sector wholesale price

**Table 6. Private sector wholesale price - ratio of median unit price to MSH international reference price (median price ratio or MPR), median for all medicines found**

<b>Product type</b>	<b>Median MPR</b>	<b>25<sup>th</sup> percentile</b>	<b>75<sup>th</sup> percentile</b>
Originator brand (n = 5 medicines)	<b>7.69</b>	<b>3.19</b>	<b>8.43</b>
Lowest price generic (n = 44 medicines)	<b>2.55</b>	<b>1.82</b>	<b>5.17</b>
Most Sold generic (n = 36 medicines)	<b>2.62</b>	<b>1.96</b>	<b>5.17</b>

Of the 50 medicines included in the survey, 5 originator brand and LPG-44,MSG-36 generics were found; Based on the median MPRs, Private sector wholesale prices of generics were LPG-2.55,MSG-2.62 times their international reference prices, and originator brands at 7.69 times their international reference prices. Thus, the government procurement agency buying from private wholesalers is not resulting in low prices compared to buying from international suppliers.. The interquartile range shows substantial variation in median price ratios across individual medicines.

### 3.2 Private sector patient prices

**Table 7. Ratio of median unit price to MSH international reference price (median price ratio or MPR), median for all medicines found**

<b>Product type</b>	<b>Median MPR</b>	<b>25 %ile</b>	<b>75 %ile</b>
Originator brand (n = 4 medicines)	<b>7.23</b>	<b>3.41</b>	<b>10.77</b>
Lowest price generic (n = 46 medicines)	<b>4.59</b>	<b>3.56</b>	<b>7.92</b>
Most sold generic (n = 45 medicines)	<b>4.37</b>	<b>3.58</b>	<b>8.08</b>

The results above show that in the private sector:

- originator brand medicines are generally sold at 7.23 times their international reference price. Half of the originator brand medicines were priced at 3.41(25<sup>th</sup> percentile) to 10.77(75<sup>th</sup> percentile) times their international reference price; there is therefore substantial variation in MPRs across individual originator brand medicines in the public sector.
- lowest price generic medicines are generally sold at 4.59 times their international reference price. Half of the lowest priced generic medicines were priced at 3.56 (25<sup>th</sup> percentile) to 7.92 (75<sup>th</sup> percentile) times their international reference price; there is therefore substantial variation in MPRs across individual generic medicines in the public sector.
- Most sold generics are generally sold at 4.37 times their international reference price. Half of the lowest priced generic medicines were priced at 3.58 (25<sup>th</sup> percentile) to 8.08 (75<sup>th</sup> percentile) times their international reference price; there is therefore substantial variation in MPRs across individual generic medicines in the public sector.

Annex 7 contains the median price ratios for individual medicines found in the private sector.

Originator brand medicines priced several times higher than international reference prices include Co-trimoxazole suspension (MPR = 11.6), Paracetamol suspension (MPR = 10.49), Amoxicillin+clavulanic acid (MPR = 3.97),. The 25<sup>th</sup> and 75<sup>th</sup> percentiles for individual medicines show that, for originator brands, prices do not vary significantly between private sector medicine outlets. Lowest price generic medicines priced several times higher than international reference prices include Fluconazole (MPR = 81.86), Hydrochlorothiazide (MPR = 40.52), Chlorphenamine maleate (MPR = 15.93). The 25<sup>th</sup> and 75<sup>th</sup> percentiles for individual medicines show that, for generic medicines, prices do not vary significantly between private sector medicine outlets.

**Table 8. Ratio matched pairs of product types, private sector**

	<b>Ratio</b>
Originator brand: most sold generic (n=3 medicines)	1.04
Originator brand: lowest priced generic (n=3 medicines)	1.08
Most sold generic: lowest priced generic (n=45 medicines)	0.98



In the above table, only those medicines for which both the originator brand and a generically equivalent product were found, were included in the analysis to allow for the comparison of prices between the two product types. The results for originator brands were based on too few medicines to draw any conclusions. But prices of most sold generics were very similar to lowest priced generics.

### 3.3 Comparison of patient prices and procurement prices in the private sector

**Table 9. Median MPRs for private wholesale prices and private sector patient prices**

Product type	Median MPR Private Procurement	Median MPR Private Patient Prices	% difference patient prices to procurement
Originator brand (n = 4 medicines)	5.44	7.23	32.8%
Lowest price generic (n = 44 medicines)	2.55	4.29	68.1%
Most Sold generic (n = 36 medicines)	2.62	4.30	64.3%

In the above table, only those medicines found in both private procurement (private wholesale prices) and private sector medicine outlets were included in the analysis to allow for the comparison of purchase price to final patient price. Results show that final patient prices in the private sector are OB- 32.8% and LPG-68.1%, MSG-64.3% higher than procurement prices for originator brands and generic equivalents, respectively.

### 3.4. Comparison of procurement prices in the public and private sector

**Table 10. Median MPRs for medicines found in both public procurement (tenders) and private procurement (purchased from local private wholesalers)**

Product type	Median MPR Public Procurement	Median MPR Private Procurement	% difference private procurement to public procurement
Most sold generic	2.24	2.62	17%
Lowest price generic	2.13	2.55	19.7%

The above table illustrates comparisons of public sector procurement median price and private wholesalers wholesale median price. The comparisons show that prices from private wholesalers were 17% higher than government tender prices for most sold generics and 19.7% higher for lowest priced generics.

## 4. Regional analysis

### Comparison of prices and availability across the six regions surveyed

As shown in the table below, the median MPR for generics in the private sector differed across the six regions surveyed. Overall, medicine prices for LPGs were lowest in Uvs and highest in Umnugodi. Median MPRs for originator brands ranged from 4.28 in Ulaanbaatar to 10.49 in Darkhan and Umnugobi. Median MPRs for lowest price generics ranged from 3.37 in Uvs to 4.95 in Umnugobi. Median MPRs for Most sold generics ranged from 4.18 in Dornod to 8.43 in Umnugobi. However, due to the small sample size in each region (5 medicine outlets per sector, based on availability of in at least 4 of the 5 outlets), results should be interpreted with caution.

**Table 11: Median MPRs per survey area, private sector (5 medicine outlets per survey area)**

	Ulaanbaatar 1	Darkhan 2	Bulgan 3	Dornod 4	Umnugobi 5	Uvs 6
Median MPR Originator brand	4.28	10.49			10.49	
Median MPR Lowest price generic	4.77	3.67	4.11	4.94	4.95	3.37
Median MPR Most sold generic	4.72	5.49	6.33	4.18	8.43	5.53

The mean availability of survey medicines in the private sector ranged from 69.6% in Umnugobi and 77.6% in Darkhan for Lowest price generic equivalents. The mean availability of survey medicines in the private sector ranged from 35.6% in Umnugobi and 62.8% in Darkhan for Most sold generic equivalents. For originator brands, mean availability was highest in Umnugobi 28.6% and lowest in Bulgan 0%.

**Table 12: Mean availability per survey area, private sector (5 medicine outlets per survey area)**

	Mean availability					
	Ulaanbaatar 1	Darkhan 2	Bulgan 3	Dornod 4	Umnugobi 5	Ubs 6
Originator brand	24.3%	25.7%	0%	14.3%	28.6%	25.7%
Lowest price generic	74.6%	77.6%	70.0%	71.6%	69.6%	73.2%
Most sold generic	53.8%	62.8	43.2%	37.6%	35.6%	52.4%

### 5. Affordability of standard treatment regimens

The affordability of treatment for 17 common conditions was estimated as the number of days' wages of the lowest-paid unskilled government worker needed to purchase medicines prescribed at a standard dose. For acute conditions, treatment duration was defined as a full course of therapy, while for chronic diseases, the affordability of a 30-days' supply of medicines was determined. The daily wage of the lowest-paid unskilled government worker used in the analysis was 6685.68 tugrig.

**Table 13. Number of days' wages of the lowest paid government worker needed to purchase standard treatments**

disease condition and 'standard' treatment	day's wages to pay for treatment		
	Public sector	Private sector	RDF sector

Condition	Drug name strength, dosage form	Treatment schedule	Originator brand	Lowest price generic	Most sold generic	Originator brand	Lowest price generic	Most sold generic	Originator brand	Lowest price generic	Most sold generic
asthma	salbutamol 100 mcg/dose inhaler	1 inhaler of 200 doses	0.6	0.8	0.9	0.8	1.7	1.7	0.8		
diabetes	glibenclamide 5 mg cap/tab	1 cap/tab x 2 x 30 days = 60					0.4	0.4		0.4	0.4
hypertension	atenolol 50 mg cap/tab	1 cap/tab x 30 days = 30		0.4	0.4		0.4	0.4		0.4	0.4
hypertension	captopril 25 mg cap/tab	1 cap/tab x 2 x 30 days = 60		0.3			0.5	0.7		0.9	1.0
hypercholesterolaemia	simvastatin 20 mg cap/tab	1 cap/tab x 30 days = 30					2.7	2.7		2.6	2.6
viral infection	aciclovir 25 mg cap/tab	1 cap/tab x 5 x 5 days = 25		0.4	0.4		0.7	0.7		0.8	0.8
adult respiratory infection	ciprofloxacin 500 mg cap/tab	1 cap/tab x 2 for 7 days = 14		0.2	0.2		0.5	0.4		0.4	
paediatric respiratory infection	co-trimoxazole 8+40 mg/ml suspension	5ml twice a day for 7 days = 70 ml				0.9	0.5	0.5			
paediatric respiratory infection	amoxicillin 25mg/ml suspension	5ml three a day for 7 days = 105ml		0.4			0.9	0.9		0.9	0.9
adult respiratory infection	ceftriaxone 1 g/vial injection	1 vial		0.1			0.7			0.5	
diabetes	metformin 500mg cap/tab	1 cap/tab x 3 x 30 days = 90		0.3			2.0	2.0		0.9	1.0
arthritis	diclofenac 50mg cap/tab	1 cap/tab x 2 x 30 days = 60		0.4	0.9		0.7	1.3		0.9	1.3
pain/inflammation	paracetamol 24mg/ml suspension	child 1 year: 120mg (=5ml) x 3 for 3 days = 45ml				0.4			0.4		
ulcer	omeprazole 20mg cap/tab	1 cap/tab x 30 days = 30		0.4	0.4		0.8	0.8		0.9	0.9
ulcer	ranitidine 150mg cap/tab	1 cap/tab x 2 x 30 days = 60		0.5	0.5		0.8	0.9		0.9	0.9
hypertension	amlodipine 5mg cap/tab	1 cap/tab x 30 days=30		1.5	1.6		2.0	2.2		2.3	2.6
epilepsy	carbamazepine 200mg cap/tab	1 cap/tab x 2 x 30 days=60		0.5	0.5		0.9	0.9		1.2	1.1

The affordability of lowest price generic and most sold generics in the public sector was good for most conditions, with standard treatment costing a 1 days' wage or less. Treatments costing over 1 days' wage of the lowest paid unskilled government worker include 30 tabs of amlodipine to treat hypertension (1.6 days).

The affordability of the few originator brands found in the public sector was reasonable. The only treatment over 1 days' wage of the lowest paid government worker was Salbutamol 100 mcg/dose inhaler (200 doses) (0.6 days).

In the private sector, the affordability of lowest price generic and most sold generics was reasonable for most conditions, with most standard treatment costing 1 days' wage or less. Treatments costing over 1 days' wage of the lowest paid government worker include Hypertension Amlodipine 5mg cap/tab 1 x30 days=30 (LPG-2.0,MSG-2.2), diabetes metformin 500mg cap/tab 1x 3 x 30 days = 90 (LPG-2.0, MSG-2.0), arthritis diclofenac 50mg cap/tab 1 x 2 x 30 days = 60 (MSG-1.3), asthma salbutamol 100 mcg/dose inhaler of 200 doses (LPG-1.7, MSG-1.7), Treating hypercholesterolaemia was required nearly three days wages. The most affordable standard treatments were those for treating acute conditions like adult respiratory infection (0.4-0.5) and hypertension (0.4-0.7).

In the private sector, the affordability of originator brands was reasonable for most conditions, with standard treatment costing 1 days' wage or less.

The affordability of lowest price generic and most sold generics in the RDF sector was reasonable for most conditions, with standard treatment costing a 1 days' wage or less. Treatments costing over a 1 days' wage of the lowest paid government worker include Hypertension Amlodipine 5mg cap/tab1x30 days=30 (LPG-2.3, MSG-2.6), and Carbamazepine 200mg cap/tab 2x30 days=60(LPG-1.2,MSG-1.1) to treat epilepsy.

In the private sector, the affordability of originator brand in the pdf sector was reasonable for most conditions, with standard treatment costing a 1 days' wage or less.

It should be noted that treatment costs refer to medicines only and do not include the additional costs of consultation and diagnostic tests. Further, many people in Mongolia earn less than the lowest government wage; as such even treatments which appear affordable are too costly for the poorest segments of the population. Finally, even where individual treatments appear affordable, individuals or families who need multiple medications may quickly face unmanageable drug costs. An example is provided below of a family where the father has asthma and the child has pediatric respiratory infection. If the family is earning the equivalent of the lowest-paid government worker's salary, total treatment costs are 1.2 days' wages in the public sector and 2.6 days' wages in the private sector if the lowest price generics are purchased. If originator brands are purchased, treatment costs are 0.6 days' wages in public sector and 0.8 days' in private sector.

**Table 14. Affordability of treatment for a family with paediatric respiratory infection and asthma: Number of days' wages of the lowest paid government worker needed to purchase standard treatments**

	ORIGINATOR BRAND – PUBLIC SECTOR	LOWEST PRICE GENERIC - PUBLIC SECTOR	LOWEST PRICE GENERIC - PRIVATE SECTOR	ORIGINATOR BRAND - PRIVATE SECTOR
FATHER - SALBUTAMOL INHALER	0.6	0.8	1.7	0.8
CHILD – AMOXICILLIN SUSPENSION PEADIATRIC		0.4	0.9	
TOTAL DAYS' WAGES FOR ONE MONTH TREATMENT	0.6	1.2	2.6	0.8

## 6. Price components

Up until 1990 medicine supply in Mongolia was provided centrally by one company hence prices were same across the country. With transition to a market economy, medicine price regulation was introduced in the country in 1992. The pricing committee was established at the Ministry of Health. The committee approved the prices for newly imported and produced medicines. Since 1997 medicine prices are not being regulated and 10% VAT was introduced in 1999.

6.1. Price components data collected for individual medicines

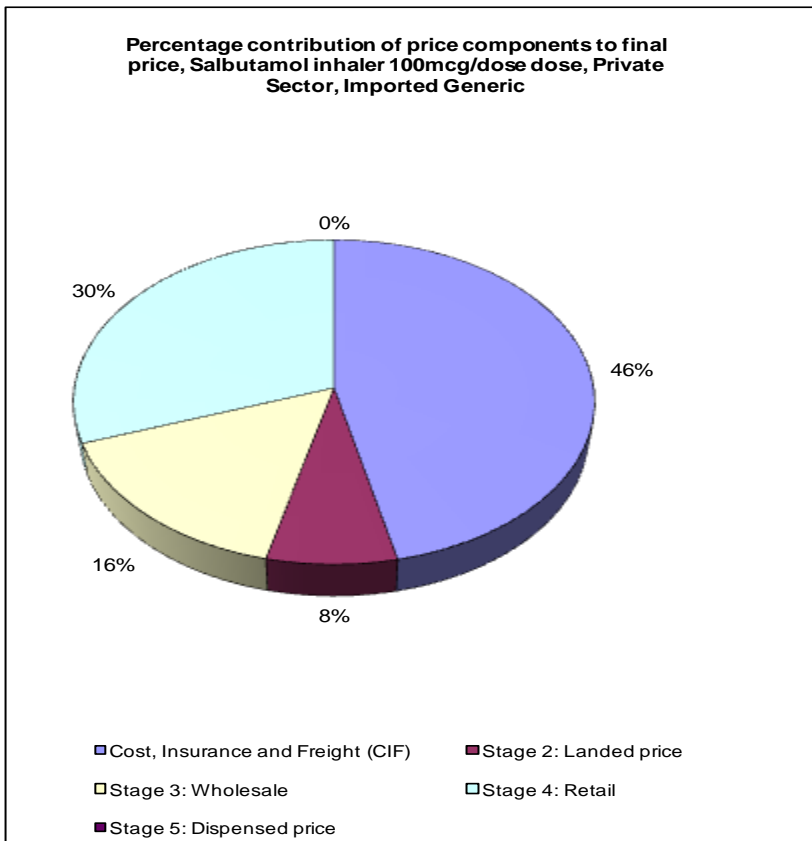
**Table 15. Per cent contribution of price components to final medicine price in the private sector, Imported vs. Locally produced medicines (urban survey area)**

	<i>Bentolin 100mcg/dose, dose 200 originator brand Import</i>	<i>Salbutamol inhaler100mcg/dose, dose 90 most sold generic Import</i>	<i>Augmentin 625mg cap/tab14 originator brand Import</i>	<i>Amoxiclav 625mg cap/tab15 most sold generic Import</i>	<i>Chlorphenamine maleate 4mg cap/tab 20 most sold generic Local</i>
	Private	Private	Private	Private	Private
MSP/CIF contribution	52.60%	46.40%	59.73%	58.46%	57.33%
Stage 1 contribution	0.00%	0.00%	0.00%	0.00%	0.00%
Stage 2 contribution	8.46%	7.46%	9.60%	9.40%	0.06%
Stage 3 contribution	12.70%	15.70%	5.13%	2.86%	14.61%
Stage 4 contribution	26.24%	30.44%	25.53%	29.29%	28.00%
Stage 5 contribution	0.00%	0.00%	0.00%	0.00%	0.00%
MSP/CIF	3208.00	2134.80	11299.92	12276.00	430.00

**Table 16. Cumulative per cent mark-ups of imported products in the private sector, originator brands vs. generics (urban survey area)**

	<i>Bentolin 100mcg/dose, dose 200 originator brand Import</i>	<i>Salbutamol Inhaler100 mcg/dose, dose 90 most sold generic Import</i>	<i>Augmentin 625mg cap/tab14 originator brand Import</i>	<i>Amoxiclav 625mg cap/tab15 most sold generic Import</i>	<i>Chlorphenamine maleate 4mg cap/tab 20 most sold generic Local</i>
	Private	Private	Private	Private	Private
MSP	3208.00	2134.80	11299.92	12276.00	430.00
Stage 1 mark-up	0.00%	0.00%	0.00%	0.00%	0.00%
Stage 2 1 mark-up	16.08%	16.08%	16.08%	16.08	0.10%
Stage 3 1 mark-up	20.80%	29.15%	7.40%	4.21%	25.43%
Stage 4 1 mark-up	35.57%	43.77%	34.29%	41.41%	38.90%
Stage 5 1 mark-up	0.00%	0.00%	0.00%	0.00%	0.00%
Total cumulative mark-up	90.10%	115.55%	67.41%	71.08%	74.40
Final price	6098.42	4601.21	18917.38	20999.94	750.01

**Figure 2. Per cent contribution of price components to final medicine price, urban region**



In the private sector, add-on costs represent 90.10% of the final patient price for imported originator brands, 115.55% for imported generics, and 74.4% for locally produced generics. The largest contributor to add-on costs is 115.55% eg retailer mark-up Monos pharm.

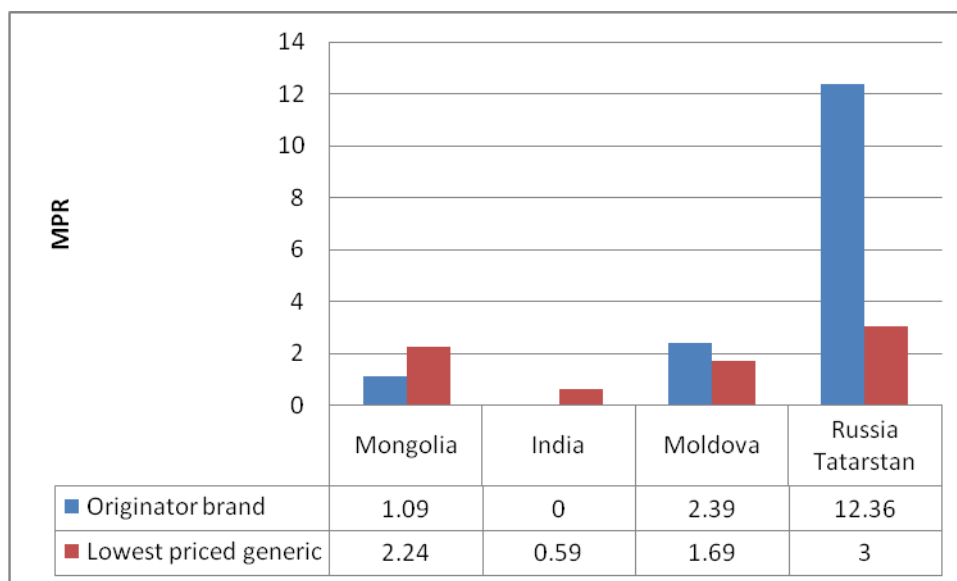
Taxes, duties and other government charges applied to medicines include 5% customs duty for imported medicines, and 10% VAT applied to all medicines.

## 7. International comparisons

In WHO/HAI surveys, data is collected in a standard way which allows for comparisons to be made across countries. Data for five countries were selected for international comparisons - Mongolia 2012, China Shaanxi province 2012, Moldova 2011, Russia Tatarstan province 2012, and India Delhi 2011. Data on availability, medicine price ratios, and affordability found in each survey were compared. Countries were selected based on similar in terms of economic wealth and development. The data were obtained from the WHO/HAI database of survey results available on the HAI website (<http://www.haiweb.org/medicineprices/>). Price data were not adjusted for inflation/deflation or purchasing power parity, and each country surveyed different baskets of medicines. Given the wide variation in the public health systems of different countries, results from this sector were not included in the analysis.

### 7.1 International comparisons of public sector procurement prices

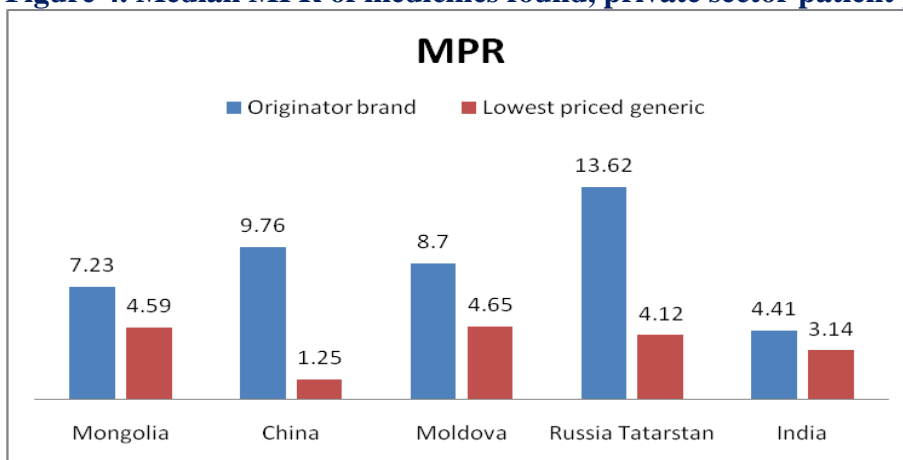
**Figure 3. Median MPRs for public sector procurement prices of medicines**



Results for all survey medicines show that procurement prices of originator brands were lower in Mongolia than in Moldova, and Russia-Tatarstan, however, this data is based on only a few products. With respect to lowest priced generic medicines, Mongolia's prices were lower than those in Russia-Tatarstan, but higher than those in India-Delhi and Moldova.

### 7.2 International comparisons of private sector patient prices

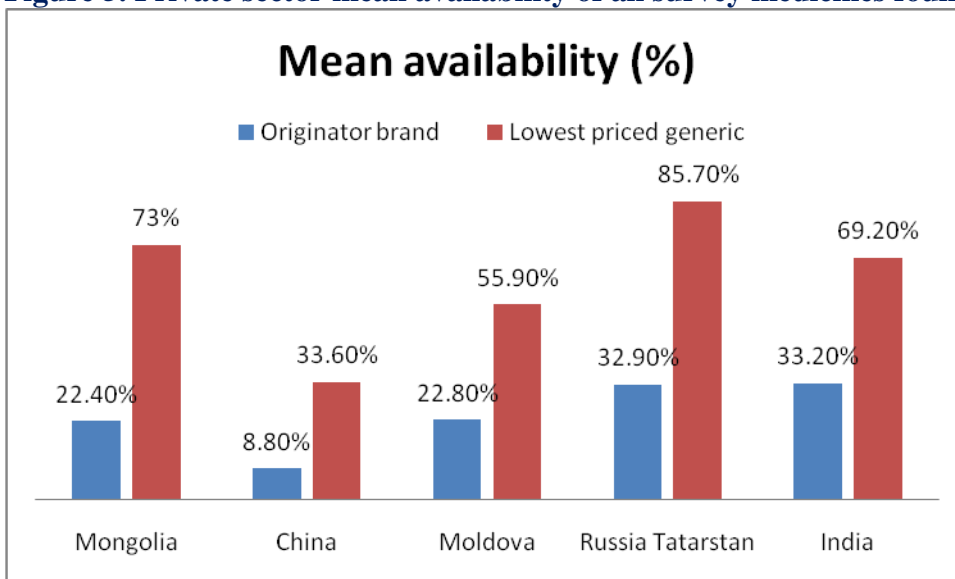
**Figure 4. Median MPR of medicines found, private sector patient prices**



Overall, patient prices of originator brand medicine in the private sector in Mongolia were lower than those in China, Moldova, Russia-Tatarstan, but higher than those in India-Delhi. With respect to lowest priced generic medicines, Mongolia's prices were higher than those in China, Russia-Tatarstan, and Delhi and very similar to those in Moldova.

### 7.3 International comparisons of private sector availability

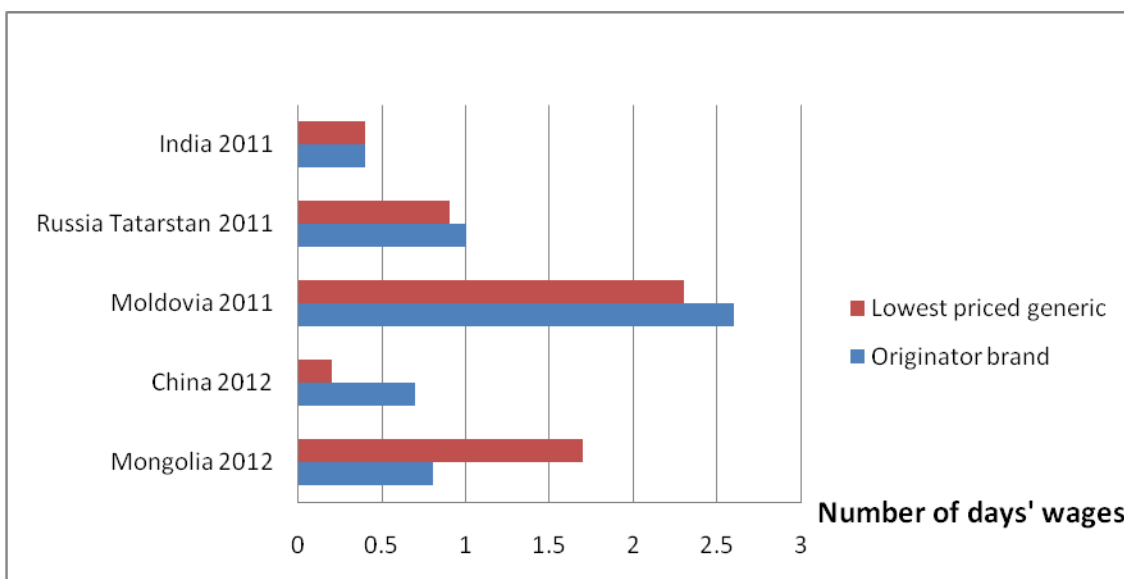
**Figure 5. Private sector mean availability of all survey medicines found in 5 countries**



The mean availability of originator brands in Mongolia was lower than in Russia-Tatarstan and India-Delhi, higher than in China-Shaanxi and very similar to Moldova. With respect to generic medicines, availability in Mongolia was lower than in Russia-Tatarstan, but higher than in China-Shaanxi, Moldova, and India-Delhi.

#### 7.4 International comparisons of private sector affordability

**Figure 6. Number of days' wages of the lowest paid government worker needed to buy Salbutamol, inhaler, 100mcg/dose for the treatment of Asthma (1 inhaler of 200doses) in the private sector**





The above figure shows that in the selected countries, treatment of Asthma using Salbutamol inhaler 100mcg/dose costs between 0.2 and 2.3 days' wages when lowest price generics are purchased from private pharmacies. In Mongolia the lowest paid unskilled government worker would need to spend 1.7 days' wages to purchase lowest price generics, which is more affordable than in Moldova but less affordable than in the other 3 countries. When the originator brand is purchased, the affordability ranges from 0.4 to 2.6 days' wages across the countries. In Mongolia, the lowest paid unskilled government worker would need to spend 0.8 days' wages to purchase the originator brand, which is similar to the affordability observed in most other countries except Moldova.

### 7.5 International comparisons of medicine price components

**Figure 7. Price components to final price for an imported generic salbutamol inhaler, urban private sector in 2 countries.**

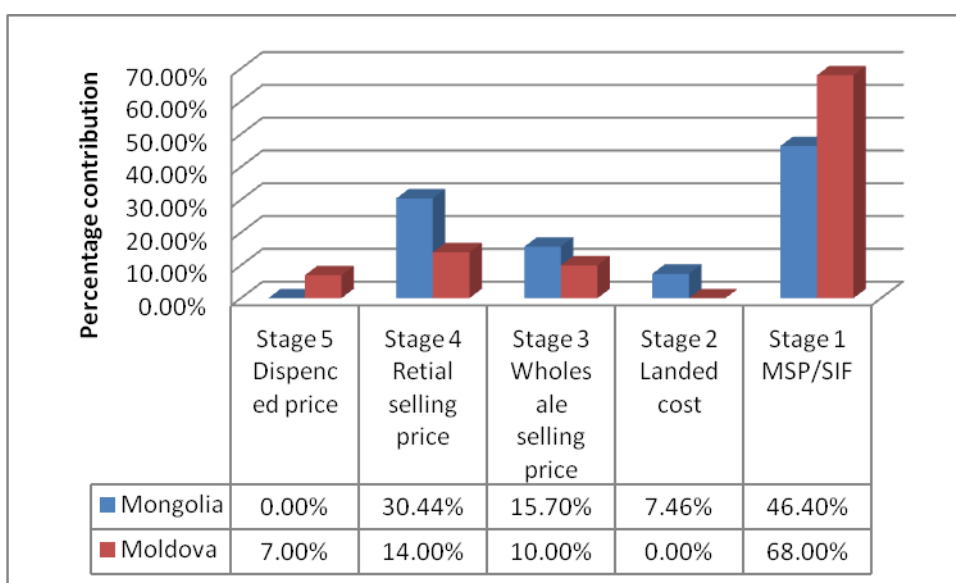


Figure 7 illustrates the price components in Mongolia and Moldova. In Mongolia the wholesale and retail mark-ups together contribute to 46.14% of the final price compared to 24% in Mongolia.

### Discussion

The Division of Pharmaceuticals and Medical Devices, Ministry of Health, Pharmacy School of Health Sciences University of Mongolia have carried out a nation-wide study to measure the availability and prices of 50 medicines in Mongolia using an international standardized methodology. Results indicate that in the public sector, the procurement of medicines is relatively inefficient, as shown by purchase prices higher than, international reference prices.

Availability of generic medicines in the public sector is poor. The average availability across all survey medicines was OB-3.7, MSG-20.8X%, LP-41.7% while the availability of medicines on the national EML was OB-4.3%, MSG-21.8%, LP-42.8%.

- Medicines with particularly low availability in the public sector include Cephalexin MSG and LPG (3.2% availability), Co-trimoxazole suspension MSG (3.2% availability), Erythromycin suspension MSG and LPG (3.2% availability).
- Given the low availability of medicines in the public sector, it can be concluded that most patients must purchase medicines from the private sector.
- Originator brand medicines are rarely in the public sector, however, this is only an issue where high quality generics are not available.

In the private sector, originator brands/generic equivalents were the predominant product type found. Mean availability in the private sector was 73.0% for lowest price generic medicines, Most sold generic medicines 48.5% and 22.4% for originator brands.

- Medicines with particularly low availability in the private sector include Albendazole LPG(2.9% availability), Cephalexin MSG and LPG(2.9% availability).

Final patient prices for lowest price generic medicines in the public sector are high. Lowest price generic medicines were priced at 2.11 times their international reference price, Most sold generic medicines were priced at 2.25 times their international reference price while the one originator brand medicine was priced at 1.33 times their international reference price. Compared with the public sector, private sector patient prices for medicines found in both sectors were, on average, higher i.e. OB-30% higher, MSG-82.5% and LPG-87.0%. Overall, in the private sector, lowest price generic medicines were 4.59 times their international reference price, most sold generic medicines were priced at 4.37 times their international reference price, and originator brand medicines were priced at 7.23 times their international reference price. The originator brand premium in the private sector is 7%, showing that patients are paying marginally more to purchase originator products as compared to lowest price generics.

- These results show that patients are paying significantly more for medicines in the private sector than in the public sector. Given the low availability in the public sector, this is a cause for concern.

In the public sector, half of lowest price generic medicines were priced between 1.72 and 4.52 times their international reference price, while half of most sold generic medicines were priced between 1.75 and 4.40 times their international reference price. In the private sector, half of lowest price generic medicines were priced between 3.56 and 7.72 times their international reference price, while half of Most sold generic medicines were priced between 3.58 and 8.08 times their international reference price while half of originator brand medicines were priced between 3.41 and 10.77 times their international reference price. These disparities suggest substantial variation in procurement efficiency and or price mark-ups between medicines.

The interquartile range for the median price ratios of individual medicines shows the variability in the medicine price across medicine outlets. In the public sector, results show a large amount of variation in price across outlets. In the private sector, a wide amount of variation in price across outlets is observed.

- The high degree of variability observed between outlets is likely the result of low market competition and the absence of price regulations.

In the public sector, the affordability of lowest price generics was reasonable for most conditions, with standard treatment costing a days' wage or less.

However, low public sector availability obliges many patients to purchase medicines from the private sector. In the private sector, the majority of treatments cost less than the daily wage of the lowest paid government worker when lowest price generics are used. The treatment of Hypertension Enalapril 10mg cap/tab 2 x30 days (2.5 days' wages), Hypercholesterolaemia Simvastatin 20mg cap/tab 1 x30 days (2.7 days' wages), Hypercholesterolaemia Atorvastatin 20mg cap/tab 1 x30days (4.0 days' wages) are clearly unaffordable even when generics are used. If originator brands and prescribed and dispensed, the lowest paid government worker would need to spend between 0.8 (Asthma Salbutamol 1 inhaler of 200doses ) to 0.9 (Peadiatric respiratory infection Co-trimoxazole suspension) days' wages to purchase medicines from the private sector. The majority of standard treatments are affordable when originator brand medicines are purchased in the private sector.

It should be noted that many people in Mongolia earn much less than the lowest government wage; as such even treatments which appear affordable are too costly for the poorest segments of the population. Given that 16.5% of the population are living below the international poverty line of less than \$1/day, even treatments which appear affordable are financially out-of-reach for a substantial number of people.

Add-on costs, such as import tariffs, taxes, and wholesale and retail mark-ups , contribute substantially to the final price of medicines. In the private sector, add-on costs represent 67.41-90.10% of the final patient price for imported originator brands, 71.06-115.53% for imported generics, and 74.42% for a locally produced generic. The largest contributor to add-on costs is 10% VAT. If this charge were removed, the cumulative mark-up would be reduced to 57.06-80.10% for imported originator brands, 61.06-105.53 % for imported generics, and 64.42% for locally produced generics.

More in-depth analysis, considering additional factors like size of the markets; capabilities of the national pharmaceutical manufacturing sector; the effect of taxes; duties and mark-ups at national and local levels; and economic indicators; is needed to reveal the reasons for variation between different countries. Such information can be useful for policymakers and governments in deciding whether any appropriate interventions can be made to make medicines more affordable and accessible in each country. Further studies and comparisons between high and low-income countries can also provide an evidence base for equity or differential pricing strategies by multinational manufacturers whereby less wealthy populations pay less than wealthier countries for essential medicines.

The results of this medicine price survey provide insight into the availability, price and affordability of medicines in Mongolia. The use of the WHO/HAI medicine prices survey has allowed for the measurement of medicine prices and availability in a reliable and standardized way that enables valid international comparisons to be made. A further strength of the methodology are the multiple steps taken to ensure data quality: training of survey personnel including a data collection pilot test; pairs of data collectors to cross-check results; double entry and verification of data into the computerized survey *Workbook*; data checker function in *Workbook* that identifies outlier or erroneous entries; and quality control checks at multiple stages.

Study results may be limited by the fact that data are inherently subject to outside influences such as market fluctuations and delivery schedules. In addition, the reliability of median price ratios is dependent on the number of supplier prices used to determine the median MSH international reference price of each medicine. In cases where very few supplier prices are available, or where

there is no supplier price and the buyer price is used as a proxy, MPR results can be skewed by a particularly high/low international reference price. A further limitation is that availability is determined for the list of survey medicines, and therefore does not account for the availability of alternate strengths or dosage forms, or of therapeutic alternatives. Finally, the methodology does not include informal sectors, such as markets and general stores, as the quality of the medicines found in such sectors cannot be assured.

## **Recommendations and conclusion**

The results of this preliminary analysis suggest that a mix of policies need to be implemented to make medicines more affordable and available. Although further investigation is required to obtain a more in-depth understanding of the causes and consequences of medicine pricing and availability, the results of this survey provide broad directions for future research and action. It is therefore recommended that the following steps be taken to improve medicine prices, availability and affordability.

### ***Availability***

1. Allocate the drug budget in an optimal manner and provide stable financing.
2. Accurately estimate the drug consumption based on demand and prevent drug shortages.
3. The Government should take measures to increase the drug budget

### ***Procurement***

1. Use of International Reference Prices as benchmark should be encouraged for ensuring lower procurement prices in the Government Sector.
2. Maintain and improve efficiency of public procurement system

### ***Pricing***

1. Overhauling of the pricing policy mechanism is required in order to achieve a greater level of transparency, uniformity and predictability in the pricing of medicines.
2. Development of a Medicines Price Index for monitoring and assessment of medicine prices on a regular basis.
3. Adopting a suitable pricing system with a view to further improve availability and affordability:

### ***Affordability***

1. To monitor and assess the Manufacturer's Selling Price with a view to improving access of medicines to the population.
2. Awareness creation and promotion of generic acceptance in the community and among the health professionals.
3. Providing adequate training for doctors to improve prescribing practices around cost effective generics.
4. Exempt VAT on essential medicines and consider recouping lost revenue by increasing taxes on unhealthy goods such as alcohol, cigarettes and sugary drinks.

The government should strengthen the pharmaceutical centralized public bidding mechanism (tenders) in order to lower medicine prices in the public sector. The pharmaceutical centralized public bidding mechanism should be more efficient.

There is a need for a pricing policy and to incorporate that pricing policy into the national drug policy.

The impact of policy changes should be measured by establishing a monitoring system to regularly monitor the price, availability and affordability of medicines.

This study has helped to provide broad insight into current issues related to the price, availability and affordability of key medicines for the treatment of common conditions. The results highlight priority areas for action for the Ministry of Health and others in improving access to affordable medicines. Broad debate and dialogue are now needed to identify how best different players can contribute to the prospect of enhancing accessibility and affordability to essential medicines.

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## Annex 1: List of Core and Supplementary Medicines

List	No	Disease	Name	Strength	Dosage form	Originator brand, Manufacturer
Global core list	1	Asthma	Salbutamol	100 mcg/dose	inhaler	Ventoline/GSK
	2	Diabetes	Glibenclamide	5 mg	cap/tab	Daonil/Sanofi-Aventis
	3	Cardiovascular disease	Atenolol	50 mg	cap/tab	Tenormin/AstraZeneca
	4	Cardiovascular disease	Captopril	25 mg	cap/tab	Capoten/BMS
	5	Cardiovascular disease	Simvastatin	20 mg	cap/tab	Zocor/MSD
	6	Infectious disease	Ciprofloxacin	500 mg	cap/tab	Ciproxin/Bayer
	7	Infectious disease	Co-trimoxazole	8+40 mg/ml	suspension	Bactrim/Roche
	8	Infectious disease	Amoxicillin	500 mg	cap/tab	Amoxil/GSK
	9	Infectious disease	Ceftriaxone	1 g/vial	injection	Rocephin/Roche
	10	Pain/inflammation	Diclofenac	50 mg	cap/tab	Voltarol/Novartis
	11	Pain/inflammation	Paracetamol	24 mg/ml	syrup/susp	Panadol/GSK
	12	Ulcer	Omeprazole	20 mg	cap/tab	Losec/AstraZeneca
Regional core list	13	Intestinal parasite	Albendazole	200 mg	cap/tab (non-chewable)	Zentel / GSK
	14	Hypertension	Amlodipine	5 mg	cap/tab	Norvasc /Pfizer
	15	Adult respiratory infection	Amoxicillin suspension	50 mg/ml (250mg/5ml)	millilitre	Amoxil / GSK
	16	Hypercholesterolemia	Atorvastatin	20 mg	cap/tab	Lipitor / Pfizer
	17	Asthma	Beclometasone inhaler	50mcg/dose	dose	Becotide / GSK
	18	Infectious disease	Cephalexin	250 mg	cap/tab	Keflex / Eli Lilly
	19	Hypertension	Enalapril	10 mg	cap/tab	Renitec / MSD
	20	Diabetes	Gliclazide	80 mg	cap/tab	Diamicon / Servier
	21	Hypertension	Hydrochlorothiazide	25 mg	cap/tab	Dichlotride / MSD

	22	Pain/inflammation	Ibuprofen	400 mg	cap/tab	Brufen / Knoll
	23	Diabetes	Metformin	500 mg	cap/tab	Glucophage / BMS
	24	Intestinal parasite	Albendazole	200 mg	cap/tab (non-chewable)	Zentel / GSK
	25	Hypertension	Amlodipine	5 mg	cap/tab	Norvasc /Pfizer
	26	Infectious disease	Metronidazole	200mg	cap/tab	Flagyl / Sanofi-Aventis
Supplementary list	27	Infectious disease	Clotrimazole topical cream	1%	gram	Canesten / Bayer
	28	Infectious disease	Erythromycin	250mg	cap/tab	Pantomicina / Abbott
	29	Antiallergics, anaphylaxis	Chlorphenamine	4mg	cap/tab	Piriton / GSK
	30	Infectious disease	Azithromycin	250mg	cap/tab	Zithromax / Pfizer
	31	Fungal infection	Fluconazole	150mg	cap/tab	Diflucan / Pfizer
	32	Viral infection	Aciclovir	200mg	cap/tab	Zovirax / GSK
	33	Cardiovascular disease	Digoxin	0.25mg	cap/tab	Lanoxin / GSK
	34	Infectious disease	Cefazolin	1g	vial	Kefzol / Eli Lilly
	35	Infectious disease	Chloramphenicol eye drops	0.5%	5ml bottle	Chloromycetin / Parke Davis
	36	Infectious disease	Doxycycline	100mg	cap/tab	<b>Vibramycin / Pfizer</b>
	37	Epilepsy	Carbamazepine	200mg	cap/tab	Tegretol / Novartis
	38	Antiallergics, anaphylaxis	Dexamethasone injection	4mg/ml	millilitre	Decadron / MSD
	39	Diuretics	Furosemide	40mg	cap/tab	Lasix / Sanofi-Aventis
	40	Paediatric respiratory infection	Co-trimoxazole tabs	80+400mg	cap/tab	Bactrim / Roche
	41	Infectious disease	Chloramphenicol caps	500mg	cap/tab	Chloromycetin / Parke Davis
	42	Infectious disease	Benzathine benzyl	2.4 IU/gr	vial	Penadur / Wyeth



		penicillin injection			
43	Adult respiratory infection	Amoxicillin	250mg	cap/tab	Amoxil / GSK
44	Fungal infection	Nystatin coated tablet	500.000 IU/gr	cap/tab	Mycostatin / BMS
45	Infectious disease	Tinidazol	500mg	cap/tab	Fasigyn / Pfizer
46	Infectious disease	Amoxicillin /Clavulanic acid	500mg+125mg	cap/tab	Augmentin / GSK
47	Peadiatric respiratory infection	Amoxicillin suspension peadiatric	25mg/ml	millilitre	Amoxil / GSK
48	Infectious disease	Erythromycin suspension	25mg/ml	cap/tab	Pantomicina / Abbott
49	Infectious disease	Spectinomycin	2 g	vial	Trobicin / Pharmacia / Upjohn
50	Infectious disease	Clarithromycin	250 mg	cap/tab	Biaxin / Abbott

## Annex 2. Medicine data collection form

Lowest priced generic equivalent product: determined at facility

A	B	C	D	E	F	G	H	I	J
Generic name, dosage form, strength	Medicine Type	Brand or product name(s)	Manufacturer	Available yes/no	Pack size recommended	Pack size found	Price of pack found	Unit price (4 decimal places)	Comments
Aciclovir 200 mg cap/tab	Originator brand				25			per cap/tab	no originator brand
	Most sold generic	Aciclovir-Akri	Akrihin		25			per cap/tab	
	Lowest-priced generic				25			per cap/tab	
Albendazole 200 mg cap/tab (non-chewable)	Originator brand				2			per cap/tab (non-chewable)	no originator brand
	Most sold generic	Zestaval	Remedica		2			per cap/tab (non-chewable)	
	Lowest-priced generic				2			per cap/tab (non-chewable)	
Amlodipine 5 mg cap/tab	Originator brand	Norvasc	Pfizer		30			per cap/tab	
	Most sold generic	Normodipin	Gedion Richter		30			per cap/tab	
	Lowest-priced generic				30			per cap/tab	
Amoxicillin 500 mg cap/tab	Originator brand				21			per cap/tab	no originator brand
	Most sold generic	Amoxicillin	NCPC		21			per cap/tab	
	Lowest-priced generic				21			per cap/tab	
Amoxicillin peadiatric 250 mg cap/tab	Originator brand				21			per cap/tab	no originator brand
	Most sold generic	Hiconcil	KRKA		21			per cap/tab	
	Lowest-priced generic				21			per cap/tab	

Amoxicillin suspension 50 mg/ml millilitre	Originator brand				100			per millilitre	no originator brand
	Most sold generic	Hiconcil	KRKA		100			per millilitre	
	Lowest-priced generic				100			per millilitre	
Amoxicillin suspension paediatric 25 mg/ml millilitre	Originator brand				100			per millilitre	no originator brand
	Most sold generic	Hiconcil	KRKA		100			per millilitre	
	Lowest-priced generic				100			per millilitre	
Amoxicillin+clavulanic acid 500 mg+125 mg cap/tab	Originator brand	Augmentin	GSK		21			per cap/tab	
	Most sold generic	Amoxiklav	Lek		21			per cap/tab	
	Lowest-priced generic				21			per cap/tab	
Atenolol 50 mg cap/tab	Originator brand				60			per cap/tab	no originator brand
	Most sold generic	Atenolol-Akri	Akrihin		60			per cap/tab	
	Lowest-priced generic				60			per cap/tab	
Atorvastatin 20 mg cap/tab	Originator brand				30			per cap/tab	no originator brand
	Most sold generic	Atoris	KRKA		30			per cap/tab	
	Lowest-priced generic				30			per cap/tab	
Azithromycin 250 mg cap/tab	Originator brand				6			per cap/tab	no originator brand
	Most sold generic	Azitron	Monospharm		6			per cap/tab	
	Lowest-priced generic				6			per cap/tab	
Beclometasone inhaler 50 mcg/dose dose	Originator brand				200			per dose	no originator brand
	Most sold generic	Beklat	Cipla		200			per dose	
	Lowest-priced generic				200			per dose	

Benzathine benzyl penicillin injection 2.4 MIU/ml millilitre	Originator brand				1			per millilitre	no originator brand
	Most sold generic	Benzathine benzyl penicillin	NPCPC		1			per millilitre	
	Lowest-priced generic				1			per millilitre	
Captopril 25 mg cap/tab	Originator brand				60			per cap/tab	no originator brand
	Most sold generic	Captopril	Sopharm		60			per cap/tab	
	Lowest-priced generic				60			per cap/tab	
Carbamazepine 200 mg cap/tab	Originator brand				100			per cap/tab	no originator brand
	Most sold generic	Carbamazepine -Akri	Akrihin		100			per cap/tab	
	Lowest-priced generic				100			per cap/tab	
Cefazolin 1 g vial	Originator brand				1			per vial	no originator brand
	Most sold generic	Cefazolin	Kraspharm		1			per vial	
	Lowest-priced generic				1			per vial	
Cefriaxone injection 1 g/vial vial	Originator brand				1			per vial	no originator brand
	Most sold generic	Cefriaxone	NPCPC		1			per vial	
	Lowest-priced generic				1			per vial	
Cephalexin 250 mg cap/tab	Originator brand				28			per cap/tab	no originator brand
	Most sold generic	Towa	Towapharm		28			per cap/tab	
	Lowest-priced generic				28			per cap/tab	
Chloramphenicol 500 mg cap/tab	Originator brand				10			per cap/tab	no originator brand

	Most sold generic	Chloramphenicol	Gambapharm		10			per cap/tab	
	Lowest-priced generic				10			per cap/tab	
Chloramphenicol eye drops 0.5% millilitre	Originator brand				5			per millilitre	no originator brand
	Most sold generic	Levomecitin-Akos	Sintez		5			per millilitre	
	Lowest-priced generic				5			per millilitre	
Chlorphenamine maleate 4 mg cap/tab	Originator brand				30			per cap/tab	no originator brand
	Most sold generic	Chlorphenamine	Monospharm		30			per cap/tab	
	Lowest-priced generic				30			per cap/tab	
Ciprofloxacin 500 mg cap/tab	Originator brand				10			per cap/tab	no originator brand
	Most sold generic	Ciprofloxacin	NCPC		10			per cap/tab	
	Lowest-priced generic				10			per cap/tab	
Clarithromycin 250 mg cap/tab	Originator brand				14			per cap/tab	no originator brand
	Most sold generic	Clarid	Kalbe Pharm		14			per cap/tab	
	Lowest-priced generic				14			per cap/tab	
Clotrimazole topical cream 1% gram	Originator brand				20			per gram	no originator brand
	Most sold generic	Clotrimazole topical cream	Antbiotice		20			per gram	
	Lowest-priced generic				20			per gram	
Co-trimoxazole 80+400 mg cap/tab	Originator brand	Bactrim	Roche		28			per cap/tab	
	Most sold generic	Co-trimoxazole	NCPC		28			per cap/tab	

	Lowest-priced generic				28			per cap/tab	
Co-trimoxazole suspension 8+40 mg/ml millilitre	Originator brand	Bactrim	Roche		100			per millilitre	
	Most sold generic	Co-trimoxazole	NPCPC		100			per millilitre	
	Lowest-priced generic				100			per millilitre	
Dexamethasone injection 4 mg/ml millilitre	Originator brand				1			per millilitre	no originator brand
	Most sold generic	Dexamethasone	KRKA		1			per millilitre	
	Lowest-priced generic				1			per millilitre	
Diclofenac 50 mg cap/tab	Originator brand				100			per cap/tab	no originator brand
	Most sold generic	Diclo-Denk	Denk Pharm		100			per cap/tab	
	Lowest-priced generic				100			per cap/tab	
Digoxin 0.25 mg cap/tab	Originator brand				10			per cap/tab	no originator brand
	Most sold generic	Digoxin	Moshimpharm		10			per cap/tab	
	Lowest-priced generic				10			per cap/tab	
Doxycycline 100 mg cap/tab	Originator brand				10			per cap/tab	no originator brand
	Most sold generic	Doxycycline	Belmedpreparat		10			per cap/tab	
	Lowest-priced generic				10			per cap/tab	
Enalapril 10 mg cap/tab	Originator brand				30			per cap/tab	no originator brand
	Most sold generic	Enap	KRKA		30			per cap/tab	
	Lowest-priced generic				30			per cap/tab	
Erythromycin 250 mg cap/tab	Originator brand				28			per cap/tab	no originator brand
	Most sold generic				28			per cap/tab	

	Lowest-priced generic				28			per cap/tab	
Erythromycin suspension 25 mg/ml millilitre	Originator brand				100			per millilitre	no originator brand
	Most sold generic	Profyricin	Medochemie		100			per millilitre	
	Lowest-priced generic				100			per millilitre	
Fluconazole 150 mg cap/tab	Originator brand	Diflucan	Pfizer		1			per cap/tab	
	Most sold generic	Funginob	Noble Healthcare		1			per cap/tab	
	Lowest-priced generic				1			per cap/tab	
Furosemide 40 mg cap/tab	Originator brand				30			per cap/tab	no originator brand
	Most sold generic	Furosemide	Monospharm		30			per cap/tab	
	Lowest-priced generic				30			per cap/tab	
Glibenclamide 5 mg cap/tab	Originator brand				60			per cap/tab	no originator brand
	Most sold generic	Mannil-5	Berlin-Chemie		60			per cap/tab	
	Lowest-priced generic				60			per cap/tab	
Gliclazide 80 mg cap/tab	Originator brand				100			per cap/tab	no originator brand
	Most sold generic	Glidabet	Kalbe Pharm		100			per cap/tab	
	Lowest-priced generic				100			per cap/tab	
Hydrochlorothiazide 25 mg cap/tab	Originator brand				30			per cap/tab	no originator brand
	Most sold generic	Gipotiazid	Incepta		30			per cap/tab	
	Lowest-priced generic				30			per cap/tab	
Ibuprofen 400 mg cap/tab	Originator brand				30			per cap/tab	no originator brand
	Most sold generic	Ibuprofen	NPCPC		30			per cap/tab	

	Lowest-priced generic				30			per cap/tab	
Metformin 500 mg cap/tab	Originator brand				100			per cap/tab	no originator brand
	Most sold generic	Metformin-Denk	Denk Pharm		100			per cap/tab	
	Lowest-priced generic				100			per cap/tab	
Metronidazole 200 mg cap/tab	Originator brand				28			per cap/tab	no originator brand
	Most sold generic	Metronidazole	NCPC		28			per cap/tab	
	Lowest-priced generic				28			per cap/tab	
Nifedipine Retard 20 mg tab	Originator brand				30			per tab	no originator brand
	Most sold generic	Nifedi-Denk	Denk Pharm		30			per tab	
	Lowest-priced generic				30			per tab	
Nystatin 500.000 IU cap/tab	Originator brand				20			per cap/tab	no originator brand
	Most sold generic	Nystatin	Belmedpreparat		20			per cap/tab	
	Lowest-priced generic				20			per cap/tab	
Omeprazole 20 mg cap/tab	Originator brand				30			per cap/tab	no originator brand
	Most sold generic	Promez	Protech Biosystems		30			per cap/tab	
	Lowest-priced generic				30			per cap/tab	
Paracetamol suspension 24 mg/ml mililitre	Originator brand	Panadol	GSK		60			per mililitre	
	Most sold generic	Paracetamol	Insepta		60			per mililitre	
	Lowest-priced generic				60			per mililitre	
Ranitidine 150 mg cap/tab	Originator brand				60			per cap/tab	no originator brand
	Most sold generic	Ranitidine	Sopharm		60			per cap/tab	



	Lowest-priced generic				60			per cap/tab	
Salbutamol inhaler 100 mcg/dose dose	Originator brand	Ventoline	GSK		200			per dose	
	Most sold generic	Salbutamol	Altaivitamin		200			per dose	
	Lowest-priced generic				200			per dose	
Simvastatin 20 mg cap/tab	Originator brand				30			per cap/tab	no originator brand
	Most sold generic	Sinba-Denk	Denk Pharm		30			per cap/tab	
	Lowest-priced generic				30			per cap/tab	
Spectinomycin 2 g vial	Originator brand				1			per vial	no originator brand
	Most sold generic	Kirin	Medochemie		1			per vial	
	Lowest-priced generic				1			per vial	
Tinidazole 500 mg cap/tab	Originator brand				4			per cap/tab	no originator brand
	Most sold generic	Ericon	T.O.Pharm		4			per cap/tab	
	Lowest-priced generic				4			per cap/tab	

### Annex 3. Availability of individual medicines, public, RDF and private sector

Medicine Name	National EML (yes/no)	% outlets where medicine was found Public sector (31 = X outlets )			% outlets where medicine was found Private sector (n = 35 outlets)			% outlets where medicine was found RDF sector (n = 20 outlets)		
		Original brand	Lowest price generic	Most sold generic	Original brand	Lowest price generic	Most sold generic	Original brand	Lowest price generic	Most sold generic
Aciclovir	yes		71.0%	67.7%		100.0%	97.1%		95.0%	95.0%
Albendazole	yes		0.0%	0.0%		2.9%	0.0%		0.0%	0.0%
Amlodipine	yes	0.0%	41.9%	22.6%	2.9%	94.3%	85.7%	0.0%	95.0%	85.0%
Amoxicillin	yes		77.4%	32.3%		100.0%	54.3%		100.0%	20.0%
Amoxicillin paediatric	yes		54.8%	3.2%		94.3%	31.4%		100.0%	5.0%
Amoxicillin suspension	yes		6.5%	3.2%		68.6%	65.7%		25.0%	25.0%
Amoxicillin suspension paediatric	yes		22.6%	9.7%		100.0%	97.1%		55.0%	40.0%
Amoxicillin+clavulanic acid	yes	3.2%	22.6%	19.4%	28.6%	60.0%	54.3%	10.0%	20.0%	20.0%
Atenolol	yes		61.3%	29.0%		100.0%	60.0%		90.0%	35.0%
Atorvastatin	yes		0.0%	0.0%		20.0%	20.0%		0.0%	0.0%
Azithromycin	yes		38.7%	19.4%		97.1%	71.4%		70.0%	60.0%
Beclometasone inhaler	yes		0.0%	0.0%		0.0%	0.0%		0.0%	0.0%
Benzathine benzyl penicillin injection	yes		38.7%	32.3%		94.3%	91.4%		85.0%	65.0%
Captopril	yes		58.1%	0.0%		100.0%	51.4%		95.0%	45.0%
Carbamazepine	yes		83.9%	35.5%		82.9%	48.6%		100.0%	30.0%
Cefazolin	yes		90.3%	87.1%		97.1%	68.6%		100.0%	85.0%
Ceftriaxone injection	yes		35.5%	9.7%		60.0%	8.6%		35.0%	0.0%
Cephalexin	yes		3.2%	3.2%		2.9%	2.9%		0.0%	0.0%
Chloramphenicol	yes		71.0%	22.6%		97.1%	17.1%		100.0%	25.0%
Chloramphenicol eye drops	yes		12.9%	9.7%		71.4%	51.4%		35.0%	15.0%
Chlorphenamine maleate	yes		87.1%	71.0%		97.1%	91.4%		100.0%	85.0%
Ciprofloxacin	yes		80.6%	22.6%		97.1%	28.6%		95.0%	10.0%
Clarithromycin	yes		12.9%	6.5%		68.6%	20.0%		25.0%	5.0%
Clotrimazole topical cream	yes		22.6%	0.0%		88.6%	40.0%		50.0%	0.0%
Co-trimoxazole	yes	0.0%	74.2%	22.6%	2.9%	94.3%	45.7%	0.0%	80.0%	20.0%
Co-trimoxazole suspension	yes	0.0%	0.0%	3.2%	14.3%	51.4%	37.1%	5.0%	15.0%	10.0%
Dexamethasone injection	yes		93.5%	16.1%		97.1%	74.3%		100.0%	20.0%
Diclofenac	yes		64.5%	32.3%		97.1%	85.7%		100.0%	65.0%
Digoxin	yes		74.2%	74.2%		68.6%	68.6%		85.0%	85.0%
Doxycycline	yes		61.3%	19.4%		97.1%	42.9%		95.0%	15.0%
Enalapril	yes		74.2%	45.2%		97.1%	97.1%		100.0%	90.0%
Erythromycin	no		61.3%	12.9%		97.1%	11.4%		80.0%	15.0%
Erythromycin suspension	no		3.2%	3.2%		48.6%	48.6%		20.0%	20.0%
Fluconazole	no	0.0%	9.7%	0.0%	5.7%	60.0%	20.0%	0.0%	5.0%	0.0%
Furosemide	yes		58.1%	41.9%		94.3%	57.1%		100.0%	80.0%
Glibenclamide	yes		6.5%	6.5%		28.6%	28.6%		20.0%	20.0%
Gliclazide	yes		12.9%	6.5%		28.6%	28.6%		10.0%	10.0%
Hydrochlorothiazide	yes		29.0%	0.0%		62.9%	11.4%		45.0%	0.0%
Ibuprofen	yes		83.9%	61.3%		97.1%	62.9%		95.0%	60.0%
Metformin	yes		25.8%	16.1%		65.7%	54.3%		20.0%	20.0%
Metronidazole	yes		83.9%	9.7%		97.1%	60.0%		100.0%	25.0%
Nifedipine Retard	yes		0.0%	0.0%		42.9%	42.9%		15.0%	15.0%
Nystatin	yes		71.0%	71.0%		91.4%	88.6%		80.0%	80.0%
Omeprazole	yes		83.9%	29.0%		100.0%	62.9%		95.0%	25.0%
Paracetamol suspension	yes	0.0%	0.0%	0.0%	65.7%	5.7%	5.7%	20.0%	0.0%	0.0%
Ranitidine	yes		71.0%	25.8%		94.3%	37.1%		95.0%	40.0%
Salbutamol inhaler	yes	22.6%	35.5%	32.3%	37.1%	25.7%	25.7%	20.0%	10.0%	10.0%
Simvastatin	yes		6.5%	6.5%		68.6%	68.6%		30.0%	30.0%
Spectinomycin	yes		9.1%	0.0%		80.0%	51.4%		35.0%	10.0%
Tinidazole	yes		0.0%	0.0%		65.7%	48.6%		25.0%	20.0%

**Annex 4. Median Price Ratios, public sector procurement prices**  
(where medicines found in at least one outlet)

Medicine Name	Originator brand MPR (25 <sup>th</sup> , 75 <sup>th</sup> %iles)	Lowest price generic MPR (25 <sup>th</sup> , 75 <sup>th</sup> %iles)	Most sold generic MPR (25 <sup>th</sup> , 75 <sup>th</sup> %iles)
Aciclovir		2.25 (2.12, 2.37)	2.22 (2.08, 2.25)
Albendazole			
Amlodipine		6.22 (5.97, 6.81)	
Amoxicillin		1.57 (1.40, 1.67)	1.57 (1.49, 1.59)
Amoxicillin paediatric		1.72 (1.56, 1.78)	
Amoxicillin suspension			
Amoxicillin suspension paediatric			
Amoxicillin+clavulanic acid		2.52 (1.28, 3.19)	2.52 (1.66, 3.19)
Atenolol		3.04 (2.81, 5.62)	2.93 (2.53, 3.25)
Atorvastatin			
Azithromycin		1.27 (0.78, 2.03)	
Beclometasone inhaler			
Benzathine benzyl penicillin injection		1.49 (1.24, 1.74)	1.61 (1.43, 1.74)
Captopril		1.98 (1.83, 2.97)	
Carbamazepine		2.24 (2.05, 2.50)	2.24 (2.15, 3.37)
Cefazolin		0.22 (0.22, 0.22)	0.22 (0.22, 0.22)
Ceftriaxone injection		0.83 (0.74, 1.18)	
Cephalexin			
Chloramphenicol		1.19 (1.05, 1.41)	
Chloramphenicol eye drops		1.85 (1.61, 2.12)	
Chlorphenamine maleate		9.68 (7.96, 10.75)	10.75 (8.82, 10.85)
Ciprofloxacin		2.09 (1.97, 2.51)	2.09 (2.07, 2.40)
Clarithromycin		2.26 (2.18, 3.70)	
Clotrimazole topical cream			
Co-trimoxazole		1.16 (1.16, 1.29)	1.19 (1.11, 1.23)
Co-trimoxazole suspension			
Dexamethasone injection		1.99 (1.84, 2.06)	
Diclofenac		2.82 (2.69, 4.10)	
Digoxin		5.20 (4.13, 5.61)	5.20 (4.13, 5.61)
Doxycycline		1.75 (1.72, 1.86)	
Enalapril		2.97 (2.39, 5.50)	
Erythromycin		2.40 (1.80, 2.80)	
Erythromycin suspension			
Fluconazole			
Furosemide		2.24 (2.06, 2.24)	2.24 (2.03, 2.25)
Glibenclamide			
Gliclazide		1.43 (1.26, 2.23)	
Hydrochlorothiazide		25.40 (16.09, 31.56)	
Ibuprofen		5.01 (4.59, 5.36)	5.22 (5.01, 5.43)
Metformin		2.66 (2.34, 3.60)	3.60 (2.66, 3.60)
Metronidazole		1.40 (1.21, 1.53)	
Nifedipine Retard			
Nystatin		0.55 (0.55, 0.61)	0.55 (0.55, 0.61)
Omeprazole		2.39 (2.34, 2.44)	
Paracetamol suspension			
Ranitidine		1.59 (1.18, 1.74)	
Salbutamol inhaler		2.21 (1.70, 2.58)	2.40 (1.94, 2.58)
Simvastatin		5.02 (3.86, 5.54)	5.02 (3.86, 5.54)
Spectinomycin			
Tinidazole			

### Annex 5. Median Price Ratios, public sector patient prices

Medicine Name	Originator brand MPR (25 <sup>th</sup> , 75 <sup>th</sup> %iles)	Lowest price generic MPR (25 <sup>th</sup> , 75 <sup>th</sup> %iles)	Most sold generic MPR (25 <sup>th</sup> , 75 <sup>th</sup> %iles)
Aciclovir		2.25 (2.05, 2.25)	2.25 (2.05, 2.25)
Albendazole			
Amlodipine		6.81 (5.97, 7.30)	7.27 (6.86, 8.29)
Amoxicillin		1.80 (1.57, 1.80)	1.80 (1.67, 1.80)
Amoxicillin peadiatric		1.72 (1.42, 2.14)	
Amoxicillin suspension			
Amoxicillin suspension peadiatric		4.73 (3.78, 4.73)	
Amoxicillin+clavulanic acid		3.19 (1.96, 3.30)	2.64 (1.91, 3.19)
Atenolol		5.62 (2.95, 6.33)	6.33 (3.87, 6.33)
Atorvastatin			
Azithromycin		1.34 (0.95, 2.05)	0.95 (0.94, 0.95)
Beclometasone inhaler			
Benzathine benzyl penicillin injection		1.74 (1.74, 1.77)	1.74 (1.74, 1.74)
Captopril		1.88 (1.51, 4.20)	
Carbamazepine		2.15 (2.05, 2.24)	2.24 (1.74, 2.37)
Cefazolin		0.23 (0.22, 0.25)	0.24 (0.22, 0.25)
Cefriaxone injection		0.74 (0.74, 0.93)	
Cephalexin			
Chloramphenicol		1.63 (1.14, 1.68)	1.68 (1.47, 1.68)
Chloramphenicol eye drops		2.02 (1.94, 2.12)	
Chlorphenamine maleate		10.75 (7.96, 12.35)	11.45 (10.75, 12.35)
Ciprofloxacin		2.07 (1.75, 2.51)	2.07 (2.07, 2.23)
Clarithromycin		2.80 (2.19, 3.49)	
Clotrimazole topical cream		4.45 (4.45, 7.17)	
Co-trimoxazole		1.61 (1.19, 1.61)	1.61 (1.19, 1.61)
Co-trimoxazole suspension			
Dexamethasone injection		1.19 (1.87, 2.26)	2.58 (2.58, 2.58)
Diclofenac		6.14 (2.82, 9.41)	12.80 (11.52, 12.80)
Digoxin		5.31 (4.74, 6.03)	5.31 (4.74, 6.03)
Doxycycline		1.86 (1.63, 2.86)	1.86 (1.63, 2.30)
Enalapril		6.69 (2.51, 9.37)	9.37 (7.36, 9.51)
Erythromycin		2.40 (2.20, 2.95)	2.40 (2.40, 2.4)
Erythromycin suspension			
Fluconazole			
Furosemide		2.24 (2.06, 2.53)	2.06 (2.06, 2.24)
Glibenclamide			
Gliclazide		1.43 (1.26, 2.23)	
Hydrochlorothiazide		10.29 (10.29, 24.93)	
Ibuprofen		4.87 (4.18, 5.36)	4.87 (4.18, 5.36)
Metformin		2.83 (2.53, 3.30)	3.00 (2.66, 3.60)
Metronidazole		1.70 (1.37, 1.82)	
Nifedipine Retard			
Nystatin		0.60 (0.55, 0.97)	0.60 (0.55, 0.97)
Omeprazole		2.41 (2.39, 2.44)	2.41 (2.04, 2.45)
Paracetamol suspension			
Ranitidine		1.71 (1.53, 1.82)	1.66 (1.54, 1.89)
Salbutamol inhaler	1.33 (1.33, 1.53)	1.84 (1.84, 2.58)	2.10 (1.84, 2.58)
Simvastatin			
Spectinomycin			
Tinidazole			

### Annex 6. Median Price Ratios, RDF sector patient prices

Medicine Name	Originator brand MPR (25 <sup>th</sup> , 75 <sup>th</sup> %iles)	Lowest price generic MPR (25 <sup>th</sup> , 75 <sup>th</sup> %iles)	Most sold generic MPR (25 <sup>th</sup> , 75 <sup>th</sup> %iles)
Aciclovir		4.61 (4.10, 5.12)	4.61 (4.10, 5.12)
Albendazole			
Amlodipine		10.16 (9.36, 11.95)	11.55 (9.96, 11.95)
Amoxicillin		3.37 (3.31, 3.60)	3.37 (3.31, 3.37)
Amoxicillin peadiatric		4.45 (3.12, 5.34)	
Amoxicillin suspension		7.17 (7.17, 7.17)	7.17 (7.17, 7.17)
Amoxicillin suspension peadiatric		9.29 (7.80, 9.69)	9.29 (8.89, 10.55)
Amoxicillin+clavulanic acid		3.74 (3.31, 4.04)	3.74 (3.31, 4.04)
Atenolol		7.03 (7.03, 1054)	7.03 (7.03, 7.03)
Atorvastatin			
Azithromycin		1.44 (1.33, 2.08)	1.42 (1.30, 1.62)
Beclometasone inhaler			
Benzathine benzyl penicillin injection		3.72 (3.06, 3.94)	3.72 (2.98, 3.94)
Captopril		4.94 (3.09, 7.04)	5.44 (3.46, 5.56)
Carbamazepine		4.85 (4.39, 5.04)	4.67 (3.92, 5.41)
Cefazolin		0.54 (0.45, 0.54)	0.54 (0.45, 0.54)
Cefriaxone injection		3.81 (3.81, 4.63)	
Cephalexin			
Chloramphenicol		2.52 (2.31, 3.15)	2.31 (2.31, 2.31)
Chloramphenicol eye drops		4.30 (3.58, 4.66)	
Chlorphenamine maleate		15.93 (15.93, 17.92)	15.93 (15.93, 17.92)
Ciprofloxacin		4.59 (3.93, 5.46)	
Clarithromycin		1.98 (1.78, 2.69)	
Clotrimazole topical cream		7.42 (4.94, 12.61)	
Co-trimoxazole		2.58 (2.50, 3.23)	2.58 (2.50, 2.58)
Co-trimoxazole suspension			
Dexamethasone injection		3.87 (3.18, 4.19)	3.61 (3.14, 4.19)
Diclofenac		12.16 (10.24, 19.20)	19.20 (19.20, 19.20)
Digoxin		8.43 (6.75, 8.43)	8.43 (6.75, 8.43)
Doxycycline		5.83 (4.66, 5.83)	
Enalapril		14.34 (10.57, 14.93)	14.34 (14.34, 16.49)
Erythromycin		3.60 (3.15, 3.93)	
Erythromycin suspension		7.00 (6.59, 7.00)	7.00 (6.59, 7.00)
Fluconazole			
Furosemide		4.48 (3.92, 5.97)	4.48 (3.92, 5.97)
Glibenclamide		8.53 (8.53, 8.53)	8.53 (8.53, 8.53)
Gliclazide			
Hydrochlorothiazide		32.73 (32.73, 38.96)	
Ibuprofen		10.44 (9.05, 10.44)	9.05 (9.05, 10.44)
Metformin		6.61 (6.31, 6.91)	6.61 (6.31, 6.91)
Metronidazole		3.64 (3.64, 4.25)	3.64 (3.64, 4.25)
Nifedipine Retard			
Nystatin		1.55 (1.34, 2.43)	1.55 (1.34, 2.43)
Omeprazole		5.62 (5.28, 6.89)	5.62 (5.62, 5.90)
Paracetamol suspension	10.49 (10.18, 11.15)		
Ranitidine		3.05 (3.05, 3.36)	3.05 (3.05, 3.05)
Salbutamol inhaler	1.74 (1.63, 1.83)		
Simvastatin		7.03 (6.68, 7.23)	7.03 (6.68, 7.23)
Spectinomycin		1.70 (1.52, 1.86)	
Tinidazole		9.14 (8.23, 11.43)	10.29 (8.57, 11.43)

## Annex 7. Median Price Ratios, private sector patient prices

Medicine Name	Originator brand MPR (25th, 75th %iles)	Lowest price generic MPR (25th, 75th %iles)	Most Sold generic MPR (25th, 75th %iles)
Aciclovir		4.10 (3.43, 4.10)	4.10 (3.41, 4.10)
Albendazole			
Amlodipine		8.82 (7.96, 9.71)	9.96 (9.96, 10.95)
Amoxicillin		3.37 (3.15, 3.37)	3.37 (3.29, 3.37)
Amoxicillin paediatric		3.56 (3.56, 4.01)	11.13 (9.74, 11.13)
Amoxicillin suspension		7.44 (6.78, 7.72)	7.72 (6.43, 7.72)
Amoxicillin suspension paediatric		9.29 (9.16, 10.62)	9.35 (9.29, 10.62)
Amoxicillin+clavulanic acid	3.97 (3.80, 4.11)	3.63 (3.19, 4.26)	3.83 (3.51, 4.58)
Atenolol		7.03 (7.03, 8.43)	7.03 (6.33, 8.43)
Atorvastatin		4.01 (3.48, 4.23)	4.01 (3.48, 4.23)
Azithromycin		1.58 (1.42, 2.03)	1.42 (1.42, 1.62)
Beclometasone inhaler			
ine benzyl penicillin injection		3.10 (2.98, 3.72)	3.14 (2.98, 3.72)
Captopril		2.97 (2.97, 3.96)	3.71 (3.46, 3.96)
Carbamazepine		3.73 (3.73, 4.11)	3.73 (3.73, 4.11)
Cefazolin		0.47 (0.45, 0.54)	0.45 (0.45, 0.54)
Ceftriaxone injection		5.44 (2.99, 6.53)	
Cephalexin			
Chloramphenicol		2.52 (2.15, 2.71)	2.42 (2.15, 2.52)
Chloramphenicol eye drops		3.58 (2.03, 3.58)	3.58 (3.58, 3.94)
Chlorphenamine maleate		15.93 (15.93, 18.47)	15.93 (15.93, 17.92)
Ciprofloxacin		4.70 (4.37, 5.46)	4.37 (4.04, 5.19)
Clarithromycin		3.56 (3.32, 5.29)	3.56 (3.36, 3.56)
Clotrimazole topical cream		8.24 (5.60, 14.21)	6.26 (5.69, 8.24)
Co-trimoxazole		2.91 (2.58, 3.23)	2.58 (2.50, 2.91)
Co-trimoxazole suspension	11.60 (10.54, 11.95)	6.44 (5.86, 7.03)	6.56 (5.86, 7.03)
Dexamethasone injection		3.87 (3.55, 4.19)	3.87 (3.55, 4.24)
Diclofenac		9.41 (6.40, 15.36)	19.20 (19.20, 19.20)
Digoxin		8.08 (6.75, 8.43)	8.08 (6.75, 8.43)
Doxycycline		5.83 (4.74, 5.83)	5.83 (5.83, 5.83)
Enalapril		13.50 (5.97, 14.34)	14.34 (13.86, 14.34)
Erythromycin		4.00 (3.60, 4.14)	4.10 (3.90, 4.26)
Erythromycin suspension		7.00 (6.46, 7.00)	7.00 (6.46, 7.00)
Fluconazole		81.86 (52.62, 116.94)	76.01 (70.16, 84.78)
Furosemide		4.48 (3.48, 4.48)	4.23 (3.48, 4.48)
Glibenclamide		8.53 (8.53, 8.53)	8.53 (8.53, 8.53)
Gliclazide		1.72 (1.52, 1.83)	1.72 (1.52, 1.83)
Hydrochlorothiazide		50.52 (36.04, 46.75)	27.27 (15.58, 48.70)
Ibuprofen		9.05 (8.35, 10.44)	8.39 (8.35, 9.05)
Metformin		6.01 (4.81, 6.01)	6.01 (5.21, 6.01)
Metronidazole		3.64 (3.19, 4.25)	3.64 (3.04, 4.25)
Nifedipine Retard		5.45 (4.97, 5.73)	5.45 (4.97, 5.73)
Nystatin		1.16 (1.10, 1.38)	1.10 (1.10, 1.38)
Omeprazole		5.06 (4.83, 5.62)	5.06 (4.57, 5.48)
Paracetamol suspension	10.49 (10.49, 11.36)		
Ranitidine		2.75 (2.44, 3.05)	3.05 (2.44, 3.05)
Salbutamol inhaler	1.73 (1.66, 1.83)	3.69 (3.69, 4.42)	3.69 (3.69, 4.42)
Simvastatin		7.23 (6.54, 7.68)	7.23 (6.63, 7.83)
Spectinomycin		1.55 (1.53, 1.86)	1.66 (1.55, 1.86)
Tinidazole		9.14 (7.89, 10.74)	9.14 (8.23, 11.43)